

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING, 650 SOUTH KING STREET, 3RD FLOOR, HONOLULU, HAWAII 96813
TELEPHONE: (808)523-4529 • FAX: (808)523-4730 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR



CHERYL D. SOON
DIRECTOR

GEORGE "KEOKI" MIYAMOTO
DEPUTY DIRECTOR

TE

August 5, 2003

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Subject: Findings of No Significant Impact (FONSI) for Kawai Nui Pathway
Environmental Assessment (EA)
Kailua, Oahu, Hawaii
TMK: 4-2-13: 5, 10, 22, 38; 4-2-15: Por. 6; 4-2-16: 1, 5, 6; 4-2-103:18

The Department of Transportation Services has reviewed the comments received during the 30-day public comment period for the above project, which began on May 23, 2002. The agency has determined that this project will not have significant environmental effects and has issued a FONSI. Please publish this Notice in the August 23, 2003 Environmental Notice.

We have enclosed a complete OEQC Publication Form and four copies of the final EA.

Please contact Mike Kato of my staff at 523-4622 if you have any questions.

Sincerely,

Handwritten signature of Cheryl D. Soon in cursive.

CHERYL D. SOON
Director

OFFICE OF ENVIRONMENTAL
QUALITY CONTROL

03 AUG -6 P1:55

Enclosures

cc: Helber Hastert & Fee

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Helber Hastert & Fee
Planners, Inc

Mr. Robert J. Gornstein, Ph.D.
July 18, 2003
Page 2

move the planning process forward. The completion of the *Kawai Nui Marsh Master Plan* (Department of Land and Natural Resources, July 1994) in 1994 was a clear blueprint for the implementation of public facilities in and around the marsh. The identification of the pathway project as a high priority of the Kailua Vision Team was a logical extension of the planning process for these facilities. The Windward community has long sought better management of and access to Kawai Nui Marsh. The proposed pathway is one element of this vision.

Certainly, there is always an element in any community that chooses not to abide by the accepted rules of the community. Any publicly-owned facility is susceptible to acts of vandalism (trashing, graffiti, etc.). We do not believe that the potential of acts by these thoughtless individuals should prevent the construction of new public facilities. Rather, we need to build adequate security and maintenance measures into the design and operation of the facility. We are confident that these issues will continue to be discussed as Kawai Nui improvements move through the permit approval process.

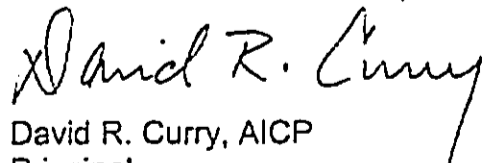
Every effort should be made to ensure that homes near the proposed pathway are protected from unwanted intrusions. Specific measures include closing parking lots after dark, providing ample distances and vegetative buffers between the pathway and residences, and providing fencing, where appropriate.

We encourage you to stay involved with the planning process in your community and to discuss your concerns with public agencies that are involved in the permitting process and the final design and operation of the pathway.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners



David R. Curry, AICP
Principal

C: Cheryl Soon

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Jun-18-02 09:53A Traffic Engineering Div

808 523 4621

P.02

7/14/02 - 2747

BENJAMIN J. CAYetano
GOVERNOR



PATRICIA HAMAMOTO
SUPERINTENDENT

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

OFFICE OF THE SUPERINTENDENT

June 7, 2002

Ms. Cheryl D. Soon, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawai'i 96813

Dear Ms. Soon:

Subject: Kawai Nui Marsh Pathway
Draft Environmental Assessment (DEA)
TMK: 4-2-13: 2, 5, 10, 22, and 38, 4-2-16: 1, 5, and 6

The Department of Education has no comment on the DEA.
Thank you for the opportunity to respond.

Very truly yours,

Patricia Hamamoto
Superintendent

PH:hy

cc: A. Suga, OBS

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12 JUN 13 P 2: 58
DIRECTOR'S OFFICE
DEPARTMENT OF TRANSPORTATION SERVICES

Helber Hastert & Fee
Planners, Inc.

July 18, 2003

Ms. Patricia Hamamoto, Superintendent
State of Hawaii
Department of Education
P.O. Box 2360
Honolulu, HI 96804



Dear Ms. Hamamoto:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of June 7, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

We note that you have no comments on the DEA.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners


David R. Curry, AICP
Principal

C: Cheryl Soon

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TE 6102-2576

BENJAMIN J. CAYETANO
GOVERNOR



BRIAN K. MINAHI
DIRECTOR
DEPUTY DIRECTORS
JEAN L. OSHITA
JADINE Y. URASAKI

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO
HWY-PS
2.6941

JUN 21 2002

Ms. Cheryl D. Soon
Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

RECEIVED
JUN 21 8:02
COMMUNICATIONS SECTION
TRANSPORTATION DEPARTMENT

Dear Ms. ~~Soon~~ ^{CHERYL}:

Subject: Kawai Nui Marsh Pathway Draft Environmental Assessment (EA)

Thank you for requesting our review of the Draft EA. We have the following comments:

1. The Final EA should include a report to assess whether a right-turn deceleration lane is needed for safe access from mauka-bound Kailua Road to the driveway shown in Figure 7 of the Draft EA.
2. If left turns are proposed to this driveway, then the Final EA should also propose construction of a left-turn storage lane on makai-bound Kailua Road.
3. Plans for work within the State highway right-of-way must be submitted to our Highways Division Traffic Branch for review and approval.

If you have any questions, please contact Ronald Tsuzuki, Head Planning Engineer, Highways Division, at 587-1830.

Very truly yours,

BRIAN K. MINAHI
Director of Transportation

c: OEQC

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Helber Hastert & Fee
Planners Inc

July 18, 2003

Mr. Rodney Haraga
Director Transportation
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813-5097



Dear Mr. Haraga:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter dated June 21, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

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

1. We note your comment suggesting that the FEA should include a report to assess whether a right-turn deceleration lane is needed for safe access from mauka-bound Kailua Road to the driveway shown in Figure 7 of the DEA. We believe this issue can be addressed at the time of application for final permits for this segment of pathway, and will be listed as an unresolved issue as part of the FEA.
2. Left-turns will not be feasible into this driveway from Kailua Road, as there is a median separating the mauka and makai-bound lanes.
3. We recognize that any plans for work within the State highway right-of-way must be submitted to the Department of Transportation Highways Division Traffic Branch.

If you have any questions regarding this project, please call me at 545-2055.

Sincerely,

HELBER HASTERT & FEE, Planners

David Curry, AICP
Principal

C: Cheryl Soon

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TE 6/02 - 2577



DISABILITY AND COMMUNICATION ACCESS BOARD

919 Ala Moana Boulevard, Room 101 • Honolulu, Hawaii 96814
Ph. (808) 586-8121 (V/TDD) • Fax (808) 586-8129

June 21, 2002

Mr. Mark Kikuchi
Project Manager
Department of Transportation Services
City and County of Honolulu
650 South King Street
Third Floor
Honolulu, HI 96813

RECEIVED
02 JUN 27 4 8 : 02
CHIEF, TRANSPORTATION SERVICES
TRANSPORTATION SERVICES

Subject: Kawai Nui Marsh Pathway
Document: Draft Environmental Assessment
Location: Kailua, Ko'olaupoko, Oahu, Hawaii
Dated: April 2002

Intent: Proposed project to consist primarily of building a combination of hiking and multi-use trails around the Kawai Nui Marsh in six segments and providing an educational component to increase the general public's interest in preservation of the habitat.

Dear Mr. Kikuchi,

Thank you for providing us the opportunity to comment on the proposed pathway being planned for the Kawai Nui Marsh. The purpose of our response is to ensure that the planning and design development phases for the six segments and/or the design alternatives of this proposed project take into account accessibility for persons with disabilities.

We offer the following comments:

- a. This project falls within the scope of the Americans with Disabilities Act (ADA) Title II, covering state and local governments, and §103-50 Hawaii Revised Statutes, which contains a requirement for a review process by the Disability and Communication Access Board.
- b. The requirement to provide for accessibility in accordance with the ADA is briefly addressed in the Draft Assessment. To meet this requirement the State of Hawaii has adopted the Americans with Disabilities Act Accessibility Guidelines (ADAAG) as its standard to address accessibility requirements for all government facilities. There are at this time no specific accessibility standards for outdoor developed areas such as Kawai Nui Marsh that have been adopted by either a federal or state agency. However, it is highly recommended to make use of the U.S. Access Board Negotiation Committee's "Final Report on Accessibility Guidelines for Outdoor Developed Areas" published in September 1999 and the Recreation Access Advisory Committee's final design guidelines for "Accessible Recreational Facilities" approved March 13, 2002. These reports address proposed standards of accessibility, which have been mentioned in this draft. In addition to the above references the U.S. Department of Transportation has also recently published a two-volume document "Designing Sidewalks and Trails for Access Parts I and II." It is Publication No. FHWA-EP-01-027 HEPH/8-01(10M)E.

Mr. Mark Kikuchi
Project Manager
Department of Transportation Services
City and County of Honolulu
June 21, 2002
Page 2

For further information regarding the above publications, contact the following resource:

U.S. Access Board
1331 F Street, NW, Suite 1000
Washington, D.C. 20004-1111
Toll free phone: 1 (800) 872-2253
Voice phone: (202) 272-0080
Fax: (202) 272-0081
TTY: (202) 272-0082
Web site: <http://www.access-board.gov>

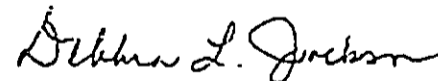
- c. Provide a general accessibility statement in the final master plan for Kawai Nui Marsh Pathway:

"All facilities will be designed to meet the requirements of the Americans with Disabilities Act and the requirements of §103-50 Hawaii Revised Statutes. Buildings, facilities, and sites should also incorporate the best design practices as noted in the recommendations from the U.S. Access Board's Regulatory Negotiating Committee on Access to Outdoor Developed Areas, the Recreation Access Advisory Committee's final design guidelines for "Accessible Recreational Facilities," and/or other current documents providing accessibility guidelines for outdoor recreation areas."

The above reflects staff's technical assistance comments. They do not reflect our Board's approval or disapproval of the plan per se. There are no further comments to offer at this time. Thank you for giving this opportunity to provide comment.

If you have any questions or concerns, please feel free to contact Mr. Gary L. Batcheller, Facility Access Specialist, or Mr. Ben Gorospe, Facility Access Coordinator, at (808) 586-8121.

Sincerely,



DEBRA L. JACKSON
Acting Executive Director

c: Tony Talat
File

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Helber Hastert & Fee
Planners, Inc.

July 18, 2003

Ms. Debra L. Jackson
Acting Executive Director
Disability and Communication Access Board
919 Ala Moana Boulevard, Room 101
Honolulu, HI 96814



Dear Ms. Jackson:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of June 21, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

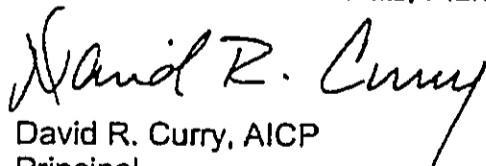
We note your first two comments relate directly to the applicability of the Americans with Disabilities Act (ADA) Title II, and §103-50, Hawaii Revised Statutes, and related guidelines for the design of outdoor developed areas. We appreciate your guidance on these issues and acknowledge the need to incorporate these rules and guidelines into the design of the pathway.

You also recommend that a general accessibility statement be incorporated into the final master plan for the Kawai Nui Marsh Pathway. There will be no such document produced. The more appropriate vehicle for this statement would be to include it in the FEA as a mitigation recommendation, which is what will be done.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners


David R. Curry, AICP
Principal

C: Cheryl Soon

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JUL-08-02 08:56A Traffic Engineering Div 808 523 4621 P.05

TE 6102-2554

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801

File, please refer to
02-139/epo

June 18, 2002

Ms. Cheryl D. Soon, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Dear Ms. Soon:

Subject: Draft Environmental Assessment (DEA)
Kawai Nui Marsh Pathway, Kailua, Oahu
Tax Map Keys: 4-2-013:2, 5, 10, 22, and 38
4-2-016: 1, 5, and 6

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92 JUN 21 10:32
DEPARTMENT OF HEALTH

Thank you for the opportunity to review and comment on the subject proposal. The DEA was routed to the various branches of the Environmental Health Administration. We have the following comments.

Wastewater Branch (WWB)

The DEA indicated that the project would not generate wastewater. However, should wastewater be generated, connection to the City sewer system is recommended.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems". We reserve the right to review the detailed wastewater plans for conformance to applicable rules.

If you have any questions, please contact the Wastewater Branch at (808) 586-4294.

Clean Air Branch

Control of Fugitive Dust

There is a significant potential for fugitive dust emissions during the removal, transport, and installation activities for this project. Implementation of adequate dust control measures during all phases of development and construction activities is warranted.

Ms. Cheryl D. Soon, Director
June 18, 2002
Page 2

Construction activities must comply with provisions of Hawaii Administrative Rules, Chapter 11-60.1, "Air Pollution Control," Section 11-60.1-33, Fugitive Dust.

The contractor should provide adequate measures to control dust from the road areas and during the various phases of construction. These measures include, but are not limited to:

- a. Planning the different phases of construction, focusing on minimizing the amount of dust generating materials and activities, centralizing on-site vehicular traffic routes, and locating potentially dusty equipment in areas of the least impact;
- b. Providing an adequate water source at the site prior to start up of construction activities;
- c. Landscaping and rapid covering of bare areas, including slopes, starting from the initial grading phase;
- d. Controlling of dust from shoulders and access roads;
- e. Providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
- f. Controlling of dust from debris being hauled away from project site.

If you have any questions regarding these issues on fugitive dust, please contact the Clean Air Branch at (808) 586-4200.

Environmental Planning Office (EPO)

Kawai Nui Marsh is co-listed with Kapaa Stream (an upstream tributary of the marsh) and Kawai Nui Stream (the downstream channel draining the marsh) by the U.S. Environmental Protection Agency as an "impaired water body" under section 303(d) of the Clean Water Act. Under this section, the Department of Health (DOH) must establish Total Maximum Daily Loads (TMDLs) for pollutants that cause this impairment - in this case nutrients, sediments, and metals. TMDLs suggest how the existing pollutant loads may be reduced in order for water quality standards to be attained. Maunawili Stream - another upstream tributary of Kawai Nui - is also listed as an impaired water body, polluted by nutrients, sediments, and trash.

As the result of a DOH consent order (effective date 08/15/2001), Oceanit, Inc. is presently conducting a TMDL study of Kapaa Stream. Although TMDLs for these listed waters are yet to be established and implemented, a first step in achieving TMDL objectives would be to prevent any project-related increases in pollutant loads. We encourage the Department of Transportation Services to participate in the TMDL process and suggest consultation with the Department of Health Clean Water Branch (Engineering Section) to discuss how water pollution control permitting may be linked with TMDL implementation.

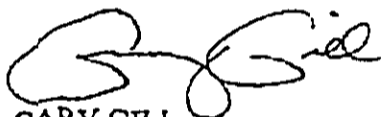
Ms. Cheryl D. Soon, Director
June 18, 2002
Page 3

While the approvals listed on page 1-7 of the Draft Environmental Assessment and the BMPs discussed throughout the document could result in water pollution control during project construction and over the entire project life-cycle, we suggest greater distinction between temporary construction-phase BMPs and more permanent, life-cycle BMPs. Maintenance of the longer-term BMPs is an important but frequently neglected factor in water quality attainment, and we suggest that the responsibility for these practices and their life-cycle maintenance schedule be discussed in greater detail.

Given the State's responsibility to establish TMDLs for the entire marsh system (including but not limited to Kapaa Stream), and the utility of concurrently studying various marsh system components, we recommend that the overall management of Kawai Nui, as guided by interested parties including but not limited to those listed on pages 2-4 (Community Planning Process) and 2-10 (Pathway Maintenance and Responsibility), include the collection of water quality data that can be used to support the development of TMDLs for the entire marsh system. This work should include consultation and cooperation with local cooperators and stakeholders, the DOH, Oceanit, and other members of the TMDL Workgroup convened by the DOH.

If you have any questions or would like more information on the TMDL program, please call David Penn, Environmental Planning Office, at (808) 586-4337.

Sincerely,



GARY GILL
Deputy Director
Environmental Health Administration

c: WWB
CAB
EPO

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Heiber Haster & Lee
Attorneys At Law

July 18, 2003

Mr. Laurence K. Lau, Deputy Director
Environmental Health Administrator
State of Hawaii
Department of Health
P.O. Box 3378
Honolulu, HI 96801



Dear Mr. Lau:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of June 18, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared. For your ease of reference, we will respond to your comments in the order they appear in your letter.

Wastewater Branch

We note your comment that if wastewater facilities are provided, connection to the City sewer system is recommended.

Clean Air Branch

We acknowledge that there is the potential for fugitive dust emissions during the removal, transport, and installation activities for the proposed pathway. Section 3.5 of the FEA will be expanded to include this discussion, and reference to the Hawaii Administrative Rules, Chapter 11-60.1-33 (Air Pollution Control, Fugitive Dust), including a list of potential dust control measures.

Environmental Planning

We concur with your observation that planning for the proposed pathway should include an objective that no project-related increase in pollutant loads to Kawai Nui Marsh be attributable to the construction and operation of the pathway. This will require careful design of the pathway, with particular attention to engineering for storm water runoff. At this time, it is unclear as to which governmental agency will assume responsibility for the implementation and management/maintenance of the proposed pathway. It would be more beneficial that the implementing and/or managing agency be responsible for participation in the program to determine Total Maximum Daily Loads for pollutants that cause a determination of an "impaired water body." It would be

Helber Hastert & Fee
Planners, Inc

Mr. Laurence K. Lau
July 18, 2003
Page 2

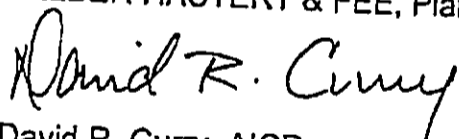
appropriate to determine agency participation in this program at the time of water pollution control permitting.

We also agree that maintenance of long-term BMPs is essential to ensure that pollutant loads linked to the pathway are kept to a minimum. A fuller discussion of long-term BMPs will be added to the FEA. However, at this time, it is unclear which governmental agency will have maintenance responsibility for the pathway, and other areas of the marsh. This is an unresolved issue that will need to be resolved before project implementation can proceed. The City and County Department of Transportation Services (DTS) may or may not be a participant in this process. Whether DTS is involved or not, we support your suggestion that the agency support the collection of water quality data in the marsh, within the context of the Total Maximum Daily Load (TMDL) Workgroup convened by the Department of Health.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners



David R. Curry, AICP
Principal

C: Cheryl Soon

TE6102-2277

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

3375 KOAPAKA STREET, SUITE H425
HONOLULU, HAWAII 96819-1869

JEREMY HARRIS
MAYOR



June 5, 2002

ATTILIO K. LEONARDI
FIRE CHIEF

JOHN CLARK
DEPUTY FIRE CHIEF

92 JUN 7 8:14

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DIRECTOR OF FIRE
SECTION
TRANSISTORATED APPROVE

TO: CHERYL D. SOON, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: ATTILIO K. LEONARDI, FIRE CHIEF

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
CHAPTER 25, ROH
PROJECTS WITHIN THE SPECIAL MANAGEMENT AREA

PROJECT NAME: KAWAI NUI MARSH PATHWAY
LOCATION: KAILUA, OAHU, HAWAII
TAX MAP KEYS: 4-2-013: 002, 005, 010, 022, 038; AND
4-2-016: 001, 005, 006
PROJECT MANAGER: MARK KIKUCHI

We received your memorandum dated May 23, 2002, regarding the above-mentioned project. The Honolulu Fire Department requests that access for emergency medical response personnel to all areas of the pathway are considered in the final design. Under the current design, response time for emergency medical response personnel will be delayed.

Should you have any questions, please call Battalion Chief Kenneth Silva of our Fire Prevention Bureau at 831-7778.

Attilio K. Leonardi
ATTILIO K. LEONARDI
Fire Chief

AKL/SK:bh

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Helber Hastert & Fee
Planners, Inc.

July 18, 2003

Mr. Attilio K. Leonardi, Fire Chief
City and County of Honolulu
Fire Department
3375 Koapaka Street, Suite H425
Honolulu, HI 96819



Dear Chief Leonardi:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of May 29, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

We note your comment that access for emergency medical response personnel to all areas of the pathway be considered in the final design of the pathway. This issue can be addressed during the preparation of final designs and alignments for each segment of the pathway.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners

David R. Curry, AICP
Principal

C: Cheryl Soon

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JF 7/02 - 2828



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809
July 10, 2002

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

LD-NAV
L-63G066136643565/3357/32643088/343534

KAWAINUI MARSH.RCM

Honorable Cheryl D. Soon, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Dear Ms. Soon:

Subject: Draft Environmental Assessment Covering the Kawai Nui Marsh Pathway
TMK: 1st/ 4-2-13: 02, 05, 10, 22 & 38 and 4-2-16: 01, 05 & 06

RECEIVED
32 JUL 16 11:16
LAND DIVISION
TRANSPORTATION SERVICES

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (DEA) covering the Kawai Nui Marsh Pathway.

A copy of the DEA was distributed to the following Department of Land and Natural Resources' Divisions for their review and comment:

- Division of Aquatic Resources - Division of Forestry & Wildlife
- Division of State Parks - Division of Boating and Ocean Recreation
- Historic Preservation Division - Commission on Water Resource Management
- Land Division Engineering Branch - Land Division Planning and Technical Services
- Land Division Oahu District Land Office

Attached herewith is a copy of the Division of Aquatic Resources, Commission on Water Resource Management, Division of State Parks, Land Division Engineering Branch, Land Division Planning and Technical Services and Land Division Oahu District Land Office comments.

The Department of Land and Natural Resources has no other comment to offer on the subject matter based on the attached responses. Should we receive additional comments, they will be forwarded to your office at that time.

Should you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 587-0438.

Very truly yours,

DIERDRE S. MAMIYA
Administrator

C: Oahu District Land Office



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P O BOX 621
HONOLULU, HAWAII 96808

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

MEMORANDUM

Correspondence: OA-124

TO: Nicholas A. Vaccaro
Land Division

FROM: Dawn Hegger
Planning Branch

SUBJECT: Kawai Nui Marsh Pathway in Kaifua, Oahu [TMK: (1) 4-2-13:2, 5, 10, 22, 38;
4-2-16:1, 5, 6]

We are in receipt of the Kawai Nui Marsh Pathway Report. Section 3.12.1.1 State Land Use District should reflect the following corrections and/or statement.

Appropriate governing regulations of the Conservation District Rules and Regulations are found in Chapter 13-5, Hawaii Administrative Rules (HAR), Conservation District. In Section 13-5-22, the identified land use(s) can be found under P-6 PUBLIC PURPOSE USES:

Land uses undertaken by the State of Hawaii or the counties to fulfill a mandated governmental function, activity, or service for public benefit and in accordance with public policy and the purpose of the conservation district. Such land uses may include transportation systems, water systems, communication systems, and recreational facilities.

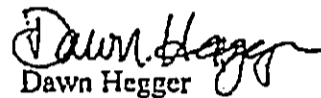
Transportation systems, transmission facilities for public utilities, water systems, energy generation facilities utilizing the renewable resources if the area (e.g. hydroelectric or wind farms) and communication systems and other such land uses which benefit the public and are consistent with the purpose of the conservation district.

Section 13-5-22 (b)(4) notes, identified land uses beginning with letter (D) require a board permit, and where indicated, a management plan. The first is identified as D-1 and the latter is identified as D-2.

The Kawai Nui Marsh Pathway project is located in the Conservation District, Protective Subzone. A Board Permit will be required from the Department of Land and Natural Resources (DLNR). In addition, under Hawaii Administrative Rules (HAR), Chapter 13-5, Section 13-5-40, public hearings shall be held on applications requiring a Board Permit in the Protective Subzone.

If you should have any questions, please contact Dawn Hegger at 587-0380.

Aloha,


Dawn Hegger

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 821
HONOLULU, HAWAII 96821

DIVISION OF AQUATIC RESOURCES	
DIRECTOR	Signature
COM FISH/EE	Draft Date
AD REC/ENV	Final Date
OFFICER	Comments
STAFF	Information
FISH DEV	Case No. / Step
STATISTICS	Feature No.
AFRC	Case No.
EDUCATION	Remarks
SECRETARY	
OFFICE SVCS	02-420
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AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

May 28, 2002

LD/NAV
KAWAINUIIMASH.CMT

L-3088

Suspense Date: 6/20/02

MEMORANDUM:

- TO: XXX Division of Aquatic Resources
 XXX Division of Forestry & Wildlife
 XXX Na Ala Hele Trails
 XXX Division of State Parks
 Division of Boating and Ocean Recreation
 Historic Preservation Division
 XXX Commission on Water Resource Management
 Land Division Branches:
 XXX Planning and Technical Services
 XXX Engineering Branch
 XXX Oahu District Land Office

FROM: *Jr* Dierdre S. Mamiya, Administrator *Dina*
Land Division

SUBJECT: Review: Draft Environmental Assessment
Project: Kawai Nui Marsh Pathway
Location: Kailua, Island of Oahu, Hawaii
Applicant: C&CoH Department of Transportation Services
TMK: 4-2-13: 2, 5, 10, 22 & 38 - 4-2-16: 1, 5 & 6

Please review the Draft Environmental Assessment (DEA) covering the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date. Should you need more time to review the subject matter, please contact Nick Vaccaro at ext.: 7-0438.

NOTE: One (1) copy of the DEA is available for review in the Land Division Office, room 220

If this office does not receive your comments on or before the suspense date, we will assume there are no comments.

() We have no comments.

Comments attached.

Signed: *D. Mamiya*

Date: 7-1-02

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BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
COMPLIANCE
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

May 28, 2002

LD/NAV
KAWAINUI MASH.CMT

L-3088
Suspense Date: 6/20/02

MEMORANDUM:

- TO: XXX Division of Aquatic Resources
 XXX Division of Forestry & Wildlife
 XXX Na Ala Hele Trails
 XXX Division of State Parks
 Division of Boating and Ocean Recreation
 Historic Preservation Division
 XXX Commission on Water Resource Management
 Land Division Branches:
 XXX Planning and Technical Services
 ✓ XXX Engineering Branch / Flood Control Section
 XXX Oahu District Land Office

FROM: *J* Dierdre S. Mamiya, Administrator *Dra*
Land Division

SUBJECT: Review: Draft Environmental Assessment
 Project: Kawai Nui Marsh Pathway
 Location: Kailua, Island of Oahu, Hawaii
 Applicant: C&CoH Department of Transportation Services
 TMK: 4-2-13: 2, 5, 10, 22 & 38 - 4-2-16: 1, 5 & 6

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If this office does not receive your comments on or before the suspense date, we will assume there are no comments.

() We have no comments.

(X) Comments attached.

Signed: *AM*

Date

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DEPARTMENT OF LAND AND NATURAL RESOURCES
Land Division
Engineering Branch

COMMENTS

Please be advised that the flood control levee, which was constructed by the Army Corps of Engineers and is included in the Kawai Nui Marsh Pathway is a working flood control structure. Upon transfer of the marsh from the City and County of Honolulu to the Department of Land and Natural Resources, the Land Division will be responsible for the operation and maintenance of the flood control levee.

It is anticipated that public access to the levee would be restricted for maintenance operations and/or inspections. Access to the levee would also be restricted during heavy rains and/or flooding events. Accordingly, we request that the applicant include some type of gate or barrier that can be used by the Land Division to effectively restrict vehicular and pedestrian access to the levee. Also, signage should be provided at both ends of the levee to indicate that it is a working flood control structure and public access would be restricted during maintenance operations, inspections, heavy rains and/or flooding events.

The project site according to the FIRM panel 290E, dated November 20, 2000 is located in Special Flood Hazard Areas (SFHAs) "A". However, portions of the various "Segments" are in SFHA Zones X and D. The National Flood Insurance Program does not have any regulations within Zones X and D, however § 60.3 (b) of Title 44 of the Code of Federal Regulations describes the minimum standards for development within SFHA Zone "A".

Although the pedestrian footbridge proposed for "Segment 5" is within SFHA Zone X, sound engineering judgment should be made with regards to the vertical positioning of the bridge. It is recommended that there be no encroachment within the stream banks. Also, keep in mind that the Oneawa Street Bridge crossing is a perched condition possibly for boating access. Depending on the final location of the footbridge, we recommend maintaining adequate clearance for boating traffic.

Please provide the Engineering Branch, Land Division with a copy of the Kawai Nui Marsh Pathway Final Environmental Assessment.

If you have any questions, please call Mr. Eric Yuasa of the Project Planning Section at 587-0229.

Signed: Andrew M. Monden
ANDREW M. MONDEN, CHIEF ENGINEER

Date: 6/20/02

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
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HONOLULU, HAWAII 96809

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AQUATIC RESOURCES
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RESOURCES ENFORCEMENT
COASTAL RESOURCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

May 28, 2002

LD/NAV
KAWAINUI MASH.CMT

L-3088
Suspense Date: 6/20/02

MEMORANDUM:

- TO:
- XXX Division of Aquatic Resources
 - XXX Division of Forestry & Wildlife
 - XXX Na Ala Hele Trails
 - XXX Division of State Parks
 - Division of Boating and Ocean Recreation
 - Historic Preservation Division
 - XXX Commission on Water Resource Management
 - Land Division Branches:
 - XXX Planning and Technical Services
 - XXX Engineering Branch
 - XXX Oahu District Land Office

FROM: *for* Dierdre S. Mamiya, Administrator *D. Mamiya*
Land Division

SUBJECT: Review: Draft Environmental Assessment
 Project: Kawai Nui Marsh Pathway
 Location: Kailua, Island of Oahu, Hawaii
 Applicant: C&CoH Department of Transportation Services
 TMK: 4-2-13: 2, 5, 10, 22 & 38 - 4-2-16: 1, 5 & 6

Please review the Draft Environmental Assessment (DEA) covering the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date. Should you need more time to review the subject matter, please contact Nick Vaccaro at ext.: 7-0438.

NOTE: One (1) copy of the DEA is available for review in the Land Division Office, room 220

If this office does not receive your comments on or before the suspense date, we will assume there are no comments.

We have no comments.

Comments attached.

Signed: *D. Mamiya*
District Administrator

Date: 6/14/02

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 521
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AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

LD/NAV
KAWAINUIIMASH.CMT

May 28, 2002

L-3088
Suspense Date: 6/20/02

MEMORANDUM:

From: [initials]
1

- XXX Division of Aquatic Resources
- XXX Division of Forestry & Wildlife
- XXX Na Ala Hele Trails
- XXX Division of State Parks
- Division of Boating and Ocean Recreation
- Historic Preservation Division
- XXX Commission on Water Resource Management
- Land Division Branches:
- XXX Planning and Technical Services
- XXX Engineering Branch
- XXX Oahu District Land Office

TO: FROM: *J* Dierdre S. Mamiya, Administrator *Draklin*
Land Division

SUBJECT: Review: Draft Environmental Assessment
Project: Kawai Nui Marsh Pathway
Location: Kailua, Island of Oahu, Hawaii
Applicant: C&CoH Department of Transportation Services
TMK: 4-2-13: 2, 5, 10, 22 & 38 - 4-2-16: 1, 5 & 6

Please review the Draft Environmental Assessment (DEA) covering the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date. Should you need more time to review the subject matter, please contact Nick Vaccaro at ext.: 7-0438.

NOTE: -One (1) copy of the DEA is available for review in the Land Division Office, room 220

If this office does not receive your comments on or before the suspense date, we will assume there are no comments.

() We have no comments.

Comments attached.

Signed: *[Signature]*

Date 6/6/02



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96819

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

June 6, 2002

M E M O R A N D U M

To: Dierdre Mamiya
Land Administrator

Attn: Nick Vaccaro

From: Steve Lau *Steve Lau*
Land Agent

Subject: Draft Environmental Assessment,
Kawainui Marsh Pathway
C&C of Honolulu, Dept. of Transportation Services
TMKs:4-2-013:2,5,10,22 & 38; TMK:4-2-016:1,5 & 6.

We have no comment on the proposed project. However, please be advised that Tax Map Key:4-2-013:5, 4-2-013:10 and 4-2-013:38 where lands acquired by the State by Condemnation for the Kawainui Marsh Resource Management Plan.

All of the above properties were acquired by DLNR and would require Land Board approval for the set aside to the City and County, Department of Transportation Services.

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BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



GILBERTS, COLOMA-AGARAN
LARRY HARRIS
BRUCE S. ANDERSON
MEREDITH J. CHING
CLAYTON W. DELA CRUZ
DRIAN C. NISHIOKA
HERBERT M. RICHARDS, JR.
LINNEL T. NISHIOKA
DEPUTY DIRECTOR

768 20 10 1 11 30

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809
JUN - 4 2002

TO: Diandre Mamiya, Administrator
Land Division

FROM: Linnel T. Nishioka, Deputy Director
Commission on Water Resource Management (CWRM)

SUBJECT: DEA Kawai Nui Marsh Pathway, Kailua, Oahu.

FILE NO.: LD/NAV KAWAINUIMARSH.CMT

Thank you for the opportunity to review the subject document. Our comments related to water resources are marked below.

In general, the CWRM strongly promotes the efficient use of our water resources through conservation measures and use of alternative non-potable water resources whenever available, feasible, and there are no harmful effects to the ecosystem. Also, the CWRM encourages the protection of water recharge areas, which are important for the maintenance of streams and the replenishment of aquifers.

- [] We recommend coordination with the county government to incorporate this project into the county's Water Use and Development Plan.
- [] We recommend coordination with the Land Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.
- [] We are concerned about the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.
- [] A Well Construction Permit and/or a Pump Installation Permit from the Commission would be required before ground water is developed as a source of supply for the project.
- [] The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit from the Commission would be required prior to use of this source.
- [] Groundwater withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.
- [] We are concerned about the potential for degradation of instream uses from development on highly erodible slopes adjacent to streams within or near the project. We recommend that approvals for this project be conditioned upon a review by the corresponding county's Building Department and the developer's acceptance of any resulting requirements related to erosion control.
- [] If the proposed project includes construction of a stream diversion, the project may require a stream diversion works permit and amend the instream flow standard for the affected stream(s).
- [X] If the proposed project alters the bed and banks of stream channels, the project may require a stream channel alteration permit.
- [X] OTHER: Construction of bridges and other facilities which alter stream channels may require a stream channel alteration permit (Hawaii Revised Statutes 174C-71).

If there are any questions, please contact David Higa at 587-0249.

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 821
HONOLULU, HAWAII 96809

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

May 28, 2002

LD/NAV
KAWAINUIMASH.CMT

L-3088
Suspense Date: 6/20/02

MEMORANDUM:

- FR: ~~TO:~~
- XXX Division of Aquatic Resources
 - XXX Division of Forestry & Wildlife
 - XXX Na Ala Hele Trails
 - XXX Division of State Parks
 - Division of Boating and Ocean Recreation
 - Historic Preservation Division
 - ✓ XXX Commission on Water Resource Management
 - Land Division Branches:
 - XXX Planning and Technical Services
 - XXX Engineering Branch
 - XXX Oahu District Land Office

10. FROM: *for* Dierdre S. Mamiya, Administrator *D.Mamiya*
Land Division

SUBJECT: Review: Draft Environmental Assessment
Project: Kawai Nui Marsh Pathway
Location: Kailua, Island of Oahu, Hawaii
Applicant: C&CoH Department of Transportation Services
TMK: 4-2-13: 2, 5, 10, 22 & 38 - 4-2-16: 1, 5 & 6

Please review the Draft Environmental Assessment (DEA) covering the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date. Should you need more time to review the subject matter, please contact Nick Vaccaro at ext.: 7-0438.

NOTE: One (1) copy of the DEA is available for review in the Land Division Office, room 220

If this office does not receive your comments on or before the suspense date, we will assume there are no comments.

() We have no comments.

(/) Comments attached.

Signed: *Dierdre Mamiya*

Date 5/30/02

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
P.O. BOX 621
HONOLULU, HAWAII 96809

GILBERT S. COLONA-AGUILAN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

JAMES T. KAWALO
DEPUTY DIRECTOR

LINNELL T. HISHIOKA
DEPUTY DIRECTOR FOR
THE COMMISSION ON WATER
RESOURCE MANAGEMENT

AQUATIC RESOURCES
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CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
HAWAIIAN ISLAND RESERVE
COMMISSION
LAND
STATE PARKS

June 28, 2002

MEMORANDUM

To: Dierdre S. Mamiya, Administrator
Land Division

From: Daniel S. Quinn, State Parks Administrator
Division of State Parks *[Signature]*

Subject: Draft Environmental Assessment for the Proposed Kawai Nui Marsh
Pathway; TMK: 4-2-13: 2, 5, 10, 22, & 38, 4-2-16: 1, 5, & 6, Kailua,
Ko'olaupoko, O'ahu

We have reviewed the subject document and have the following comments regarding Segments 1 and 2 located along the south edge of the marsh and the spur trail in Segment 1 that will connect to Ulupō Heiau State Monument.

The Division of State Parks (State Parks) has management jurisdiction over the 1.4-acre parcel that encompasses Ulupō Heiau (TMK: 4-2-103: 18). Legal access to the heiau is via a roadway easement from Kailua Road. Due to highway safety concerns, this easement is not currently in use. Subsequently, public access occurs through the Kukanono subdivision and the YMCA parcel.

We support the proposed spur trail as an alternate public access route that will reduce the impacts on the neighboring community of Kukanono and the YMCA. However, to avoid impacts to the cultural and archaeological sites in the area and to insure that the route complements other plans for the heiau, the construction style and route for this spur trail should be discussed and approved by State Parks. Additionally, Kailua Hawaiian Civic Club and Pā Ku'i A I lolo, Curators of Ulupō Heiau, will be asked to participate in the review and approval process.

Along the southern perimeter of the marsh, land was acquired for the "Ulupō View Corridor". Much of the area in Segment 2 will be transferred to State Parks for inclusion in the Ulupō Heiau State Monument (TMK: 4-2-13: 38 and 4-2-103: 25, 35, 36). An interpretive plan will be developed by State Parks for the expanded park area and include designs for secondary paths with interpretive signs.

While the archaeological reconnaissance and historical overview that was conducted on the archaeological complexes is fairly comprehensive, with further research and planning, we will be assured that the pathway will not be placed in these areas. However, we recommend that the pathway be routed on the marsh side of the complexes.

Draft Environmental Assessment for
Kawai Nui Marsh Pathway
Page 2

We support the development of the southern portion of the pathway for pedestrians only. The use of the pathway by bicycles and motorized vehicles could potentially impact the cultural sites and the historical setting that exists around Ulupō Ieiau. In the Cultural Impact Evaluation by Hallett H. Hammatt and David W. Shideler, to mitigate impacts to the cultural resources, including archaeological sites, close coordination with affected agencies is recommended. In the future, please include State Parks as one of the agencies.

As to the other segments of the trail system being proposed, we have no objections as long as the plans remain consistent with the 1994 Master Plan report. Thank you for the opportunity to provide comments. Should there be questions, please contact Lauren Tanaka at 587-0293.

c: Helber Hastert & Fee Planners, Inc.

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Location: Niihau, Island of Oahu, Hawaii
Applicant: C&CoH Department of Transportation Services
TMK: 4-2-13: 2, 5, 10, 22 & 38 - 4-2-16: 1, 5 & 6

Please review the Draft Environmental Assessment (DEA) covering the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date. Should you need more time to review the subject matter, please contact Nick Vaccaro at ext.: 7-0438.

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() We have no comments.

(X) Comments attached.

Signed: *[Signature]*
State Parks Administrator

Date: 6/2/16

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ADMINISTRATOR
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96801

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
ENVIRONMENTAL
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

May 28, 2002

LD/NAV
KAWAINUI MASH.CMT

L-3088
Suspense Date: 6/20/02

MEMORANDUM:

TO: ... COPY TO ...

- XXX Division of Aquatic Resources
- XXX Division of Forestry & Wildlife
- ✓ XXX Na Ala Hele Trails
- XXX Division of State Parks
- Division of Boating and Ocean Recreation
- Historic Preservation Division
- XXX Commission on Water Resource Management
- Land Division Branches:
- XXX Planning and Technical Services
- XXX Engineering Branch
- XXX Oahu District Land Office

FROM: *J* Dierdre S. Mamiya, Administrator *Dina*
Land Division

SUBJECT: Review: Draft Environmental Assessment
Project: Kawai Nui Marsh Pathway
Location: Kailua, Island of Oahu, Hawaii
Applicant: C&CoH Department of Transportation Services
TMK: 4-2-13: 2, 5, 10, 22 & 38 - 4-2-16: 1, 5 & 6

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() We have no comments.

(X) Comments attached.

Signed: *[Signature]*
State Parks Administrator

Date: *6/20/02*

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Helber Hastert & Fee
Attorneys At Law

July 18, 2003

Ms. Dierdre S. Mamiya, Administrator
Land Division
State of Hawaii
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809



Dear Ms. Mamiya:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of July 10, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared. Attached to your letter were comments received from several divisions and branches of the Department of Land and Natural Resources (DLNR): Aquatic Resources Division; Commission on Water Resource Management; Land Division Engineering Branch; State Parks Division; Division of Forestry and Wildlife; and Land Division Planning Branch. We have consolidated comments to the various divisions and branches herein, with the exception of the State Parks Division (we have responded to State Parks under separate cover).

Land Division, Planning Branch

We recognize that a board permit will be required for those sections of the proposed pathway that lie within the State Conservation District. Section 1.5 of the DEA lists a Conservation District Use Permit as one of the required permits for the project.

Land Division, Engineering Branch

Thank you for clarifying that the Land Division will be responsible for the operation and maintenance of the levee once ownership of the marsh is transferred from the City and County of Honolulu to the Department of Land Natural Resources.

We note that access to the levee must be restricted during heavy rains and/or flooding, and during maintenance operations and/or inspections. To allow for this control, the FEA will include a recommendation to include gates/ and appropriate signage at either end of the levee.

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Planners, Inc.

Ms. Dierdre S. Mamiya
July 18, 2003
Page 2

Jurisdictional divisions of DLNR will be consulted during the design phase of the pedestrian footbridges to ensure appropriate design, including necessary clearance for boats.

Division of Forestry and Wildlife

We note that the Land Office has no comments on the project.

Oahu District Land Office

We note that the Land Office has no comments on the project.

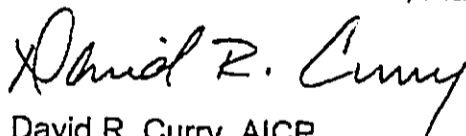
Commission of Water Resource Management

We note that depending on the design and location of proposed pedestrian bridges which will cross streams, it is possible that a Stream Alteration Permit may be required by the Commission.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners



David R. Curry, AICP
Principal

C: Cheryl Soon



**UNIVERSITY OF HAWAII
ENVIRONMENTAL CENTER**

A UNIT OF THE WATER RESOURCES RESEARCH CENTER

June 22, 2002

RE: 0728

Mark Kikuchi
City and County Of Honolulu
Department of Transportation Services
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Dear Mr. Kikuchi:

Draft Environmental Assessment
Kawai Nui Marsh Pathway
Ko'olaupoko, Oahu

The City and County Department of Transportation Services is proposing to build a perimeter pathway around the 830-acre, Kawai Nui Marsh. The proposed project consists primarily of building a combination hiking and multi-use pathway (divided into five segments) around the marsh. In addition to the pathway, several spur trails are planned to allow pathway users better access to view the marsh and its wildlife, and parking facilities will be provided in appropriate locations. The project will also include signage regarding location, prohibited activities, importance of a location, and special instructions on safety, preservation, and pathway boundaries. Signage will be provided at appropriate entry sites, observation points, archeological/cultural sites, wildlife viewing areas, and important vegetation areas.

This review was conducted with the assistance of Jon Matsuoka, School of Social Work; James Bayman, Anthropology; and Dave Sims, Environmental Center.

Mark Kikuchi
June, 22, 2002
Page 2

General Comments

Over all this sounds like a very positive project from both a recreation and a conservation standpoint. It will highlight, arguably, one of the State's premier remaining wetland ecosystems and one rich in cultural heritage. The draft EA is a thoughtful summary of the major environmental issues concerning the impact of the proposed trail. It contains a valuable summary of known archaeological sites in the area and also provides a useful sketch of some of the legends and oral histories of the area. However, there is little mention of the present and historical cultural uses of this area. We urge that "kapuna" in the area be consulted to see if there are any present cultural practices in the vicinity. Perhaps some of these traditional practices (agriculture, fishponds, plant gathering, etc.) could be reintroduced into Kawai Nui as a result of this project.

Archaeology

The proposed management of cultural resources and archaeological sites within the project area is of concern. The EA proposes that an archaeological survey be undertaken prior to the installation of the proposed trail facilities, and that mitigation be considered for sites that may lie in the route of the proposed trail. Consideration should be given to re-alignment of the trail (to go around sites) to minimize any impact on the archaeological sites. This would likely be more cost-effective than excavation or other more invasive mitigation measures.

The draft EA notes that the placement of the trail near -- but not too close -- to some archaeological sites will prevent "direct" negative impacts to these locales. On this we agree. We suggest, however, that the draft EA also consider the possibility of "secondary" impacts to archaeological sites. Increased pedestrian traffic via hikers, etc., may impart some degree of "secondary" impact. For example, some (albeit rare) visitors may take artifacts (such as stone adzes) from some sites, or deface the walls of heiau or other constructions. A system of periodic monitoring should be undertaken for known archaeological sites, to assess the extent of potential negative impact and damage to them, once the trail is installed and used over a period of months and years. Cultural practitioners in the local community could potentially play an important role in monitoring and reporting any direct or secondary impacts to sites along the trail corridor.

Mark Kikuchi
June, 22, 2002
Page 3

Correction

One reference (i.e., James 1991) on page 3-17 of the EA is not included in the bibliography. This is a key reference, and it should be added to the list.

Sincerely,



Jacquelin N. Miller, Ph.D.

Associate Environmental Coordinator

cc: OEQC
David Curry
James Moncur
Jon Matsuoka
James Bayman
Dave Sims

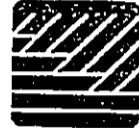
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Helber Hager & Fee

Planners, Inc.

July 18, 2003

Ms. Jacquelin N. Miller, Ph.D.
Associate Environmental Coordinator
Krauss Annex 10
2600 Dole Street
Honolulu, HI 96822



Dear Ms. Miller:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your thoughtful letter dated June 5, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared. For your ease of reference we will respond to your comments in the order they appear in your letter.

General Comments

For over 20 years, Kawai Nui Marsh has been viewed by many people in the Windward Oahu community (and elsewhere) as an area that held the secrets of its past use by the ancient Hawaiians. Decades (if not centuries) of abandonment and neglect have served to obliterate or hide the physical evidence of past use. However, in the recent past many groups from within the community have stepped forward to assume stewardship for many of the marsh's cultural resources, bringing a heightened awareness of their prior functions and use. These groups are planting native species, clearing introduced vegetation, and restoring or preserving other sites. It is quite logical that future use of these sites could re-establish more traditional uses of cultural resources in the vicinity of Kawai Nui Marsh and the proposed pathway. A brief discussion of present day efforts to expand identification and use of cultural sites in the marsh area will be presented in the FEA.

If anything, the implementation of the proposed pathway will improve access to the marsh and its resources, facilitating preservation and stewardship. The details of the use of these facilities need to be worked out by the stakeholders in the area.

Archaeology

We share your concern regarding potential impacts (both primary and secondary) to cultural resources within the vicinity of any future pathway alignment. The FEA will include a discussion of secondary impacts as well. We agree that consideration of final pathway alignments should include careful

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Planners, Inc.

Ms. Jacquelin N. Miller, Ph.D.
July 18, 2003
Page 2

consideration of proximity to cultural resources, and consultation with important stakeholders. We also agree that practitioners and benefactors in the local community can play an important role in monitoring and reporting any direct or secondary impacts to sites along the trail corridor.

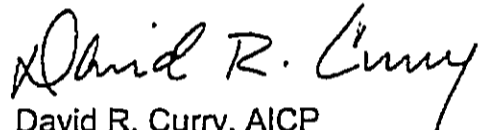
Correction

The correct reference listed on page 3-17 of the DEA should be to Cultural Surveys Hawaii, 2000. The FEA will reflect the correct citation.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners



David R. Curry, AICP
Principal

C: Cheryl Soon

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June 22, 2002

COPY

City and County of Honolulu
Department of Transportation Services
Attn: Mark Kikuchi
650 South King Street, 3rd Floor
Honolulu, Hawai'i 96813

RE: Kawai Nui Marsh Pathway Draft Environmental Assessment

Kawai Nui Heritage Foundation appreciates the opportunity to comment on the subject dEA, for several reasons. First, it allows the Foundation to note that, although two of our Board members participated in the Kailua Vision Team subcommittee that developed the Pathway conceptual plan and discussions regarding Segment 1, the Foundation was never consulted as an entity. Thus, it surprises us to be listed as a consulted party. In addition, although one of those participating Board members did receive a copy of the dEA, the Foundation did not receive a copy.

Second, the Foundation is concerned that the dEA covers all segments of the proposed pathway when only Segment 1 has been planned in detail, and, as we note below, even that detail does not clearly cover certain aspects of the project. The dEA lacks detail because pathway planning is partly dependant on other proposed, but undetermined, improvements to the marsh habitat, as well as a lack of knowledge of aspects of the marsh itself, e.g., the depth and stability in certain areas.

The Foundation's concern about lack of detail in the dEA is exacerbated by the fact that this dEA is being prepared to be submitted with applications for the required Special Management Permit (SMP) and Conservation District Use Permit (CDUP). Review requirements, especially for the SMP, by law require an analysis of the cumulative impacts of the project. Without detail, cumulative impacts cannot be ascertained.

Since there is no funding available at this time for construction of any segment of the Pathway, the Foundation urges the Department and the proponents to withdraw this dEA and revise and resubmit it only for Segment 1, with additional information as suggested below. We believe this course of action will make it much more likely that needed permits will be received and may then be correlated with funding from next year's City budget.

We suggest the following elements of the planning for Segment 1 be expanded or clarified:

1. A management component, especially relating to public use, is needed. This includes the safety of trail users, the control of commercial activities, the numbers of people - residents and tourists - expected to use the trail and pathway over different time periods, and the anticipated nature, cost, and impacts of maintenance of the pathway.

Na Kia'i Pono 'o Kawai Nui

KAWAI NUI HERITAGE FOUNDATION
P.O. BOX 1101 KAILUA, HAWAI'I 96734

2. Any archeological inventory survey for the pathway segment needs to be conducted within the framework of the fact that the Kawai Nui cultural-historical-archaeological complex is eligible for listing in the National Register of Historical Places and therefore falls under the provisions of Section 106 of the National Historic Preservation Act. These provisions include consultation with any indigenous peoples whose cultural sites are present in the project area.

If the Foundation can be of assistance in accomplishing the expansion and clarification of elements as suggested, please do not hesitate to be in touch with me at 261-7580.

In closing, the Foundation wants to emphasize its belief that inclusion of all Pathway segments in this dEA is both inappropriate and likely to result in substantial delays in receipt of needed permits, if not their outright denial.

Me ke aloha pumehana,



Susan Elliott Miller, President

Cc: Helber Hastert and Fee, Attn: David Curry
Office of Environmental Quality Control

Helber Hastert & Lee

Planners, Inc.

July 18, 2003

Ms. Susan Elliot Miller, President
Kawai Nui Heritage Foundation
P.O. Box 1101
Kailua, HI 96734



Dear Ms. Miller:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of June 22, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared. For ease of reference, we will respond to your comments in the order they appear in your letter.

Consultation

We regret your perception that the Foundation was not consulted as part of the preparation of the DEA. It was never our intent to exclude the Foundation (or any other stakeholder) from any aspect of the planning effort for the pathway project. In fact, we were deliberate in our attempt to expand the base of participation in the community planning effort. As you can certainly understand, during such efforts, organizations usually will designate individuals to represent them. It was our impression that the two board members you allude to in your letter were representing the interests of the Foundation during project-related meetings and discussions. In fact, one of these board members specifically invited us to appear at a Foundation-sponsored conference that included your full board of directors, to present an update on the pathway project.

Since these individuals were involved during the community process, and identified themselves as members of the Foundation, we assumed that they would be the most logical choices to receive the DEA for the Foundation. Usually, in other similar circumstances, the organization representatives will then report back to the full organization.

DEA Withdrawal

We note your concern about a lack of detail in the DEA, and your suggestion that the EA be withdrawn and revised to focus on Segment 1 of the proposed pathway. We believe that the intent of an environmental assessment, similar to other documents prepared under the provisions of Chapter 343, Hawaii Revised Statutes and Hawaii Administrative Rules Title 11, Chapter 200, Environmental Impact Statement Rules, is to disclose the breadth and scope of

Helber Hastert & Fee
Planners, Inc.

Ms. Susan Miller
July 18, 2003
Page 2

a particular project, a general description of the action's technical, economic, social, and environmental characteristics, and a summary of anticipated impacts and proposed mitigation measures (HAR, 11-200-10). In addition, a project that is identified with several phases, is to be treated as one action (HAR, 11-200-7).

We also recognize that more detailed information will be needed before applications for permits can be processed for any segment of the proposed pathway. In this context, the information you suggest that should be expanded or clarified (management component, agency responsibilities, Section 106 Consultation), can and should be concluded before any permit applications are submitted. The FEA will clearly identify these areas as unresolved issues.

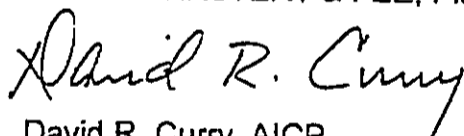
Cumulative Impacts

A discussion of cumulative impacts will be added to the FEA.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners



David R. Curry, AICP
Principal

C: Cheryl Soon

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BENJAMIN J. CAYetano
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
P.O. BOX 621
HONOLULU, HAWAII 96809

GILBERT S. COLOMA-AGARAN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

JANET T. KAWELO
DEPUTY DIRECTOR


LINNEL T. NISHIOKA
DEPUTY DIRECTOR FOR
THE COMMISSION ON WATER
RESOURCE MANAGEMENT

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE
MANAGEMENT
CONSERVATION AND RESOURCE
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE
COMMISSION
LAND
STATE PARKS

June 28, 2002

MEMORANDUM

To: Dierdre S. Mamiya, Administrator
Land Division

From: Daniel S. Quinn, State Parks Administrator
Division of State Parks 

Subject: Draft Environmental Assessment for the Proposed Kawai Nui Marsh
Pathway; TMK: 4-2-13: 2, 5, 10, 22, & 38, 4-2-16: 1, 5, & 6, Kailua,
Ko'olaupoko, O'ahu

We have reviewed the subject document and have the following comments regarding Segments 1 and 2 located along the south edge of the marsh and the spur trail in Segment 1 that will connect to Ulupō Heiau State Monument.

The Division of State Parks (State Parks) has management jurisdiction over the 1.4-acre parcel that encompasses Ulupō Heiau (TMK: 4-2-103: 18). Legal access to the *heiau* is via a roadway easement from Kailua Road. Due to highway safety concerns, this easement is not currently in use. Subsequently, public access occurs through the Kukanono subdivision and the YMCA parcel.

We support the proposed spur trail as an alternate public access route that will reduce the impacts on the neighboring community of Kukanono and the YMCA. However, to avoid impacts to the cultural and archaeological sites in the area and to insure that the route complements other plans for the *heiau*, the construction style and route for this spur trail should be discussed and approved by State Parks. Additionally, Kailua Hawaiian Civic Club and Pā Ku'i A Holo, Curators of Ulupō Heiau, will be asked to participate in the review and approval process.

Along the southern perimeter of the marsh, land was acquired for the "Ulupō View Corridor". Much of the area in Segment 2 will be transferred to State Parks for inclusion in the Ulupō Heiau State Monument (TMK: 4-2-13: 38 and 4-2-103: 25, 35, 36). An interpretive plan will be developed by State Parks for the expanded park area and include designs for secondary paths with interpretive signs.

While the archaeological reconnaissance and historical overview that was conducted on the archaeological complexes is fairly comprehensive, with further research and planning, we will be assured that the pathway will not be placed in these areas. However, we recommend that the pathway be routed on the marsh side of the complexes.

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Draft Environmental Assessment for
Kawai Nui Marsh Pathway
Page 2

We support the development of the southern portion of the pathway for pedestrians only. The use of the pathway by bicycles and motorized vehicles could potentially impact the cultural sites and the historical setting that exists around Ulupō Heiau. In the Cultural Impact Evaluation by Hallett H. Hammatt and David W. Shideler, to mitigate impacts to the cultural resources, including archaeological sites, close coordination with affected agencies is recommended. In the future, please include State Parks as one of the agencies.

As to the other segments of the trail system being proposed, we have no objections as long as the plans remain consistent with the 1994 Master Plan report. Thank you for the opportunity to provide comments. Should there be questions, please contact Lauren Tanaka at 587-0293.

c: Helber Hastert & Fee Planners, Inc.

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Helber Hastert & Fee
Planners, Inc.

July 18, 2003

Mr. Daniel S. Quinn, State Parks Administrator
Division of State Parks
State of Hawaii
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809



Dear Mr. Quinn:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of June 28, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

We recognize the Division of State Park's maintenance responsibility for the 1.4-acre parcel that encompasses Ulupō Heiau, and we support your recommendation to consult with the Division of State Parks concerning the segment route for the proposed pathway and construction style of the spur trail to the *heiau*. We also support consultation with the Kailua Hawaiian Civic Club and Pā Ku'i A Holo for these areas of the pathway. The FEA will reflect these recommendations.

The archaeological consultant for the project (Cultural Surveys Hawaii), has suggested a potential pathway alignment for the segment through the archaeological complexes discussed in your letter. These appear on pages 61, 64, and 68 of the DEA's Appendix D. As you can see from these exhibits, one alignment could include a trail through this area. However, final alignment will be thoroughly reviewed by appropriate agencies and organizations. The Division of State Parks will be included in all such discussions.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBERT HASTERT & FEE, Planners

David R. Curry
David R. Curry, AICP
Principal

C: Cheryl Soon

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Jun-17-02 09:47A Traffic Engineering Div

808 523 4621

P.02

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BENJAMIN J. CAYetano
GOVERNOR



GLENN M. OKIMOTO
COMPTROLLER

MARY ALICE EVANS
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 115 HONOLULU, HAWAII 96810

PWD02.P307

MAY 31 2002

Ms. Cheryl D. Soon, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Dear Ms. Soon:

Subject: Kawai Nui Marsh Pathway
Draft Environmental Assessment

Thank you for the opportunity to review the Kawai Nui Marsh Pathway Draft Environmental Assessment for the subject project.

This project does not impact any of the Department of Accounting and General Services projects or existing facilities. Therefore, we have no comment to offer.

Should you have any questions, please have your staff call Mr. Allen Yamanoha of the Planning Branch at 586-0488.

Very truly yours,

HAROLD H. SONOMURA
Acting Public Works Administrator

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DEPARTMENT OF PUBLIC
WORKS
TRANSPORTATION SERVICES

Helber Hastert & Fee
Planners Inc.

July 18, 2003

Mr. Russ Saito
Acting Public Works Administrator
State of Hawaii
Department of Accounting and General Services
P.O. Box 113
Honolulu, HI 96810



Dear Mr. Saito:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of May 31, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

We note your comment that the proposed project does not impact any of the Department of Accounting and General Services projects of existing facilities.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners

David R. Curry, AICP
Principal

C: Cheryl Soon

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BENJAMIN J. CAYETANO
GOVERNOR



GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENT QUALITY CONTROL
235 SOUTH BERETAMA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

June 19, 2002

Cheryl Soon
Department of Transportation Services
711 Kapiolani Blvd., #1200
Honolulu, Hawaii 96813

Attn: Mark Kikuchi

Dear Ms. Soon:

Subject: Draft Environmental Assessment (EA) for Kawai Nui Marsh Pathway

We have the following comments to offer:

Contacts: Document all contacts in the final EA, including those made during the pre-consultation phase. Enclose copies of any correspondence with state or county agencies, especially the DLNR Divisions of State Historic Preservation and Forestry and Wildlife.

Permits and approvals: List all required permits and approvals for this project and give the status of each.

Significance criteria: Include a discussion of findings and reasons, according to the significance criteria listed in HAR 11-200-12, that supports your forthcoming determination, either Finding of No Significant Impact (FONSI) or EIS preparation notice. You may use the enclosed sample as a guideline.

Cumulative impacts:
Section 2.4.3 of the draft EA alludes to the 1994 Master Plan, a visitor center and community park, and the planned dredging by the Army Corps of Engineers. Our records show that the *Kawai Nui Education Center* (1998) is still a pending EA. The *Kawai Nui Marsh Management Plan* EA, submitted by DLNR, and the *Kawai Nui Community Park Parking Lot & Landscape Improvements* EA were both finalized in 2000. In addition to these projects, *Kawai Nui Gateway Park* draft EA was recently submitted to our office for publication in the June 23rd, 2002 *The Environmental Notice*.

The EIS law requires discussion and analysis of cumulative impacts on all geographically-related projects. HAR §§11-200-5 states "the agency shall assess at the earliest practicable time

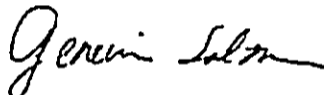
Cheryl Soon
June 19, 2002
Page 2

the significance of potential impacts of its actions, including the overall, cumulative impact in light of related actions in the region and further actions contemplated" and §§11-200-2 clarifies the role of the assessor by referring to the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions." [emphasis added]

In the final EA please provide such an analysis. Factors should include traffic, noise, air quality, water resources, drainage and flora and fauna.

If you have any questions call Nancy Heinrich at 586-4185.

Sincerely,



GENEVIEVE SALMONSON
Director

Enc.

c: David Curry, Helber Hastert & Fee

From: *Mokulele Highway/Puuuene Bypass* final EA (1997)

FINDINGS AND REASONS SUPPORTING DETERMINATION

SIGNIFICANCE CRITERIA: According to the Department of Health Rules (11-200-12), an applicant or agency must determine whether an action may have a significant impact on the environment, including all phases of the project, its expected consequences both primary and secondary, its cumulative impact with other projects, and its short and longterm effects. In making the determination, the Rules establish "Significance Criteria" to be used as a basis for identifying whether significant environmental impact will occur. According to the Rules, an action shall be determined to have a significant impact on the environment if it meets any one of the following criteria:

- (1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resources;**

The proposed project will not impact scenic views of the ocean or any ridge lines in the area. The visual character of the area will change from the current agricultural land to an improved 4-lane highway which is compatible with the surrounding land use plans and programs being implemented for the region. The highway corridor is comprised of "Prime" agricultural land which is an important resource. Development of drainage systems will follow established design standards to ensure the safe conveyance and discharge of storm runoff. In addition, the subject property is located outside of the County Special Management Area (SMA).

As previously noted, no significant archaeological or historical sites are known to exist within the corridor. Should any archaeologically significant artifacts, bones, or other indicators of previous onsite activity be uncovered during the construction phases of development, their treatment will be conducted in strict compliance with the requirements of the Department of Land and Natural Resources.

- (2) Curtails the range of beneficial uses of the environment;**

Although the subject property is suitable for agricultural uses, the land area adjoining the Mokulele Highway is naturally suited for transportation purposes due to its location proximate to an existing highway system. To return the site to a natural environmental condition is not practical from both an environmental and economic perspective.

- (3) Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS; and any revisions thereof and amendments thereto, court decisions, or executive orders;**

The proposed development is consistent with the Environmental Policies established in Chapter 344, HRS, and the National Environmental Policy Act.

(4) Substantially affects the economic or social welfare of the community or state;

The proposed project will provide a significant contribution to Maui's future population by providing residents with the opportunity to "live and work in harmony" in a high quality living environment. The proposed project is designed to support surrounding land use patterns, will not negatively or significantly alter existing residential areas, nor will unplanned population growth or its distribution be stimulated. The project's development is responding to projected population growth rather than contributing to new population growth by stimulating in-migration.

(5) Substantially affects public health;

Impacts to public health may be affected by air, noise, and water quality impacts, however, these will be insignificant or not detectable, especially when weighed against the positive economic, social, and quality of life implications associated with the project. Overall, air, noise, and traffic impacts will be significantly positive in terms of public health as compared to the "no action" alternative.

(6) Involves substantial secondary impacts, such as population changes or effects on public facilities;

Existing and planned large-scale housing development projects within Wailuku-Kahului and Kihei will contribute to a future population growth rate that will require expansion of public and private facilities and services. These improvements will become necessary as the overall population of Maui grows and settlement patterns shift. However, the proposed project will not in itself generate new population growth, but provide needed infrastructure the area's present and future population. In addition, new employment opportunities will generate new sources of direct and indirect revenue for individuals and the County of Maui by providing both temporary and long-term employment opportunities during the construction period. Indirect employment in a wide range of service related industries will also be created from construction during project development.

(7) Involves a substantial degradation of environmental quality;

The proposed development will utilize existing vacant agricultural land. With development of the proposed project, the addition of urban landscaping will significantly mitigate the visual impact of the development as viewed from outside the site while the overall design will complement background vistas. Makai views from the subject property are available, however, they are not significant nor generally available to the public in the property's present restricted condition.

(8) Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for larger actions;

By planning now to address the future needs of the community and the State, improvement of

the transportation system is consistent with the long term plans for Maui. No views will be obstructed or be visually incompatible with the surrounding area.

(9) Substantially affects a rare, threatened or endangered species or its habitat;

No endangered plant or animal species are located within the highway corridor.

(10) Detrimentally affects air or water quality or ambient noise levels;

Any possible impact to near-shore ecosystems resulting from surface runoff will be mitigated by the establishment of on-site retention basins during the construction phases of development. After development, retention areas within the highway right-of-way will serve the same function to encourage recharge of the groundwater.

(11) Affects or is likely to suffer damage by being located in an environmentally sensitive area, such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, freshwater, or coastal waters;

Development of the property is compatible with the above criteria since there are no environmentally sensitive areas associated with the project and the physical character of the corridor has been previously disturbed by agricultural uses. As such, the property no longer reflects a "natural environment". Shoreline, valleys, or ridges will not be impacted by the development.

(12) Substantially affects scenic vistas and view planes identified in county or state plans or studies;

Due to topographical characteristics of the property, views of the area to be developed are generally not significant although they are visible. The majority of the proposed project will not be visible, except from higher elevations by the general public or from persons traveling along the highway.

(13) Requires substantial energy consumption;

The location of the proposed project is between Maui's major growth areas. This relationship will reduce travel times and energy consumption after project build out through efficiencies gained by the increased capacity of the highway. Construction of the proposed project will not require substantial energy consumption relative to other similar projects.

Helber Hastert & Fee
Attorneys, Pa.

July 18, 2003

Ms. Genevieve Salmonson
Director
State of Hawaii
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, HI 96813



Dear Ms. Salmonson:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of June 19, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared. For your ease of reference, we will respond to your comments in the order they appear in your letter.

1. Contacts. As outlined in Chapter 7 of the DEA, there was an extensive two-year series of meetings that were held in the Kailua community to assist with the planning effort for the proposed pathway. In addition to residents of the area, various community groups and government agencies participated in these meetings and discussion. The result of this effort was the *Kawai Nui Marsh Pathway Plan*, published in May 2001. In addition to the community meetings, numerous site visits and informal discussions were held with many of the participants in the process. An appendix will be added to the FEA that lists the attendees of the various (seven) community meetings that were held between December 1999 and September 2000).
2. Permits and Approvals. Permits anticipated for the implementation of the proposed pathway are currently identified in Section 1.5 of the DEA. As stated in the DEA, no permits applications have been filed to date.
3. Significance Criteria. Section 1.4 of the FEA will include an expanded discussion of the Significance criteria found in HAR 11-200-12, that supports a Finding of No Significant Impact.

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Planners, Inc

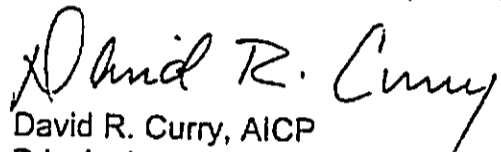
Ms. Genevieve Salmonson
July 18, 2003
Page 2

4. Cumulative Impacts. The FEA will include a section which discusses cumulative impacts.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBERT HASTERT & FEE, Planners


David R. Curry, AICP
Principal

C: Cheryl Soon

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363 Lapa Pl.
Kailua, Hi. 96734
June 10, 2002

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22 JUN 12 4 8: 10
DIRECTOR'S OFFICE
TRANSPORTATION SERVICES

Department of Transportation Services
650 S. King St., Third Floor
Honolulu, Hi. 96813

ATTN: Mr. Mark Kikuchi

RE: Kawainui Marsh - Proposed Trail

Dear Mr. Kikuchi:

In the late 1980's or early 1990's, I attended several community meetings concerning plans for Kaiwainui Marsh. These meetings covered many aspects of the Marsh, its history, its use, its purpose, etc.

A trail around the perimeter of the Marsh was one of many proposals to make the Marsh more accessible for the people of Hawai'i. It would have included viewpoints, educational signage, helped preserve but allow people to see and watch the native birds, and been accessible to hikers but not bikers or motorized vehicles.

Therefore, I am highly in favor of a trail, particularly for hikers. I would suggest that a trail for bikers also be considered, but that the pedestrian trail and a bike trail not be combined for safety reasons. They could parallel each other, but usage would not be intermingled.

I hope that this trail is put in the conceptual plans with monies allocated in the City's Budget for the fiscal year 2003-2004 and beyond with monies allocated for extension, upkeep, and improvement. This is long overdue and should be done before the Marsh which was once a bay - that became a fishpond, that became swampy then marshy and is rapidly becoming a meadow - is lost to because it became more valuable to develop than to preserve.

Thank you for reading my comments.

Sincerely,

Barbara J. (Hoppy) Smith

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Helber Hastert & Fet
Planners, Inc.

July 18, 2003

Ms. Barbara J. (Hoppy) Smith
363 Lapa Place
Kailua, HI 96734



Dear Ms. Smith:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of June 10, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

We note your general support of the proposed pathway, your concern about mixing hikers and bikers on the same pathway, and your suggestion to provide two parallel for separate pedestrian and bicycle paths. We should point out that the proposed sections of the trail along the southern edge of the marsh will be for pedestrians only. The sections of the trail on the western edge of the marsh (roughly parallel to Kapaa Quarry Road) will be for multi-modal use. However, the conceptual design of these sections of the trail are based on standards for multi-use pathways established by the Bicycle Federation of America. It would be quite difficult (due to topography) and very expensive to provide two separate paths.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners

David R. Curry, AICP
Principal

C: Cheryl Soon

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DEPT. OF TRANSPORTATION SERVICES
City and County of Honolulu
650 S. King St.
Honolulu HI 96813

TS02.164

Dear Sir and Madam:

We are vehemently opposed to having any parking for the proposed pathway around Kawainui Marsh. People can walk or bike to this pathway from all around various areas in Kailua. Entering and exiting proposed parking lots off of Kailua Road is unsafe. It is unsafe off of any of the existing roads in Kailua at present. This is a proposed pathway (multi-use) so it is unnecessary to have parking to get to it. Most of the hiking trails in Hawaii have no parking. We must preserve all of the vegetation and not have paving.

Sincerely,

D. Krall

Kailua, Hawaii
lifelong residents,

569 Uluomau Dr.
Kailua HI 96734

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Helber Hastert & Fee
Planners, Inc.

July 18, 2003

G. Sulkey
D. Kroll
569 Ulumanu Drive
Kailua, HI 96734



Dear Kailua Residents:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

We note that your comments are restricted to the safety and appropriateness of parking facilities with access on Kailua Road, and the need for parking facilities at all for the proposed pathway.

Any parking facilities with access from Kailua Road, will only have access from the mauka-bound lanes. There will be no left-turns from Kailua Road into the parking facility. In addition, any improvements in this area must be reviewed and approved by the State Department of Transportation.

In terms of the philosophical question regarding the need for parking in general, we must point out that residents of other areas of Oahu will certainly be interested in visiting this valuable resource, and will need to drive to get there. In addition, accommodations must also be made to provide access to all citizens under the Americans with Disabilities Act. This includes the provision of accessible parking opportunities.

We also note that parking access for hiking trails is a topical issue. The vast majority of public access hiking trails on Oahu do provide parking for trail enthusiasts.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners

David R. Curry

David R. Curry, AICP
Principal

C: Cheryl Soon

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TE 6/02-2563
GEN-6 (EIS)



June 21, 2002

Ms. Cheryl D. Soon, Director
Department of Transportation Services
City & County of Honolulu
Honolulu Municipal Building - Third Floor
650 South King Street
Honolulu, HI 96813

RECEIVED
92 JUN 25 P 1:29
DIRECTOR, DEPT. OF TRANSPORTATION SERVICES

Attn: Mr. Mark Kikuchi

Dear Ms. Soon:

Re: Kawai Nui Marsh Pathway
Kailua, Oahu

Thank you for the opportunity to comment on the April 2002 Draft EA for the Kawai Nui Marsh Pathway. We have reviewed the subject document and have the following comments:

1. Please note that HECO facilities may be located within the vicinity of the proposed drainage improvement area.
2. When the construction plans are nearing finalization, we would appreciate the opportunity to review them to determine whether the project will impact our facilities.

Our point of contact for this project is Enrique Che (543-7281), Director of Planning & Design, Customer Installations Department. I suggest your staff and consultant deal directly with Enrique to coordinate HECO's continuing input in this project.

Sincerely,

Kirk S. Tomita
Senior Environmental Scientist

cc: OEQC
E. Che

WINNER OF THE EDISON AWARD
FOR DISTINGUISHED INDUSTRY LEADERSHIP

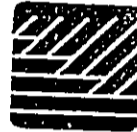


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Helber Hastert & Fee
Planners, Inc.

July 18, 2003

Mr. Kirk S. Tomita
Senior Environmental Scientist
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, HI 96840-0001



Dear Mr. Tomita:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of June 21, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

We note your concern about the proximity of Hawaiian Electric facilities within the vicinity of the proposed drainage improvement area. As final alignments are considered, project designers will work closely with Hawaiian Electric to ensure minimal disruption to facilities. The FEA will include a recommendation that speaks to this concern.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners

David R. Curry
David R. Curry, AICP
Principal

C: Cheryl Soon

TE 6/02. 4.86



United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Water Resources Division
677 Ala Moana Boulevard
Suite 415
Honolulu, Hawaii 96813

May 29, 2002

Ms. Cheryl Soon, Director
City and County of Honolulu
Department of Transportation Services
650 South King Street
Honolulu, Hawaii 96813

Dear Ms. Soon:

I am providing the following information in response to your letter regarding the Draft Environmental Assessment for the Kawai Nui Marsh Pathway. The U.S. Geological Survey (USGS) operates 2 recording water-level gages along the flood-control levee of Kawai Nui Marsh and one recording water-level gage on the Kawai Nui Canal at the Oneawa Street bridge. These gages are operated in cooperation with the State of Hawaii Department of Land and Natural Resources as a flood-warning network. Data are transmitted in real time and are available on our web site (<http://hi.water.usgs.gov>). The gages along the levee are clearly visible from the levee pathway, but we do not anticipate any additional problems from increased recreational use of the pathway. We periodically drive vehicles onto the pathway to service the gages, but we exercise appropriate caution in order to avoid disturbing or endangering the public.

The USGS also collected continuous water-quality data at the Oneawa Street bridge in 1997 and 1998. These data included water temperature, pH, specific conductance, and dissolved oxygen. The data were published in our annual water-resources data reports for Hawaii for water years 1997 and 1998. If these data would be of use to you, we would be happy to send you copies of the data tables.

If any further information is needed, please contact Barry Hill at 587-2407.

Sincerely,

Gordon Tribble
District Chief

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DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING, 850 SOUTH KING STREET, 3RD FLOOR, HONOLULU, HAWAII 96813
TELEPHONE: (808)523-4525 • FAX: (808)523-4730 • INTERNET: www.cc.honolulu.gov

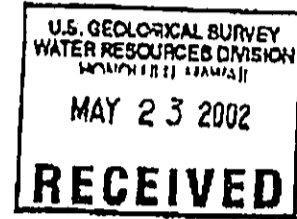


JEREMY HARRIS
MAYOR

CHERYL D. SOON
DIRECTOR

GEORGE KEON MIYAMOTO
DEPUTY DIRECTOR

May 23, 2002



Dear Participant:

DRAFT ENVIRONMENTAL ASSESSMENT
CHAPTER 25, ROH
PROJECTS WITHIN THE SPECIAL MANAGEMENT AREA

Project Name: Kawai Nui Marsh Pathway
Location: Kailua, Oahu, Hawaii
Tax Map Keys: 4-2-13: 2, 5, 10, 22, and 38
4-2-16: 1, 5, and 6
Project Manager: Mark Kikuchi Phone: 527-5026

Enclosed for your review and comment is the Draft Environmental Assessment prepared for the above-described project. We would appreciate any comments you have regarding impacts on Special Management Area (SMA) resources or concerns, as defined in the SMA Ordinance (Chapter 25, ROH) and the State Coastal Zone Management Act (Chapter 205A, HRS), as well as any other concerns you may identify.

Under the Shoreline Management Area Ordinance, Section 25-3.3, ROH, the department must determine whether the impacts of the project are significant enough to warrant preparation of an Environmental Impact Statement (EIS). The department will also process an SMA Use Permit application for the project, including a public hearing.

Based on the information currently available, the department anticipates issuing a Findings of No Significant Impact for this project (no EIS required). The deadline for comments is 30 days from the date of this letter.

If you have any questions, please call Mark Kikuchi at 527-5026.

Sincerely,

CHERYL D. SOON
Director

Enclosure

REPLY DUE TO DTS: June 22, 2002

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Helber Hastert & Fee
Planners, Inc.

July 18, 2003

Mr. Gordon Tribble
District Chief
United States Department of the Interior
U.S. Geological Survey
Water Resources Division
677 Ala Moana Boulevard, Suite 415
Honolulu, HI 96813



Dear Mr. Tribble

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of May 29, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

We note that your comments are directed to acknowledgement that you do not expect any additional problems related to increased recreational use of the pathway, to three water-level gages that you operate within the marsh as part of a flood-warning network in cooperation with the Department of Land and Natural Resources.

In regard to the water quality data you collected in 1997 and 1998, it is possible that this data could be useful as baseline data to compare with future data collection efforts.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners

David R. Curry, AICP
Principal

C: Cheryl Soon

4# 0102 - 2494

June 19, 2002

Department of Transportation Services
Honolulu Municipal Building
650 South King Street
Honolulu, Hawai'i 96813

RECEIVED
02 JUN 21 12:40
ENR/CEDES/PT/E
TRANSITION UNIT/COMMUNITY

RE: Kawai Nui Marsh Pathway Draft Environmental Assessment

Although the Kailua Neighborhood Board is listed as a consulting party, which we were not, we did not receive a copy of the DEA in time to gather information from communities impacted by the pathway and trail. So that we can understand community concerns we request a sixty-day extension to respond.

The Environment Committee of the Kailua Neighborhood Board would like to state that neither this committee, the Parks and Recreation Committee nor the entire Board were consulted parties during the preparation of this DEA.

The Environment Committee of the Kailua Neighborhood Board has reviewed the DEA and has the following questions, concerns and requests for information.

As we show in the follow analysis of the DEA lacks specifics. Without specific information it is impossible to comprehensively review, analyze and understand all the individual and cumulative impacts to the water quality of the marsh, the wildlife, including four endangered birds, and their habitat.

The DEA does not mention how much vegetation will be removed, how much asphalt will be laid, amount of crushed blue rock to be used or the extent of the cut and fill for each section/segment.

The pathway around Kawai Nui Marsh is a massive undertaking yet there is no mention of trail, bridge, boardwalk multi-pathway maintenance and vegetation removal or revegetation and the accompanying costs. Maintaining the trails, bridges, boardwalk and pathway are critical to having a safe and inviting project.

The DEA does not address the multitude of safety issues involved with placing a trail open to thousands of people around the marsh and the pathway on the narrow heavy truck traffic Kapaa Quarry Road.

The DEA is silent on how commercial activities will be controlled. It is a proven and known fact that once a public trail is constructed commercial enterprises begin bringing in tourists by the busloads.

The DEA does not provide a comprehensive description of each segment in Section 2.0 Project Description. Instead the facts and figures of each segment are not given until Appendix A. This disjointed manner makes it impossible to understand and evaluate the individual and cumulative implications and impacts of each segment on the marsh, wildlife and their habitat and cultural and natural resources.

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The DEA is silent on impacts from point and non-point pollution from construction, pedestrian use and maintenance of the trail and pathway.

The DEA does not give a projection of how many people- residents and tourists, are anticipated to use the trail and pathway - daily, monthly and yearly. Without an understanding of how many people are expected to use the trail and pathway it is impossible to evaluate impacts to the wetland, archeological sites, wildlife and their habitat.

The DEA does not evaluate the cumulative impact on water quality from the added asphalt for the pathway or the additional runoff from the trail and the pathway.

The DEA does not present a re-vegetation plan. The only time replanting and the use of native vegetation is mentioned is briefly in Section 3.6 Flora.

The DEA is silent on potential impacts to water quality and wildlife from the use of treated lumber in construction of the trail.

The DEA does not address how the Kawai Nui Marsh Pathway project will impact the transfer of the marsh from the City to the State?

The DEA is silent on how the trail and pathway will be financed. Will Federal money be used for any portion of the trail and pathway? If yes, explain how much and what the money will be used for?

The DEA is silent on whether street lighting along Kapaa Quarry Road will be required? If street lighting is anticipated explain what type of lighting will be use, how many poles will be required, explain how much grading, grubbing, cut and fill will be required and give a time table for installation of electrical lines, and lighting fixtures.

The DEA is silent on whether curbs and gutters are required along Kapaa Quarry Road? If curbs and gutters are anticipated explain where they will be placed, amount of concrete to be used, types of gutters and curbs and amount of cut and fill associated with the construction of individual segments and the total project.

The DEA does not state whether the multi-purpose pathway along Kapaa Quarry Road be ADA accessible?

The DEA lacks sufficient specifics and details thus preventing us from adequately determining individual and cumulative impacts from each segment during and after construction.

In order to assess the individual and cumulative impacts from construction and use of the trail and pathway by thousands of pedestrians around Kawai Nui Marsh and to adequately protect this unique wetland ecosystem from further degradation an **Environmental Impact Statement** must be done.

1.3.1 Physical Environment

Soil

- What areas will be watered down to prevent dust and erosion during construction? Where will the water come from?
- What criteria will be used to select "appropriate BMPs?"

Water Quality

- What is meant by excavation will be "minimal." Identify the areas that this refers too.
- The thick mat covering the marsh can be deceiving yet there is no discussion of safety precautions for pedestrians, students who conduct water quality or wetland resource studies. What safety precautions will be used to prevent people from walking onto and falling through the mat?

Aquatic Species

- How and what aquatic species will be impacted by soil movement and erosion from each segment?
- How will aquatic species and their habitat be protected from erosion and polluted water during construction for each segment of the trail/pathway?
- How will aquatic species be protected from trampling, capture or harassment after the trail is built and visited by thousands of people?

Archeological Assessment

- Will the proposed "archeological inventory survey for pathway segments" be a supplemental section to this DEA? Will the public have an opportunity to provide input into the inventory while it is being conducted or after completion?
- The lack of a complete archeological inventory means that each site will be evaluated independent of the larger cultural context. Kawai Nui is a cultural and historical complex not a series of sites and should not be treated as such.
- Kawai Nui is eligible for listing in the National Register of Historical Places as a cultural/historical and archeological complex so the various components cannot be evaluated in isolation but the entire area must be considered as a whole complex.

1.3.2 Socio-Economic Characteristics

- Why didn't the DEA take into consideration the individual impacts from the model airplane field, the transfer station, Ameron quarrying operations, Le Jardin, the closed landfills, the industrial park and the trail and pathway in order to evaluate the cumulative impacts to the marsh? While not all operations are adjacent to the marsh such as the identified Kailua town and Castle Hospital, all are within the Kawai Nui marsh watershed and do impact the marsh.
- We disagree that the social and economic impacts are limited. Each of the above operations pollutes Kawai Nui in some way - runoff, erosion, sediment, dust, and trash.
- While the location, mauka of the marsh, may be good for business these operations are not good for the marsh. The water is polluted and nutrients continue to feed the California grass and other weeds thus clogging the marsh and preventing the wetland from purifying the water before it enters Kailua Bay or

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providing a clean healthy environment for the four endangered water birds and migratory birds that depend on the marsh.

- > The proposed pathway will bring in thousands of people to places that are rarely touched by humans now. This in itself will have great socio-economic impact yet the DEA does not discuss, consider or evaluate this impact.

Ranch Operations.

- > Since a DEA is a disclosure document why wasn't the "Kawai Nui Marsh Pathway Report" (HHF, 2001) that is quoted several times in this section included so that readers can understand why and how the mitigation measures 1-3 were reached? This report must be a part of the EIS.
- > It is our understanding that the Army Corp is required to create the ponds. Why does the DEA continue to say if the ponds are constructed in numbers 1 and 3?

Residential Communities

- > Are the proposed 15-20 parking stalls at the maintenance entrance sufficient to accommodate anticipated users and prevent overflow parking in Kukunono?
- > How will access to the trail be prohibited through Kukunono and Kawai Nui Vista residential subdivisions?
- > How will motorized vehicles be prevented from going on trail at other places?

Cultural Impact Evaluation

- > What is meant by a "good faith effort to investigate the potential for adverse impacts to any archeological, avian, earth, fish, and plant resources?"
- > What is meant by "has identified potential impacts only to archeological and religious sites?" (emphasis added) What a flippant statement. Archeological and religious sites are significant connections with Hawaiians culture and must not be considered, as inferred by this statement, as if they are not important and impacts can be mitigated. The lack of understanding and insensitivity in this statement is one of the reasons a full EIS is required.
- > It is not sufficient to just coordinate final trail design and construction with Kawai Nui Heritage Foundation. Coordination must include the appropriate divisions of DLNR, City and County Planning and Parks departments, the Army Corp., Kukunono residents and other interested parties such as the Kailua Neighborhood Board.

11.3.3 Public Facilities and Services

Recreational Facilities.

Police and Fire Protection

- > What data was gathered that allows the preparers of this DEA to conclude that loitering, loud gatherings of groups (drinking, etc) "should not represent a significant increase to existing calls for service?" That data must be provided in an EIS. What measures are in place to protect adjacent communities if noise and gatherings do become problems? Will the police patrol the less accessible sections of the trail?

1.4 DETERMINATION

- > As shown above and throughout our response we disagree that the DEA sufficiently identifies and assesses the individual and cumulative impacts on the water quality of the marsh, wildlife, habitat, parking, community and pedestrian safety.

1.6 ALTERNATIVES CONSIDERED

- > The assumption that without this project "access to view the marsh will not be developed" is not true. There are various existing sites that offer views of the marsh - Na Pohaku o Hauwahine, future Kawai Nui Gateway Park, the dike road, the model airplane field, Kawai Nui Neighborhood Park, and the removal of brush along Mokapu and Kailua Road has opened up vistas. Clearing of vegetation along Quarry Road will also open up vistas of the marsh.
- > The creation of Kawai Nui Gateway Park, expansion of Kawai Nui Neighborhood Park, improvements at Na Pohaku, and access from the dike road give visitors and

1.4 DETERMINATION

- As shown above and throughout our response we disagree that the DEA sufficiently identifies and assesses the individual and cumulative impacts on the water quality of the marsh, wildlife, habitat, parking, community and pedestrian safety.

1.6 ALTERNATIVES CONSIDERED

- The assumption that without this project "access to view the marsh will not be developed" is not true. There are various existing sites that offer views of the marsh - Na Pohaku o Hauwahine, future Kawai Nui Gateway Park, the dike road, the model airplane field, Kawai Nui Neighborhood Park, and the removal of brush along Mokapu and Kailua Road has opened up vistas. Clearing of vegetation along Quarry Road will also open up vistas of the marsh.
- The creation of Kawai Nui Gateway Park, expansion of Kawai Nui Neighborhood Park, improvements at Na Pohaku, and access from the dike road give visitors and residents many opportunities to enjoy the Kawai Nui. While opportunities may be limited such limitation may be necessary for public safety and preferred to protect the natural and cultural resources and wildlife of Kawai Nui.

1.7 Unresolved issues

- What is meant by "will depend [on] future decisions regarding these issues?"
What issues are outstanding and have yet to be resolved?

2.0 PROJECT DESCRIPTION

2.2.2 Community Planning Process

- What is the City's 21st Century Oahu community planning process? Many in the community thought that this was a vision team project? Are vision teams a component of the City's 21st Century Oahu?
- Other than vision team meetings how were other groups such as the Kailua Neighborhood Board, Kawai Nui Heritage Foundation, Kailua Hawaiian Civic Club contacted and included in the planning process?

2.3.3 Pathway Access

- How will the public be informed when a trail or boardwalk is closed due to flooding or shifting of cattle grazing operations? How will pedestrians on the trail/boardwalk impacted by cattle grazing?

2.3.4 Pathway maintenance and Responsibility

- It is unclear what agencies will have primary responsibility for maintaining the various facets of the trail system because each identified agency is followed by or.
- Maintaining a trail system is crucial to protection of natural and cultural resources and pedestrian safety. So the exact agencies responsible for maintenance must be identified and concur and understand their obligations before this disclosure document is accepted.

2.4.1 Segment 1

➤ New parking lot.

- What are the dimensions of the new parking lot? How much grading will need to be done? How much fill material will be brought in or used on site? What surface material will be used for the parking lot – asphalt, gravel?
- How much and what type of vegetation will be removed? Will trees be removed? If so identify type, size and how many?
- Will the maintenance road from Kailua Road be widened? If so, give the new dimensions.
- Are the moss rock retaining walls shown in Figure 7 new? If so, give the dimensions of each segment and explain how many moss rock segments there are, how much grading and grubbing will be required and how much fill be brought in or taken out.
- In Figure 7 it appears that the hill bordering Kailua Road will be excavated to make way for parking. If so, give the dimensions of the cuts; state how much fill will be removed and/or brought in and if a retaining wall will be built give the dimensions.
- What is the "existing concrete foundation" identified in Figure 7?
- Who will open and close the gate at the entrance of the maintenance road? What are the hours that the gate will be open? Can pedestrians still access the dike from this area when the gate is locked?

➤ Pedestrian pathway.

- What is a "low-impact boardwalk"?
- Why is a "low-impact boardwalk" being constructed for below the Kawai Nui Vista subdivision but is not mentioned for the segment below Kakemono subdivision?
- What features and devices will be used to prevent bicycles and motorized vehicles from going on the trail?

2.4.2 Segment 2

- What are the recommendations of the USACE 1997 Restoration Plan for Kawai Nui Marsh for the mudflats and/or shallow ponds? Why weren't the recommendations included in this disclosure document? It is impossible to understand or present a well-informed respond without knowing and understanding these recommendations.
- *The use of "vegetation density" to encourage people to stay on the trail seems to contradict the provision in another section that advocating cutting vegetation ten feet away from the trail. Which is the true statement? If both are applicable explain why and where the methods will be used.
- Why are two trail alignments shown in Figure 6? How and when will the final alignment be selected?
- How will parking in Kakemono and access to the trail through the subdivision be prohibited? The DEA did not adequately address how parking will be prohibited, access to the trail limited, or how noise, late night gatherings etc. will impact Kukuono residents. These issues must be discussed and evaluated in greater detail in an EIS.

- Y Why is a "switchback" alignment being used behind Castle Hospital when there is only residence behind the hospital?
- Y Since there is only one resident behind Castle Hospital and the point of the trail is to open up Kawai Nui marsh we recommend eliminating the switchback and continuing the trail in segment 3 along the marsh where it connects to segment 2.

2.4.3 Segment 3

- Y This segment of the trail will have to cross Maunawili and Kahana Iki streams yet these streams are not mentioned. How will the trail cross these streams?
- Y It is impossible to address pedestrian safety, impacts on water quality and flora and fauna when the only description of access across these two prominent and critical streams is a "small foot bridge." The exact location and description must be provided in an EIS.
- Y What are the dimensions and design of the small footbridges, will they span each stream from bank to bank or will pilings be driven into the streams?
- Y What habitat improvements are proposed along Kahana Iki stream and who will be doing the improvements?
- Y Why does continuation of the trail along this segment rely on whether cattle grazing continues or not? If pedestrian safety is an issue couldn't fences be put up to contain and separate the cattle from the pedestrians?

2.4.2 Segment 4

- Y What is meant by the statement "Cattle grazing in the marsh precludes hiking?" Does this mean that if there were no cattle then hiking would be allowed on the perimeter and in the marsh? The deceptive floating mat that covers the marsh is an extremely important pedestrian safety issue.
- Y Including the "small median" how wide would the multi-purpose pathway be and what is the surface material? How much grubbing and grading will have to be done to create the median and make a safe flat surface?
- Y How much fill will be needed to create the median and multi-purpose pathway? How much fill will be brought in and how much fill will be removed? Where will the excess dirt be deposited?
- Y Has the state been involved in planning this section of the pathway? Has the state agreed to the use of state property for creation of the multi-purpose pathway?
- Y What methods will be used to separate pedestrians and ranching operations? When and how would these two activities conflict other than the Knott's ranch area?
- Y How much grading, grubbing, fill and dirt removal will be required to create an on grade path?
- Y How much cut and fill is required to create the retaining walls?
- Y How much cut and fill is required to cut slopes and lower existing contours?
- Y How much fill will be brought in and taken out from any segment of this section?

2.4.3 Segment 5

- Y Was a traffic safety analysis conducted to evaluate the safety hazards of creating a crosswalk across Kupaa Quarry Road near the model airplane field? As more and more businesses move into the industrial park the car and truck traffic will increase presenting an every increasing public safety issue.

- Was a traffic safety analysis conducted to evaluate the safety of constructing a multi-purpose pathway along Kapaa Quarry Road?
- What criteria was used and a safety analysis conducted in determining which side of Kapaa Quarry Road the pathway should be on?
- What are the dimensions of the footbridge connecting the proposed park to the existing dike? How much grading, grubbing, fill and dirt removal is required to construct the footbridge?
- What are the dimensions of the multi-purpose bridge over Kapaa stream? How much grading, grubbing, fill and dirt removal is required to construct the footbridge? Will poles be driven into the stream? If so, list how many and give the dimensions.
- How much grading, grubbing, fill and dirt removal will be required to create an on grade path?
- How much cut and fill is required to create retaining walls?
- How much cut and fill is required to cut slopes and lower existing contours?
- How much fill will be brought in and taken out from any segment of this section?
- Where will the extra dirt be deposited?

3.0 EXISTING CONDITIONS AND IMPACT ASSESSMENT: PHYSICAL ENVIRONMENT

➤ Bird Habitat Areas

- It is incorrect to say, "the water bird habitat area encompasses a small proportion of the overall acreage within the marsh boundaries" because the entire marsh is water bird habitat. The areas referred to are the current man-made islands and future open water areas required when the Army Corp. dredged along the dike to build a larger base for the flood control wall.

3.4 TOPOGRAPHY

- This section narrowly describes the topography of Kawai Nui by height only and then declares no significant impact. The topography of Kawai Nui is the landscape of the marsh and surrounding areas. This narrow view dooms Kawai Nui to be considered nothing more than a bothersome over grown puddle of water.
- The slopes of Kawai Nui must be protected and cutting into them, building close and on top of them will lead to another polluted water body like Salt Lake and Enchanted Lake.
- Creating a trail and pathway on the slopes of Kawai Nui will have cumulative and individual impacts therefore it is wrong and insufficient to say there are "no significant impacts."

3.5 SOIL

- This disclosure document did not reveal any potential short-term impacts. The only discussion is that BMPs will be used to mitigate potential effects of exposed bare soil. Yet, there will be extensive vegetation clearing, grading, and excavating during construction and there is no mention of future repairs. What are the consequences to the marsh and streams from heavy rain when the soil is bare of

vegetation? What mitigation measures are proposed to prevent runoff into the marsh or streams?

3.6 FLORA

- The DEA identifies anticipated impacts as being positive because the removal of non-native species will be replaced with native species. Yet, one of the BMPs to be used is grassing and landscaping to prevent soil loss.
- What native grasses and plants will be used in landscaping, re-vegetation and to prevent soil loss?

3.7 AVIFAUNA

- The statement that the "proposed route is separated from open water and foraging area habitats..." thus there are no anticipated impacts neglects to evaluate impacts at the Kailua Road area where the path crosses Maunawili and Kahana Iki streams or behind Kukunono subdivision where the trail skirts the marsh in order to stay away from bordering homes.
- Explain how providing "positive educational opportunities" is a mitigation measure?

3.8.2 Water Quality

- Other than stating that the postholes for the boardwalk are small no other description or dimension is given. How large are the post holes, how many will be dug in each segment, how deep will they be, will each post require a cement foundation and what will they be constructed of? How much marsh soil will be disturbed in the digging of each pole?
- Describe how the pole holes will be dug - by hand or with heavy equipment? If heavy equipment will be used describe the equipment and how it will be moved from place to place to avoid destroying habitat and causing siltation/erosion into the marsh.
- What is the cumulative impact from digging hundreds of holes and disturbing the highly contaminated soil on aquatic wildlife and avifauna, their habitat and on the water quality of the marsh?
- The statement that marsh soil will be excavated infers that soil within the wetland of the marsh will be impacted. This appears to contradict the above statement that the proposed route is separated from open water and foraging areas.
- While the concept of developing the project in segments is good the scope of each segment is not given. Are the segments referred to here the same as identified in Figure 5? If so, the 1.5-mile Segment 4 is very long and it is not explained how impacts would be minimized.

3.9 AQUATIC SPECIES

- The DEA is silent on the extent of the individual and cumulative impact on the marsh's aquatic habitat when the soil is disturbed during placement of the five boardwalks.
- The DEA is silent on the dimensions of any of the boardwalks including size of poles to be placed into the marsh.

3.12' RELATIONSHIP OF THE PROPOSED PROJECT TO EXISTING PUBLIC PLANS, POLICIES AND CONTROLS

- Page 3-23, states that the project is an initiative of the City and County Vision Team 2000 program. This contradicts section 2.2.2 Community Planning Process that identifies this project as a part of the City's 21st. Century Oahu. Which is the correct process and what are the public involvement components of each process?
- Page 3-24. The statement that the proposed project will take place in an inland area that is not coastal dependant is incorrect. The entire marsh is within the Shoreline Management Area and is tidal.
- Page 3-24. While the pathway may not be coastal, as defined by being along the shoreline, the trail definitely is coastal dependent since the purpose of the trail is to provide residents, visitors and students the opportunity to experience the marsh. In other words, the trail would not be proposed if it were not located on the edge of the largest freshwater marsh in the state.

3.12.2.3' Special Management Area

- This section does not discuss the individual or cumulative impacts from grading, vegetation clearing, construction and digging of poles of all viewing platforms in the marsh and the streams on the water quality of the marsh, wildlife and their habitat.
- There is no plan showing how often or how trash receptacles will emptied or how trash not in receptacles and blown into the marsh will be picked up.
- The DEA does not discuss potential impacts to water quality and wildlife including the four endangered water birds from trash blown or left by the thousands of visitors.
- How will pedestrians using or wishing to use the pathway and boardwalks be alerted that flooding could occur or that the pathway is closed?
- Page 3-29 The DEA states that the boardwalks "will most likely be affected during heavy flooding" but lacks any discussion of how the boardwalks will be affected. An EIS must give a full accounting of how the boardwalks will be affected by flooding including the cost of replacement and repair and the impacts on the wildlife and their habitat should the boardwalks breakup and the material deposited into the marsh.
- Page 3-29 The DEA asserts that the project will protect aquatic species, bird habitat, natural features and native vegetation but does not explain how. An EIS must be done to identify the above protections.
- Page 3-30 It is incorrect to say that the proposed project "will not alter any water bodies" when new foundations for boardwalks, bridges and viewing platforms will be dug into the marsh.
- The DEA does not evaluate the impact of chemically treated wood on the water quality of Kawai Nui.

4.0 EXISTING CONDITIONS AND IMPACT ASSESSMENT: SOCIO-ECONOMIC CHARACTERISTICS

4.3 RESIDENTIAL COMMUNITIES

- Providing safe and adequate parking is a problem. Other than increased police surveillance or community patrol it will be impossible to prevent parking in the

Kukunono subdivision and parking along the Quarry Road can be hazardous. While the site across from Le Jardin School may be a convenient site for parking none of the maps shows any access points to the pathway and until a visitor center is built turning that corner into a parking lot would not present a desirable entrance into Kailua.

- With only one temporary residence behind Castle Hospital isn't a switchback alignment cost prohibitive?
- If the trail is located 200-300 feet from Kukunono residences does that place it in any wetland?

4.6 CULTURAL IMPACT EVALUATION

- What is meant by impacts to any potential cultural resources will have "light footprints?"

APPENDIX A TRAIL CONSTRUCTION

- All the following issues were not adequately addressed in the DEA. Without know the full extent of the individual actions it is impossible to evaluate cumulative impacts.
 - How much asphalt will be used in each segment?
 - What measures will be used to prevent erosion, silt, gravel, asphalt and polluted water from entering the marsh during construction of each segment?
 - What are the cumulative impacts from each trail segment including boardwalks and footbridges and Kapaa Quarry Road pathway segments on the marsh, wildlife and habitat?
 - How wide is the shoulder at each pathway segment? How much cut and fill will be required for each segment? Where will additional dirt come from?

B1 Boardwalk in Marsh.

- This is the first mention of the width of the boardwalk or that "treated lumber" will be used. What chemicals will the wood be treated with, how much treated lumber will be used for each trail segment, for the entire project? What are the impacts on water quality and wildlife from the use of treated lumber?

B2 Foot Bridge.

- This is the first mention of footbridges crossing "steep streambeds." What is the slope of the streambeds, how deep will the holes have to be for the bridge foundations? Will cement be used to build the foundations? Will the poles be dug into wetland or fast land? How much treated lumber will be used for the poles? What is the individual and cumulative impact of using and placing treated lumber into or adjacent to wetlands? What is the individual and cumulative impact of using formed concrete for bridge structure and foundation? How much water, wetland, vegetation and habitat will be disturbed/destroyed in the constructing of the boardwalks and footbridges?

M1 Multi-Use Pathway - on grade.

- o This section identifies six segments with three on the marsh side of Kapaa Quarry Road and one segment bordering a water catchment area below the industrial park and fed by Kapaa stream yet there is no discussion on how much cut and fill will be required for each segment. There is no shoulder at this area so explain how much fill will be needed to create the 20 foot pathway, how much fill material will be brought in, and what type of fill material will be used and what are the impacts from flooding once the water holding capacity is reduced?
- o The DEA is silent on the current width of Kapaa Quarry Road, the width of the existing shoulders in each segment and the width of Kapaa Quarry Road when the project is completed.
- o Since Kapaa Quarry Road is approximately a 40-foot asphalt road with narrow shoulders it is assumed that extensive cutting and filling will be required. Yet, the DEA is silent on the amount of cut and fill necessary for each segment.
- o How wide are the shoulders in each segment, how much grading, grubbing, cutting and filling will be required to construct the 20foot pathway for the three segments bordering the marsh and the water catchment area?

M2 Multi-Use Pathway - on fill w/retaining wall.

- o Only one M2 segment is identified in Figure 6. What is the difference between this segment and the others? Why is a retaining wall required and why is a 10-foot head clearance mentioned? The DEA never discussed the length of the retaining wall, how much gravel will be used or how much cut and fill will be required to construct the wall or potential impacts to the marsh.
- o Describe how the retaining wall will control water run-off and where will the water will go after it leaves the area behind the wall.

M3 Multi-Use Pathway - Cut Slope w/Retaining Wall

- o There are three M3 segments; two are on the marsh side of the Quarry Road. How deep will the cuts be into the existing slopes? How much dirt will be removed? What is the length of the cuts and the retaining wall? How much gravel and asphalt will be used on each individual segment? What is the height of the retaining wall?

M4 multi-Use Pathway - Lowered w/Retaining Wall

- o Why is there only one segment with this configuration? Why is the path lower than the shoulder in this segment? How much cutting into the slope is required? How much dirt will be removed? How much fill will be required? Where will the dirt be deposited? What are the length, height and width of each retaining wall?

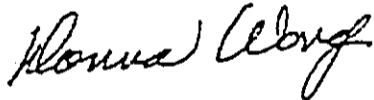
M5 Multi-Use Pathway – Away from road.

- o How much cut and fill is required for each of these 3 segments? When will it be determined if retaining walls are needed and what criteria will be used to make the determination?

T1 & T2 Pedestrian Trail – Section(s)

- o How much crushed blue rock will be brought in and used for each section? How will the vegetation on either side of the trail be cleared by hand or machine? What is the purpose of clearing 10 feet on either side of the trail? Won't clearing areas invite pedestrians to stray off the trail? How often will the vegetation be cleared? Will any trees be cut down? What is the plan to evaluate the area for native and endangered plants before clearing begins?
- o This is the first time the use of "stakes" has been mentioned. How many stakes will be used in this segment and all segments? What are the dimensions of the holes needed for the stakes? What are the dimensions of the stakes?
- o What is the impact from the stakes, gravel, plastic lumber and geotextile fabric on the marsh and wildlife habitat should these materials be wasted away during a flood?
- o Is the six-foot width of the trail an ADA requirement? If the T2 section is not being built to meet ADA standards why is it six feet wide?
- o How much cut and fill is required for each segment?

Submitted by Environment Committee of the
Kailua Neighborhood Board



Donna Wong, Chair

CC: Faith Evans, Chair
Kailua Neighborhood Board

DOCUMENT CAPTURED AS RECEIVED

Helber Haster & Fee
Attorneys at Law

July 18, 2003

Ms. Donna Wong, Chair
Environment Committee
Kailua Neighborhood Board No. 31
1525 Uluhao Street
Kailua, HI 96734



Dear Ms. Wong:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter dated June 19, 2002 on the above draft environmental assessment (DEA). Your letter and this response will be included in the final environmental assessment (FEA) being prepared.

For your ease of reference we will respond to your comments in the order they appear in your letter. Material in boldface represents your comments. Material below the boldface sections are responses to our comments.

1. **So that we can understand community concerns, we request a 60-day extension to respond.**

Since several months have elapsed since the end of the comment period for the DEA, we assume that sufficient time has gone by for you to determine community concerns. We should point out that we have received six other comment letters from individuals and groups in the Kailua area. Based on these letters, and extensive comments received during the planning period for the pathway, we believe that there is an excellent information base to appreciate community concerns regarding the proposed pathway.

2. **Neither the Environment Committee, the Parks and Recreation Committee, or the entire Board were consulted parties during the preparation of the DEA.**

Our records indicate you attended a scoping meeting for the project on October 4, 1999. Subsequently, you were notified of all community meetings regarding the pathway project via e-mail. Faith Evans, the Kailua Neighborhood Board Chair, was also on the e-mail distribution list and was notified about the time and location all community meetings.

Chapter 7 of the DEA indicates that a presentation was made to the Kailua Neighborhood Board Recreation Sub-Committee during the development of the pathway plan. No major concerns were raised by

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members of the Neighborhood Board, and a request to present to the full board was never forthcoming.

3. **The DEA lacks specifics. Without specific information it is impossible to comprehensively review, analyze and understand all the individual and cumulative impacts to the water quality of the marsh, the wildlife, including four endangered birds, and their habitat.**

A section on cumulative impacts will be added to the FEA. We believe the DEA adequately describes the nature of anticipated impacts related to the construction and operation of the proposed pathway. We should also point out, that more detailed information will be required at the time permit applications are filed to construct any individual segment of the pathway. The environmental assessment is not intended to be a stand-alone document that entirely supports requests for permit approvals.

4. **The DEA does not mention how much vegetation will be removed, how much asphalt will be laid, amount of crushed blue rock to be used or the extent of cut and fill for each section/segment.**

These design details will be addressed at the time of permit application.

5. **There is no mention of trail, bridge, boardwalk multi pathway maintenance and vegetation removal or revegetation and the accompanying costs. Maintaining the trails bridges, boardwalk and pathway are critical to having a safe and inviting project.**

Pathway construction estimates of about \$1.3 million were included in the *Kawai Nui Marsh Pathway Plan* (HHF, May 2001). However, this estimate does not provide for any "self-help" or community-based work efforts to implement the pathway. This information will be added to the FEA. We will also attach the *Kawai Nui Marsh Pathway Plan* as appendix to the FEA. We agree that an operation and maintenance budget will be important to the condition of the pathway after it is constructed.

6. **The DEA does not address the multitude of safety issues involved with placing a trail open to thousands of people around the marsh and the pathway on the narrow heavy truck traffic on Kapaa Quarry Road.**

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The conceptual design of the sections of the pathway that parallel Kapaa Quarry Road are based on standards established by the Bicycle Federation of America for multi-use pathways. At a minimum, all sections of this portion of the pathway will have a 5-foot shoulder next to Kapaa Quarry Road, and will be 10 feet wide. Some sections of this portion of the pathway will be setback a minimum of 20 feet from Kapaa Quarry Road.

7. **The DEA is silent on how commercial activities will be controlled. It is a proven and known fact that once a public trail is constructed commercial enterprises begin bringing in tourists by the busload.**

The Kawai Nui Pathway would be regulated as would any other publicly-owned trail.

8. **The DEA does not provide a comprehensive description of each Segment in Section 2.0 Project Description. Instead the facts and figures of each segment are not given until Appendix A.**

Section 2.4 of the DEA includes written descriptions of all segments of the proposed pathway. The second paragraph of this section (on page 2-10) indicates that drawings illustrating construction approaches to various sections of the trail can be found in Appendix A. The appendices are considered part of the environmental assessment, and are intended for the benefit of readers who want more information than is provided in the main text of the EA.

9. **The DEA is silent on impacts from point and non-point pollution from construction, pedestrian use and maintenance of the trail and pathway.**

There will be no point-source pollution attributable to the construction or operation and maintenance of the pathway. The DEA does suggest that erosion and/or runoff could occur as a result of the construction of the project. The FEA will be amended to include discussion of runoff from those portions of the pathway that will have impervious surfaces.

10. **The DEA does not give a projection of how many people-residents and tourists, are anticipated to use the trail and pathway-daily, monthly, and yearly. Without an understanding of how many**

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people are expected to use the trail and pathway it is impossible to evaluate impacts to the wetland, archaeological sites, wildlife and their habitat.

The information you request on projected users of the pathway is impossible to predict. Certainly the overall volume of users of any resource can overwhelm its ability to maintain its integrity. We need only to look at Hanauma Bay to appreciate the importance of careful resource monitoring. Likewise, it will be necessary to monitor both the number of pathway users and any apparent changes to the integrity of resources within the marsh. We believe that because there are already a large number of community efforts involved in restoring resources, and government efforts to monitor environmental conditions, it will be easier to keep track of the marsh's important resources.

- 11. The DEA does not evaluate the cumulative impact on water quality from the added asphalt for the pathway or the additional runoff from the trail and the pathway.**

A section on cumulative impacts will be added to the FEA. However, it is important to remember that an area of almost 6,200 acres drains into Kawai Nui Marsh. The total area of the proposed pathway will be approximately 5.5 acres (less than 0.1% of the drainage basin), and the portion of the pathway that will have an impervious surface will be about 3.1 acres (about 0.05% of the drainage basin). The remainder of the pathway will be either boardwalk or compacted blue rock, which will allow some percolation of rain water. The amount of additional runoff added to the marsh attributable to the impervious surface added for the pathway will be statistically insignificant compared to the volume that currently reaches the marsh.

- 12. The DEA does not address how the Kawai Nui Pathway project will impact the transfer of the marsh from the City to the State.**

The pathway project is irrelevant to the outcome of the transfer of ownership of the marsh.

- 13. The DEA is silent on how the trail and pathway will be financed. Will Federal money be used for any portion of the trail and pathway? If yes, explain how much and what the money will be used for.**

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Financing sources for the implementation of the pathway plan have not yet been identified, Federal funding is one possible source, as are state and/or county sources.

14. **The DEA is silent on whether street lighting along Kapaa Quarry Road will be required.**

Street lighting for Kapaa Quarry Road is not contemplated as part of the pathway project.

15. **The DEA is silent on whether curbs and gutters are required along Kappa Quarry Road.**

No improvements are contemplated for Kapaa Quarry Road as part of the pathway project.

16. **The DEA does not state whether the multi-purpose pathway along Kapaa Quarry Road will be ADA accessible.**

Section 2.3.4 of the DEA (page 2-9) indicates that the entire length of the pathway along Kapaa Quarry Road will be ADA accessible.

17. **The DEA lacks sufficient specifics and details thus preventing us from adequately determining individual and cumulative impacts from each segment during and after construction.**

See #3, above.

18. **In order to assess the individual and cumulative impacts from construction and use of the trail and pathway by thousands of pedestrians around Kawai Nui Marsh and to adequately protect this unique wetland ecosystem from further degradation an Environmental Impact Statement must be done.**

In regard to your request for more studies, we would like to point out that the completion of the environmental assessment does not allow the project to be constructed. Two major permits would remain to be approved for the project: a Special Management Area Use Permit (SMA Permit) from the City and County of Honolulu, and a Conservation District Use Permit from the State Department of Land and Natural

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Resources. Each of these permits will require at least one public hearing (two in the case of the SMA Permit), allowing for public discussion of all aspects of the project. In addition, when applications for any future permits are submitted, information in the environmental assessment will need to be supplemented with additional information and studies. An environmental assessment does not necessarily answer all questions. However, it is supposed to identify subject areas that may need additional study.

19. **Section 1.3.1. Physical Environment. Soil. What areas will be watered down to prevent dust and erosion during construction? Where will the water come from? What criteria will be used to select "appropriate BMPS?"**

As detailed plans for each of the segments are prepared, specific best management practices will be selected by the project civil engineer to employ.

20. **Section 1.3.1. Physical Environment. Water Quality. What is meant by excavation will be "minimal?" Identify the areas that this will refer to. The thick mat covering the marsh can be deceiving yet there is no discussion of safety precautions for pedestrians, students who conduct water quality or wetland resource studies. What safety precautions will be used to prevent people from walking onto and falling through the mat?**

Figure 6 of the DEA (page 2-12) identifies the methods of pathway construction for its various segments. Those sections keyed as M3, M4, and M5, will require some excavation to provide an acceptable pathway surface. These sections account for about 18% of the total lineal footage for the new pathway segments (5,400 feet of the total 29,140 feet) (not including the levee).

Railings will be added to the boardwalk sections of the pathway that are proposed over the marsh. Signs will also be added warning path users to stay on the boardwalk.

21. **Section 1.3.1. Physical Environment. Aquatic Species. How and what aquatic species will be impacted by soil movement and erosion from each segment? How will aquatic species and their habitat be protected from erosion and polluted water during**

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construction for each segment of the trail/pathway? How will aquatic species be protected from trampling, capture or harassment after the trail is built and visited by thousands of people?

Section 3.9 of the DEA identifies aquatic species present in the marsh. Impacts to these species could occur as a result of construction activities, or from the effects of storm water runoff (turbidity, etc.). Impacts during construction can be mitigated by a number of different BMPs (silt curtains, runoff barriers, collection basins, work during dry season, limit work to small areas, quickly revegetate bare soil, etc).

Unfortunately, there is no failsafe method to prevent the capture/harassment of aquatic species. Clear signage should be incorporated into the pathway system that warns against this behavior. However, it is probable that a limited amount of aquatic species capture will occur.

22. **Section 1.3.1. Physical Environment. Archaeological Assessment. Will the proposed "archaeological inventory survey for pathway segments" be a supplemental section to this DEA? Will the public have an opportunity to provide input into the inventory while it is being conducted or after completion? The lack of a complete archaeological inventory means that each site will be evaluated independent of the larger cultural context. Kawai Nui is a cultural and historical complex, not a series of sites, and should not be treated as such. Kawai Nui is eligible for listing in the National Register of Historic Places as a cultural/historical and archaeological complex so the various components cannot be evaluated in isolation but the entire area must be considered as a whole complex.**

The archaeological inventory survey components of the environmental review for the pathway will not be conducted as part of this environmental assessment. Rather, they will occur as individual segments of the pathway move forward to construction. This approach has been found to be acceptable by the Department of Land and Natural Resources, State Historic Preservation Division. The public will have the opportunity to review these documents at the time the individual segments obtain entitlements (SMA Use Permit, Conservation District Use Permit).

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We do not agree with your statements arguing in favor of the preparation of an inventory survey for the entire pathway alignment at one time. There is a significant amount of information currently available about the cultural and historic resources found around the marsh, and the greater *ahupua`a* of Kailua. It is inaccurate to assert that archaeological studies of smaller areas of the marsh cannot be interpreted without a total inventory survey. The evolution of knowledge regarding the cultural/historic past of the Hawaiian Islands has been built on the accumulation of information provided by individual surveys over the last 30+ years. Certainly any information derived in and around Kawai Nui will be evaluated in the context of information already available. As each segment proceeds, we will benefit from the additional data that is presented. It is inaccurate to suggest that such an approach is flawed.

23. **Section 1.3.2. Social-Economic Characteristics. Why didn't the DEA take into consideration the individual impacts from the model airplane field, the transfer station, Ameron Quarrying operations, Le Jardin, the closed landfills, the industrial park, and the trail and pathway in order to evaluate the cumulative impacts to the marsh? We disagree that the social and economic impacts are limited. Each of the above operations pollutes Kawai Nui in some way-runoff, erosion, sediment dust, and trash. While the location for these uses may be good for business, these operations are not good for the marsh. The water is polluted and nutrients continue to feed the California grass and other weed, thus clogging the marsh and preventing the wetland from purifying the water before it enters Kailua Bay or providing a clean health environment for the four endangered water birds and migratory birds that depend on the marsh. The proposed pathway will bring in thousands of people to places that are rarely touched by humans now. This in itself will have great socio-economic impact yet the DEA does not discuss, consider, or even evaluate this impact.**

As stated in #3, above, a section on cumulative impacts will be added to the FEA. In regard to your perspective on socio-economic impacts, we believe your perception of the evaluation of these impacts is not entirely accurate. The physical environment is decidedly different from the socio-economic environment. The purpose of evaluating socio-economic impacts is to try and discern whether the proposed project will have any

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impact to social and economic concerns. The implementation of the entire project will not negatively impact the socio-economic environment. In fact, overall impacts will be positive, as money is spent to implement the project, and better access to cultural resources allows more people to get a better understanding of the cultural and physical history of the marsh.

24. **Section 1.3.2. Ranch Operations.** Since a DEA is a disclosure document, why wasn't the *Kawai Nui Marsh Pathway Report* (HHF, 2001), that is quoted several times in this section, included so that readers can understand why and how the mitigation measures 1-3 were reached? This report must be a part of the EIS. It is our understanding that the Army Corp is required to create the ponds. Why does the DEA continue to say if the ponds are constructed in numbers 1 and 3.

The *Kawai Nui Marsh Pathway Plan* will be added to the FEA as an appendix. We are unaware of any statute or adopted policy that requires the Corps of Engineers to create this additional wildlife habitat. While it is clearly the Corps' intent to implement this project, there is no guarantee that federal monies will be appropriated to carry out the plan.

25. **Section 1.3.2. Residential Communities.** Are the proposed 15-20 parking stalls at the maintenance entrance sufficient to accommodate anticipates users and prevent overflow in Kukanono? How will access to the trail be prohibited through Kukanono and Kawai Nui Vista residential subdivisions?

See #38, below.

26. **Section 1.3.2. Cultural Impact Evaluation.** What is meant by a "good faith effort to investigate the potential for adverse impacts to any archaeological, avian, earth, fish, and plant resources"? What is meant by "has identified potential impacts only to archaeological and religious sites?" (emphasis added). What a flippant statement. Archaeological and religious sites are significant connections with Hawaiian culture and must not be considered, as inferred by this statement, as if they are not important and impacts can be mitigated. The lack of understanding and insensitivity in this statement is one of the reasons a full EIS is required. It is not sufficient just to coordinate final trail design and construction with

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Kawai Nui Heritage Foundation. Coordination must include the appropriate divisions of DLNR, City and County Planning and parks departments, the Army Corp, Kukanono residents, and other interested parties such as the Kailua Neighborhood Board.

By use of the term "good faith" the author of the cultural impact evaluation was attempting to convey that an honest, professional, effort was made to determine if the implementation of the pathway project would adversely affect practitioners of traditional customs and practices within the vicinity of the pathway.

We apologize if the use of the word "only" caused you to infer that the statement denigrated the importance of archaeological and religious sites. The statement was meant simply as an inclusionary reference for archaeological and religious sites, indicating that potential impacts were identified for them, but not for traditional practitioners.

Language in the FEA pertaining to coordination of final trail design and construction will be amended to include a wider range of organizations and agencies.

- 27. Section 1.3.3. Public Facilities and Services. What data was gathered that allows the preparers of this DEA to conclude that loitering, loud gatherings of groups (drinking, etc.) "should not represent a significant increase to existing calls for service?" That data must be provided in an EIS. What measures are in place to protect adjacent communities if noise and gatherings do become problems? Will the police patrol the less accessible sections of the trail?**

In a comment letter regarding the DEA, the City and County of Honolulu Police Department indicated they did not "anticipate any significant impact on police services as a result of this proposal." This letter will be included in the FEA.

- 28. Section 1.4. Determination. As shown above, and throughout our response we disagree that the DEA sufficiently identifies and assesses the individual and cumulative impacts on the water quality of the marsh, wildlife, habitat, parking, community and pedestrian safety.**

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As a result of comments received concerning the DEA, we have added information to the FEA which we believe addresses your concerns.

29. **Section 1.6. Alternatives considered. The assumption that without this project "access to view the marsh will not be developed" is not true. There are various existing sites that offer views of the marsh- Na Pohaku o Hauwahine, future Kawai Nui Gateway Park, the dike road, the model airplane field, Kawai Nui Neighborhood Park, and the removal of brush along Mokapu and Kailua Road has opened up vistas of the marsh. The creation of Kawai Nui Gateway Park, expansion of Kawai Nui Neighborhood Park, improvements at Na Pohaku, and access from the dike road give visitors and residents many opportunities to enjoy Kawai Nui. While opportunities may be limited, such limitation may be necessary for public safety and preferred to protect the natural and cultural resources and wildlife of Kawai Nui.**

You correctly assert that there are many existing and future sites around the marsh that allow views of Kawai Nui. However, with the exception of the levee path, these sites are disconnected, with many views from vehicles. The opportunity provided by the proposed pathway is to connect all the points with pedestrian access, thus improving the viewing experience and appreciation for the marsh and its many assets.

Language in the FEA will be amended to make it clear that the pathway will provide pedestrian access to many areas not currently accessible.

30. **Section 1.7. Unresolved issues. What is meant by "will depend on future decisions regarding these issues?" What issues are outstanding and have yet to be resolved?**

The decisions referred to in the phrase you quote, are identified in the beginning of the paragraph: (1) the status of cattle ranching within the marsh; and (2) the final design of the U.S. Army Corps of Engineers (USACOE) design of the pond restoration project. The resolution of whether to continue to allow cattle ranching on land owned by DLNR, and where to locate ponds to be created by the USACOE, will influence the location of any trail in those areas.

31. **Section 2.2.2. Project Description. Community Planning Process. What is the 21st Century Oahu Community planning process? Many**

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in the community thought this was a vision team project? Are vision teams a component of the City's 21st Century Oahu? Other than vision team meetings how were other groups such as the Kailua Neighborhood Board, Kawai Nui Heritage Foundation, Kailua Hawaiian Civic Club, contacted and included in the planning process?

The "21st Century Oahu" community planning process is commonly referred to as the "City's vision (or visioning) process." As part of this process, vision teams have been set up in 19 neighborhoods and communities all over Oahu. Initially, the pathway project received its first impetus from a proposal submitted by the Coconut Grove Community Association to the State Department of Transportation to qualify for Federal Highway Administration (FHWA) funds in 1998. Subsequently, the project was incorporated into the Kailua Vision Team's list of projects in 1999. Once the project was funded by the City and County, a consultant was selected (Helber Hastert & Fee, Planners) to prepare a plan for the pathway and to complete an environmental assessment after the plan was completed. The first step for the plan preparation effort was the identification of stakeholders to participate in the plan preparation process. The stakeholders/plan participants are not synonymous with the Kailua Vision Team. Although the first meeting of the stakeholders was comprised primarily of vision team participants, their first order of business was to expand the participant base. This was done by group discussion. As a result, representatives of the Kawai Nui Heritage Foundation attended all subsequent meetings, and as noted previously, the Neighborhood Board Chair and yourself were notified of all meetings. Also, notices were placed in *Midweek*, advertising upcoming meeting dates, and direct mail-out to Kukanono Subdivision residents was done to specifically invite their participation as well. It should be pointed out that many groups or individuals who were asked to join the effort, never showed up for any meetings, in some cases despite repeated efforts to contact them.

32. **Section 2.3.3. Project Description. Pathway Access. How will the public be informed when a trail or boardwalk is closed due to flooding or shifting of cattle grazing operations. How will pedestrians on the trail/boardwalk be impacted by cattle grazing?**

There are already flood warning gauges in place in the marsh and its tributaries. It is probable that warning signs/and or a gate system will

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close the pathway during periods when floods threaten the marsh. In regard to cattle grazing, the pathway will be routed outside the areas that will be used for grazing. Thus, users of the pathway will not be impacted by cattle grazing, and vice versa.

33. **Section 2.3.4. Pathway Maintenance and Responsibility.** It is unclear what agencies will have primary responsibility for maintaining the various facets of the trail system because each identified agency is followed by or. Maintaining a trail system is crucial to protection of natural and cultural resources and pedestrian safety. So the exact agencies responsible for maintenance must be identified and concur and understand their obligations before this disclosure documented is accepted.

You correctly point out that the specific maintenance responsibilities for the proposed pathway project have not yet been determined. Various governmental agencies already have some jurisdiction of some aspects of the marsh's resources: U.S. Army Corps of Engineers, State Department of Land and Natural Resources (Divisions of Forestry and Wildlife, Historic Preservation, Land Management, Commission on Water Resources), and City and County Department of Planning and Permitting. It will be necessary for these agencies to come together and determine actual pathway responsibilities. This issue will be added to the list of unresolved issues in the FEA that appears in Section 1.7.

34. **Section 2.4.1. Segment 1. New Parking Lot.**

The questions you ask in this section of your letter pertain primarily to the design details for the parking lot and its access driveway. While we can say that the proposed parking lot surface material is gravel, and the access drive will probably be asphalt, the remainder of your questions will have to wait for answers until the parking lot is designed to a greater of level detail. This will occur at the time permits must be obtained. Plans and other application material will be available for public review at that time.

Section 2.4.1. Segment 1. Pedestrian Pathway. What is a "low - impact boardwalk"? Why is a low-impact boardwalk being constructed for below Kawai Nui Vista subdivision but is not mentioned for the segment below Kakemono [sic]? What features

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and devices will be used to prevent bicycles and motorized vehicles from going on the trail.

The use of the term "low-impact boardwalk" is used to convey that the area within which the boardwalk is to be located cannot sustain an on-grade path, and that the presence of the boardwalk (and its construction) will have a low impact on the surrounding environment. The conditions below the Kawai Nui Vista Subdivision warrant a boardwalk because the alignment must be away from the residential area to reduce potential impacts to residents. Conditions below the Kukanono subdivision are not similar. Signage will be the primary means to prevent use of the pathway by motorized vehicles.

- 35. Segment 2. What are the recommendations of the USACE 1997 Restoration Plan for Kawai Nui Marsh for the mudflats and/or shallow ponds? Why weren't the recommendations included in this disclosure document? It is impossible to understand or present a well-informed response without knowing and understanding these recommendations.**

The 1997 *Kawai Nui Marsh Environmental Restoration Project Draft Project Modification Report & Environmental Assessment* prepared by the State of Hawaii and the USACOE details a project that would ultimately create 70.7 acres of mudflats and shallow ponds and restore habitat primarily for the Hawaiian stilt and Hawaiian moorhen. The final alignment of Segment 2 of the proposed pathway will depend on the specific configuration of these areas. The FEA will include a fuller description of this proposed program.

- 36. Segment 2. The use of "vegetation density" to encourage people to stay on the trail seems to contradict the provision of another section that advocates cutting vegetation ten feet away from the trail. Which is the true statement? If both are applicable explain why and where the methods will be used.**

At face value, perhaps the two statements are contradictory. However, the intent of the proposal is to accomplish two objectives: (1) open up a view plane from the pathway to the marsh; and (2) keep users on the pathway. It is possible to trim the vegetation on the marsh-side of the trail allowing for improved views, while maintaining vegetation below eye

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level that effectively creates a barrier between pathway users and the marsh. Section T2 in Appendix A graphically depicts this proposal.

37. Why are two trail alignments shown in Figure 6? How and when will the final alignment be selected?

Selection of the final alignment will be determined after the USACOE has determined the final limits of the shallow ponds and mudflats that will be created west of the Kukanono Subdivision.

38. How will parking in Kakemono [sic] and access to the trail through the subdivision be prohibited? The DEA did not adequately address how parking will be prohibited, access to the trail limited, or how noise, late night gatherings, etc. will impact the Kukanono residents. These issues must be discussed and evaluated in greater detail in an EIS. Why is a "switchback" alignment being used behind Castle Hospital when there is only residence behind the hospital? Since there is only one resident behind Castle Hospital and the point of the trail is to open up Kawai Nui marsh, we recommend eliminating the switchback and continuing the trail in Segment 3 along the marsh where it connects to Segment 2.

It is impossible to prevent the public from parking on the public streets within the Kukanono Subdivision. In terms of accessing the pathway from within the subdivision, it will be extremely difficult to traverse the slope and the vegetation on the marsh-side of the Kukanono slope. Thus, people will not have an easy opportunity to reach the trail in this way. Design of the trail features, including vegetation and fencing, can impede access to the pathway between Kukanono Subdivision and Castle Hospital.

The use of a switchback trail up the slope to the west of the Kukanono Subdivision is an intentional effort to create a wider buffer between the trail and the subdivision. If the trail were cut straight up the slope, it would have to be located closer to the subdivision. The trail was brought up the slope because the cattle operations of Knott Ranch prevent its extension at the base of the slope (see Figure 4 of the DEA on page 2-8).

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- 39. Segment 3. Comments regarding this section deal primarily with location and design issues for bridges proposed over Maunawili and Kahana Iki streams.**

More specific design specifications for these bridges will not be determined until this segment of the pathway is ready for entitlement review.

If cattle grazing continues, it makes more sense to route the pathway around the area used for cattle grazing.

- 40. Segment 4. What is meant by the statement "Cattle grazing in the marsh precludes hiking?" Does this mean that if there were no cattle then hiking would be allowed on the perimeter and in the marsh? The deceptive floating mat that covers the marsh is an extremely important pedestrian issue.**

Most of Segment 4 is located parallel to Kapaa Quarry Road. The portions of Segment 4 which extend north from the intersection of Segment 3 are located at elevations above the marsh. This portion of Segment 4 was laid out in this manner because: (1) there is limited viewing experience at the foot of this slope; and (2) it is probable that cattle grazing will continue in this area and it is desirable to separate the cattle from pathway users. It is probable that even if cattle grazing activities were discontinued, the pathway would be located above the marsh in this area.

- 41. Segment 4. Many of the comments in this section of your letter ask detailed design questions regarding grading, grubbing, cuts and fills.**

These design questions will be addressed when plans are prepared for entitlement purposes.

- 42. Segment 4. Has the state been involved in planning this section of the pathway? Has the state agreed to the use of state property for creation of the multi-purpose pathway?**

The Department of Land and Natural Resources (DLNR) has been an active participant in the planning process for the pathway. It should also

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be clearly understood that the proposed pathway is a logical extension of the *Kawai Nui Marsh Master Plan*, prepared for DLNR in 1994.

43. **Segment 5. Was a traffic safety analysis conducted to evaluate the safety hazards of creating a crosswalk across Kapaa Quarry Road near the model airplane field? As more and more businesses move into the industrial park the car and truck traffic will increase presenting an every increasing public safety issue. Was a traffic safety analysis conducted to evaluate the safety of constructing a multi-purpose pathway along Kapaa Quarry Road?**

At this time no such analysis was conducted for the crosswalk or the pathway along Kapaa Quarry Road.

44. **Segment 5. Many of the comments in this section of your letter ask detailed design questions regarding grading, grubbing, cuts and fills.**

These design questions will be addressed when plans are prepared for entitlement purposes.

45. **Section 3.0. Bird Habitat Areas. It is incorrect to say, "the water bird habitat area encompasses a small proportion of the overall acreage within the marsh boundaries" because the entire marsh is water bird habitat. The areas referred to are the current man-made islands and future open water areas required when the Army Corps dredged along the dike to build a larger base for the flood control wall. (p 3-1)**

This statement will be amended in the FEA to make it clear the reference is to open-water.

46. **Section 3.4. Topography. This section narrowly describes the topography of Kawai Nui by height only and then declares no significant impact. The topography of Kawai Nui is the landscape of the marsh and surrounding areas. This narrow view dooms Kawai Nui to be considered nothing more than a bothersome overgrown puddle of water.**

The discussion of the topography of the project site will be expanded in the DEA.

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47. **Section 3.4. Topography. The slopes of Kawai Nui must be protected and cutting into them, building close and on top of them will lead to another polluted water body like Salt Lake and Enchanted Lake.**

It is inaccurate to characterize the earthwork necessary to implement the pathway plan as analogous to the large-scale urbanization that surrounds Enchanted Lake and Salt Lake. Comparatively, the pathway project is insignificant. It is true that some amount of cut and fill will be required for the pathway along the segment which parallels Kapaa Quarry Road. However, the essential topographic character of the marsh's slopes will remain intact, and engineering and construction of the pathway will take every precaution to avoid adding sediment loads to the marsh, or creating areas of erosion.

48. **Section 3.5. Soil. This disclosure document did not reveal any potential short-term impacts. The only discussion is that BMPs will be used to mitigate potential effects of exposed bare soil. Yet, there will be extensive vegetation clearing, grading, and excavating during construction and there is no mention of future repairs. What are the consequences to the marsh and streams from heavy rain when the soil is bare of vegetation? What mitigation measures are proposed to prevent runoff into the marsh or streams.**

It should be pointed out that the entire length of the pathway will not be constructed at one time. It is also highly unlikely that the entirety of any individual segment would be laid bare at one time. In fact, many areas of the pathway corridor is characterized by bare soil, because little or no sunlight penetrates the vegetation canopy. These phases of the construction can be limited to periods during the "dry" season. BMPs have evolved over the years to be acknowledged and accepted standards of construction practice. Many potential BMPs applicable to the pathway project have been identified in Section 3.5. It will be up to the project engineer to devise specific BMPs in all areas of work. Prior to any grading or grubbing for the pathway, a grading permit must be obtained from the City and County of Honolulu. Once the grading permit issued, it will be up to the construction contractor to adhere to its requirements. We can hopefully assume that the citizens of Kailua and the Windward side will aggressively monitor the construction work as it proceeds, to provided additional insurance that project-related work

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minimizes any impacts to the marsh, its water quality, and the animals that inhabit its environs.

49. **Section 3.6. Flora.** The DEA identifies anticipated impacts as being positive because the removal of non-native species will be replaced with native species. Yet, one of the BMPs to be used is grassing and landscaping to prevent soil loss. What native grasses and plants will be used in landscaping, re-vegetation and to prevent soil loss?

At this point in time it is premature to identify specific plant materials that would be used as landscape material during the construction of the pathway. Selected plants will include those that are known from the region and environment-appropriate. As the project proceeds to its entitlement phases, conceptual landscape plans will need to be prepared for submittal with other application materials, and a more detailed landscape plan will probably be required by the City and County prior to issuance of any grading or building permits.

50. **Section 3.7. Avifauna.** The statement that the "proposed route is separated from open water and foraging area habitats..." thus there are no anticipated impacts neglects to evaluate impacts at the Kailua Road area where the path crosses Maunawili and Kahana Iki streams or behind Kukanono subdivision where the trail skirts the marsh in order to stay away from bordering homes. Explain how providing "positive educational opportunities" is a mitigation measure.

The areas of the two streams that will lie beneath pedestrian bridges that cross them as part of the proposed pathway are insignificant when compared with the overall foraging and nesting habitats of the marsh. Further, the bridge will be separated by several feet from the stream surface and any nesting areas within the vegetation on the stream banks. In the highly unlikely event that the bridge creates unacceptable nesting habitat for any individual waterbirds, the birds will have ample opportunity to relocate elsewhere in the marsh.

The discussion of "positive educational opportunities" will be moved to the section on "anticipated impacts" in the FEA.

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51. **Section 3.8.2. Water Quality.** This section of your letter is devoted to questions regarding construction methods for the boardwalk (number of postholes, method of construction, etc.) and the impacts of construction.

According to estimates derived during the preparation of the *Kawai Nui Marsh Pathway Plan*, approximately 1,900 lineal feet of boardwalk will be constructed as part of the pathway project. If we assume that one supporting post will be required at 6 feet on center, we can then estimate that approximately 650 posts will be required for the boardwalk. The posts will be on the order of 4 inches by 4 inches, and could be comprised of a number of different materials (untreated wood, recycled composite material, concrete). Postholes can be dug by hand with a posthole digger, and then pounded into place.

The segments in this section are those identified in Figure 5.

52. **Section 3.9. Aquatic Species.** The DEA is silent on the extent of the individual and cumulative impact on the marsh's aquatic habitat when the soil is disturbed during placement of the five boardwalks. The DEA is silent on the dimensions of any boardwalks include size of poles to be placed into the marsh.

During the digging and placement of posts for the boardwalk that will overlay the floating vegetation mat, (see #51, above), some sediment will be suspended in the marsh, thus increasing turbidity in the immediate vicinity of the posthole. However, because of the temporary nature of the turbidity, the limited area of effect, and the limited area worked on at any given time, no significant impacts are anticipated to aquatic species in the marsh.

As described in Figure B1 of Appendix A, the boardwalks are planned to be 6 feet wide.

53. **Section 3.12. Relationship of the Proposed Project to Existing Public Plans, Policies and Controls.** Page 3-23 states that the project is an initiative of the City and County Vision Team 2000 program. This contradicts section 2.2.2 Community Planning Process that identifies this project as part of the City's 21st Century Oahu. Which is the correct process and what are the public involvement components of each process.

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The use of the terms "City and County Vision Team" program and the "City's 21st Century Oahu" program are synonymous. The island of Oahu has been divided into 19 Vision Team areas. Since the inception of the program, each of the 19 areas has been allotted \$2 million dollars per year to spend for Capital Improvement Projects within their respective areas. Vision Teams are not selected or elected. Participation is voluntary and the make-up of vision teams can and do change from year to year or month to month. Anyone can participate in the monthly vision team meetings that are held. Meetings are publicized in newspapers and on the City's website. The City Administration assigns someone who is a City employee to guide the vision team and provide liaison with the Administration.

Each vision team identifies and prioritizes projects within its area to be included in the next fiscal year's capital improvement budget. Once budgeted, projects can be implemented. Projects usually require a combination of planning, design, and construction monies allotted to implement a given project. Planning, design, and construction budgets can be spread over more than one budget cycle, as needed.

Once the City Administration sends its budget to the City Council, public hearings are held on the budget and the City Council can make changes to the proposed budget as they see fit. Council members then vote on the budget, whereupon the budget bill can be signed by the Mayor or vetoed. If vetoed, the bill must go back to the City Council for further consideration, whereupon the budget can either be amended, or the City Council can vote to override the Mayor's veto.

54. **Section 3.12. Relationship of the Proposed Project to Existing Public Plans, Policies and Controls. Page 3-24.** The statement that the proposed project will take place in an inland area that is not coastal dependent is incorrect. The entire marsh is within the Shoreline Management Area [sic] and is tidal. While the pathway may not be coastal, as defined by being along the shoreline, the trail definitely is coastal dependent since the purpose of the trail is to provide residents, visitors, and students the opportunity to experience the marsh. In other words, the trail would not be proposed if it were not located on the edge of the largest freshwater marsh in the state.

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The discussion of "coastal dependent" is based on the Objectives and Policies of Chapter 205-A, Hawaii Revised Statutes (HRS). The set of policies included with the one for coastal dependency is listed under the category of "Scenic and Open Spaces." The specific language in questions reads as follows: "*Encourage those developments which are not coastal dependent to locate in inland areas.*" The purpose of the language is to ensure that incompatible "development" is not located improperly within the coastal zone. The uses contemplated as coastal dependent development are further elaborated in Chapter 205-A2(c)(5) HRS, and include uses such as harbors and ports. Whether the "shoreline" of the marsh is "coastal" or not is arguable. Certainly, the pathway would have no relevance without the presence of the marsh, and is therefore "dependent" on the marsh to justify its construction.

It must be remembered, that many of the other policies and objectives of Chapter 205A, HRS relate to increasing access to and enjoyment of areas of natural beauty and ecological importance.

55. **Section 3.12.2.3. Special Management Area. This section does not discuss the individual or cumulative impacts from grading, vegetation clearing, construction, and digging of poles of all viewing platforms in the marsh and the streams on the water quality of the marsh, wildlife and their habitat.**

The discussion in this section of the EA speaks to the general considerations to review guidelines that the City Council must consider in their deliberation of any SMA Use Permit, and is not intended to substitute for more specific discussions elsewhere in the environmental assessment. In terms of cumulative impacts, a section will be added to the FEA which deals with cumulative impacts.

56. **Section 3.12.2.3. Special Management Area. There is no plan showing how often or how trash receptacles will be emptied or how trash not in receptacles and blown into the marsh will be picked up. The DEA does not discuss potential impacts to water quality and wildlife including the four endangered water birds from trash blown or left by the thousands of visitors.**

The management of solid waste generated by pathway users is an operational detail that is better addressed at the time entitlements are considered for the pathway.

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57. **Section 3.12.2.3. Special Management Area. How will pedestrians using or wishing to use the pathway and boardwalks be alerted that flooding could occur or that the pathway is closed. The DEA states that the boardwalks "will most likely be affected during heavy flooding" but lacks any discussion of how the boardwalks will be affected. An EIS must give a full accounting of how the boardwalks will be affected by flooding including the cost of replacement and repair and the impacts on the wildlife and their habitat should the boardwalks break-up and the material deposited into the marsh.**

Currently, as part of the improvements made to the flood control levee after the flood of January 1, 1988, there are flood early warning systems now in place. These consist of two real time reporting stations which monitor rainfall and stream levels in the Olomana Stream area of Maunawili Valley and monitor marsh water elevations and rainfall near the levee. These systems can be used to anticipate flooding conditions which would preclude use of the pathway system. It should be noted that the intensity and duration of a storm to generate the conditions that would induce flooding in the marsh would be quite significant, and thereby be within a reasonable likelihood of early forecasting.

Should such an storm event occur, it is likely that a large volume of material would be washed out of streams and stream mouths into the marsh. It is possible that portions of the boardwalk would break-up as well. It would be difficult to project how much it would cost to repair/replace sections of the boardwalk that do break loose. The deposition of such material deeper into the central portion of the marsh should have little impact on the marsh's waterbirds or aquatic species.

58. **Section 3.12.2.3. Special Management Area. Page 3-29. The DEA asserts that the project will protect aquatic species, bird habitat, natural features and native vegetation but does not explain how. An EIS must be done to identify the above protections.**

The greatest potential for impact to the marsh wildlife and their habitats will come during the construction phases of the pathway. We have repeatedly indicated that BMPs will be incorporated into the design of the pathway segments, including grading permits. The designs will be thoroughly reviewed by agencies with permitting authority for the project,

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and will be the subject of public hearings held by the Department of Land and Natural Resources, the Department of Planning and Permitting, and the Honolulu City Council. Plans will be reviewable by the public prior to the public hearings, and subject to comment or testimony at the time of those hearings.

59. **Section 3.12.2.3. Special Management Area. Page 3-30. It is incorrect to say that the project "will not alter any water bodies" when new foundations for boardwalks, bridges and viewing platforms will be dug into the marsh.**

The functionality of the marsh and its tributaries, the surface area of open water, the areal extent of the marsh itself, and the physical features of the marsh will not be affected by the implementation of the pathway project. Bridges to be constructed over streams will not have supporting members in the streams, and the supporting posts for the boardwalks will be of limited impact. As such, it is fair to say that the project will not alter any water bodies.

60. **Section 3.12.2.3. Special Management Area. The DEA does not evaluate the impact of chemically treated wood on the water quality of Kawai Nui.**

As discussed in the description of the boardwalk elements in Appendix A (B1), the building materials for the boardwalk would be comprised of a composite of recycled plastic and wood chips. After consideration of your comments, the FEA will be amended to reflect that framing material will also be composed of plastic lumber or untreated wood, rather than chemically treated wood.

61. **Section 4.3. Residential Communities. Providing safe and adequate parking is a problem. Other than increased police surveillance or community patrol it will be impossible to prevent parking in the Kukanono subdivision and parking along Quarry Road can be hazardous. While the site across from Le Jardin School may be a convenient site for parking none of the maps shows any access points to the pathway and until a visitor center is built turning that corner into a parking lot would not present a desirable entrance into Kailua.**

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You are correct in your observations about the provision of safe and adequate parking. This subject took up a significant portion of the public discussion during the planning process for the pathway, particularly as it would impact the residents of the Kukanono Subdivision. Because the streets of the Kukanono Subdivision are public streets, legally parked vehicles cannot be removed. In order to discourage parking in this area, it must be difficult, if not impossible, for individuals to be able to access the pathway along the rear of Castle Hospital. Screening vegetation and/or fences would eliminate access from this area. In this case, people who want to access the pathway would be much less inclined to park in the Kukanono Subdivision, especially if convenient parking is provided near the entry to the levee.

Improvements to Kawai Nui Neighborhood Park will add more parking spaces for path users at the other end of the levee. When the Kawai Nui Gateway Park is constructed at the end of the Oneawa Canal, more parking will be available for potential users. It is hoped that the availability of this additional parking will make parking in the Kukanono Subdivision a less attractive alternative.

62. **Section 4.3. Residential Communities. With only one temporary residence behind Castle Hospital isn't a switchback alignment cost prohibitive? If the trail is located 200-300 feet from Kukanono residences, does that place it in any wetland?**

A decision to call for a switchback design behind Castle Hospital was made because it could be implemented further away from the Kukanono subdivision. It will not add that much more to the overall cost of the entire pathway.

The pathway at the base of the slope fronting the Kukanono Subdivision will not be in a wetland.

63. **Section 4.6. Cultural Impact Evaluation. What is meant by impacts to any cultural resources will have "light footprints?"**

The use of the phrase "light footprints" was used by the author of the report to convey that impacts are thought to be minimal.

64. **Appendix A. Trail Construction. All the following issues were not adequately addressed in the DEA. Without knowing the full extent**

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of the individual actions it is impossible to evaluate cumulative impacts. How much asphalt will be used in each segment? What measures will be used to prevent erosion, silt, gravel, asphalt and polluted water from entering the marsh during construction of each segment? What are the cumulative impacts from each trail segment including boardwalks and footbridges and Kapaa Quarry Road pathway segments on the marsh, wildlife and habitat? How wide is the shoulder at each pathway segment? Where will additional dirt come from?

Segments 4 and 5 will be the only portions of the pathway to have an asphalt surface. Collectively, this accounts for about 13,700 lineal feet of the approximately 29,000 lineal feet of pathway. The width of the pathway will be 10 feet. Therefore the areal extent of the asphalt surface will be ± 3 acres. This represents less than 0.05% of the approximate 6,200-acre drainage basin that empties into Kawai Nui Marsh.

The remainder of the pathway will have either a crushed rock or slatted wood surface, allowing for a higher level of percolation through the pathway surface. Taken in the context of the entire drainage basin, any additional storm water input from the ± 3 acres will be minimal.

In terms of construction-period impacts, we have described a number of times in response to other comments, that BMPs will be included in future project designs, evaluated by appropriate government agencies, and subject to public scrutiny and public hearings as part of entitlement proceedings.

65. **Appendix A. B1 Boardwalk in Marsh.** This is the first mention of the width of the boardwalk or that "treated lumber" will be used. What chemicals will the wood be treated with, how much treated lumber will be used for each trail segment, for the entire project? What are the impacts on water quality and wildlife from the use of treated lumber?

As discussed in #60, above, after consideration of your comments, all the building materials for the boardwalk will be either a composite of recycled plastic and wood, concrete or untreated lumber.

66. **Appendix A. B2 Footbridge.** This is the first mention of footbridges crossing "steep streambeds." What is the slope of the streambeds,

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how deep will the holes have to be for the bridge foundations? Will cement be used to build the foundations? Will the poles be dug into wetland or fast land? How much treated lumber will be used for the poles? What is the individual and cumulative impact of using and placing treated lumber into or adjacent to wetlands? What is the individual and cumulative impact of using formed concrete for bridge structure and foundation? How much water, wetland, vegetation and habitat will be disturbed/destroyed in the constructing of the boardwalks and footbridges?

As discussed in the DEA and in this response letter, the final alignment for the pathway has not been determined, and no detailed engineering documents have been prepared for any elements of the pathway, including proposed footbridges. When a final alignment is selected, and more detailed plans completed, the plans will be submitted as part of the application materials required for entitlement actions for the various segments of the pathway. These plans, and other application materials, will be available for public review, including proceedings for public hearings on the various entitlements required.

67. **Appendix A. M1 Multi-Use Pathway – on grade. This section identifies six segments with three on the marsh side of Kapaa Quarry Road, and one segment bordering a water catchment area below the industrial park and fed by Kapaa stream, yet there is no discussion on how much cut and fill will be required for each segment. There is no shoulder at this area, so explain how much fill will be needed to create the 20-foot pathway, how much fill material will be brought in, and what type of fill material will be used and what are the impacts from flooding once the water holding capacity is reduced?**

See response to #66, above.

68. **Appendix A. Comments related to: M2 Multi-use Pathway – on fill w/retaining wall; M3 Multi-Use Pathway – Cut slope w/retaining Wall; M4 Multi-Use Pathway – Lowered w/Retaining Wall; M5 Multi-Use Pathway – Away from road.**

See response to #66, above.

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69. **Appendix A. T1 & T2 Pedestrian Trail – Section(s). How much blue rock will be brought in and used for each section? How will vegetation on either side of the trail be cleared by hand or by machine? What is the purpose of clearing 10 feet on either side of the trail? Won't clearing areas invite pedestrians to stray off the trail? How often will vegetation be cleared? Will any trees be cut down? What is the plan to evaluate the area for native and endangered plants before clearing begins? This is the first time the use of "stakes" has been mentioned. How many stakes will be used in this segment and all segments. What are the dimensions of the holes needed for the stakes? What are the dimensions of the stakes? What is the impact from the stakes, gravel, plastic lumber and geotextile fabric on the marsh and wildlife habitat should these materials be wasted away during a flood. Is the six-foot width of the trail an ADA requirement? If the T2 section is not being built to meet ADA standards why is it 6-feet wide? How much cut and fill is required for each segment?**

According to the *Kawai Nui Marsh Pathway Plan*, the T1 and T2 sections of the Pathway will total approximately 13,200 lineal feet. Assuming that these sections are six feet in width with a 4-inch surface of crushed rock, the total of blue rock used will be approximately 975 cubic yards.

It is probable that a small bobcat-type backhoe will be used to clear vegetation for the pathway. Vegetation off the pathway corridor will be cleared and thinned by hand, including the use of chain saws. There are two purposes for clearing and thinning of vegetation off the pathway: (1) to improve views toward the marsh on the "makai" side of the pathway; and (2) to improve vegetation habitat on the "mauka" side of the pathway. The trimming of vegetation on the "makai" side of the pathway will still retain a vegetative barrier between the trail and the marsh, thereby encouraging pathway users to stay on the trail. The frequency of clearing of vegetation after construction of the pathway will depend on a number of factors: (1) rate of vegetative growth; (2) maintenance budget available for the pathway; (3) personnel assigned to oversee the pathway. It is probable that some trees will need to be removed to implement the pathway, although every effort will be made to retain mature trees and route the pathway around these trees. The proposed pathway alignment has been evaluated for the presence/absence of native and endangered plants (Appendix B of the DEA). The results of

Helber Hastert & Fee

Planners, Inc

Ms. Donna Wong

July 18, 2003

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the botanical resources assessment revealed that the pathway corridor is dominated by introduced species. There were no naturally occurring native or endangered species identified during the assessment. Endangered and native plants have been introduced to the area in the vicinity of Na Pohaku O Hauwahine by local groups responsible for the care and maintenance of this site.

The "stakes" you refer to are common elements found in trail and landscape treatment, typically used to reinforce wood or plastic lumber borders. They are made of aluminum and vary in length (1-3 feet) and about 1/2-inch in diameter. If stakes are used on both sides of the T1 and T2 pathway sections and placed at 3 feet on center, approximately 8,800 stakes will be needed. These sections of the pathway are not located in a floodway, so if a flood event occurred, it is probable that they would not be washed away.

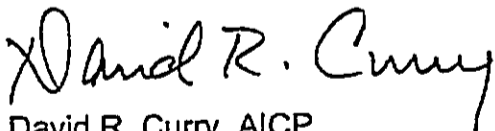
The 6-foot width proposed for the pathway sections are beyond the minimum guideline suggested by the Guidelines for Outdoor Developed Areas (3 feet) for disabled accessibility. Planning for the pathway suggested it was reasonable to provide a generous width.

In regard to volumes of cut and fill, see #66, above.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners



David R. Curry, AICP
Principal

C: Cheryl Soon
Kathy Bryant-Hunter, Acting Chair, Kailua Neighborhood Board No. 31

DOCUMENT CAPTURED AS RECEIVED

TS 0102-2365



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

REPLY TO
ATTENTION OF

June 10, 2002

Regulatory Branch

Ms. Cheryl D. Soon, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Dear Ms. Soon:

This letter responds to your request dated May 23, 2002, for our review of the draft Environmental Assessment for the Kawai Nui Marsh Pathway. Although the alignments for the various pathway segments are not yet firm, it is likely that a Department of the Army permit or permits will be required for some segments. Please have your planning staff coordinate early with this office to insure that permit actions, if required, can be done expeditiously.

If you have any questions concerning this determination, please contact William Lennan of my staff at 438-6986, or FAX 438 4060 and reference File No. 200200359.

Sincerely,

George P. Young, P.E.
Chief, Operations Branch

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12 JUN 13 2002
ENGINEER DISTRICT
HONOLULU

Helber Hastert & Fee
Planners Inc.

July 18, 2003

Mr. George P. Young, P.E., Chief
Operations Branch
Department of the Army
U.S. Army Engineer District, Honolulu
Ft. Shafter, HI 96858-5440



Dear Mr. Young:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of June 21, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

We note your comment that it is likely that a Department of the Army Permit, or permits, will be required for some segments of the proposed pathway. The FEA will identify permits that may be required by the U.S. Army Engineer District, Honolulu.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBERT HASTERT & FEE, Planners

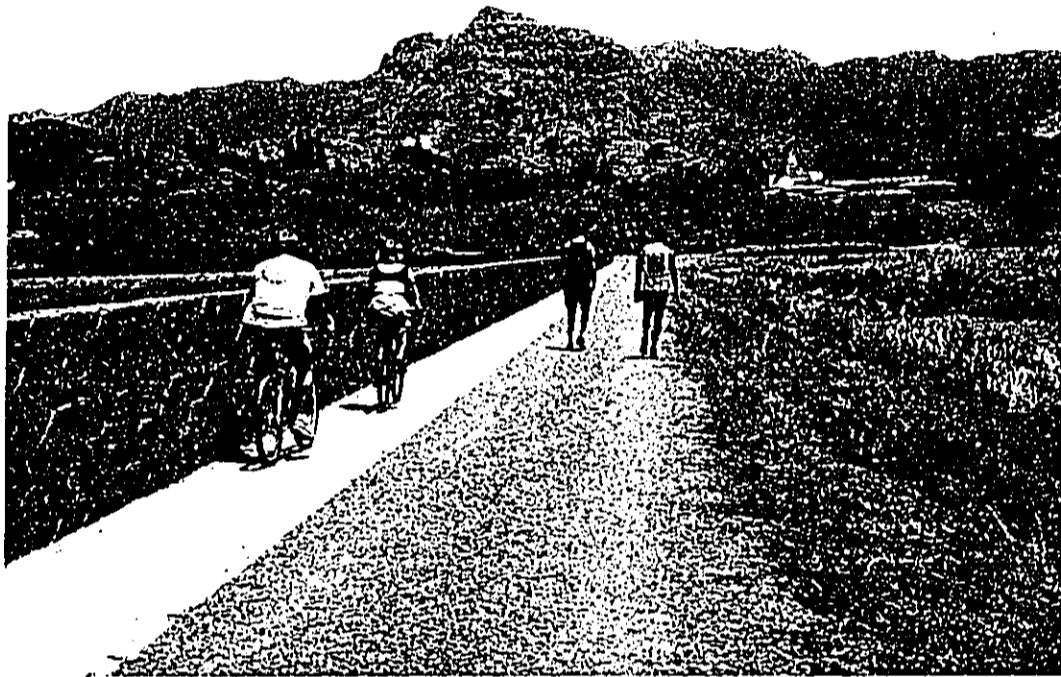
David R. Curry, AICP
Principal

C: Cheryl Soon

2003-08-23-0A-PEA

AUG 23 2003

FILE COPY



Kawai Nui Marsh Pathway Final Environmental Assessment

Prepared for:
City & County of Honolulu, Department of Transportation Services

Prepared by:
Helber Hastert & Fee, Planners

July 2003

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Chapter 1
INTRODUCTION &
SUMMARY

1.0 INTRODUCTION AND SUMMARY

This Final Environmental Assessment (FEA) is prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, and the Hawaii Revised Statutes (HRS) Chapter 343 and Title 11, Chapter 200, Hawaii Administrative Rules (HAR) of the Department of Health (DOH).

The proposed project is known as the "Kawai Nui Marsh Pathway", given its location in the Kawai Nui Marsh.

1.1 GENERAL INFORMATION

Project Name:	Kawai Nui Marsh Pathway
Proposed Action:	To construct a perimeter trail system around Kawai Nui Marsh
Applicant/Petitioner:	City and County of Honolulu, Department of Transportation Services
Accepting Authority:	City and County of Honolulu, Department of Planning and Permitting
Property Owner:	City and County of Honolulu / State of Hawaii, Department of Land and Natural Resources (DLNR)
Planning Consultant:	Helber Hastert & Fee, Planners Pacific Guardian Center, Makai Tower 733 Bishop Street, Suite 2590 Honolulu, Hawai'i 96813
Project Location:	Kailua, Ko'olaupoko, O'ahu, Hawai'i
Tax Map Keys:	4-2-13:5 State of Hawaii, Owner 4-2-13:10 State of Hawaii, Owner 4-2-13:22 City and County of Honolulu, Owner 4-2-13:38 State of Hawaii, Owner 4-2-15: Por. 6 Michael C. Baldwin Trust, et al., Owner 4-2-16:1 City and County of Honolulu, Owner 4-2-16:5 City and County of Honolulu, Owner

	4-2-16:6 City and County of Honolulu, Owner
	4-2-103:18 State of Hawaii, Owner
Total Acreage:	830 Acres
State Land Use District:	Conservation/Urban
City and County of Honolulu Zoning:	P-1 Restricted Preservation/P-2 General Preservation

1.2 INTENDED USE OF THIS DOCUMENT

This FEA has been prepared to address the environmental and social impacts of the construction of the proposed project. The proposed project is designed to enhance the visual, educational, cultural, archeological, and historical value of Kawai Nui Marsh.

1.3 SUMMARY OF PROBABLE IMPACTS AND MITIGATION MEASURES

The intent of the proposed project is to minimize potential impacts to any affected areas. It is expected that any potential impacts will be short-term and minimal during the construction of the proposed project. After the construction of the pathway, there are no foreseeable long-term impacts.

1.3.1 Physical Environment

The impacts to the Physical Environment are limited. The following sections have no anticipated negative impacts: Geology, Climate, Topography, Flora, Avifauna, Water Resources (Kawai Nui Marsh Hydrology Section), Cultural Resources (Oral Documentation and Legends Section, Kawai Nui Agricultural and Aquacultural Resources Section, Historical Resources Section), Aesthetic and Visual Environment and Land Use Controls.

The following sections have anticipated negative impacts for the project: Soil, Water Resources (Water Quality Section), Aquatic Species and Cultural Resources (Archeological Assessment Section).

Soil. The overall project development will not affect a large portion of the project site. Any potential impacts are short-term and minimal during the construction of the proposed project. No outside soil will be brought in to grade the pathway. Existing, on-site soil that is cleared (or cut) will be used as fill material to grade the pathway. After the construction of the pathway, there is no foreseeable long-term impact.

Compliance with Best Management Practices (BMPs) will mitigate the potential effects of exposing soil to storm and wind erosion. BMPs might include: wetting exposed soil; erecting silty barriers, as necessary; grassing over and landscaping areas to prevent soil loss and erosion and limiting the area of ground disturbance, among others. The selection of appropriate BMPs will be made during the final design of the proposed project.

Water Quality. During excavation work for the proposed pathway, soil could erode into the marsh and reduce water quality. However, because of the minimal scope of the excavation, the impact of this activity will be negligible.

In addition, the project has been proposed in segments to minimize the impact to the physical environment. After the construction of proposed boardwalks and viewing platforms there is no foreseeable long-term impact to water quality. The boardwalks and viewing platforms would provide up-close but non-invasive viewing opportunities of wildlife habitats and opportunities for students to conduct water quality and wetland resource studies.

Compliance with BMPs will mitigate the potential effects of exposing soil within the marsh. Such BMPs might include: erecting water and soil barriers, where necessary and limiting the area of water disturbance, among others. The selection of appropriate BMPs will be determined during the final design of the proposed project.

Aquatic Species. The proposed project requires the removal of small amounts of soil in and around the marsh for boardwalk construction. Soil erosion during the placement of boardwalk posts could degrade the marsh's aquatic habitat by increasing turbidity.

Impacts to aquatic species are anticipated to be short-term and minimal during the construction of the boardwalks and viewing platforms. These facilities will provide up-close, but non-invasive opportunities to view endangered waterbirds in their natural habitat. Educational opportunities will be provided for field studies such as aquatic species, water hydrology, and water quality.

Archeological Assessment. A positive long-term impact associated with the proposed pathway will be an increase in accessibility to view and study the archeological, cultural and historical resources of the marsh. The recommended pathway alignment will allow pathway users to understand Kawai Nui's rich cultural heritage. The project looked at the potential, feasibility and impacts of trail construction from the standpoint of historic preservation and historic/cultural interpretation.

The final pathway alignment may vary based on future decisions by DLNR. Nonetheless, the proposed trail should be designed to avoid direct impacts to

cultural sites, but close enough to educate visitors about Kawai Nui Marsh's role in the *ahupua`a* of Kailua.

The following three mitigation measures are recommended once the final pathway alignment for individual segments is determined:

1. A complete archeological inventory survey for pathway segments should be completed, as needed, prior to commencement of construction.
2. If necessary, complete any data recovery prior to construction. Data recovery is a form of mitigation and it negates or lessens the impact of a project's development by collecting available information before a historic property is affected.
3. Prepare an archeological preservation plan for any affected archeological and cultural sites. This plan would include the pathway construction methods, the proposed mitigation of impact on the historic properties, long and short-term preservation measures for the historic properties and how properties should be interpreted and protected.

1.3.2 Socio-Economic Characteristics

The impacts to Socio-Economic Characteristics are limited. The following sections have no anticipated negative impacts: Kailua Town, Castle Hospital and Industrial Activities.

The following sections have potential negative impacts for the project: Ranch Operations and Residential Communities.

Ranch Operations. Impacts to the status of Knott Ranch will depend on future decisions by DLNR regarding cattle grazing activities. Today, Knott Ranch operations utilize the area where Segment 3 of the recommended pathway would be located. DLNR has indicated it prefers to continue cattle grazing to control vegetation in the marsh. The proposed alignment would not impact this decision. VO Ranch will not be affected by the proposed project, as the proposed alignment is along Kapaa Quarry Road.

The "Kawai Nui Marsh Pathway Report" (HHF, 2001) addressed ranch operation concerns with the following mitigation measures: (1) the final alignment of Segment 3 should be determined after the USACE pond restoration project is designed; (2) if ponds are constructed, construct a pedestrian trail at the base of the slope behind Kailua Road (to link to DLNR's 1994 Master Plan concepts); and (3) if ponds are not constructed and cattle grazing continues in the area, consider eliminating construction of a trail in this segment.

Residential Communities. Approximately 17,000 residents live within one-half mile of the Kawai Nui Marsh perimeter. These include residents of the Kalaheo, Coconut Grove, Kukanono and Kawai Nui Vista neighborhoods, which are adjacent to the marsh perimeter (DBEDT, 2000). There will be a positive impact to recreational opportunities in Kailua. There is also an anticipated positive impact to improved access to Kawai Nui Marsh. The Pathway Report (HHF, 2001) recommended several locations to improve access including: (1) construct a parking lot and pedestrian pathway at the terminus of the southern end of the levee (Segment 1); (2) construct a spur trail from Ulupo Heiau into the marsh (Segment 1); (3) possibly develop a spur trail from the visitor center site as recommended in the 1994 DLNR plan (Segment 4); and (4) construct a parking lot and access trail near Na Pohaku o Hauwahine (Segment 4).

A primary measure to mitigate anticipated traffic impacts is to direct traffic and visitors to alternative parking locations. The Pathway Report (HHF, 2001) recommended that a parking area be constructed at the end of the maintenance road that terminates at the Kailua Road end of the levee. This lot is intended to provide approximately 15-20 stalls. The entrance to the parking lot would utilize the existing maintenance access road off Kailua Road. This lot would reduce traffic through in the Kukanono neighborhood, and would be accessible from alternative transportation routes (bike and bus route and roadway/sidewalk circulation). Prohibiting access to the pathway through the Kukanono neighborhood will eliminate the potential for pathway users to park on public streets in Kukanono.

According to the DLNR Master Plan, increased parking opportunities are to be provided at the proposed Kawai Nui Gateway Park (also called Kalaheo Park) on Mokapu Boulevard, at Na Pohaku o Hauwahine on Quarry Road, at Mokulana Peninsula on Kailua Road, and at the proposed visitor center across from Le Jardin School.

Mitigation measures addressing potential safety and crime impacts include: (1) prohibiting access to the trail through the Kukanono and Kawai Nui Vista residential subdivisions; (2) keeping the trail alignment well away from the residential areas (use a switchback alignment behind Castle Hospital to keep the trail away from residential lots); and (3) using railings, fencing, vegetation density and signage where appropriate to keep pedestrians on the pathway within its identified alignment.

Potential noise impacts will be alleviated by: (1) keeping the pathway alignment away from residential areas; (2) maintaining a minimum distance of 100 feet from residential house lots for recommended alignments; (3) prohibiting motorized vehicles be from all portions of the pathway; (4) using gates and other design features at trail heads to restrict access to the pathway by motorcycles and other types of motorized vehicles; (5) installing informative signage to indicate park hours; and (6) minimizing access points.

Cultural Impact Evaluation. A good faith effort to investigate the potential for adverse impacts to any archeological, avian, earth, fish, and plant resources which Kawai Nui has held for Hawaiians has identified potential impacts only to archeological and religious sites. These impacts can be mitigated by designing the final pathway alignment to avoid cultural resources. Other mitigation measures include coordinating final trail design and construction with the Kawai Nui Heritage Foundation, the Kailua Hawaiian Civic Club, the Office of Hawaiian Affairs, and the DLNR State Historic Preservation Division, among others.

1.3.3 Public Facilities and Services

Recreational Facilities. Construction of the proposed project will not have a significant impact on the continued use of existing community parks in the study area. Pathway users are expected to utilize parking stalls at existing parking lot locations. This presently takes place at the Kawai Nui Neighborhood Park by those wanting access to the north end of the levee. With the recent improvements to the parking lot at this location, space to accommodate park visitors is generally not a problem except for some peak afternoon hours.

To mitigate any impacts of an increase in parking at existing parking facilities, the DLNR Master Plan recommends construction of additional parking at the proposed Kawai Nui Gateway Park site on Mokapu Boulevard, at Mokulana Peninsula along Kailua Road, at the visitor center site across from Le Jardin School, and at Na Pokaku O Hauwahine Overlook on Kapaa Quarry Road. Additionally, during the planning process for this report, a parking lot of 15 to 20 stalls is recommended to be constructed along Kailua Road at the southern end of the levee in order to reduce the amount of vehicles transiting through the Kukanono neighborhood to park at the YMCA.

Police and Fire Protection. There are two fire stations that serve the Kailua area, including the project site. The first is located on Kalaniana'ole Highway, approximately 1.5 miles south of Kawai Nui Marsh. The other fire station is located next to the police station, on Kuulei Road east of the marsh. The police station serves the area from Waimanalo to the Marine Corps Base Hawaii, Kaneohe Bay.

It is possible that once the pathway is completed, there could be an increase in activities associated with the pathway, such as loitering, loud gatherings of groups (drinking, etc), although this should not represent a significant increase to existing calls for service.

1.0 INTRODUCTION AND SUMMARY

This Final Environmental Assessment (FEA) is prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, and the Hawaii Revised Statutes (HRS) Chapter 343 and Title 11, Chapter 200, Hawaii Administrative Rules (HAR) of the Department of Health (DOH).

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Project Location:	Kailua, Ko'olaupoko, O'ahu, Hawai'i
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	4-2-16:6 City and County of Honolulu, Owner
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This FEA has been prepared to address the environmental and social impacts of the construction of the proposed project. The proposed project is designed to enhance the visual, educational, cultural, archeological, and historical value of Kawai Nui Marsh.

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Soil. The overall project development will not affect a large portion of the project site. Any potential impacts are short-term and minimal during the construction of the proposed project. No outside soil will be brought in to grade the pathway. Existing, on-site soil that is cleared (or cut) will be used as fill material to grade the pathway. After the construction of the pathway, there is no foreseeable long-term impact.

1.4 DETERMINATION

The significance criteria found in §11-200-12 of the Hawaii Administrative Rules (HAR) of the Department of Health (DOH) are employed to determine whether any action may have an effect on the environment:

- (1) The proposed pathway does not involve an irrevocable commitment to loss or destruction of any natural or cultural resource. The principles guiding the project are intended to increase awareness of such resources and educate the public about the need for their preservation.
- (2) The project will not curtail the range of beneficial uses of the environment. In fact, implementation of the pathway will increase beneficial uses of the environment, making it easier to study Kawai Nui Marsh, and appreciate the cultural resources around its perimeter.
- (3) The pathway project is consistent with the State's long-term environmental policies, and supports agency goals and plans for management of Kawai Nui Marsh and its environs.
- (4) The project will not substantially affect the economic welfare, social welfare, and cultural practices of the community or State. The implementation of the project will improve access to cultural resources around the marsh.
- (5) Public health will not be affected by the project.
- (6) There will be no substantial secondary impacts resulting from project implementation, such as population changes or effects on public facilities.
- (7) Evaluation of the project identified potential impacts associated with stormwater runoff and sedimentation. However, because of the modest scope of the project, and the ability to use Best Management Practices (BMPs) to mitigate impacts, it is not anticipated that there will be degradation of environmental quality.
- (8) Analysis conducted for the EA has shown that the real extent of the pathway represents a minimal percentage of the drainage basin that empties into Kawai Nui Marsh. BMPs employed during the construction and maintenance of the pathway will further limit impacts to the marsh. The marsh is considered an island-wide resource that absorbs region-wide impacts. For decades, Federal, State, and County agencies, in addition to community groups and individuals have recognized the importance of Kawai Nui Marsh. The implementation of the proposed action is one element of a larger vision for the marsh. As such, the overall impacts of the project will be positive in nature.

cumulative

- (9) Although there are endangered water birds (and habitat) in the vicinity of the proposed project, they will not be substantially affected by the implementation of the project. *Spf on habitat*
- (10) Air and ambient noise quality will not be affected by the proposed project. Analysis indicated the potential to impact the water quality of the marsh, but mitigation measures will minimize this impact.
- Protective area* (11) Kawai Nui Marsh collects stormwater runoff from a regional drainage basin, and has flooded in recent history (1988). Flood levee was constructed subsequent to the 1988 flood, and will function as a segment of the overall pathway. Access to the levee will be restricted during storm events that could flood the levee trail.
- (12) The implementation of the proposed pathway will not affect vistas of the marsh, but will make vistas of the marsh available to more people.
- (13) The implementation of the project, and its longer-term maintenance and operation will not require considerable energy consumption. Much of the work associated with the project can be done by hand, or smaller-scale construction vehicles.

Therefore, the overall and cumulative effects of the proposed action will not have a significant adverse effect on the environment, under the Hawaii Revised Statutes (HRS), Chapter 343 and Title 11, Chapter 200, Hawaii Administrative Rules (HAR) of the Department of Health (DOH), and an Environmental Impact Statement will not be required.

1.5 COMPATIBILITY WITH LAND USE PLANS AND POLICIES

The proposed project is consistent with the City and County of Honolulu, State of Hawaii and Federal Government land use plans and policies. Chapter 6 provides a detailed description of the permits and approvals needed from the various County, State and Federal agencies. A summary of possible required approvals is listed below. No approvals have been obtained for the project at this time.

Authority	Approving Agency
<u>Federal Government</u>	
Individual/Nationwide Permit	USACE
Regional General Permit	USACE
Section 10 Permit	USACE
Federal Consistency Determination	USACE
Memorandum of Agreement	Federal Advisory Council on Historic Preservation

State of Hawaii

Section 401 Water Quality Permit	DOH, Clean Water Branch
Section 404 Permit	DOH, Clean Water Branch
Memorandum of Agreement	DLNR, SHPD
Conservation District Use Permit	DLNR
Federal Consistency Determination	Department of Business, Economic Development & Tourism, CZM Branch
Stream Alteration Permit	DLNR

City and County of Honolulu

Special Management Area Use Permit	Honolulu City Council
Grading Permit	DPP – Civil Engineering Branch

1.6 ALTERNATIVES CONSIDERED

Three alternatives were considered for the proposed project: 1) the No Action Alternative; 2) Alternative Design # 2 - Department of Land and Natural Resources (DLNR), "1994 Kawai Nui Marsh Master Plan" concept; and 3) Alternative Design # 3 – "Perimeter Bike Pathway" concept.

1.6.1 No Action Alternative

The proposed pathway is intended to provide access to many areas currently inaccessible. The No Action alternative means the study area will remain in its existing state and access to the marsh for recreational and educational purposes will not be enhanced. This is inconsistent with the DLNR 1994 Master Plan, the USACE 1997 Restoration Project and the desires of many residents of Kailua.

Access in and around the levee will continue to be limited. Kawai Nui Marsh users (pedestrians, bicyclists and joggers) would continue to access the levee from Kaha Park (Kawai Nui Neighborhood Park) or at the levee's southern terminus at Kailua Road.

Educational opportunities associated with the marsh will continue to be limited. Currently, the Kawai Nui Heritage Foundation and adjacent elementary and high schools utilize the marsh for field studies, such as hydrology and water quality sampling. However, access in and around the marsh is limited to the open water areas (Na Pohaku o Hauwahine and the undeveloped parcel across from the Kalaheo High School - future Kawai Nui Gateway Park - Mokapu Site) and from the levee.

Without the proposed project, opportunities for visitors and community residents to enjoy the resources of marsh would be limited. For these reasons, the alternative was rejected.

1.6.2 Alternative Design # 2 - Department of Land and Natural Resources (DLNR), "1994 Kawai Nui Marsh Master Plan"

Alternative design # 2 is based on the DLNR 1994 Master Plan and takes into account the multiple educational and recreational opportunities associated with the marsh.

The plan considered the following development concepts be incorporated into future phases:

- A visitor center (at the Kailua Road/Kapaa Quarry Road intersection).
- A cultural park (for Ulupo Heiau and Pahukini Heiau).
- An ethnobotanical garden (reflecting the medicinal, dye, fiber and ceremonial dryland plants once planted there).
- An agricultural area (for wetland taro plantings).
- Increasing water bird habitats.
- A maintenance area.
- Increased park space (utilizing undeveloped land).
- A trail system.

The fundamental planning objectives of the trail system are to provide access to the marsh and recreational and educational opportunities in and around the marsh. These planning objectives follow the concepts of the 1983 State Resource Management Plan, which encouraged hiking and jogging trails, access to the marsh, educational facilities and overlooks around the marsh's perimeter.

This perimeter trail would link the visitor center, cultural parks, ethnobotanical garden, archeological and cultural sites, agricultural areas, and other development components listed above.

A positive aspect of this alternative linked all of Kawai Nui Marsh's educational, historical and cultural resources. However, it was not selected for several reasons: (1) educational and habitat viewing opportunities in the northern portion of the marsh along Kapaa Quarry Road are limited; (2) remote areas of the pathway, particularly along Kapaa Quarry Road, may have security issues; (3) a perimeter pathway would require significant filling in the northern portion of the marsh; and (4) a perimeter pathway would conflict with cattle grazing if DLNR continues this activity in the future.

1.6.3 Alternative Design # 3 - "Perimeter Bike Pathway"

This alternative considered the Kailua Vision Team's concept to build a "Bike Pathway" around the perimeter of Kawai Nui Marsh.

While this alternative expanded the opportunities for recreational use around the marsh, it had significant negative aspects. Most notably, the concept was not

consistent with the DLNR Master Plan, which focused on pedestrian activities and educational opportunities. Second, construction of a bike path at the edge of the wetland would require landfill that would potentially impact the marsh resource. For these reasons, this alternative was not selected.

1.6.4 Conclusion

The no action alternative, alternative design # 2, and # 3 did not fully address the goals and objectives for the proposed path as expressed by the Kailua Vision Team and participants at community meetings.

The proposed action was determined to be the most responsive to the problems, issues and needs identified in the study and was selected as the recommended plan.

1.7 Unresolved Issues

The following issues remain unresolved at the completion of the EA:

- (1) The status of cattle ranching within the marsh;
- (2) Final design of the USACE pond restoration project;
- (3) Ultimate maintenance responsibility for all segments of the proposed pathway;
- (4) A management plan for the completed pathway;
- (5) The successful completion of consultation under Section 106 of the National Historic Preservation Act, if Federal funds are used for any portion of the Pathway project;
- (6) Traffic studies to determine the need for a right-turn deceleration lane for safe access from mauka-bound Kailua Road to the proposed parking area on the east side of the levee, and the need for a crosswalk from a proposed parking area on the south side of Kapaa Quarry Road, in the vicinity of the Model Airplane Park.

1.8 PROJECT COST

Pathway construction costs have been estimated to be \$1.3 million (HHF, May 2001). However, this estimate does not account for any "self-help" or community-based work efforts to implement the pathway.

Chapter 2
PROPOSED
KAWAI NUI MARSH
PATHWAY DESCRIPTION

2.0 PROJECT DESCRIPTION

2.1 INTRODUCTION

The proposed project is located in Kailua Town, Ko`olaupoko, O`ahu. The *ahupua`a* of Kailua is the largest valley and the largest *ahupua`a* of the Ko`olaupoko District.

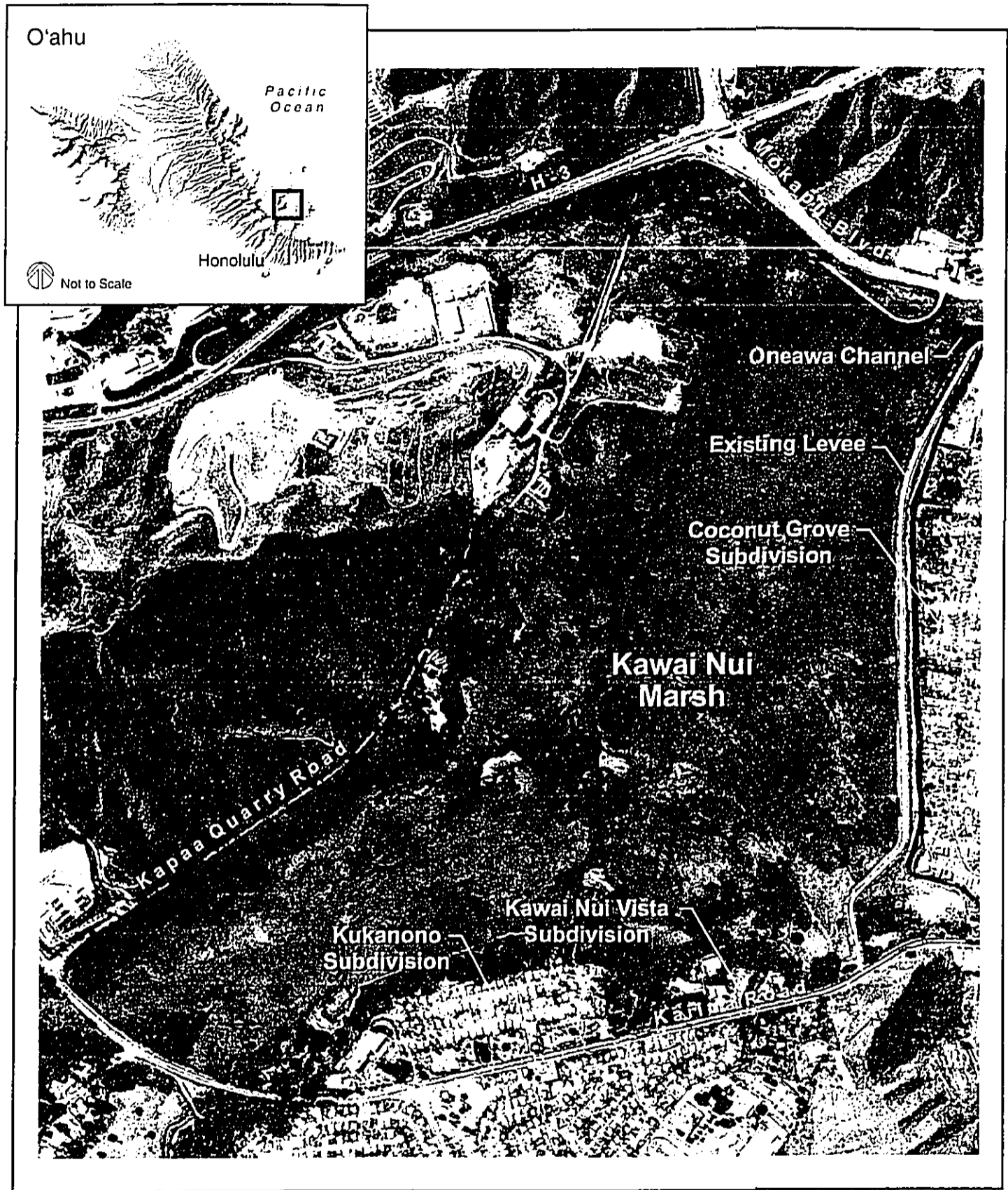
Kawai Nui Marsh is the largest remaining wetland in Hawai`i, consisting of 830 acres. It is located on the northeast, *ko`olau* (windward) side of O`ahu. It is nestled between the Ko`olau mountain range and Kailua Town. The marsh is bound by Kapaa Quarry Road to the west, Mokapu Boulevard to the north, the Coconut Grove subdivision to the east and Kailua Road to the south (Figure 1). Ten miles to the south is Honolulu. The Maunawili, Kapaa and Kahana Iki Streams are three tributaries that empty into the marsh. The marsh is connected to Kailua Bay by Oneawa Channel.

Currently, the City and County of Honolulu is the primary landowner of the marsh (Figure 2). The City is working to transfer ownership of the marsh's 830 acres to the State DLNR, which will be responsible for the maintenance of the marsh once the right, title and fee simple interest of the lands are transferred. The Oneawa Channel will also be transferred to the State by cancellation of an Executive Order that initially transferred the channel to the City. The two transfers are being handled as separate matters.

2.2 PROJECT BACKGROUND

Inspiration for the proposed project came from the 1983 Resource Management Plan for Kawai Nui Marsh by the former State of Hawaii, Department of Planning and Economic Development (DPED). The plan outlined objectives, policies and a comprehensive list of recommended actions to manage and protect the marsh. Later, DLNR expanded the project under the 1994 Master Plan. These two reports provided guidance for the proposed project.

Kawai Nui Marsh acts as a flood control facility for Kailua Town. It provides the community with recreational, cultural, archeological, religious, educational, and wildlife opportunities. The DLNR 1994 Master Plan trail system was proposed to encompass these values. Development concepts included a visitor/educational center, cultural park, ethnobotanical garden, agricultural areas, waterbird enhancement areas, aquatic fauna migratory habitat, parks, and a trail system. The objective of the trail system was to provide access along the perimeter of the marsh in a contiguous manner that links the various uses. Long-term planning envisioned the trail system to link to the Mount Olomana and Maunawili Valley trail systems. The trail would be a recreational and educational asset, allowing access for users of all-ages.



Proposed Project Location

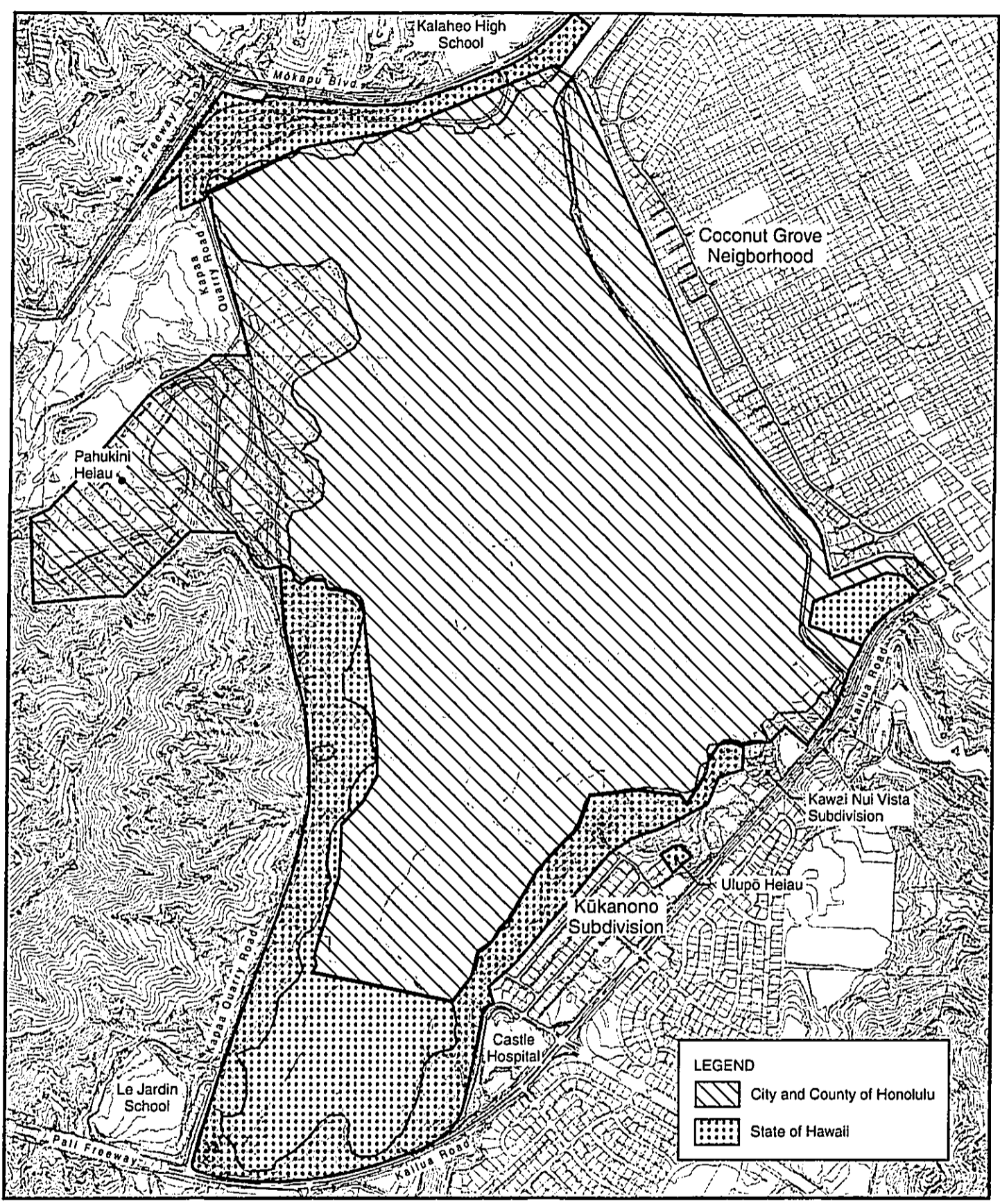
Kawai Nui Marsh Pathway
 Kailua, Ko'olaupoko, O'ahu



Not to Scale

Figure

1



Land Ownership
 Kawai Nui Marsh Pathway
 Kailua, Ko'olaupoko, O'ahu

0 Feet 1300
 0 Meters 400

Figure
2

2.2.1 Coconut Grove Community Association (CGCA)

In August 1998, the CGCA applied for State Department of Transportation (DOT) Funds to use Federal Highway Administration Funds (FHWA) to build a "bike pathway" around the perimeter of Kawai Nui Marsh in accordance with the recommendations of the DLNR 1994 Master Plan. In its application to DOT, the CGCA described the proposed project as a pedestrian pathway/bikeway to provide visitors and residents better access between the various components of the area's transportation system. These included Mokapu Boulevard, local streets adjacent to the Coconut Grove Community, streets within the business district of Kailua Town, and Kailua Road (Figure 3).

2.2.2 Community Planning Process

Planning for the proposed project commenced in 1999 as part of the City's "21st Century Oahu" community planning process. The scope of work included a community outreach effort that included over 40 potential stakeholders. A series of public meetings were held from December 1999 to August 2000 and provided community input into the planning process. Input on the project was received from the following:

Government

US Army Corps of Engineers (USACE)

State of Hawaii

Department of Land and Natural Resources (DLNR)

Division of Forestry and Wildlife (DOFAW)

Land Division

State Trails (Na Ala Hele)

Historic Preservation Office (SHPO)

City and County of Honolulu

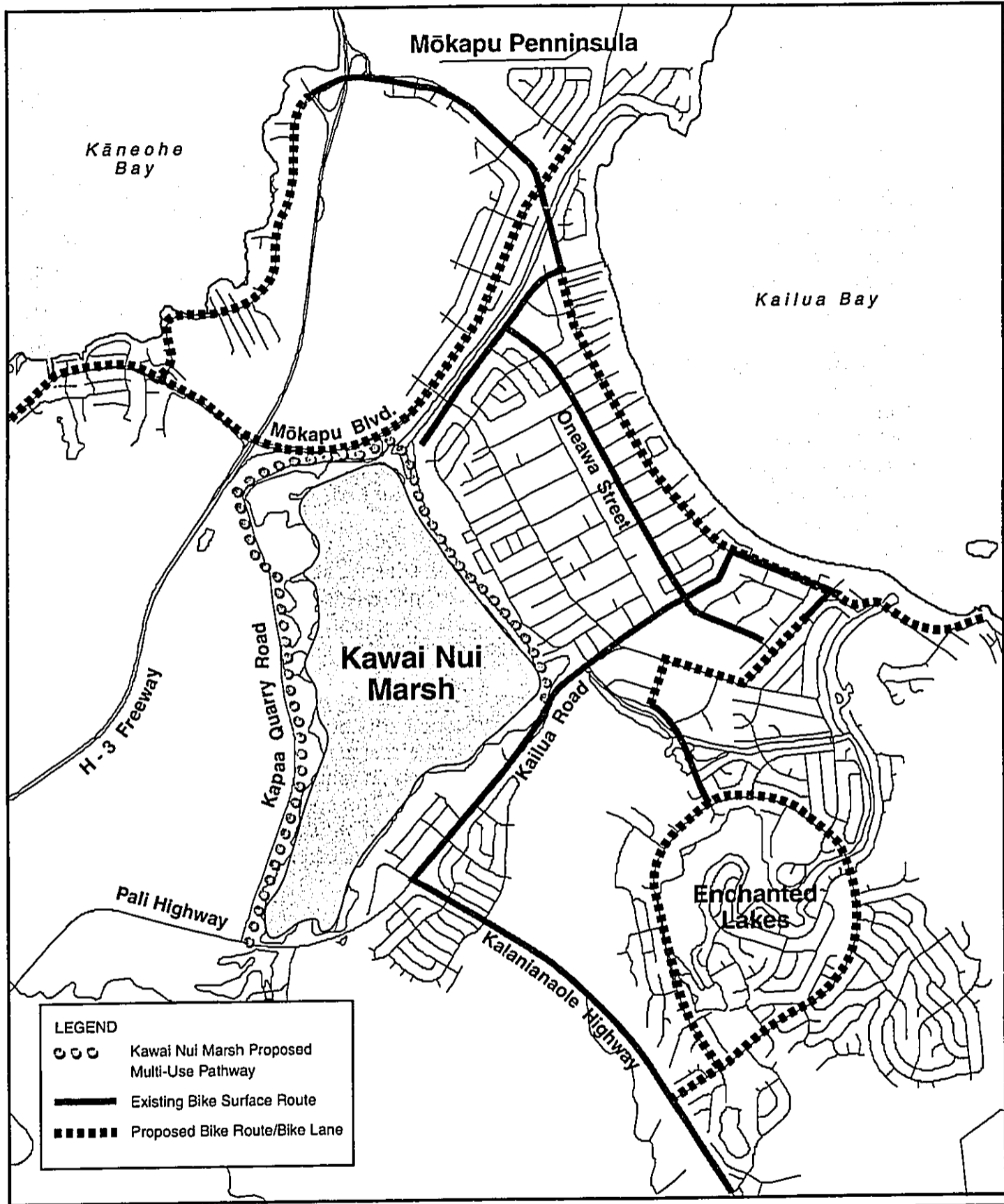
Department of Planning and Permitting (DPP)

Department of Transportation Services (DTS)

Ranching Operations

VO Ranch

Knott Ranch



Regional Bike Plan

Kawai Nui Marsh Pathway
 Kailua, Ko'olaupoko, O'ahu



Figure
3

Community Groups

Kailua Neighborhood Board (Recreation Sub-Committee)
Coconut Grove Community Association (CGCA)
Kukanono Community Association
Kawai Nui Heritage Foundation
Model Airplane Club
Hawaii Bicycling League (HBL)
Castle Foundation
Windward YMCA
Numerous Individuals in the Kailua Community

2.3 PROPOSED KAWAI NUI MARSH PATHWAY PROJECT

The planning process for the proposed project provided the opportunity to take recommendations from previous planning efforts and evaluate the detailed issues involved in their implementation. The DLNR 1994 Master Plan concluded that the trail system at Kawai Nui Marsh was to be a perimeter trail. The current planning effort refined the DLNR concept as follows:

1. Participants in the community outreach process did not see the pathway as "only a perimeter trail." Opportunities for different experiences, and the need to provide for existing uses or those proposed in the future, led to the conclusion that pedestrian and bicycle opportunities should be included.
2. Community participants recommended not constructing a pedestrian trail on the interior (marsh) side of Kapaa Quarry Road in the northern portion of the marsh. Few critical habitats exist in the area and a significant portion of the pathway (estimated at about 3,000 linear feet) would require fill or boardwalks since areas adjacent to the road include wetlands. The community participants recommended the pathway should be located on the *mauka* (mountain) side of Kapaa Quarry Road with a focus on recreational activities such as jogging and/or bicycling.
3. The existing flood control levee should be shown as a multi-purpose pathway, which would provide pedestrian, jogging and bicycling opportunities. Community participants noted the significance of the levee as an existing resource and recommended the first priority of future pathway development should begin at the southern end (by Kailua Road) of the levee.
4. The southern portion of the study area (from the levee to Kapa`a Quarry Road) was recommended for pedestrian access only, based on the evaluation of the natural resources of the marsh. The southern portion of the marsh has the greatest concentration of cultural features and is close to water bird habitats. Future plans to expand water bird habitats in the southern portion of the marsh would strongly enhance the area's potential for recreational and educational opportunities.

5. Along Kapaa Quarry Road, the concept was to provide a multi-purpose pathway for recreational use with pedestrian access to the marsh at prominent natural resource locations.

Figure 4 provides an overview of recommendations for the proposed project.

2.3.1 Pathway Guiding Principles

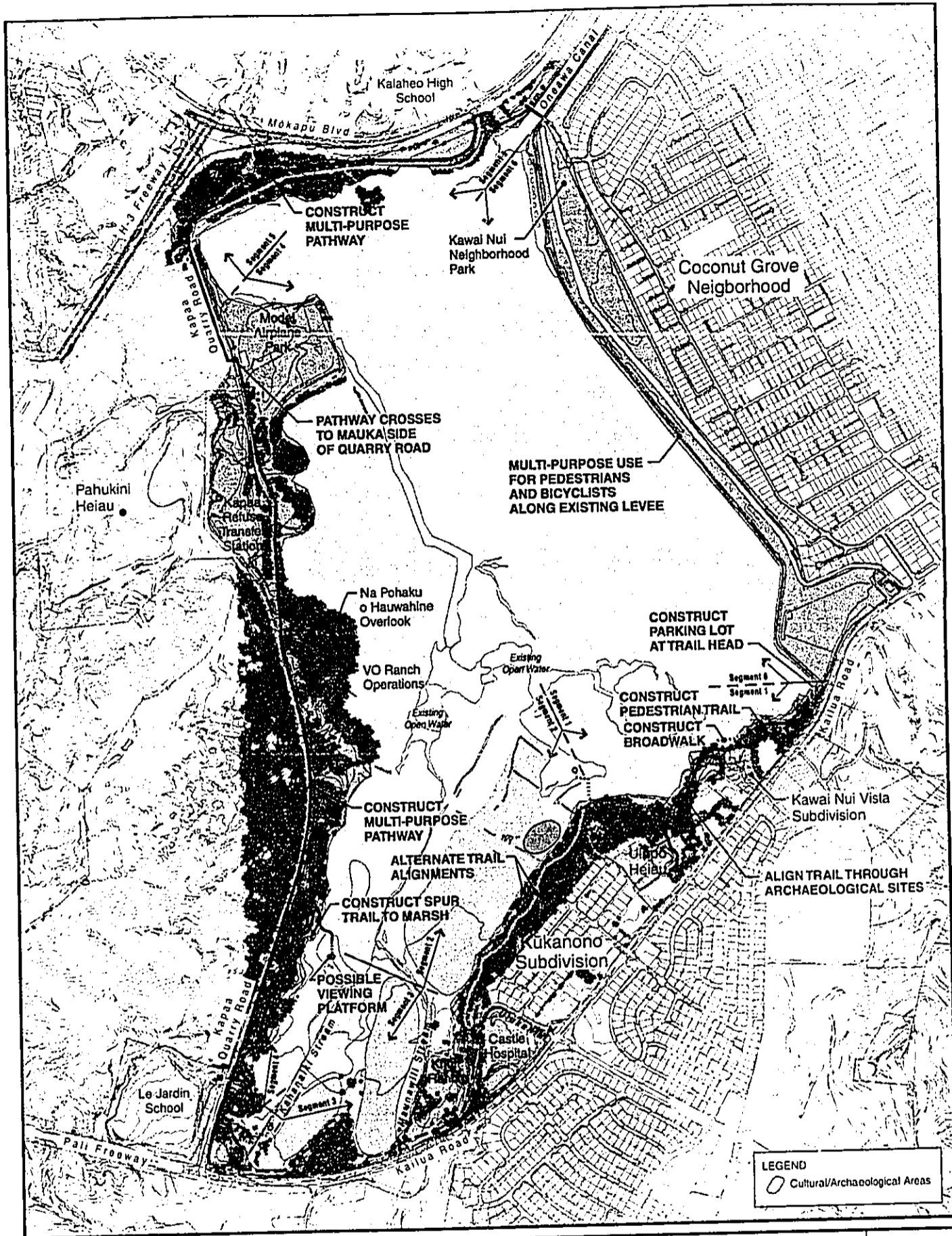
Guiding principles were formulated to help determine the layout and design of the proposed pathway. The guiding principles were based on community input, site analysis, and research on pedestrian and multi-use pathway standards. The intent of the guiding principles is to ensure that: (1) the pathway is designed in a manner that preserves and protects the resources of the marsh; (2) new recreational and educational opportunities are provided; and (3) community concerns are recognized.

The general guiding principles for the proposed project are to:

- Provide a diversity of experiences by having a mix of open and closed trails, natural features, wildlife viewing, and historic sites along the marsh fringe;
- Provide experiences for pedestrians, joggers, bicyclists, and disabled individuals of all ages;
- Design portions of the trail for active multi-use and passive nature experiences;
- Provide safe viewing experiences;
- Identify logical access points and links to other trail systems and transportation routes such as bike trails, bus routes, and roadway/sidewalk circulation;
- Link the pathway to the proposed DLNR 1994 Master Plan components;
- Minimize visitor impacts on wildlife, natural features, and significant historic and archeological sites;
- Minimize conflicts with ongoing ranching operations and private residences – regarding issues such as privacy, security, noise pollution, parking, street safety, and trespassing;
- Recognize existing site opportunities and natural features, such as interesting flora, landmark trees, unusual rock outcroppings, panoramic viewpoints, and educational opportunities; and
- Segment major sections of the trail, as much as possible (entry/exit access points, focal points, parking, and feature diversity), so that the entire trail can be implemented in phases without undue fragmentation.

2.3.2 Design Features

To accommodate the various environmental settings and physical constraints around the marsh, different pathway designs were proposed. Designs for the



Proposed Kawai Nui Marsh Pathway

Kawai Nui Marsh Pathway
 Kailua, Ko'olaupoko, O'ahu

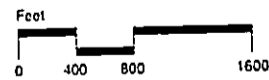


Figure
4

multi-purpose pathway included construction - at grade, on fill with retaining wall, cut slope, and cut and fill. Pedestrian trails included areas meeting Americans with Disabilities Act (ADA) standards, and others with various grade conditions strictly for hikers. Boardwalk treatments were also utilized.

2.3.3 Pathway Access

In order to preserve the beauty and ecology of the marsh, and to minimize the disturbance to adjacent residential communities, clearly defined and controlled access points to the pathway network were developed.

Safety, security, restricting motorized vehicles, and appropriately sized parking lots were important elements of the location of access points to the pathway. Parking areas and trailheads were located away from existing residential communities to minimize the negative impacts of the trail.

During periods of trail maintenance, marsh pond excavations, and/or levee maintenance, access to portions of the trail may be closed. During the rainy season, access to the lower portions of the trail might be limited as boardwalks might be flooded or cattle grazing operations might shift to avoid flooded areas.

2.3.4 Americans with Disabilities Act Requirements

The Americans with Disabilities Act (ADA) requires new trails constructed with public funds for pedestrian use to be made accessible to the disabled. The proposed project represents an opportunity that provides recreational and educational opportunities in a natural setting for the physically disabled.

The ADA accessibility guidelines note a trail is "a route that is designated, or constructed for recreational pedestrian use or provided as a pedestrian alternative to vehicular routes within a transportation system." The paving of trails is not a requirement as long as the surface is "firm and stable." Handrails and edge protection along the trails are not required for ADA accessibility, but if they are provided they should meet appropriate standards.

Due to terrain conditions in several portions of the recommended alignment (e.g., within portions of Segments 1 to 4), it is not practical to provide for ADA accessibility. Departure from specific accessibility guidelines is permitted for any portion of the pathway where terrain or the prevailing construction practices make ADA compliance unfeasible.

Areas where ADA accessibility will be ensured include: the existing levee; the trail from Ulupo Heiau to the viewing platform (at the marsh level); at the visitor center; and along the entire length of the multi-purpose pathway along Kapaa Quarry Road. Pathways from future and expanded parking areas at both ends of the levee need to provide access onto the levee according to ADA guidelines.

Additionally, proposed wetland/bird habitat improvements within the marsh should include opportunities for all visitors to enjoy viewing plants and wildlife activities within the marsh. As a general guideline, all facilities will be designed to meet the requirements of the Americans with Disabilities Act and Chapter 103-50, HRS. Buildings, facilities, and sites should also incorporate the best designing practices as noted in the recommendations from the U.S. Access Board's Regulatory Negotiating Committee on Access to Outdoor Developed Areas, the Recreation Access Advisory Committee's final design guidelines for "Accessible Recreation Facilities," and/or other current documents providing accessibility guidelines for outdoor recreation areas.

2.3.5 Pathway Maintenance and Responsibility

Maintenance of the proposed pathway will be the responsibility of the DLNR Na Ala Hele Program or the City and County of Honolulu, Department of Parks and Recreation Department (DPR), or the City Department of Transportation Services, depending on agreements reached prior to development of the pathway system (see section 1.7, Unresolved Issues). Na Ala Hele would control the hiking paths, while the City and County would control the multi-use trails along roadways in City parks, as appropriate.

Other interested agencies include:

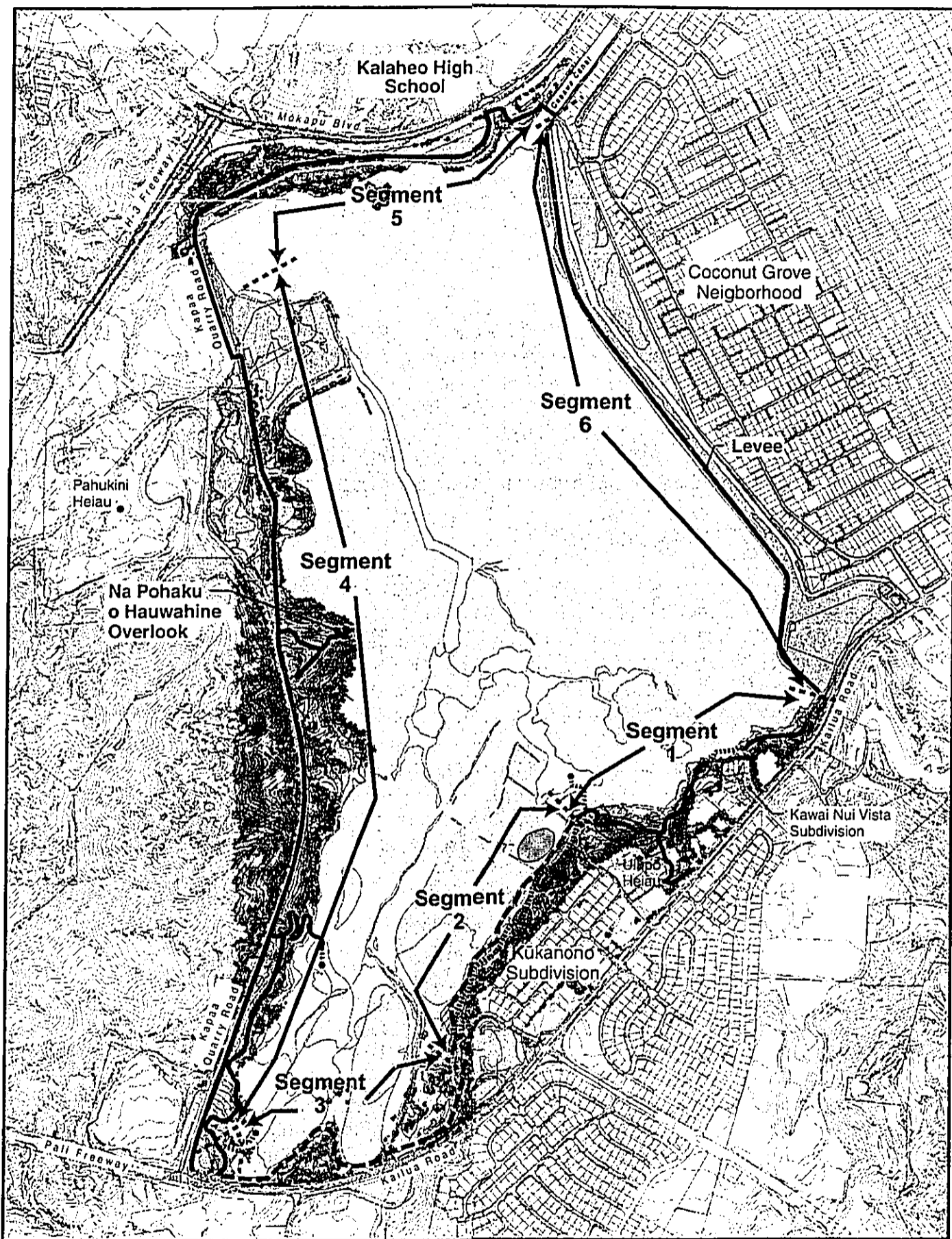
- USACE to monitor Kawai Nui Marsh's flood control basin;
- DLNR, DOFAW to monitor fish and wildlife;
- DLNR, Division of Conservation and Resource Enforcement (DOCARE) to monitor and enforce DLNR's rules and regulations;
- DLNR, Land Division;
- City and County of Honolulu, Department of Environmental Services (DES).

2.3.6 Pathway Signage

The proposed project will include signage regarding location, prohibited activities, importance of a location, and special instructions on safety, preservation, and pathway boundaries. Signage will be provided at appropriate entry sites, observation points, archeological/cultural sites, wildlife viewing areas, and important vegetation areas. Signage along roadways will conform to local codes and standards for clearance and breakaway posts.

2.4 PATHWAY SEGMENTS AND CONSTRUCTION

The proposed project acknowledges the unique characteristics of individual areas around the marsh, the issues and concerns that need to be addressed and their potential for implementation by the proposed pathway segments. Figure 5 presents an overview of the proposed segments within the study area. The



Pathway Segments

Kawai Nui Marsh Pathway
 Kailua, Ko'olaupoko, O'ahu



Figure
5

following discussion describes the individual segments, highlights opportunities and constraints, and lists specific design recommendations.

Figure 6 provides an overview of the types of construction likely to be required. Drawings which illustrate the various types of construction, and full descriptions of the construction methods are presented in Appendix A¹.

2.4.1 Segment 1

Segment 1 extends from the southern (Kailua Road) terminus of the levee to the beginning of the Kukanono subdivision. This segment has numerous educational and recreational experiences due to the concentration of archeological and historic sites. There is a broad diversity of terrain and vegetation, and the segment exhibits excellent view planes of the marsh. The proposed trail alignment meanders along the slopes of the marsh so views are maximized and impacts on archeological and environmental features are minimized.

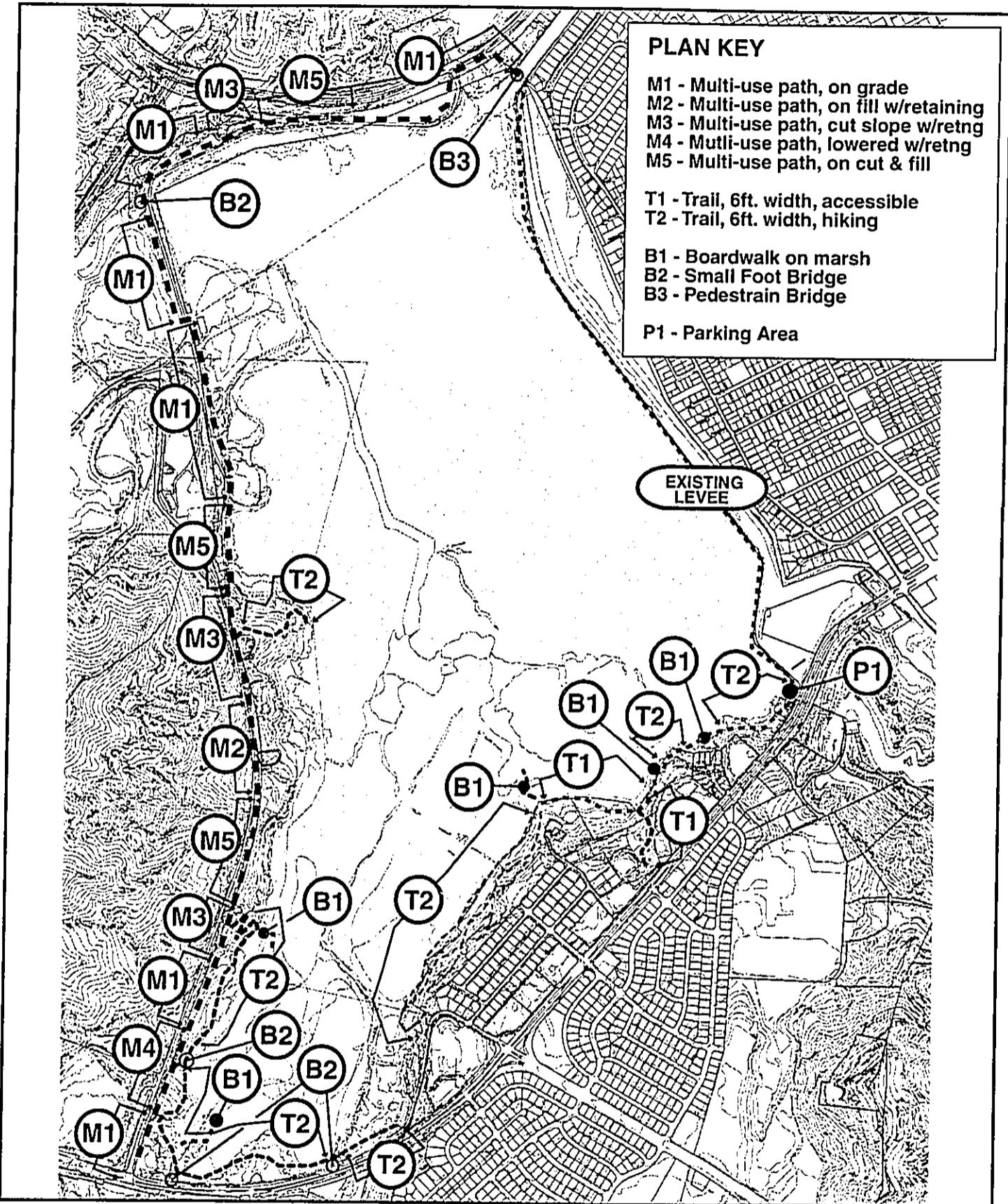
Recommendations for Segment 1 include:

- Construction of a new parking lot at the base of the maintenance road at the south end of the levee. Improvements will include an entry gate which can be closed at night to control access. As shown in Figure 7, the entrance to the parking lot will utilize the existing maintenance road to the levee.
- Construction of a pedestrian pathway that maximizes the diverse environmental experiences (*Hau* forest, rock outcrops, *taro* terraces, and wetlands) and provides access to archaeological/cultural features in the area.
- Construction of a spur pathway trail to the Ulupo Heiau.
- Construction of a low-impact boardwalk away from (minimum 100') the Kawai Nui Vista subdivision to keep pedestrians separated from residential lots.
- Construction of a boardwalk and viewing platform that extends into the marsh below the Kukanono subdivision.
- Prohibition of bicycles and motorized vehicles.
- Utilization of interpretive signage for information and instructions on allowable activities.
- Development of a pedestrian entryway through the highway guardrail on Kailua Road above Ulupo Heiau.

2.4.2 Segment 2

This pathway segment extends from the terminus of Segment 1 to Ulukahiki Street behind Castle Hospital. It contains moderate to steeply sloped terrain, mature tree and shrub species, medium to large rock outcroppings and Banyan tree aerial root structures. The slopes behind the Kukanono subdivision offer a continuation of the pedestrian visitor experience, with a focus on existing

¹ A description of construction techniques is also provided in Appendix A.



PLAN KEY

- M1 - Multi-use path, on grade
- M2 - Multi-use path, on fill w/retaining
- M3 - Multi-use path, cut slope w/retng
- M4 - Multi-use path, lowered w/retng
- M5 - Multi-use path, on cut & fill

- T1 - Trail, 6ft. width, accessible
- T2 - Trail, 6ft. width, hiking

- B1 - Boardwalk on marsh
- B2 - Small Foot Bridge
- B3 - Pedestrain Bridge

- P1 - Parking Area

Implementation Plan

Kawai Nui Marsh Pathway
 Kailua, Koolaupoko, Oahu

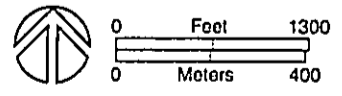
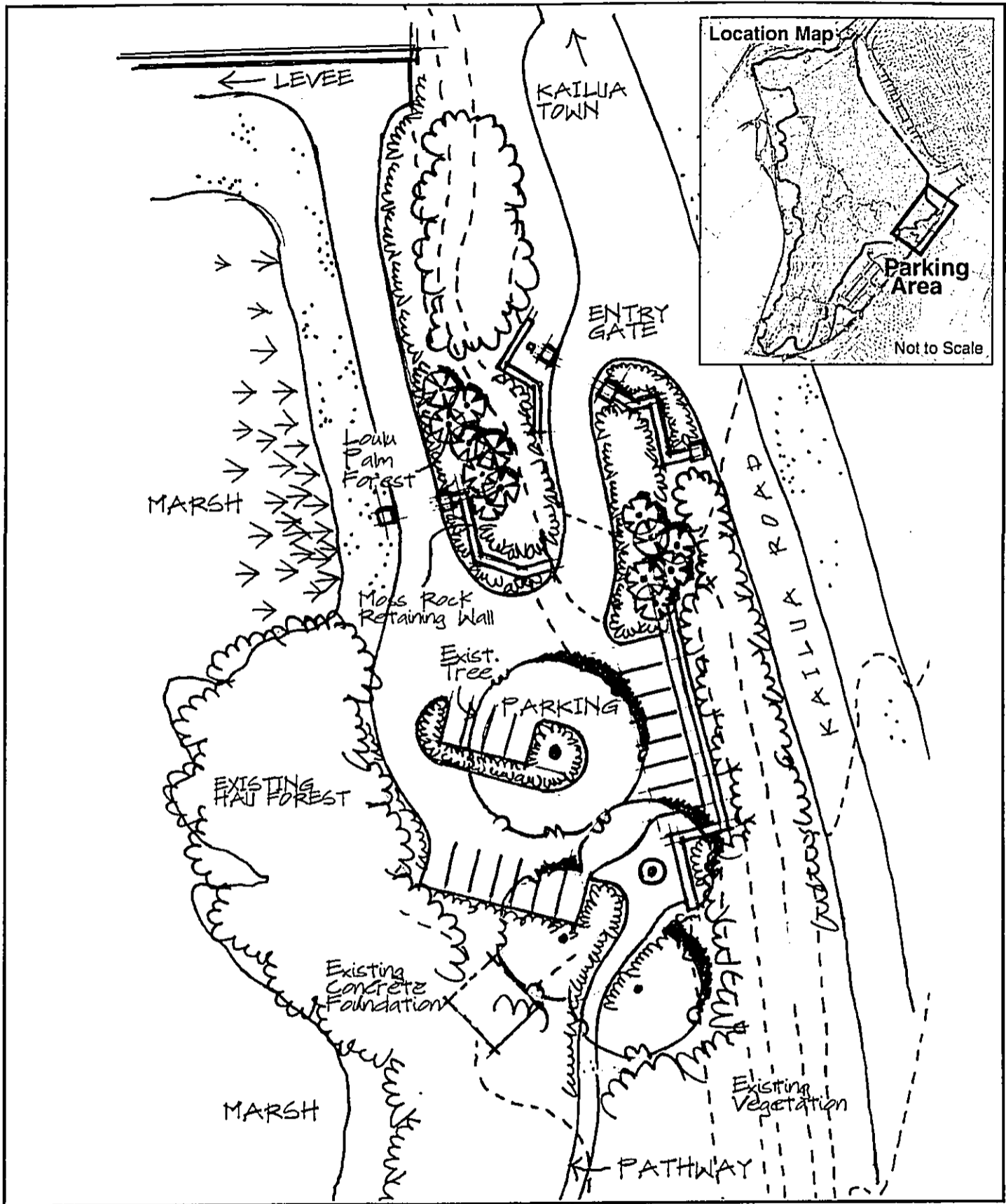


Figure
6



Parking Plan

Kawai Nui Marsh Pathway
Kailua, Ko'olaupoko, O'ahu



Figure

7

archeological and natural features. Marsh viewing will be enhanced if recommendations in the USACE 1997 Restoration Plan for Kawai Nui Marsh for mudflats and/or shallow ponds in the marsh are implemented. These recommendations include the creation of approximately 10 acres of mudflat/pond areas (see Figure 5). Water levels in these areas would be regulated to provide steady hydrologic conditions to minimize the effect of flooding, particularly during the nesting seasons of endangered waterbirds.

During public review of the pathway plan Kukanono subdivision residents expressed concerns about a pathway along the slopes below their homes. Major concerns included a potential increase in property crime, how to maintain the quiet and private character of the area, and how to minimize automobile traffic and parking on neighborhood streets.

Recommendations for Segment 2 include:

- Develop only after the construction of Segment 1. Segment 2 should be viewed as a continuation of Segment 1 rather than constructed independently.
- Determine final pathway alignment after the completion of water bird habitat improvements (pond restoration), as proposed by the USACE 1997 Restoration Plan for Kawai Nui Marsh, and any related cattle grazing plans are completed. The location of future water bird habitat ponds (if constructed) will be a major factor in the alignment of the trail (to maximize views of water bird areas).
- Align the pedestrian trail along the edge of the tree canopy, running parallel with the fences proposed by the USACE, if ponds are constructed. Small spur trails could link to archaeological sites in the area.
- The alignment should be upslope to allow for cattle to reach high ground during wet conditions, if ponds are not constructed and cattle grazing remains along the Kukanono hillside.
- Prohibit access to the trail through the residential subdivision.
- Keep trail alignments well below the residential areas, using a switchback alignment behind Castle Hospital to keep the trail away from residential lots.
- Prohibit motorized vehicles and bicycles.
- Encourage pathway users to stay on the trail with the use of railings, fencing, vegetation density and signage as appropriate.

2.4.3 Segment 3

This pathway segment extends from the terminus of Segment 2 on Ulukahiki Street to the intersection of Kailua Road and Kapaa Quarry Road. It is currently dominated by cattle ranch operations and is mostly fast land with level terrain. Natural slopes occur along the access road to the Knott Ranch and Mokulana Peninsula (located at the southernmost end of the marsh). There are no recorded historic properties within this segment.

The DLNR 1994 Master Plan proposed a visitor center and a community park in this segment. The USACE plan also proposed to dredge shallow ponds for endangered water bird habitats. DLNR currently leases the land for cattle ranching on a month to month revocable lease.

Recommendations for Segment 3 include:

- Determine the final pathway alignment after the USACE pond restoration project is resolved. The location of future ponds (if constructed) will be a major determining factor in the alignment of the trail in order to maximize views of water bird areas.
- Construct a pedestrian trail at the base of the slope below Kailua Road, if ponds are constructed. The trail will link the DLNR 1994 Master Plan concepts to the proposed visitor center and Mokulana Peninsula park.
- Consider eliminating construction of a trail in this segment, if ponds are not constructed and cattle grazing continues in the area.
- Construct bridges over existing streams with wood or natural appearing materials to blend with the environment.
- Construct a boardwalk and viewing platform below the proposed visitor center site to provide pedestrian viewing of habitat improvements along Kahana Iki Stream.

2.4.4 Segment 4

Segment 4 extends approximately 1.5 miles along Kapaa Quarry Road from the intersection at Kailua Road to the Model Airplane Park. Natural characteristics of the area are similar to those in the Kukanono area (Segment 2) such as mature tree and shrub species, and *hau* thicket. The pedestrian trail along the slope will continue the same viewing experiences as Segment 3. Na Pohaku o Hauwahine, a prominent overlook point of the marsh, is located in this segment. The VO Ranch is located south of the overlook.

Design for Segment 4 is influenced by several constraints. Kapaa Quarry Road is the current access road to the City Refuse Transfer Facility, the industrial park (at the northern end of the marsh) and between the Pali Highway and the H-3 Freeway. Near Na Pohaku o Hauwahine the road bends and dips creating a hazardous situation. Shoulder areas along the road are not paved. Cattle grazing in the marsh precludes hiking.

Recommendations for Segment 4 include:

- Construct a multi-purpose pathway (for bicyclists and pedestrians) along the marsh side of Kapaa Quarry Road.
- Provide a small median between the multi-purpose pathway and Kapaa Quarry Road to separate vehicles from bicyclists and pedestrians, increasing safety along the pathway.

- Provide pedestrian spur trails within the forest area, and where appropriate, to the marsh edge.
- Provide racks to secure bicycles at spur trails.
- Construct a pedestrian trail in the southern portion of this segment along the slope below the road to link the proposed visitor center site with a new habitat viewing area approximately 0.5 mile north of Kailua Road. [Note: the boardwalk and viewing platform are presented as a long-term option, depending on the area to be used for cattle grazing in the future.]
- Ensure the separation of pedestrians and ranching operations.

2.4.5 Segment 5

Segment 5 extends along Kapaa Quarry Road from the Model Airplane Park to the proposed Kawai Nui Gateway Park Site on Mokapu Blvd (across from Kalaheo High School). The natural character of the land *makai* of Kapaa Quarry Road is flat with much of the area consisting of actual marsh features in close proximity to the road. Terrain *mauka* of the road includes an area of moderate to steeply sloped land with a number of mature trees and shrub species that create a forest-like setting.

Recommendations for Segment 5 include:

- Develop a crosswalk fronting the Model Airplane Park for crossing to the *mauka* side of the road. Community participants recommended not developing on the *makai* side due to impacts on wetlands.
- Construct a multi-purpose pathway (for bicyclists and pedestrians) along the *mauka* side of Kapaa Quarry Road.
- Provide a small median between the multi-purpose pathway and the road to separate vehicles from bicyclists and pedestrians, increasing safety along the pathway.
- Connect the pathway to the proposed Kawai Nui Gateway Park (referred to as "Kalaheo Park" in the DLNR plan) across from Kalaheo High School.
- Construct a footbridge of natural-looking or wood materials connecting the proposed park to the existing levee.

2.4.6 Segment 6

Segment 6 extends approximately 6,300 feet along the eastern boundary of the marsh, from Oneawa Canal to Kailua Road. It has an existing pathway (both paved and gravel-covered) that provides multi-use recreational opportunities for area pedestrians, bicyclists and joggers along its length.

Recommendations for Segment 6 include:

- Identify the levee as a part of the Kailua bikeway system and encourage its use as a multi-purpose recreational feature.

- Evaluate the opportunity to create a new pedestrian connection to the Coconut Grove Neighborhood. This discussion could be part of the planning effort that considers passive use improvements on un-used City property south of the Kawai Nui Neighborhood Park.

2.5 COMMUNITY IMPLEMENTATION PRIORITIES

The project is proposed to be implemented in phases as funding becomes available. The final design and implementation of specific portions of the pathway are contingent upon future pond construction and ranching operations.

Based on input from the community, Segment 1 is the first priority for development. Other segments represent longer-term projects, which may be implemented depending on the development of other proposed projects (i.e., from the DLNR 1994 Master Plan) and funding availability.

Chapter 3
PHYSICAL
ENVIRONMENT

3.0 EXISTING CONDITIONS AND IMPACT ASSESSMENT: PHYSICAL ENVIRONMENT

This chapter describes the existing physical environment and examines the anticipated impacts of the proposed Kawai Nui Marsh Pathway project and relevant mitigation measures.

3.1 PROJECT AREA

Existing Conditions

An overview of existing land uses and resources within the study area is shown in Figure 8. The following discussion summarizes information regarding each component in the project area.

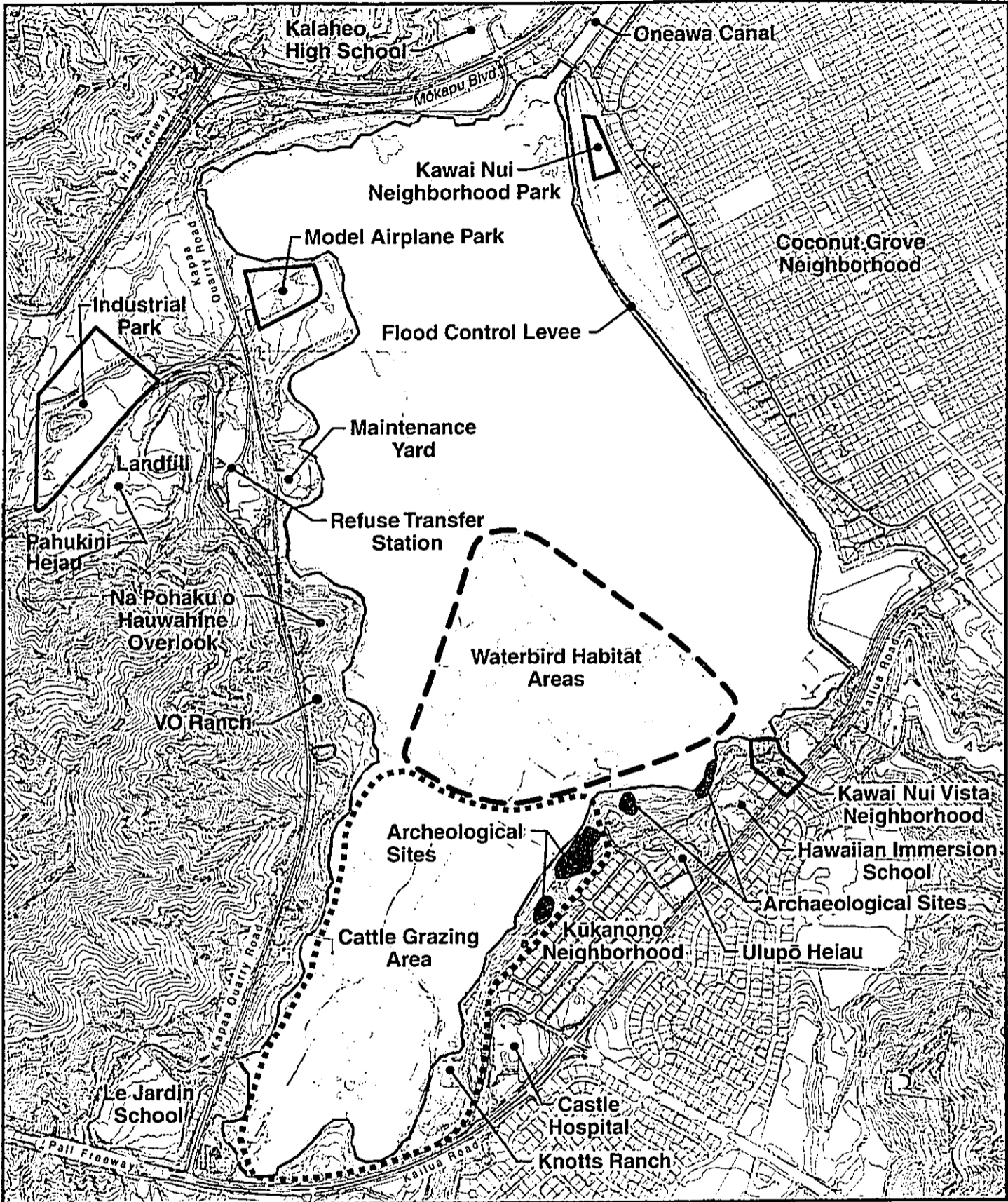
Flood Control Levee

In 1966, a levee was constructed along the northeastern edge of the marsh to enhance its flood storage capacity. In 1988, floodwaters overtopped the levee and flooded homes in the Coconut Grove neighborhood. In response to this event the USACE and the City and County of Honolulu upgraded the levee to achieve a 100-year storm level of flood protection. The existing structure extends approximately 6,300 feet along the eastern boundary of the marsh, from Oneawa Canal to Kailua Road. It includes an existing pathway (both paved and gravel-covered) that provides recreational opportunities for area residents, who walk, jog and bicycle along its length.

Access to the levee pathway is most easily available at the northern end through the existing Kawai Nui Neighborhood Park. An existing parking lot adjacent to the maintenance road leading to the levee provides convenience and safety for those who drive or bike to the area. Access at the Kailua Road entrance is much more restricted. Located approximately 500 feet *mauka* of the urban Kailua area, parking along the shoulder of the road is limited. Except for people living in proximity to the neighborhood park, access to the levee from the Coconut Grove neighborhood is not readily convenient.

Bird Habitat Areas

Existing wetland vegetation and open water areas are located within the central portion of the marsh. As shown in Figure 8, the water bird habitat area encompasses a small proportion of the overall acreage within the marsh boundaries. Plans to upgrade the habitat are discussed in the following section of this chapter.



Existing Conditions

Kawai Nui Marsh Pathway
 Kailua, Ko'olaupoko, O'ahu



 0 Feet 1300
 0 Meters 400

Figure 8

Cattle Ranching

Since 1963, approximately 80 acres of land in the southern portion of the marsh have been used for cattle grazing by the Knott Ranch. Several small structures, a corral, and stables are located within a small compound behind Castle Hospital. The ranch generally maintains 50 to 100 head of cattle on the site, which help to control California grass growth around the water bird habitat area. The ranch controls access to the grazing area. Unsupervised visits to the ranch are not allowed to ensure the safety of visitors from cattle.

Along Kapaa Quarry Road, the VO Ranch operates on approximately 10 acres of land. This activity has been in existence since the early 1970's. Improvements to the area consist of fenced enclosures and stables for horses and cattle and a maintenance shed.

Archeological/Cultural Resources

Archeological/cultural resources are predominantly located along the southern boundary of the marsh. Several features are also located in the western slopes overlooking the marsh. The most dominant feature is Ulupo Heiau, which is a large *luakini* type *heiau* (state-temple where human sacrifice occurred) located on a natural promontory overlooking the marsh (Cultural Surveys Hawaii, 2000).

The *heiau* platform measures 140 x 240 feet, with walls up to 30 feet in height. It was listed on the National Register of Historic places in 1972. Additional cultural resources are located below and to the west of the *heiau*, and include terraces, habitation sites, a residential complex, agricultural complexes and linear walls.

Along Kapaa Quarry Road, two clusters of features make up the site known as Na Pohaku o Hauwahine. This basalt outcrop serves as a focal point along the western boundary and provides a sweeping view of the marsh. During recent years, volunteers from the Kawai Nui Heritage Foundation have cleared trails from the road to the overlook and down to the edge of the marsh. They have planted native Hawaiian vegetation in the area.

Recreational Resources

Kawai Nui Neighborhood Park is located at the northern end of the levee. Youth soccer and softball leagues heavily use the park. Across the marsh on Kapaa Quarry Road, at the Model Airplane Park, clubs use approximately 5 acres of public land for their activities.

3.1.2 Surrounding Area

Existing Conditions

Residential Neighborhoods

The Coconut Grove neighborhood borders the marsh to the east and is one of

the most populated areas of Kailua. As noted earlier, access to the recreational opportunities of the marsh by Coconut Grove residents is restricted. Improved access to the levee is desired by residents, particular those living closer to Kailua Road.

The Kukanono subdivision is located south of the marsh, next to Castle Hospital. The relatively small residential area has two primary streets. Property boundaries of residents on the mauka side of Manu-Mele Street abut the public-owned marsh. Kukanono includes several churches and the Windward YMCA. Visitors to Ulupo Heiau (discussed above), park at the YMCA. Because of cattle grazing in the area, residents generally do not access the marsh.

The 15-lot Kawai Nui Vista subdivision is located on Kailua Road approximately one-half mile *mauka* of Kailua Town.

Schools

Several schools are located in proximity to the boundary of the marsh. Le Jardin is located on Kailua Road at the intersection with Kapaa Quarry Road. North of the marsh, Kalaheo High School is located just across Mokapu Boulevard. The Ke Kula 'o Samuel M. Kamakau Hawaiian Immersion School is located on Kailua Road. The marsh is readily accessible from this facility.

Industrial Uses

For many years, Kapaa Quarry Road has been heavily used by trucks and other large vehicles to access the Kapaa Landfill and the nearby industrial park. The landfill was closed in the mid-1990's. However, the City and County of Honolulu operates a refuse transfer station *mauka* of the road. With the opening of the H-3 Freeway, the majority of trucks access the industrial area from Mokapu Boulevard.

3.2 GEOLOGY

Existing Conditions

Kawai Nui Marsh dates from between the Tertiary Period to the early Pleistocene Epoch (approximately 2 to 1 million years before present day). It was once located in the center of a caldera which indented the summit of the Ko'olau Volcano. The caldera floor and volcano walls sagged, due to erosion and poor support to form the Kailua syncline (behind Lanikai).

Today, Kawai Nui Marsh is located in the center of the old caldera. Underneath the marsh exists a volcanic plug of dense basaltic rock, which prevents stream and rain runoff. From all directions, except from the east, the marsh is surrounded by basaltic flows, dike complexes, cemented throat breccia and the talus slopes of the Kailua and Ko'olau Volcanic Series.

Six thousand to 4,000 years ago, Kawai Nui Marsh was an open saltwater marine bay. Evidence of this includes marine deposits of coral sand/silt that have been recorded at a 30-foot depth. A sand barrier formed on the *mauka* side of the coral reef, thus increasing deposits of alluvial sedimentation and soils in the newly formed lagoon. Athens and Ward (1991) estimated that the marsh was transformed into a freshwater system around 200 B.C. (DLNR, 1994).

Anticipated Impacts

No significant impacts are anticipated to the geology of the area as a result of the proposed project.

3.3 CLIMATE

Existing Conditions

The climate around Kawai Nui Marsh has a mean annual temperature of 75° F (42° C), with a mean maximum temperature of 81° F (27° C) and a mean minimum temperature of 68° F (20° C). Humidity usually varies between 70 to 80 percent. Marsh elevations receive more solar energy than hill elevations. The solar insolation in the upper watershed can range between 300 calories/cm² to 375 calories/cm² in the marsh.

Tradewinds flow from east to west. They are more persistent in the afternoon than night, and during summer months. Winds from the north-northeast and east blow 86% of the time. Kona winds, or southerly winds blow for 10% of the time and winds are calm for 4% of the time. Due to the varied terrain, Kailua neighborhoods may get different exposure/protection to/from the wind.

Rainfall increases when the inversion layer (at 4,000 to 5,000 feet) that contains moist air meets the mountain *pali* (ridgeline) as it is forced over to the other side of the mountain. Readings show an approximate median annual rainfall over the Maunawili drainage basin at 84 inches per year, and Kailua at 40 inches per year (DLNR, 1994).

Anticipated Impacts

No significant impacts are anticipated to the climate of the area as a result of the proposed project.

3.4 TOPOGRAPHY

Existing Conditions

The Oneawa Hills and the Kukanono slope, to the west and east of the project site, respectively, act as a cradle for Kawai Nui Marsh (Figure 9). The hills rise to the Ulumawao Summit at 995 feet Above Mean Sea Level (AMSL). From Kapaa Quarry Road, elevation ranges from 60 feet AMSL (old Kailua Drive-In) to 7 feet AMSL near the Ameron HC&D Quarry. Flooding occurs in this low-lying area when water elevation in the marsh is high. At the intersection of Mokapu Boulevard and Kapaa Quarry Road, the road is 11 feet AMSL. The Kukanono slope ranges in elevation from 5 feet AMSL to 75 feet AMSL (DLNR, 1994). The topography of the proposed pathway corridor varies from flat in many areas, to steeply sloped (portions of Segment 2). Many portions of pathway are actually hiking trails with changes in topography requiring upslope and downslope maneuvering at various points.

Anticipated Impacts

No significant impacts are anticipated to the topography of the areas as a result of the proposed project.

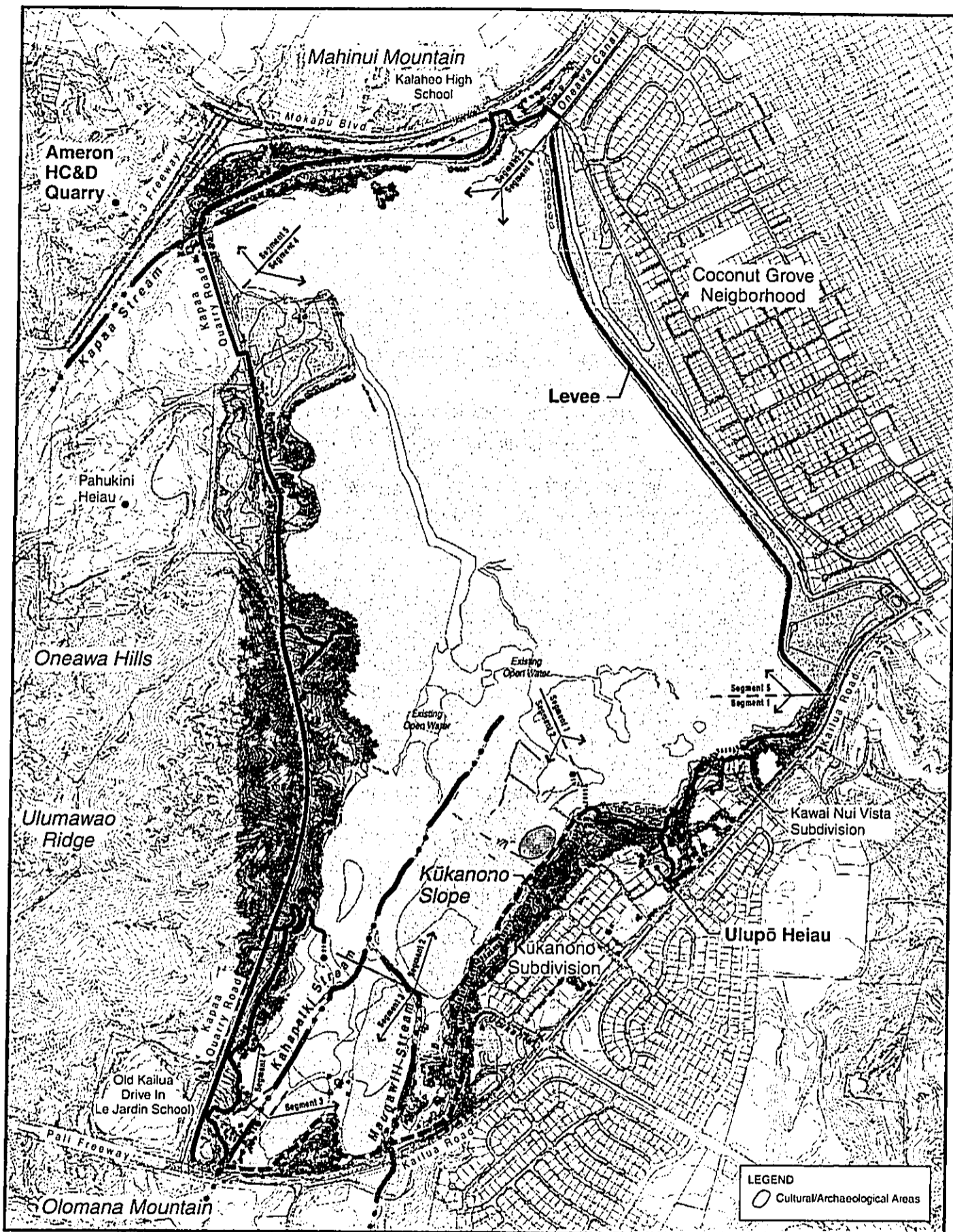
3.5 SOIL

Existing Conditions

Kawai Nui Marsh has a variety of soil layers depending on depth and location. Dames and Moore (1961) found a layer of basal deposits of shells in coral sand and gray marine deposits of silt, 30 feet below the surface layer of the marsh. Located above this layer to a depth of 10 feet were organic silts. Above this layer to the surface was a peat and root layer (DLNR, 1994).

The U.S. Department of Agriculture, Soil Conservation Service (USDA-SCS) describes soil saturation for Kawai Nui Marsh as follows:

- Marsh clay (MZ) occupies 60 percent of Kawai Nui Marsh. It is wet, periodically flooded and covered with grass, bulrush and other plants.
- Pearl Harbor clay (Ph) soil resides between the Kukanono slope to the Kapaa Quarry Road slope. It is not very permeable, has slow runoff and a slight erosion hazard.
- Hanalei silty clay (HnA) is located in the southern end of the marsh. It is moderately permeable, has slow runoff and a slight erosion hazard. This soil is a hazard when flooding occurs.
- Papaa clay (PYE) soil resides on the Kukanono slope below the Kailua Lutheran Church. It is similar to PYF clay, which is sticky and cracks when dry. It has slow to medium runoff and a slight to moderate runoff hazard.



Topography & Stream Tributaries
 Kawai Nui Marsh Pathway
 Kailua, Ko'olaupoko, O'ahu

0 400 800 1600 Feet

Figure 9

- Stony steep land (rSY) soil resides on the Kukanono slope and consisting of boulders and stones.
- Alaeloa silty clay (AeE) soil resides below Kapaa Quarry Road. It is moderately permeable, has medium runoff and a moderate erosion hazard.
- Alaeloa silty clay (ALF) soil is similar to AeE and resides at the intersection of Kailua Road and Kapaa Quarry Road. It has rapid runoff and a severe erosion hazard.
- Kawaihapai stony clay loam (KlaB) soil resides in the area by the VO Ranch and along Kapaa Quarry Road. It has slow soil runoff and a slight erosion hazard.
- Kawaihapai clay loam (KIB) soil is like KlaB soil (with fewer rocks) and is located along Kapaa Quarry Road.
- Kokokahi clay (KtC) resides in the northern portion of the marsh along Kapaa Quarry Road. It has slow permeability, medium runoff and a slight to moderate erosion hazard.
- Waikane silty clay (WpB) resides in the Mokulana peninsula. It has slow runoff and a slight to moderate erosion hazard.

Anticipated Impacts

As mentioned, the intent of the proposed project is to minimize potential impacts to any of the affected areas. No outside soil will be brought in to grade the pathway. It is expected that any potential impacts to soils will be short-term and minimal during the construction of the proposed project. Nevertheless, there is potential for fugitive dust emissions during the removal, transport, and installation activities for the proposed pathway. Existing, on-site soil that is cleared (or cut) will be used as fill material to grade the pathway. After the construction of the pathway, there are no foreseeable long-term impacts.

As discussed in Section 3.4 (Topography) and 3.5 (Climate) the area in the vicinity of the project area is low lying and receives moderate rainfall (40 inches per year). Consequently, soil erosion might occur due to wind or a rain storm.

Mitigation Measures

Implementation of Best Management Practices (BMPs) will mitigate the potential effects of exposing bare soil to storm and wind erosion. BMPs might include: wetting exposed soil; erecting silt barriers, as necessary; grassing over and landscaping areas to prevent soil loss and erosion and limiting the area of ground disturbance, among others. The selection of appropriate BMPs will be made during the final design of the proposed project. Additionally, the contractor will submit erosion control measures for the City and County's approval per the City and County grading ordinance, and must adhere to the requirements of the Hawaii Administrative Rules, Chapter 11-60. 1-33 (Air Pollution Control, Fugitive Dust).

There must also be a commitment to long-term BMPs on the part of the entity charged with maintenance of the pathway. These BMPs could include ensuring that trail users stay on main pathways, maintaining path inspection schedules, and keeping bare areas to a minimum.

3.6 FLORA

Existing Conditions

A botanical survey of the project site was conducted in July 2000 and February 2001 by Char & Associates (Appendix B). The survey findings are summarized below.

Most of the vegetation within the limits of the proposed pathway is comprised of alien or introduced species. Native species have diminished since Western contact due to human occupation and activity (i.e. urbanization). Existing plants found in the project area are discussed below.

Segment 1

Dense thickets of *hau* (*Hibiscus tiliaceus*), 25 to 30 feet tall, cover the hill slopes and border the edge of the marsh. *Maile pilau* vines (*Paederia foetida*) are common and drape over the *hau*. The ground underneath the *hau* is heavily shaded and leaf litter and barren soil are the dominant features. Patches of *Hilo* grass (*Paspalum conjugatum*), blechnum fern (*Blechnum occidentale*) and wood fern (*Christella parasitica*) grow where light hits the ground. At the edge of the marsh, California Grass (*Brachiaria mutica*) forms dense mats up to 6 feet tall. Open water areas support bulrush (*Schoenoplectus californicus*) and cattail (*Typha latifolia*).

Segment 2

Vegetation consists of patches of *koa haole* shrubs (*Leucaena leucocephala*) and mixed introduced species. Observed trees and shrubs include: Java Plum (*Syzygium cumini*), African tulip tree (*Spathodea campanulata*), Christmas Berry (*Schinus terebinthifolius*), China Berry (*Melia azedarach*), monkeypod (*Samanea saman*) and octopus tree (*Schefflera actinophylla*). Large Banyan trees (*Ficus spp.*) 50 to 60 feet tall, with an extensive aerial root structure are common along the rocky outcrops in this segment. Some species that occur in this area are commonly used for landscaping and include allspice (*Pimenta dioica*), mock orange (*Murraya paniculata*), surinam cherry (*Eugenia uniflora*), golden pothos (*Epipremnum pinnatum*), Tabebuia sp., lemon (*Citrus limonum*) and soursop (*Annona muricata*). Some species may mark former house sites and others represent plants which have escaped cultivation and are naturalized. Ground cover is sparse and barren soil and leaf litter is a common feature. Low patches of wedelia (*Spageticola trilobata*) and *Dicliptera chinensis* are found here and there.

Segment 3

Mixed introduced forest covers the upper slopes along the paved road, which leads to Knott Ranch. The recommended pathway alignment crosses onto mostly level terrain, which is largely open pastureland with *Hilo* grass and scattered shrubs of castor bean (*Ricinus communis*) and sourbush (*Pluchea carolinensis*). A park is proposed at Mokulana Peninsula (DLNR 1994 Master Plan); this area supports a very tall, dense forest of mixed introduced trees. Large old mango trees (*Mangifera indica*) are abundant. California Grass and Napier grass (*Pennisetum purpureum*) line the Maunawili and Kahana Iki streams.

Segment 4

Along Kapaa Quarry Road the area is largely barren soil and leaf litter with a few patches of grass and weeds. *Makai* of the road right-of-way, there are dense thickets of *hau* on the moderate to steeply sloping terrain. A few albizia (*Falcataria moluccana*) and Java plum trees are scattered through the *hau* thickets. South of the Na Pohaku o Hauwahine overlook the area is covered with Christmas Berry and *koa haole* scrub with scattered clumps of fiddlewood (*Citharexylum caudatum*). Adjacent to Na Pohaku o Hauwahine, *koa haole* and Guinea grass (*Panicum maximum*) scrub, Chinese violet (*Asystasia gangetica*) is abundant in this area. Several prominent rock sites characterize this area. The Kawai Nui Heritage Foundation and the `Aha Hui Malama I Ka Lokahi have cleared the rock outcrops and landscaped the site with native plants that are: (1) endemic (native to the Hawaiian Islands and not found anywhere else) species; (2) indigenous (native to the Hawaiian Islands and found elsewhere) species; (3) Polynesian plants (species brought to the Hawaiian Islands by the ancient peoples before 1778); and (4) possibly indigenous species (may be early Polynesian introduction). The overlook falls within the project site and is adjacent to the proposed pathway alignment.

Segment 5

Swollen fingergrass (*Chloris barbata*), Guinea grass, *koa haole* scrub, Java plum, large monkeypod trees and weeds characterize the *mauka* side of Kapaa Quarry Road. The *makai* side of the road is characterized by dense mats of California grass (5 to 6 feet tall). Standing water supports clumps of bulrush and the non-wetland areas support *koa haole* and Guinea grass scrub.

Anticipated Impacts

The botanical survey concluded that none of the plant species encountered along the proposed pathway alignment were threatened, endangered, or a species of concern, except for those planted at Na Pohaku o Hauwahine. There is no botanical reason to impose restrictions and/or conditions to the project. As previously mentioned, cleared vegetative areas could be grassed over and landscaped to prevent soil loss.

The proposed project will have an overall positive impact to flora as non-native species will be selectively cleared during the pathway's construction, and replanted with native species.

3.7 AVIFAUNA

Existing Conditions

A survey of avifauna within the project area was conducted in May and July 2000 by Phil Bruner (Appendix C). Survey findings are summarized below.

The following species of native resident waterbirds and migratory shorebirds were encountered during the survey:

- Seven *auku`u* or Black-crowned Night Heron (*Nycticorax nycticorax hoactli*).
- Ten endangered *Koloa maoli* or Hawaiian Duck (*Anas wyvilliana*).
- Twelve endangered *'Alae ke`o ke`o* or Hawaiian Coot (*Fulica alai*).
- Four endangered *'Alae `ula* or Common Moorhen (*Gallinula chloropus sandvicensis*).
- Five endangered *ae`o kukulao* or Black-necked Stilt (*Himantopus mexicanus knudseni*).
- Three *kolea* or Golden-Plover (*Pluvialis fulva*).
- Two *'akekeke* or Ruddy Turnstone (*Arenaria interpres*).

Because the fieldwork was conducted in May and June, no migratory waterfowl were recorded as they were on their breeding grounds in North America. The number of migratory shorebirds tallied was limited to the few individuals that failed to return to the arctic to breed. These birds are typically juveniles that failed to obtain sufficient fat reserves to migrate, and adults that may have sustained injury that inhibited their ability to migrate. There were no unexpected species found in the study area.

Anticipated Impacts

No significant impacts are anticipated to avifaunal resources as a result of the proposed project. The proposed route is separated from open water and foraging area habitats, and dense vegetation separates nesting waterbirds, from the proposed pathway alignment.

The pathway project will provide positive educational opportunities for the community and visitors to the marsh. As a result, specific measures can be taken to enhance the experience of those who use the pathway:

- Construct educational signage at viewing platforms and points of interest along the path, regarding endangered native bird species, their habitats and archeological sites.

- Build a boardwalk and a viewing station below Ulupo Heiau (the boardwalk would extend out into the marsh towards the present open water).
- Consider future boardwalks and viewing platforms if the USACE restores waterbird habitat.

3.8 WATER RESOURCES

3.8.1 Kawai Nui Marsh Hydrology

Existing Conditions

Kawai Nui Marsh is the state's largest freshwater wetland. The marsh acts as a sediment filter and a nutrient recycler. The Maunawili Stream, Kahana Iki Stream and Kapaa Quarry Stream are three tributaries that feed into the marsh. Other water sources for the marsh are rainwater and small rivulets. An area equal to about 6,200 acres drains into Kawai Nui Marsh.

Water inflow and outflow measurements vary for the marsh. Various reports estimate inflow water to the marsh between 6.8 million gallons per day (mgd) to 13.1 mgd. Outflow estimates are between 4.6 mgd to 6.4 mgd. Today, the marsh acts as a flood control basin for the Kailua community. It drains an approximate 9.61 - square mile area.

In 1966, Kawai Nui Marsh's flood storage capacity was estimated to be 3,000 acre-feet. The mean water level in the marsh has been determined to be 3.3 feet AMSL and fluctuates between 2 to 4 feet AMSL. Levee height varies from 12.9 to 17.7 AMSL and was designed to withstand a 100-year flood. Several communities adjacent to the Kawai Nui Marsh were flooded January 1, 1988, during a severe storm. Consequently, the USACE redesigned the levee in May 1997, to increase its flood control capacity. The levee prevents floodwaters from entering the Coconut Grove community.

During the last thirty years, Maunawili Valley, a significant drainage basin for the marsh, has become more urbanized. This urbanization has led to increased sedimentation in the marsh, reducing the marsh's flood control capacity. In the past, treated sewage was also discharged into the marsh increasing nutrients, and stimulating vegetation growth, further reducing the marsh's flood control capacity (DLNR, 1994).

Anticipated Impacts

The total area of the proposed pathway will be about 5.5 acres. This represents less than 1% of the drainage basin that empties into Kawai Nui Marsh. It is estimated that about 3.1 acres of the total 5.5-acre pathway will have an impervious surface, which represents about 0.05% of the total drainage basin. The total of additional runoff added to the marsh attributable to the impervious

surface added for the pathway will be statistically insignificant compared to the volume that currently reaches the marsh. Therefore, no significant impacts are anticipated to Kawai Nui Marsh's hydrology as the result of the proposed project.

Mitigation Measures

Although no significant impacts to the hydrology of the marsh is anticipated as a result of the proposed pathway, it is still important to successfully manage any additional stormwater runoff generated by the proposed pathway to protect the water quality of the marsh (see 3.8.2, Water Quality, below).

3.8.2 Water Quality

Existing Conditions

In 1993, the Water Resource Research Center (WRRC) assessed fecal indicator bacteria in and around the marsh. Three indicator bacteria (fecal coliform, *Escherichia coli* and *enterococci*) were noted which exceeded established recreational water quality standards. Levels of the bacteria *Clostridium perfringens* (an indicator of polluted water) were elevated near urban areas. All of these bacteria were elevated in the Oneawa Canal.

The 1994 DLNR Master Plan noted that: 1) the process of uptake by marsh plants; 2) loss to sediments; and 3) 90% of the nitrogen and phosphoric nutrient loading in the marsh, were removed as a result of loss to the atmosphere. Therefore, suspended solids are retained in the marsh then output through Oneawa Canal. The Master Plan found the discontinuation of the sewage treatment plant discharge had reduced nutrient mass loading. The study also noted heavy levels of copper, chromium, iron, nickel and zinc were found in the marsh's sediments.

Anticipated Impacts

As discussed in Section 3.9.1 (Kawai Nui Marsh Hydrology), the marsh is classified as a wetland. It also serves as Kailua's flood control basin. Consequently, the marsh needs to retain its capability as a flood control basin.

The proposed project recommends selective construction of boardwalks and viewing platforms around the marsh. Marsh soil will have to be excavated to dig support posts for the boardwalks. The soil that is removed will be used as fill material to grade the pathway. During excavation work, soil could erode into the marsh and reduce water quality. However, because of the small size of the post-holes, the impact of this activity will be minimal. There will also be a small increase in the volume of stormwater runoff that reaches the marsh as a result of the portions of the pathway that will be constructed with impervious surfaces.

Mitigation Measures

Compliance with BMPs will mitigate the potential effects of exposing soil within the marsh. BMPs might include: erecting water and soil barriers, where necessary, and limiting the area of water disturbance, among others. The selection of appropriate BMPs will be determined during the final design of the proposed project.

Design of drainage improvements for the pathway should include measures for a slower release of stormwater runoff to the marsh which will allow sediments to settle before reaching the marsh.

The project is recommended to be implemented in segments which will minimize the impact to the physical environment during construction phases.

3.9 AQUATIC SPECIES

Existing Conditions

Legends and oral history note Kawai Nui Marsh was once the largest inland pond on O`ahu (Cultural Surveys Hawaii, 2000). Today, the marsh supports an aquatic environment of insect, fish and invertebrate species. Its open waters contain tilapia, top minnows, other "mosquito fish", oriental rice eel, small mouth bass, Louisiana crayfish, and the pond snail.

Although exotic species predominate, several native fish species inhabit Oneawa Canal, including: *o`opu naniha* (*Stenogobius genivittatus*), *o`opu nakea* (*Awaous stamineus*), *o`opua `akupa `oau*, *awa* or milkfish (*Chanos chanos*), *aholehole* or silversides (*Kuhlia sandwicensis*), *`ama`ama* or mullet (*Mugil cephalus*) and *kaku* or barracuda. At the head of the channel, lizardfish, *papio* (*Caranx sp.*), *oio*, *uouoa* and crab and prawn species are present. Two species, *o`opu nakea* and the *opae kala `ole* or mountain shrimp (*Atyoida bisulcata*) migrate from Oneawa Canal through the marsh in their diadramous life cycle.

Anticipated Impacts

As mentioned in Section 3.5 (Soil), implementation of the proposed project requires limited removal of soil in and around the marsh for boardwalk construction. Soil erosion during the placement of boardwalk posts could degrade the marsh's aquatic habitat by increasing turbidity.

Mitigation Measures

Compliance with BMPs will be used to mitigate the potential effects of increased turbidity. The impacts to aquatic species are anticipated to be short-term and minimal during the construction of the boardwalks and viewing platforms. The

boardwalks and viewing platforms will provide up-close, but non-invasive, opportunities to view aquatic species in their natural habitat.

3.10 CULTURAL RESOURCES

Oral Documentation and Legends

Kawai Nui Marsh, known as "Kawai Nui" ("big water" in Hawaiian), has a rich and extensive oral and written history. The SHPD, Bishop Museum, Kawai Nui Heritage Foundation, private individuals and other groups have contributed to the documentation of its history over many decades.

Oral documentation notes the significance of Kawai Nui as a residence of great chiefs over the centuries and as a productive part of a larger *ahupua`a*. Documentation exists for the Ulupo Heiau, Pahukini Heiau and Holomakani Heiau (Kawai Nui Heritage Foundation, 2001).

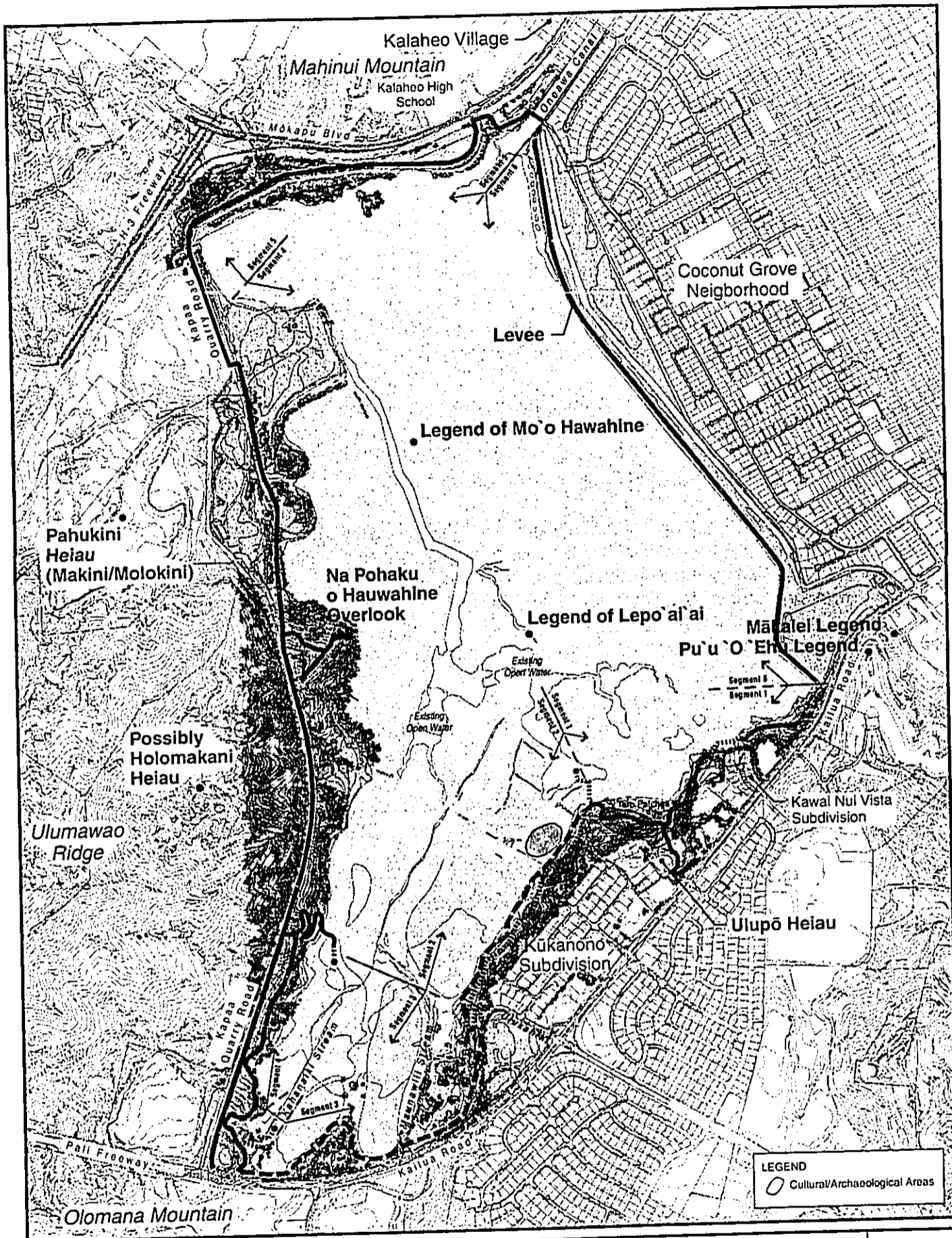
There are rich legends surrounding Kawai Nui (Figure 10). Legends noted the *ahupua`a* of Kailua was a "fat" land or a land that was plentiful. The legend of the *Makalei* was about a supernatural tree that could attract fish in Kawai Nui. This tree was located by the present Hamakua Street Bridge. The legend of the *lepo`ai`ai* was about the edible, *haupia*-like mud that was available from Kawai Nui Marsh. This legend implied a bountiful Kailua where even the mud is edible.

Legends noted the *menehune* lived at Kawai Nui and built its fish ponds and religious structures. Legends indicated the *mo`o* named Hauwahine, was the guardian spirit (in the shape of a lizard) of Kawai Nui fishpond. *Hauwahine* means "female ruler". She made sure the ponds wealth was equally distributed and punished greedy takers. Legends noted her residence at Kawai Nui followed the earth-mother goddess, *Haumea* which means "red ruler."

Legends noted the Pu`u `o `Ehu, Hauwahine's sacred stones, which overlook the marsh and the entryway to Kailua. The channel beneath the stones once connected the waters of Kawai Nui and Ka`elepulu (known today as Enchanted Lake). Hawaiians thought it to be the coital connection between the two fishponds, thus giving the area great *mana* (supernatural power).

Ulumawao Ridge (peak of Oneawa Hills) means "growth at forest." However, legends refer to it as the "sleeping husband of Pele." Other legends refer to Mahinui Mountain located above Kalaheo High School. There are two legends regarding Mahinui, which means "great champion." One legend noted Mahinui Mountain was named for the hero that was defeated by Chief Olomana. When Olomana slew him, his body was cast to where the Mahinui Mountain now lies.

Another legend noted Chief Olomana was cut in half by Palila, one portion becoming Mahinui ridge and the other remaining as Mount Olomana.



Legends and Cultural Sites

Kawai Nui Marsh Pathway
 Kailua, Ko'olaupoko, O'ahu

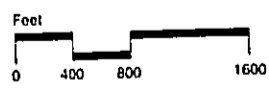


Figure
10

Legends noted the *ali'i* who once lived in Kawai Nui. Chief `Olopana and his brother Kahikiula established several Kāne'ohē and Kailua *heiau*, such as Pahukini and Holomakani. Kakuhihewa and Kualii lived in the area in the 16th century. Before that, Kahekili and Kamehameha I lived in Kawai Nui.

Kawai Nui Agricultural and Aquacultural Resources

Kailua was once a productive *ahupua`a*. Kawai Nui's agricultural uses included wetland and *kula* (dry land agriculture) along its slopes, where *taro*, yams, gourds and sweet potatoes were once planted. Aquaculture was also used to dam the waters and channel streams into *lo`i* and *`auwai* fields. Kawai Nui had a 440-acre fishpond and 250 acres of *taro lo`i* and *`auwai*. Kawai Nui once drained into Enchanted Lake or Ka`elepulu by a mile long canal. Ka`elepulu means "moist blackness". Kawai Nui Heritage Foundation noted that Kawai Nui would have been called a "*loko wai*" or freshwater inland pond.

Sterling and Summers (1978) note Kawai Nui had a bountiful garden, where fish, fowl and vegetables were plentiful. Many *mele* (chants) noted Kawai Nui, was famous for its mullet and *awa*. Kawai Nui *taro* was also mentioned in the *mo`olelo* (epics). Kamehameha I used resources from Kawai Nui to feed his army during the unification of Hawai`i.

After the post-contact period, the Hawaiian population declined due to Western contact, diseases and influences. Agricultural resources were abandoned as a new Western lifestyle was adopted. In the later half of the 19th century, sugar and rice became the main agricultural resources planted in the marsh as crops.

Historical Resources

Kawai Nui Marsh gives valuable insight to the migration, settlement and cultural development practices of prehistoric Polynesian Cultures. Kawai Nui played a prehistoric and historic role as an economic component of an *ahupua`a* unit. It was eligible for listing on the National Register of Historic Places in 1972.

Located on the eastern edge of the marsh, next to the YMCA, is Ulupo Heiau (Site Number 80-11-371). In 1971, it was listed on the Hawaiian Register as Ulupo Heiau State Monument and in 1972 it was listed on the National Register of Historic Places. It measures 140 feet by 180 feet across and is 30 feet in height. The Department of Land and Natural Resources, Division of State Parks has maintenance responsibility for the 1.4-acre parcel that encompasses the *heiau*.

Today, all that remains is a platform, with slopes angled downward. It provides an excellent view of the marsh. Ulupo means "night inspiration." Legend noted the *menehune* built it in one night, by handing rocks from hand to hand a great

distance. It is thought to be an agricultural class *heiau* due to its location. The Kailua Hawaiian Civic Club is the curator. Tourists visit this site and Native Hawaiians use it for cultural expressions.

On the western side of the marsh is located Pahukini Heiau, also known as Makini and Mo`okini Heiau. It was listed on the National Register of Historic Places (1972) and the State Register of Historic Sites (Site Number 80-11-359). Mo`okini means "many *mo`o* or many lineages." It is 110 feet by 175 feet and located on the Kapa`a Ridge, above the Kapaa Waste Transfer Station area. It is located on land owned by the City and County of Honolulu. The area around the site used to be the Kailua landfill, until it was closed.

Pahukini means "many drums." Chief `Olopana was said to have built this *heiau* in AD 1100. It is thought to be a *luakini* type *heiau* (state class *heiau* for state matters). This *heiau* may have been a human sacrifice or *po`okanaka heiau* due to its walled in structure and the burials within the platform area (Cultural Surveys Hawaii, 2000).

Ameron HC&D and the Kailua Business and Professional Women's Club (BPW) are the curators of this *heiau*. This *heiau* is hard to find because of its location in the landfill and a lack of signage.

On the slope north of the old Kailua Drive-in (Ulumawao Ridge), the remains of Holomakani Heiau may have been identified. Legends note it may have been built by Chief Olopana. *Holomakani* means "wind running or racing." At present, not much is known about its oral or written history.

On the *makai* side of the marsh is Na Pohaku o Hauwahine, known as "the stone of the Hauwahine." As mentioned, she was the *mo`o* or guardian spirit of the pond and ensured its productivity.

3.10.1 Archeological Assessment

Existing Conditions

An archeological assessment and background literature search was conducted for the proposed project in July 2000 by Cultural Surveys Hawaii, Inc. (Appendix D).

The assessment consisted of a historical and archeological literature review and a reconnaissance type field inspection of the proposed pathway alignment. Background research provided the historical and cultural context of the pathway construction and the field reconnaissance assessed the potential impacts of the pathway construction on the historic properties known to be in the vicinity of the trail's alignment. The study findings are summarized below.

A number of archeological features are located in proximity to the recommended pathway alignment. These are listed below and shown in Figure 11.

- Segment 1: Ulupo Heiau, the Kawainui Terraces, the Kukanono Habitation Site, the Kukanono Residential Complex and the Kukanono Terrace and Habitation Complex.
- Segment 2: Kukanono Cluster, the Miomio Agriculture and Habitation Complex, the Kawainui Slope, the Pohakupu Agriculture Cluster, the Makalii Slope, the Kawainui Marsh Site 7.
- Segment 3: Makalii Historic Site and the Makalii Mounds.
- Segment 4: Kapaloa Agricultural Terrace, the Pohakea Terrace, possibly Holomakani Heiau, the Kawainui Cluster, and Pahukini Heiau.
- Segment 5: none.
- Segment 6: none.

Anticipated Impacts

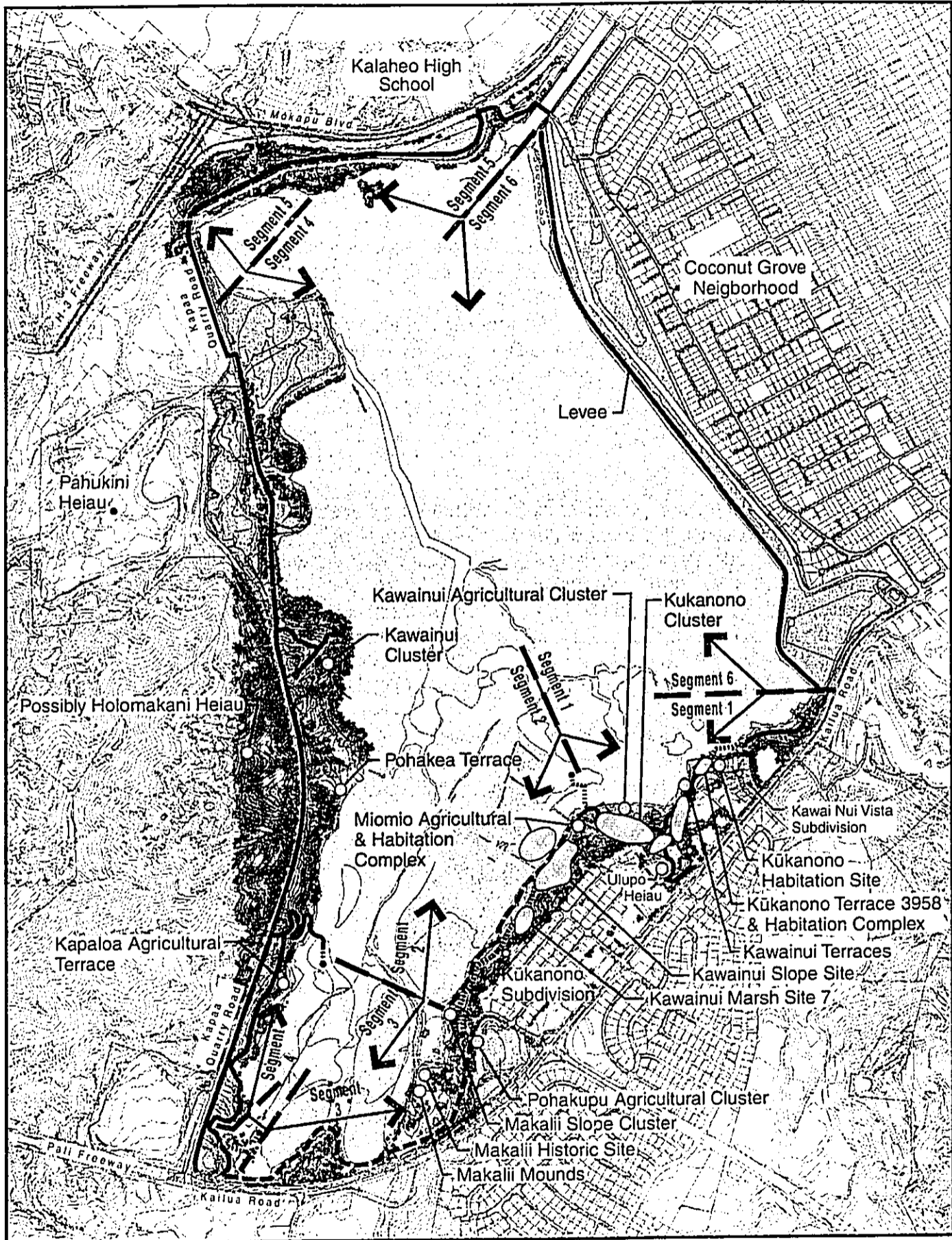
A positive long-term impact associated with the proposed pathway will be an increase in accessibility to view and study the archeological, cultural and historical resources of the marsh. The recommended pathway alignment will allow pathway users to understand Kawai Nui's rich cultural heritage. The project looked at the potential, feasibility and impacts of trail construction from the standpoint of historic preservation and historic/cultural interpretation (Figure 10). The spur to the Ulupo Heiau from Segment 1 of the proposed pathway will intersect with the parcel under the jurisdiction of DLNR, State Parks Division.

The final pathway alignment may vary based on future decisions by DLNR. Nonetheless, the proposed trail should be designed to avoid direct impacts to cultural sites, but close enough to educate visitors about Kawai Nui Marsh's role in the *ahupua`a* of Kailua.

Mitigation Measures

The following four mitigation measures are recommended once the final pathway alignment for individual segments is determined:

1. A complete archeological inventory survey for pathway segments should be completed, as needed, prior to commencement of construction.
2. If necessary, complete any data recovery prior to construction. Data recovery is a form of mitigation and it negates or lessens the impact of a project's development by collecting available information before a historic property is affected.



Archeological Sites

Kawai Nui Marsh Pathway
 Kailua, Ko'olaupoko, O'ahu

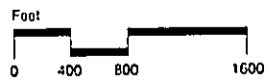


Figure
11

3. Prepare an archeological preservation plan for any affected archeological and cultural sites. This plan would include the pathway construction methods, the proposed mitigation of impact on the historic properties, long and short-term preservation measures for the historic properties and how properties should be interpreted and protected.
4. The DLNR, State Parks Division, the Kailua Hawaiian Civic Club and Pā Ku'i A Holo should be consulted concerning the alignment and construction style of the spur trail from Segment 1 of the proposed pathway to the Ulupo Heiau.

3.11 AESTHETIC AND VISUAL ENVIRONMENT

Existing Conditions

Depending on accessibility and effort involved, observers can view the marsh at high or low elevations. The higher elevation views are accessible from the Pali Highway, from Mount Olomana, and from the Maunawili Demonstration Trail. Lower elevation views of Kawai Nui can be seen from Kapaa Quarry Road, Ulupo Heiau, Pahukini Heiau and from Na Pohaku o Hauwahine. The lowest views are available along the flood control levee and above the slopes of the marsh area. The view from the flood control levee is spectacular as one can see the entire marsh from north to south.

Anticipated Impacts

Existing views of the marsh will not be impacted by the construction of the proposed pathway since no structural elements will be constructed (other than boardwalks and viewing platforms).

Views of the marsh will be enhanced along the recommended alignment by selective clearing of vegetation.

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

3.12.1 State of Hawaii

3.12.1.1 State Land Use District

Under the provisions of Chapter 205, HRS, the State Land Use Commission, classifies all lands in the State of Hawaii under one of four land use districts: (1) Conservation; (2) Agriculture; (3) Urban; and (4) Rural. The project site lies within the State Conservation Land Use District, Protective subzone.

Appropriate governing regulations of the Conservation District Rules and Regulations are found in Chapter 13-3 (HAR) Conservation District, Section 13-

5-22 (b)(1). Under these guidelines a board permit (and a management plan) is required for the project, which falls under the category of "Public Purpose Uses," categories D-1 and D-2, which note:

"D-1 Land uses undertaken by the State of Hawaii or the counties to fulfill a mandated governmental function, activity, or service for public benefit and in accordance with public policy and the purpose of the conservation district. Such land use may include transportation systems, water systems, communication systems, and recreational facilities.

D-2 Transportation systems, transmission facilities for public utilities, water systems, energy generation facilities utilizing the renewable resources of the area (e.g. hydroelectric or wind farms) and communication systems and other such land uses which are undertaken by non-governmental entities which benefit the public and are consistent with the conservation district."

3.12.1.2 Coastal Zone Management Area

The project lies within the State's Coastal Zone Management (CZM) Area. Therefore, the CZM objectives and policies, as stated in Section 205A-2 HRS, are applicable to the proposed project.

The Coastal Zone Management objectives and policies (Section 205A-2) applicable to the proposed project are cited and discussed below:
Objectives:

- (1) *Recreational Resources;*
 - (A) *Provide coastal recreational resources opportunities accessible to the public.*
- (2) *Historic Resource;*
 - (A) *Protect, preserve, and, where desirable, restore the natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.*
- (3) *Scenic and open space resources;*
 - (A) *Protect, preserve, and, where desirable restore or improve the quality of coastal scenic and open space resources.*
- (5) *Economic uses;*
 - (A) *Provide public or private facilities and improvements important to the State's economy in suitable locations.*
- (6) *Coastal hazards;*
 - (A) *Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.*

(7) Managing Development;

- (A) Improve the development review process, communication, and public participation in the management of coastal resources and hazards.*

Discussion: The project proposes improvements to an area that currently has limited access for the general public. Recreational and educational opportunities will be enhanced. Before the proposed project is initiated, the State's Historic Preservation Division (SHPD) will be consulted, to minimize impacts to archeological and cultural resources. The project will protect and preserve existing open space. View planes in and around the marsh will be enhanced as dense vegetation along the recommended alignment will be selectively cleared. The pathway will provide additional pedestrian and bicycling opportunities. Informative signage about Kawai Nui Marsh, its role as a wetland, and flood control basin for Kailua will be provided to stimulate public awareness and provide educational lessons about the project.

Policies:

(1) Recreational resources;

- (A) Improve coordination and funding of coastal recreational planning and management; and*
- (B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by;*
- (iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;*
 - (iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;*
 - (v) Ensuring public recreational use of county, state and federal owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources; and*
 - (vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters.*

Discussion: The project is an initiative of the City and County of Honolulu, Vision Team 2000 program. The Kailua Vision Team (KVT) members allocated public funds for the planning of a perimeter pathway around Kawai Nui Marsh in FY 1999. The project provides diverse recreational opportunities for pedestrians, joggers, bicyclists and disabled users. The pathway alignment and proposed

spur trails will increase public access to otherwise inaccessible areas in the marsh. The project will use BMPs to mitigate soil pollution where necessary.

(2) Historic resources;

- (A) Identify and analyze significant archeological resources.*
- (B) Maximize information retention through preservation of remains and artifacts or salvage operations; and*
- (C) Support state goals for protection, restoration, interpretation, and display of historic resources.*

Discussion: Cultural Surveys Hawaii conducted an archeological survey of the project area. As mentioned in Section 3.10.1 (Archeological Assessment), a number of archeological features are located in proximity to the recommended alignment (see Figure 11). The pathway will allow the user to understand Kawai Nui Marsh's archeological and cultural resources and its role in the *ahupua`a* of Kailua. The SHPD, DOFAW, DLNR, the Kawai Nui Heritage Foundation and other parties will be consulted regarding the final pathway alignment and design.

(3) Scenic and open space resources;

- (A) Identify valued scenic resources in the coastal zone management area;*
- (B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;*
- (C) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and*
- (C) Encourage those developments, which are not coastal dependent to locate in inland areas.*

Discussion: The proposed project will take place in an inland area that is not coastal dependant. There are no views of the ocean from the project site, except for higher elevation lookouts. Dense vegetation and trees obstruct the project area while driving along Kapaa Quarry Road and Kailua Road. Currently, views of Kawai Nui Marsh are restricted to Ulupo Heiau, Na Pohaku o Hauwahine overlook, the levee and the Model Airplane Park.

Scenic resources within the project area consist of Ulupo Heiau and Na Pohaku o Hauwahine. Pathway users will be able to view the *heiau* and overlook from different vantage points. Opportunities for scenic resources (water birds and aquatic habitat) within the project area will increase if the pathway is constructed. The project is designed to: (1) blend in with the landscape (by using natural looking material); (2) maximize views (by clearing selective vegetation); and (3) minimize the disruption of public viewplanes.

(5) Economic Uses

- (A) *Concentrate coastal dependant development in appropriate areas;*
- (B) *Ensure that coastal dependant development such as harbors and ports, and coastal related developments such as visitor industry facilities, and energy generating facilities, are located, designed and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and*
- (C) *Direct the location and expansion of coastal dependant developments to areas presently designed and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependant development outside of presently, designated areas when:*
 - (i) *Use of presently designated locations is not feasible;*
 - (ii) *Adverse environmental effects are minimized; and*
 - (iii) *The development is important to the State's economy.*

Discussion: The pathway is not coastal dependant, therefore the objectives and policies noted here are not applicable to the project.

(6) Coastal Hazards

- (A) *Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;*
- (B) *Control development in areas subject to storm waves, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;*
- (C) *Ensure that developments comply with requirements of the Federal Flood Insurance Program;*
- (D) *Prevent coastal flooding from inland projects; and*
- (E) *Develop a coastal point and nonpoint source pollution control program.*

Discussion: The U.S. Federal Emergency Management Agency, National Flood Rate Map, Flood Insurance Rate Map (FIRM) has determined Kawai Nui Marsh falls in Zone A, defined as no base flood elevation, determined for a 100-year flood.

According to the Land Use Ordinance, Flood Hazard Districts, Section 21-9.10-5 Floodway District, public outdoor recreational facilities, lawn, garden, and play areas are permitted uses in accordance with the underlying zoning district in floodways and flood fringe areas (Section 21-9.10-13 (a)(1)). In addition, fences and retaining walls (Section 21-9.10-13 (a)(2), signs Section 21-9.10-13 (a)(7), walkways Section 21-9.10-13 (a)(11), and landscaping (Section 21-9.10-13 (a)(12), are exempt from hazard district requirements.

Soil erosion control measures and Best Management Practices (BMPs) will be used during construction to minimize point and nonpoint source pollution Kawai Nui Marsh.

- (7) *Managing development;*
- (A) *Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;*
 - (B) *Facilitate timely processing of applications for developing permits and resolve overlapping or conflicting permit requirements; and*
 - (C) *Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life-cycle and in terms understandable to the public to facilitate public participation in the planning and review process.*

Discussion: The preparation of this Final Environmental Assessment (FEA) is consistent with the CZM objectives and policies. The document will support a future application for a Special Management Area (SMA) Use Permit and the Conservation District Use (CDUP).

3.12.2 City and County of Honolulu

3.12.2.1 Ko'olaupoko Sustainable Communities Plan

The Koolaupoko Development Plan (1983) was repealed and replaced by the Koolaupoko Sustainable Communities Plan in August 2000.

The Koolaupoko Sustainable Communities Plan, Section 3.1.3.3 (Wetlands, Wildlife Preserves and Nature Parks/Preserves), notes Koolaupoko is significant because of the occurrence and abundance of native waterbirds, such as the Hawaiian Stilt (*ae`o*), Hawaiian Coot (*`alae ke`oke`o*), Hawaiian Duck (*koloa maoli*), Hawaiian Moorhen (*`alae`ula*), and migratory waterfowl and shorebirds.

The section describes Kawainui Marsh as one of eight major existing wetlands, proposed nature parks/preserves and/or botanical gardens of Koolaupoko.

"Kawainui Marsh serves multiple purposes as a flood storage basin, wetland filter, wildlife habitat and cultural and scenic resource pursuant to a master plan prepared in 1994². The master plan includes hiking trails through the Marsh. Also proposed are an environmental education center and a pedestrian path around the perimeter of the Marsh."

² State of Hawaii Department of Land and Natural Resources, *Kawai Nui Marsh Master Plan*, July 1994.

Kawainui Marsh Site # 7, Pahukini Heiau and Ulupo Heiau are recognized as significant archeological sites in Koolaupoko. In the report, Kawai Nui Marsh is labeled as Open Space/Preservation Area.

Discussion: The project is consistent with the DLNR 1994 Master Plan and Section 3.1.3.3 of the Koolaupoko Sustainable Communities Plan. The pathway links the proposed Master Plan development concepts and provides a perimeter pathway around the marsh, while minimizing potential impacts to significant archeological and cultural sites.

3.12.2.2 General Plan

As described in the introduction to the General Plan, first adopted in 1977:

"The General Plan for the City and County of Honolulu is a comprehensive statement of objectives and policies which sets forth the long-range aspirations of Oahu's residents and the strategies of actions to achieve them. It is the focal point of a comprehensive planning process that addresses physical, social, economic and environmental concerns affecting the City and County of Honolulu. This planning process serves as the coordinative means by which the City and County government provides for the future growth of the metropolitan area of Honolulu."

The proposed pathway project is consistent with the following objectives and policies of the General Plan:

Natural Environment

Objective A: To protect and preserve the natural environment.

Policy 10: Increase public awareness and appreciation of Oahu's land, air, and water resources.

Objective B: To preserve and enhance the natural monuments and scenic views of Oahu for the benefit of both residents and visitors.

Policy 4: Provide opportunities for recreational and educational use and physical contact with Oahu's natural environment.

Culture and Recreation

Objective B: To protect Oahu's cultural, historic, architectural, and archaeological resources.

Policy 1: Encourage the restoration and preservation of early Hawaiian structures, artifacts, and landmarks.

Policy 2: Identify, and to the extent possible, preserve and restore buildings, sites, and areas of social, cultural, historic, architectural, and archaeological significance.

Policy 4: Promote the interpretive and educational use of cultural, historic, architectural, and archaeological sites, buildings, and artifacts.

Policy 5: Seek public and private funds, and public participation and support, to protect social, cultural, historic, architectural, and archaeological resources.

Objective D: To provide a wide range of recreational facilities and services that are readily available to all residents of Oahu.

Policy 2: Develop and maintain a system of regional parks and specialized recreation facilities.

Policy 5: Encourage the State to develop and maintain a system of natural resource-based parks, such as beach, shoreline, and mountain parks.

Policy 6: Provide convenient access to all beaches and inland recreation areas.

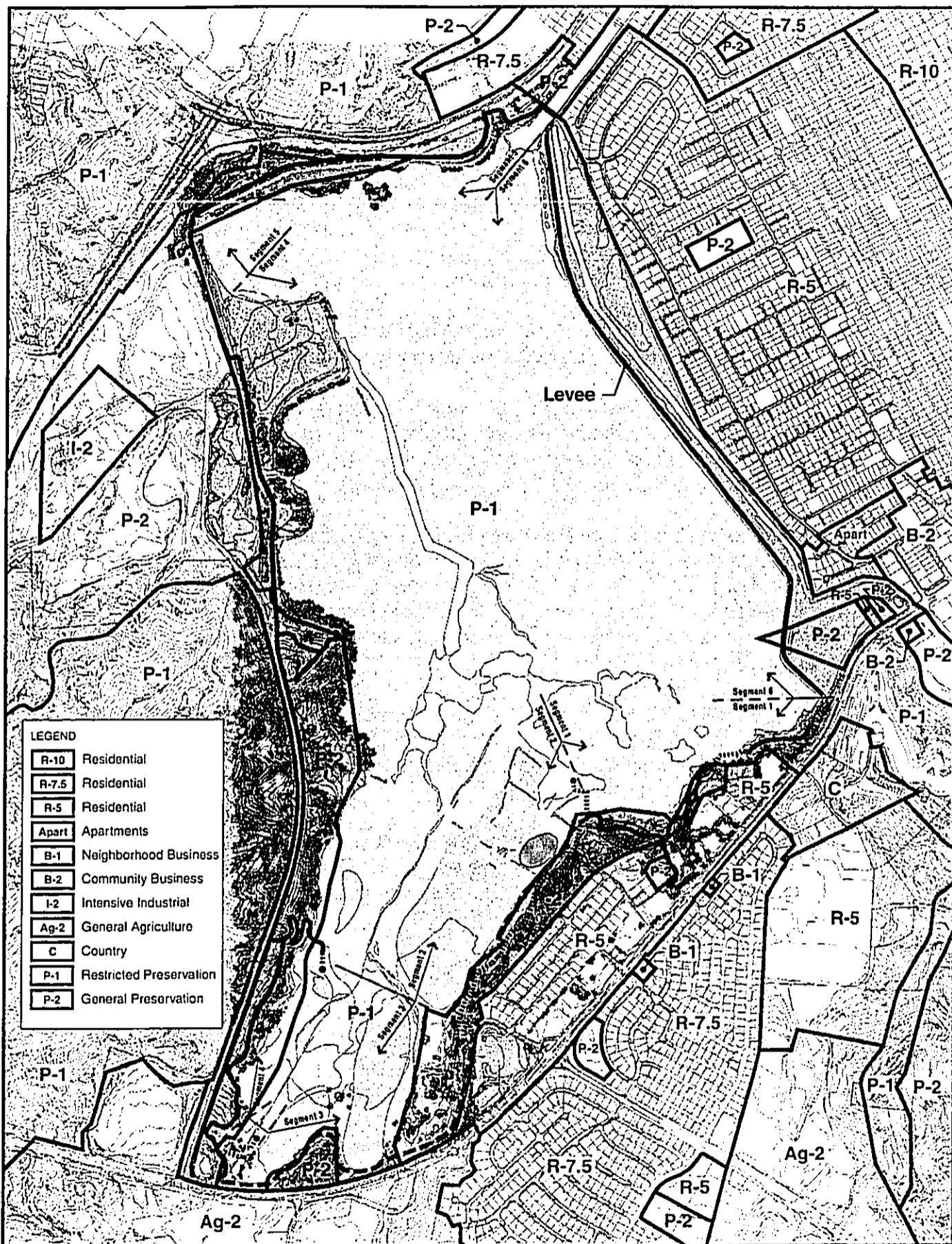
3.12.2.3 Zoning

The City and County of Honolulu's Zoning Map classifies Kawai Nui Marsh as P-1 (Restricted Preservation). Most of the project site lies within the area zoned P-2 (General Preservation). However, there are some exceptions where the pathway's alignment lies within the P-1 zone, such as: (1) the levee; (2) the area *makai* of Ulupo Heiau; and (3) the latter part of Segment 4 (Figure 12). The proposed pathway is a permitted use in the P-2 General Preservation District as a public use and structure, as defined in County Zoning regulations. Uses within the P-1 Restricted Preservation District are regulated by the State of Hawaii's Department of Land and Natural Resources.

3.12.2.4 Special Management Area

The project area lies within the City and County's SMA boundary so the review guidelines, as stated in Section 25-3.2 ROH, are applicable to the proposed project. These review guidelines, and the relationship of the proposed pathway are discussed below:

All developments in the special management area shall be subject to reasonable terms and conditions set by the City Council to ensure that:



Zoning Map
 Kawai Nui Marsh Pathway
 Kailua, Ko'olaupoko, O'ahu

0 400 800 1600 Feet

Figure 12

(a) All development in the special management area shall be subject to reasonable terms and conditions set by the council to ensure that:

- (1) Adequate access, by dedication or other means, to publicly owned or used beaches, recreation areas and natural reserves is provided to the extent consistent with sound conservation principles;*
- (2) Adequate and properly located public recreation areas and wildlife preserves are reserved;*
- (3) Provisions are made for solid and liquid waste treatment, disposition and management which will minimize adverse effects upon special management area resources; and*
- (4) Alterations to existing land forms and vegetation; except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation or failure in the event of earthquake.*

Discussion: Pedestrian access to the marsh will increase at various access points depending on the final pathway alignment: (1) from the terminus of the southern end of the levee; (2) from the spur trail at Ulupo Heiau; (3) from the current access road to Knott Ranch; (4) from Na Pohaku o Hauwahine; (5) from the proposed visitor center at the corner of Kailua Road and Kapaa Quarry Road; and (6) at the proposed Gateway Park.

Although boardwalks and viewing platforms are proposed within the marsh, they are considered a minimal impact to the overall project. The project will expand public recreational areas. Wildlife viewing opportunities will be enhanced as well as protected by the pathway.

There are no public restroom facilities so the objectives and policies for liquid waste are not applicable to this type of development. Solid waste will be collected from trash receptacles, in areas still to be designated, once the pathway is constructed.

The physical landform of the marsh and its important landmarks will remain unchanged.

The pathway's alignment falls within the FIRM base flood elevation, designated for Kawai Nui Marsh. The proposed boardwalks will most likely be affected during heavy flooding. During floods, the segments and boardwalks affected will be closed to pedestrians.

(b) No development shall be approved unless the council has first found that:

- (1) The development will not have any substantial, adverse environmental or ecological effect except as such adverse effect is*

minimized to the extent practicable and clearly outweighed by public health and safety, or compelling public interest. Such adverse effect shall include, but not be limited to, the potential cumulative impact of individual developments, each one of which taken in itself might not have a substantial adverse effect and the elimination of planning options;

(2) The development is consistent with the objectives and policies set forth in Section 25-3.1 and area guidelines contained in HRS Section 205A-26;

(3) The development is consistent with the county general plan, development plans and zoning. Such a finding of consistency does not preclude concurrent processing where a development plan amendment or zone change may also be required.

Discussion: The project seeks to minimize any substantial, adverse environmental and/or ecological effects. Positive impacts associated with the project include; (1) the protection of aquatic species and bird habitats; (2) the protection of natural features (Na Pohaku o Hauwahine) and native vegetation; and (3) the selective clearing of dense, non-native vegetation.

As discussed in Section 3.12.1.2 (Coastal Zone Management Area), the proposed project is consistent with the policies and objectives contained in Section 205A-2, HRS. Further as shown in Sections 3.12.2.1 (Ko'olaupoko Sustainable Communities Plan), Section 3.12.2.3 (Special Management Area) and Section 3.12.2.2 (Zoning), the proposed project is consistent with the General Plan, Koolauapoko Sustainable Communities Plan, and zoning.

(c) The council shall seek to minimize, where reasonable:

(1) Dredging, filling or otherwise altering any bay, estuary, salt marsh, river mouth, slough or lagoon;

(2) Any development which would reduce the size of any beach or other area usable for public recreation;

(3) Any development which would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management area and the mean high tide line where there is no beach;

(4) Any development which would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast; and

(5) Any development which would adversely affect water quality, existing areas of open water free of visible structures, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agricultural uses of land.

Discussion: The proposed project will not alter any water bodies (bay, estuary, salt marsh, river mouth, slough and/or lagoon). It will not reduce any beach or other area useable for public recreation. There will be no development which will reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams. The ocean is not visible from the project site.

Impacts to water quality are considered minimal and short term during the construction of the project. Impacts to aquatic habitats are considered minimal and mitigation measures will include consulting a DOFAW biologist before the proposed boardwalks are constructed. There is no significant impact to avifauna.

3.13 Cumulative Impacts: Physical Environment

The region that has the greatest influence on the physical characteristics of Kawai Nui Marsh is largely defined by the ±6,200-acre drainage basin that empties into the marsh. Urban development activities within the drainage basin peaked during the 1960s and 1970s. Any future development in the region would be of an infill nature, rather than large-scale development of vacant land. Therefore, it is anticipated that regional sediment and stormwater input into the marsh will not increase significantly. This includes any additional input resulting from the construction of the impervious sections of the proposed pathway, which comprise less than 0.05% of the entire drainage basin.

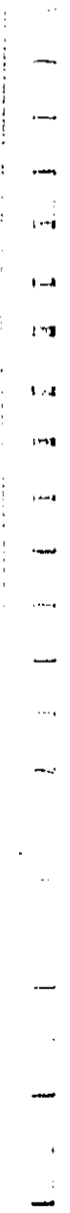
On the whole, there is intangible value associated with the implementation of the proposed project, because it will increase access to the marsh, and thereby increase awareness of the marsh ecology and the factors which affect that ecology. With increased awareness, the greater community is better equipped to make decisions which will benefit the marsh.

In addition, it is important to understand that there are other agency and community projects under consideration that are geared to the environmental protection and enhancement of the marsh, in addition to providing increased educational awareness about the marsh.

Overall, the proposed project complements an on-going effort to support the environmental health of the marsh.

It is possible that increased visitation to the marsh could result in unforeseen instances of pollution (trash) and possible intrusion into endangered species habitat by visitors who leave marked trails. However, mitigation in the form of proper signage, trash receptacles, and adequate maintenance should limit these problems.

Chapter 4
SOCIO-ECONOMIC
CHARACTERISTICS



4.0 EXISTING CONDITIONS AND IMPACT ASSESSMENT: SOCIO-ECONOMIC CHARACTERISTICS

4.1 KAILUA TOWN

Existing Conditions

Kailua Town is located on the windward (east) side of O`ahu. It supports a resident population of approximately 36,000 people. Kawai Nui Marsh is located northwest of the town.

4.2 RANCH OPERATIONS

Existing Conditions

Knott Ranch utilizes approximately 80 acres along the southern end of Kawai Nui Marsh for grazing between 50 to 100 head of cattle. Since 1964, the Cash family has operated the VO Ranch on approximately ten acres, on the *makai* side of Kapaa Quarry Road, south of Na Pohaku o Hauwahine. Both ranches operate on a month-to-month revocable permit from the State DLNR.

Anticipated Impacts

Impacts to the status of Knott Ranch will depend on future decisions by DLNR regarding cattle grazing activities. Today, Knott Ranch operations utilize the area where Segment 3 of the recommended pathway would be located. This segment runs from Ulukahiki Street to the intersection of Kailua Road and Kapaa Quarry Road, through the ranch's main operations area. DLNR has indicated it prefers to continue cattle grazing to control vegetation in the marsh. The proposed alignment would not impact this decision. VO Ranch will not be affected by the proposed project, as the proposed alignment is along Kapaa Quarry Road.

Mitigation Measures

The "Kawai Nui Marsh Pathway Report" (HHF, 2001) addressed ranch operation concerns with the following mitigation measures: (1) the final alignment of Segment 3 should be determined after the USACE pond restoration project is designed; (2) if ponds are constructed, construct a pedestrian trail at the base of the slope behind Kailua Road (to link to DLNR's 1994 Master Plan concepts); and (3) if ponds are not constructed and cattle grazing continues in the area, consider eliminating construction of a trail in this segment.

4.3 RESIDENTIAL COMMUNITIES

Existing Conditions

Approximately 17,000 residents live within one-half mile of the Kawai Nui Marsh perimeter³. These include residents of the Kalaheo, Coconut Grove, Kukanono and Kawai Nui Vista neighborhoods, which are adjacent to the marsh perimeter (DBEDT, 2000).

During public meetings, community members discussed key issues and concerns regarding the proposed project. The following text provides an overview of these issues.

Desire for Recreational Opportunities and Improved Access in the Area.

The impetus for the Kawai Nui Marsh Pathway project came from community members (particularly from the Coconut Grove neighborhood) who wanted to expand recreational opportunities around the marsh. During recent years, use of the levee for walking and jogging has increased substantially. Expanding opportunities along the fringe of the marsh from the existing levee resource is viewed by many in the surrounding neighborhoods and general public to be a positive addition to the quality of life in Kailua.

Protection of Natural and Cultural Features. As the largest wetland area in the State, Kawai Nui Marsh is a major focal point of the entire ahupua`a. Because of its rich natural features, the area was a center of Hawaiian agricultural activities for many years. As a result, numerous habitation and other important cultural sites exist around the marsh, particularly along the Kukanono hillside. It is important to the community that increased access to the marsh environment not adversely impact the natural or cultural resources of the area.

Impact on the Residential Neighborhoods. Located along Kailua Road (Pali Highway) between Castle Hospital and the levee, the Kukanono and Kawai Nui Vista neighborhoods include approximately 100 single-family house lots. Residents of the neighborhoods expressed concern that a pathway would increase traffic and encourage users of the pathway to park on the streets. There is also concern over potential increases in property crime, safety, and noise.

Anticipated Impacts

Recreational Opportunities and Improved Access in the Area. There will be a positive impact to recreational opportunities in Kailua. Project planning looked at the feasibility of increasing pedestrian and bicycling routes around the perimeter of Kawai Nui Marsh. An overview of the study area is presented in Section 2.4 (Pathway Segments and Construction) and shown in Figure 5. Among other subjects, the section discusses design recommendations for each pathway

³ These residents comprise census tracts 109.01, 109.03, 109.04, 109.05, and 110.

segment. Pedestrian and bicycling opportunities are important features of the discussion.

There is an anticipated positive impact to improved access to Kawai Nui Marsh. The Pathway Report (HHF, 2001) recommended several locations to improve access including: (1) construct a parking lot and pedestrian pathway at the terminus of the southern end of the levee (Segment 1); (2) construct a spur trail from Ulupo Heiau into the marsh (Segment 1); (3) possibly develop a spur trail from the visitor center site as recommended in the 1994 DLNR plan (Segment 4); and (4) construct a parking lot and access trail near Na Pohaku o Hauwahine (Segment 4).

Protection of Natural and Cultural Features. As mentioned in Section 3.10.1 (Archeological Assessment) the final pathway alignment will be determined by DLNR after decisions regarding the development of ponds and the location of cattle grazing operations are made. The recommended alignment described in this report is sensitive to the presence of historic resources and would take advantage of interpretive opportunities to tell the story the marsh's significance from a cultural perspective.

There will be no significant impacts to the natural environment (flora, avifaunal and aquatic species) in proximity to the recommended pathway alignment. Char and Associates (flora expert) and Phil Bruner (terrestrial expert) conducted surveys of the proposed pathway corridor. No flora species or avifaunal species will be impacted by the project. As mentioned in Section 3.9 (Aquatic Species), soil removal in some areas could increase turbidity in portions of the marsh. The EA addresses this issue and provides mitigation measures to minimize potential impacts.

Impact on Residential Neighborhoods. Potential impacts to the residential neighborhoods around the marsh are most evident to the Kukanono and Kawai Nui Vista areas. These potential impacts include:

1) Traffic and Parking. The Pathway Report (HHF, 2001) noted a development constraint was providing access to the pathway without impacting the Kukanono neighborhood by increasing traffic through the area. Section 5.6.1, details existing parking adjacent to the proposed pathway, and the conditions of these areas.

2) Safety and Crime. Access into the marsh area adjacent to the Kukanono neighborhood is currently prohibited because of cattle crazing operations. Further North, access into the marsh near the Kawai Nui Vista neighborhood is restricted by vegetation and general topography of the area. An increase in pedestrian traffic in the marsh could increase opportunities for property crimes and a decline in overall safety in the area.

3) Noise. Current activities in the marsh create a quiet and tranquil setting for residents in the Kukanono and Kawai Nui Vista neighborhoods. Noise from pedestrians along the pathway could impact the existing environment. Motorized vehicles should be prohibited from all areas of the pathway. Such activities would impact both residential neighborhoods and bird habitats in the marsh.

Mitigation Measures

Recreational Opportunities and Improved Access in the Area. Construction of the pathway will increase use of the marsh for recreational and educational activities. Providing new access points at locations away from residential areas will control impacts of increased use. Access to the pathway through the Kukanono and Kawai Nui Vista neighborhoods will be prohibited. Installation of informative signage at access points should be provided to inform pathway users of acceptable activities.

Protection of Natural and Cultural Features. Cultural Surveys Hawaii identified areas of cultural significance in the marsh. Based on the report (Appendix D), the recommended pathway alignment was designed to minimize the potential for disturbing cultural artifacts, while providing opportunities for cultural interpretation.

As mentioned in Section 3.9 (Aquatic Species), soil removal in some areas could increase turbidity in the marsh habitat. Compliance with BMPs will mitigate the potential effects of increased turbidity. In addition, the State DLNR, in consultation with the U.S. Fish and Wildlife Service (USFWS) and other agencies/organizations as appropriate, will determine the final pathway alignment and ensure there are minimal impacts to aquatic habitats.

Impact on Residential Neighborhoods.

Traffic and Parking. A primary measure to mitigate anticipated traffic impacts is to direct traffic and visitors to alternative parking locations. The Pathway Report (HHF, 2001) recommended that a parking area be constructed at the end of the maintenance road that terminates at the Kailua Road end of the levee. This lot is intended to provide approximately 15-20 stalls. The entrance to the parking lot would utilize the existing maintenance access road off Kailua Road. This lot would reduce traffic through in the Kukanono neighborhood, and would be accessible from alternative transportation routes (bike and bus route and roadway/sidewalk circulation). Prohibiting access to the pathway through the neighborhoods will eliminate the potential for pathway users to park on public streets.

According to the DLNR Master Plan, increased parking opportunities are to be provided at the proposed Kawai Nui Gateway Park (also called Kalaheo Park) on Mokapu Boulevard, at Na Pohaku o Hauwahine on Quarry Road, at Mokulana

Peninsula on Kailua Road, and at the proposed visitor center across from Le Jardin School.

Safety and Crime. Mitigation measures addressing potential safety and crime impacts include: (1) prohibiting access to the trail through the Kukanono and Kawai Nui Vista residential subdivisions; (2) keeping the trail alignment well away from the residential areas (use a switchback alignment behind Castle Hospital to keep the trail away from residential lots); and (3) using railings, fencing, vegetation density and signage where appropriate to keep pedestrians on the pathway within its identified alignment.

Noise. Potential noise impacts will be alleviated by: (1) keeping the pathway alignment away from residential areas; (2) maintaining a minimum distance of 100 feet from residential house lots; (3) prohibiting motorized vehicles be from all portions of the pathway; (4) using gates and other design features at trail heads to restrict access to the pathway by motorcycles and other types of motorized vehicles; (5) installing informative signage to indicate park hours; and (6) minimizing access points.

4.4 CASTLE HOSPITAL

Existing Conditions

Castle Hospital is located at the southern end of the marsh, above the current Knott Ranch.

Anticipated Impacts

No significant impacts to Castle Hospital are anticipated from the implementation of the proposed project.

4.5 INDUSTRIAL ACTIVITIES

Existing Conditions

The Kapaa Industrial Park is located to the northwest of Kawai Nui Marsh. Ameron HC & D, operates the quarry adjacent to the industrial park. They lease the land from the Trustees of the Harold K.L. Castle Estate. Quarry operations will continue in the area for the foreseeable future.

Anticipated Impacts

No significant impacts to Kapaa Industrial Park or Ameron HC & D are anticipated from the implementation of the proposed project.

4.6 CULTURAL IMPACT EVALUATION

Existing Conditions

Cultural Surveys Hawaii (CSH) prepared a cultural impact evaluation for the proposed pathway project (Appendix E). CSH reviewed a significant breadth of available literature on Kawai Nui and identified a number of traditional uses of Kawai Nui.

Literature review included subjects related to archeological resources, avian resources, earth resources, fish resources, and plant resources. There are many references to the use of Kawai Nui for hunting, adze quarrying, fishing, and collecting of plants for a variety of reasons. Many of these activities are no longer enjoyed because native resources are not present or are lacking in abundance. However, there are many organizations and individuals who have led efforts to identify important cultural resources in and around Kawai Nui, and to preserve, restore, and maintain these resources. These groups include the Kailua Hawaiian Civic Club and the Kawai Nui Heritage Foundation.

Anticipated Impacts

A good faith effort has been made to investigate the potential for adverse impacts to any archeological, avian, earth, fish, and plant resources, which Kawai Nui has held for the Hawaiian people. The only such potential adverse impacts that have been identified are to archeological (and religious sites). The nature of the proposed pathway is such that the portions likely to be closest to any potential cultural resources will be relatively modest with "light footprints." The overall impact of the project will be to improve access to Kawai Nui, and its resources.

Mitigation Measures

It should prove a simple matter to design the pathway so as to avoid any adverse impact to cultural resources. In order to mitigate any potential adverse impacts to cultural resources, final plans for trail construction and actual trail construction should be closely coordinated with the Kawai Nui Heritage Foundation. It is further recommended that any interpretive signage pertaining to Hawaiian sites or cultural practices be submitted for review and comment to SHPD, History and Culture Branch, to the Office of Hawaiian Affairs (OHA), the Kailua Hawaiian Civic Club, and the Kawai Nui Heritage Foundation.

4.7 CUMULATIVE IMPACTS: SOCIO-ECONOMIC CONDITONS

The cumulative impacts of the proposed action on socio-economic conditions should be viewed in the context of other planned improvements around the marsh. These include a proposed visitor center, and the Kawai Nui Gateway Park. Collectively, these projects will provide greater access to the marsh, and

provide opportunities for more people to experience its natural and cultural environment.

Chapter 5
PUBLIC FACILITIES &
SERVICES

5.0 EXISTING CONDITIONS AND IMPACT ASSESSMENT: PUBLIC FACILITIES AND SERVICES

5.1 UTILITIES

Existing Conditions

There are no existing public utilities within the project area. The proposed project will not require any utility services, and therefore, will not impact infrastructure in neighboring communities.

Anticipated Impacts

Hawaiian Electric Company, Inc. (HECO) has indicated that HECO facilities may be located in the vicinity of areas that may require drainage improvements.

Mitigation Measures

As final alignments for pathway segments are considered, project designers should work closely with HECO to ensure minimal disruption to the electric facilities.

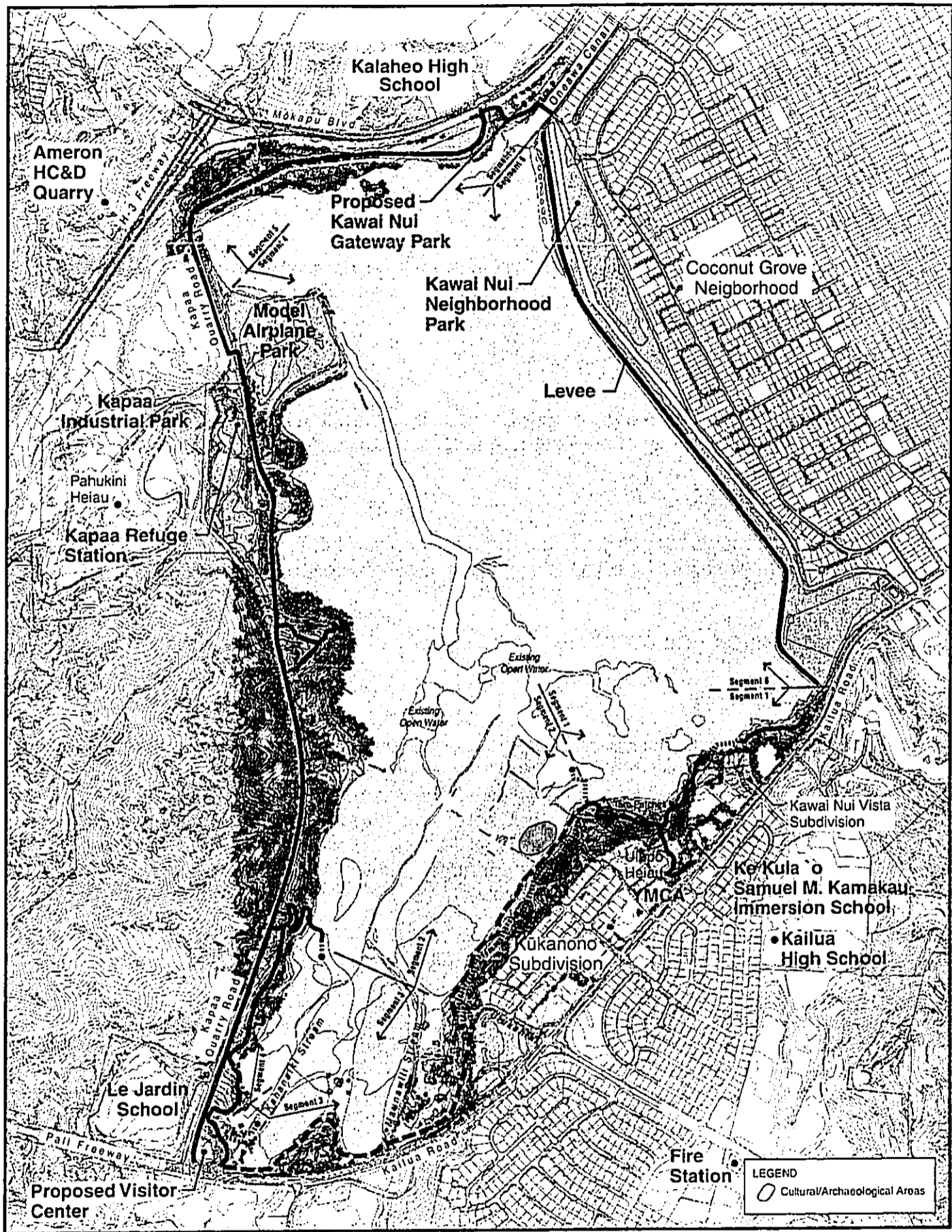
5.2 PUBLIC FACILITIES

Existing Conditions

No additional public facilities are required for the proposed Kawai Nui Marsh Pathway project. Public restrooms and water fountains are not included in the project. They are addressed in the DLNR 1994 Master Plan. The proposed Kawai Nui Gateway Park and Visitor Center sites (Figure 13) are planned to have restroom facilities and potable water services. The pathway is a separate project that focused on the construction of a perimeter pathway around the marsh.

Anticipated Impacts

No significant impacts are anticipated to public facilities.



Public Facilities and Services

Kawai Nui Marsh Pathway
 Kailua, Ko'olaupoko, O'ahu

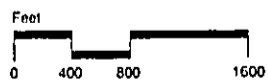


Figure
13

5.3 U.S. ARMY CORPS OF ENGINEERS FLOOD CONTROL LEVEE

Existing Conditions

Kawai Nui Marsh acts a flood storage basin to protect the Kailua community. The Coconut Grove subdivision sustained severe flooding in January 1988. Subsequently, in 1997, the USACE modified the 6,300-foot long levee to sustain a 100-year storm by raising the levee 4 feet.

Many residents and visitors access the levee for recreational use (bicyclists, joggers and pedestrians), for its spectacular view of the marsh, and to enjoy its visual and aesthetic beauty.

Anticipated Impacts

Expansion of the pathway around the marsh will increase in the use of the levee by pedestrians and bicyclists. The USACE was consulted (personal communication with Jim Pennaz, 7/18/01) regarding potential impacts to the levee. No problems are anticipated with the increased use of the levee as long as maintenance vehicles are not precluded from access to the levee. The DLNR indicated that access to the levee must be restricted during heavy rains and/or flooding, and during maintenance operations and/or inspections.

Mitigation Measures

Gates to control access when necessary and appropriate signage should be placed at either end of the levee warning of flooding hazards.

5.4 KAPAA REFUSE STATION, KAPAA SANITARY LANDFILL AND KAPAA ENERGY PARTNERS

Existing Conditions

The City and County of Honolulu Kapaa Refuse Station is located northwest of the marsh, on the *mauka* side of Kapaa Quarry Road. The transfer station is located at the eastern base of the City and County of Honolulu Kapaa Sanitary Landfill.

Kapaa Energy Partners leases property on the landfill. The company has a grid collection system to extract methane gas for commercial use. The Kalaheo Sanitary Landfill located north of the marsh was closed in 1990.

Anticipated Impacts

No significant impacts are anticipated to the City and County of Honolulu Kapaa Refuse Station, the transfer station, or to Kapaa Energy Partners.

5.5 ELEMENTARY AND HIGH SCHOOLS

Existing Conditions

Several schools are within a one-mile radius of Kawai Nui Marsh. Kalaheo High School is located off the northwest corner of the marsh across Mokapu Boulevard. It had an enrollment of approximately 1,045 students for school year 2001. Le Jardin School is located on the southwestern corner of the marsh. It serves students from preschool to 8th grade (the school is currently expanding to high school levels) and had an enrollment of approximately 438 students for school year 2001. The Ke Kula `o Samuel M. Kamakau Immersion School is located on Kailua Road. It serves students from kindergarten to 12th grade and had an enrollment of 46 students for school year 2001.

Kainalu Elementary School, Aikahi Elementary School, Kailua Elementary and Intermediate School and Kailua High School are located within a three-mile radius of the marsh.

Anticipated Impacts

Construction of the proposed pathway project will provide an increase in the educational opportunities to area schools to study the marsh's history, biology, hydrology, water quality, native birds and aquatic life.

5.6 RECREATIONAL FACILITIES

5.6.1 Community Parks

Existing Conditions

Two community parks, the Kawai Nui Neighborhood Park (Kaha Park) and the Model Airplane Park, are located along the perimeter of the marsh. The Kawai Nui Neighborhood Park, is located in the northeastern corner of the marsh. It is accessible from Kaha Street in the Coconut Grove subdivision. The 4.4-acre park is used primarily by youth soccer and baseball leagues. Parking at the park has recently been expanded to accommodate 40 stalls. The Model Airplane Park, located on Kapaa Quarry Road, near the access road to the industrial park. It is used by model airplane enthusiasts primarily during peak periods from Thursdays and Sundays. The gravel parking lot accommodates approximately 25 stalls. Neither of these parks have public restroom facilities. Portable facilities are available at both sites.

Anticipated Impacts

Construction of the proposed project will not have a significant impact on the continued use of existing community parks in the study area. Pathway users are expected to utilize parking stalls at existing parking lot locations. This presently takes place at the Kawai Nui Neighborhood Park by those wanting access to the north end of the levee. With the recent improvements to the parking lot at this location, space to accommodate park visitors is generally not a problem except for some peak afternoon hours.

Mitigation Measures

To mitigate any impacts of an increase in parking at existing parking facilities, the DLNR Master Plan recommends construction of additional parking at the proposed Kawai Nui Gateway Park site on Mokapu Boulevard, at Mokulana Peninsula along Kailua Road, at the visitor center site across from Le Jardin School, and at Na Pokaku O Hauwahine Overlook on Kapaa Quarry Road. Additionally, during the planning process for this report, a parking lot of 15 to 20 stalls is recommended to be constructed along Kailua Road at the southern end of the levee in order to reduce the amount of vehicles transiting through the Kukanono neighborhood to park at the YMCA.

5.7 POLICE AND FIRE PROTECTION

Existing Conditions

There are two fire stations that serve the Kailua area, including the project site. The first is located on Kalaniana'ole Highway, approximately 1.5 miles south of Kawai Nui Marsh. The other fire station is located next to the police station, on Kuulei Road east of the marsh. The police station serves the area from Waimanalo to the Marine Corps Base Hawaii, Kaneohe Bay.

Anticipated Impacts

It is possible that once the pathway is completed, there could be an increase in activities associated with the pathway, such as loitering, loud gatherings of groups (drinking, etc), although this should not represent a significant increase to existing calls for service.

5.8 CUMULATIVE IMPACTS: PUBLIC FACILITIES AND SERVICES

The proposed pathway will not require connection to public utilities, nor will it generate a need to increase provision of public services. Overall, environmental educational opportunities in the region will increase, especially if other public

projects in and around the marsh are implemented (e.g., visitor center, Kawai Nui Gateway Park, USACE mudflat/pond enhancement).

Chapter 6
PREPARERS OF THE
EA

6.0 PREPARERS OF THE EA

This Environmental Assessment (EA) was prepared for the City and County of Honolulu, Department of Transportation Services. The following list identifies individuals and organizations involved in the preparation of this EA and their respective contributions.

Helber Hastert & Fee, Planners

Dave Curry (Project Manager)
Rick Quinn (Physical Planning)
Lori Chun (Graphic Presentation)

Technical Consultants

Consultants

Char & Associates
Phil Bruner
Cultural Surveys Hawaii

Technical Area

Botanical Resources
Terrestrial Fauna
Archaeology, Cultural Impact Evaluation

Chapter 7
CONSULTED
AGENCIES & GROUPS

7.0 PARTIES CONSULTED DURING THE PREPARATION OF THE EA

7.1 Draft Environmental Assessment

Planning for the Kawai Nui Pathway commenced in 1999 as part of the City's "21st Century Oahu" community planning process. A total of seven community meetings were held between December 1999 and August 2000 to identify stakeholders in the project, develop pathway concepts, evaluate alternative pathway designs, and review the recommended pathway alignment. The purpose of the meetings and their dates are listed below.

<u>Meeting Date</u>	<u>Purpose of Meeting</u>
December 1, 1999	Existing Condition Analysis Discuss Opportunities and Constraints
April 5, 2000	Review Preliminary Concepts
May 11, 2000	Review Preliminary Pathway Alignments Sub-consultant Reports
June 22, 2000	Discuss Kukanono Area Alignment Address Planning Issues
August 2, 2000	Discuss Pathway Segment Guiding Principles Identify Pathway Segment Priorities
September 12, 2000	Present Pathway Recommendations to the Kukanono Community Association
September 21, 2000	Review Recommended Pathway Plan

The following list of agencies and organizations participated in the community planning process and/or provided information critical to the effort.

- U.S. Army Corps of Engineers (USACE)
- State of Hawaii, Department of Land and Natural Resources (DLNR),
Forestry and Wildlife Division
Land Division
State Historic Preservation Division (SHPD)
- City and County of Honolulu,
Department of Planning & Permitting (DPP)
Department of Transportation Services (DTS)
- Kailua Neighborhood Board (Recreation Sub-Committee)
- Coconut Grove Community Association (CGCA)

- Kukanono Community Association (plus many individual members of the Community).
- VO Ranch
- Knott Ranch
- Kawai Nui Heritage Foundation
- Model Airplane Club
- Hawaii Bicycling League (HBL)
- Castle Foundation
- Windward YMCA
- Hawaii's Thousand Friends
- Outdoor Circle
- Numerous individuals of the Kailua community

7.2 Final Environmental Assessment

Notice of the availability of the DEA was published in the May 23, 2002 issue of the "Environmental Notice," commencing a 30-day public review period. The DEA was distributed to the 56 agencies, organizations and individuals listed below, for review and comment. A total of 24 written comments were received. These parties are identified in the list below by the symbol, "√". Their comments were incorporated into the Final EA, and are attached at the end of this chapter.

United States Federal Agencies

- √Army Corps of Engineers
Regulatory Branch
Environmental Protection Agency
Region IX
- √U.S. Department of the Interior
Fish & Wildlife Services
U.S. Department of the Interior
U.S. Geological Survey

State of Hawaii Agencies

- √Dept. of Accounting & General Services, Comptroller
Dept. of Agriculture
Dept. of Business, Economic Development & Tourism
Office of Planning

- √Dept. of Education
 - Superintendent of Education
- √Dept. of Health
 - Environmental Planning Office
 - Dept. of Land and Natural Resources
 - √Historic Preservation Division
 - √Land Division, Engineering Branch
 - √Office of Environmental Quality Control
 - √State Parks Division
- √Dept. of Transportation, Director
 - √ Disability and Community Access Board
 - Hawaii State Library System
 - Hawaii Documents Center
 - Kailua Public Library
 - Kaneohe Regional Public Library
 - Legislative Reference Bureau
 - Office of Hawaiian Affairs
 - Administrator
 - Rep. Cynthia Thielen, District 49
 - Rep. David Pendleton, District 50
 - University of Hawaii at Mānoa
 - Hamilton Library- Hawaiian collection
 - √Environmental Center
 - Marine Programs
 - Water Resources Research Center

City & County of Honolulu Agencies

Board of Water Supply, Chief Engineer

- √Dept. of Community Services
 - Dept. Design & Construction
 - Dept. Environmental Services
 - Dept. Parks & Recreation
- √Dept. Planning and Permitting, Randall Fujiki
- √Honolulu Fire Department, Fire Chief
- √Honolulu Police Department, Police Chief
 - Municipal Reference and Records
 - Steve Holmes, City Council, District 2
 - John Henry Felix, City Council, District 3

Organizations and Individuals

- Abbot, Larry
- Castle Foundation, Kate Braden
- Coconut Grove Association, Libby Tomar
- DeCastro, Virginia
- Ducks Unlimited, Inc., Sharon Reilly
- Duncan, John
- Ferrira, Mr. & Mrs. Casey
- √ Figel, Rich
- √ Hawaiian Electric Company
Honolulu Advertiser, Editor
- √ Kawainui Heritage Foundation, Chuck Burrows, Bill Gorst and Susan Miller
- √ Kawai Nui Vista Homeowners Association
- √ Kailua Neighborhood Board, Environmental Committee, Donna Wong
Knotts Ranch, Evie Lingle
- √ Le Jardin Academy, Adrian Allan
 - Life of the Land
 - Outdoor Circle
 - Phillips, Lunsford
 - Sansone, Anthony
 - Sierra Club
- √ Smith, Barbara (Hoppy)
Star Bulletin
- √ Sulky, G. & D. Kroll
 - Turner, Cindy
 - VO Ranch, John Cash
 - Wipple, Mr. & Mrs. LJ

Chapter 8
REFERENCES

8.0 REFERENCES

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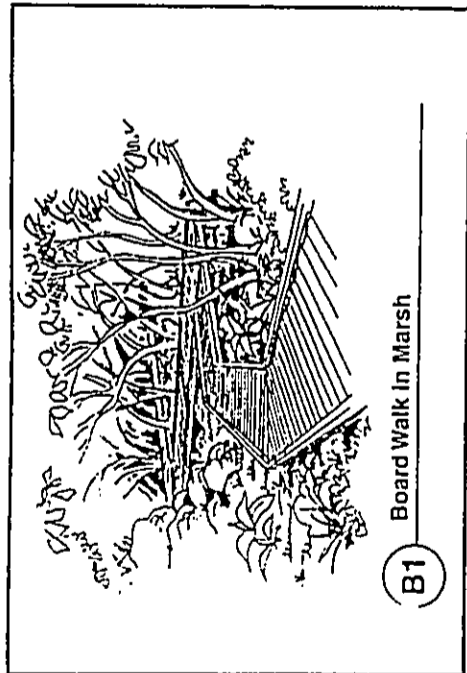
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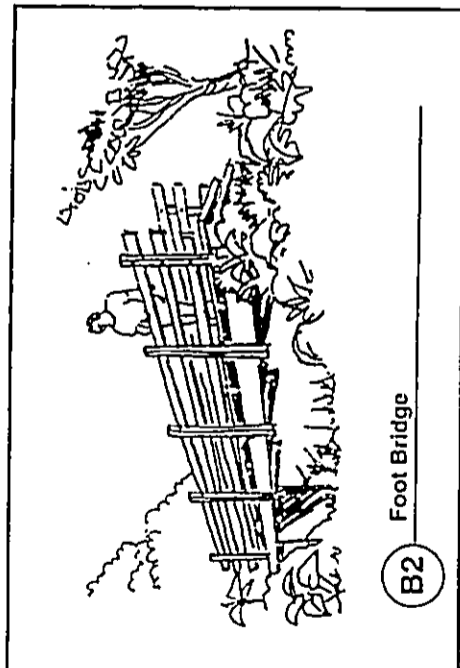
APPENDICES

Appendix A
Trail Construction



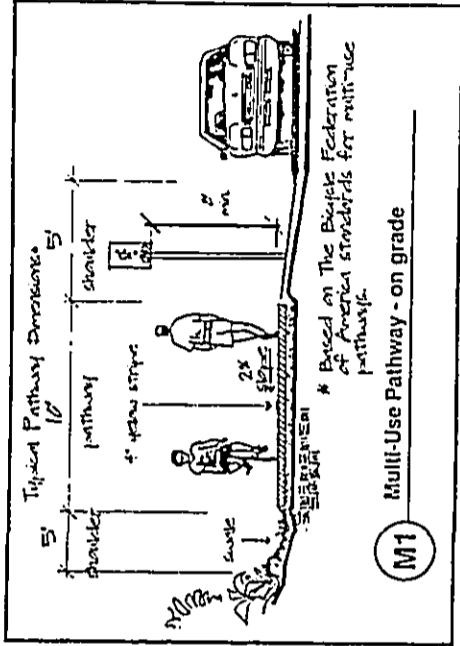
B1 Board Walk in Marsh

Boardwalks are proposed in two locations. The boardwalk will be 6 feet wide and composed ideally of plastic lumber planking with treated lumber framing. Railings will be provided in critical areas. The boardwalks will be about 8 to 10 inches above the marsh's surface.



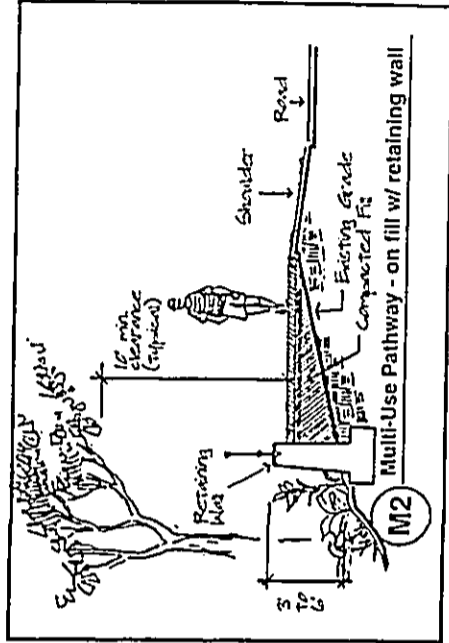
B2 Foot Bridge

A small footbridge bridge is proposed to cross steep streambeds. The bridge's planking ideally will be made of plastic lumber and its structure should be either treated lumber, steel, or formed concrete, depending on the span of the bridge. Shorter spans could use treated lumber.



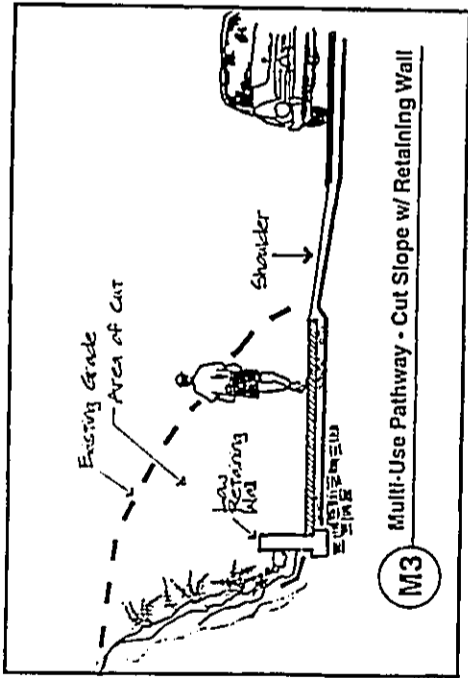
M1 Multi-Use Pathway - on grade

This path will be generally on grade with minimal cut or fill. The typical path dimensions will contain a 5-foot shoulder, a 10-foot wide pathway for shared multi-use, and a 5-foot cleared shoulder area. The 5-foot distance from the road will increase pedestrian safety from high-speed car traffic and will enable a car to pull over in an emergency, without impacting the path or its users. The path will have a 2% cross slope. The path will be graded and compacted, with a gravel base layer and topped with asphalt.

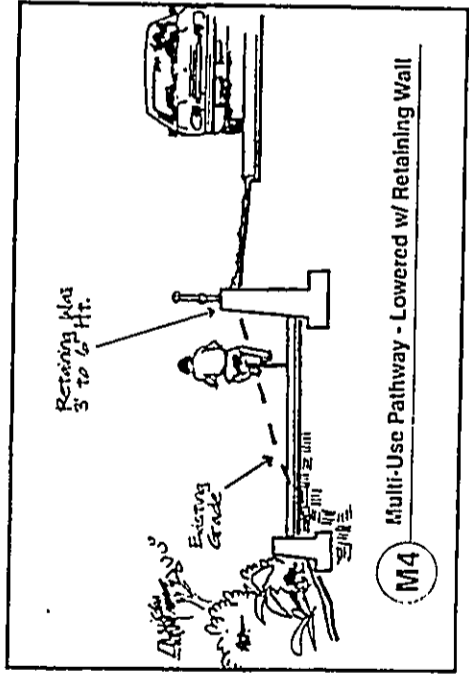


M2 Multi-Use Pathway - on fill w/ retaining wall

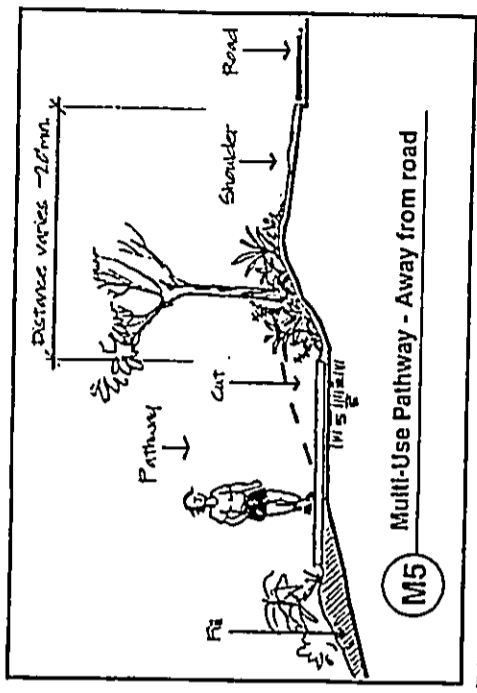
This path is similar to M1, but will be on fill with a retaining wall. This path will be 10 feet wide with a 10-foot head clearance. The path will be set off of the road by a minimum of a 5-foot shoulder. The terrain varies in slope so the existing grade will be filled in with compacted fill. The pathway will have a base layer of gravel and finished with asphalt. To obtain a level surface and retain the fill soil, a low retaining wall will be required. The wall will also act to control water run-off. This wall will be 3 to 6 feet in height and built of cinder blocks or formed concrete.



This path will be cut out of an existing slope. The path will be 10 feet wide and have a minimum 5-foot shoulder between the path and the adjacent roadway. The compacted sub-grade will be overlain with gravel and asphalt. A low retaining wall will be built of cinder block or formed concrete to control runoff and erosion of the cut slope. The exposed face of the wall could be clad in moss rock.



This path will be lower than the shoulder of the road. It will be 10 feet wide and have a minimum 5-foot shoulder. The pathway will be cut into the slope, with low walls needed on both sides to retain cut and fill. The compacted sub-grade will be overlain with gravel then finished with asphalt.



This path has a minimum setback of 20 feet from the road. This path will be 10 feet wide. The pathway will follow existing grade, with some minor cut and fill work. There will not be any retaining walls. The compacted sub-grade will be overlain with gravel then finished with a layer of asphalt.



Appendix B
Floral Survey
Char & Associates

BOTANICAL RESOURCES ASSESSMENT
KAWAI NUI MARSH PATHWAY
KO'OLAUPOKO, O'AHU

BOTANICAL RESOURCES ASSESSMENT
KAWAI NUI MARSH PATHWAY
KO'OLAUPOKO, O'AHU

INTRODUCTION

In 1994, the State Department of Land and Natural Resources prepared a master plan for Kawai Nui Marsh and vicinity to preserve, protect, and enhance the natural and cultural resources of the marsh. A pathway around the entire marsh was proposed in the master plan. The pathway would provide visitors and residents better access to various points of interest such as Ulupo Heiau, Na Pohaku O Hauwahine, etc. The pathway is divided into six segments. An existing pathway is found on the levee on the makai side of the marsh.

by

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An assessment of the botanical resources found along the proposed pathway was made on July 2000 and February 2001. The primary objectives of the study were to provide a general description of the vegetation on the pathway and to search for threatened and endangered species as well as species of concern. Areas of potential environmental problems or concerns were also identified.

Prepared for: Helber Hastert & Fee

DESCRIPTION OF THE VEGETATION

March 2001

The plant names used in the discussion follow Wagner *et al.* (1990). The few recent name changes are in accordance with those reported in the Hawaii Biological Survey series (Evenhuis and Miller 1995-1998; Evenhuis and Eldredge 1999-2000).

Segment 1

This segment extends from the southern (Kailua Road) terminus of the levee to Ulupo Heiau. Tall, dense thickets of hau (Hibiscus tiliaceus), 25 to 30 ft. tall, cover the slopes and border the edge of the marsh. Maile piau vines (Paederia foetida) are locally common and drape over the hau. The ground beneath the hau thicket is heavily shaded; leaf litter and barren soil are the dominant features. Where there are openings in the thicket and light is able to reach the ground, there are patches of Hilo grass (Paspalum conjugatum), blechnum fern (Blechnum occidentale), and wood-fern (Christella parasitica).

Along the edge of the marsh, California grass (Bracharia mutica) forms dense mats up to 6 ft. tall. Open water areas near this segment support bulrush (Schoenoplectus californicus) and cattail (Typha latifolia).

Segment 2

This segment extends from the spur trail leading to Ulupo Heiau to the service road behind Castle Hospital. From the spur trail to the water pump station, the vegetation consists of hau thickets on the slopes and California grass on the marsh edge.

From the water pump station to the service access road, the vegetation consists of a forest of mixed introduced tree species as well as patches of koa haole shrubs (Leucaena leucocephala). Some of the more frequently observed trees and shrubs include Java plum (Syzygium cumini), African tulip tree (Spathodea campanulata), Christmas berry (Schinus terebinthifolius), China-berry (Melia azedarach), monkeypod (Samanea saman), and octopus tree (Schefflera actinophylla). Large banyan trees (Ficus spp.),

50 to 60 ft. tall, with extensive aerial roots are common on rocky outcrops along this segment. Several species commonly used for landscaping occur in this area and include allspice (Pimenta dioica), mock orange (Murraya paniculata), surinam cherry (Eugenia uniflora), golden pothos (Epipremnum pinnatum), Tabebuia sp., lemon (Citrus limonum), and soursoop (Annona muricata). Some of these are remnant plantings which may mark former house sites, others represent plants which have escaped cultivation and are naturalized. Ground cover is usually sparse and, again, barren soil and leaf litter are a common feature. Low patches of wedelia (Spagneticola trilobata) and Dicliptera chinensis are found here and there.

Segment 3

This pathway segment extends from the southwest corner of Kukanono Subdivision to Kahanaiki Stream near the intersection of Kapa'a Quarry Road and Kailua Road. Mixed introduced forest covers the upper slopes along the paved road which leads to the ranch. The pathway then crosses onto mostly level terrain which is largely open pastureland with Hilo grass and scattered shrubs of castor bean (Ricinus communis) and sourbush (Pluchea carolinensis).

A park is proposed at Mokulana Peninsula; this area supports a very tall, dense forest of mixed introduced trees. Large, old mango trees (Mangifera indica) are abundant. Maunawili and Kahanaiki streams cross this segment. California grass and Napier grass (Pennisetum purpureum) line the streams.

Segment 4

This small segment crosses the southwest corner of the marsh. A dense hau thicket covers most of the sloping areas, while California grass occupies the low lying wetland areas.

Segment 5

This segment is approximately 1.5 mile long and follows along the Quarry Road from the intersection at Kailua Road to the Model Airplane Park. The area alongside the road is largely barren soil and leaf litter with a few patches of grass and weeds. It is infrequently maintained. Makai of the road right of way, there are dense thickets of hau on the moderate to steeply sloping terrain. A few albizia (Falcataria moluccana) and java plum trees are scattered through the hau thickets. Two overlook sites, one at Na Pohaku O Hauwahine and the other south of the V0 Ranch, would provide rest stops and marsh viewing areas. The proposed overlook south of the V0 Ranch is covered by Christmas berry and koa haole scrub with scattered clumps of fiddlewood (Githarexylum caudatum).

By Na Pohaku O Hauwahine, the pathway crosses koa haole and Guinea grass (Panicum maximum) scrub; Chinese violet (Asystasia gangetica) is also abundant in this area. Several prominent rock outcrops characterize this overlook site. Members of the Kawai Nui Heritage Foundation and 'Aha Hui Malama I Ka Lokahi have cleared much of the area around the rock outcrops and landscaped the site with native plants to recreate a dryland forest. The volunteers are also working in the marsh to improve wetland bird habitat. Several endangered plant species which include the red 'ilima or ko'olua'ula (Abutilon menziesii), 'ohai (Sesbania tomentosa), Nihoa loulu (Pritchardia remota), ma'o hau hele (Hibiscus brackenridgei), etc., have been outplanted at the site. The rambling, woody anapanapa vine (Colubrina asiatica) occurs here naturally in fairly large numbers.

Segment 6

This segment extends from the Model Airplane Park to the proposed

Kalaeo Park. The pathway could follow along the mauka side of the Quarry Road or the makai side of the road. On the mauka side, the pathway would follow along an overgrown dirt road covered by swollen fingergrass (Chloris barbata), Guinea grass, and weeds. It would cross Kapa'a Stream. From the stream, it travels through koa haole scrub with scattered stands of trees, primarily Java plum. Large, old monkeypod trees line the Quarry Road.

The area makai of the Quarry Road crosses parts of the marsh and is overgrown with dense mats of California grass, 5 to 6 feet tall. Areas with standing water support clumps of bulrush. Fast land or nonwetland areas support koa haole/Guinea grass scrub.

DISCUSSION AND RECOMMENDATIONS

Much of the vegetation on the pathway is composed of introduced or alien species such as California grass, Java plum, koa haole, etc. Introduced species are all those plants which were brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact, that is, Cook's arrival in the islands in 1778. This finding is not surprising as most lowland areas, especially heavily urbanized O'ahu, have been disturbed for a long time by human occupation and activity (Cuddihy and Stone 1990).

Hau, considered an indigenous species, covers large areas of the pathway on Segments 1 and 5. An indigenous species is native to the Hawaiian Islands and elsewhere. Hau can be found in similar wet, lowland areas throughout the Pacific.

None of the plants found during this study is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service 1999; Wagner et al. 1999) which occurs naturally on the project site. Plantings of rare and endangered plants can be

found at the Na Pohaku O Hauwahine site.

The proposed pathway is not expected to have a significant negative impact on the botanical resources. There are no botanical reasons to impose any restrictions, conditions, or impediments to the proposed development of the pathway. It is recommended, however, that areas cleared of vegetation be grassed over or landscaped as soon as possible to prevent soil loss.

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Appendix C
Faunal Survey
Phil Bruner

REPORT OF AN AVIFAUNAL FIELD RECONNAISSANCE SURVEY FOR
THE PROPOSED KAWAI NUI MARSH PATHWAY, KOOLAUPOKO,
OAHU, HAWAII

INTRODUCTION

The purpose of this report is to present the findings of a field survey of the proposed route of a pathway encircling Kawai Nui Marsh at Koolaupoko, Oahu. References to earlier avifaunal surveys at Kawai Nui Marsh are also noted and discussed.

The objectives of the field survey were:

- 1- To determine if the proposed pathway would adversely impact the quality of the wetland for native waterbirds.
- 2- Gather data on native waterbird usage of areas directly impacted by the proposed pathway.
- 3- Look for areas that might provide opportunities to develop viewing and interpretative stations that would also not adversely impact the native waterbirds.

Report Prepared for:
Helber Hastert and Fee, Honolulu

METHODS

The field survey work took place in May and July 2000. A total of two man-days of field work were employed in this task. The focus of the field work was directed at areas along the proposed pathway that either had not been previously examined by the subcontractor or were close to open water and habitat where waterbirds might be seen. The number of each species of waterbird encountered on the field survey were kept as a documentation of the field work. The waterbirds of Kawai Nui Marsh and the importance of this wetland have been documented in several studies. The two most thorough investigations are discussed in Ahuimanu Productions (1977) and Kawai Nui Marsh Technical and Policy Advisory Committee (1983) reports. Both of these studies

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conducted field work at Kawai Nui Marsh. I was involved in the ornithological (bird) surveys on both investigations. The findings of these studies are comparable with the present conditions and species composition.

The scientific and vernacular names of birds used in this report follow Pyle (1997). This source incorporates the current taxonomic changes.

RESULTS

Table One lists the species of native resident waterbirds and migratory shorebirds encountered on the field survey. Because the field work was conducted in May and July there were no migratory waterfowl recorded. At this time of year they are on their breeding grounds in North America. Likewise the number of migratory shorebirds tallied was limited to only those few individuals that failed to return to the arctic to breed. Some shorebirds do "over-summer" on the "wintering" grounds here in Hawaii (Johnson et al. 1981). These birds are typically juveniles that failed to obtain sufficient fat reserves to migrate or adults that may have sustained an injury that inhibited their ability to migrate.

Figure One indicates the location of the two most appropriate sites to view waterbirds, given the present location of the open water. The Na Pohaku O Hauwahine Overlook is elevated slightly and provides a relatively unobstructed view. The area shown in Figure One near Ulupo Heiau is lower and more visually restricted. This view point could be enhanced (see recommendations for specifics).

DISCUSSION AND CONCLUSIONS

The field survey noted waterbirds and shorebirds known to occur at Kawai Nui Marsh. There were no unexpected species. The proposed pathway does not adversely impact the habitat presently occupied by native waterbirds. The proposed route is presently separated from open water and foraging, nesting waterbirds by a thick buffer of vegetation. If the wetland is modified to create more open water and habitat suitable for waterbirds to forage and nest the pathway might allow better views of the birds.

Boardwalks and viewing platforms within and near wetlands have been helpful in educating the public of the importance of wetland resources. A prime example of this is the facility at the James Campbell National Wildlife Refuge Kii Unit at Kahuku, Oahu. This refuge is visited by schools and the general public. Many residents and visitors have come to know the native and endangered waterbirds by visiting this refuge. Kawai Nui Marsh could also serve this important task.

RECOMMENDATIONS

Although the primary purpose of the field work was to conduct an avifaunal reconnaissance of the proposed pathway, a secondary objective was to note any potential conflicts the pathway might present to native waterbirds presently found along the route. In other words would the pathway adversely impact the foraging and nesting of these species? Likewise could structures such as platforms and boardwalks be built that would

TABLE ONE

List of native waterbirds and migratory shorebirds noted on the field surveys of the proposed pathway around Kawai Nui Marsh, Koolauapoko, Oahu. The total number of each species tallied over the course of the survey visits are also noted

COMMON NAME	SCIENTIFIC NAME	NUMBER
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	7
Koloa (Hawaiian Duck)*	<i>Anas wyvilliana</i>	10
Hawaiian Coot*	<i>Fulica alai</i>	12
Common Moorhen*	<i>Galimula chloropus</i>	4
Black-necked Stilt*	<i>Himantopus mexicanus</i>	5
Pacific Golden-Plover+	<i>Pluvialis fulva</i>	3
Ruddy Turnstone+	<i>Arenaria interpres</i>	2

* = Endangered species

+ = Migratory species

enhance the viewing of wildlife while at the same time not interfere with their natural behavior? In light of the two objectives of the field work the following recommendations are offered:

- 1- Build boardwalk and viewing station in the area fronting Ulupo Heiau. This boardwalk should extend out into the marsh to the present open water.
- 2- Build a viewing platform at Na Pohaku O Hauwahine Overlook. This viewing station could be covered to allow protection from both the sun and rain. Panels with information and drawings of the waterbirds could be fixed to the viewing platform to further enhance the experience and knowledge of those using the facility. The native plants at this site could also be identified in a panel.
- 3- If the marsh is opened up and permanent ponds created elsewhere other boardwalks and viewing platforms should be considered.

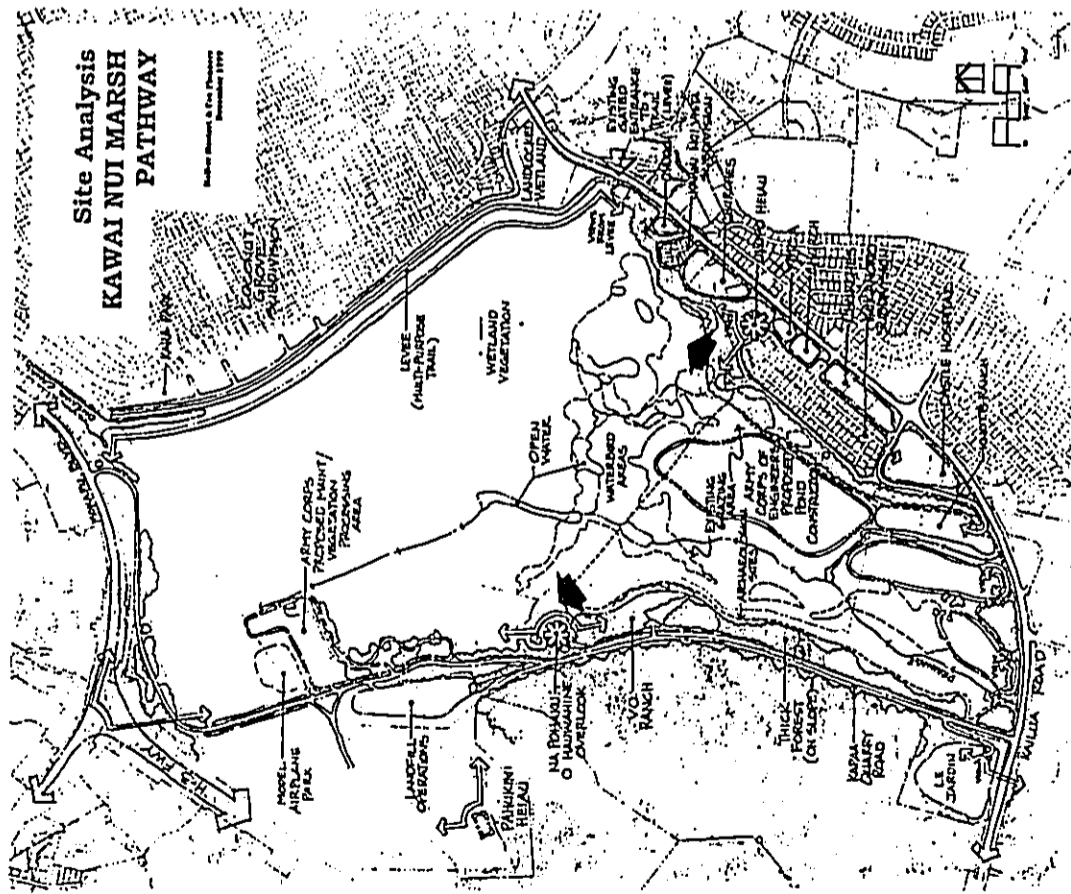


Fig. 1. Location of proposed pathway with dark solid arrows indicating areas where boardwalks or viewing platforms might be located in order to observe waterbirds.

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Archaeological Assessment and Background Literature Search
for the Proposed Circle-Kawai Nui Marsh Trail Project,
Kailua Ahupuaʻa, District of Koʻolaupoko, Island of Oʻahu

Prepared for:

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December 2000

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I. INTRODUCTION

Cultural Surveys Hawai'i, Inc., was contracted by Helber, Haeert, and Fee, Planners, Inc., to provide an archaeological assessment for the Kawai Nui Marsh Pathway project, Kailua Ahupua'a, Ko'iaupoko District, Island of O'ahu. For decades there has been community, county, and state discussion regarding the construction of a peripheral trail system along the margins of Kawai Nui Marsh. The proposed trail system is to be recreational and interpretive, highlighting the natural and cultural/historical resources of the marsh. The 1994 Kawai Nui Marsh Master Plan, prepared for the State of Hawaii Department of Land and Natural Resources, summarizes some of the objectives and purposes of the marsh trail network:

The primary planning objective for trails is to provide access along the marsh fringe and to interpret resources for educational purposes. Recommended actions set forth in the 1993 State Resource Management Plan encourage the creation of establishment of safe hiking paths and jogging trails in perimeter areas of the marsh; and the establishment of trails and overlook systems to connect principal cultural features such as heiau, and interpretive centers with wildlife overlooks. The trails could link park space, the visitor center, the ethnobotanical garden, cultural sites, and other master plan components in a contiguous manner. In addition to being a recreational asset, the trails would be of educational value by allowing access to natural areas for group hikes. It is envisioned that the trails would serve school groups of all ages, providing them access to the marsh fringe. However, the trails should also be capable of serving the unaccompanied public via signage and interpretive displays. (Wilson Okamoto & Associates, Inc. 1994:4-16--4-16)

The current report is a step toward making these Master Plan objectives a reality. Kawai Nui Marsh and its periphery were the focus of land use from early prehistoric times into the modern era. This land use has left physical remains, legends, and oral traditions. Historical, ethnohistorical, and archaeological research document the rich cultural resources of the area. One of the objectives of the Kawai Nui Trail is to expose trail-users to this rich cultural heritage. This report looks at the potential, feasibility, and impacts of trail construction from the stand point of historic preservation and historic/cultural interpretation.

Background research for the project was undertaken in the Spring of 2000. The field inspection was done in July 2000. Figure 1 shows the location of the project area and the proposed trail segments.

A. Scope of Work

The agreed upon scope of work consisted primarily of historical and archaeological literature review and a reconnaissance-type field inspection of the proposed pathway alignment. With the background research providing the historical and cultural context of

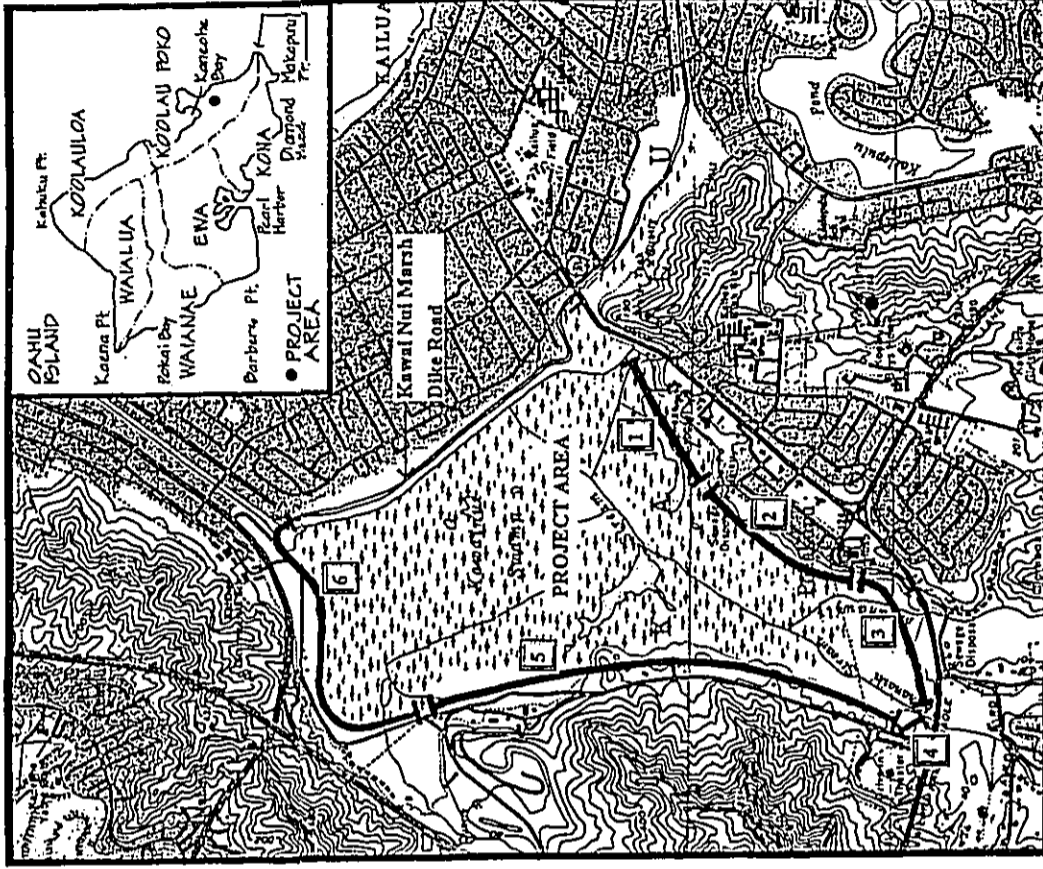


Figure 1 Portion of the 1983 USGS Topographical Map, Mokapu Quadrangle, Showing the Project Area in Hatching and the Proposed 6 Segments of the Circle. Kawai Nui Trail

the Kawai Nui Trail, the field reconnaissance assessed and addressed potential impacts of the pathway construction on the historic properties known to be in the vicinity of the trail alignment. Terrain and vegetation limitations were noted. The interpretive potential of the different sites was considered along with the potential impact to the sites with increased pedestrian traffic through this currently under-utilized area. The specific scope of work included three items:

1. A literature review to a) produce an up-to-date bibliography of all studies on Kawai Nui, b) produce an updated table and map of all archaeological sites in the immediate vicinity of Kawai Nui, c) produce an assessment of the impacts of path development on archaeological resources and of the opportunities presented for archaeological resource interpretation, and d) produce a compendium of information for the interpretation of the archaeology of the entire marsh as well as of the most important archaeological sites in the immediate vicinity (Ulupo, Pahukini and Holomakani Heiau) for which site interpretation may be desired.
2. A field reconnaissance of the entire proposed pathway to a) better understand constraints and opportunities of archaeological resources, b) to document photographically archaeological sites and opportunities for cultural landscape interpretation
3. Production of this report to document findings specifically dealing with archaeological constraints and their mitigation and archaeological opportunities and their enhancement and interpretation.

This document is not intended for review by the Department of Land and Natural Resources/State Historic Preservation Division as part of the State's historic preservation review process. This document is for planning purposes and is intended to guide decisions regarding the potentials for various trail alignments, for public interpretation of historic properties, and how to mitigate the impacts of trail construction on the adjacent historic properties.

B. The Proposed Trail Alignment

The 1994 Kawai Nui Master Plan has the following to say regarding the location of the proposed trail:

The trail system in the proposed master plan is a perimeter trail. This was supported by community participants despite concerns about safety and security, and the cost of footbridges or boardwalks across the wetland. However, the primary segments continue to be from Ulupo Heiau to Kukanono Slope, along the Kapa'a Quarry Road slope, and along the flood control levee. Construction of the remaining trail segments to complete the perimeter trail is envisioned as a long-term project. (Wilson Okamoto & Associates, Inc. 1994:4-16-4-17)

Helber, Haastert, and Fee have proposed the completion of the circle-Kawai Nui Trail through the construction of 6 contiguous trail segments, see Figure 1. These trail segments are to be completed as funds are made available.

Segment 1, the first segment proposed for construction, will connect the southern end of the Kawai Nui Dike (or Levee) Road with the vicinity of Ulupo Heiau. The terrain in this area is characterized by steep to moderate undulating slopes that meet abruptly at the edge of the marsh. *Hau* bush fringes the marsh edge and forms a thick nearly impenetrable forest throughout the area.

Continuing clockwise around the marsh, Segment 2 will connect Ulupo Heiau with the vicinity of Castle Medical Center. This segment will pass along the Kukanono slope through areas that are currently used by the Knott ranching operation. Some of the more striking natural features of this area include medium to large rock outcrops and the aerial root structures of Banyan trees.

Segment 3 will connect Castle Medical Center with the Pali Highway end of the Kapa'a Quarry Road. This segment extends from the southeast corner of Kukanono Subdivision to Kahanaiki Stream near the intersection of Quarry road and Kailua Road. The natural character of this segment which is currently dominated by the Knott cattle ranch operation, is mostly open land with level terrain. Natural slopes occur along the access road to the ranch operations, as well as at Mokulana Peninsula. The segment is bisected by Maunawili and Kahanaiki Streams. The Army Corps of Engineers has proposed the excavation and maintenance of shallow ponds in the vicinity, generally parallel the two streams in the area. The pond construction is intended to restore waterbird habitats.

Segment 4 is a short trail length that cuts across the corner formed by Pali Highway and Kapa'a Quarry Road. This corner is one of the proposed sites of the Kawai Nui Marsh Visitor Center. The terrain varies from forested slopes to low lying wetland marsh along Kahanaiki Stream. The area incorporates some of the lands proposed to become restored waterbird habitat

Segment 5 will extend approximately 1 1/4 miles along Kapa'a Quarry Road from Pali Highway to the vicinity of the Honolulu City and County's model airplane park, near Kapa'a Land Fill. Natural characteristics of the area are similar to those in the Kukanono area (Segment 2), with moderate to steeply sloped terrain that includes a variety of mature tree and shrub species that combine to create a full shade producing canopy. Significant area of the *Hau* bush also fringes the marsh in some locations. The area includes several prominent rock outcrops including the Na Pohaku O Hauwahine Overlook. Ranch operations (VO Ranch) occupy approximately 10 acres just south of Na Pohaku.

Segment 6 will connect the vicinity of the model airplane park with the north end of the existing Kawai Nui Dike (Levee) Road. A foot bridge may or may not be built to cross Oneawa Canal at the northern end of the Dike Road. Alignment options for this final segment include a pathway on the makai (marsh) side of Quarry Rd. As recommended by the 1994 master plan, or crossings to the mauka side of the road. The natural character of

the area makai of Quarry Road is flat, with much of the area consisting of actual marsh features in close proximity to the road. Terrain mauka of the road includes an area of moderate to steeply sloped terrain with a number of mature trees and shrub species to create a more forest-like setting. From the northeastern end of Segment 6, the Kawai Nui Dike Road extends to Segment 1 and completes the perimeter of the marsh.

C. Methods

Background Research

Background research included a review of previous archaeological/historical studies on file at the State Historic Preservation Division of the Department of Land and Natural Resources; a review of geology and cultural history documents at Hamilton Library of the University of Hawaii, the Hawaii State Archives, the Mission Houses Museum Library, the Hawaii Public Library, and the Archives of the Bishop Museum; study of historic photographs at the Hawaii State Archives and the Archives of the Bishop Museum; and a study of historic maps at the Survey Office of the Department of Accounting and General Services. Land conveyance research related to the *Māhele* of the mid-19th century was done through *Waihoana-Aina.com*, the Internet search company. This research provided the environmental, cultural, historic, and archaeological background for the project area.

Many good historical and/or archaeological sources exist for Kawai Nui Marsh and its vicinity. These include, but are not limited to, Cordy (1977), Kelly and Nakamura (1980), Creed (1992), Clark (1990), Hall (1997), Erkelens (1993), Athens (1983a), Hammatt (*et al.* 1990), and Athens and Ward (1991). The purpose of the background research was to glean information from these existing sources and present it in the context of trail development. Previous historic and archaeological reports were used to prepare site location maps and site tables. Site location data were overlain on the proposed trail route alignment supplied on the Helber, Hastert, and Fee Kawai Nui Maps.

Field Inspection

Using the Helber, Hastert, and Fee trail alignment map with the overlay of the site location information, the trail alignment was walked. Using the site and feature descriptions from previous reports it was usually possible to relocate the previously documented sites. Comparisons were made between the previous description of the site and its present condition. Sites that may potentially be affected by trail construction and use were inspected to assess what the trail impact might be. Recommendations for mitigating trail impacts on specific sites were recorded. Using the site and feature maps from previous reports, proposed trail alignments through or near site areas were sketched. Trail alignments and their relationship to historic properties were photographed. A general assessment of the feasibility of trail alignments based on limiting factors such as vegetation and topography was also made.

II. CULTURAL AND HISTORICAL SETTING OF KAWAI NUI WITHIN THE AHUPUA'A OF KAILUA

The history of the Kailua region of O'ahu has been documented in a number of studies including, but not limited to, Hall's (1997) "The History of Kailua", Creed and Chiogioji's (1991) "Facets of Maunawili Valley and Kailua Ahupua'a History", and Kelly and Nakamura's (1981) "Historical Study of Kawai Nui Marsh Area, Island of O'ahu". All of these studies detail the legendary history and oral traditions, the legendary rulers and personalities, the early historic accounts, land ownership and utilization changes during and following the *Māhele*, and the changes in land use from traditional to modern times. With so many sources already documenting Kailua's rich historical and cultural past, the purpose of this section is only to orient the present project area within the overall historical and cultural setting. For more detailed accounts of Kailua's past, the reader is referred to the above sources, as well as the ones cited in the following text. Included in this section, under the discussion of the *Māhele* land divisions of the mid 19th century, is a detailed discussion of the Land Commission Awards claimed and awarded along the margins of Kawai Nui Marsh. This information was provided through *Waihoana Aina Corporation* (*Waihoana.com*), an Internet *Māhele* database.

A. Setting

Kailua Ahupua'a is the largest valley on the windward side of O'ahu, and the largest Ahupua'a of the Ko'olaupoko District (approximately 15 km by 11 km). Flanked by the Ahupua'a of Waimānalo on the southeast, Kāne'ōhe on the northwest and Honolulu to the south, the Ahupua'a of Kailua is shaped like a rectangle. From the Ko'olau ridge line it extends down two descending ridge lines which provide the natural boundaries for the sides of the Ahupua'a. The fourth side of the rectangle is the reef line of Kailua Bay.

The natural environment includes the sand barrier upon which Kailua Town stands, the mountainous upland terrain and alluvial valleys of Maunawili, the largest fresh water marsh in Hawaii (Kawai Nui Marsh), another inland pond (Ka'elepulu), approximately 18 permanent and intermittent streams, a freestanding mountain halfway between the shore and the Ko'olau (Olomana-1,643 ft.), several low ridge lines, and offshore the Mokulua Islands, Mokole'a Rock, and Popoia Island. It comprises 11,885 acres of land according to the Boundary Commission Review of the mid-19th century, but in fact extends beyond the shore approximately a mile out to sea, to the reef.

During the estimated 1060 to 1600 years since initial Polynesian settlement, the sand barrier that forms the shore at Kailua Bay has provided a desirable location for residences with a sunny, dry beach area. The well-watered interior lands, including the two marsh/pond areas of Ka'elepulu and Kawai Nui and the many springs and streams of Maunawili, provided bountiful agricultural and resource gathering areas. During the 15th and 16th centuries Kailua O'ahu was the center of a large royal complex with ample playgrounds for sports and physical training, and recreation (Sterling and Summers 1978:231-232). Supporting this large complex was a most bountiful garden hinterland

where fish, fowl, and vegetables were plentiful (*Ibid.*:227-228).

Mele or chants about Kailua frequently mention the two fishponds famous for their mullet and *auao*. They also tout the taro gardens of the area (see Beckwith 1979 and Drigot (1982), in the legendary *mo'olelo*, or epics (e.g. Hi'ikakalipolopole, Kahinahanui, Makalei Tree, Ka'ulu are a few of the stories). Early visitors (Bowser (1880), in particular) to the island also mention a wealth of birds in the area.

Beside a sunny beach area and uplands watered by frequent showers, other resources were easily available in Kailua. As the center of the caldera of the ancient Ko'olau Volcano (MacDonald and Abbott 1974:363) a basalt quarry (the present Ameron Quarry is built upon the site of the pre-contact quarry) for material for lithic tools was near at hand. Kailua was a residential district surrounded by *Ahupua'a* that were also highly cultivated and capable of providing ample resources for a large resident and visiting population. Kailua apparently also was a *pu'uhonua* (place of refuge) before Kamehameha I conquered the island of O'ahu. After this time the ancient *pu'uhonua* were abolished.

B. Oral Traditions and Legends

Legends and oral history provide stories for many of the place names and also give specific beliefs Hawaiians held and hold about the land. The name Kailua, meaning "two seas", apparently refers to the two large inland waters, Ka'elepulu Pond and Kawai Nui Pond (Pukui *et al.* 1974:69; Quebral 1991:14). That Kailua was a "fat" land, a land of plentiful food in all times, is suggested by several legends. The *Makalei*, or Fish-Attracting Tree was a mythological tree or stick which could summon fish from Kawai Nui. Reportedly located near the present day Hama'kua Street Bridge, it was described as a never failing source of a plentiful supply of food (Beckwith 1970:279-280 and Pukui and Elbert 1991:382, cited in Kelly and Nakamura 1981:6). Another tradition of the ample productivity of the Kailua region involves the edible, *houpio*-like mud, called *Iepo'oi'oi*, which was available from Kawai Nui Marsh (Kelly and Nakamura 1981:6). This legend implies a bountiful Kailua where even the mud is edible.

Kailua is one of the places where, following their arrival on O'ahu from Kahiki, the *menehune* were assigned to live. These legendary workers are credited with the construction of numerous fish ponds and religious structures. Fornander points out that the term *menehune* in Tahitian had become the name for the lowest laboring class of people--suggesting a Tahitian origin for the term for the legendary workers (Fornander 1969:23).

There are legendary accounts of the prominent Mount Olomana, that is named after a great mythological giant and/or chief (Kelly and Nakamura 1981:1) Tradition also says Kawai Nui was inhabited by a *mo'o* (large dragon-like mythical creature) called Hauwahine, whose name literally means "female ruler". Her residency at Kawai Nui follows Haumea's, the earth-mother goddess whose name literally means "red ruler". She made sure all the people of the *Ahupua'a* shared in the pond's wealth and punished those

who were greedy (Beckwith 1970:126).

Oral history notes that the stones overlooking Kawai Nui on Pu'u o 'Ehu are sacred to Hauwahine and her companion (Paki, 1976). The reason for this is connected to the ancient Hawaiian notion that the channel/canal beneath Pu'u o 'Ehu connects Kawai Nui and Ka'elepulu and was considered to be the coital connection between the two fishponds, giving the area great *mana*. Kawai Nui Marsh was considered male and Ka'elepulu Pond, female. They mated at Kawailoa according to a Hawaiian tradition (Paki 1976).

Traditional history credits Kailua as the residence of many prominent O'ahu ruling chiefs. There is 'Olopana "who with his brother Kahikula came to O'ahu from Kahiki . . . He is said to have established several *heiau* in Kane Ohe and Kailua, including Pahukini and Holomakani in the Kawai Nui area" (Kelly and Nakamura 1981:3). One of the earliest great chiefs to reside in Kailua was Kakuhinewa, who built himself a great house at 'Alele in Kailua (*Ibid.*:6). At approximately the same time (the 16th century) another prominent chief, Kuali'i, born at Kalapawai, Kailua, and raised in Kualoa and Kailua, had his navel cutting ceremony at the *heiau* of Alala (present day Lanikai point), and, after being the hero of many battles, became the high chief of all O'ahu (*Ibid.*:6) In early historic times the conquering chiefs Kahakii followed by Kamehameha I resided in Kailua for a time (*Ibid.*:6-7).

C. Early Population Estimates

The drastic depopulation of the Hawaiian Islands following the introduction of Western disease has been documented in a number of sources (Bingham 1947; Stannard 1969; and Bushnell 1993). According to one estimate the population of Hawaiians and part-Hawaiians fell from approximately 300,000 in 1778 to 82,693 by 1850 (Schmitt 1968:48, 74, cited in Kelly and Nakamura 1981:10). Population counts from the 1830s place the population of Kailua at approximately 760 individuals (Schmitt 1973:19 cited in Kelly and Nakamura 1981:10). This low population figure is incongruous with the productivity of the region, but well in keeping with population decline estimates due to western disease. Westerners passing through Ko'olaupoko in the mid 1840s made note of the cold and flu symptoms among the native Hawaiians and that much formerly productive land appeared abandoned (Wylie 1948:20 cited in Kelly and Nakamura 1981:10).

D. Early Historic Accounts

Historic accounts of Kailua before the 1850s are rare. One of the only accounts that could be located is that of Levi Chamberlain, a missionary who made a circuit around O'ahu to inspect the mission schools in 1828. This account is particularly important because Chamberlain travels through and describes the landscape in the immediate vicinity of the current project area. Chamberlain describes his progress from the settlement at Kailua through the low hills, today called the Kalabeo hills and the location of Kalabeo High School, that separate Kailua from Kane ohe.

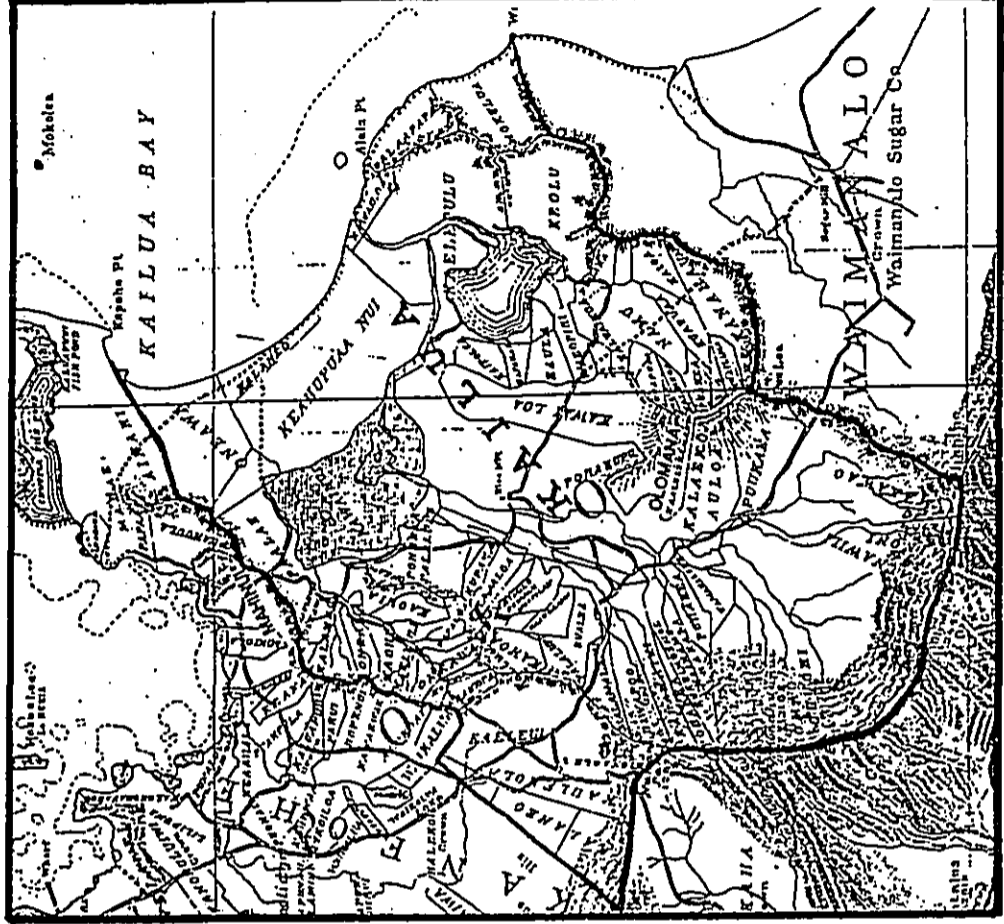


Figure 2 Map Showing the 'i'i Land Divisions of Kailua Ahupua'a, From John M. Donn, 1902, Hawaii Terr. Survey

Directing our course towards Kane'ohē, the next district, we were obliged to pass over a tract of low land mostly overflowed with water by the late rains. Here I was obliged to wade, as the distance was too great to admit of my being carried on the shoulders of my attendants, as was generally the case in passing a small stream of water. After emerging from the flat, our path was not improved, for we had now to walk through mud instead of water--we walked some distance along the steep hill, and at length by a winding path ascended to the top of it. We sat down to rest for a few minutes, and I found myself upon the summit of a ridge extending from the mountains in a right line to the sea and dividing the low lands of Kailua from those of Kaneohe. (Chamberlain Ma.:664 in Kelly and Nakamura 1981:7).

It is clear from this account that this west-northwest portion of Kailua, in the vicinity of the current project area (Segment 6), was low lying and prone to flooding. As we shall see in later discussion, this does not appear to change with the passage of time.

E. *Māhele* Records

Māhele records are an important resource for determining land-use during the first half of the 19th century. In the great division of lands among Kamehameha III and his people between 1848 and 1853, approximately 260 Land Commission Awards (LCAs) were claimed before the Board of Commissioners to Quiet Land Titles (Land Commission) in Kailua. Many persons claimed their land from the time of their *mākuakane* (ancestors) but no one indicates any time farther back than the time of Kaloli (contemporaneous with Kamehameha I). The most recent claims are probably those granted by Governor Kekū'ānoa. Not all claimants told how long they had occupied the land but of those who do they refer primarily to the ruling chiefs and then some refer to the local *konohiki*.

Many Kailua claimants list kings, queens, *kūhina nui* or governors to provide a time frame for when they received their land. The earliest such reference appears to be Kaloli, the wife of Kalani'ōpu'u who lived from 1762 to 1782 (Kuykendall 1980, vol I:30-32), followed by Kamehameha I, *Mō'i* or king and conqueror of O'ahu in 1795 (p.87), Liholiho, King Kamehameha II in the 1820s, Kaomi, the Tahitian companion of Kamehameha III who died in 1833 (p. 136), Boki, governor in 1820s and his wife Liliha, *kūhina nui* - after 1829 and during the 1830s, Kina'u, Queen from 1832-1839, Ka'ahumanu, Queen and *kūhina nui* in 1820s and Kekū'ānoa, the governor of O'ahu in the 1830s and 40's (p. 286), Pāki, a high chief during the same period (p. 285), and Kamehameha III during the early 1840s. Some claimants give specific dates and these range from 1828-1848. Thus, the people established in Kailua by 1848-1853 only ascribe their roots to the land for the period of the 60-70 years before the Land Commission Awards. While some claimant's lands may have been in their family for longer periods, it would not have been politic in the land commission claims for land offered to them by Kamehameha III to refer to rulers prior to the Kamehameha dynasty.

At the time of the *Māhele*, it would appear that Kailua, Kane'ohē and Waimanalo

In the *Māhele* records, 123 house lots are mentioned in the awards. This, probably does not offer a true reflection of habitations, as the majority of 171 claimants probably lived within the *Ahupua'a*. Where "kaunahale" or homes are mentioned the location of these house lots is typically bounded "on all sides by upland." However, although they were close to the fields, they had to be out of the wetlands. There are several house lots in the vicinity of the current project area.

Ai'i in Kailua don't specify what use they are making of their land in the LCAs. Most land use information comes from the LCAs (*kūleana*) belonging to commoners. In Kailua most claims include taro patches. All the many upper and lower valley streams are lined with taro *lo'i*. Upper valley springs also have their taro patches. Some 1255+ taro *lo'i* are listed in the LCAs. (Where Native Register and Foreign Testimony differ, the smaller number was used for conservative estimation, (cf Kelly 1991:27)). Kelly researched both the *'i'i* of Olohana and Kumu and found no boundaries ever defined, the LCAs listed there all claimed taro *lo'i*. Although we don't have information on the size of the taro patches, we know that there were 1255 taro *lo'i* being tilled by some 200 claimants at the time of the *Māhele* in Kailua, O'ahu.

Kailua LCAs list other crops: *malo*s of *wauke* or *tapa* fields, bananas, sugarcane, 'awa, sweet potatoes and gourd fields; coconut, hala, kukui, *koa*, and fruit trees and one in Kukanono mentions cotton growing. An upland *'i'i* is named for a *koa* pit, which would indicate that at some time in the past, *koa* existed in the area. Other woods mentioned in the *'i'i* names are *noni* ("to eat noni"), *koa* (*kālaikoa* - "to hew *koa*"), *'ohia* (*Ka'ohia*), *kukui* (*Kukui*moemoemo - *kukui* and *sleep* or *ambush*), and *kamani* (*Kalekalamani* - "where the *kamani* trees sway"). *Wauke* (paper mulberry), *Melons* and *potatoes*, *potatoes* or *sweet potatoes* and *'awa* are some crops mentioned in the LCAs. Four *'i'i* in Kailua have names associated with *tapa*/*kapa*. *Kapaloa* (*long kapa*), (LCAs 2464, 8799 mention a *mo'o* or *kūia* without specifying what kind of cultivation) *Kapa eie* (*dark kapa*), *Kapalai* (*silent kapa*), *Kapalepo* (*dirty kapa*). There are many *mo'o* (*garden plots*) mentioned in the LCAs testimonies with no crop designated. According to local farmers (*Rocky Mlkani*, pers. comm.) the small piles of rocks in rows that one encounters on hillsides in Kailua are a sign of *sweet potato* patches and because *sweet potatoes* were a staple of the Hawaiian diet, it would make sense that these *mo'o* where crops are unspecified were mostly being used to grow *sweet potatoes*.

No mention of *livestock* shows up in the claims, but presumably there was some. Mention is made of numerous fisheries and pools where fish would have been raised. Early 20th century testimony (S. Mahoe) indicates that the fishermen at the shore traded ocean fish for taro with the upland farmers and this is probably a long-established pattern.

family, and then to important *ai'i*, particularly warrior chiefs for *Kamehameha I*. The entire *Ahupua'a* of Kailua was awarded to Queen Kalama. Within the *Ahupua'a* the Crown took for itself the *'i'i* of *Kawailoa* which surrounds the *Olohana* peaks, with a portion in *Maunawili* Valley and the major portion descending to the sand barrier and yet another detached portion of this *'i'i* is found along the shoreline. Princess Victoria Kāmāmalu was awarded the *'i'i* of *Ka'elepulu* which has both a down land and upland portion.

At the time of the *Māhele* land claimants testified before the Land Commission. This testimony provides valuable information in terms of land use circa 1860 and before. The LCAs records for Kailua document a thriving area of garden areas clustered along its 18+ permanent and intermittent streams. The *Maunawili/Kahana 'i'i* Stream delta is a large, marshy low-lying area with no more than a 6% slope, with fertile soils along stream beds with many taro *lo'i*. *Kapa'a Valley* is narrow but also had many gardens along its stream. Other fertile areas are on the *mauka* side of *Ka'elepulu Pond* (modern fill now surrounds most of the former pond) going toward *Waimānalo*; and several very fertile areas are found within the present-day *MidPac Country Club*. The two great lagoonal fish ponds joined underneath the lookout point of *Pu'u Ehu* and a few LCAs are found nearby. Another area between *Keolu Hills*, just to the southeast of the *Pond/Lake*, which shows fertile soils but does not have recorded Hawaiian farming there. This isn't to say that farming wasn't taking place there, merely that we have no record of it. A very narrow fertile area sits on the *Pohakupu* upland about the location of *Kailua High School*. These fertile soil areas are the location of most of the awards in the LCAs Native Register, Foreign Testimony and Native Testimony.

'i'i are the land divisions within the *Ahupua'a* and these were governed by the lesser chiefs and *konohiki*. The *'i'i* of Kailua are shown in Figure 2, a portion of a map prepared by John Donn in 1902. Land divisions came about supposedly under the reign of *Ma'ilikakahi* (born about 1860 A.D.), one of the chiefs who spent time in Kailua. There were approximately 70-80 *'i'i* exploited in Kailua at the time of the *Māhele*.

A majority of the *'i'i* in Kailua, O'ahu were divided up among 41 of *Kamehameha III*'s high chiefs. Others (39 *konohiki* awards) received *'i'i* or partial *'i'i* from *Kamehameha III* (13 or 20% of the 60 *ai'i* granted land in Kailua). These 39 are given 38 *'i'i* (two each get a half of *Pohakupu*). Thirteen of the 60 high chiefs and *ai'i* retained the majority of the 70-80 *'i'i*. At least two of the descendants of these chiefs still live on their land in Kailua; the descendants of *Kuke* (*Tute*) and the descendants of *Peleleu*. In addition to the names of those persons applying for a claim, we have witnesses' names and names of neighbors. Field boundaries are described by naming the neighboring cultivators, and many of these names did not appear on the LCAs list. Some claimants mention where they are cultivating under the aegis of another. In all, there are about 251 names given in the Native Register, Foreign and Native Testimony in the claims dealing with the Kailua, O'ahu area. Of these 251, 200 persons are mentioned tilling the land in Kailua *Ko'olaupoko* in some way. About 65% of those working the land actually applied for an award.

F. Land Commission Award Information for Kawatnu Trail Segments

Queen Hakeleponi Kapakuhali Kalama (ca 1820-1870), wife of Kamehameha III received the entire ahupua'a of Kailua of 11,885 acres as Land Commission Award 4452: portion 12 at the time of the *Māhele* (1848-1853). There are over 250 claims for the entire ahupua'a, of which 28 Land Commission Awards are in or surrounding the marsh (See Table 1 following this section).

Segment 1, (TMK 4-2-13 and 4-2-16)

This segment extends from the southern (Kailua Rd.) Terminus to the levee to Ulupo Heiau. The TMK maps and the J. Iao 1919 map traced from W. Wall 1899 (R.M. 2049) and A. Bishop 1888 map (R.M. 1434) show slightly different locations for the Land Commission Awards. On TMK maps there is only one award located towards the ocean (north) and east of Ulupo Heiau - No. 10183.

LCA 10183 - Makea claims and is awarded LCA 10183 in the 'i'i of Kumu. The award is shown on TMK 4-2-16, but no maps indicate the 'i'i and its boundaries. No. 10183 award is for one ahupua'a of 1.442 Acs, where Makea has 14 lo'i since the time of Liholiho (1820s). He died in 1848, before the claim was fully processed. Kumu inherits his land.

Segment 2, (Portion of TMK 4-2-13)

This pathway segment extends from the spur trail leading to Ulupo Heiau to the service access road behind Castle Hospital. In this section we find 7 land claims with 11 portions (opona) of land claims: (1) *Māhele* Award 7; (2) LCA 2536:3; (3) a portion of LCA 4452: 12 to the Queen for half the 'i'i of Pohakupu; (4) LCA 4896; (5) LCA 5333:3; (6) LCA 6099 1&2; (6) LCA 7147:2; and (7) LCA 9546:2,3,4 (Figure 2)

Four *kūteana* awards in 6 parcels are shown on both Wall and Bishop maps as along the marsh and east of the heiau. These same *kūteana* appear on TMK 4-2-13, i.e. Segment 2 (which we will assume is more accurate). Here they appear towards the marsh and inland of Ulupo Heiau.

Māhele Award 7 - Kaluainana (M.Aw. 7) received 1/3 of Pohakupu (the *Māhale* Awards were reserved for the *ali'i*) of 38.27 Acs. It appears that Kaluainana did not live permanently in Kailua, as he only claims the 'i'i land, the planted trees, and some coconut and hala trees. This land with such resources would have provided him with goods needed for a person of his status to provide for the higher chiefs and the King (tithing or taxes) and his own retinue. He receives his right from the *Mō'i*, King Kamehameha III. He does not state an earlier right in the land; so he may not have been one of the many Kamehameha I's warriors and encourage, who got compensated in land for their part in helping to conquer O'ahu when Kamehameha I unified the islands. No land use is given, but the land extends into the marsh and there may have been lo'i near the Maunawili Stream and *kūia* upland.

LCA 2536:3 - Ukikolo who was awarded the heiau site (opona 3). The other two ahupua'a are in Segment 3 (Opona 1 is for 2 lo'i and opona 2 is for 4 lo'i). Ukikolo (LCA 2536), possibly the descendant of an *ali'i*, listed in other Kailua claims as a *konohiki*, does not receive a *Māhele* Award, but is awarded 3 opona or parcels totaling 4.19 Acs. He appears to have been a permanent resident of Kailua and claims lo'i, *kūia* and house lot. He notes that his ancestors received these lands from Kamehameha I (previous to his death in 1819) and indicates his ancestors were likely part of the Hawai'i Island soldiers and retinue awarded lands in Kailua. Since his house lot includes the Ulupo Heiau, his ancestors may also have been the caretakers of the heiau. According to claim 6969 Ukikolo is a *konohiki*.

Ukikolo's properties include Ulupo or Upo Heiau, the 'i'i of Manu and its *kūia*. His house site in Kukanono includes the heiau, which is not named in the claim. At the time of the *kūteana* awards the few heiau mentioned are often described as house sites standing on former heiau. If it were not for the protest of Kahele, the *konohiki*, whose property surrounded Ukikolo's, the fact that this site had been a heiau wouldn't have been part of the *kūteana* record. Kahele believes that the heiau site should have been part his, the *konohiki's*, property. Despite Kahele's protest Ukikolo received the property and his lands were bequeathed to his daughter, Kaiwikulani, when he dies of small pox in 1853.

Ukikolo also claims several other 'i'i. His award (2536) consists of a) 2 lo'i at Olhana along Maunawili Stream (see map); 4 lo'i at Manu and it is notable that he does not receive his other 'i'i he claims in Malamalama (an 'i'i kupono - not subject to the *konohiki* management of an ahupua'a but owing fealty only directly to the Highest Chief).

LCA 4452:12 is a part of the entire ahupua'a awarded to Queen Kalama and is one of several 'i'i of Pohakupu shown on the map as belonging to Queen Kalama. Although Native Testimony (page 368 volume 10) says that all those lands (Kailua being one of them) are for Hazaleponi Kalama as fee simple without a half division for the government, in fact, another large portion of Pohakupu, directly *makai* was for the Government.

LCA 4896 - Kekonahaleole (LCA 4896) is awarded a .844 Ac. parcel for 7 lo'i in Pohakupu. This parcel is surrounded by Paki mauka, the *kahawai* on the Koolauloa side, Holoa's lo'i *makai* and *kūia* on the Waipānalo side. He received these lo'i from Holoa in 1843. This parcel is one of 5 that he receives in Kailua. He appears to be a permanent resident of Kailua with his house lot in the 'i'i of Palawai, where he is awarded 3 opona He cites 1843 as the date of his acquisition of this land from Liiha, a former *kūhianani* or regent of O'ahu (the wife of Boki). Thus he may be a more recent arrival to Kailua than Ukikolo. Or he may have been an even earlier resident, among those conquered, who would find it more politic not to mention tenure prior to the time of the Kamehamehas.

LCA 5835 - Kaleiokane claims (LCA 5835) five lo'i at Kekai and his *kūia* house lot at Kapi'a. Like Ukikolo, he too is probably the descendant of one of the warriors or retinue of Kamehameha I since he claims his right from that time. He is probably a resident of Kailua since he was awarded the .37 Ac. in Pohakupu and .52 Ac. in Kihewakukakua

(Kapia) (where witnesses claims he has both 6 lo'i and his house lot). It would appear that his house lot was actually in Pohakupu or what became Pohakupu. Claimant died in 1848 at the beginning of the *Māhele* land division and is survived by Makalani, his widow.

LCA 6099:1 & 2 - Miomio (LCA 6099) claims a *kūlo* house lot (6900:2) at Kukanono (Kukanono). He also claims a *mo'o* at the shore, and a *kūlo* planted in 'awa way inland near Kukepoki (Maunawili) (another *heiau*). His witness in the Native Testimony ascertains *Opone* 1 is 10 lo'i and *Opone* 2 is the house lot. The two pieces total 1.088 Acs. He derived his land from Kalechano at the time of Boki (about 1824). He does not receive his claims at the shore or in Maunawili, but he does receive this 10-lo'i piece below Ulupo *Hei'ou* in addition to his house.

LCA 7147 - Kahale (LCA 7147) is a *konohiki*, and claims the 'ili of Kukanono contesting Ukikolo for the parcel containing the *heiau*. He is awarded 4.19 Acs in 3 pieces at Olohana, but Ukikolo is awarded the *heiau* land. No land use is given, but because of its location within the marsh, it is likely that this land was used for lo'i.

LCA 9646 - Kapolo, claims 1 and gets 4 *opona*. The 1.4 Ac.-parcel at Ulupo may be the 2nd parcel described in the Native Testimony as bounded on all sides by upland. No land use is described. Kapolo died in 1848, leaving his wife Kaulalea as his heir. He receives an *opona* at Ulupo of 1.4 Acs; this would have been his house lot, and he receives two other *opona* which are out in the marsh along Maunawili Stream. These most likely would have been used for lo'i.

Segment 3 includes the area from the southwest corner of Kukanono Subdivision to Kahanaiki stream near the intersection of quarry Road and Kailua Road. It includes 7 'ili: Kamakalepo, Kapaloa, Kapia, Manu, Manulele & Kaihee (TMK 4-2-13). This area includes 3 *Māhele* Awards, and 11 land claim awards in 14 parcels. These include: (1) *Māhele* Award 6; (2) *Māhele* Award 27:1; (3) *Māhele* Award 47:1&2; (4) LCA 2596:1&2; (5) LCA 2544:1; (6) LCA 2575:1; (7) 6825 (8) LCA 6153; (9) LCA 6813:2; (10) LCA 6969:2; (11) LCA 7113:1&2; (12) LCA 7122:3; (13) LCA 8162; and (14) LCA 9539:2.

Māhele Award 6 - Honaunau, an *ali'i* (M.Aw 6), is awarded ½ 'ili of Manulele in Kailua in *Māhele* Award 6 (12.88 Acs in 2 *opona*). Honaunau also claimed and received lands in Lahaina, Maui and Ewe, O'ahu. Honaunau died in 1854 and since his wife Julia Kikoa died before him, he left his property to an adopted son, Beritani (Pelekane) and an adopted daughter, Helekaipo. A. Faki was to be administrator. Honaunau claims his right from the King, but does not mention which king (Barrère 1994:56). No land use is given, but because this is in the marsh, it is likely lo'i land with perhaps some other *kūlo* type plantings.

Māhele Award 27 - Kalawaiaku, an *ali'i* is awarded a *Māhele* Award (M.Aw 27). The claim for the 'ili of Kapia is listed under land claim 7146 which was not awarded. Also under another claim, 6668, Kalawaiaku claims several *po'olima* (land that is worked by others for him) and the 'ili of Manu in Kailua and other pieces in Nu'uano. He received the 'ili of Kapia, supposedly in 2 *opona*, which amounted to 14.12 Acs. He does not receive the

other claims. No land use is given, but its location would indicate lo'i land, with perhaps some *kūlo*.

Since his inherited land (aina hoolina) was an aina panalaa ("conquered land") it is safe to assume that it had been given in reward by Kamehameha after the Battle of Nuuanu, as so many of the Koolaupoko lands were (Barrère 1994:176).

This large land area would have been ideal for lo'i, since it lies between the two streams.

Māhele Award 47 - Kaeliwai, an *ali'i*, is awarded a *Māhele* Award (M.Aw 47). The claim for this award is described in land claim 6237 which is not awarded. Kaeliwai claims ¼ of Kaihee 'ili in Kailua) which is 2 *opona* amounting to 9.12 Acs, as well as land in Wai'anae and land on Molokai.

Kaeliwai requests Government to take his ¼ interest in 'ili Kaihee in payment for fee simple title to his houselot in Honolulu (Barrère 1994:106).

However, he receives his claim for Kaihee. Kaeliwai was the son of Lono (father) and Kapau (mother) and was married to Paalua, the granddaughter of Hewshewa. It is not known when he died, but is thought to be some time after 1860. He had no children (Barrère 1994:107). He does not state the right for his claim. He does not mention land use.

LCA 2596:1&2 - Ukikolo, whose house lot is in Kukanono (Segment 2), also claims 2 patches in "Olohana", an 'ili (Section 1) bounded on the Waimānalo side by the stream and 4 patches in "Manu", an 'ili (Section 2) which is also bounded on the Waimānalo side by the stream. Section 1 he received from Hekona in 1845 or 1856 and Section 2 he received some time before Poki (or Boki) went to Kahiki in 1829.

LCA 2544:1 - Lapalapa claims a *mo'o* at Manu from the time of Kaiola. And he has some orange and lemon trees at Hooauloa. He is awarded 4 lo'i and a house lot; 1 *opona* in 'ili of Manu for 1.38 Acs and another 'ili, Kalaipuu, for 6.46 Acs. The section 1 description describes the land as bounded by Ukikolo *makai* and the stream on the Waimānalo side. Section 2 is described as being in the upland.

LCA 2575:1&3 (27) - Hekona claims an 'ili, Manulele, and a *kūlo* from the time of Kalechano. He had one *mala ipu* (gourd garden) in the *kūlo* of Pohakupu. The second claim is for 'ili of Olohana. He is awarded 10 lo'i and a house lot in the 'ili of Olohana (2.29 Acs). His lo'i land is bounded by the stream on the Koolauloa side. His house lot is bounded on all sides by upland. He received his land from Honaunau in the time of Liliha. He died in 1849 and his widow, Kamakakau is his heir.

LCA 6825 - Kaanaana claims 4 *opona* which contain a *mo'o*, 4 lo'i, and a *kūlo* house lot. He receives only 1 *opona* in Kaihee of 2.297 Acs. His section 1 is bounded by an 'auwai *mouka* and the river on the Waimānalo side. It is likely that he received a consolidated parcel of land to make up for the 4 parcels claimed, since he only received 1 of

them. He received his land in 1840 or thereabouts and appears to be a resident of Kailua. It is likely that this is *lo'i* land and his house may have been higher up on the same piece of land.

LCA 6163 - Nanawahine claims 2 *lo'i* at Manulele and a *malo* of *wauke* at Kawailoa from the time of Kalola (a wife of Kamehameha ca. 1796). He received 1 *opana* of .22 Ac. He does not receive his nearby *wauke* land.

LCA 6162 - Punipeki (LCA 6162) claims 12 *lo'i* at Olohana, and a small *kula* in Pohakupu. He receives 1 *opana* in Olohana of 2 *lo'i* totaling .47 Ac.

LCA 6807:2 - Kepano claims a *mo'o* from 1833. This parcel (6807:2) is 8 *lo'i* and he lists his neighbors and Kuula and Kaleo with *nahelohelo* (fallow land or waste land) on two sides. He receives 2 *opona* in Kamakalepo of 11.89 Acs and another *opona* which today would be in an area across the highway in Maunawili away from the presently bounded *march* for other *lo'i* and his house lot.

LCA 6811:1 - Kuula claims a *mo'o* of 4 *lo'i* in Kamakalepo. He received his lands in 1846. This land is bounded by Kelikanakaole (claim 6813) on the *makoi* side. He receives 1 *opana* of 2.56 Acres.

LCA 6818:2 - Kelikanakaole (LCA 6813) claims the *'i'i* of Kamakalepo and has there 19 *lo'i* and a house lot in 6 portions of Kamakalepo. Portion 2 is shown on the TMK map. He also claims a *lo'i* in Kapalai and one in Moopilau and orange trees in Kahanaiki and a *lauhala* tree in Haimilo. Only three *opona* in Kamakalepo are awarded (7.126 Ac.). His tenure dates from the time of Kinau (Queen from 1832-1839).

LCA 6869:2 - Kuwahina (Kuahine) claims 30 *lo'i*, a *kula* and a house. Five of his patches are in the *'i'i* of Manu, the others in Kawailoa. Section 2 is bounded by the creek on the Wainanalo side. He receives a 1.3 Ac.-parcel in the *'i'i* of Manu and 1.62 Acs in Kawailoa.

LCA 7113:1&2 - Keaka claims 1/2 Manu *'i'i*. He claims it is his one-half right from the King. He resides at Kapemoo, not in Kailua. Keaka receives 1.62 Acs in Manu and 1.52 Acs in Kawailoa, both are for taro lands.

LCA 9689:2 Kaikhoio claims a *mo'o* *'i'i* at Palawai which is bounded by the creek on Koolauloa side and a hill called *Auelepu mauka*. He is awarded 2 pieces of land totaling 4.36 Acs. The parcel in the marsh is section 2 for which there is no separate description. Kaikhoio received his land in 1842. He died in 1848 and Ohole, his wife is heir. This claim is contested by C. Kanaina who claims Kaikhoio has all the patches and he has none, but the award is upheld. Being on the Maunawili Stream, it is likely these were taro patches.

Segment 4 is the southwest corner of the marsh and does not contain any Land Commission claims.

Segment 5 runs approximately 1 1/4 mile along Quarry road, from the intersection at Kailua Road to the Model Airplane Park. In this portion there are 1 *Māhele* Award and 4 awarded claims in 5 parcels.

Māhele Award 9:2 - Hale receives a *Māhele* Award (MAW 9) the *'i'i* of Kaakepa, in 4 *opana* of 60.66 acres. The portion within the marsh is portion 2. The claim for this property is made in claim No. 7273, which he does not receive. In order to get his *Māhele* Award, Kaakepa he relinquished his claim to the *'i'i* of Pohakea *'i'i* (which contains the site of the Holomakani *heiau*). In Claim 696, for Hale's Honolulu property, Pitkoi testifies that Hale is a "Kanaka hana (worker/servant) of the King (presumably Kamehameha III) or a "Kanaka maoli (native Hawaiian) (Barrère 1994:27). It is quite curious that a worker/servant or native would receive a *Māhele* Award if he weren't an *ali'i*. It is also interesting that he should have had the care of Pohakea *'i'i* prior to the *Māhele*. It is even more interesting another *opana* or part (*lele*) of Kaakepa is probably the present site of the Pahukini *heiau* (TMK 4-2-16). The other large section of Kaakepa is cut in two sections by H-3 Highway, closer to Kahakili Highway. A prominent Hawaiian, S. Kaapuiki also claimed Pohakea as a *korohiki* award (Baker and Baker 1989). The fact that Hale was not a resident of Kailua, and had the stewardship of these two lands, one with the Holomakani *heiau* (this *heiau* was thought to have been destroyed and was only recently re-located), and the other with Pahukini *heiau* would fit the pattern of a person of a family in the forces or retinue of King Kamehameha I, who was given land in Kailua for his services during the unification of the islands. It makes one wonder if there were certain persons entrusted with the care of these *heiau* lands. There was no probate when he died so it may not be possible to find out more information about Hale although there are several Hale families on O'ahu. No land use is given.

LCA 6808:1 - Poniuhua claims a *mo'o* in the *'i'i* of Kamakalepo with fifteen taro *lo'i*. He has a house nearby in the *'i'i* of Haimilo where he has some fruit trees in the land of Kaoo (8797). His *lo'i* are along the river. He is awarded 3 *opana*, totaling 5.254 Acs., all in Kamakalepo. He acquired the land in 1843.

LCA 7122:2 - Tehuarū Tute (Kuke) A Tahitian Missionary from the London Missionary Society in the Society Islands arrived, with his wife, L. Kalawela, in Hawaii in July 1826 and became the private chaplain of both Kamehameha III and IV. Tute was the *korohiki* of Oneawa and claimed and received 6 parcels for Oneawa of 674.90 Acs in Kailua. Tute bequeathed his property at his death, in 1858 (age 77), to his Hawaiian born daughter, Manaiula Sumner (Barrère). No land use is given in the document.

LCA 7588 - Kamoohu, an *ali'i*, divides his land with the King, but he is not given a *Māhele* award. He claims the *'i'i* of Palahale (or Palapule) in Kailua, and Mooiki in Hamakua Hawaii Island. He receives Palapule in Kailua in 1 piece totaling 7.88 Acs. Kamoohu had his land from Kamehameha I and was either a retainer/warrior or a descendant of one. No land use is given. It is likely that the *lo'i* land would be down near

the marsh and other things might have been planted on the higher ground.

LCA 8797 - Kaoo claims 1 apana of *kuia*, house lot, and a *koia* tree in Kapalaoo. The testimony declares there is also *kaio* land. Kaoo acquired this land at the time of Liliha (1829-30). He died in 1848 of smallpox. He is awarded 2 parcels next to each other, both along the Kabaneiki stream. His 2 parcels total 2.61 Ac.

LCA 8799 - Kausakamalii claims two *lo'i*, one *kuia*, and one house lot, in Kapalaoo. He has other claims elsewhere in the *Ahupua'a*. He received the land from his grandfather, Kalia, in 1839, and Kalia acquired it from Keano during his lifetime. He is awarded 1 apana of 2.658 Ac.

Segment 6 extends from the Model Airplane Park to the proposed Kalahaoo Park on Mokepu Blvd. There are no Land Commission claims in the marsh for this section.

Settlement Pattern within and near the Marsh

As reflected by Land Commission documentation, the settlement pattern along the margins of Kawai Nui Marsh during the mid 1800s was dominated by both dry-land and irrigated agriculture with associated dispersed habitations. Agricultural lands included numerous spring and stream watered pond fields (*lo'i*) with their associated irrigation and drainage ditches (*ouwoi*). Dryland agriculture would have dotted the hill slopes above the marsh. Crops included traditional Hawaiian economic plants as well as Western introduced economic plants, such as fruit trees. House lots would have been dispersed on the higher grounds surrounding the marsh. *Māhele* records indicate differing periods of occupation of the land claimants. Some appear to be long time local residents. Others evidently received their land from the Kamehameha dynasty relatively recently. The distribution of LCAs indicated that the southern end of the marsh, closer to Maunawili, Pahukiki Heiau, Holomakani Heiau, and Ulupo Heiau, was more developed agriculturally and may have been the site of more residences.

Table 1 lists the LCAs for the vicinity of Kawai nui marsh. The table was compiled using LCA information available through *Waipono-Ainoa.com*. These data provide insight into the specific land-use that was under way along the trail alignment during the mid-19th century. Several of the LCA correspond to specific State Inventory of Historic Places site numbers. For example State site 50-80-04-3957 corresponds to LCA 7147.

Table 1: Land Claim Awards within the Present-day Boundaries of Kawainui Marsh, Kailua, listed by Segments

Land Claim #	Claimant	Kawainui Marsh Segment	ili (sub-division)	Land Use	Acreage awarded
4452	Kalama, Queen	in particular, 1 & 3	entire Ahupua'a (in particular) Kawainui Fish pond, Pohakupu	none given	11,886 Acs
10183	Makea	Segment 1	Kumu	14 lo'i	1 <i>apana</i> of 1.442 Acs
<i>Māhele</i> Award 7	Kaluaiainanea	Segment 2	½ of Pohakupu	no land use given, probably lo'i near Steam and <i>kula</i> upland.	38.27 Acs
2536:3 2536:1 2536:2	Ukikolo	Segment 2 Segment 3 Segment	Ulupo, Kukanono Olohana Manu	house lot 2 lo'i 4 lo'i	3 ap.; 4.19 Acs
4896	Kekoahaleole	Segment 2	Pohakupu	7 lo'i	1 ap. .844 Ac
5835	Kaleiokane	Segment 2	Kekai Kapia	5 lo'i <i>kula</i> house lot	.37 Ac. .52 Ac.
6099:2	Miomio	Segment 2	Kukanono	<i>kula</i> house lot 10 lo'i	2 ap.; 1.088 Acs.
7147	Kahele	Segment 2	Olohana		3 ap.; 4.19 Acs
9546	Kapolo I	Segment 2	Ulupo	house lot?	1 of 4 ap.; 1.4 Acs
<i>Māhele</i> Award 6-	Honaunau	Segment 3	½ ili of Manulele	no land use given; likely lo'i land with some <i>kula</i> ?	2 ap.; 12.88 acs

Land Claim #	Ohiama'i	Kawānūli'i Trail Segment	'Ii (land division)	Land use	Acreage awarded
Māhele Award 27	Kalawaiaku	Segment 3	'Ii of Kapia	no land use given; likely lo'i land with some kula?	2 ap.; 14.12 Acs.
Māhele Award 47	Kaeliwai	Segment 3	½ of Kaahee	no land use given; likely lo'i land with some kula?	2 ap.; 9.12 Acs
2544:1	Lapalapa	Segment 3	Manu	mo'o	1 ap.; 1.38 Acs
2585:1 & 2	Hekona	Segment 3	Manulele Pohakupu Olohana	'Ii & kula ipu garden 10 lo'i and a house lot	not awarded not awarded 2 ap.; 2.29 Acs
5825	Kaanaana	Segment 3	Kaahee	lo'i and house lot?	1 ap.; 2.297 Acs
6153	Nanawahine	Segment 3	Manulele	2 lo'i	1 ap.; .22 Ac.
6162	Punipeki	Olohana	Olohana Pohakupu	12 lo'i kula	1 ap.; .47 Ac. not awarded
6807:2	Kapano	Segment 3	Kamakalepo	8 lo'i	2 ap.; 11.59 Acs
6811:1	Kuula	Segment 3	Kamakalepo	4 lo'i	1 ap.; 2.56 Acs.
6813	Keliikanakaole	Segment 3	'Ii of Kamakalepo Kapalawai	19 lo'i and a house lot 1 lo'i	3 ap.; 7.126 Acs not awarded

Land Claim #	Claimant	Kawai Nui Māhi Segment	ʻIi (land division)	Land use	Acreage Awarded
6969:2	Kuwahine (Kuwahine)	Segment 3	Manu Kawailoa	5 loʻi 30 loʻi, a <i>kula</i> and a house	1 ap.; 1.3 Ac. 1 ap.; 1.52 Acs
7113:1 & 2	Keaka	Segment 3	½ Manu ʻIi Kawailoa	taro lands	1 ap.; 1.52 Acs 1 ap.; 1.52 Acs
9539:2	Kaikihoio	Segment 3	Palawai	<i>moʻo</i> (loʻi)	2 ap.; 4.36 Acs
Māhele Award 9	Hale	Segment 5	Kaakepa	no land use given (loʻi land?)	4 ap.; 60.56 Acs
6808:1	Poniuhua	Segment 5	Kamakalepo	15 loʻi	3 ap.; 5.254 Ac
7122:2	Tute / Kuke	Segment 5	Oneawa ʻi(i)(s)	no land use given, (marsh edge loʻi land?)	6 ap.; 674.90 Acs
7588	Kamoonohu	Segment 5	Palapule	no land use given (loʻi land?)	1 ap.; 7.88 Acs.
8797	Kaoo	Segment 5	Kapaloo	<i>kula</i> , house lot, and a <i>hala</i> tree	2 ap.; 2.61 Ac.
8799	Kauakamalii	Segment 5	Kapaloo	2 loʻi, a <i>kula</i> , and a house lot	1 ap.; 2.658 Acs.

F. Ranching

In the early 1900s Kāne'ōhe Ranch comes to dominate land holdings in the Kailua and Kāne'ōhe area. Included within this acreage is much ranch land which has been bought, sold, let and used as ranch land by numerous parties since the mid-1860s. Kelly and Nakamura's history (1981:34-36) mentions that Government land sales amounting to 3,000 acres were sold to 21 buyers in Kailua between the years 1849 and 1863. The largest parcel went to William Jarrett of the 'i'i of Maunawili in 1849. The second largest was 399.5 acres to T. Cummins in Mokuua. Both parcels were used for ranching. Other land holdings which were turned into ranch land in the mid-1850s included the 'i'i of Mōkapu and 'Oneawa (by William Sumner and J. I. Dowsett) and the 'i'i of Puaena and 'Ohua 'uli (by the son of Paulia Mariri, Paul F. Manini). These large land holdings were used for years as ranch lands before becoming part of the Castle's Kāne'ōhe Ranch. Cattle, sheep, and horses, were thus allowed to roam at will through many parts of Kailua, and would have destroyed many gardens and abandoned habitation areas. Kelly and Nakamura point out that although specific records are not available, based on tax information, it is not unreasonable to estimate that several thousand head of cattle were grazing in Kailua by 1876 (1981:69).

Kāne'ōhe Ranch (Castle Trust) eventually acquired much of the land in Kailua (Hall 1997:84). Kāne'ōhe Ranch, in addition to ranching, grew pineapple and sugar cane. The With the decline of rice farming around the margins of Kawai Nui, cattle stock move onto the abandoned agricultural lands. Ranching in Kailua continues to this day, albeit on a drastically reduced scale.

G. Growth of Cash Crops in Kailua

For the nearly 100 years following the *Māhele*, Kailua grew into an important area of commercial agriculture. Until the early 1900s, rice was the major crop. Rice was followed by truck farming of taro and Western crops. The truck farming gave way to suburbanization, as Kailua became the premier bedroom community for growing Honolulu.

The Reciprocity Treaty between the United States and the Kingdom of Hawaii allowed for the duty free exportation of Hawaiian sugar to the U. S. This 1876 treaty greatly favored the plans of the already existing Hawaiian export sugar industry. The duty free export of rice was also covered under the treaty, however, it was the growing Asian population, first Chinese and later Japanese, brought to Hawaii to supply labor to the escalating export sugar industry, that provided the main impetus for the expansion of rice growing. With local consumption steadily growing, and duty-free export, rice growing in Hawaii had a boom period of its own.

Unlike the adjacent *Ahupua'a* of Kō'ōlaupoko, Kailua's main cash crop became rice rather than sugar. Kailua's numerous abandoned taro *lo'i* in the former taro lands of Maunawili and Kawai Nui provided perfect areas for the expansion of rice. At one time

there were multiple rice mills functioning in Kailua *Ahupua'a*. By the first part of the 20th century, rice growers in California were using more modern production methods to reduce their costs. This led to the rapid decline in rice farming in Hawaii (Kelly and Nakamura 1981:51-53).

Sugar never became an important crop in Kailua itself, but the need for water for the adjacent sugar lands of Waimānalo was an important factor in the transformation of the Kailua water shed. Following the 1876 Reciprocity Treaty the adjacent *Ahupua'a* of Waimānalo became the site of rapid sugar development, what became the extensive Waimānalo Sugar Company's fields. The development of these fields relied upon water from Kailua. As early as the late 1870's a system of flumes, ditches, and tunnels were built in the *mauka* portions of adjacent Maunawili to collect water from the abundant springs and streams. By 1881 close to 1,000 acres of sugar had been planted and milling operations were underway in Waimānalo (Kelly and Nakamura 1981:76). Expansion in acreage continued, increasing the need for water. By the 1920s improvements to the Waimānalo Irrigation System included catchment tunnels that were excavated into the base of the Kō'ōlau in Maunawili to increase flow.

Also, completed in 1923, was a system of pumps, pipelines, tunnels, and ditches, that conducted water from Kawai Nui March into the Kailua ditch, a portion of the Waimānalo Irrigation System. This system continued to supply Kawai Nui water to Waimānalo until the early 1950s (Harland, Bartholomew, and Associates 1959:53-54; Hall 1997:94; Kelly and Nakamura 1981:78-79). According to Wilcox (1986:111) two pumps lifted water from Kawai Nui and took it to the head of a 10,000-foot system of small tunnels, most through stone or hard earth, into a reservoir in Waimānalo.

In 1909 the Hawaiian Copra Company is established on the sandy area that is today bounded by Kalanoo and Oneawa Streets. Over 130 thousand trees were planted in an operation that involved leveling "the sand dunes and smooch[ing] out the sand hillocks" (*Honolulu Star Bulletin*, Sept. 12, 1931 cited in Kelly and Nakamura 1981:100; Hall 1997:77-78). The name Coconut Grove stuck, referring to most of the sand barrier area of Kailua. Clearly this leveling and smoothing of former dune areas had a great impact on the archaeological record of this area of Kailua.

The most prominent inroad made by sugar agriculture in Kailua was the establishment of the Hawaiian Sugar Planter's Association's field laboratory in 1926. It was established to farm rice fields in extreme climates, near present-day Kailua Town. By 1946 the laboratory was in the process of moving further *mauka* into Maunawili (Kelly and Nakamura 1981:100).

By the 1950s, the truck farms that had flourished since the turn of the century within the bounds of present day Kailua Town, are slowly replaced by housing, municipal, and retail developments. Kailua is promoted as the bedroom community for Honolulu businessmen, only "8 miles and 20 minutes" from Downtown. Residential developments are planned for more outlying areas of Kailua Town, such as Olomana, Pohakupu, and Oneawa Hills (Hall 1997:141).

H. Kawai Nui Flood Control

As Chamberlain's early account, quoted above, shows, Kailua has historically been susceptible to flooding. From 1902 to 1940, Kawai Nui Marsh was hit with numerous heavy rainfalls resulting in major alluvial run-off. The Kawai Nui Marsh area became the target for federal flood control projects in the 1930's and a report was authorized by the Flood Control Act of August 11, 1939 (Wheeler 1949: 3; Kelly and Nakamura 1981). Plans for this project initially called for a canal that was expected to provide for a discharge of water at the rate of 4,000 cubic feet per second and maintain control of the water levels in the marsh. The plan for the canal was drawn out on an aerial photograph in December of 1948 (figure 22 in Kelly and Nakamura 1981:87). In March of 1951 Kailua experienced a major flood, resulting from two days of continuous rain (Swain and Huxel 1971: 8), where Kawai Nui overflowed and 250 people were forced to be evacuated. The flood extended from Noelia Place to Uiumu St. (Brady 1959:10).

As a result of this flood, the Territory of Hawaii implemented its "pilot channel" project, where in 1952 the 'Oneawa canal, which extended from Kawai Nui marsh to Kailua Bay, was built. Part of this pilot canal project was the "inner canal, that ran perpendicular to 'Oneawa, which was expected to carry the water away from the marsh and prevent flooding of adjacent residences. Both the "inner canal" and the larger 'Oneawa canal are directly adjacent to the current project area (Segment 6 and the Kawai Nui Dike Road. The excavation and dredging associated with the construction of these two drainage channels would have directly affected the current project area.

The completion of the 'Oneawa Canal (1952) led the Kailua community to believe they were safe from flooding, however this was not the case. In March of 1958, heavy rainstorms again flooded Kailua, forcing the Army engineers to admit publically that "the present Kawai Nui Canal system would not be able to handle such a downpour..." (Brady 1959: 10).

A study published in 1971 (Swain and Huxel 1971: 18) revealed that the shallow water table beneath the frequently flooded areas and the lack of drainage was the primary reasons responsible for continued flooding in the low land areas.

III. PREVIOUS ARCHAEOLOGY

A. Summary of Previous Archaeological Research in Kailua Ahupua'a

This previous archaeology section is intended to compliment the cultural and historical background section. It discusses the archaeology of Kailua Ahupua'a in general, with many specific references to Kawai Nui, to provide an archaeological context for the trail. The specific archaeological sites that circle Kawai Nui Marsh will be listed and summarized by trail segment at the end of this section.

Twentieth century archaeological findings from inventory surveys, data recovery projects, and inadvertent finds during development are the main source of our knowledge about the archaeological record in Kailua. Archaeological work in the last 25 years in Kailua has been fairly extensive. This work has been concentrated along the margins of Kawai Nui Marsh and within Maunawili Valley for the most part. This is largely due to the fact that most of the *maka'i* portions of the Ahupua'a had been developed prior to the implementation of State and Federal Historic Preservation Rules (Dye 1992). The many archaeological reports dealing with Kailua are listed and briefly summarized in Table 1.

The earliest habitation of the Kailua area is still under debate. A radiocarbon date obtained from a charcoal enriched soil layer has been interpreted as evidence that human habitation of Kailua began somewhere in the neighborhood of 350-550 A. D. (Clarke 1980: 32-33, 77-78). This site is located within the current project area. This date is not universally accepted, however, it is fairly well agreed among the archaeological community that by approximately 1200-1300 A. D. dramatic changes in the pollen record are indicative of the expansion of agriculture in the Kailua area, most likely in the well-watered margins of Kawai Nui Marsh (Hammatt et al. 1990; Athens and Ward 1991). Human colonization of the region would clearly have had to precede this agricultural expansion, perhaps by many centuries. Erkelens (1993:51) reports three early dates, A.D. 1024-1296, A.D. 779-1266, and A.D. 770-1270, from his excavations along the Kukanono slopes within the current project area. It is logical that Kailua, and other regions of Ko'olaupoko, with their abundant marine and terrestrial resources, would have been attractive to the initial Polynesian colonizers.

The work of Hammatt (et al. 1990) and Athens and Ward (1991), has largely discredited Kraft's (1980) earlier assertions that Kawai Nui Marsh was an open water embayment at the time of initial Polynesian colonization. Athens and Ward (1991) suggest the Kawai Nui Embayment was sealed off during the first millennium B. C. as the result of a drop in sea-level. They correlate the Kawai Nui event with similar events at the same time in Kahana Valley and Ft. Shafter Flats, O'ahu.

Remains of upland terraces show that taro has been grown extensively and intensively in Kailua since the 13th or 14th century, and possibly earlier (Allen 1981, Williams, Mills and Allen 1996). The work of Cordy (1977, 1978), Allen (1981, 1986-87), and Athens (1983a) all document the mix of irrigated and dryland agriculture that was carried out in Kailua during prehistory and continuing into the historic period. Dryland

agriculture, including yams, gourds, and sweet potato, would have been carried out on slopes and on drier flat-lands. Modification to the landscape would have been variable, ranging from none at all to the construction of terraces and mounds for planting. According to Handy (1940:156) the beach barrier at Kailua (current day Coconut Grove) was famous for its production of sweet potatoes, grown in small mounds. Irrigated agriculture would have been carried out along streams and below springs. Associated landscape modifications would have included construction of terraces and/or ponds, *auwai*, and earthen and stacked-stone berms. These types of dryland and irrigated agricultural features have been found in Maunawili and along the margins of Kawai Nui Marsh.

Previous archaeological investigations in Kailua have located dispersed prehistoric habitation remnants. This is in keeping with the observations of early Westerners in Hawaii that the settlement pattern for the most part was dispersed habitations scattered across the landscape amid agricultural fields. It should be remembered that settlement data is conspicuously absent from the lowland, beach berm areas of Kailua, due to early development of these areas.

McAllister (1933) reported eight *heiau* within the *Ahupua'a* of Kailua, and it is not unreasonable to conclude there were several more of which McAllister's informants had no knowledge. This is well in keeping with Kailua's status as a productive *Ahupua'a*, the residences of *Ai'i*. The three known *heiau* closest to the current project area are McAllister's sites 359 Pabukini *Heiau*, 360 Holomakani *Heiau*, and 371 Ulupo *Heiau* (located within the project area)--see discussion below.

In the last eleven years over 15 reports of inadvertent finds of human skeletal remains have been made in Kailua, on the sandy beach berm of Coconut Grove and Lanikai. As with other near shore sandy areas in Hawaii, clearly Kailua was used for burial of the dead. These burial remains are not nearly as extensive, however, as the hundreds of human burials discovered from nearby Mōkepe peninsula (Snow 1974).

Table 2. Previous Archaeological Reports, *Ahupua'a* of Kailua, *Ko'olaupoko*, O'ahu

Reference	Location	Description and Results
Thrum, various 1907-1918.	Kailua <i>Ahupua'a</i>	In his articles for the <i>Honolulu Almonac and Annual</i> (1907-1918) Thrum is the first to document many of the <i>heiau</i> in the <i>Ahupua'a</i> of Kailua.
McAllister 1933	Kailua <i>Ahupua'a</i>	McAllister's island-wide survey of the major archaeological sites of O'ahu supplies some of the first detailed descriptions, maps, and photographs of Kailua's archaeological remains. He describes 16 sites within Kailua <i>Ahupua'a</i> , including Kawai Nui pond (#370), <i>Ka'alepulu</i> fishpond (#377), Ulupo <i>heiau</i> (#371), Holomakani <i>heiau</i> , and Pabukini <i>heiau</i> (#359). In all eight <i>heiau</i> are reported for Kailua.

Handy 1940	Kailua <i>Ahupua'a</i>	Handy's discussion of traditional Hawaiian agriculture gives regional descriptions of what crops were planted where within the Hawaiian chain. <i>Ahupua'a</i> is described as a rich, productive, well terraced sweet potato, using a plowing system of small soil mounds (p. 155, plate 8)
Clark and Connolly 1977	Hāmākua Drive along Kālelepu Stream.	This survey identified five stacked-stone alignments, a possible wall alignment, a potential habitation site, two agricultural sites, the remains of an irrigation ditch, and surface midden. A possible <i>heiau</i> was also recorded, however, when Hommon (1982) and Morgenstein (1982) revisited this project area, they found no remains of the possible <i>heiau</i> structure reported by Clark and Connolly.
Cordy 1977	Kawai Nui Marsh	Cordy, working for the U. S. Army Corps of Engineers, performed archaeological survey, historic document research, and aerial photograph analysis, for the alignment of a proposed City and County sewer-line along the south and southeastern margin of Kawai Nui Marsh. He documented historic house sites and both dryland and wetland agricultural features, including terraces.
Cordy 1978, Morgenstein 1977-	Kawai Nui Marsh	Agricultural features from Cordy's earlier identified "Site 7" (from Cordy 1977) were subjected to excavation to determine the chronology of land use. Previous examination of aerial photographs revealed extensive agricultural fields in this southern extension of Kawai Nui Marsh. Excavations revealed sequential land use of the area, from prehistoric irrigated taro agriculture, into historic irrigated taro agriculture, into later historic rice agriculture. Prehistoric agricultural features, such as terrace walls, were found buried below sediments, suggesting that they had not been substantially disturbed by later historic rice and livestock grazing activities in the area.
Dye 1979	Kapa'a Ridge	Reports the discovery, mapping and excavation of Bishop Museum site # 50-Oa-06-31, a combination of terraces remnants and cobble paving, thought to be prehistoric agricultural remnants. The site is located just below the summit of Ulumawo Ridge, in a hanging valley of an intermittent stream. After the work was completed these features were destroyed by the expansion of the Amaron Quarry facility
Kraft 1980	Kawai Nui Marsh	John C. Kraft is a specialist in prehistoric and historic coastal land form changes. Based on his research, which included coring various spots around the marsh, Kawai Nui Marsh was a shallow marine embayment of the coastal reef tract, very similar to present day Kūia 'Ōhe Bay. Between 6000 and 2800 years B. P., before the Kailua sand berm had formed, corals grew and marine foraminiferal sands and carbonate mounds were deposited around the margins of the embayment. Only after 2800 B.P. did the sand berm begin to form, slowly closing off the embayment. Until 400 or 600 years B. P. both the north and south outlets of the embayment (Oosawa and <i>Ka'alepulu</i>) remained open. Kraft suggested the possibility that formation of the sand berm could be related to human factors, such as the construction of stacked stone fish ponds within the embayment. According to Kraft's recreation, the terrigenous in filling of the margins of the embayment was a relatively recent development, in the last 400-500 years B. P., with most taking place in the last 200 years.

Allen-Wheeler 1981	Kawai Nui Marsh	Allen-Wheeler conducted excavations in the Marsh with results that confirmed and refined Kraft's (1959) sequence of Kawai Nui development from embayment to marsh. Terrestrial in-filling of the marsh began about 650 A.D. with the formation of a peat layer. By 1300 A. D. a layer of alluvial soil had been deposited--possibly the result of human agricultural activity within Maunawili. Rapid alluvial in-filling continued at a rapid rate until the present. Taro cultivation within the marsh could not have taken place until approximately 1200 A.D.
Morgenstein 1982; Hommon 1982	Hāmākua Drive adjacent to Ka'elepulu Stream	Morgenstein and Hommon report surface survey and subsurface testing conducted to assess the potential of archaeological features along the Ka'elepulu truck sewer line. The investigation documented layers of historic fill in the upper layers and the presence of one potential agricultural bund, thought to be associated with rice farming, below.
Neller 1982a	Kawai Nui, Kukanono area TMK 4-2-13-38	Neller reports the work he undertook in Kukanono as part of a field school on behalf of the Sierra Club School Hikers Program and Hawaii Science Teachers Association. These limited subsurface investigations were carried out in the same area reported by Clark (1960) and Athens (1983a). Neller dismisses the early data reported by Clark (1960).
Neller 1982b	Maunawili Valley TMK 4-2- 09:1	This short letter report documents a field trip to investigate archaeological sites in the back of Maunawili Valley. The reported locations of McAllister's sites 373 (Halaulele Heiau), 374 (Kūkapōki Heiau), and 375 (house sites), were visited. The extensive agricultural terraces, abandoned $10\frac{1}{2}$ %, were noted along large portions of both Ono and Maunawili Streams.
Athens 1983a	Pohakupu Kukanono slope S.S. #50-80-11- 2022	Working in much the same area documented by Clark (1960), these investigations consisted predominantly of surface collections and subsurface testing. Excavation revealed that the abundant surface features (primarily agricultural mounds and terraces) were built in the most recent soil layers after 1800 A. D. Only one small area of the project area contained undisturbed prehistoric deposits. An earth oven in this prehistoric deposit was dated to the 13 th to 16 th centuries A. D., calling into question the early dates (4 th to 7 th century A. D.) obtained by Clark on the same slope of Kawai Nui. Soil erosion on the Pohakupu-Kukanono slope was apparently intense during the prehistoric period and soil deposition and development was infrequent prior to construction of the historic terraces.
Athens 1983b	83 Kihapai Street, Kailua TMK 4-3- 57:55	This report documents the 11 grid units excavated in site 50-0s-G6-40, the H.A.R.C. site. The site consists of marine midden, and subsurface features including hearths and pits. Radiocarbon dates indicate occupation of the site sometime in the mid- 13 th to early 15 th century. Midden remains were analyzed and conclusions suggest a change through time in the exploitation pattern. Athens suggests the use of the Kailua accretion barrier for habitation may have started about the same time as the occupation of the site. This site was originally located and excavated by Wheeler (1981).

Toenjes and Donham 1986	Maunawili Valley	This reconnaissance for the City and County's Maunawili District Trunk Sewer was located along Maunawili Stream north (north) of Maunawili Highway. One historic site, a ditch which once carried water from Maunawili Stream to a rice mill, and several potentially prehistoric terrace remnants were discovered within the project area. The authors report previously unreported archaeological features within the vicinity of the project area, associated with Maunawili Stream.
Brennan 1986	Maunawili Valley	This reconnaissance survey was done for Royal Hawaiian Country Club, Inc., for a parcel proposed for a golf course in MAUNAWILI. Brennan located and described 42 sites, some of which had been previously identified. Sites include historic features (a bath site), a heiau (which appears to match McAllister's site 374, Heiau on the land of Kūkapōki) prehistoric irrigated taro fields, habitations, walls, burials and stream embankments.
Allen 1986, 1987	Maunawili Valley	These mitigation and data recovery plans and preliminary reports detail the results of archaeological investigations at the site of the Royal Hawaiian Country Club, Inc. golf course. Sites investigated included historic habitations, charcoal kilns, roads and trails, and agricultural sites. The final report for these investigations is forthcoming.
Shun, Price- Beggerly, and Athens 1987	Kailua mauka, west of the Pali Golf Course	This inventory survey of approximately 200 acres, the site of a proposed golf course, revealed that the area was not used extensively by traditional Hawaiians for habitation, agriculture, or other activities. Historic document research revealed that Pineapple agriculture (c. 1912) and truck farming, in the 1920s, were some of the greatest land uses of the parcels. Sites found included a small terrace complex, two charcoal kilns or seepage walls, a habitation complex, and a rock wall.
Williams 1988	Maunawili	This reconnaissance survey took place to investigate the proposed new location for the displaced Luaiuku farmers (by H-3 development). 13 sites were recorded in this mauka portion of Maunawili (640-920' elevation), including probable historic charcoal kilns and agricultural complexes.
Szabian 1989	Foot of Mount Olomana	During this archaeological reconnaissance survey of the proposed site of the Women's Community Correctional Complex (adjacent to Maunawili Elem. School) on an area of subsurface archaeological sites of deposits were discovered. The authors did remove the remains of Kūkapōki Heiau (State Site # 50-80-11-372), which was first reported by Thrum and McAllister (site # 372), and re-discovered by Neller. They also note the freshwater spring "Kawailoa freshwater spring" adjacent to this Heiau.

Hammatt, et al. 1990	Kawai Nui Marsh	The sediments from sediment cores from 10 locations in the Marsh were analyzed to characterize their "depth, age, and nature". Conclusions: Kawai Nui was a marsh bay with open circulation and tidal activity for most of the Holocene. Around the end of the first millennium B. C. in a relatively sudden geological event, the bay was partially blocked by a sand barrier, becoming a lagoon of mixed fresh and saline waters. This change is marked by a 600% increase in sedimentation rates on within the Kawai Nui basin. The lagoon persisted until as late as 570 A. D. By 1400 A. D. the lagoons outlet to the sea was closed and the Kawai Nui basin, already largely filled with terrigenous silty clays developed its wetland appears of today. Pollen samples which bracket this period from bay to marsh show no apparent changes resulting from early Polynesian settlement. At approximately 1400 A. D. there are dramatic changes showing voluminous drops in mixed marine forest species and an increase in grasses and sedges. These changes may well be the result of increases in Hawaiian subsistence activities.
Quebral, Orndoff, and Athens 1991	Hāmbakua Drive and Pu'u o Ehu Ridge	Four most likely historic sites were located during this inventory survey along the margins of Ka'elepulu Stream, in an area that has seen modern in filling. Although background research indicated the importance of the project area for traditional agriculture, no specific indication of traditional Hawaiian land use was found. The project area was used for historic rice cultivation and livestock grazing.
Athens and Ward 1991	Kawai Nui Marsh	Thirty-seven core/auger units were dug along the eastern margin of Kawai Nui Marsh, in the vicinity of the drainage control levee. Conclusions: The marsh basin was transformed into a relatively closed, freshwater system at about 200 B. C. Data from other locations on O'ahu (Pt. Shafter Flats and Kahana Valley) support the conclusion that the transformation was due to regional causes, namely a fall in mean sea-level, rather than local forces, as had previously been proposed. The Kailua sand berm begins to form between 600 and 1000 B. C. Until approximately 1000 A. D. the Kailua lowlands were dominated by Pritchardia-palm forest. After 1000 A. D. these forests decline rapidly. The vegetation transformation is attributed to rising human population levels and the expansion of agriculture. Counts for chaco-am type and grass pollen rise dramatically after approximately 1200 A. D. These pollen types are indicators of disturbed environments and are thought to be indicators of the expansion of agriculture. Based on increases in sedge pollen after about 1000 A. D., it appears that Kawai Nui basin was too deep to support a marsh community, except along its margins, until this time.
Hammatt and Shideler 1991	Maunawili	This inventory survey for the Na Ala Hale Trail Corridor through the mauka portion of Maunawili Valley found seven sites. Sites included the Old Pali Road, two probable historic charcoal kilns, and a large agricultural complex. It was unclear if any of the sites were prehistoric.
Hammatt, Pfeiffer and Creed 1993	Pu'u o Ehu Ridge TMK 4-2-03:46	This inventory survey for the proposed location of the Kailua 372 Reservoir found no historic properties. Oral history research did reveal the traditional Hawaiian significance of Pu'u o Ehu park as a spot overlooking the waterway that joined Ka'elepulu and Kawai Nui ponds.

Brennan 1994	Maunawili Valley	This short letter report, address to Dr. Tom Dye, SHPP, documents and explains significance evaluations for 8 newly recorded sites in Maunawili. These sites were found during monitoring for the Royal Hawaii Country Club Golf Course. Features include ponds, fields, firepits, trash dumps, a cemetery documented from oral history, habitations, slope retainers, terraces, and a possible military training bunker.
Hammatt, Creed and Masterson 1994	Maunawili Estates (TMK 4-2-63:31,38)	This reconnaissance survey of a 10 acre parcel revealed no historic properties.
Williams, Mills, and Allen 1995	Upper Maunawili Valley	Excavations at six sites within upper Maunawili Valley (the location of the Lohuku Banana Farmers Relocation) are reported. These six predominantly prehistoric agricultural sites, based on radiocarbon dating results, were constructed between 1260 and 1850 A. D. These radiocarbon dates suggest that extensive agricultural and other cultural activities began in the valley by the 14 th century, and possibly a few centuries earlier. No human burials or definite habitation areas were discovered in the six sites, but evidence for pre-contact habitation was found at a previously unidentified site.
Hammatt and Chigiogioji 1997	'Auloo Road	This reconnaissance assessment of a 0.8 mile section of 'Auloo Road, immediately north of Castle Junction, found no historic or archaeological sites, other than the previously recorded Mas'oha Ranch office building and the adjacent war memorial monument (State site 50-80-10-13669).
Hammatt and Medeiros 1999	Kailua Ahupua'a TMK 4-3-28:73	Inadvertent burial find of a single individual, represented by the remains of one bone fragment (radius or ulna) in situ. The lower skeletal remains were recovered by SHPD/DIHR staff, while the contents of the excavated sand was intensively screened and fragmented remains were recovered. The remains collected by the Burial Program staff included both femora, both fibulae, one tibia, both innominate, both humeri, proximal fragments of right ulna and radius, distal fragment of left ulna, mandible, sacrum, and a frontal fragments of the cranium.
Medeiros, Bush, and Hammatt 2000	Kailua Ahupua'a TMK 4-3-63:29	Inadvertently discovered burial of a single individual was partially recovered because of previous disturbance of this Kailua project area. A total of 6 human bones were recovered during the length of this project, including 1 adult skull (minus the mandible), 1 rib fragment, 1 carpal fragment, and two unidentified fragments. This represents less than 5% of the total remains. The remains collected appear to represent one individual. The ethnicity of the remains is not apparent, especially with the low percentages of the entire burial recovered. There was no evidence near the remains, or anywhere within the stratum containing the burial, to suggest ethnicity.
Kikiloi, McDermott, and Hammatt 2000	Kailua Ahupua'a TMK 4-2-17:por 4	Archaeological inventory survey with a focus on the evaluation of subsurface deposits of a small lot on the north-northwest margin of Kawai Nui Marsh. Backhoe testing revealed modern fill sediments overlying sandy marsh type sediments at a depth of 1.25-1.6 m below the current land surface. No historic properties documented. This margin of the marsh was heavily modified by the dredging of the adjacent Onawa and "Inner" canals that control Kawai Nui drainage.

B. Summary of Recorded Historic Properties at Kawai Nui Marsh By Trail Segment

The recorded historic properties around the margin of Kawai Nui Marsh are shown on Figure 3, an adaptation from the State Historic Preservation Division/Department of Land and Natural Resources GIS historic property location data base. More detailed site location information, and in some instances site maps, are provided in the discussion of each individual segment of the Kawai Nui Trail, see below. Table 3, below, is a site number correlation list that outlines the various site designations that have been used for the Kawai Nui periphery sites over the years.

Segment 1

There are five archaeological sites within Segment 1 of the Pathway. These include State Site #s -371, -2022, -2027, -3957, -3958, and -4042.

Site -371, Ulupo Heiau:

Site -371, Ulupo Heiau is a large *luakini* type heiau (state-temple where human sacrifice occurred) that is located on a natural promontory west of the Kawai Nui Marsh. The heiau platform measures 140 x 240 feet, with walls up to 30 feet in height. In May 1971, Ulupo Heiau was submitted to the Hawaii's Historic Places Review Board and placed on the Hawaii's Register of Historical Places on June 21, 1971. It was later listed on the National Register of Historic Places on November 9, 1972.

According to McAllister (1930), "Its earlier importance and size is indicated by large open terraces... the paving is now very rough, undoubtedly having been disturbed by relic hunters. The stones used average about 1.5 feet in size. The sides of the terrace are not evenly faced, but are roughly piled at about a 45-degree angle... this huge mass of stones completely dominates the surrounding taro patches and it is little wonder that the construction of the temple is attributed to the *menehunes*... (the menehune pathway)... is most clearly visible on the side of the heiau, but at the top is confused with the disturbed paving.... The south half of the structure is completely covered with *halu*... There is evidence of a small inclosure, but the southern walls and extent of the heiau were obliterated in the construction of a cattle pen..."

The following features were catalogued in McAllister's 1930 survey:

1. Sides of terrace form slope 30 feet high roughly piled with stones
2. Crudely built wall 40 feet from top of terrace, 5-6 feet high, broken lines indicate slight evidence of terracing.
3. Walls evenly faced with 2-foot stones, 4 to 5 feet high and wide on three sides, open on heiau side.
4. Small inclosure 4 feet wide, 7 feet long, walls 2 feet high outside, paved flush with 6-inch stones on heiau side.

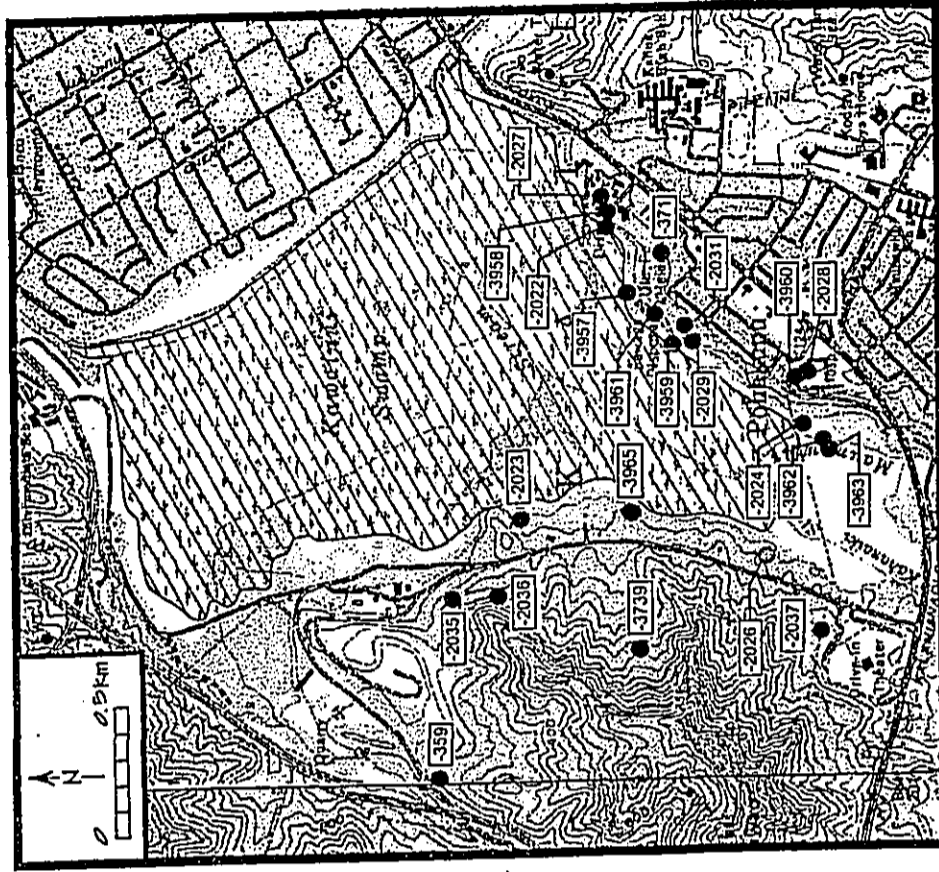


Figure 3 Portion of the 1983 USGS Topographical Map, Mokapu Quadrangle, Showing the Location of Recorded Historic Properties Adjacent to the Project Area (Created Using Information from the SHPD/DLNR GIS Data Base)

Table 3: Kawaiinui Archaeological Sites - Correlation Table of Site Nomenclature & Site Descriptions

State Site #	Mc Allister #	Bishop Museum Site #	Clark (1980a & b) #	Cordy (1977/1978) #	Ewart & Tuggle (1977) #	Site Description	Site name/ TMK
50-80-11-359	359	50-Oa-G6-4	...	...	...	<p>-<i>heiau</i> located by McAllister and now in middle of landfill in Kapa'a Quarry. This site is now on the National Register and State Register of Historic Sites as State Site 50-80-11-359. This <i>heiau</i> was also called <i>Mo'okini heiau</i> referring to many lineages; the name <i>pahukini</i> means "many drums" (see Pukui & Elbert, 1974). Thrum also lists an alternate name of Makini. It is said to have been built by the high chief Olopana in the 12th century and is a <i>luchini</i> or state-class of <i>heiau</i>, important enough to accommodate preparations of war and other highly important state matters. Rescued from oblivion in 1987 when a restoration project was begun. The upkeep is now shared by Ameron HC&D and the Lani-Kailua Business & Professional Women's Club.</p>	Pahukini Heiau TMK 4-2-15:1
50-80-11-360	360	50-Oa-G6-5	...	...	...	<p>-<i>heiau</i> that McAllister (1933) noted on Ulumawao Ridge, NE of the quarry; supposedly built by high chief Olopana in the twelfth century. The name means "wind running or racing". Holomakani (Site 369; State site 50-80-11-369), McAllister lists on the slopes below Pahukini, & was thought to have been destroyed when the land it occupied was cleared for agriculture (Sterling & Summers 1978:229). Between the present landfill and Kalaniana'ole Highway, a site was recently located which may be this <i>heiau</i>. C. Kawachi of the State Historic Preservation Division and staff did a field check on 6/15/88 (memorandum) in response to a call from Susan Miller to check the site. LCA 6966, awarded to Keala, listed its land use as "a kula." State archaeologists said that this site may be Holomakani Heiau (Site 360).</p>	Holomakani Heiau TMK 4-2-14:2

State Site #	Mc Allister #	Bishop Museum Site #	Clark (1980a&b) #	Cordy (1977/1978) #	Ewart & Tuggle (1977) #	Site Description	Site name/ TMK
50-80-11-371	371	50-Oa-G6-1	...	...	...	<p>—<i>heiau</i>, (State site #50-80-11-380) agricultural <i>heiau</i> dominating the Kawaiui Marsh. Located on the southeast side of marsh in the area known as Kukanono, near the present YWCA site. Its large 43 m. (140') x 9.1 m. (30') high terrace dominates the marsh. Its name means "night inspiration."</p> <p>It is said to have been built in a night by the Menehune, The spring beneath was used for washing the pigs before bringing them up to the temple oven (Akuni Ahau in Sterling and Summers, 1978). The land was accepted as a part of the territorial park system in 1951 and now is a state park.</p>	Ulupo Heiau TMK 4-2-13:2
50-80-11-2022	...	50-Oa-G6-32	cluster 1	site 1	site 1	Series of terraces from marsh edge up edge of slope, a long retaining wall upslope, ruins of a historic house, a spring, excavation yielded charcoal dates in range of A.D. 353-655 & A.D. 529-0965, Artifact found on surface	Kawaiui Terraces 2022 TMK 4-2-13:38
50-80-11-2023	...	50-Oa-G6-33	clusters 10 & 11	...	...	cluster 10: 12 features: retaining walls, L-shaped alignments of rocks, terraces, a roadbed, a level terrace or platform, surface scatter; cluster 11: 2 retaining walls	Kawaiui Cluster 2023 TMK 4-2-13:10
50-80-11-2024	...	50-Oa-G6-34	cluster 7	...	site 4	mounds, wall remnants, a terrace	Makalii Slope Cluster 2024 TMK 4-2-13:10
50-80-11-2026	...	50-OA-G6-36	cluster 12	...	...	a large agricultural terrace; 67 m. long along marsh edge in a NE/SW direction, 14 m SE/NW; walls single-course high; rusting crane	Kapaloa Agricultural Terrace 2026 TMK 4-2-13:10
50-80-11-2027	...	50-Oa-G6-37	cluster 15	...	...	stone-walled enclosure, linear pile of rocks, terrace, surface artifacts	Kukanono Habitation Site 2027 TMK 4-2-13:38

State Site #	Mc Allister #	Bishop Museum Site #	Clark (1980a&b) #	Cordy (1977/1978) #	Ewart & Tuggle (1977) #	Site Description	Site name/ TMK
50-80-11-2028	...	50-Oa-G6-38	cluster 14	...	...	2 walls which meet at a right angle	Ulukahiki Walls 2028 TMK 4-2-06:4 or 7
50-80-11-2029	...	50-Oa-G6-39	cluster 13	site 7	...	large agricultural complex of rectangular fields, probable water channel; excavation yielded basaltic glass date A.D. 1738+34 years as well as large taro root stains and taro pollen	Kawainui Marsh site 7 TMK 4-2-13:14, 16:06
50-80-11-2030	...	50-Oa-G6-40	Allen-Wheeler 1981	...	...	excavation exposed a truncated cultural layer under modern fill and overlying beach sand producing prehistoric artifacts. Dates obtained were between A.D. 1374 to 1630	Kihapai Occupation Site 2030 TMK 4-02-57:65
50-80-11-2031	...	50-Oa-G6-41	Athens 1983	...	...	evidence for prehistoric occupation/ many surface artifacts; corrected carbon dates range A.D. 1240-1385 obtained were between A.D. 1374 to 1630	Kawainui Slope Site 2031 TMK 4-3-13:38
50-80-11-3957	...	50-Oa-G6-32	cluster 2	site 2	site 2	9 dryland agricultural terraces, 20 mounds, small c-shaped structures, walls, a walled depression, remains of a historic structure; surface artifact recovered.	Kawainui Agricultural Complex 3957 TMK 4-2-13:38
50-80-11-3958	...	50-Oa-G6-32	cluster 3	site 3	...	terrace, walls 38+ m. & 28+ m. long	Kukanono Terrace 3958 & Habitation Complex TMK 4-2-13:31 or 38
50-80-11-3959	...	50-Oa-G6-32	cluster 4	site 4	site 3	26 mounds, 19 dryland agricultural terraces, linear walls, one 63 m. long, a historic house foundation, a prehistoric basalt mirror found on surface & other prehistoric basalt artifacts, large boulder grindstone; historic artifacts, date ranges from AD 1362+ 70 to A.D. 1742 + 79	Miomio Agricultural & Habitation Complex TMK 4-02-13:38

State Site #	Mc Allister #	Bishop Museum Site #	Clark (1980a&b) #	Cordy (1977/1978) #	Ewart & Tuggle (1977) #	Site Description	Site name/TMK
50-80-11-3960	---	50-Oa-G6-32	cluster 5	site 5	---	a large <i>lo'i</i> , ca 40 x 30 m.; a stone and earthen platform, a stone-lined channel 10 m. long, stone mounds	Pohakupu Agricultural Cluster 3960 TMK 4-2-13:38
50-80-11-3961	---	50-Oa-G6-32	cluster 6	site 6	---	stone mounds, a stone-edged canal, terraces, retaining walls	Kukanono Cluster 3961 TMK 4-2-13:38
50-80-11-3962	---	50-Oa-G6-34	cluster 8	---	site 5	3 historic buildings	Makalii Historic Site 3962 TMK 4-2-13:10
50-80-11-3963	---	50-Oa-G6-34	cluster 9	---	site 6	earthen mounds	Makalii Mounds 3963 TMK 4-2-13:10
50-80-11-3964	---	50-Oa-G6-36	---	---	sites 8, 9	recently abandoned houses	Kaeleuli House site TMK 4-2-15:06
50-80-11-3965	---	50-Oa-G6-36	---	---	site 7	low stone terrace perpendicular to stone wall; abut at SE corner	Pohakea Terrace 3965 TMK 4-2-13:10
50-80-11-3739	---	50-Oa-G6-85	---	---	---	Kawachi (1988) did a field inspection and describes a large level terrace (30 by 15 m.), NW-SE with three levels of wall terracing. Suggests this is a <i>heiau</i> and may be Holomakani Heiau. Pantaleo and Cleghorn (1989) did a reconnaissance survey, found the same feature and describes it as a large, rock-faced terrace and an L-shaped terrace. Mentions this site as a possible <i>heiau</i> , but does not associate it with Holomakani.	Unnamed Heiau, possibly Holomakani TMK 4-2-14:2

5. Inclosure 4 feet wide, 7 feet long, walls 2 feet high and wide on three sides, open on *heiau* side.
6. Curved arm of large 2-foot stones, 6 feet wide, 3 feet high.
7. Stone-paved area, slightly depressed.
8. Slope 5 feet high probably formerly depressed.
9. Circular inclosures with low surrounding walls similar to pens 16 and 17. Outer wall to pen 11.
10. Former cattle pen now planted in bananas
11. Stone mound 4 feet high, 10 feet in diameter, with several large flat stones about base.
12. Round pile of stones 4 feet in diameter, large stones on outside and small stones in center.
13. Small mound of stones.
14. Irregular wall built of 6-inch stones, 10 feet long, 2 feet high and wide.
15. Pen similar to Pen 17 with better constructed walls 2 feet high, but rough paving, small break in wall to south.
16. Circular pen paved with 8-inch and 4-inch stones, 9 feet in diameter, with walls of roughly piled stones 1 foot high, small break in wall to south.
17. Open terrace 140 by 180 feet by 30 feet high.
18. Portion of low terrace 1 foot high.
19. Partial inclosure, with flat stones forming pathway.
20. Portion of low stone wall.
- 21.

Later surveys of the *heiau* revealed some features not previously noted, specifically three "niches" in the western slope, the side that overlooks Kawaiinui Maroh. The three "niches" are of different sizes in the approximate center of the slope. It has been suggested that these might have been emplacements for wooden idols.

Site -2022, Kawaiinui Terraces: Excavation (Clark, 1980)

Site -2022, called the Kawaiinui Terraces, is considered a substantial site. It has been recorded during several surveys of the Kawaiinui Maroh. The site has been disturbed in the recent past. There are 34 features in Site -2022 of seven basic types:

1. DRY FIELD AGRICULTURE TERRACES: Most of the terraces (21 features) are probably associated with dry field agriculture (Features 1-4, 6-17, 21-22, 28-30). These terraces are marked by retaining walls that range from single to several courses high (0.2-1.4 meters).
2. IRRIGATED AGRICULTURE TERRACES: The remaining (6) terraces (Features 23-27) are situated perpendicular to a small spring most likely were constructed to be irrigated by the spring. The terraces are retained by single-course stone walls.
3. LINEAR WALLS: Three free-standing linear walls, two run perpendicular (Features 18, 31) to the maroh edge and one is roughly parallel (Feature 19).

4. ENCLOSURE: One small oblong enclosure (Feature 5) that measures 2 m N/S x 3 m E/W, with a single-course stone wall.

5. J-SHAPED STRUCTURE: Cordy (1977: 46) stated this feature was "suggestive of prehistoric house patterns". The structure has a retaining wall (1 stone high). This feature was test excavated (Clark, 1980:64-65). One stratum was exposed with charcoal flecking. 176 artifacts were recovered, most from the first 5 cm. 169 artifacts were non-indigenous, 7 were indigenous (basalt flakes). Clark concludes that there is no evidence to support this was a prehistoric house site. One sondage was excavated and a C14 sample collected, although it is not associated with any cultural feature. The calibrated calendar age was A.D. 363-655.

6. STONE PLATFORM: Small, crude stone platform 8 m x 1.8 m x 2 m (Feature 20).

7. HISTORIC STRUCTURE FOUNDATION: Constructed of stones and mortar (Feature 32), a local informant identified this site as a piggery. There is also the remains of a historic building (Feature 33) associated with piggery. An aerial photograph shows these structures still standing and a local informant confirms the site was abandoned in the 1950s.

One test pit was excavated at Site -2022. Excavation revealed a number of artifacts such as glass shards, ceramic sherds, nails, metal, .22-caliber cartridge casings, a metal clamp, mortar fragments, tar, and basalt flakes. This mixed assemblage of traditional Hawaiian artifacts with historic materials indicates the continuation of land use in the vicinity from prehistoric times.

Site -2027, Kukanono Habitation Site:

Site -2027, called the Kukanono Habitation Site, consists of six features located along a basalt outcrop bluff. There are four types:

1. STONE WALL ENCLOSURES: 2 features were considered stone-walled enclosures. The walls of both measured 0.5 meters (one-course) high and 2.5 meters (one-course) wide.
2. LINEAR PILE OF ROCK: 1 feature was considered a linear pile of rocks that was 7 meters long, 2 meters wide, and 0.7 meters high. A metal cable twisted around some of the rocks indicates that it is historic in nature, although post-construction collapses may account for this positioning.
3. LINEAR WALL: 1 feature was considered a linear wall (Feature 4). It extends for 16 meters and then turns into a retaining wall that extends over 8 meters. The wall runs parallel to the bluff edge.
- 4) SMALL TERRACES: 2 features were considered small terraces. Both terraces

are fronted by retaining walls several courses high.

Surface artifacts include one basalt adze fragment and one piece of pearl shell. Clark (1980) suggested that the enclosure may represent prehistoric residential structures, while the rock pile may be historic in nature. No excavation was conducted at this site.

Site -3957, Kukanono Residential Complex

Site -3957 (also called cluster 2 and 3 in Clark (1980)) is comprised of a cluster of features located just north of the Pump House (formerly known as "Kukanono Sewage Plant" in Clark 1980). There were 72 features located within this area (Clark 1980 Map; Erkelens 1993 Map), with 6 basic types:

1. TERRACES: 22 features were considered agricultural terraces and typically consisted of a retaining wall, one to two courses high (0.3 to 0.6 meters).
2. C-SHAPED STRUCTURES: 5 features were C-shaped structures, that ranged from 2 to 4 meters across and the retaining walls were one course high.
3. MOUNDS: 36 of the features were stone mounds that were roughly circular at the base, and showed variation from oval to rectangular in cross-section. The mounds are generally well built structures in the form of a truncated cone. The sizes of the mounds vary from 0.7 meters on the shortest axis, to 1.5 - 3.0 meters on the longest axis, and 0.5 - 1.8 meters high.
4. LINEAR WALLS: 3 free-standing linear walls are located in this area. They range from 12- 25 meters long, and 0.4 - 0.7 meters high.
5. HISTORICAL RESIDENCE: 2 identifiable historic features were found in this area that consists of a roughly circular cluster of rocks with interspersed historic glass and ceramics. Nearly 40 meters to the south lies the foundation of a historic structure that has a foundation constructed of mortared stones and has two concrete steps facing the marsh. One basalt adze was located on the surface. Structure is visible on 1928 USGS quad map.

Four test pits were excavated in Site -3957 by Clark (1980).

TP1: Test pit 1 was excavated in a terrace retaining wall. The location was chosen because the wall appeared prehistoric and a date for wall construction was desired. Three non-indigenous artifacts were found (2 glass sherds, one brownstone ceramic sherd) within the wall construction. This is a clear indication that this feature was constructed post-contact (within the last two hundred years). A small suburface retaining wall (E2) was found during the excavation of the terrace retaining wall. The top of the feature was found at 30 cmbs and this wall runs parallel to the originally excavated wall. Thirteen artifacts were found, seven non-indigenous (five glass sherds and one ceramic sherd) and six

indigenous artifacts, two volcanic glass flakes and four basalt flakes.

TP2: Test pit 2 was excavated on the next terrace up slope from TP1. There was charcoal flecking throughout the unit. This was interpreted as an indication of generalized surface burning in the vicinity. One suburface feature was encountered, a stone alignment, at a depth of 31 cmbs. A charcoal sample was collected from a piece of burned branch for radiocarbon dating. Thirty-six artifacts were found in the first 15 cm, 27 non-indigenous and five indigenous. The indigenous artifacts include three volcanic glass flakes, one basalt flake, and one basalt flake with modified edge. From 15-30 cmbs, four basalt flakes were recovered.

TP3: Test pit 3 was excavated on the Feature 64 Terrace. No sub-surface features were identified during excavation. Ten artifacts were collected including nine non-indigenous and one indigenous artifact.

TP4: Test pit 4 is situated at the base of Feature 93, a stone mound. Mound construction consists of larger boulders around the perimeter with an interior fill of smaller pebbles. Five indigenous artifacts were found, three basalt flakes and two volcanic glass flakes. A few fragments of carbonized kukui were also found.

Subsurface excavations revealed an abundance of artifacts in the vicinity, such as bottle glass, glass, volcanic glass, numerous basalt flakes, coral, midden, lithic tools, ceramics, charcoal flecking, historic machinery pieces, wire, mortar, and metal. Also, features such as grindstones, *kuwai* (water irrigation channels), stone alignments, *imu* (cooking pits), hearths, and post molds were discovered within the subsurface strata.

As part of a University of Hawaii archaeological field school, Conrad Erkelens (1993) studied site -3957. His objective was to provide empirical evidence for rates and causes of geomorphological alteration of Kawaiinui Marsh in order to better establish models concerning settlement patterns, agricultural intensification and the evolution of social stratification. Up to now, the generally accepted hypothesis is that Hawaiian slash and burn agriculture caused accelerated erosion of slope areas which resulted in dramatic alteration of the physical environment. Newly discovered surface features (12 new features were discovered, including modified springs, mounds, walls, and one enclosure) were mapped. Twenty-nine test pits were excavated. Analysis of the stratigraphy and related archaeological features indicated that:

at Kukanono there is no evidence of colluvial or alluvial flows occurring that could have moved large volumes of sediment recently or in the past. . . . While it is certain that Kawaiinui Marsh has been in-filled by deposition, evidence from Kukanono suggests Hawaiian agricultural practices had little impact on this long term natural process. The majority of the sediment deposited in Kawaiinui is more likely the result of runoff from Kahanaiki and Maunawili Streams over the millennia rather than the result of rapid deposition from Hawaiian induced erosion of the landscape. (Erkelens 1993:42-43)

Excavation results support the evidence that the Kawai Nui Marsh area was settled by at least 1000 BP and land use was continuous thereafter. In addition, there is substantial evidence for pre-contact habitation occurring in this lower slopes surrounding the marsh. A additional grindstones was discovered during this study (Erkelens 1993).

Site -3958, Kukanono Terrace and Habitation Complex:

Site -3958 is composed of comparatively few features (6): three terraces (Features 34, 35, 37) and two linear walls (Features 36, 38). The three terraces are divided from the linear walls by a spring rivulet. One terrace which lies adjacent to the rivulet may have been irrigated by it. One of the linear walls lies perpendicular to the marsh edge and the other lies parallel to the marsh edge. Other features exist in the dense *hou* thicket, but could not be mapped. No excavation was conducted at this site.

Site -4042

In 1923 a system of pumps, pipelines, tunnels, and ditches, was completed to conduct water from Kawai Nui Marsh into the Kailua ditch, a portion of the Waimanalo Irrigation System. This system continued to supply Kawai Nui water to Waimanalo until the early 1950s (Harland, Bartholomew, and Associates 1959:53-54; Hall 1997:94; Kelly and Nakamura 1981:778-79). According to Wilcox (1996:111) two pumps lifted water from Kawai Nui and took it to the head of a 10,000-foot system of small tunnels, most through stone or hard earth, into a reservoir in Waimanalo. This entire system was given State Site # 60-80-15-4042 in 1992 (Creed 1992). The pump house and the associated canal are located within the present project area in Segment 1. The pump house foundation is a rectangular concrete foundation with some construction of mortared basalt boulders. This pump house once housed the pumps that lifted water out of the marsh and into the pipe line. Several large diameter iron pipes are located within the structure. There is a canal that extends out from the pump house into the marsh. The banks of this canal are lined with basalt boulders near to the pump house, but are earthen further out towards the marsh.

Segment 2

There are seven recorded archaeological sites within Segment 2 of the Kawai Nui Path. These include State Site #s, -3961, -3969, -2031, -3960, -2024, and a good portion of 2029.

Site -3961, Kukanono Cluster 3961

Site -3961 is located west of the Kukanono Sewage Treatment Plant. Land disturbances from the sewage plant construction separate Site -3961 from Site -3957 to the north and Site -3959 to the south. There are six recorded features at this site: No test excavation was done at this site.

STONE MOUNDS: Two stone mounds were recorded, ranging in size from 1-2 meters in diameter to 4-1 meter in height.

TERRACES: Two terraces were recorded, one may be natural and the other is probably historic as it has mortar in its construction.

C-SHAPED RETAINING WALL: with mortar chunks and mortar rocks found in the wall construction indicating its historic construction.

CANAL: stone-lined canal measuring 1-1.5 m wide, 0.6 m deep and almost 12 m long.

Site -3959, Miomio Agricultural & Habitation Complex

Site -3959 is located on the slopes fronting Kukanono Subdivision and south of Kukanono Sewage Treatment Plant. Site -3959 is separated from Site -3961 in the north by land disturbances created by construction and from Site -3960 in the south by a rock outcropping. The northern portion of the site has been previously disturbed and is now used for cattle pasture. A total of 49 features were recorded with the majority located in the southern part of the site. The site is divided into a north and south segment by an erosional gully (Clark, 1980).

DRYLAND TERRACES: 19 dryland terraces with retaining walls, often utilizing natural outcropping. Terrace heights range from 0.5 to 1.2 meters in height.

STONE MOUNDS: There are two types of mounds: free-standing and terrace. Free-standing mounds. Twenty walls seem to be free-standing and four are terrace mounds.

LINEAR WALLS: two linear walls, one 53 meters in length and 0.6-0.9 m high. This wall may correspond to the boundary between Kukanono and Pohakupu *iii*. The second wall is short, 2.5 m long, and crudely constructed.

HISTORIC DUMP: scatter of metal, concrete and other items

HISTORIC CONCRETE FOUNDATION: pre-1940 aerial photographs show several structures in this location

Test Excavations at Site -3959

Clark (1980) excavated two test pits in Site -3959, one in a terrace-style mound situated next to an earthen terrace. The second test pit was excavated in a free-standing mound.

TP 6: Excavated within a terrace-style stone mound with a perimeter of large boulders surrounding an interior of pebble fill and earth. Excavation proceeded to a depth of 35 cmbs. Charcoal was noted throughout. Forty-six artifacts recovered, 26 indigenous and 19 non-indigenous. The indigenous artifacts include basalt flakes, volcanic-glass flakes, one volcanic glass core. The non-indigenous artifacts include glass sherds, ceramic sherds, nails (including square nails) and mortar fragments. Most of TP6 had a mix of

indigenous and non-indigenous artifacts.

TP 8: excavated to 35 cmbs in a free-standing mound. Mound construction consists of a outer perimeter of larger boulders with an interior cobble fill. No subsurface features or artifacts were observed.

Neller (1982) led a group of Sierra Club High School Hikers in an Ecology Camp at Kawaiuli Marsh. Nine test pits were excavated in the old Momiol LCA 6099. Several prehistoric artifacts were found including basalt waste flakes, adze blanks and adze fragments, worn basalt flakes, hammer stone fragments, stone abraders and polishing stones, cut bone, bone fragment, large amounts of unworked coral (3533.1 gm), few marine shell fragments. The majority of the artifacts were historic including bottle fragments from the 1800s, metal objects and few ceramic sherds. Also found was a large grinding stone on the Kukanono slopes. The abundance of artifacts in the disturbed cultural layer verifies the former use of the area by prehistoric Hawaiians, 19th century native Hawaiian farmers, and 20th century Japanese-American farmers, and suggests that habitation sites existed somewhere in the immediate area" (Neller 1982). The entire project area was previously disturbed by farming and grading. The test pits were not excavated to an adequate depth to determine the presence or absence of buried, undisturbed archaeological features in the study area.

Site -2081, Kawaiuli Slope Site 2081

Site -2031 has no surface features except for a pig pen foundation (still in use in 1969 according to aerial photographs). However, the large quantities of surface artifacts suggest subsurface deposits. Six trenches and a "strat pit" were excavated and a probably earth oven was located. In addition, several pit features were identified. Artifacts are almost exclusively indigenous with the exception of two small metal fragments which were the result of infiltration from upper levels. Corrected age ranges are of AD 1240-1385.

Athens (1989) undertook archaeological investigations of both Sites -9869 and -2081 due to a proposed residential development and recommendations by the Bishop Museum. Objectives were to date and determine the function of a sample of the surface features and conduct a search for possible subsurface deposits that might be of very early date. Excavation revealed that all the surface features were built in the most recent soil layers after AD 1900. Above the marsh slope, undisturbed prehistoric deposits were located at G8-41 (State Site -2031). An earth oven gave dates of between the 13th and 16th centuries. Analysis of a large collection of stone artifacts recovered suggests this area was being used as a reduction area for lithics. The presence of a large boulder grindstone is further evidence. Athens suggests that the lack of prehistoric agricultural features on the slopes may indicate that this area was being used only for non-intensive forms of agriculture, such as for breadfruit and other trees and bushes that can tolerate marginal soil conditions. Athens questions Clark's (1980) early dates (5th and 8th century AD) considering that the C14 samples that were dated did not come from *in situ* archaeological features and were not primarily deposited stratigraphically. Athens' investigations indicate that prehistoric habitation was most intensive in the area above the slope in the vicinity of G8-

41 (Site -2031). This is indicated by the distribution and densities of surface and subsurface lithic artifacts. A wide range of adze sizes and six awls suggests a variety of different woodworking activities were being performed. Athens suggests there is a lack of prehistoric agricultural features and implies the use of a cropping system.

Site -3960, Pohakupu Agricultural Cluster 3960

The site is situated near the marsh and separated from Site -3959 by a basalt outcrop. There are natural springs in the area (at least 3). Site -3960 has 11 features. (Clark 1980).

LO'I: dimensions are c. 40 by 30 meters separated from the marsh by a stone and earthen embankment. Lo'i are fed by a natural spring directed through a stone-lined channel. Waimanalo resident, Norman Kawachi remembers his father using the existing lo'i for taro and watercress in the 1930s.

STONE MOUNDS: five free-standing stone mounds, two built by Mr. Kawachi's father during land clearing.

LINEAR WALL: also constructed by Mr. Kawachi's father, 16 meters long and 0.5-0.7 m. high.

RETAINING WALL: three retaining walls, two bordering natural springs.

TERRACE OR PLATFORM: crudely constructed

Cordy (1978) excavated one test pit in Site -3960 and found one artifact (dated AD 1692-1788) and charcoal. Cordy suggested the charcoal was evidence of some type of agriculture, being practiced at the same time as agriculture in the swamp.

Site -2024, Makalii Slope Cluster 2024

The site is located up slope approximately halfway between Uluoa and Manu-Laiki Streets within the Kukanono subdivision. It is somewhat isolated from other sites along the Kukanono slope. It consists of one terrace and four small stone mounds. No test excavation was carried out on this site (Clark 1980).

Site -2029, Kawaiuli Marsh Site 7

Site -2029 consists of a series of walls through the marsh from Pohakupu slopes to Maunawili Stream (1400 feet). These features were studied through analysis of aerial photos (Cordy 1977). Site 7 is a remnant of the abandoned field system that was once extant in this portion of Kawaiuli Marsh. Four test trenches were excavated, two across a wall (1 meter high and 2.4 m wide), another trench across a second wall (0.6 m wide) and the last trench on the slope (in Site -3960) overlooking the marsh. The first wall can be dated to AD 1704-1772. Taro root stains in soil layers are evidence of taro cultivation, though taro pollen percentages were low. In Site -3960, there is evidence of agriculture in the form of charcoal. Dated at AD 1692-1788, this trench is evidence of contemporaneous

cultivation in the marsh and on marsh slopes. Analysis of aerial photos show rectangular to square fields approximately 60 by 90 meters in size. The field remnants seem to cover an area of 260 acres (Cordy 1978).

Allen-Wheeler (1981) did further research at the site. The objective was to determine more precisely the geophysical setting of the marsh sites at the time that initial occupation took place centering on archaeological excavation of the marsh floor. "The general theoretical focus concerned the evolution of land-use and human occupation in and around the marsh and, by extension, in windward O'ahu, during the prehistoric and early historic periods" (Allen-Wheeler 1981). As in Cordy's study in 1978, the research centered on the Marsh floor itself (Site -2029), rather than the surrounding slopes. A review of maps and aerial photographs was undertaken. A ground survey was conducted. Two former canals were identified, one along the north border of LCA 6989/2 and the other alongside Maunawili Stream at the base of the Pohakupu slopes. Four trenches were excavated where taro and later rice were grown. Trench A was excavated to expose a standing wall (visible above ground) situated perpendicular to Pohakupu slopes. Trench B was excavated in a feature identified from aerial photos, aligned perpendicular to field boundaries. Trench C was excavated to test agricultural plots visible in aerial photos (not recorded by Cordy). Trench D could not be completed. Based on palynological, stratigraphic, and sedimentological analysis, the settlement pattern for Kawaiinui was presented. At approximately AD 600-800 there was initial settlement of the Pohakupu/Kukanono area. The higher ground of the marsh slopes sloped met a coral and cobble beach on a marine bay, that was to become Kawai Nui Marsh. Initial land use of the area was interpreted as marine and coastal bay exploitation, possibly accompanied from the beginning by dryland cultivation on the hill slopes around the bay. Wetland agriculture developed later. After AD 1300, pond-field cultivation expanded into the wetlands in the marsh. The adjacent hillside were terraced for dry and/or wet cultivation during the late prehistoric or early historic periods.

Site 2028, Ulukahiki Walls 2028:

Located behind Castle Hospital, off of Ulukahiki Street the site consists of two standing walls (7-1.6 meters high) meeting at right angles to each other. Clark (1980) suggests that the north-south wall relates to the old road and both walls are historic. No site map. No excavation made.

Site 3982, Makali Historic Site 3982:

This site is composed of the remains of a historic building. No site map and no excavations were made by Ewart and Tuggle (1977). No site description in Clark (1980).

Site 3983, Makali Mounds 3983:

This site is composed of some earthen mounds located in a hooi grove immediately west of a "farm lot". No site map and no excavations were made by Ewart and Tuggle (1977). No site description in Clark (1980).

Segment 3

There are no recorded archaeological sites along this segment of the proposed pathway.

Segment 4

There are no recorded archaeological sites along this segment of the proposed pathway.

Segment 5

Site 2026, Kapaioa Agricultural Terrace 2026:

Located approximately 600 meters north of Kalaniana'ole (Pal) Highway and Kapa'a Quarry Road intersection, this site is along the marsh edge. A rusted crane (approximately 80 m north of the site) supposedly marks the general location of this site. The site consists of a large terrace, with walls 65 m long NE-SW and 14 m long SE-NW. Walls are one course high and the terrace is built on partially flat region next to marsh (Clark 1980). There is no site map for this site and no subsurface testing was done. This site is not marked on the SHPD GIS map of Kawaiinui sites (but the approximate location has been added to the adaptation of this map that is Figure 3) and may be difficult to relocate based on available information.

Site 3966, Pohaka Terrace 3966:

A low stone alignment forming a terrace approximately 5 m in length, with a stone wall running perpendicular. No site map, no excavations (Ewart and Tuggle 1977).

Site 3739, thought to be Site -360, Holomakani Heiau:

Holomakani Heiau, Kapa'a, Kailua--McAllister's Site 360. This heiau, on the mountain side of Kawaiinui fishpond, was destroyed and the land used for agricultural purposes. It was just beneath Pahukini. Said to have been built by Olopana (McAllister 1930:182)

More recently a large stacked stone terrace was re-discovered on the slopes above the Kapa'a Quarry Road. This terrace is thought to be the remains of Holomakani Heiau (Kawachi 1988)

Site 2023, Kawaiinui Cluster 2023:

(Clark, 1980) Located east of the Kapa'a Quarry Road and eastern Kapa'a Land-Fill Access Road junction, the site consists of 11 features, separated into two clusters. This area is also known as Na Pohaku o Hauuohine overlook and the most striking feature is the basalt outcrop that provides a splendid view of the entire Kawaiinui Marsh. This basalt outcrop also serves as a focal point for several archaeological features, the outcrop being incorporated into feature construction. Features radiating out from the outcrop include retaining walls, linear walls, L-shaped alignment of rocks, terrace (6 x 3 m), portion of old

north-south running road bed, platform. Nearer the marsh is another set of features including two retaining walls covered in short grass and hau. One test pit was excavated in the terrace located near the basalt outcrop. Excavated to a depth of between 33 and 43 cm, two distinct strata were identified with cultural material in both including charcoal. One subsurface feature was recorded, a single use fire pit or the dump of a more permanent hearth. Several artifacts were collected including two glass shards, basalt flakes, volcanic glass flakes, one basalt grinder, one probable adze flake.

Site 369, Pahukini Heiau: (McAllister, 1933)

Pahukini Heiau is one of the larger religious sites on the windward side of O'ahu. Its remnants include a large enclosure that measures 176 by 110 feet. It is located along a ridge in Leonia, on the Kapa'a slope, facing the range of hills dividing Kaneohe from Kailua. The site is today enclosed by the Kapa'a Land-Fill. It is believed to be of *po'okonoko* (human sacrifice) class. Oral traditions indicate Chief 'Olopana built this heiau at around AD. 1100, naming it Pahukini, which means many drums. On the north wall is a small inclosure which Thrum believes is of "modern service" (32 x 88 feet in dimension). The paving has been moved around and piled into small mounds throughout the heiau. The site has also been disturbed by a heavy growth of guava, lantana and other shrubby within the heiau.

Along one end of the structure a ledge several feet in width ran probably its entire length, resembling a prominent feature of the temple of Puu o Mahuka. Like the rest of the site, this structure has also been disturbed.

Segment 8

Site 8984, Kaeleuli House site:

"North of the stream, two recently abandoned house sites were located"....modern trash suggests they were occupied until recently (Ewart and Tuggle, 1977). No site map, no excavation. This site location is not marked on the SHPD GIS map of Kawai Nui Marsh historic properties; see Figure 3.

Kawai Nui Marsh Corings

(Hammett et al., 1990) The U.S. Army Corps of Engineers proposed construction of open water channels in the marsh for flood control. There was concern for impacts to archaeological resources within/surrounding the marsh. Objective of study was to (1) characterize depth, age and nature of sediments to be impacted in relation to present marsh sediments and (2) reconstruct environmental history of marsh to determine nature and location of native Hawaiian use including shoreline habitation, fishponds, agricultural sites. Ten sediment cores were taken from Kawai Nui Marsh and analyzed for pollen, organic clay mineralogy, stratigraphy and heavy metals. Results of paleoenvironmental study of Kawai Nui Marsh were:

- 1) the marsh basin is not a uniform bowl-shaped depression
- 2) during most of the Holocene, Kawai Nui was a marine bay with open circulation and tidal activity. The bay was partially blocked by sand barrier by 1000 BC.
- 3) Kawai Nui became a lagoon with alternating fresh and saline environments until as late as AD 670. By AD 1400, the ocean inlet was cut off and the basin became filled with terrestrial silty clays.
- 4) The transition from bay to lagoon was marked by a dramatic increase in sedimentation rate (600%)
- 5) There are no apparent changes in pollen zones during early Polynesian settlement. Dramatic changes appear in pollen zones by AD 1400 associated with dramatic decreases in mixed mesic forest species and increases in grasses and sedges. These changes may be related to increased Hawaiian agricultural and subsistence activities.
- 6) Vast numbers of *Ioulu* palm (*Pritchardia*) may have provided a major food supply to Hawaiians during early Hawaiian occupation. The dramatic decrease of *Ioulu* may be the result of human impact.

(Athens and Ward, 1991): This report documents archaeological work along the marsh levee. Athens and Ward evaluated the presence and absence of significant archaeological sites, which might have been affected by flood control project at Kawai Nui Marsh. Thirty-seven core/rauger units were placed along both sides of the levee and two units were tested within the marsh and analyzed for pollen, stratigraphy, and sedimentation rates. In addition, a surface survey and the excavation of three test units on the south end of the levee (where two sites were known to be located) were conducted. No archaeological remains were found in the project area. However, much information was gained on the following areas: A) prehistoric human occupation in and around the marsh, B) initial Polynesian settlement of Hawaii, C) the natural history of windward O'ahu. The following are the results of the Athens and Ward studies conducted at Kawai Nui Marsh:

- 1) The sediments of Kawai Nui Marsh provide a continuous record of sedimentation and in-filling since before 2000 BC.
- 2) The marsh basin was transformed into a closed, freshwater system at about 200 BC
- 3) It is probable that the change from a marine to freshwater basin at Kawai Nui Marsh was due to a fall in sea-level
- 4) The initial appearance of the Kailua sand berm (or accretion barrier) above water probably dates to before about 600 BC, but not earlier than about 1000 BC.
- 5) The sediment cores from Kawai Nui yield a rich assemblage of angiosperm palynomorphs
- 6) The lowlands prior to Polynesian contact and up to roughly AD 1000 were dominated by *Pritchardia* palm forests.
- 7) The pollen diagram of Kawai Nui is distinctive for its triad of dominant types—*Pritchardia*, *Dodonaea*, and *Kanaloa Kanaloawensis*.
- 8) After about AD 1000, the dominant plant species decline precipitously. This may be related to rising human population levels and the expansion of agriculture.
- 9) The pollen record from Ft. Shafter is comparable in diversity to that of Kawai Nui Marsh.

- 10) There are few "Polynesian introduced" species in the pollen record. Only three species were found--*Aleurites moluccana* (kukui), *Cocos nucifera* (niu), and *Cordia* (*the fruticosa* (ti). These occur late, after about AD 1000 to 1200.
- 11) Sedimentation data indicates that the commonly held belief that agricultural practices of prehistoric Hawaiians were responsible for in-filling of the basin is incorrect...Natural processes rather than human activities (particularly agriculture) are paramount with respect to causation for coastal progradation and basin in-filling.
- 12) Lack of charcoal particles suggests fire had little or no effect on natural vegetation communities in the Kawai Nui basin watershed.
- 13) Remains of vegetation associated with disturbed environments begins to rise dramatically at about AD 1200. The significance of this information is that it provides a time frame--about AD 1200--for the onset of what was probably the rapid growth of a previously small population and inland agricultural expansion.
- 14) The sedge pollen suggests the Kawai Nui Marsh was an open body of water prior to AD 1000. After this, the marsh spread rapidly.

IV. ASSESSMENT OF SEGMENT 1

Segment 1 begins at the hairpin turn in the gravel access road that connects the southern end of the Kawai Nui Marsh Dike Road with Kailua Road. The trail segment continues in a generally southwest direction, parallel to Kailua Road, to the vicinity of Ulupo Heiau. Segment 1 runs along the marsh-side of several recognizable Kailua Road properties, including St. John's Evangelical Lutheran Church, the Kawai Nui Vista Subdivision, the Kailua Baptist Church, the Kailua Methodist Church, and the state owned parcel containing Ulupo Heiau itself.

The following discussion of Segment 1 will be by different geographical components of the segment. The properties along Kailua Road and the specific archaeological sites will be used to demarcate these different components of the segment, shown in Figure 4. Discussion of the individual components will proceed from the Kawai Nui Dike Road southwest towards Ulupo Heiau.

Of the five proposed segments of the circum-Kawai Nui Marsh Trail, Segment 1 will be the most difficult trail section to construct. For the most part, the land form in Segment 1 is steep, sometimes vertical, basalt bedrock outcrops and basalt boulder covered slopes. Much of the vegetation is dense *hou* thickets that will need to be cut back and maintained along the route. These conditions will make trail construction and maintenance challenging. They will also make combining vistas of the marsh with access to the archaeological sites along the marsh edge difficult. For instance, in many places to be near the archaeological sites a "hou tunnel" will have to be cut that will not allow views of the marsh. The specifics of these trail construction challenges will be discussed below under the different components of Segment 1.

Before discussing the trail alignments it should be mentioned that there appears to be a good location for parking at the beginning of Segment 1 at the access road that connects Kawai Nui Dike Road with Kailua Road, see Figure 6. There is room for 10 to 12 parking stalls along the lower portion of the access road. Within the *hou* immediately southwest of the access road's hairpin turn is a 20 by 20 or 30 by 30 meter area that could also be made available for parking with grubbing and grading. This area within the existing *hou* could be selectively grubbed to allow shade for the parked cars and the hikers entering and exiting the circum-Kawai Nui trail system.

Component 1 extends from the hairpin turn in the access road that connects Kawai Nui Dike Road with Kailua Road to the northwest end of the Kawai Nui Vista Subdivision. This component will be the easiest to construct because it will be the least hampered by rugged terrain and dense vegetation. The difficulty in the construction of Component 1 will be crossing the rugged terrain associated with the intermittent drainage that runs between St. John's Lutheran Church and the Kawai Nui Vista Subdivision and getting around the Kawai Nui Vista Subdivision itself, see discussion below. Closest to the hairpin turn vegetation in this component of Segment 1 is fairly high canopy of *hou* intermixed with bamboo. Further along, closer to St. John's, the vegetation changes to grasses, vines, and

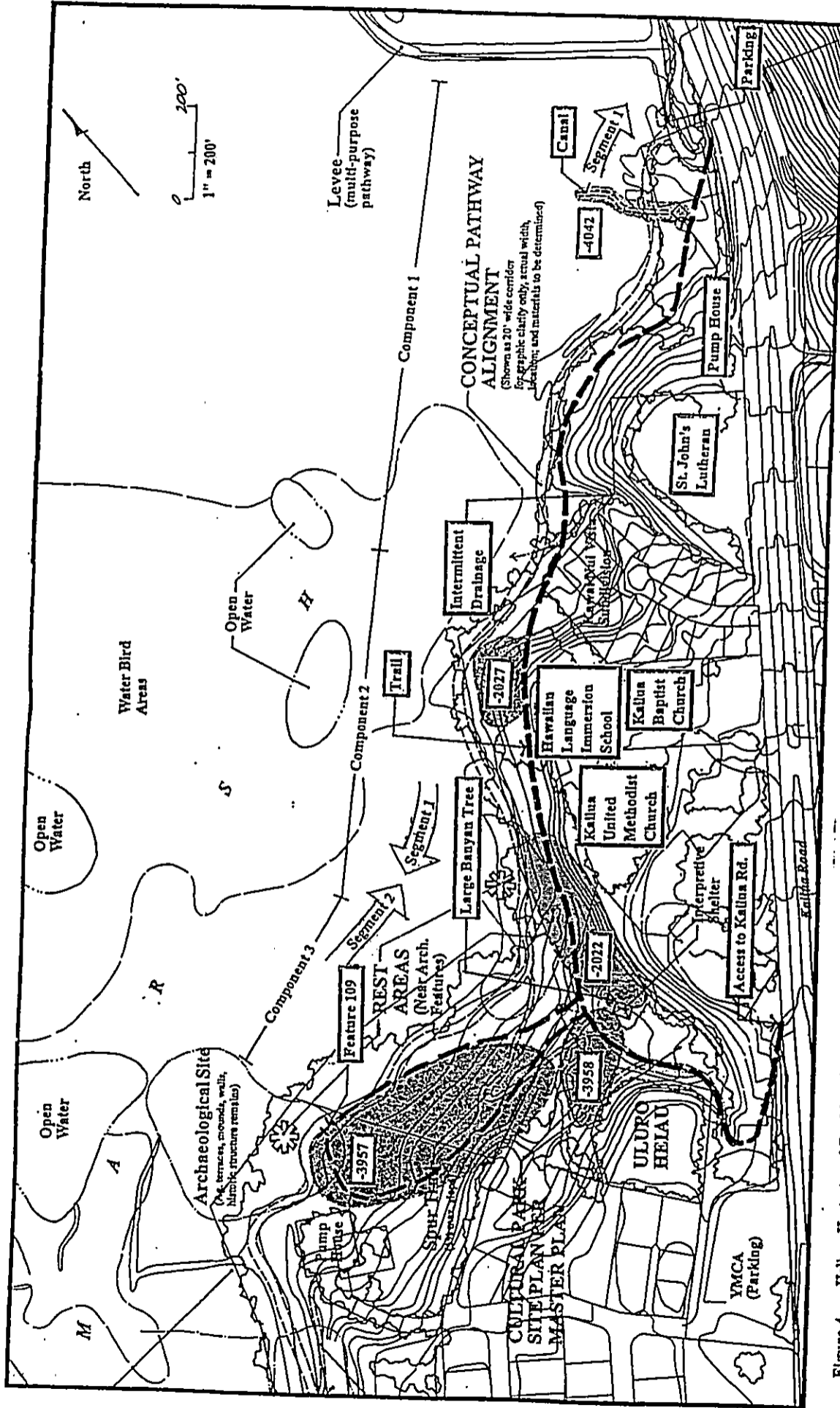


Figure 4 Helber, Hestert, and Fee Map of Segment 1 Showing Sites, Locations, and Landmarks Discussed in the Text.

koa hooie. Some good vistas of the marsh are possible in Component 1 of Segment 1. Only a single historic site is located in this first component of Segment 1.

The single historic property of note within component consists of an excavated canal and an associated housing foundation for a pumping facility. These features are part of the Waimanalo Irrigation System. Completed in 1923, the Waimanalo Irrigation System is a system of pumps, pipelines, tunnels, and ditches that conducted water from Kawai Nui Marsh to the Waimanalo sugar cane fields until the early 1950s (Harland, Bartholomew, and Associates 1959:63-64; Hall 1997:94; Kelly and Nakamura 1981:78-79). According to Wilcox (1996:111) two pumps lifted water from Kawai Nui Marsh and took it to the head of a 10,000-foot system of small tunnels to a reservoir in Waimanalo. The Waimanalo Irrigation System was nominated to the State and National Registers of Historic Places in 1992 (Creed, application form, 1992). The system was given state site # 50-80-16-4042, but was not placed on either the State or National Registers.

The location of the pump housing structure and canal is shown on Figure 4. The pump housing structure is roughly rectangular and constructed predominantly of mortared basalt boulders. There are the remains of some large diameter iron pipes within the structure. The associated canal extends out into the Kawai Nui Marsh from the pump housing structure. This canal alignment is visible on the Topographic Map 4:2:13 and can be seen from Keilua Road where it extends into the marsh. The canal side walls are lined with dry masonry basalt boulders immediately at the pump housing structure. Further from the pump structure the side-walls of the canal alignment are earthen. Both the canal and the pump structure are overgrown with *hou* trunks. The base of the canal is standing water and mud. For the trail to cross the canal a bridge would be needed. It is better that the trail alignment pass around the canal and pump structure, towards Keilua Road, avoiding the need for a bridge. The canal and pump structure are part of site # 50-80-16-4042 and have interpretive value as physical remains of the engineering feats undertaken by the sugarcane industry in Hawaii. I recommend that an interpretive plaque be installed along the trail where it passes near the site.

Once past the features of site # 50-80-16-4042 the trail should continue through the *hou* vegetation. There is an existing trail that can be improved upon. This existing trail is located between the dike access road to the area in back of St. John's Lutheran Church. During the initial portions of the trail, no views of the adjacent marsh will be possible because of the dense *hou* vegetation. However, because of the relatively high canopy of this *hou* thicket, the trail alignment should not be hampered by vegetation. Approximately 160-200 feet past the pump structure, the vegetation becomes grasses and *koa hooie*. At this change in vegetation there is a good vantage point of the marsh and the Kawai Nui Dike Road--see Figure 6. Once the trail emerges from the *hou* thicket, it can follow closely the boundary of the marsh, which will be intermittently visible between the *koa hooie* vegetation. Vegetation clearance along this entire portion of Component 1, from the *hou* thicket to the intermittent drainage (between Kawai Nui Vista Subdivision and St. John's Lutheran Church), could be cut down and maintained with little effort, thereby exposing the marsh view.

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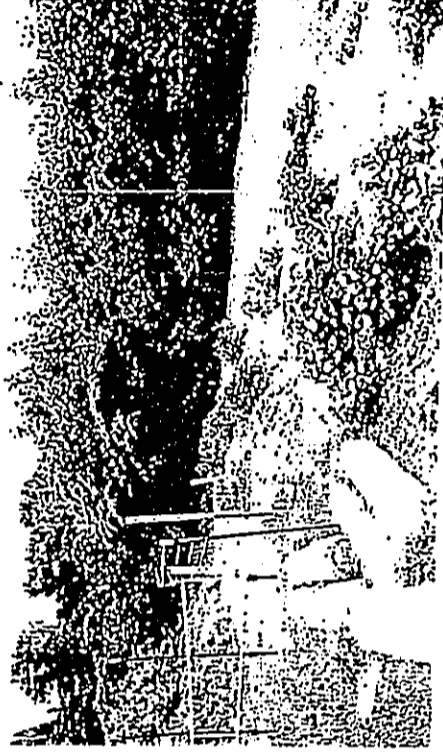


Figure 5 Shot Southwest of Potential Parking Area At the Access Road Switchback at the Southern End of the Kawai Nui Dike Road



Figure 6 View North from Component 1 of Segment 1 Showing Marsh and Kawai Nui Dike Road

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In this grass and *koa hooke* portion of Component 1, there are some remnants of peat land use, including stone alignments, ceramic fragments, bottles, and what appears to be a portion of a historic roadway or trail. These remains are indistinct and most likely all date to the historic period. They are not particularly valuable for public interpretation and would be undetectable to the vast majority of persons using the trail. These historic remains are located up-slope of the proposed trail alignment and, because of their location and indistinctness, should not be affected by trail construction and use.

Near the intermittent drainage that separates St. John's Lutheran Church from the Kawai Nui Vista Subdivision terrain becomes more boulder strewn with exposed basalt outcrops nearer to the intermittent drainage. Trail construction around these boulders will take some negotiating. A bridge may be required to cross the drainage itself.

During the field inspection of the Segment 1 trail alignment, colored flagging tape and surveyors stakes were noted in the house lots of the Kawai Nui Vista Subdivision that border the marsh. Based on the layout of these flags and pins, the property boundaries of these lots appear to extend down to the standing water of the marsh itself--see Figure 7. If this is the case there will be no solid ground, outside of the subdivision lots, for the trail along the marsh edge. The property boundaries of these lots should be checked. It is possible the future home owners will allow the trail to go through their property if need be, although this is unlikely. Perhaps a boardwalk could be constructed in this portion of Segment 1, bringing the trail alignment out, away from the Kawai Nui Vista lots and into the marsh. This boardwalk could also be used to bypass the rough terrain around the intermittent drainage that separates St. John's Lutheran Church from the Kawai Nui Vista Subdivision.

Component 2 of Segment 1 extends from the northwest corner of the Kawai Nui Vista Subdivision to the vicinity of sites 50-80-04-3956 and -2022. Component 2 is the most rugged section of Segment 1, with vertical basalt outcrops and steep, boulder-strewn slopes--see Figure 8. Vegetation consists predominantly of a dense tangle of *hou*, with occasional mango and banyan trees. Along the up-slope areas, nearest to the churches and other structures along Kailua Road, there is some relatively level grass and low-vegetation open space. There are also some currently cultivated areas containing wetland taro and banana. These cultivated sections are part of site 50-80-04-2022.

The existing trail alignment on the Helber, Hestert, and Fee Map shows the trail running along the edge of the marsh in this portion of Segment 1. In reality this would be at the base of the basalt outcrop, through the tangle of dense *hou*, in low land that may be seasonally underwater. No view of the marsh would be possible. Because of the rough terrain, the simplest means of creating a trail alignment through this area would be to elevate the trail on the up-slope side of the basalt outcrops. This would mean the trail would have to hug the property boundaries of the church and school properties fronting Kailua Road. Good vistas of the marsh would be possible. Also the trail could take advantage of the relatively unvegetated and boulder free terrain on the up-slope side of the outcrop. One of the problems with elevating the trail on top of the basalt outcrop is accessing the top of the basalt bluff. The bluff meets with the properties of the Kawai Nui



Figure 7 Shot West from the Kawai Nui Vista Subdivision Showing the Lots Extending Down to the Margin of the Marsh



Figure 8 Shot South from the Base of the Vertical Basalt Outcrop (Approximately 20 Feet High) in the Vicinity of State Site 50-80-15-2027

Vista Subdivision and there is little room for switch-backs to ascend the approximately 20-foot high bluff. Perhaps stairs would be possible.

Of course it would be possible to establish the trail down at the level of the marsh, down slope of the basalt boulders and outcrops. This would require some boardwalk construction and a great deal of *hau* vegetation clearance. This trail alignment would be a "hau tunnel" with no view of the marsh. It would also be subject to seasonal inundation during heavy rains.

The first archaeological site that is encountered along Component 2 of Segment 1 is State Site 60-80-11-2027. This site was originally recorded by Clark (1980:61-62) and appears to have been affected by bulldozer activity in the intervening 20 years. The site covers an area that measures approximately 250 ft. east/west by 125 ft. north/south. The six features that comprise the site were interpreted by Clarke as both historic and prehistoric features related to habitation and possibly agriculture. Stacked basalt wall segments, terraces, and enclosures, and basalt adz fragment were recorded--see Figure 9, which is Clark's map of the site. Feature 3, a single basalt boulder rectangular enclosure was the single feature that could be accurately re-identified during the current field inspection for the trail alignment. Features 4, 5, and 6 were also likely identified, but appear to have been affected by bulldozing in the vicinity. The Pohakapu Sewage Treatment Plant, shown of Figure 9, is no longer extant, having been dismantled in the last few years and replaced by the lots of the Kawai Nui Vista Subdivision.

The features of Site 60-80-11-2027 are somewhat indistinct and not particularly suited for public interpretation. If the trail is to be placed on the up-slope side of the basalt outcrop, then it should be placed up slope of the features, i.e. between the archaeological features and the properties along Kailua Road. As the features are not particularly obvious to untrained eyes (see Figure 10), care should be taken to point out the location of the features before the trail is constructed. Depending on how close the trail is to pass to these features, some form of signage might be required to protect the sites, especially Feature 3, from damage by trail users. If the trail is to be placed down slope from the basalt outcrop, the features will not be affected.

Continuing southeast along Component 2 of Segment 1, past Site 60-80-11-2027, the terrain remains fairly rugged, with dense vegetation and basalt outcrops closer to the marsh, and fairly open vegetation and a more level land surface along the up-slope areas closest to the properties that front Kailua Road. This terrain continues until the vicinity of Site 60-80-11-2022. Again the path of least resistance would place the trail up-slope, near the lower boundary of the properties that front Kailua road. Of course there is the option of building the trail down slope closer to the marsh, but this would require ample *hau* clearance and the maintenance of the resulting "hau tunnel". Figure 11 is photograph of the dense *hau* vegetation.

In the vicinity of Site 60-80-11-2022 the hill slope down to the marsh becomes less steep and the vegetation is less dense. Basalt boulders and outcrops are still common and a trail alignment that traverses the slope will have to negotiate this irregular terrain. In the

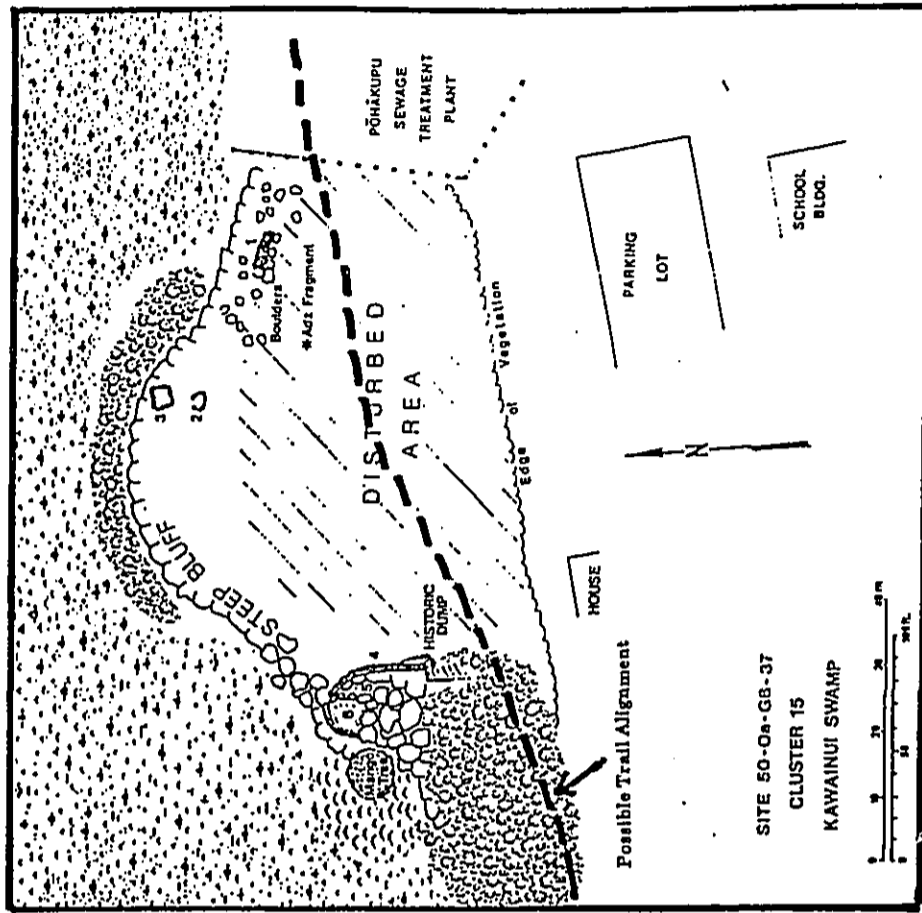


Figure 9 Clark's (1980:62, Figure 19) map of Site 60-80-15-2027--Showing Archaeological Features.

area between Sites 50-80-11-2027 and 50-80-11-2022 it is recommended that the trail remain elevated near the boundaries of the properties that front Kailua Road. This will avoid the dense vegetation and rough terrain. Closer to Site 50-80-11-2022 the slope, vegetation, and boulder outcrops are less substantial obstacles and the trail can descend closer to the marsh. In this portion of the Segment 1, closer to Site 50-80-11-2022, there is no longer a relatively level area between the properties that front Kailua Road and the hill slope that leads to the marsh. The trail will need to traverse the hill slope or run along its base at the margin of the marsh.

The features of Site 50-80-11-2022 consist largely of stacked basalt boulder retaining walls for agricultural terraces--see Figure 12, which is Clark's (1980: Sheet 1) map of the site. The terraces form rectangular *lo'i*, or wetland taro pond fields. These features were likely constructed prehistorically and their use continued through the 19th century. Several of the terraces are spring fed and are actively under cultivation with taro and banana. These active terraces are located immediately in back of the Hawaiian-language immersion school (in back of the Kailua Methodist Church). The immersion school may be responsible for the active cultivation. With the maintained terrace walls, spring-fed water trickling down slope from pond field to pond field, and the taro and banana plants themselves, this is a beautiful spot and will be one of the high-points of the Segment 1 alignment--see Figure 13. The trail will most likely have to cross this area of active cultivation--unless it skirts it, either up-slope close to the Kailua Road properties, or down slope near the margin of the marsh. A board walk would be the easiest means of crossing this area, as the exposed soils are mucky and their is standing water in the pond fields themselves. The dry masonry, stacked basalt boulder terrace walls are not substantial and are not sufficiently stable to support pedestrian traffic.

The southern most features of Site 50-80-11-2022 shown on Clark's map in the vicinity of the large banyan tree, are the foundations of a historic piggery. The foundations are low enclosures of cemented basalt boulders. Smaller internal features included what appear to be water or food troughs made of cement.

The recommended, path of least resistance, alignment of the proposed trail through Site 50-80-11-2022 is shown on Figure 12. This proposed alignment passes among the features of the site. Appropriate signage is recommended along the trail alignment to interpret the agricultural features of the site. If for some reason it were deemed undesirable to have the trail alignment pass directly through the features of Site 50-80-11-2022, the features could be skirted either up or down slope of the site. Up slope the terrain is steep and vegetation is fairly thick, but the trail could pass through. Downslope the terrain is more level, but the vegetation is thick.

The proposed trail alignment of the Helber, Hestert, and Fee map shows the trail passing along the margin of the marsh, down slope of Site 50-80-11-2022. The location labeled "Interpretive Shelter" is in the vicinity of the large banyan tree on top of the prominent basalt outcrop shown on Clark's map of Site 50-80-11-2022 (Figure 12). This basalt outcrop is rugged terrain. In the area downslope of this large outcrop the vegetation is relatively open, but the terrain consists of jumbled large basalt boulders. On the



Figure 10 Shot Southwest of Site -2027 Feature 3, Covered with Vegetation

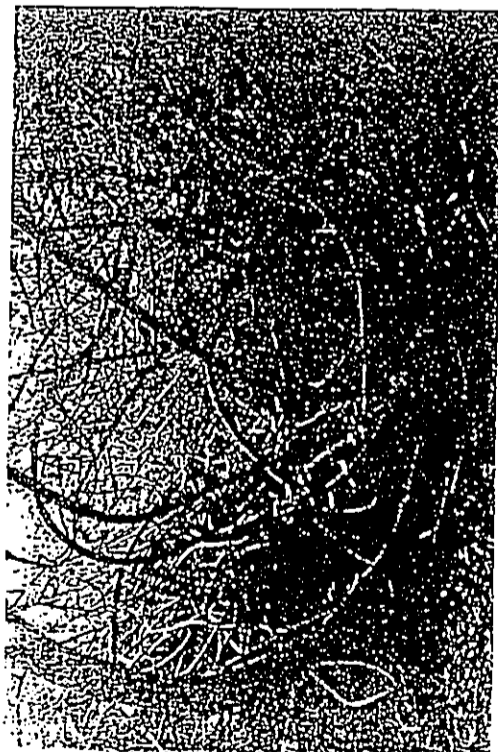


Figure 11 Shot Southwest of Dense *Hou* Vegetation Near the Marsh Edge Between Sites -2027 and -2022

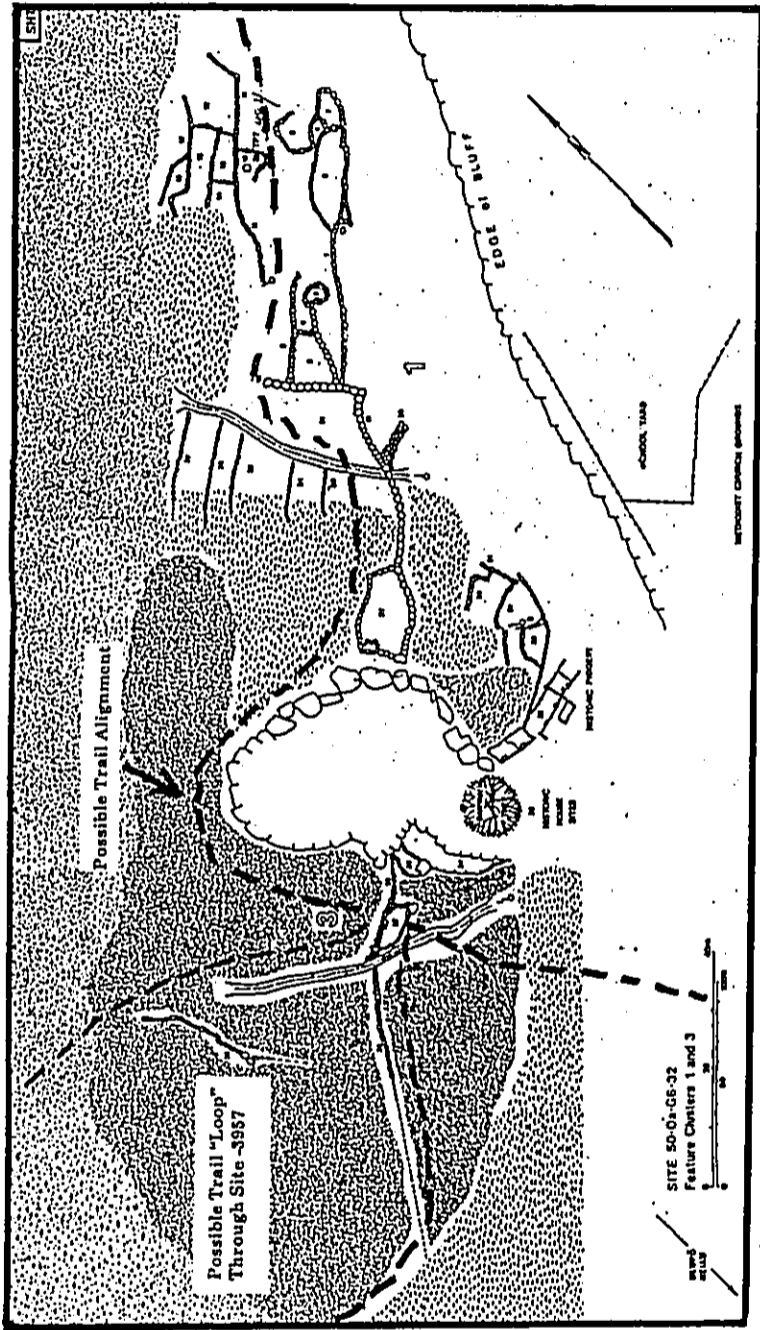


Figure 12 Clark's (1980: Sheet 1) Map of Sites 50-80-11-2022 (Labeled on Clark's Map as Cluster 1) and 50-80-11-3957 (Labeled on Clark's Map as Cluster 3). Showing Recommended Segment 1 Trail Alignment.

west-southwest side of the boulder outcrop (also shown on Figure 12) are the features of Site 50-80-11-3958. These stacked basalt boulder walls and alignments are likely prehistoric features that were modified by subsequent historic land use. Clark's map depicts a spring amid the features of Site 50-80-11-3958. During the field inspection, a drainage channel from the spring was observed, but it was dry at the time.

Component 3 of the Segment 1 Trail alignment is the area west of Sites 50-80-11-2022 and 50-80-11-3958. As one progresses further west beyond this large outcrop and the features of Site 50-80-11-3958, the terrain becomes less boulder covered and more level. The vegetation however, is dense *hou*. The trail alignment will form another "hou tunnel" in this area. Beyond Site 50-80-11-3958 the trail alignment heads west towards Site 50-80-11-3957. The trail alignment could run along the wall segment that connects Site 50-80-11-3958 with Site 50-80-11-3957. This wall segment is labeled feature 36 on Clark's map of Site 50-80-11-3958 (Figure 12). There are many other possible alignments for the trail in this area between Sites 50-80-11-3958 and 50-80-11-3957.

Just beyond Site 50-80-11-3958 there are many possible alignments for Segment 1. The trail should access the vicinity of Site 50-80-11-3957, Ulupo heiau, and Kailua Road. This can be accomplished through trail branches, a trail loop, or by winding the trail alignment. A trail loop is recommended, see Figure 4. The trail branches shown on the Helber, Haertel, and Fee map are feasible. Again in this portion of Segment 1 vegetation is dense, but would not hinder the trail construction.

Site 50-80-11-3957 would be the furthest western extent of Segment 1. This site consists of numerous stacked stone features including clearing mounds, enclosures, wall alignments, a historic house site, and irrigation features such as *ouwai*--see Figure 15, 16, and 17. The features are both prehistoric and historic. Conrad Erkelens (1993) did extensive investigation of this site. It is one of the most studied and best understood sites along the margin of Kawai Nui Marsh. It is recommended that the Segment 1 alignment proceed as far as Feature 109, a historic residence. Research by Erkelens identified Feature 109 as the *Mihale* Land Commission Award (L.C.A.) of the *Konohiki* (land manager) named Kahele. Excavation at the feature and its vicinity uncovered traditional Hawaiian artifacts as well as historic artifacts, including a fire-arm and a U. S. coin dating to the 1840s. Site 50-80-11-3957 offers good opportunities for public interpretation as the features that make up the site are fairly representative of the changes in land use that took place from the prehistoric period into the 20th century. These features would be good for interpretation with signage along the trail route.

The Segment 1 trail alignment can meander among the other features of Site 50-80-11-3957 to reach Feature 109. Feature 109 is on the margin of the marsh not far from one of the areas of open water--See Figure 16. With some *hou* clearance a trail segment could extend from the vicinity of Feature 109 out to the open water along a constructed boardwalk.



Figure 13 Shot North of the Terraces of Site -2022 Under Active Cultivation with Taro and Banana



Figure 14 Shot South of Ulupo Heiau



Figure 16 Shot Southwest of a Typical Dry-masonry, Stacked-Boulder Clearing Mound of Site -3957

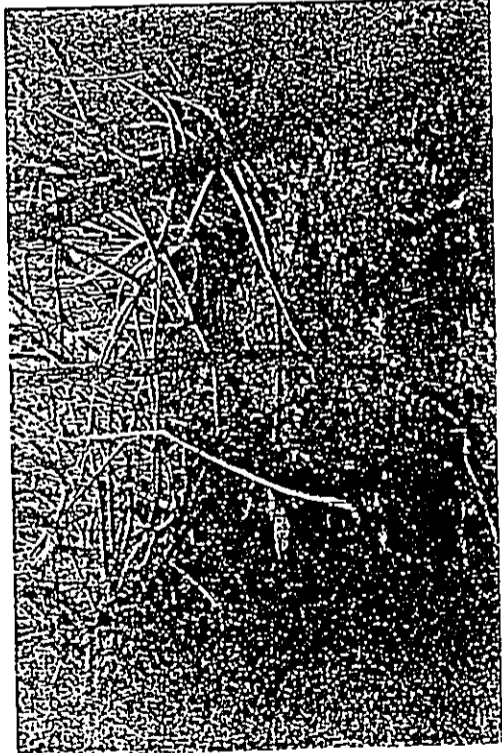


Figure 16 Shot Southwest of Site -3957, Feature 109 Habitation, Beneath Dense Hau Vegetation

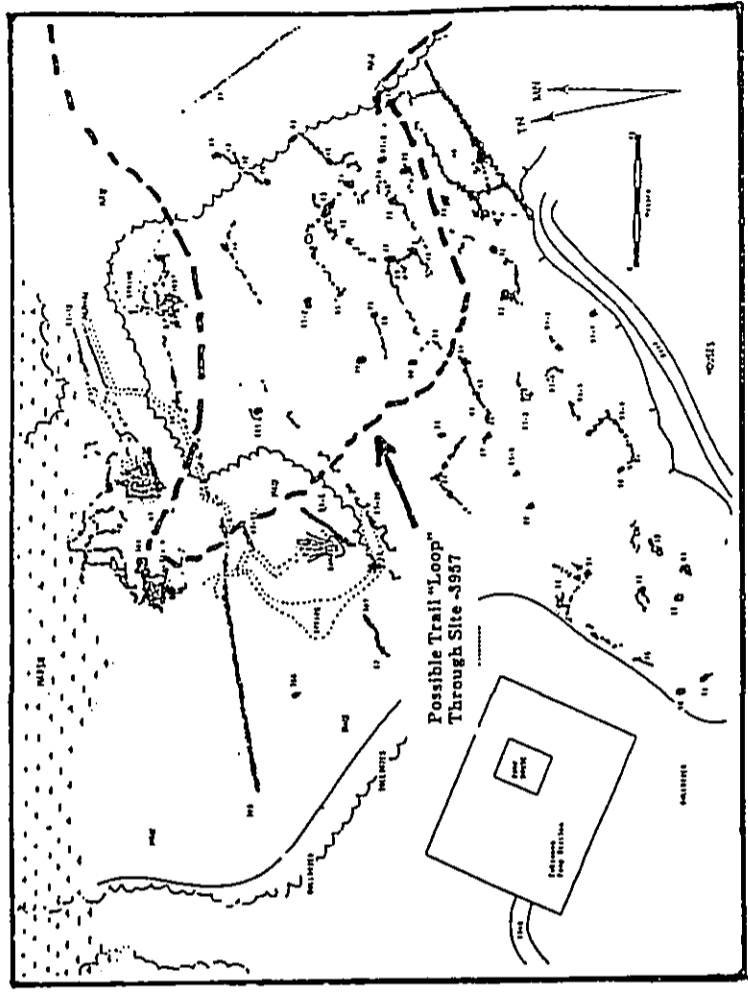


Figure 17 Erhelens' (1993:58) Map of Site 50-80-11-3957--Showing Recommended Segment I Trail Alignment.

V. ASSESSMENT OF SEGMENT 2

The vicinity of Feature 109 (Site 60-80-11-3957) would be the furthest extent of Segment 1--see Figure 17. From here the trail would either loop back on itself to connect with Ulupo Heiau and Kallua Road, or trail-users would backtrack the way they had come. Once Segment 2 is constructed the trail can continue past Feature 109.

Ulupo Heiau is one of the most visually impressive traditional Hawaiian religious structures on the island of Oahu. Trail-users on Segment 1 will approach the Heiau from below the stacked boulder terraces--see Figure 14. This approach is dramatic and highlights the labor invested in the Heiau construction. From the marsh side of the Heiau, the trail alignment can circle around to the upper side of the platform where existing signage is displayed. From Ulupo Heiau Kallua Road is easily accessed along an asphalt pathway that previously provided vehicular access to the Y. M. C. A. parking lot.

The discussion of Segment 2 will proceed from Ulupo Heiau west to the vicinity of Castle Medical Center. From the vicinity of Ulupo Heiau and Sites 60-80-11-3958 and 60-80-11-3957, as was noted previously, the vegetation is a dense mix of introduced species and hau. This area is relatively level and has less of the large basalt boulder outcrops that characterize the adjacent portions of Segment 1. Beyond the Kukanono pumping facility the vegetation changes from predominantly dense mixes of hau thickets and introduced species, to a more open canopy of predominantly *koa hoola* with African tulip, monkey pod, Christmas berry, and banyan. There is a low understory of grasses and shrubs, however, walking is much easier through this area, see Figure 18. This vegetation change is most likely related to the access of cattle to this portion of the Kukanono slope, immediately behind the Kukanono subdivision. The cattle of Martin Knott have kept the vegetation from taking over as it has in most portions of Segment 1. Mr. Knott's lease hold land extends along the Kukanono slope to the area of the Kukanono Pumping Facility. Trail construction and maintenance along Segment 2 will be much less difficult in relation to Segment 1 because of the more open vegetation and the lack of pronounced basalt boulders and outcrops.

Segment 2 should proceed from the western most extent of Segment 1, the end of the "loop" section that connects Ulupo Heiau to Feature 109 (historic house foundation and related features) of Site 60-80-11-3957, see discussion in the Segment 1 Assessment, above. The trail segment should proceed west from Feature 109, through the dense vegetation, to the vicinity of Site 60-80-11-3961 on the marsh side of the Kukanono pumping facility. The six features of Site 60-80-11-3961 are most likely historic agricultural features. These features will not be adversely affected by the trail segment. These features are not well suited for public interpretation and the trail segment should be aligned to by-pass them. This is best accomplished by having the trail alignment past between Site 60-80-11-3961 and the Kukanono pumping facility.

Further west, beyond Site 60-80-11-3961 and the Kukanono pumping facility, better views of the marsh are available and vegetation is more open. In the vicinity of Site 60-80-11-3959 the vegetation is open under a canopy of *koa hoola* (Figure 18). At the base of the Kukanono slope are broad vistas of the marsh (Figure 19). It is recommended that an interpretive plaque, or series of plaques be installed along the trail in the vicinity of Site 60-80-11-3959. Public interpretation should highlight the results of archaeological research in vicinity at Sites 60-80-11-2029, 60-80-11-2031, 60-80-11-3959, and 60-80-11-3960 including the documentation of historic and prehistoric stacked stone features, prehistoric grinding stones for adz manufacture, and the documentation of buried prehistoric and historic agricultural field walls out in the level surface of the marsh itself (Site 60-80-11-2029--Allen-Wheeler 1981; Cordy 1977). The trail alignment can follow a direct route through the stacked stone features of Sites 60-80-11-3959, 60-80-11-3960, and 60-80-11-2031. With the exception of the adz grinding stones, these are modest stacked stone features and individually they are not particularly suited for public interpretation. The buried agricultural walls of Site 60-80-11-2029 are not visible on the marsh surface (see



Figure 18 Shot West of Typical Vegetation Along Kukanono Slope, Segment 2, in the Vicinity of Sites 60-80-11-2031 and 60-80-11-3959



Figure 19 Shot NW from the Base of Kukanono Slope in the Vicinity of Site 60-80-11-3959 Showing the Open Vieta of the Marsh

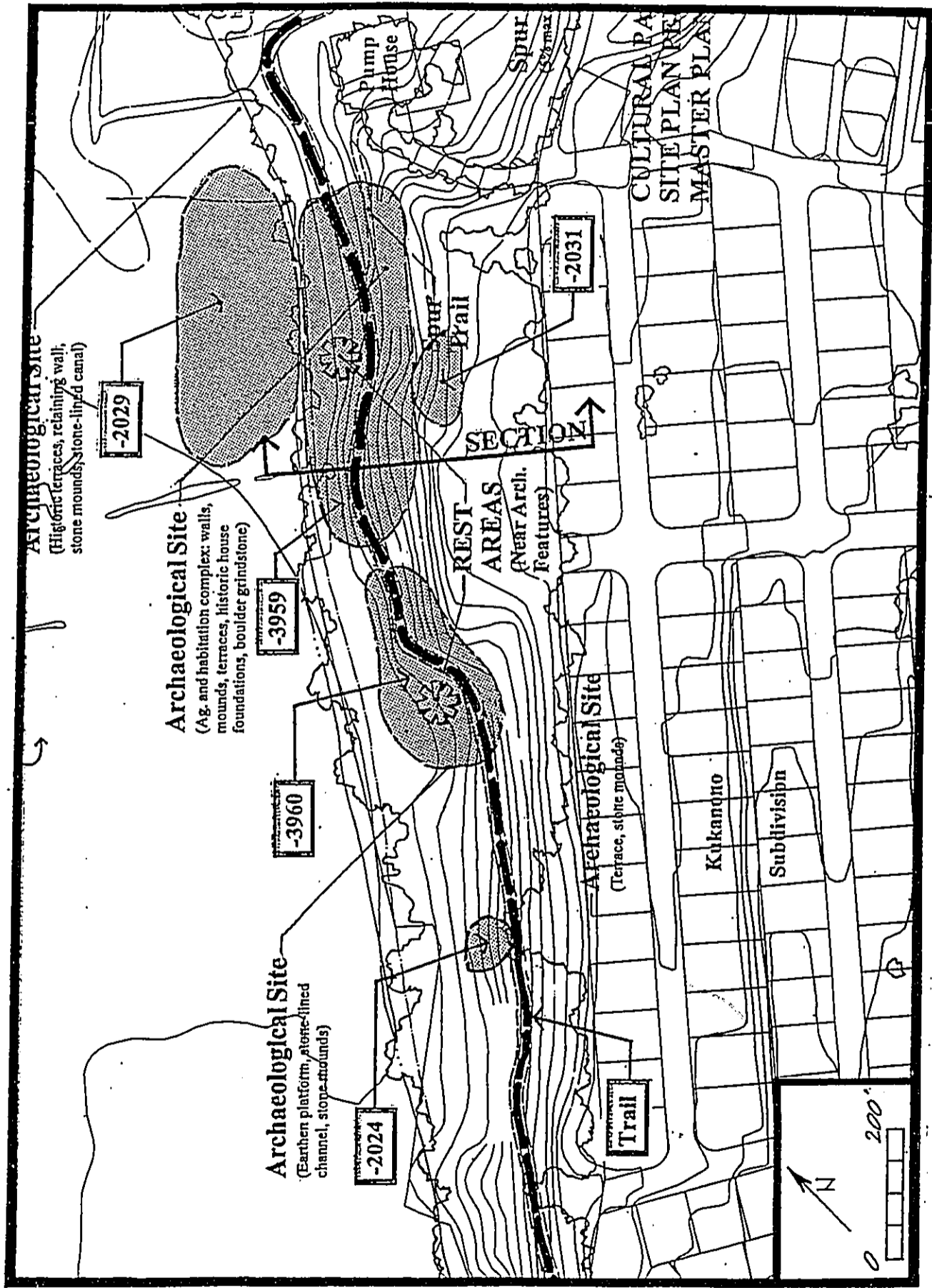


Figure 20 Clark's (1980) Map of Site 50-80-11-3959. Adz Grinding Stones are Located at Features 147 and at the Northern End of Feature 116.

Figure 19). But as a whole the cultural landscape is representative of hundreds of years of land use along the margins of Kawai Nui Marsh. The adz grinding stones are more noteworthy features, and perhaps the signage would be best situated near these features. The stacked stone walls, terraces, and mounds of Sites 50-80-11-3989 and 50-80-11-2031 are unlikely to be adversely affected by the increased public access associated with the trail. Although small portable artifacts have been collected by past investigations at these sites, the danger of looting at these sites is not particularly great. Certainly the danger does not outweigh the benefit of public interpretation of the sites. Clark's (1980) map of site 50-80-11-3989 (Clark's cluster 4) is shown as Figure 20.

Further west the recorded sites along the Kukanono Slope are smaller, less distinct features on the landscape. Site 50-80-11-2024 consists of five small features, a terrace and a mound. This small site was not relocated during the assessment field work, however, it is likely that the mounds and terrace features are not particularly suited for public interpretation. They will most likely not be affected by increased pedestrian access in the vicinity related to the trail construction and use. The trail alignment should avoid this site. The vegetation in the vicinity is open and trail construction should not be hindered, see Figure 21. Many areas on the higher Kukanono Slope were clearly bulldozed as part of the grading related to the development of the Kukanono Subdivision. There are bulldozer push piles and mounds related to this earth moving activity.

The Kukanono Slope further west, beyond Site 50-80-11-2024 and continuing around in back of Castle Medical Center is steeper and more overgrown. Several large, irregular, linear alignments of boulders over 1 meter in diameter were noted, see Figure 22. These are the result of bulldozer clearance of the slope area. This bulldozer activity may be related to historic agriculture or ranching. Closer to the margin of the marsh, the land is cleared and fenced, with corrals and sheds. This is part of Mr. Martin Knott's ranching infrastructure. Three smaller historic properties, Sites 50-80-11-2028, 50-80-11-3982, and 50-80-11-3983, are located in the this vicinity. These sites could not be relocated during the assessment field inspection. It is unlikely, however, that these sites will be affected by the trail construction and use as the trail will not extend through this area. Instead the trail will connect with Ulukahiki Street to avoid the Knott ranch. Ulukahiki Street is one of the proposed entrances and exits to the trail system.



Figure 21 Shot West of Typical Vegetation Along Kukanono Slope, Segment 2, in the Vicinity of Sites 50-80-11-2024



Figure 22 Shot NW from Near the Base of Kukanono Slope in the Vicinity of Ulukahiki Street, Showing One of the Massive Boulder Alignments from Bulldozer Clearance in the Area.

VI. ASSESSMENTS OF SEGMENTS 8 AND 4

There are no recorded historic properties within either Segments 3 or 4. Segment 3 extends from the end of Uluahiki Street to Kahanaiki Stream, near the corner of Kalaniana'ole Highway and Kapa'a Quarry Road. This segment of the trail will provide access to the Mokulana "Peninsula" area and cross both Maunawili and Kahanaiki Streams. The historic wooden structure at the end of Uluahiki Street is the only known potential historic property within Segment 3. This structure is very rotted and termite infested. It may be beyond salvage. However, it is clearly over 60 years old and may be a significant historic property. If the trail system will impact this structure, through increased pedestrian use of the area, the State Historic Preservation Division should be consulted regarding the need for further documentation. Possible documentation might involve the drawing of elevations and floor plans and photographing the structure by an architectural historian. It may be that the site requires no further historic preservation documentation.

Vegetation and topography within Segment 3 should not hinder trail construction. Vegetation is grasses and dispersed trees for the most part. On Mokulana Peninsula itself there is a tall canopy of introduced trees. Beneath this canopy is limited undergrowth due to the cattle and horse grazing (see Figure 23). Where Segment 3 and 4 meet, adjacent to Kahanaiki Stream, the vegetation becomes more dense with stands of *hou*, introduced trees, and taller grass.

Mokulana Peninsula was used by the military during World War II (Chuck Burrows, personal communication, 2000). The area is used today by the Knott Ranch for cattle and horse pasturage (see Figure 23). Although no cultural deposits are known from the area, considering the location, it is likely that the area was used prehistorically and historically for both habitation and agriculture. It is as yet unclear if subsurface remnants of this past land use remain. It is unlikely, however, that the proposed trail construction will be of sufficient impact to damage as yet undetected subsurface cultural layers. However, if trail construction will involve substantial grubbing and grading of the trail route, it may be that further historic preservation work will be required. This could include an archaeological inventory survey and/or archaeological monitoring during trail construction.

Great vistas of the marsh are available from the Mokulana Peninsula area. Figure 24 is the view to the west from Mokulana towards Segments 4 and 5.

Vegetation is thicker in the vicinity of Segment 4. The relief is greater as well. The relatively short Segment 4 is the proposed site for the Kawai Nui Educational Center as outlined in the Kawai Nui Master Plan (1994). An educational structure and parking for 60 to 70 cars is proposed. Although there are no recorded historic properties within the proposed construction areas, it is likely that an archaeological inventory survey will be required as part of the permitting process for the educational center development. Again, consultation with SHPD/DLNR will resolve this matter.



Figure 23 Shot South Beneath the High Canopy on Mokulana Peninsula, Showing Vegetation and Current Land Use (Horse Grazing).



Figure 24 Shot West from Mokulana Peninsula Towards Segments 4 and 5, Showing Vegetation and One of the Marsh Vistas from the Peninsula

VII. ASSESSMENT OF SEGMENT 5

Segment 5 extends along Kapa'a Quarry Road, from its intersection with Kalaniana'ole Highway, to the vicinity of the Honolulu City and County's Model Airplane Park. Current trail planning calls for the Circle Kawai Nui Trail to utilize the marsh-side shoulder of the Kapa'a Quarry Road as the primary alignment of Segment 5. The dense vegetation between the Quarry Road and the marsh will preclude marsh vistas. Accordingly, Segment 5 will be the most removed contextually from the marsh of all the proposed trail segments. To minimize this contextual disassociation, two branch trail segments are proposed for Segment 5 from Quarry road down to the marsh edge. These spur-trails will incorporate high spots in the natural topography, thereby providing broad marsh vistas. They will also meander along the slope down from Quarry Road to reach the marsh, providing access to the natural and cultural environment of the marsh itself as well as its periphery.

There is only a single known historic property along the proposed alignment of Segment 5 with its associated spur-trails (Site 50-80-11-2023 *Na Pohaku o Hauwahine*--see discussion below). Several other sites are located in the vicinity that are of archaeological interest and that could be trail destinations for public interpretation related to Segment 5. The five historic properties along the Segment 5 route, from south to north are: 50-80-11-2026 (agricultural terrace); 50-80-11-3965 (small presumably agricultural terrace); 50-80-11-3739/360 *Holomakani Heiau*; 50-80-11-50-80-11-2023 *Na Pohaku o Hauwahine*; and 50-80-11-359 *Pahukiki Heiau* (see Figure 3).

Sites 50-80-11-2026 (Clark 1980) and 50-80-11-3965 (Ewart and Tuggie 1977), both stacked stone terraces, were not relocated during the field inspection along the marsh margins. The general location of these apparent agricultural terraces are shown on Figure 3. These features are unlikely to be affected by the relatively slight increase of pedestrian traffic along this margin of the marsh that will come with use of Segment 5. Vegetation between Kapa'a Quarry road and the marsh in this southern portion of the Segment 5 is a dense mix of introduced species including Banyan, Monkey Pod, Octopus Tree, Christmas Berry, and *Hou*. Topography is even and slopes gradually towards the marsh from Quarry Road. There are several intermittent drainages that descend this slope perpendicular to Quarry road, however, for the most part construction of spur-trails in this area would not be greatly hampered by either vegetation or topography.

The southern most of the two proposed spur trails will ascend to one of the highest points along the marsh side of Quarry road and descend to the marsh below. This high point will provide good views of the marsh once the predominantly Christmas Berry vegetation has been cleared. From this high point the proposed spur-trail will descend with many switch-backs to the marsh below. No previously located historic properties are known for this area. During the field inspection several older barbed wire fences from cattle ranching were noted. There is also an old road cut that extends perpendicular to the slope. This road cut is located in the vicinity of the spur trail, mid-way between Quarry Road and the marsh edge. It descends across the slope toward the marsh and has recently

been cleared of vegetation. As this former road cut has already been crudely graded, it could easily be incorporated into at least a part of the route of the spur-trail. Nearer to the marsh edge, where the road cut descends to the marsh edge, are several areas of old mango trees that would be good locations for rest areas and picnic tables. Board walks out into the marsh could be built from these areas for wildlife viewing. Topography and vegetation should not hamper the construction of this southern spur-trail.

The proposed northern spur-trail along Segment 5 will utilize the already existing trail system that connects Site 50-80-11-2023 (*Na Pohaku o Hauwahine*) to the Quarry road. The existing trail system at Site 50-80-11-2023 was constructed and is maintained by Mr. Chuck Burrows and the volunteers that work with him from Kamehameha School and the Kawai Nui Heritage Foundation. As the site description in the previous archaeology section, above, points out, there are good views of the marsh from this site; see Figure 25. The natural rock outcrop is a dramatic setting to appreciate the natural environment of the marsh. There are several legends about *Hauwahine* and *Kawai Nui* marsh that could be the subject of signage along the spur trail and at the *Na Pohaku* overlook; see the historic background section above.

There are also archaeological features, including stacked-stone retaining walls, modified outcrops, and a adze grinding stone (Figure 26). The archaeological remains at the site are fairly modest and, with the exception of the grinding stone, are not particularly suited for public interpretation. It is unlikely that the archaeological remains at Site 50-80-11-2023 will be negatively affected by increased pedestrian traffic in the area following the implementation of Segment 5.

The *Na Pohaku* Site is a good location for general Kawai Nui Marsh interpretation. With the broad vistas, the area is well suited for discussions of the marsh's geology and formation chronology, natural environment, legends and oral traditions, and history and prehistory. A series of interpretive signs could be situated along the outcrop, each related to a different topic. It is recommended that Mr. Chuck Burrows of the Kawai Nui Heritage Foundation be consulted before any trail development proceeds in the vicinity of the *Na Pohaku* Site.

Two *heiau* are located in the general vicinity of Segment 5, Site 50-80-11-3739/360 *Holomakani Heiau* and Site 50-80-11-359 *Pahukiki Heiau*. Each is located a considerable distance up-slope from the Quarry Road and the proposed alignment of Segment 5; see Figure 3. However, there is potential for spur-trails that connect these two significant prehistoric sites with the Segment 5 alignment. Both *Heiau* sites are good locations for public interpretation through signage.

Holomakani Heiau (Site 50-80-11-3739/360) is currently accessible from Kapa'a Quarry Road by a steep earthen pathway that is primarily the result of off-road vehicle use of the hill-slope above Quarry Road. *Holomakani Heiau* is located on private land, but perhaps an arrangement could be worked out with the land owner to allow public access to the site. A graded spur trail with switch backs could be made that would mitigate the otherwise steep slope.



Figure 25 View to the East from Site 50-80-11-2023 (No Pohaku o Hauwahine)

Pahukiki Heiau (Site 50-80-11-359) is located within the Kapa'a Land Fill and is most easily accessed by the roadways in the land-fill. It is possible that a trail segment could be constructed that connects Pahukiki and Holomakani. However, this route would cover some fairly steep slopes and rough terrain. It would be difficult to make this route suitable for wheel-chairs.



Figure 26 Reported Adze Grinding Stone at Site 50-80-11-2023 (No Pohaku o Hauwahine)

VIII. ASSESSMENT OF SEGMENT 6

The Segment 6 alignment offers the least potential for cultural/historical public interpretation of all the Circle-Kawai Nui Trail segments. Segment 6 extends from the Honolulu City and County's model airplane park to the Oneawa Canal and the northern end of the Kawai Nui Dike Road in the northeast corner of Kawai Nui Marsh. The exact configuration of Segment 6 has yet to be determined. However, the route under consideration will utilize portions of the shoulder of the Kapa'a Quarry Road as well as spur trails that extend through portions of the marsh and inland of the marsh on the adjacent slopes. This portion of the Kapa'a Quarry Road, and its immediate vicinity, have been heavily affected by modern land alteration. This includes the excavation of drainage canals along both sides of Quarry Road, and the cutting and filling of large land areas related to the construction of the adjacent H-3 Freeway; see discussion in Kelly and Nakamura (1981). It is very unlikely that any significant historic properties will be affected by the construction and use of the Segment 6 Trail alignment, whether it stays on the shoulder of Kapa'a Quarry Road, extends through the marsh on boardwalks to the east of the road, or extends along a prepared pathway through the disturbed land areas on the west and north side of Quarry Road.

The field inspection of the southern portion of the proposed alignment of Segment 6, from the model airplane park to the eastern bend in Kapa'a Quarry Road, found no indication that historic properties might be affected by the construction and utilization of the trail. Drainage canals have been excavated along both sides of Quarry Road. West of Quarry Road the land surface has been bulldozed extensively. East of Quarry Road beyond the drainage canal, there is only open marsh. Vegetation consists of introduced, disturbance-loving, species.

Field inspection along the northern portion of Segment 6 from the eastern bend in Quarry Road to the Oneawa Canal, found no indication of significant historic properties. The area to the north of Quarry Road consists of undulating slopes that were affected by land alteration related to the construction of the adjacent H-3 Freeway. Vegetation consists of *Hou*, Christmas Berry, Monkey Pod, *Koa Hoole*, and grasses and vines. Several intermittent drainages, derived from drainage culverts off of the H-3 Freeway, cut down through this slope. The south side of Quarry Road consists of fill land that was reclaimed from the marsh with excavated material from the construction of the H-3 Freeway (Kelly and Nakamura 1981). This area was formerly the site of an auto-wrecking yard. Car parts, and oil stains are still visible on the land surface. Vegetation is predominantly *Koa Hoole* and Monkey-pod trees. There is an abrupt boundary with the marsh vegetation and standing water to the south of this portion of Segment 6.

There is only a single recorded historic property in the vicinity of Segment 6, Site 50-80-11-3964, the Kaeleuli House site (Ewart and Tuggle 1977). This site is not shown on Figure 3, but its location is indicated on the U.S.G.S. map that is the basis for Figure 3. Ewart and Tuggle (1977) describe the site as two house remnants, which, because of their associated modern materials, appeared to have been inhabited until recently (the survey

work of Ewart and Tuggle was done in the mid to late 1970s). On the U.S.G.S. (See Figure 3), in the northwest corner of "Kawaiuli Swamp", adjacent to the eastern bend in Kapa'a Quarry Road, are two square dots representing houses or structures. These two structures match the location of the two house remnants that make up Site 50-80-11-3964 as reported by Ewart and Tuggle (1977). During the field inspection this area was investigated. No remnants of Site 50-80-11-3964 were found, however, it was noted that the area had been greatly disturbed by bulldozing and dumping of construction materials. It is likely that these house remnants have been removed since the work of Ewart and Tuggle in the 1970s.

Chuck Burrows, of the Kawai Nui Heritage Foundation, related that there had once been a historic rice-mill in the vicinity of Site 50-80-11-3964 (Chuck Burrows, personal communication, 2000). During the field inspection of this area, no remnants of a rice mill were located. As with Site 50-80-11-3964, it is likely that the historic rice mill remnants were removed or covered by recent land disturbance.

IX. RECOMMENDATIONS

The archaeology and history of the Kawai Nui Marsh area have been well documented in numerous previous studies. Many of the marsh's historic properties have good public interpretive potential. They represent the physical record of centuries of changing land-use around the margin of Kawai Nui Marsh. There are prehistoric and historic habitation, agricultural, and irrigation features. There are prehistoric grinding stones for adz manufacture. There are also historic features related to large-scale commercial rice and sugar cultivation. An interpretive trail through these historic properties would be a history lesson on Kawai Nui specifically and Kailua in general.

A. State Historic Preservation Review Process

According to State of Hawaii historic preservation guidelines, before trail construction can begin the project should pass through the State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR) historic preservation review process. The usual first step in the SHPD review process is an undertaking such as this trail construction would be an archaeological inventory survey of the proposed trail route. Typically, archaeological inventory survey would include:

- 1) Systematic inspection of the project area and the documentation of all historic properties located with scale maps, written descriptions, and limited test excavations.
- 2) Evaluation of feature function and age based on available archaeological, ethnohistoric, and historic evidence;
- 3) Significance evaluations of the recorded sites based on the significance criteria of the State and National Registers of Historic Places; and finally,
- 4) Recommendations regarding how to mitigate the impact of trail construction and use on the historic properties in the vicinity of the trail.

Following review and approval by SHPD of the project area's archaeological inventory survey, it is possible that a data recovery phase of archaeological/historical investigation would be required. Data recovery is a form of mitigation. It negates or lessens the impacts of project development by collecting available information before historic properties are affected.

Whether or not data recovery investigation is required, if significant historic properties are located within the project area, a preservation plan for the project must be prepared. The plan would detail the construction methods, the proposed mitigation of impact on historic properties, and both the long and short term preservation measures for the project area's historic properties. The plan would also specify how the historic properties would be interpreted and protected.

B. Special Circumstances for the Kawai Nui Trail Alignment

Outlined above are the steps of the historic preservation review process that are typical for development projects. The Kawai Nui Trail development project is out of the ordinary in the amount of previous archaeological and historical work that has been undertaken in the vicinity of the marsh. Although this work was not done as an inventory survey, it has resulted in the systematic pedestrian inspection of large portions of the marsh periphery, the documentation of sites and features with scale maps and written descriptions, and the subsurface testing of many archaeological features (items 1 and 2 from above). As this document demonstrates, there is a substantial amount of information regarding the sites on the periphery of the marsh. This information includes site maps, excavation results, sedimentological analysis, and ¹⁴C dating results. What are lacking for these sites are significance evaluations and mitigation recommendations (items 3 and 4 from above).

It is recommended that SHPD be consulted regarding the proposed trail construction and the requirements to fulfill the historic preservation review process. During initial consultation regarding this project, SHPD was sympathetic and well aware of the time and monetary constraints associated with archaeological inventory survey of the entire marsh periphery. In consultation with SHPD it may be possible to work out a scope of work for the inventory survey of a specific trail alignment. As the pedestrian inspection and site recording for much of the marsh periphery has already been accomplished, this scope of work could focus on supplying the missing significance evaluations and mitigation recommendations for the sites along the trail alignment. With these evaluations and recommendations SHPD would have the information to evaluate the impacts of the trail alignment on historic properties. SHPD would also have the information needed to evaluate the required trail preservation plan. It may even be possible, in consultation with SHPD, to create a single document that includes the site significance evaluations, mitigation recommendations, and the trail preservation and interpretive plan.

Cultural Surveys Hawaii, Inc. cannot speak for SHPD. The specifics of the historic preservation review process will have to be worked out in consultation with Dr. Sara Collins, the O'ahu Island SHPD archaeologist. Although the proposed trail alignments and information summaries presented in this document will be useful during consultation with SHPD, it would be best to have a specific trail alignment. This facilitates decisions regarding what sites will be affected directly by trail construction and what sites will be affected by increased pedestrian traffic associated with the trail.

C. Recommendation for Route Selection

For selection of the specific trail alignment, it is recommended that the proposed routes be walked, evaluated, and discussed by the consulting archaeologist, land surveyor, trail construction company representative, trail architect, and any other parties whose input will be important to the specific trail alignment. Once the route is agreed upon, it should be recorded and marked with survey stakes by land surveyors. These survey points can then be used as locator points to complete the historic preservation scope of work that is worked out with SHPD.

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Appendix E
Cultural Impact
Evaluation

Cultural Surveys Hawaii, Inc.

**CULTURAL IMPACT EVALUATION
IN SUPPORT OF THE
KAWAI NUI MARSH PATHWAY PLAN
KAWAI NUI, KAILUA AHUPUA'A, KO'OLAUPOKO DISTRICT, O'AHU**

By
Hallett H. Hammatt, Ph.D.
and
David W. Shideler, M.A.

for
Helber, Hastert & Fee, Planners

By
Cultural Surveys Hawaii, Inc.

November, 2001

I. INTRODUCTION

A. Introduction to the Project

In support of the Kawai Nui Marsh Pathway Plan (Helber, Hastert and Fee, 2001), Cultural Surveys Hawaii has carried out this Cultural Impact Evaluation. The Kawai Nui Marsh Pathway project was proposed by the Kailua Community Vision Team and the Coconut Grove Community Association and has involved an extensive community outreach effort to address the desire to enhance the recreational and educational value of Kawai Nui Marsh for the people of Kailua and Hawaii nei. Among the numerous agencies and organizations participating in this community planning process the Kawai Nui Heritage Foundation has played a major role and been a leading force in avoiding impacts to cultural resources.

B. Overview of Kawai Nui's Place in Hawaiian Culture

Kawai Nui is a "wahif paha", a celebrated, noted and legendary place in Hawaiian traditions. Kawai Nui is referred to in the legends of Kawelo, Kahaloopuna, Keatomekemele, the *menehune*, and in the history of the ruling chiefs Kūali'i and Olopana. Kawai Nui was the home of the *mo'o* (water spirit) Hauwahine and *oma'o*, Kawai Nui's fame is related in numerous chants (Drigot 1982:84-96 presents a good summary). Kawai Nui was proverbial for the abundance it supplied to the Hawaiian people. The following section on the Cultural Resources of Kawai Nui summarizes some of the specific archaeological, avian, earth, fish, and plant resources which Kawai Nui has held for the Hawaiian people. Subsequently the impact of the Kawai Nui Marsh Pathway Plan is evaluated and steps to mitigate adverse impact to

C. Overview of the Proposed Pathway Project

It is anticipated that the pathway will be accomplished in increments as funding becomes available. The first priority objectives are to provide a pedestrian-oriented pathway from the existing levee trail to the beginning of the Kūkanono slope and Uluopō Heiau (Segment 1) providing recreational and educational opportunities. This would be a six foot wide trail of compacted gravel retained by plastic lumber borders built on the edge of the marsh with short segments of boardwalk over marshy ground. The next priority would be a multi-purpose pathway from Kailua Road to the proposed Kawai Nui Gateway Park, along the shoulder of Kapa'a Quarry Road (Segments 4 & 5). This multi-use path would typically be ten feet wide with five foot shoulders to accommodate both bicycle and pedestrian traffic. There would be some cutting and filling and retaining wall construction involved.

II. CULTURAL RESOURCES OF KAWAI NUI

A. Archaeological Resources

A recent summary of previous archaeological studies (McDermott et al. 2000:28-34) in the greater Kawai Nui Marsh area lists some thirty-two previous archaeological works that document a variety of traditional and post contact archaeological sites at Kawai Nui including agricultural, habitation and religious sites. The reader is referred to that archaeological study for further details of the archaeological resources of Kawai Nui (McDermott et al. 2000) Such sites as Uluopō Heiau, Pahūtini Heiau and Holomakani Heiau have particular importance as cultural treasures of the Hawaiian people.

B. Avian Resources

Kawai Nui Marsh was proverbial for its avian resources as recorded for example in the poetic saying:

Wawā ka mēnehune i
Pu'ukapēle ma Kawa'i, puoho
ka manu o ka loko o Kawai Nui
ma O'ahu

The shouts of the mēnehune on
Pu'ukapēle on Kawa'i startled
the birds of Kawai Nui Pond
on O'ahu (Pukui 1983:320)

In 1880, George Bowser commented on the avifauna at Kawai Nui that:

Wild duck and the famous Hawaiian goose are also to be found here in abundance. During the day I have fallen in with any quantity of plover. A good shot might have bagged his fifty brace in a very short time. These birds are very plentiful all over this part of the country... (quoted in Kelly, Marion and B. Nakamura 1981:60)

In a discussion of the famous places of Kailua in a Hawaiian language newspaper of 1911 it was noted that "The necks of the birds appeared on the pond of Kawai Nui among the rushes...." (*'Huakai Makai kai i nā Wahi Pawa o Kini Kailua' - Ke Au Hou August 9, 1911*)

While we have identified no specific reference to traditional Hawaiian bird catching at Kawai Nui Marsh it seems a virtual certainty to have been a customary practice.

Birds documented at Kawai Nui include various geese and ducks of *Koloa* such as Northern Pintail (*Anas acuta*), Northern Shoveler (*Anas clypeata*), Mallard (*Anas platyrhynchos*), Canada Goose (*Branta canadensis*), Emperor goose (*Chen corone*), Ring-necked Duck (*Aythya collaris*), Lesser Scaup (*Aythya affinis*), Green-winged Teal (*Anas crecca*), American Widgeon (*Anas americana*), and Redhead (*Aythya americana*) (Shallenger 1977, Conant 1981, Drigot 1982, Englis 1988, U.S. Fish and Wildlife Service 1991). Migratory shorebirds reported from Kawai Nui Marsh include: the Lesser Golden Plover or *K. Iea* (*Pluvialis dominica*), Ruddy Turnstone or *'Ōlīli* (*Heteractes incanus*) (Shallenger 1977, Conant 1981, Drigot 1982, Englis 1988, U.S. Fish and Wildlife Service 1991). Other commonly seen species include the indigenous Black-crowned Night Heron or *'Auku'u* (*Nycticorax nycticorax*) and four endemic, federally listed endangered waterbird species: the Hawaiian Coot or *'Alae Ke'oke'o* (*Fulica americana alai*), Hawaii Gallinule (aka Hawaiian Common Moorhen) or *'Alae Uia* (*Gallinula chloropus sandvicensis*), Hawaiian Duck or *Koloa maoli* (*Anas wyvilliana*) and Hawaiian Stilt or *Āe'o* (*Kaitiaki āe'o*) (*Himantopus mexicanus knudseni*) (Shallenger 1977, Conant 1981, Drigot 1982, Englis 1988, U.S. Fish and Wildlife Service 1991).

David Malo reported on wild animals (*N. Hoaholona laka*) presents insights into Hawaiian perceptions regarding a number of these species of water fowl. Regarding the *'Alae* (*Fulica americana alai*) and *Gallinula chloropus sandvicensis*) he reports:

3

...ua mana o ia kēia manu, he akua, ua nui ka po'e ho'omana i kēia manu, ua like kona nui me kēkēhi moa wahine, he manu 'ono no ke 'ai ia i ka alualua a me ka pehi ka mea e loe'a [ai] (from Chun 1987:22)

This bird is thought to be a god and there are many people who worship this bird. Its size is like a hen. It is delicious to eat and it is chased after using stones to catch it. (Chun 1987:164)

Similarly Malo reports the *Koloa* (*Anas wyvilliana* and other ducks) and the *Kōlea* (*Pluvialis dominica*) as "he manu 'ono" "delicious birds". The *Kutulu Āe'o* (*Himantopus mexicanus knudseni*) is reported as a kind of edible bird (he manu 'ono ke 'ai ia) as is the *'Auku'u* (*Nycticorax nycticorax*) (Chun 1987:22, 164) Malo reports that most of these water birds were taken by pelting them with stones.

Several waterfowl species are understood to have been widely hunted for food from traditional Hawaiian times into the mid twentieth century. The Hawaiian Coot and Hawaiian Duck were legal game birds until 1939 (a bag limit of twenty-five birds a day was set) and the Hawaiian Gallinule and Hawaiian Stilt were legally hunted until 1941 (Drigot 1982:142-148). Many of these waterfowl species are now on state and federal lists of endangered species and protected by federal (and state) laws which are generally acknowledged as overriding native customary practices (as in the case of sea turtles for example). This question may be moot in this case as no gathering of avifauna at Kawai Nui is known.

The only other bird species present known to have been worshipped beside the *'Alae* previously mentioned was the *Kōlea* (Valeri 1985:27), although it seems virtually certain *'Auku'u* would have been an *'aumāhuā* (guardian ancestral spirit) species. Several of the bird species in Kawai Nui including the *'Akekeke*, *'Alae Ke'oke'o*, *'Alae 'Uia*, *'Auku'u*, *Kōlea*, *'Ōlīli* and the transiting Great Frigate bird or *'Iwa* (*Fregata minor palmerstoni*) have various mythological associations (see Drigot 1982: 141 ff).

A recent reconnaissance of Kawai Nui Avifauna in support of the pathway project had as an objective "to note any potential conflicts the pathway might present to native waterbirds" (Brunner 2000 in Heiber Hyster & Fee 2001). No problems were noted.

C. Earth Resources

The area below (north) of Pahukini Heiau in Kapa'a was known as a traditional Hawaiian adze quarry (Stierling & Summers 1978:229) but how close this exposure of workable basalt came to Kawai Nui is uncertain. Grinding stones at the base of the Kūkanono Slope suggest adze working at that locale.

One of the more famous traditional Hawaiian associations with Kawai Nui is the "edible earth" (*Lepo 'ai ia*) which was proverbial. Pukui (1983:83) provides the following poetical saying:

He lepo ka 'ai a O'ahu, a
mā'ona no i ka lepo

Earth is the food of O'ahu, and
it is satisfied with the earth

4

She provides the following explanation:

Said in derision of O'ahu, which was said to be an earth-eating land. In olden times, an edible mud like gelatine was said to fill Kawai Nui Pond. The mud which was brought hither from Kahiki in ancient days, was once served to the warriors and servants of Kamehameha as a replacement for poi. (Pukui 1983:83-84)

Sterling and Summers (1978:231-232) provide the following accounts of the edible mud:

When there was a shortage of taro in Kailua, during Kamehameha's stay there with his men, the men of Kailua went to the pond of Kawai Nui to get the edible mud of Kawai Nui. It was a mud brought from Kahiki by Kaulu-a-kalana and put in the pond of Kawai Nui. The warriors and servants of Kamehameha ate the mud which had been put in the calabashes. ("History of Kamehameha, *Ka Ma'i Au'uni* Sept. 4, 1906 in Sterling and Summers 1978:231-232).

The additional information is provided:

The "*Lepo 'ai ia*" or edible mud, was found only in Kawai Nui Pond at Kailua, O'ahu. It was thick and jelly-like, like *haupia* pudding. A strict *kapu* was imposed when one dived to get it. No one was allowed to utter a word while the diver was in the pond getting it. If a word was spoken, ordinary mud rose up around the diver and covered him so that he died. There was no escape. ("Note from Lahilahi Webb" in Sterling and Summers 1978:232).

A similar account comes from Mrs. Charles Alona:

Here also was found the "*Lepo 'ai ia*" or a certain kind of mud that resembled *haupia* pudding in texture but has the color of poi. It was brought by Kaulu, a noted chief, from the pillars of Kahiki. (Mrs. Charles Alona, informant, in Sterling and Summers 1978:232).

There is a tradition among archaeologists of a certain archaeologist from the mainland consuming a good serving of the famous "*Lepo 'ai ia*". He soon fell quite sick. Given the presence of leptospirosis in the Kawai Nui drainage mud consumption can not be recommended and is not believed to be on-going.

D. Fish Resources

Kawai Nui was a fish pond known as Kawai Nui Loko, a partially brackish inland pond (*loko wa'i*). The fat fishes of the ponds of Kailua including Kawai Nui at the fore were famous (Kamakau, *Ku'oko'a*, Nov. 27, 1875). It had "the finest fat mullet on this side of the island...The *Awa* fish were so tame that they were easily caught" (Alona 1939 IEN Vol. 1, pp. 1314-1315) While it is understood that "The pond belonged to the *ali'i*" (McAllister 1933:186). Keko'owai (*Ka Nupapa Kiokoa*, January 6, 1922) gives an account of communal cleaning of the pond in which the people harvested some fish for their own use.

This being communal work, the *konohiki* (land agent) commanded the men, women and children of Maunawili, Kailua and Waimanalo to come to Kawai Nui. The people went into the pond, and with their hands broke the *limu* (algae) loose, piling it up, twisting it under as it was gathered. After a quantity of *limu* had been piled and twisted under, the workers formed it into a ring. "Then the *limu* that was broken off was pressed (*pi'i*) down like a dish

and all the fish that were caught in this *limu* dish were for the *limu* breakers." The workers put these fish into lauhala bags which were tied behind them, for the fish in the "limu dish" were no longer the property of the *konohiki*. Breaking of the *limu* was continued until the pond was clean and "the food of the fish clean," which for Kawai Nui, required three days. (Account in Summers 1964:22).

While the majority of fish species reported from Kawai Nui are exotic, native species of the Kawai Nui drainage include the endemic goby or '*O'opu nakea* (*Awaous taminicus*), the indigenous goby '*O'opu naniha* (*Stenogobius genivittatus*), the endemic eleotrid (various Hawaiian names: '*O'opu 'akupa*, '*Okuhe*, '*Apoia*, '*Kuhe*, '*O'au*) (*Eleotris sandwicensis*), the endemic flagtail or '*Aholehole* (*Kuhlia sandwicensis*) and the indigenous mullet or '*Amama* (*Mugil cephalus*), Milkfish or *Awa* (*Chanos chanos*) and occasionally a variety of other common inshore species including jacks, barracuda and lizard fish (Driget 1982:171, U.S. Fish and Wildlife Service 1991). Mullet and *Awa* (Alona 1939) and the '*O'opu* (Dictionary of Hawaiian Localities 1983) were the most famous fish of the pond. The '*O'opu* were proverbial as in the saying:

*He 'o'opu ku'ia, ka i'a hila
o Kawai Nui*

A bashful 'o'opu, the shy fish
of Kawai Nui

Pukui (1983:94) explains that this poetical saying was said of a bashful person. We have this account of communal '*O'opu* catching at Kawai Nui from 1883:

The '*O'opu kua* was a large fat mud fish, caught by many people joining hands and dancing in its [Kawai Nui's] waters to stir up mud, when the fish would run their heads up against the people, and so were caught. The fishes would cluster very thickly against particular individuals while leaving many others untouched, when, of course, he or she, would make a good haul and fill up his calabashes rapidly. This gave rise to the common saying of olden times, "*he 'i'i ona ia*" - "attractive skin" (Dictionary of Hawaiian Localities 1983)

In a somewhat similar vein, Alona (1939) relates that the *Awa* fish of Kawai Nui "did not like persons with strong smelling skins (*i'i awa*) and kept away from them. Fishing in Kawai Nui is known to continue to the present.

E. Plant Resources

Vegetation composition within Kawai Nui Marsh has been significantly impacted by human activities with the result that the overwhelming majority of the vegetation is exotic. Some vegetation studies report no native plants or Polynesian introductions at all (M&E Pacific, Inc. 1990:3-21). Dominant plants include the following exotic species California bunnish (*Schoenoplectus californicus*), saw-grass (*Thelypteris intermedia*), common cat-tail (*Typha latifolia*), California grass (*Brachiaria mutica*), arrowhead (*Sagittaria latifolia*), Wandering Jew or Homohono grass (*Commelina diffusa*), water hyacinth (*Eichhornia crassipes*) and water lettuce (*Pistia stratiotes*) (Driget 1982, U.S. Fish and Wildlife Service 1991). The upper slopes are wooded with *haole koa* (*Leucaena leucocephala*), guava (*Psidium guajava*),

Chinese banyan (*Ficus microcarpa*), Christmas berry (*Schinus terebinthifolius*) Java plum (*Syzygium cumini*), octopus tree (*Schefflera actinophylla*), African ulip tree (*Spauhoden campanulata*), albiza (*Falcataria moluccana*) and monkey pod (*Samanea saman*) (M&E Pacific, Inc. 1990:3-21, Char 2000)

However, as Beatrice Krauss pointed out in 1980, "The approach to the study of the flora surrounding Kawai Nui Marsh has been one which appears almost totally taxonomic and ecological" (in Drigot 1982:99) and the ethnobotany of the marsh is not well documented. The only plants that we know of that are understood as indigenous are *Hau* (*Hibiscus tiliaceus*), *Anapanapa* (*Colubrina asiatica*) and Primrose willow or *Kamaie* (*Laubwiga ovalifolia*). *Hau* was used for quite a variety of traditional purposes such as fiber, fish net floats, line making, tool handles, outriggers, firestarts and religious ceremonies. *Hau* is rather ubiquitous in Kō'olau, O'ahu. No specific cultural uses of *Anapanapa* or *Kamaie* are known. Such Polynesian introductions as *Noni* (*Morinda citrifolia*) *Ulu* (*Artocarpus communis*) *Maia* (*Musa paradisiaca*) and *Kalo* (*Colocasia esculenta*) are known on the perimeter of the marsh. Certain plants associated with Kāhala/Kawai Nui marsh legends including *awa*, *ōhi'a*, *pūhala*, *uhi*, *aka'aka*, *ilima*, *loulu*, *ki*, *popolo* and *kukui* are known on the perimeter of the marsh. Hawaiian gathering practices are likely to be focused on these Polynesian cultivars and later introductions such as Mango (*Mangifera indica*). Char (2000:6) notes that: "The proposed pathway is not expected to have a significant negative impact on the botanical resources."

III. EVALUATION OF CULTURAL IMPACTS

A. Summary

Two of the issues that have set the stage for the pathway concept have been: 1) improved access in the area and 2) the protection of natural and cultural features (Helber, Hastert and Fee, 2001:3-2). The purpose of the pathway is, in part, to improve access to the Kawai Nui Marsh. Access for any traditional cultural practices should not be adversely impacted in any way. The Pathway Plan asserts: "The pathway should be designed to be low impact and to minimize the potential for disturbing wildlife and/or cultural artifacts." (Helber, Hastert and Fee, 2001:3-2). A good faith attempt has been made to investigate the potential for adverse impacts to any archaeological, avian, earth, fish, and plant resources which Kawai Nui has held for the Hawaiian people. The only such potential adverse impacts that have been identified are to archaeological (and religious) sites. This is a concern of all involved in the project and to the State Historic Preservation Division which will review potential impacts to archaeological resources.

The nature of the proposed pathway is such that the portions likely to be closest to any potential cultural resources will be relatively modest with "light-footprints". It should prove a simple matter to design the trail so as to avoid any adverse impact to cultural resources.

B. Recommendations

In order to mitigate any potential adverse impact to cultural resources it is recommended that final plans for trail construction and actual trail construction be closely co-ordinated with the Kawai Nui Heritage Foundation which has a long history of concern for the cultural resources of Kawai Nui Marsh. It is further recommended that any interpretive signage pertaining to Hawaiian sites or cultural practices be submitted for review and comment to the State Historic Preservation Division, History and Culture Branch and to the Office of Hawaiian Affairs and the Kāhala Hawaiian Civic Club and the Kawai Nui Heritage Foundation.

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Appendix F
List of Pathway Community
Meeting Attendees

OCTOBER 4, 1999

SIGN UP
FINAL SCOPING MEETING

	NAME	ORGANIZATION	ADDRESS	PHONE/FAX	EMAIL
1	Kenneth Wong	Hawaii 1000 Friends			
2	Bob Corst				
3	Eric Ingie	self + Knotts Ranch			
4	Cindy Turner	self + Outdoor Circle			
5	Rep. Anthony Thiele		State Capitol		
6	Larry Abbott	"Co. Champion"	667 Ilihiu Pt		
			1224 manu Hoha		
7	Margaret DeGroot	Kukunono Linn	Kailua		
8	Tara Cook	110 Ranch	PO Box 895 Kailua HI		
9					
10					
11					
12					
13					
14					
15					

MEETING ATTENDANCE RECORD
Kawai Nui Marsh Pathway Project

Date: May 11, 2000 Time: 6:30 p.m Location: Aikahi WWTP

Name	Organization/Code	Phone	Email
ISAAC FISEL	Home owner - Kaiiki Estates	531-3755-46	Isabel@JapanHawaii.com
NANCY CASSANOVO	UCDP - KAILUA RESIDENT	254-8702	umecass@kva.net
Paula Loomis	city & County of Hon. + Res.	527-5159 262-5052	
JOAN CASH	VO RANCH	258-8046	
MR KWOTH	KWOTH RANCH	261-3101	
M.H. McDermott	Cultural Surveys Hawaii	262-9972	
Bill Gort	Kaunani Heritage Foundation		
Eric Lingke	Kaate Ranch + Resident	262-5922	
B.J. + Cookie Ferreira	KUKARONO RES. + Ranch	262-2105	
Darrell L. Bueno	P.O. Box 282 Waimanalo Kroft Ranch	259-7146	

MEETING ATTENDANCE RECORD
Kawai Nui Marsh Pathway Project

Date: 22 June 2000 Time: 6:30 p.m. Location: Keilua WWTP

Name	Address	Phone	Email
Mrs. MRS. L.J. WHIPPLE	1250 Manu Mele St.	261-5087	
Maureen Heidel	1341 Manu-mele St	261-4585	maureen@earthlink.net
Anthony Sennett	1342 Manu Mele St	262-4613	
John Carl	PO Box 895	258 8046	
Martin Knott	Knotts Ranch	261-3101	
M/M Sanchia	1372 Manu Mele St	263-3839	sanchia@aol.com
Larry Abbott	665 Flaxia St Keilua	254-9951	
Kate Braden	146 Huhili St Ste 203A	262 9443	braden@castlefordotcom.org
M/M Casey Ferrara	1215 Mamakona St	262-6059	
M/M Robert Kirschhuter	1349 Manu-Mele St.	261-6255	
Eric Luigle	323 Accuriala Rd	262-5922	self + Kna H Ranch
Dan Schneider	733 N. Kakahele Ave	262-9972	
Virginia L. DeCastro	1224 Manu-Aloha St	261 3275	
John De Castro	" "	"	
John R. Heidel	1341 Manu-mele St.	261-4585	jheidel@punahou.edu
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MEETING ATTENDANCE RECORD
Kawai Nui Marsh Pathway Project

Date: 08/02/00 Time: 6:30 Location: Kailua Wastewater Plant

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Edgelyne	1250 Manu Mele St.	261-5087	
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Bill Bunney	665 Manu-oo St	262-7448	
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Jim Wood	PO Box 1013, Kailua	263-6001	

Kawai Nui Marsh Pathway

9/21/00

<u>Name</u>	<u>Address</u>	<u>Phone #</u>
STAN CADINHA JR	1196 Eki Pl.	373-2512
KATE BRAOEN	HKL Castle Fnd	263 7071
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Jay Abbott	665 Iliiwa St Kailua	254-4907
Jim Wood	P.O. Box 1013 Kailua	263-6001
Bill Gerst	45-219 Kokoehi Pl.	235-2386

Appendix G
Kawai Nui Marsh
Pathway Plan

KAWAI NUI MARSH
PATHWAY PLAN



- Prepared For:
Kailua Community Vision Team
- Prepared By:
Helber Hastert & Fec. Planners
- May 2001

KAWAI NUI MARSH
PATHWAY PLAN

- Prepared For:
Kailua Community Vision Team
- Prepared By:
Helber Hastert & Fec. Planners
- May 2001

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

During the fall of 1998, Mayor Jeremy Harris and the City and County of Honolulu initiated a community planning process known as "21st Century Oahu - A Shared Vision for the Future." Residents of Kailua attended meetings as one of 19 community "vision teams" to create a vision of their community's future. As part of this process, each of the 19 communities was allowed to earmark funds for planning, design, and/or construction of improvements to help implement the future vision. Funding for the preparation of a pathway plan around the Kawai Nui Marsh and related environmental documentation was one of the projects proposed by the Kailua Community Vision Team (KCVT).

This plan supports the application of the Coconut Grove Community Association (CGCA) submitted to the State Department of Transportation (DOT) for use of Federal Highway Administration (FHWA) funds to construct a pathway around the perimeter of the marsh, in accordance with the recommendations of the 1994 Kawai Nui Master Plan prepared by the State Department of Land and Natural Resources. The federal funds, made available by the 1998 Transportation Equity Act for the 21st Century (TEA-21), were approved by Congress for "transportation enhancement (TE) activities" to encourage states to increase spending for transportation improvements that benefit recreation, tourism, or the environment. FHWA guidelines require that expenditures for transportation enhancement projects benefit or have a direct relationship to the State's surface transportation system.

The planning process included an extensive community outreach effort that included over 40 project stakeholders. A series of public meetings were held between December 1999 and August 2000 to provide for community input. The planning process reinforced the underlying premise of the Kawai Nui Marsh Pathway Plan - that the marsh's resources represent many things to many stakeholders and interest groups. Design of the pathway, therefore, considered ecological conditions, the natural environment, wildlife habitats, recreational needs, cultural resources, existing uses (i.e., ranching operations), and the concerns of surrounding residents, in addition to sound design principles.

The 1994 Master Plan recommended a trail system within the marsh as a pedestrian perimeter trail. This was supported by community participants, despite concerns about safety and security, and the cost of footbridges or boardwalks required in many locations. According to the plan, priority segments are from Ulupo Heiau to the Kukanono slope, along the Kapaa Quarry Road slope, and along the flood control levee.

EXECUTIVE SUMMARY

The current planning effort has reached similar conclusions, but with a few notable exceptions. First, participants in the community outreach process did not see the pathway as "only a perimeter trail." Opportunities for different experiences, and the need to provide for existing uses or those proposed in the future, lead to the conclusion that much of the perimeter "experience" can include pedestrian and bicycle opportunities, with specific areas identified as pedestrian only.

The pathway plan recognizes the priority of the existing levee as a flood control measure, but also notes the value of the levee as an existing multi-purpose pathway. Community participants believed the priority of future pathway development should continue from the existing levee. Therefore, the first priority for new construction is to create a pedestrian-oriented pathway extending from the existing levee trail to the beginning of the Kukanono slope and Ulupo Heiau. This would include construction of a new parking area at the base of the maintenance road leading to the levee. The objective is to provide educational and recreational opportunities in this area of abundant natural and cultural features. Because it begins at the existing levee, and connects at Ulupo Heiau, the segment is readily accessible from Kailua Road, where recent upgrades have been made to the bicycle route.

The next priority project would construct a multi-purpose pathway along the shoulder of Kapaa Quarry Road from Kailua Road to the proposed Kawai Nui Gateway Park. The multi-purpose pathway would accommodate bicyclists, joggers, and pedestrians. Other segments represent longer-term projects, which may be implemented depending on the development of other proposed projects (i.e., from the Master Plan) and funding availability.

The estimated costs for recommendations in the Kawai Nui Marsh Pathway Plan total over \$1.2 million.

1.0 INTRODUCTION

During the fall of 1998, Mayor Jeremy Harris and the City and County of Honolulu initiated a community planning process known as "21st Century Oahu – A Shared Vision for the Future." Residents of Kailua attended meetings as one of 19 community "vision teams" to create a vision of their community's future. As part of this process, each of the 19 communities was allowed to earmark funds for planning, design, and/or construction of improvements to help implement the future vision. Funding for the preparation of a pathway plan around the Kawai Nui Marsh and related environmental documentation was one of the projects proposed by the Kailua Community Vision Team (KCVT). In July 1999, the firm of Heiber Hastert & Fee (HHF) Planners was selected by the City to work with the Kailua community to carry out this work.

HHF assembled a team of specialists to ensure proper design of the pathway. Sub-consultants included:

- Cultural Surveys Hawaii, Inc., a firm specializing in archaeology and cultural resource surveys. See Appendix A for the complete report from Cultural Surveys Hawaii.
- Phil Bruner, a specialist in faunal surveys. See Appendix B for the complete report from Mr. Bruno.
- Char & Associates, a firm specializing in floral surveys. See Appendix C for the complete report from Char & Associates.

1.1 Background

As a public resource, Kawai Nui Marsh has long been viewed as an invaluable asset to the people of Kailua, in particular, and to the State as a whole. The Marsh is the largest remaining wetland in Hawaii, encompassing approximately 830 acres of land in Kailua, along the windward side of Oahu (Figure 1). The priority use of the area is as a flood control basin. However, the Marsh also represents a significant natural and cultural resource, and has the potential to become a significant educational and recreational resource as well.

Two planning documents provide guidance for planning of the pathway. The 1983 Kawai Nui Marsh Resource Management Plan (State of Hawaii, Department of Planning and Economic Development (DPED)) specified objectives, policies, and a comprehensive list of recommended actions to manage and use the Marsh. The primary recommended use is as a flood control facility. Secondary uses are to take

Chapter 1 INTRODUCTION

CHAPTER 1 INTRODUCTION

advantage of the area's intrinsic recreational, cultural/archaeological, religious, educational, open space, wildlife, and economic value. Recommended actions included encouraging the creation of safe hiking paths and jogging trails in perimeter areas of the marsh; the creation of access routes, trails, and facilities for nature studies; and the establishment of trails and overlook systems to connect principal cultural features in the area.

In 1994, the State of Hawaii, Department of Land and Natural Resources (DLNR) completed the Kawai Nui Marsh Master Plan to supplement the conceptual framework set forth in the Resource Management Plan. A major focus of the Master Plan is to ensure the continued preservation of the marsh's resource values, while pursuing its enhancement for public use and appreciation. To accomplish this, the Master Plan recommended a number of specific recommendations that preserve, protect, and enhance the ecological and historic/cultural resources of the Marsh.

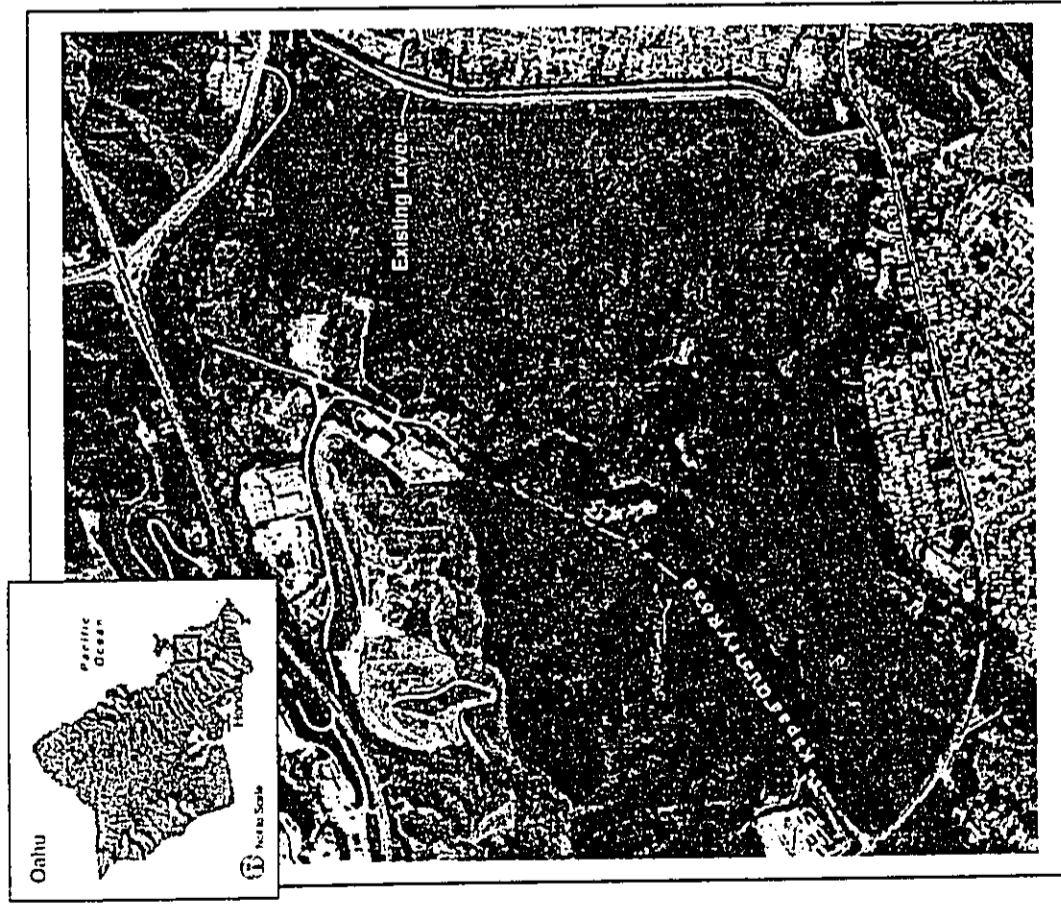
One specific recommendation is to create a trail system to provide access along the marsh fringe as a recreational asset and to interpret resources for educational purposes. The trails are to be used as links to other components of the master plan that will be discussed in the next chapter.

1.2 Application for Federal Highway Administration Funds

In August 1998, the Coconut Grove Community Association (CGCA) submitted an application to the State Department of Transportation (DOT) for use of Federal Highway Administration (FHWA) funds to construct a pathway around the perimeter of the marsh, in accordance with the recommendations of the 1994 Master Plan. The federal funds, made available by the 1998 Transportation Equity Act for the 21st Century (TEA-21), were approved by Congress for "transportation enhancement (TE) activities" to encourage states to increase spending for transportation improvements that benefit recreation, tourism, or the environment. FHWA guidelines require that expenditures for transportation enhancement projects benefit or have a direct relationship to the State's surface transportation system.

In its application to DOT, CGCA described the proposed project as a pedestrian pathway/bikeway to provide visitors and residents better access between various components of the area's transportation system. These components include Mokuapu Boulevard (also known as the Saddle Road), local streets within the adjacent Coconut Grove community, streets within the business district of Kailua

Kawai Nui Marsh Pathway 1-3



Project Location
 Kawai Nui Pathway
 KAAHI, KOOLAUPUNO, OAHU

Figure 1

CHAPTER 1 INTRODUCTION

town, and Kailua Road. The project would provide an alternative to the automobile and expand the surface transportation system in the region.

After receiving the application, DOT placed the proposed project on its list of "Potentially Fundable TE Project." Requirements to obtain funding for the project included preparation of the pathway plan and environmental documentation. City funds provided to the KCVT are intended to meet this requirement.

1.3 Scope of Work

The intent of this planning report is to prepare a design for the Kawai Nui Marsh pathway and prepare related environmental documentation to support CGCA's application for federal funds. This is to be done within the guidelines and recommendations of the 1983 Kawai Nui Marsh Resource Management Plan and 1994 Kawai Nui Marsh Master Plan. The analysis, community outreach, and design recommendations of this effort focus on the issues and details necessary to take the next step towards final design and construction of various segments of the pathway. Other components of the 1994 Master Plan are shown in this report, but will be implemented through separate planning efforts. Specific tasks in the scope of work include the following:

Research/Data Collection/Analysis/Mapping

Research and collect information regarding the Kawai Nui Marsh area, which could impact the design of a pathway. In addition to State documents previously mentioned, information on land use, existing transportation systems, topography, soils/wetlands, waterbird habitats, cultural resources, and other pertinent data will be collected and mapped as it affects the project site.

Field Research

Work with residents/organizations of the Kawai Nui Marsh area and other knowledgeable resource people to conduct a thorough investigation of the marsh perimeter. Field verify topographic maps and photograph the perimeter of the marsh in order to prepare a pathway alignment and design that is most conducive to preserve and interpret the natural and cultural resources of the marsh.

Government Agency Coordination

Coordinate all design concepts for the pathway with DLNR in order to ensure the project is in accordance with the Department's Kawai Nui Marsh Master Plan. Divisions at DLNR to be consulted include the Land Division, State Historic

CHAPTER 1 INTRODUCTION

Preservation Division, Forestry and Wildlife Division, and the State Parks Division. Additional agencies to be consulted include, but are not limited to:

- Federal Highway Administration
- U.S. Army Corps of Engineers
- State Department of Transportation
- City and County of Honolulu Department of Transportation Services

Community Outreach/Meetings

A list of over 40 potential stakeholders was generated during the scoping meeting. Maintain the stakeholder list and inform individuals and organizations on the list of the latest project developments, and provide monthly project status reports to the stakeholders if desired by the group.

Alternative and Recommended Pathway Design

Based on the 1994 DLNR plan, analysis of environmental issues, field research, input from sub-consultants, and guidance from DLNR staff and project stakeholders, develop alternative pathway designs around the perimeter of Kawai Nui Marsh. The guiding principle of the design process will be how to most appropriately protect and interpret the history and value of the marsh. The design process will consider the following:

- Areas which are environmentally and culturally sensitive and which have interpretive value, and how to best provide pedestrian access into the areas taking into account the limited resources available and the need to protect cultural and natural resources.
- Areas appropriate for multi-purpose activities.
- Pathway materials.
- Design requirements under the American With Disabilities Act.
- Linkage to hiking trails, bikeways, and bus routes outside of the Kawai Nui Marsh area.
- Providing safety along the pathway.

- Major access points, parking areas, and sites for bike racks.

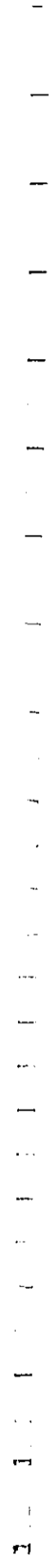
CHAPTER 1 INTRODUCTION

- Location of bridges to link the Coconut Grove neighborhood to the pathway.
- Location of boardwalks over designated areas.
- Operations, maintenance, and security issues.
- A logo design for trail signs, educational displays, etc.

Environmental Documentation

Expenditure of federal funds requires the preparation of environmental documentation in accordance with the National Environmental Policy Act (NEPA). Prepare NEPA environmental documentation in support of the CGCA application for transportation enhancement funds.

Chapter 2 PROJECT SETTING



CHAPTER 2 PROJECT SETTING

2.0 PROJECT SETTING

Kawai Nui Marsh serves as a critical flood control basin to protect the developed lower-lying areas of urban Kailua and to protect the water quality of Kailua Bay. The marsh provides important habitat for four endangered species of native Hawaiian water birds and for migratory bird species, and is identified by the U.S. Fish and Wildlife Service as a "primary habitat" for the recovery of these water bird species. Its waters also support a variety of introduced and indigenous aquatic wildlife. With two prominent heiau overlooking the marsh and numerous significant archaeological sites below, the entire marsh has been determined to be eligible for listing in the National Register of Historic Places.

2.1 Existing Land Ownership

The City and County of Honolulu is the primary landowner within the study area (see Figure 2). The City and the State DLNR are working to transfer ownership of approximately 750 acres in the central and northern portions of the marsh to the State. Final agreement is pending.

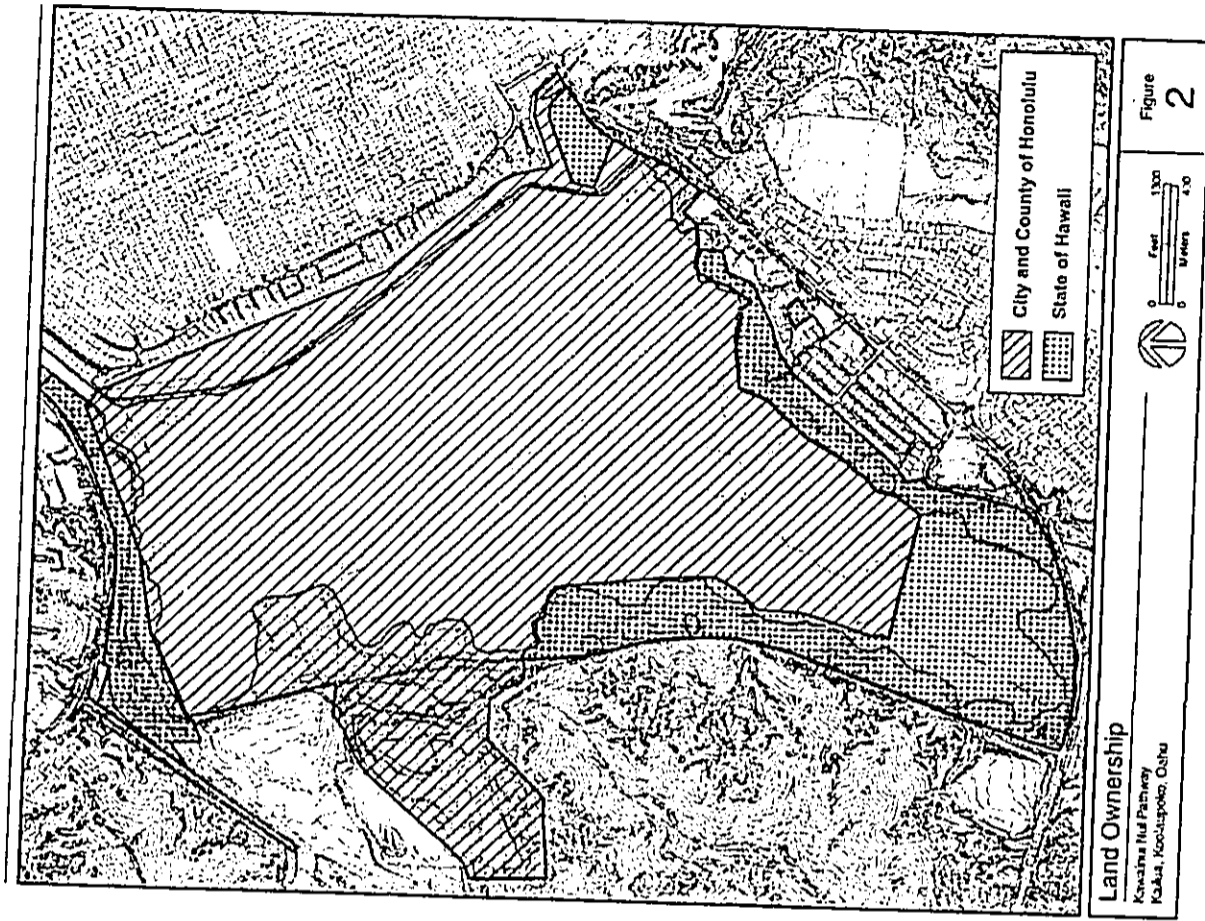
2.2 Existing Uses and Resources

An overview of existing land uses and resources within the study area are shown in Figure 3. The following discussion summarizes information regarding each component.

Flood Control Levee

In 1966, a levee was constructed along the northernmost edge of the marsh to enhance its flood storage capacity. In 1988, floodwaters overtopped the levee and flooded homes in the Coconut Grove neighborhood. In response to this event, the U.S. Army Corps of Engineers (USACE) and the City and County of Honolulu upgraded the levee to achieve a 100-year level of flood protection. The existing structure extends 6,300 feet along the eastern boundary of the marsh, from Oneawa Canal to Kailua Road. It includes an existing pathway (both paved and gravel-covered) that provides recreational opportunities for area residents, who walk, jog and bicycle along its length.

Access to the levee pathway is most easily available at the northern end through the existing Kawai Nui Neighborhood Park. An existing parking lot adjacent to maintenance road leading to the levee provides convenience and safety for those who drive or bike to the area. Access at the Kailua Road entrance is much more restricted. Located approximately 500 feet mauka of the urban Kailua area, parking along the shoulder of



CHAPTER 2 PROJECT SETTING

The road is very limited. Except for people living in proximity to the neighborhood park, access to the levee from the Coconut Grove neighborhood is not readily convenient. Improving this situation is a priority objective of the CGCA, as well as others in the general community (e.g., the Kawai Nui Heritage Foundation).

Bird Habitat Areas

Existing wetland vegetation and open water areas are located within the central portion of the marsh. As shown in Figure 3, the water bird habitat area encompasses a small proportion of the overall acreage within the marsh boundaries. Degradation of the habitat is due to lack of vegetation control and wildlife management. Plans to upgrade the habitat are discussed in the following section of this chapter.

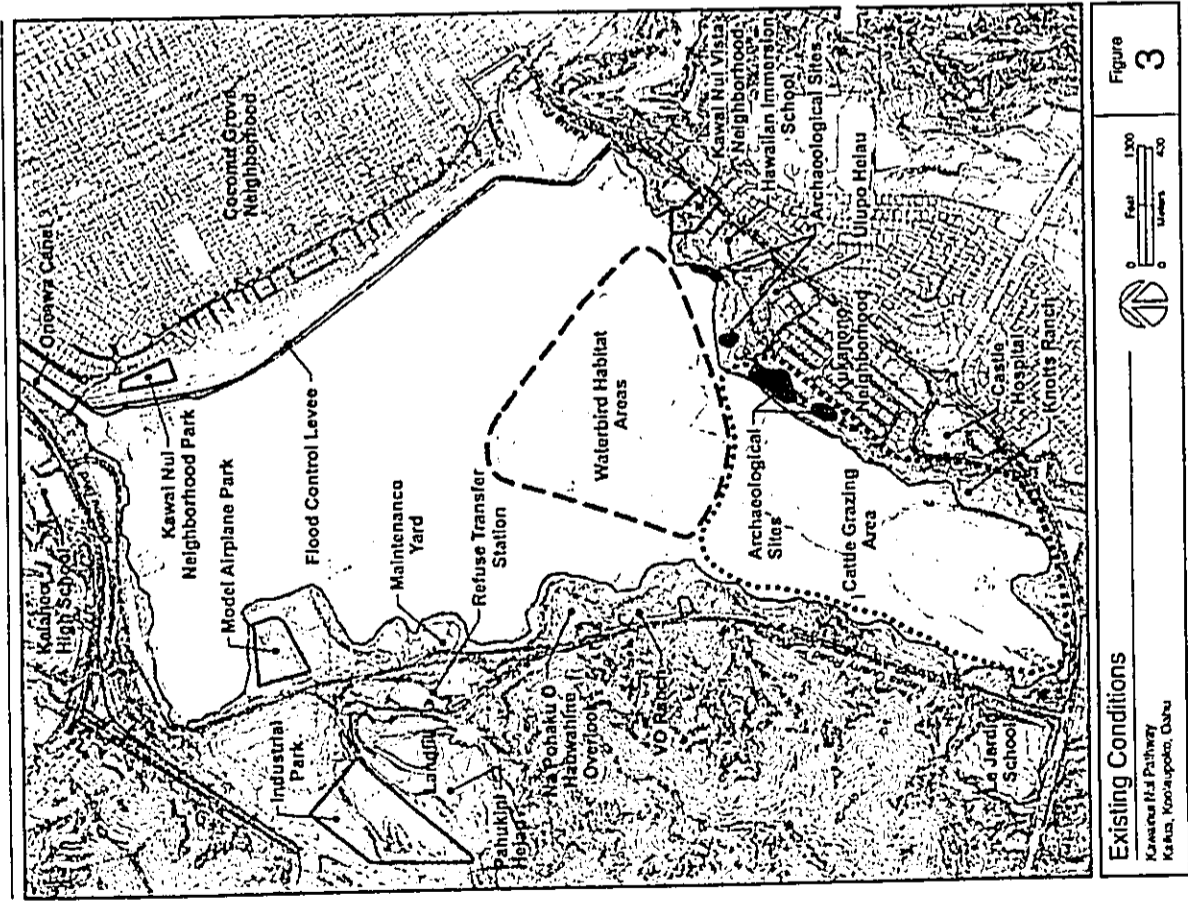
Cattle Ranching

Since 1963, approximately 80 acres of land in the southern portion of the marsh have been used for cattle grazing by the Knott Ranch. Several small structures, a corral, and stables are located within a small compound behind Castle Hospital. The ranch generally maintains 50 to 100 head of cattle on the site, which help to control California grass around the water bird habitat area. The ranch controls access to the grazing area. Unsupervised visits are not allowed to ensure protection of visitors.

Along Kapaa Quarry Road, the VO Ranch operates on approximately 10 acres of land. This activity has also been in existence since the early 1970's. Improvements to the area consist of fenced enclosures and stables for horses and cattle, and a maintenance shed.

Archaeological/Cultural Resources

Archaeological/cultural resources are predominantly located along the southern boundary of the marsh. Several features are also located in the western slopes overlooking the marsh. The most dominant feature is the Ulupo Heiau, which is a large *Iuakini* type heiau (state-temple where human sacrifice occurred) located on a natural promontory overlooking the marsh (Cultural Surveys Hawaii, 2000). The heiau platform measures 140 x 240 feet, with walls up to 30 feet in height. It was listed on the National Register of Historic Places in 1972. Additional cultural resources are located below and to the west of the heiau, and include terraces, habitation sites, a residential complex, agricultural complexes, and linear walls.



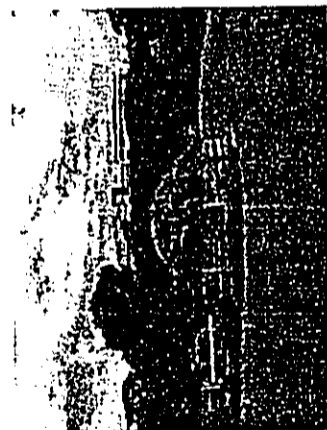
Cluster 2

PROJECT SETTING

The existing flood control levee extends 6,300 feet along the marsh and protects the Coconut Grove Neighborhood from severe



Existing bird habitat areas include the Hawaiian Shill (Ae'o), the Hawaiian Coot (Aie Ae'o), the Hawaiian Moorhen (Aie'ua), and the Hawaiian Duck (Koloa maoh).



Knott Ranch operates on about 80 acres of land, maintaining cattle that help control California grass around the water bird habitat

Kawai Nui Pathway Project

2-5

Cluster 2

PROJECT SETTING

Ulupa Heiau is listed on the National Register of Historic Places. It measures 140 x 240 feet, and rises up to 30 feet in height.



Cultural features along the Kulanani Hillside include endemic stone, habitat sites, agricultural complexes, and walls.



Na Pokaku O Heaunahine is a beautiful outcrop along Quarry Rd. that serves as a vantage point and provides sweeping views of the marsh.



Kawai Nui Pathway Project

2-6

Along the Kapaa Quarry Road, two clusters of features make up the site known as Na Potaku o Haurahine. This basalt outcrop serves as a focal point along the western boundary and provides a sweeping view of the marsh. During recent years, volunteers from the Kawai Nui Heritage Foundation have cleared trails from the road to the overlook, and down to the edge of the marsh, and have planted native Hawaiian vegetation in the area.

Residential Neighborhoods

The Coconut Grove neighborhood borders the marsh to the east and is one of the most populated areas of Kailua. As noted earlier, access to the recreational opportunities of the marsh are restricted. Improved access to the levee is desired by residents, particular those living closer to Kailua Road.

The Kukanono neighborhood is located south of the marsh, next to Castle Hospital. The relatively small residential area has two primary streets. Property boundaries of residents on the mauka side of Manu-Mele Street abut the public-owned marsh. Kukanono includes several churches and the Windward YMCA. Visitors to the Ulupo Heiau discussed above, park at the YMCA. Because of cattle grazing in area, residents generally do not access the marsh. Furthermore, residents are concerned about increasing traffic through their neighborhood to get to the marsh. This and other issues are discussed in detail in Chapter 3.

A new residential area, Kawai Nui Vista, is located on Kailua Road approximately one-half mile mauka of Kailua Town. The area has about 15 house lots; approximately half have been developed.

Schools

Several schools are located in proximity to the boundary of the marsh. Le Jardin is located on Kailua Road at the intersection with Kapaa Quarry Road. North of the marsh, Kalaheo High School is located just across Mokapu Boulevard. The Ke Kula o Samuel M. Kamakau Hawaiian Immersion School is located on Kailua Road. The marsh is readily accessible from this facility.

Recreational Resources

The Kawai Nui Neighborhood Park (also known as Kaha Park) is located at the northern end of the levee. Youth soccer and softball leagues heavily use the park. Across the

marsh on Kapaa Quarry Road, model airplane clubs use approximately 5 acres of public land for model airplane activities.

Industrial Uses

For many years, Kapaa Quarry Road has been heavily used by trucks and other large vehicles to access the Kapaa Landfill and the nearby industrial park. The landfill was closed in the mid-1990's. However, the City and County of Honolulu operates a refuse transfer station mauka of the road. With the opening the H-3 Freeway, the majority of trucks access the industrial uses from Mokapu Boulevard.

2.3 Proposed Improvements in the Area

Management Plan for Kawai Nui Marsh

Figure 4 provides an overview of proposed improvements in Kawai Nui Marsh. In the near-term, DLNR has given priority to provide for long-term maintenance activities to assure the protection and enhancement of the marsh's flood control capabilities. To augment existing operations, DLNR is proposing to construct a maintenance facility and a vegetation processing area south of the existing model airplane park. These facilities will provide a base location for vegetation removal operations that will focus in the central portion of the marsh to increase open water areas that have become overrun by California grass and water hyacinth (DLNR, March 2000).

Another priority DLNR project is the restoration of wildlife habitats in the marsh. The DLNR Division of Forestry and Wildlife (DOFAW), in conjunction with the U.S. Army Corps of Engineers, Pacific Ocean Division (Corps) propose to create approximately 70 acres of mudflats and shallow ponds in three areas in the southern portion of the marsh. The proposal also includes restoration of riparian wetland habitat along Maunawili and Kahanaiki Streams, vegetation clearing, and installation of fencing from the Kailua Road end of the flood control levee, along the Kukanono slope to Kapaa Quarry Road, and north to the vegetation processing area. Implementation of the project is contingent on approval of the project by the Corps and receipt of federal funding.

The proposed location of the ponds has a significant impact on existing cattle grazing operations. The Final Environmental Assessment (EA) for the Management Plan for Kawai Nui Marsh (DLNR, Land Division, March 2000) states "facilities presently used by the Knotts (Ranch) for ranching activities may be relocated to other areas around the marsh." DLNR will continue to use the existing facilities used by the ranch for maintenance operations. The EA further states that it is DLNR's plan "to continue

CONTEXT PROJECT SETTING

Indefinitely a small-scale cattle and horse operation in the marsh for the purpose of, and at a scale appropriate for, controlling vegetation in areas outside of the planned habitat restoration project. Cattle grazing areas will be located on the mauka side of the ponds, and may require development of additional livestock holding pens. (Note: The area identified for livestock grazing in Figure 4 is shown for general discussion purposes. Exact locations for cattle grazing are not known at this time.)

1994 Kawai Nui Marsh Master Plan

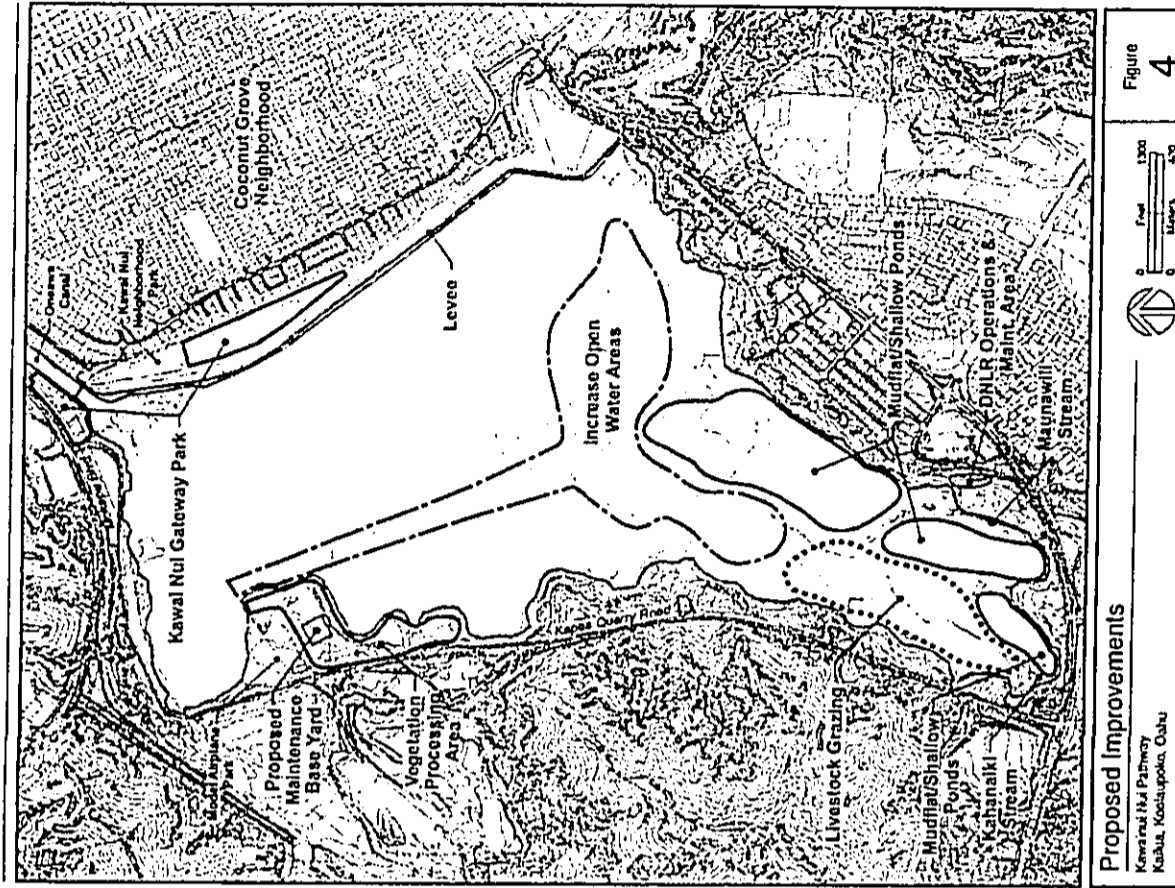
As noted in Chapter 1, the 1994 Master Plan recommended a number of specific projects to improve the operation and management of the resource as a flood control facility, and to help the public to learn about, appreciate, and enjoy the marsh, while ensuring preservation of the resource through increased public awareness of its resource values. Plan proposals included an education center/visitor center, a cultural park, ethnobotanical gardens, agricultural areas, scenic parks, and a trail system.

The primary objective for trails is to provide access along the marsh fringe and to interpret resources for educational purposes. The Master Plan recommends that trails should eventually link major features within the marsh periphery. Priority features include the education center/visitor center, Ulupo Helau, Kukanono historic sites, Na Pohaku O Hauwahine, the Oneawa Canal footbridge, and the flood control levee.

Kawai Nui Gateway Park

During the second year of the visioning process, the KCVT proposed the creation of a new Kawai Nui Gateway Park, which would be an expansion of the existing Kawai Nui Neighborhood Park. The general concept of the park is to serve as a visual gateway to Kailua from the north or Kaneohe direction, and to enhance the use of underutilized areas along the fringes of Kawai Nui Marsh and Oneawa Canal for recreational and educational opportunities.

The project involves two parcels of land. The first parcel, located along Mokapu Boulevard, is approximately 4.4 acres in size. It is owned by the State of Hawaii and is currently vacant and generally overgrown with hale koa and other types of shrubs. The area is envisioned to provide limited facilities for canoe club activities, including a launch area into Oneawa Canal. The second parcel is approximately 15 acres owned by the City and County of Honolulu. The area is intended to be for passive uses only.



Chapter 3 COMMUNITY OUTREACH

3.0 Community Outreach

Design of the Kawai Nui Pathway commenced in 1999 as part of the City's "21st Century Oahu" community planning process. As noted in Chapter 1, the scope of work included a community outreach effort that included over 40 potential stakeholders. A series of public meetings were held from December 1999 to August 2000 to provide for community input into the planning process.

3.1 Participating Organizations and Individuals

The following list of agencies and organizations participated in the community planning process and/or provided information critical to the effort.

- U.S. Army Corps of Engineers
- State of Hawaii, Department of Land & Natural Resources, Division of Forestry and Wildlife Land Division
- State Trails (Na Ala Hele) Historic Preservation Office
- City and County of Honolulu, Department of Planning & Permitting
- Department of Transportation Services
- Kaitiua Neighborhood Board (Recreation Sub-Committee)
- Coconut Grove Community Association
- Kukanono Community Association (plus many individual members of the community)
- VO Ranch
- Knott Ranch
- Kawai Nui Heritage Foundation
- Model Airplane Club
- Hawaii Bicycling League
- Casila Foundation
- Windward YMCA
- Numerous individuals of the Kaitiua community

3.2 Major Planning Issues

The community planning process was a means to solicit input from and identify the needs of the various project stakeholders. The planning process reinforced the underlying premise of the Kawai Nui Marsh Pathway plan--that Kawai Nui Marsh's resources represent many things to many stakeholders and interest groups.

Design of the pathway, therefore, considered ecological conditions, the natural environment, wildlife habitat, recreational needs, cultural resources, existing uses (i.e., ranching operations), and the concerns of surrounding residents, in addition to sound design principles. It also considered current and future plans for the marsh and surrounding area described earlier in Chapter 2.

These components were diverse and competing at times. The goal of the planning process was to balance these interests and to develop a design that is sensitive to the natural environment, as well as to the needs and desires of the stakeholders. The following discussion presents an overview of some of the major issues that were raised during the planning process. These issues set the stage for the overall pathway concept.

Desire for Recreational Opportunities and Improved Access in the Area. The impetus for the Kawai Nui Marsh Pathway project came from community members who wanted to expand recreational opportunities around the marsh by creating a pathway for pedestrians and bicyclists. Pedestrian access to the marsh is intended to implement the concept of a trail system as recommended in the 1994 Master Plan. Opportunities for expanding bike lanes looked to increase outdoor recreation opportunities for Kailua and improve access to the marsh and surrounding areas.

Protection of Natural and Cultural Features. A major concern expressed during the community outreach phase was the importance of preserving and protecting the marsh's natural environment. While the desire for recreational opportunities is strong, the proposed improvements should not adversely impact the wetland environment or cultural resources. The pathway should be designed to be low impact and to minimize the potential for disturbing wildlife and/or cultural artifacts.

Recognition of Diverse Marsh Characteristics. It was acknowledged that the marsh and its surroundings include a number of sub-environments with different physical and natural characteristics. For example, while the south side of the marsh along Kailua Road includes a number of archaeological sites, the north and east sides contain little of historic value. Wildlife areas are concentrated in the central and southern portions of the marsh. It was agreed that for areas where natural and cultural features provide viewing and educational opportunities, the pathway should focus on a hiking trail concept. In areas where natural and cultural features are less prominent, the pathway should have a recreational emphasis.

Compatibility with Other Planning Efforts. The proposed pathway is one component of a larger, comprehensive Kawai Nui Master Plan that includes a visitor center, ethnobotanical garden, and enhanced water bird habitat. It was

agreed that the proposed pathway should acknowledge and complement other existing and proposed improvements. For example, it should be compatible with proposed water bird habitat enhancement. The pathway should also comply with Americans with Disabilities Act (ADA) requirements.

Compatibility with Ranching Operations. Ranching is an ongoing activity in the marsh that continues on a month-to-month lease with the State of Hawaii. The State's decision to continue the lease could impact the pathway alignment in the southern area of the marsh, as well as Corps plans for water bird habitat restoration (see discussion in Chapter 2). While many area residents support continued ranching operations, others have argued that ranching has a less than positive effect on the wetland environment and is incompatible with long-term plans to improve water bird habitat.

Impact on Residential Communities. A major issue raised during the community planning process was the need to minimize adverse impact on surrounding residential areas, in particular, Kukanono Subdivision. Residents of Kukanono expressed concern over whether the proximity of the pathway would reduce privacy and security, increase crime, and exacerbate traffic and parking problems in their neighborhood. At the June 22, 2000 meeting, residents of the Kukanono neighborhood presented a petition that had been signed by 25 members of the community. It read as follows:

"We the Residents of Kukanono Oppose the Kawai Nui Marsh Trail"

"The development of the proposed Kawai Nui Marsh Pathway is of major concern to the residents of the Kukanono subdivision. We are in full support of the educational value it possesses, however, hold strong opposition for the added traffic, loitering, parking situation, and overall safety for our quiet, peaceful community. We ask that you reconsider your proposal to utilize the Kukanono subdivision as access to the Kawai Nui Marsh Pathway."

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4.3 PATHWAY PLAN

This chapter presents an overview of the pathway concepts, a listing of guiding principles for the alignment design, and recommendations for five segments around the marsh perimeter.

4.1 Pathway Concept Overview

The planning process for the pathway has provided the opportunity to take recommendations from previous planning efforts and evaluate the issues, in detail, that are involved in implementing the recommendations. The 1994 Master Plan concluded that the trail system at Kawai Nui Marsh was to be a perimeter trail. This was supported by community participants, despite concerns about safety and security, and the cost of footbridges or boardwalks required in some locations. According to the plan, primary segments are from Ulupo Helau to the Kukanono slope, along the Kapaa Quarry Road slope, and along the flood control levee.

The current planning effort has reached similar conclusions, but with a few notable exceptions. First, participants in the community outreach process did not see the pathway as "only a perimeter trail." Opportunities for different experiences, and the need to provide for existing uses or those proposed in the future, lead to the conclusion that much of the perimeter "experience" can include pedestrian and bicycle opportunities, with specific areas identified as pedestrian only.

A second conclusion relates to the first. Community participants recommended not constructing a pedestrian trail on the interior (marsh) side of Kapaa Quarry Road in the northern portion of the study area. It was noted that few, if any, habitats exist in the area, and that a significant portion of the pathway (estimated at about 3,000 linear feet) would require fill or boardwalks since areas adjacent to the road are wetlands. The community recommended the pathway be located on the mauka side of Kapaa Quarry Road, and focus on recreational activities such as jogging and/or bicycling.

Figure 5 provides an overview of general concepts for the pathway around the marsh. As it is used today, the existing flood control levee is shown as a multi-purpose pathway, providing pedestrian, jogging, and bicycling opportunities. It is noted that improved access to the facility needs to be considered. Community participants note the significance of the levee as an existing resource, and recommend that the first priority of future pathway development should look at continuing from the levee—the most likely location starting from the southern (Kailua Road) end.



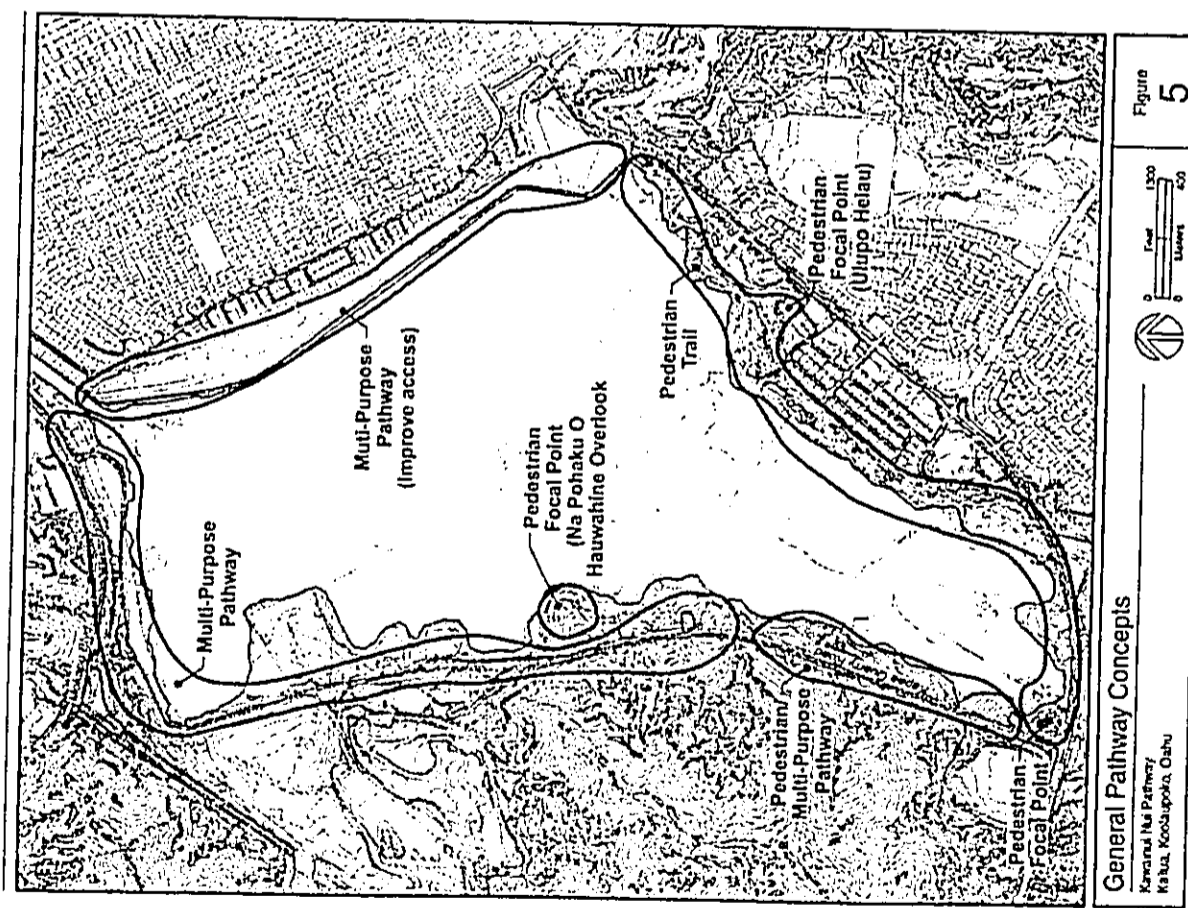
The entire southern portion of the study area, from the levee to Kapaa Quarry Road, is recommended for pedestrian access only. This conclusion was arrived at based on an evaluation of the natural resources of the marsh. By far, the southern portion of the marsh has greater concentrations of cultural features, and provides some proximity to water bird habitats. Furthermore, future plans to expand water bird habitats in the southern portion of the marsh will strongly enhance the area's potential for recreational and educational purposes. The 1994 Master Plan proposes a site at the corner of Kailua Road and Kapaa Quarry Road for development of a visitor center.

Along Kapaa Quarry Road, the concept is to provide a multi-purpose pathway for recreational use, with pedestrian access to the marsh at prominent natural resource locations.

4.2 Pathway Guiding Principles

A set of guiding principles was formulated to help determine the layout and design of the pathway system. The guiding principles were based on community input, site analysis, and research on pedestrian and multi-use pathway standards. The intent of the guiding principles is to ensure the pathway is designed in a manner that preserves and protects the resources of the marsh, efficiently utilizes economic resources, and recognizes community concerns. These general principles are as follows:

- Provide a diversity of experiences (mix of open and closed trails, natural features, wildlife viewing, historic sites) along the marsh fringe.
- Provide for a diversity of users (walkers, runners, riders, wheelchairs); portions of trail for more active multi-use and some portions for more passive nature experiences.
- Provide a safe experience (minimize potential for accidents and crime).
- Identify logical access points and links to other trail systems and transportation routes (bike trails, bus routes, roadway/sidewalk circulation).
- Link park space, visitor center, ethnobotanical garden, cultural sites, and other master plan components in a contiguous manner.
- Do not disturb wildlife, important natural features, or significant historic and archeological sites.



Kailua Marsh Pathway Plan 4-3

Figure 5 4-2

CHAPTER 4 PATHWAY PLAN

- Minimize conflicts with ongoing ranching operations and private residences (privacy, security, noise pollution, parking, street safety, trespassers).
- Recognize existing site opportunities and features, such as interesting flora, landmark trees, unusual rock outcroppings, panoramic viewpoints, and educational opportunities.
- Major trail segments should be self contained as much as feasible (entry/exit access points, focal points, parking, feature diversity) so that the trail can be implemented in phases without undue fragmentation.

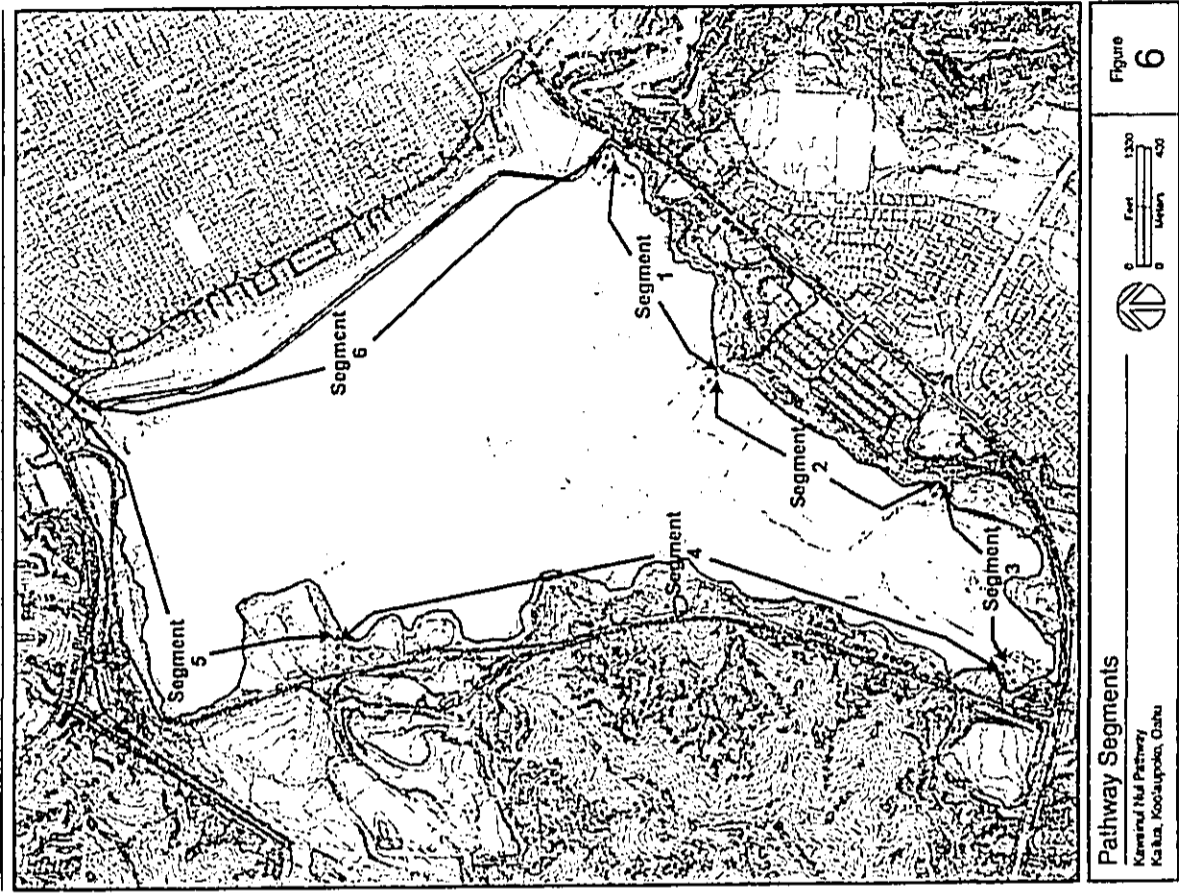
4.3 Pathway Segments

Plans for various areas of the marsh were developed in segments following the above guidelines. This approach acknowledged the unique characteristics of different areas, issues and concerns that need to be addressed, and the potential for implementation. Figure 6 presents an overview of sections within the study area. The following discussion describes the individual segments, highlights opportunities and constraints, and lists specific recommendations. The detailed discussion of pathway segments was largely provided by the field analysis conducted by the archaeological sub-consultant (Cultural Surveys Hawaii).

4.3.1 Segment 1 (Figure 7)

Description: This segment extends from the southern (Kailua Road) terminus of the levee to the beginning of the Kukanono area. The area includes the Ulupo Heiau. The terrain is characterized by steep to moderate undulating slopes that meet abruptly at the edge of the marsh. Hau bush (*Hibiscus tiliaceus*) fringes the marsh edge and forms a thick, nearly impenetrable forest at a number of locations.

Opportunities: Segment 1 represents the best opportunity to create a fascinating educational and recreational experience. It has the greatest concentration of archeological and historic sites around the marsh, and a broad diversity of terrain and vegetation, with good views of the marsh. The area offers the linkage of the existing pathway on the levee to the Ulupo Heiau, and to open water areas below the Kukanono subdivision.



Pathway Segments
Kawai Nui Marsh Pathway
Kailua, Koolauloa, Oahu
Figure 6
4-5

CANDIDATE PATHWAY PLAN

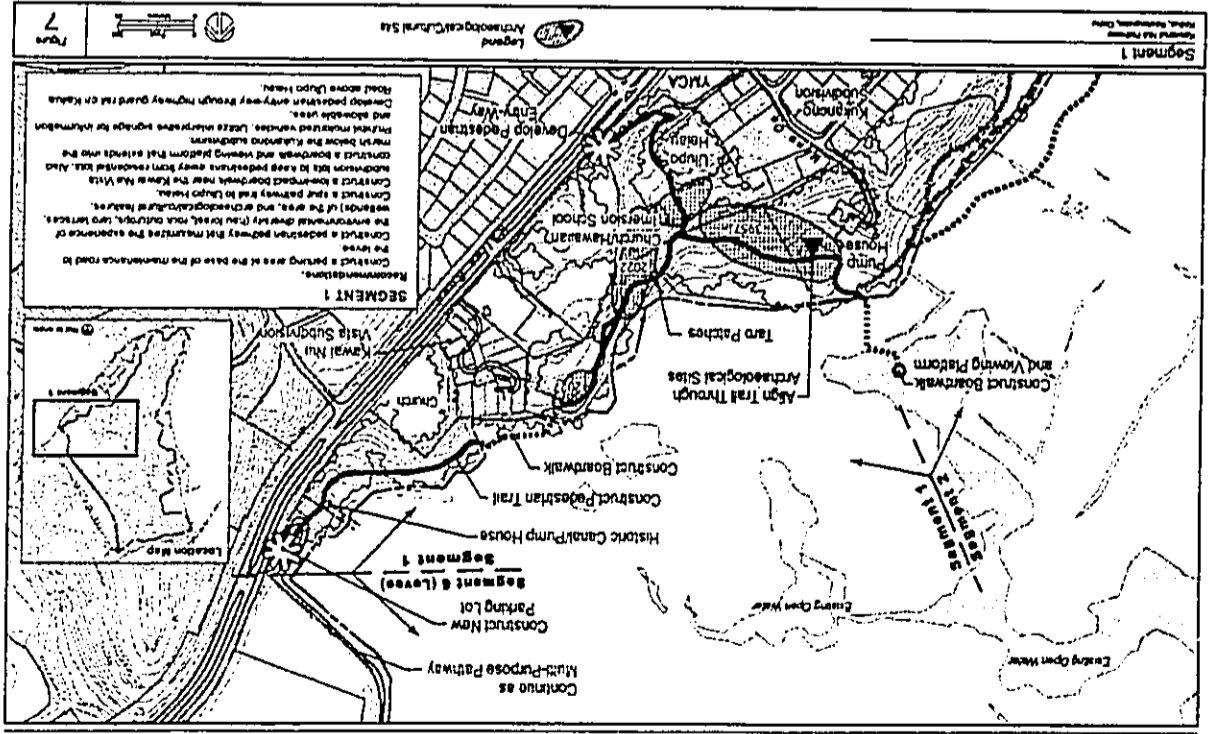
Constraints: The primary constraint to development of this segment is providing access to the pathway without impacting the Kukanono neighborhood by increasing traffic through the area. Parking at the YMCA currently provides for visitors to Ulupo Heiau. New parking outside of the neighborhood needs to be identified to reduce pressure for parking at the YMCA.

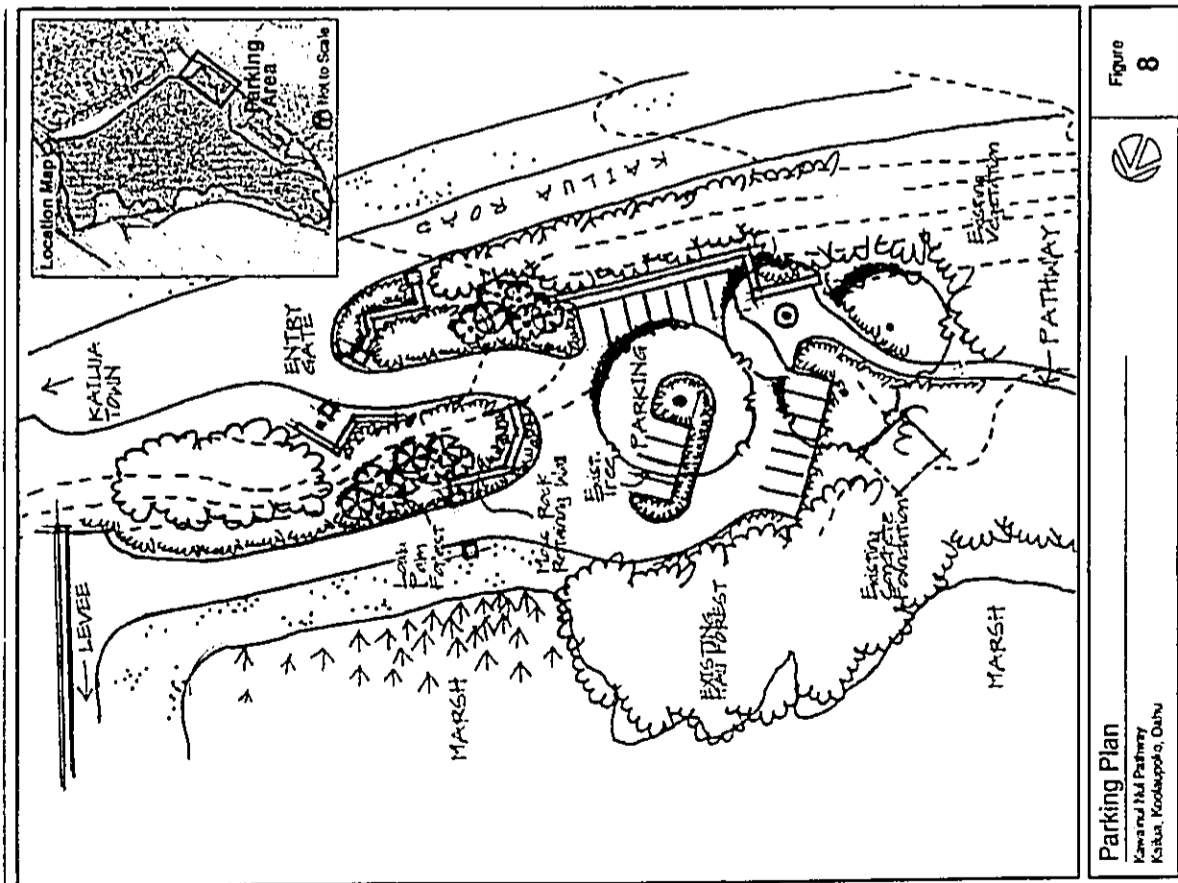
Recommendations: Recommendations for Segment 1 include the following:

- Construct a new parking lot at the base of the maintenance road at the south end of levee. Improvements should include an entry gate (recent distinctive designs have been prepared and submitted to DLNR) that can be closed at night to prohibit access.
- Construct a pedestrian pathway that maximizes a diverse environmental experience (hau forest, rock outcrops, Taro terraces, wetlands) and access to archaeological/cultural features in the area.
- Construct a spur pathway trail to the Ulupo Heiau.
- Construct a low-impact boardwalk near the Kawai Nui Vista subdivision to keep pedestrians away from residential lots. Also construct a boardwalk and viewing platform that extends into the marsh below the Kukanono subdivision.
- Prohibit motorized vehicles. Utilize interpretive signage for information and instructions on allowable activities.
- Develop a pedestrian entryway through the highway guard rail on Kailua Road above Ulupo Heiau.

Discussion: At the Kailua Road terminus of the levee, there is an opportunity to construct a new parking area capable of accommodating approximately 15-20 cars. As shown in Figure 8, the entrance to the parking would utilize the existing maintenance access road to the levee. No widening of the road is recommended. The parking would require cleaning and grubbing of existing hau thickets south of the access road's hairpin turn. The area within the hau thickets could be selectively cleared to allow shade for the parked cars and for pedestrians accessing the pathway.

From the parking area, the trail extends down-slope towards the Kawai Nui Vista subdivision. This portion will be the easiest to construct because it will be the least hampered by rugged terrain and dense vegetation. A single historic property of note is





Parking Plan
 Kawanaulani Pathway
 Kailua, Koolauloaa, Oahu
 Figure 8
 4-8

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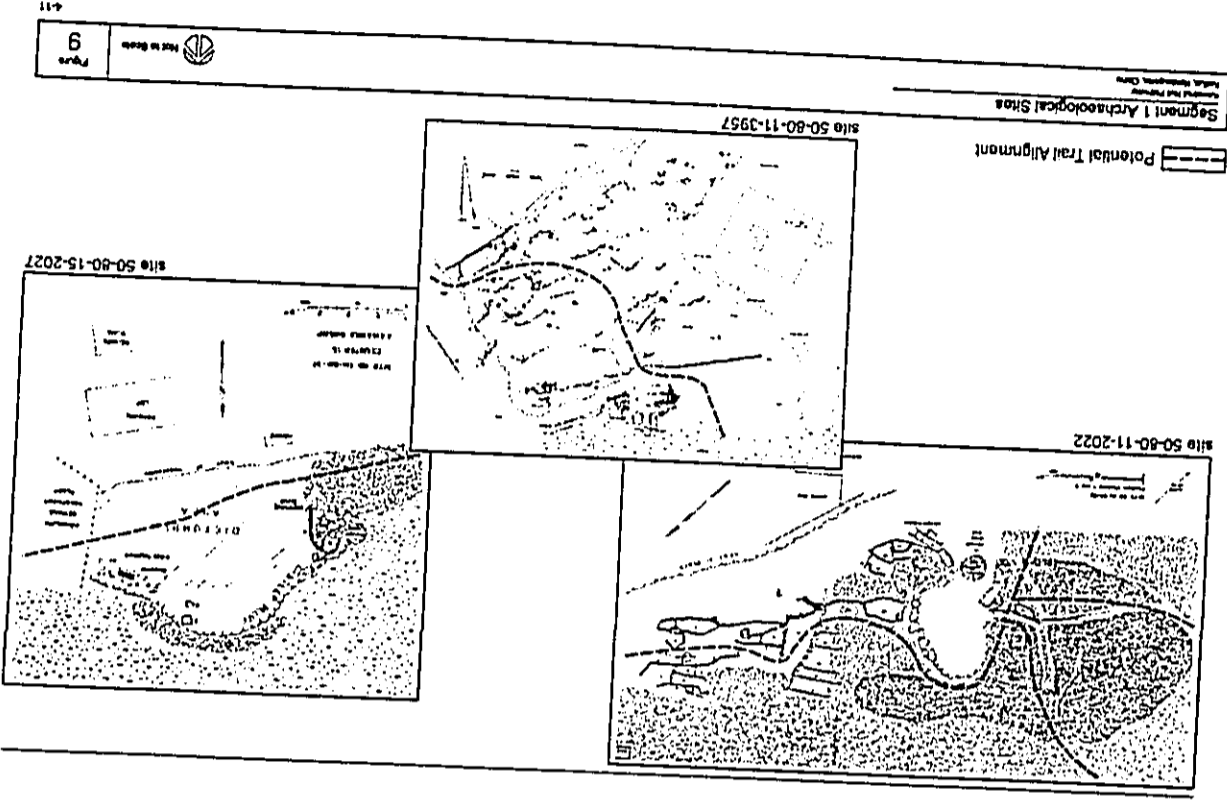
located just south of the proposed parking area. The site includes a pump house and excavated canal that are part of the Waimanalo Irrigation System completed in 1923.

The pathway alignment is recommended to be located on the Kailua Road side of the property in order to avoid the need to construct a bridge.

Once past the pump house, the trail should continue through the hau vegetation. There is an existing trail that can be improved upon. Initially, hau vegetation will block views of the marsh. However, because of the relatively high canopy of this hau thicket, the trail alignment should not be hampered by vegetation. Eventually, the vegetation becomes grasses and koa haole. At this point, there are opportunities for views of the marsh. Some difficulties may arise from the intermittent drainage that runs between St. John's Church and the subdivision. Construction of a boardwalk would address this issue, as well as move pedestrian traffic farther away from the subdivision lots.

Once past the subdivision, the terrain becomes more rugged, with vertical basalt outcrops and steep, boulder-strewn slopes. Vegetation consists predominantly of a dense tangle of hau, with occasional mango and banyon trees. Because of the rough terrain, the simplest means of creating a trail alignment through this area would be to elevate the trail on the up-slope of the basalt outcrops, in proximity to the property boundaries of the church and school properties in the area. Good vistas of the marsh would be possible.

There are several archaeological sites along this segment that could be incorporated into the pathway alignment. One site (State Site 50-80-11-2027) comprises both historic and prehistoric features (Clark, 1980) related to habitation and possibly agriculture. Stacked basalt wall segments, terraces, and enclosures, and basalt adz fragment were recorded in the area. The features are somewhat indistinct and not particularly suited for public participation. In the vicinity of a second site (State Site 50-80-11-2022), the hill slope down to the marsh becomes less steep and the vegetation is less dense. Basalt boulders and outcrops are still common and a trail alignment that traverses the slope will have to negotiate this irregular terrain. Features of Site 2022 consist largely of stacked basalt boulder retaining walls for agricultural purposes. The terraces form rectangular lo'i, or wetland taro pond fields. These features were likely constructed prehistorically and their use continued through the 19th century. Several of the terraces are spring fed and are actively under cultivation with taro and banana. This area is a beautiful spot and could be one of the high-points of the trail in this area. Site 50-80-11-3957 is in the western-most portion of Segment 1. The site consists of numerous stacked stone features including clearing mounds, enclosures, wall alignments, a



CHAPTER 4 PATHWAY PLAN

historic house site, and irrigation features (Erkelens, 1993). Features in this area are good for interpretation.

Figure 9 shows the potential trail alignment through the three sites described above. Generally, the trail alignment should meander through these areas. From the historic residence feature, which is located on the margin of the marsh not far from an existing open water area, the construction of the boardwalk with viewing platform is recommended. Regardless of future plans for the construction of ponds for water bird habitat, this component of the trail could be implemented and provide a new recreational and educational opportunity for visitors.

From a point near the archaeological features below, a spur trail is recommended to connect to Ulupo Heiau. The heiau is one of the most visually impressive traditional Hawaiian religious structures on Oahu. Trail-users along this segment will approach the heiau from below, and experience a dramatic view of the structure. From the heiau, trail users can be directed up an old roadway alignment to access Kaitua Road. Creation of an entryway through the existing highway guardrail will provide the opportunity for hikers and/or bicyclists to exit the area.

4.3.2 Segment 2 (Figure 10)

Description: This pathway segment extends from the terminus of Segment 1 to Ulukahiki Street behind Castle Hospital. The moderate to steeply sloped terrain includes a variety of mature tree and shrub species that combine to create a full shade-producing canopy. Some of the more striking natural features in this area include medium to large rock outcroppings and the aerial root structures of Banyan trees.

Opportunities: The slopes behind the Kukanono subdivision offer a continuation of a pedestrian hiking experience, with a focus on existing archaeological and natural mudflats or shallow ponds in the marsh directly fronting this entire segment.

Constraints: As discussed in Chapter 3, residents of the Kukanono subdivision have expressed concerns about a pathway along the slopes below their homes. Issues of particular concern include a potential increase in property crime, maintaining the quiet and private character of the area, and the impacts from increased automobile traffic and parking on neighborhood streets.

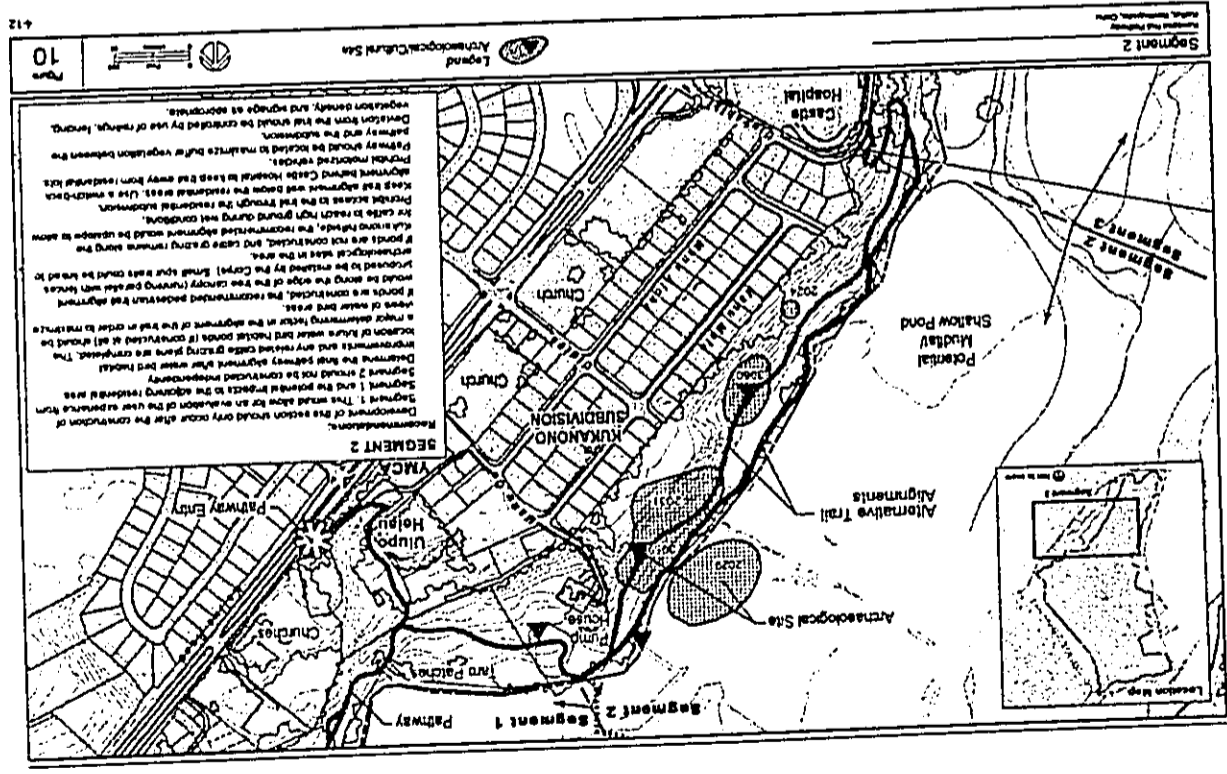
Chapter 3 PATHWAY PLAN

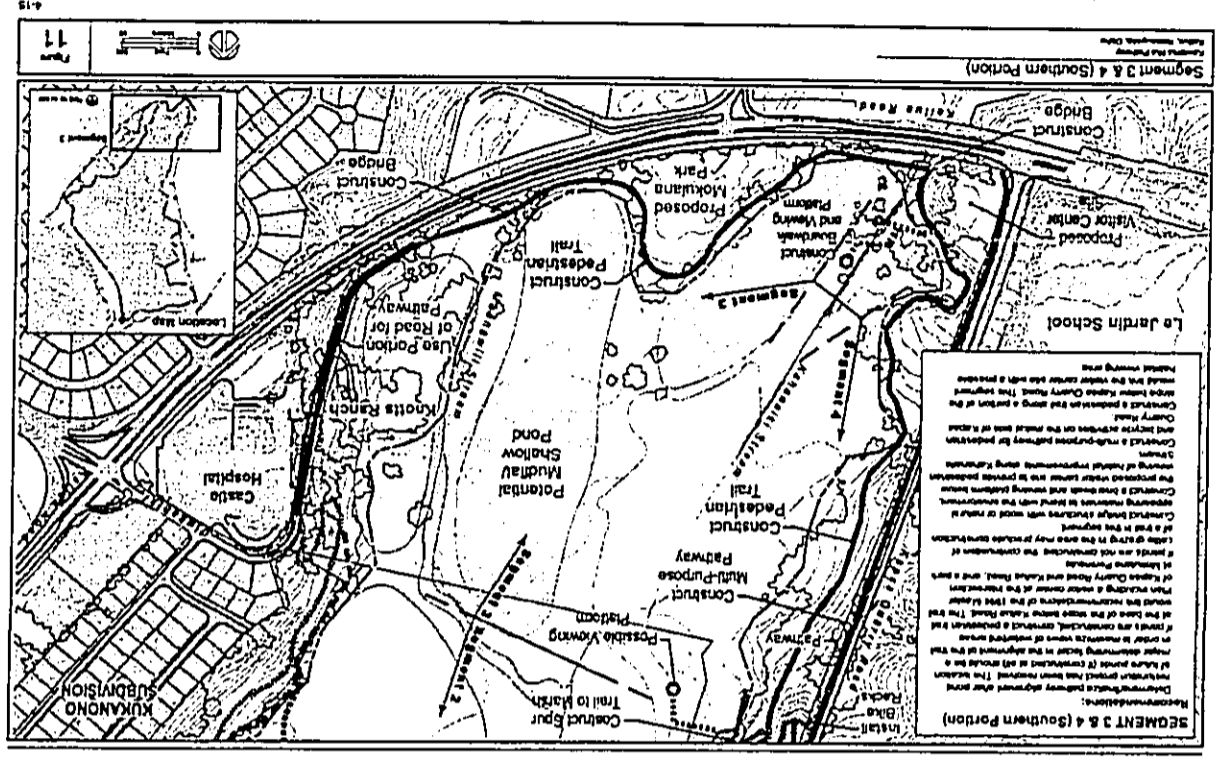
Recommendations for Segment 2 include the following:

- Development of this section should only occur after the construction of Segment 1. This would allow for an evaluation of the user experience from Segment 1 and the potential impacts to the adjoining residential area. Segment 2 should not be constructed independently.
- Determine the final pathway alignment after water bird habitat improvements and any related cattle grazing plans are completed. The location of future water bird habitat ponds (if constructed at all) should be a major determining factor in the alignment of the trail in order to maximize views of water bird areas.
- If ponds are constructed, the recommended pedestrian trail alignment would be along the edge of the tree canopy (running parallel with fences proposed to be installed by the Corps). Small spur trails could be linked to archaeological sites in the area.
- If ponds are not constructed, and cattle grazing remains along the Kukanono hillside, the recommended alignment would be upslope to allow for cattle to reach high ground during wet conditions.
- Prohibit access to the trail through the residential subdivision.
- Keep trail alignment well below the residential areas. Use a switchback alignment behind Castle Hospital to keep trail away from residential lots.
- Prohibit motorized vehicles.
- Deviation from the trail should be controlled by use of railings, fencing, vegetation density, and signage as appropriate.

Discussion: Beyond the pumping station at the end of Manu Oo Street, the vegetation along the proposed trail alignment changes from predominantly dense mixes of hau thickets and introduced species, to a more open canopy of various trees. This vegetation change is most likely related to the access of cattle to this portion of the Kukanono slope. Trail construction and maintenance along this segment will be much less relative to Segment 1.

As noted in the list of recommendations above, options exist for the trail alignment based on the creation of shallow ponds in the marsh directly below the neighborhood. In either case, public interpretation of archaeological features in the area should highlight





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features of a number of sites including Sites 50-80-11-2029, 50-80-11-2031, 50-80-11-3959, and 50-80-11-3960. These sites include prehistoric stacked stone features, prehistoric grinding stones for adz manufacture, and likely buried prehistoric and historic agricultural field walls out in the level surface of the marsh.

Access directly to the trail is not proposed from any of the primary neighborhood streets. Ulukahiki Street provides vehicular access to Kukanono, in addition to Castro Hospital and Knoll Ranch. Some very limited parking is a possibility along the right side of the street down to the base of the hill behind the hospital.

4.3.3 Segment 3 (Figure 11)

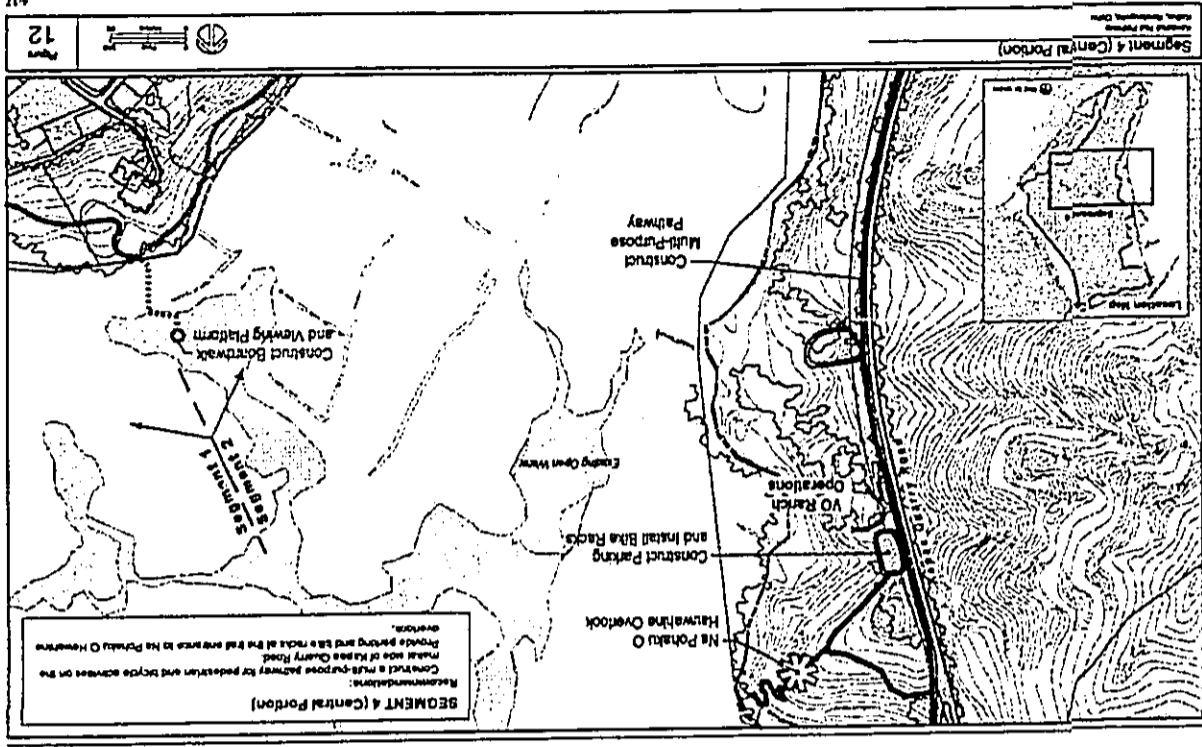
Description: This segment extends from the terminus of Segment 2 on Ulukahiki Street to the area that encompasses the visitor center site (proposed by the 1994 Master Plan) at the intersection of Kailua Road and Kapaa Quarry Road. The natural character of this segment, which is currently dominated by cattle ranch operations, is mostly flat land with level terrain. Natural slopes occur along the access road to the Knoll Ranch, as well as at Mokulana Peninsula, at the southernmost end of the marsh.

Opportunities: This segment includes proposals for a visitor center, a park at Mokulana Peninsula, and construction of shallow ponds for water bird habitats. If these proposals are actually implemented, this segment provides a tremendous opportunity to expand recreational and educational activities in the area. Maunawili and Kahanaiki Streams, creating a diverse natural landscape highly suitable to pedestrian use, bisect the area.

Constraints: Cattle grazing and ranch operations currently utilize the entire area. DNLR is responsible for determining where these activities will be located in the future, and as yet, that decision is pending.

Recommendations: Recommendations for Segment 3 include the following:

- Determine/finalize pathway alignment after pond restoration project has been resolved. The location of future ponds (if constructed at all) should be a major determining factor in the alignment of the trail in order to maximize views of water bird areas.
- If ponds are constructed, construct a pedestrian trail at the base of the slope below Kailua Road. The trail would link recommendations of the 1994 Master Plan to construct a visitor center at the intersection of Kapaa Quarry Road and Kailua Road, and a park at Mokulana Peninsula.



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- If ponds are not constructed, the continuation of cattle grazing in the area may preclude construction of a trail in this segment.
- Construct bridges over existing streams with wood or natural appearing materials to blend with the environment.
- Construct a boardwalk and viewing platform below the proposed visitor center site to provide pedestrian viewing of habitat improvements along Kahanaiiki Stream.

Discussion: There are no recorded historic properties within this segment. Vegetation and topography should not hinder construction of the pathway, except for having to cross the two streams. On Mokulana Peninsula, there is a tall canopy of introduced trees. Beneath this canopy is limited undergrowth due to the grazing operations. Excellent vistas of the marsh are available from the peninsula.

Views of equal significance are available from the proposed visitor center site. The State's objectives for the center are to: 1) orient residents, school groups, and visitors to designated points of interest around the marsh; 2) serve as a center for educational and interpretive programs of the marsh; and 3) provide a repository for historical, cultural, ecological and other reference and exhibits. The proposed pathway alignment would link to this facility and provide access to the marsh where a boardwalk and viewing platform along Kahanaiiki Stream could be constructed.

4.3.4 Segment 4 (Figures 11, 12, and 13)

Description: This segment extends approximately 1-1/2 miles along Kapaa Quarry Road, from the intersection at Kailua Road to the Model Airplane Park. Natural characteristics of the area are similar to those in the Kukanono area (Segment 2), with moderate to steeply sloped terrain that includes a variety of mature tree and shrub species that create a full shade-producing canopy. Significant areas of hau thicket also fringe the marsh in some locations. The area includes several prominent rock outcrops including the Na Pohaku O Hauwahine Overlook. Ranch operations (VO Ranch) occupy approximately 10 acres just south of Na Pohaku.

Opportunities: Portions of this segment are geologically very interesting, with large rock outcroppings and boulders. High points and vistas present impressive views of the marsh.

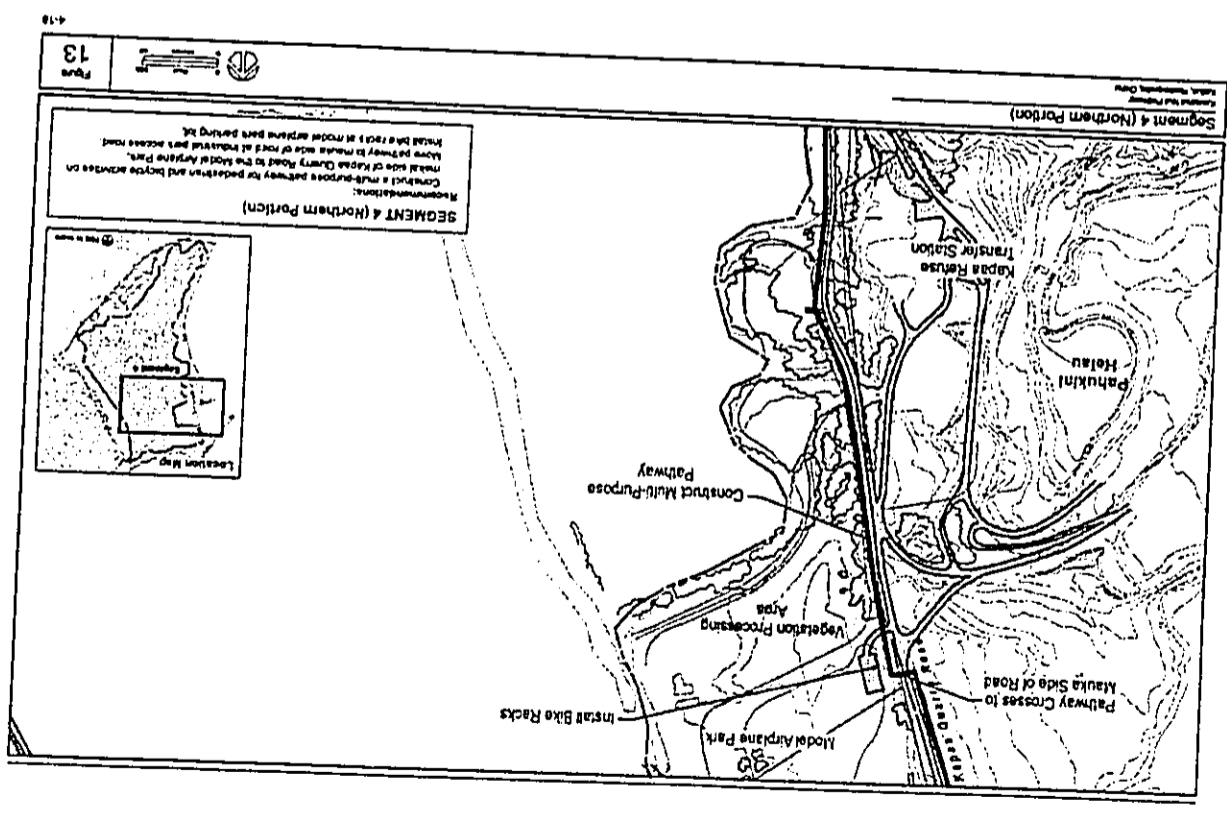
Chapter 4 PATHWAY PLAN

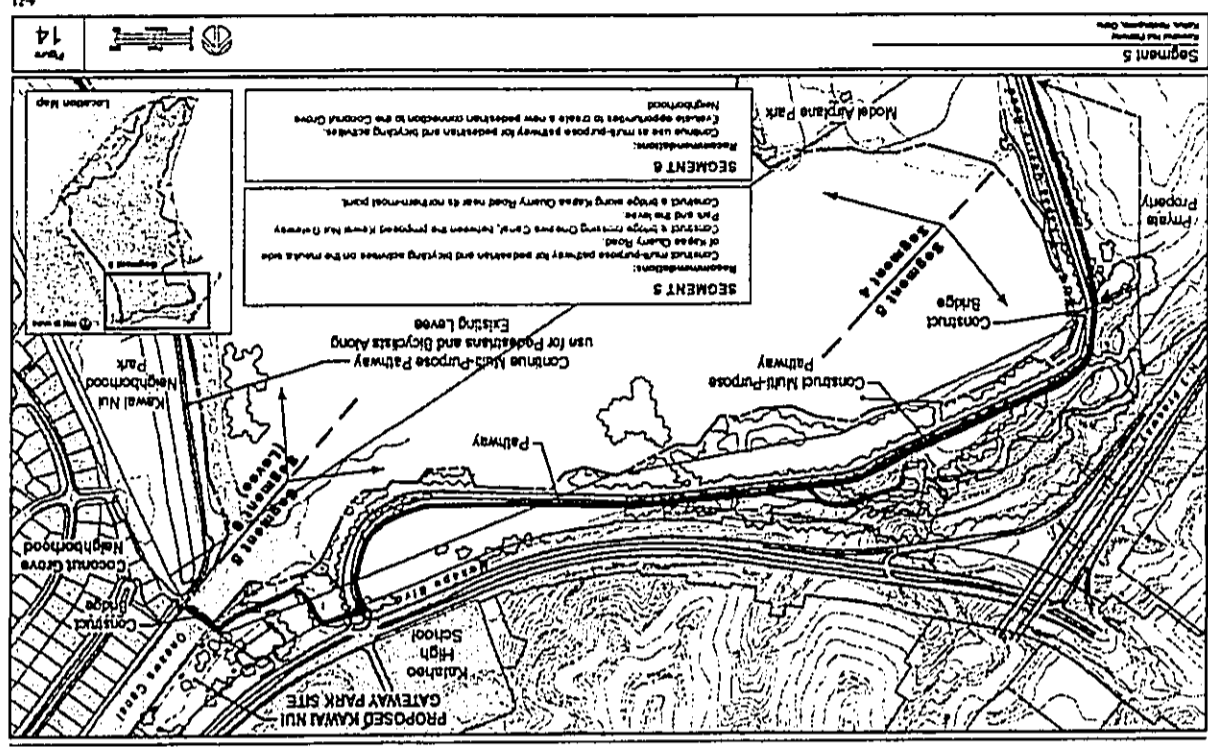
Constraints: Kapaa Quarry Road and adjacent lands are isolated from the general community. Historically, the road has been used predominantly for traffic to the landfill. More recently, growth at the industrial park at the northern end of the marsh has increased industrial truck traffic. Due to its remoteness, vehicles often travel at excessive speeds. Near Na Pohaku O Hauwahine, the road bends and dips creating a hazardous situation. Shoulder areas along the road are not paved. Within the marsh, cattle grazing operations preclude hiking.

Recommendations: Recommendations for Segment 4 include the following:

- Construct a multi-purpose pathway (for bicyclists and pedestrians) along the makai (marsh) side of Kapaa Quarry Road.
- Provide a small median between the multi-purpose pathway and Quarry Road to separate vehicles from bicyclists and pedestrians, increasing safety along the pathway.
- Provide pedestrian spur trails within the forest area, and where appropriate, to the marsh edge.
- Spur trails should have bicycle racks to secure bicycles.
- In the southern portion of this segment, construct a pedestrian trail along the slope below the road, linking the proposed visitor center site with a new habitat viewing platform approximately 1/2 mile north of Kailua Road. [Note: the boardwalk and viewing cattle grazing in the future.]
- Ensure separation of pedestrians and ranching operations.

Discussion: The dense vegetation between the Kapaa Quarry Road and the marsh will preclude vistas of the marsh for users of the multi-purpose pathway. However, the pedestrian trail along the slope would continue the viewing experience around the southern end of the marsh that characterizes the experience along Segment 3. The proposed spur trail approximately 1/2 mile from Kailua Road would ascend to one of the highest points along the marsh side of the road. This high point will provide good views of the marsh onto the predominantly Christmas Berry vegetation has been cleared. The spur trail would require a number of switchbacks to the marsh below. An old road cut that extends perpendicular to the slope in the area could be incorporated into a portion of the spur trail.





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The multi-purpose trail will include a bike rack at the trailhead leading to the Na Pohaku overlook. The existing trail to the archaeological feature was constructed and is maintained by volunteers from the Kamehameha School and the Kawai Nui Heritage Foundation. The multi-purpose trail continues northward along the road to the Model Airplane Park where it crosses the road to the mauka side (see following discussion).

4.3.5 Segment 5 (Figure 14)

Description: This segment extends along Kapaa Quarry Road from the Model Airplane Park to the proposed Kawai Nui Gateway Park on Mokapu Blvd. The natural character of the area makai of Kapaa Quarry Road is flat, with much of the area consisting of actual marsh features in close proximity to the road. Terrain mauka of the road includes an area of moderate to steeply sloped land with a number of mature tree and shrub species to create a more forest-like setting.

Opportunities: This segment offers the least potential for cultural/historic public interpretation within the marsh. Expansive views of the marsh would be available from the marsh edge. The Kailua CVT has funded detailed planning for a new Kawai Nui Gateway Park located on Mokapu Boulevard. The 1994 Master Plan recommends constructing a bridge from the future park site to the existing levee.

Constraints: Much of the land on the makai side of Kapaa Quarry Road is wetland. Construction of a pathway along the edge of the marsh, as proposed by the 1994 Master Plan, would require significant fill or construction of boardwalks. Decisions from participants in the community meetings recommended not pursuing this alignment. Truck traffic along this stretch of the road is heavy.

Recommendations: Recommendations for Segment 5 include the following:

- Develop a crosswalk fronting the Model Airplane Park for crossing to the mauka side of the road.
- Construct a multi-purpose pathway (for bicyclists and pedestrians) along the mauka side of Kapaa Quarry Road.
- Provide a small median between the multi-purpose pathway and the road to separate vehicles from bicyclists and pedestrians, increasing safety along the pathway.

- Connect the pathway to the proposed Kawai Nui Gateway Park across from Kalahaio High School.
- Construct a footbridge of natural-looking or wood materials connecting the proposed park to the existing levee.

Discussion: The multi-purpose pathway in this segment is a continuation of the pathway described for Segment 4, thus extending the facility along the entire length of Kapaa Quarry Road. When it first crosses to the mauka side of the road, the pathway will extend approximately 1,200 linear feet on private land. At the large curve in the road, the land returns to public ownership.

4.3.6 Segment 6 (Existing Levee, see Figure 14)

Description: This segment extends 6,300 feet along the eastern boundary of the marsh, from Oneawa Canal to Kailua Road. It has an existing pathway (both paved and gravel-covered) that provides recreational opportunities for area residents to walk, jog, and bicycle along its length.

Opportunities: The levee is not officially identified or encouraged to be used as a multi-purpose pathway. The levee could become more of an alternative transportation element within the Kailua area.

Constraints: The levee must be free of any obstructions in order to allow access by maintenance vehicles.

Recommendations: Recommendations for Segment 6 include the following:

- Identify the levee as a part of the Kailua bikeway system and encourage use as a multi-purpose recreational feature.
- Evaluate opportunities to create a new pedestrian connection to the Coconut Grove Neighborhood. This discussion could be part of the planning effort that considers passive use improvements on un-used City property south of the Kawai Nui Neighborhood Park.

Discussion: It is important to keep in mind that the levee is an existing pathway element that needs to be maintained, and clearly identified as a multi-purpose pathway for use by the public. Improvements to continue or even improve access to the levee are important. Comments on the draft report included consideration of expanding the paved surface along the levee on areas that are now covered by gravel. DLNR personnel

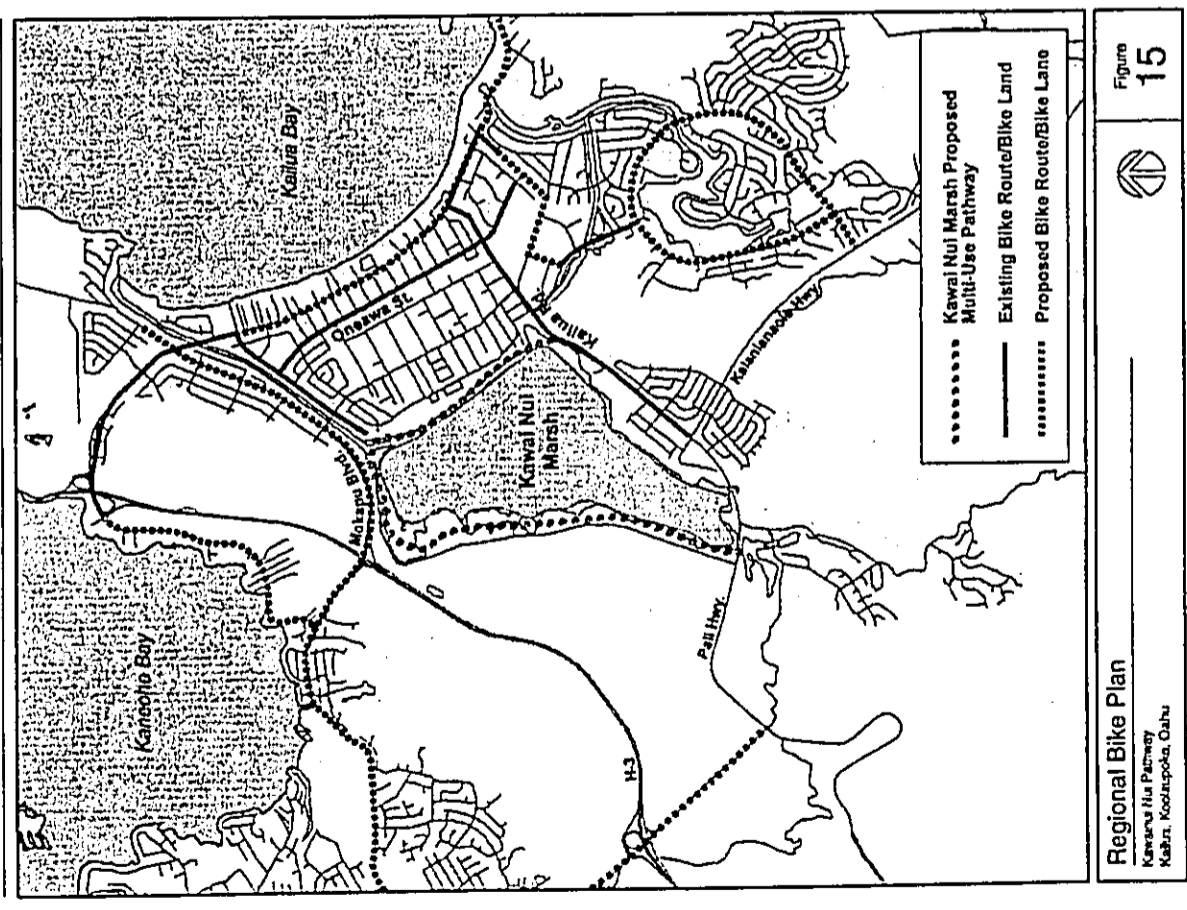
responsible for the maintenance of the levee indicated they would not object to such an improvement, as long as structures were not constructed that could impede access of maintenance vehicles. However, others stakeholders who have participated in the pathway project expressed concerns over the potential of increased erosion along the edge of the marsh. Use of permeable materials (as opposed to asphalt) is one way to mitigate this potential impact. Continued discussion of this issue is warranted.

4.4 Integration with Regional Bicycle System

Existing and proposed bike routes/lanes in the Kailua area are shown in Figure 15. Recent improvements to the system have been made from Kailua Town to Castle Hospital, linking up with existing routes along Oneawa Street in the Coconut Grove neighborhood. Existing routes extend from Lanikai to Kaneohe Bay. The proposed multi-purpose pathway would provide a major linkage to the existing and proposed system, thereby providing alternative transportation opportunities through the region.



Chapter 5 PATHWAY IMPLEMENTATION



5.0 PATHWAY IMPLEMENTATION

This chapter discusses priority projects, design and construction guidelines, accessibility requirements, and estimated costs.

5.1 Implementation Priorities

It is anticipated that the implementation of the pathway will be accomplished in increments, as funding becomes available. Also, the final design and implementation of portions of the pathway are contingent upon future pond construction by the U.S. Army Corps of Engineers. The pathway segments, as described in chapter 4, serve as general implementation increments.

Based on input from the community, the priority pathway project would be Segment 1, extending from the existing levee trail to the beginning of the Kukanono slope and Ulupo Heiau. The objective in Segment 1 is to create a pedestrian-oriented pathway providing educational and recreational opportunities. This segment affords an abundance of natural and cultural features. Because it begins at the existing levee, and connects at Ulupo Heiau, the segment is readily accessible from Kailua Road, where recent upgrades have been made to the bicycle route.

The next priority project would be the construction of a multi-purpose pathway in Segments 4 and 5. This facility would extend from Kailua Road to the proposed Kawai Nui Gateway Park, along the shoulder of Kapaa Quarry Road. The multi-purpose pathway would accommodate bicyclists, joggers, and pedestrians. The pathway would run along the mauka (marsh) side of the road to the Model Airplane Park, and on the mauka side of the road to the park. Because this segment has fewer natural and cultural points of interest, the emphasis is on enhancing its recreational use.

Other segments represent longer-term projects, which may be implemented depending on the development of other proposed projects (i.e., from the Master Plan) and funding availability. As noted in Section 4.3.2, development of Segment 2 should follow the construction of Segment 1, and should not be constructed independently. The final pathway alignment for Segment 2 would be an extension of Segment 1, but should be determined only after water bird habitat improvements and any related cattle grazing plans are completed.

5.2 Pathway Components

Major components of the pathway plan, including design features, access to the pathway, Americans with Disabilities Act requirements, and signage are discussed in the following sections.

5.2.1 Design Features

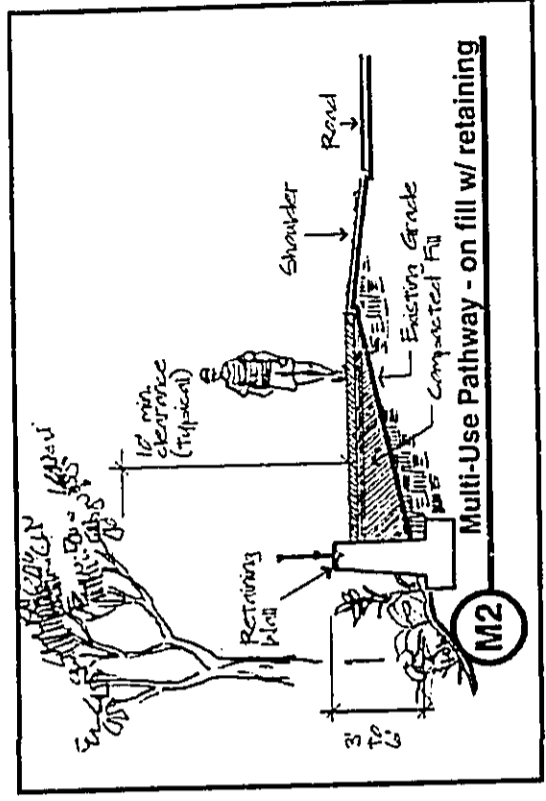
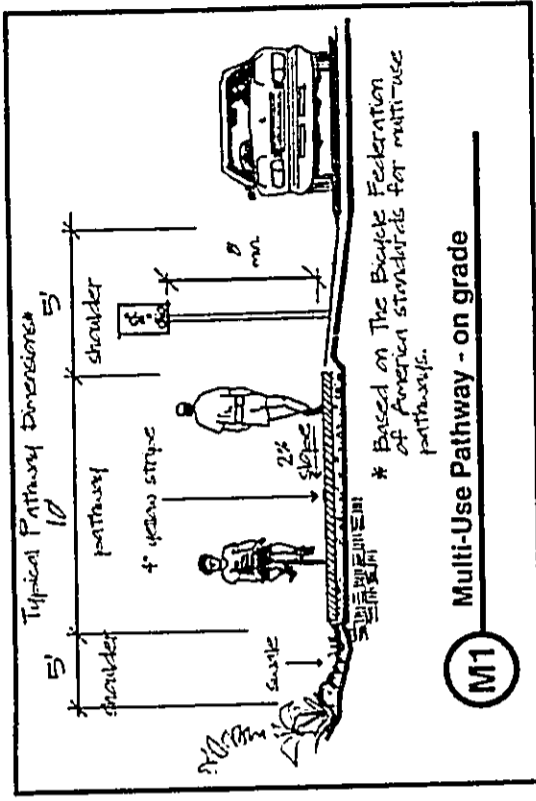
To accommodate the various environmental settings and physical constraints around the marsh, different pathway designs are proposed. Designs for multi-purpose pathway include at grade construction, on fill with retaining wall, cut slope, and cut and fill. Pedestrian trails include those meeting ADA standards, and others strictly for hikers. A variety of boardwalk treatments are also utilized. Figure 16 provides an overview of the location where different types of pathway designs are recommended. Pages following the figure provide detailed drawings of each design.

5.2.2 Pathway Access

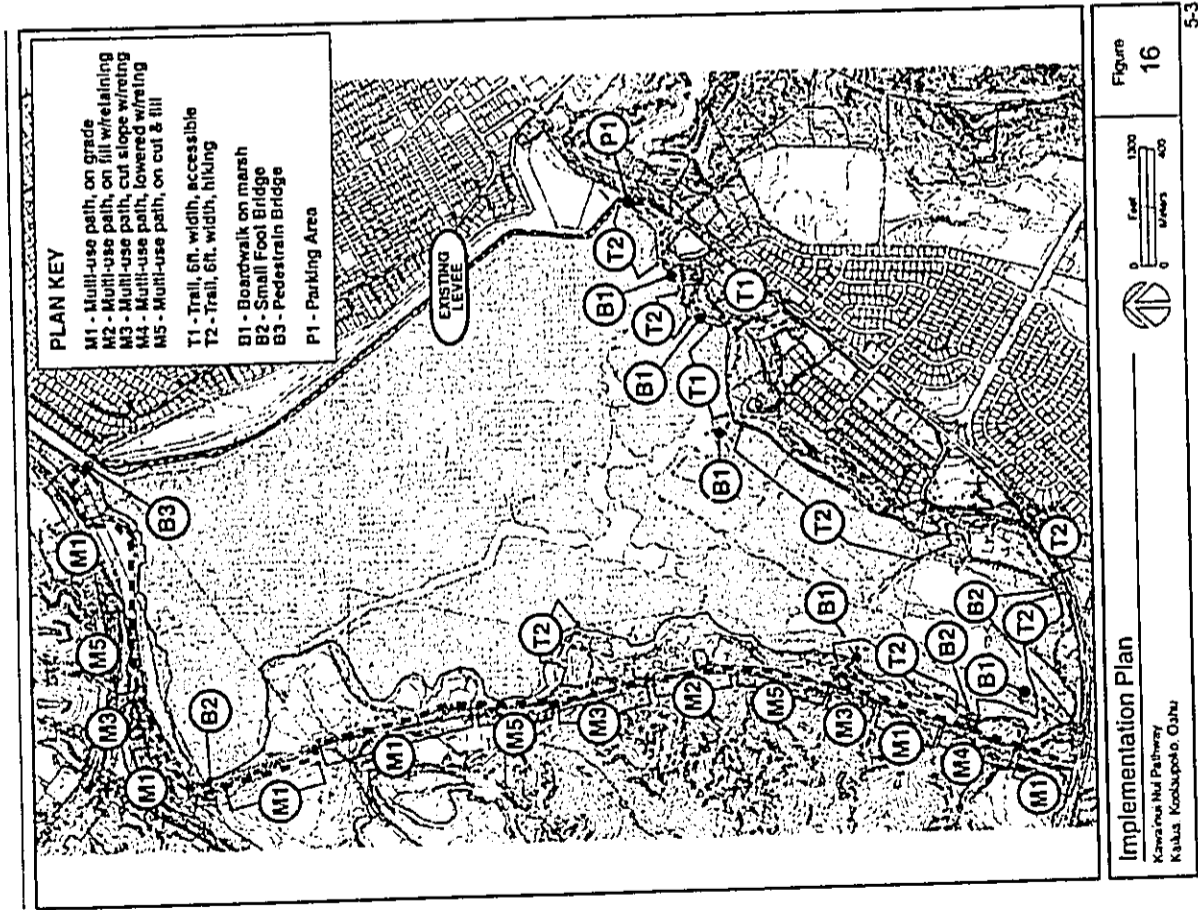
At present, access to the marsh is very limited. Parking is available at the north end of the levee at Kawai Nui Neighborhood Park. Pedestrians can access the levee from Kailua Road (south end), but parking is very limited along the shoulder of the road. In order to preserve the beauty and ecology of the marsh, and to minimize the disturbance to adjacent residential communities, it is important to provide clearly defined and controlled access points to the pathway network as new segments are developed.

Safety, security, and appropriately-sized parking are important elements of the location of access points to the pathway. By locating parking areas and trailheads away from existing residential communities, negative impacts of the trail can be greatly reduced. Also, the careful design of access points can help to control inappropriate use of the pathway by motorized vehicles.

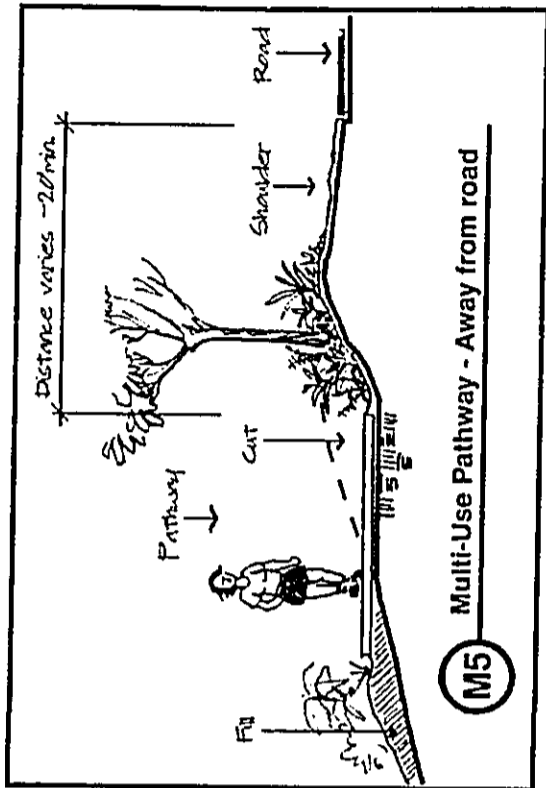
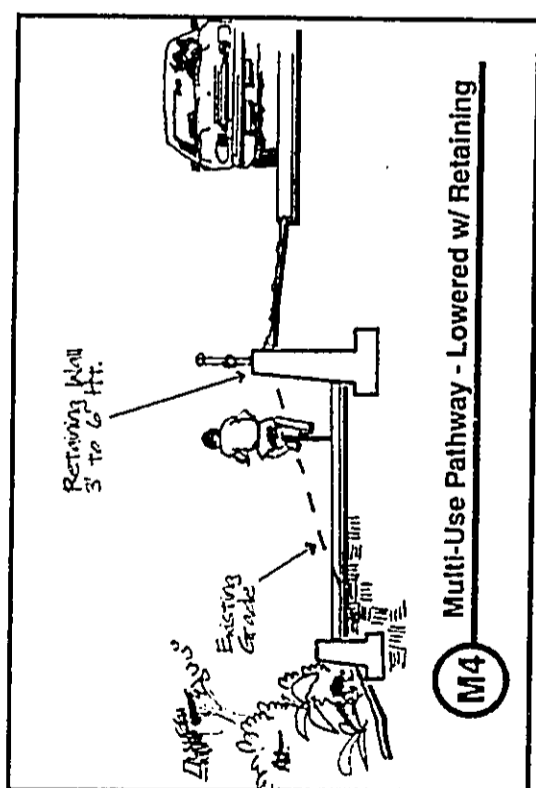
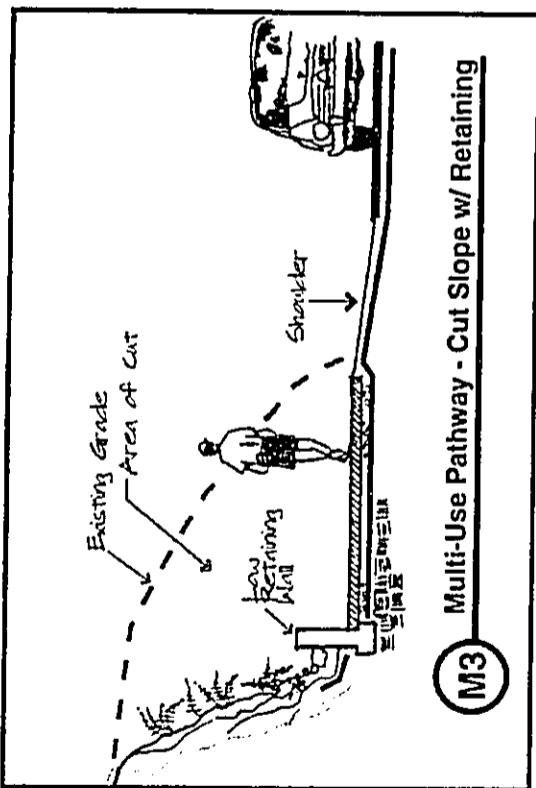
During periods of trail maintenance, marsh pond excavations, or levee maintenance, access to portions of the trail will need to be closed. Also, it can be anticipated that in periods of the rainy season, access to the lower portions of the trail might be limited, as boardwalks might be flooded or cattle grazing operations would shift to avoid flooded areas. Access to the pathway along the levee should be gated and locked, to control un-authorized vehicular use, and to allow for authorized maintenance vehicles and tractors.

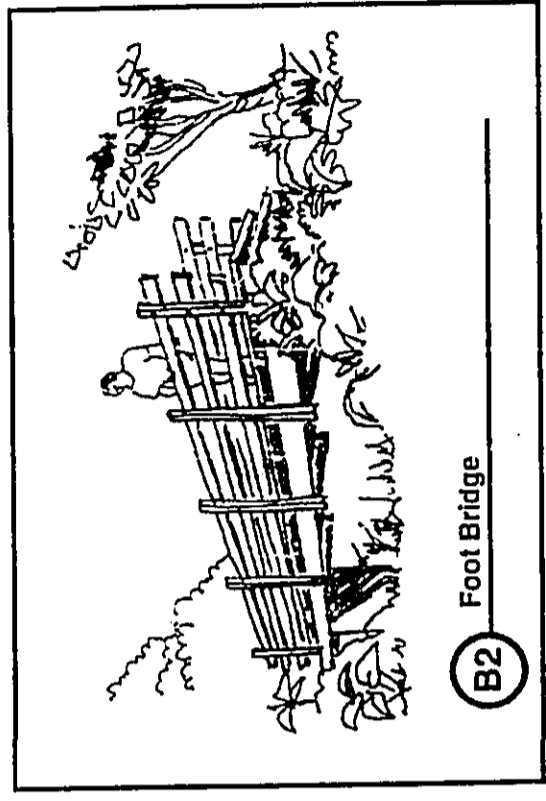
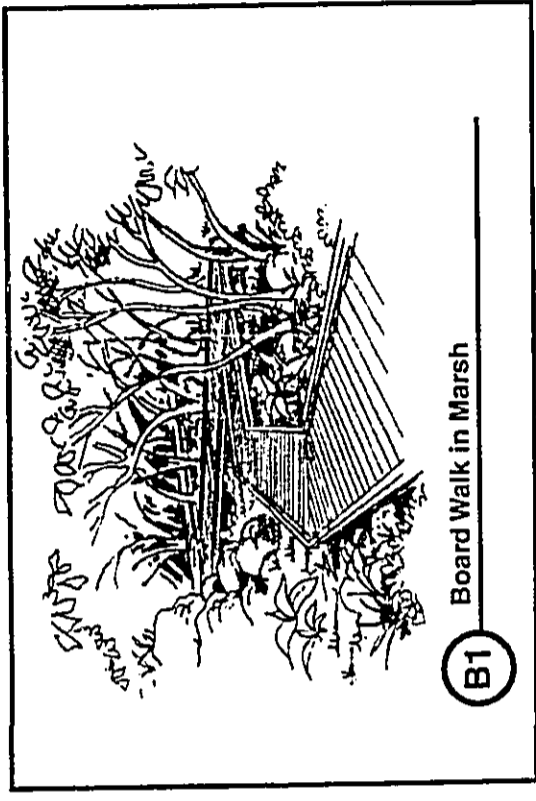


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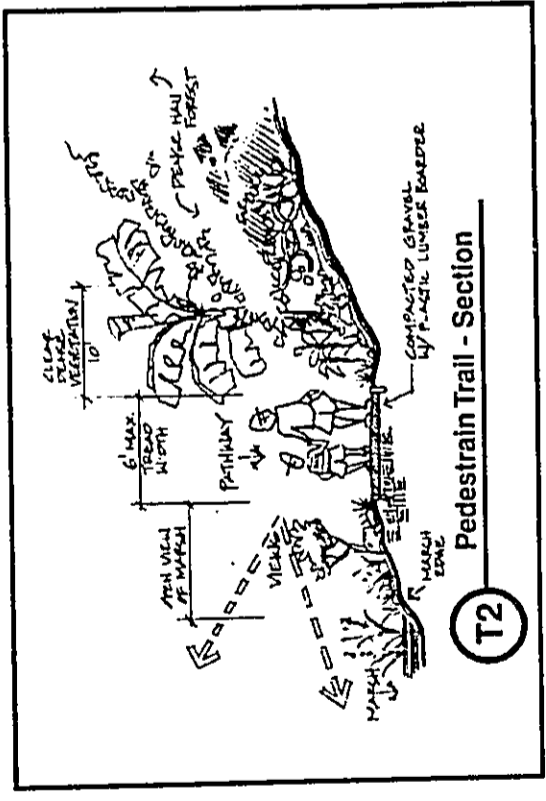
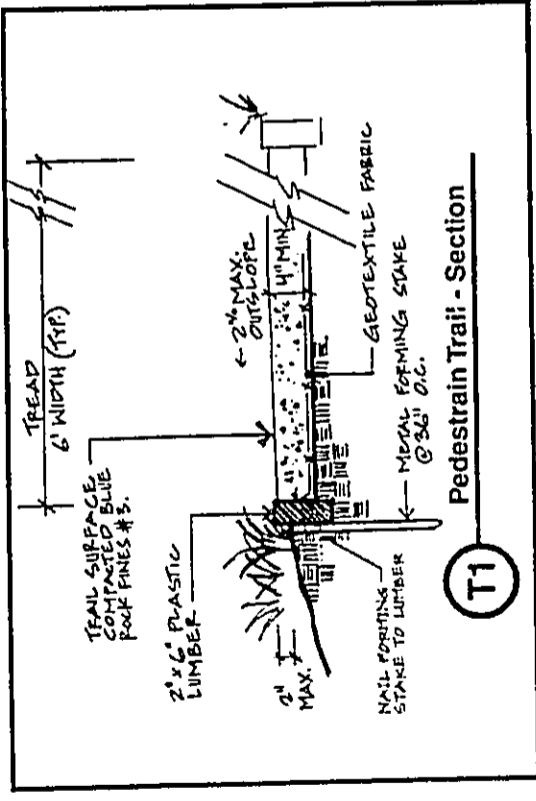


5-3





5-8



5-7

Chapter 5 PATHWAY IMPLEMENTATION

The 1994 Master Plan recommended additional parking areas at Mokulana Peninsula, at the corner of Kailua Road and Kapaa Quarry Road at the proposed visitor center, near Na Pohaku O Hauwahine Overlook, and at a small park along Mokapu Boulevard across from Kalaheo High School. The Kailua Vision Team recently funded the expansion of parking at the Kawai Nui Neighborhood Park. This planning report recommends adding a parking area at the southern terminus of the levee with access from Kailua Road. This would expand the opportunities for access to the levee, but more importantly would provide parking for pedestrians wanting access to the segment 1 pathway from the levee to below the Kukanono area. It is the intent of this parking area to minimize parking at the existing YMCA, thus reducing/avoiding traffic going through the Kukanono residential neighborhood.

5.2.3 Americans with Disabilities Act Requirements

Kawai Nui Marsh is an important recreational and educational resource that should be available to all the citizens of Hawaii. The Americans with Disabilities Act (ADA) requires that new trails, which are designed and constructed for pedestrian use, should be made accessible. The current availability of accessible trails on the Island of Oahu is extremely limited. Potential pathway development around the marsh represents an important opportunity to provide recreation and educational opportunities in a natural setting for the physically disabled.

According to the ADA accessibility guidelines, a trail is "a route that is designated, or constructed for recreational pedestrian use or provided as an pedestrian alternative to vehicular routes within a transportation system." Paving of trails is not a requirement, as long as the surface is "firm and stable". Handrails and edge protection along trails are not required for ADA accessibility, but if they are provided they should meet appropriate standards.

Under the accessibility guidelines, accessible portions of the pathway will need to meet these minimum technical provisions:

- Clear tread width: 36" minimum
- Tread Obstacles: 2" high max
- Cross slope: 5% max.
- Running Slope (trail grade) meets one or more of the following:
 - 5% or less for any distance

Chapter 5 PATHWAY IMPLEMENTATION

- up to 8.33% for 200' max. Resting intervals no more than 200' apart.
- Up to 10% for 30' max. Resting intervals 30'.
- Up to 12.5% for 10' max. Resting intervals 10'
- No more than 30% of the total trail length may exceed a running slope of 8.33%.
- Passing Space: provide at least every 1000' where trail width is less than 60'.
- Signs: shall be provided indicating the length of the accessible trail segment.

Due to terrain conditions, there will be portions of the Kawai Nui Marsh pathway (e.g., within segment 1 and segment 4) that will not be practical to provide ADA accessibility. Departure from specific accessibility guidelines is permitted for any portion of the pathway where terrain or the prevailing construction practices make ADA compliance un-feasible. Also, the pathway portion would be exempt from ADA compliance if there is potential harm to cultural, historic, religious, or significant natural features or characteristics.

Areas where ADA accessibility should be ensured include the levee, the trail from Ulupo Heiau to the viewing platform at the marsh level, at the visitor center, and along the entire length of the multi-purpose pathway on Kapaa Quarry Road. The recommendation in Chapter 4 to clearly identify the existing levee as a multi-purpose pathway to ensure its availability to the community must include opportunities for the physically disabled to enjoy the pathway as well. Pathways from new and expanded parking areas at both ends of the levee need to provide easy access onto the levee according to ADA guidelines. Additionally, proposed wetland/bird habitat improvements within the marsh should include opportunities for all visitors to enjoy viewing plant and wildlife activities within the marsh.

The American with Disabilities Act trail guidelines report and additional information regarding the design and building of accessible trails can be found at the American Trails website: <http://www.americantrails.org>. The Regulatory Negotiation Committee on Accessibility Guidelines for Outdoor Developed Areas, Final Report, dated September 30, 1999 is available on-line at: <http://www.access-board.gov/outdoor/outdoor-rec-rpt.htm>

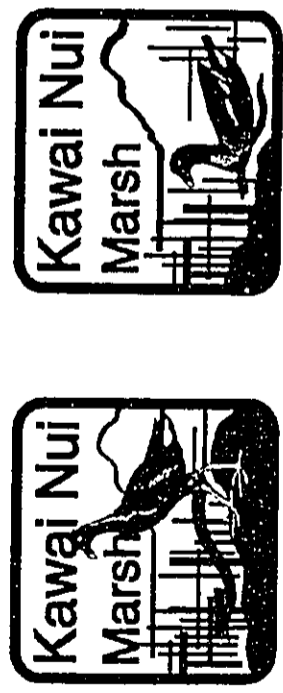
5.2.4 Pathway Signage

The pathway should include information regarding location, prohibited activities, importance of a location, and special instructions on safety, preservation, and

pathway boundaries. Kawai Nui Marsh has abundant opportunities for environmental and cultural education. Informational signage should be provided at appropriate entry sites, observation points, archeological/cultural sites, wildlife viewing areas, and important vegetation areas. Signage along roadways must conform to local codes and standards for clearance and breakaway posts.

Because of the value and abundance of opportunities at Kawai Nui, use of a logo on signage may be a way to distinguish Kawai Nui from other environmental preserves in the State, and to attract attention to information provided to visitors along the pathway. The logo could re-enforce the identity and special sense of place that is Kawai Nui Marsh.

During this planning project, several logos designs were developed for future consideration. These designs are presented below. The logos represents the basic elements of the marsh setting, it's majestic views, and special wildlife. The bird depicted is the Hawaiian Gallinule, an endangered species that inhabits the marsh.



Proposed Kawai Nui Marsh Logo designs depict the 'Aloa Ula (Hawaiian Gallinule)

5.3 Pathway Implementation Costs

Table 1 presents estimated costs for the five segments around the marsh. The total estimated cost for development is over \$1.2 million. These costs are presented for planning purposes only.

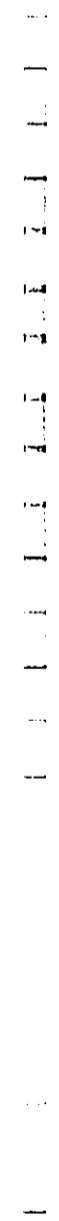
Table 1 Kawai Nui Marsh Pathway - Cost Estimation										
Pathway Type	Cost per Ln. Ft.	sgmnt 1	sgmnt 2	sgmnt 3	sgmnt 4	sgmnt 5	Trail Segments			
							Linear Foot Take-offs	sgmnt 3	sgmnt 4	
M1	\$240.00						3,200			4,000
M2	\$45.00									
M3	\$65.00									
M4	\$60.00									
M5	\$70.00									
T1	\$25.00	1,800								
T2	\$18.00	1,600	3,000							
B1	\$80.00	1,200						5,800		1,000
B2	\$110.00							700		
B3	\$150.00							60		40
P1	\$7.00	12,000								120
(square ft.)										8,000
Total Cost per Segment:		\$229,800	\$54,000	\$153,000	\$480,900	\$375,200				
									Total Cost:	\$1,292,900

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APPENDICES

Appendix A
ARCHEOLOGICAL
& CULTURAL SURVEY
Cultural Surveys Hawaii, Inc.

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Refer to: REPORT OF AN AVIFAUNAL FIELD RECONNAISSANCE
SURVEY FOR THE PROPOSED KAWAI NUI MARSH
PATHWAY, KOOLAUPOKO, OAHU, HAWAII

Appendix C
Floral Survey
Char & Associates

Appendix D Bibliography

Refer to: BOTANICAL RESOURCES ASSESSMENT
KAWAI NUI MARSH PATHWAY
KO'OLAUPONO, O'AHU



Bruner, Phil. *Report of an Avifaunal Field Reconnaissance Survey for the Proposed Kawai Nui Marsh Pathway, Koolauopoko, Oahu, Hawaii*. 2000.

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Rails to Trails Conservancy. *Trails for the Twenty-first Century, Planning, Design, and Management Manual for Multi-Use Trails*. 1997.

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The Nature Conservancy. *Kawai Nui Marsh Project*. 1983.

Wilson Okamoto and Associates. *Kawai Nui Marsh Master Plan*. Prepared for: State of Hawaii, Department of Land and Natural Resources, Division of Forestry and Wildlife, Division of Water and Land Development. 1991.

Appendix H
Draft EA
Response Letters

List of Comment Letters
Kawai Nui Marsh Pathway Environmental Assessment
October 16, 2002

No.	Name	Affiliation
1	Allan, Adrian	Le Jardin Windward Oahu Academy
2	Amii, Michael	City and County of Honolulu Department of Community Services
3	Donohue, Lee	City and County of Honolulu Police Department
4	Figel, Rich	Kailua Resident
5	Fujiki, Randall	City and County of Honolulu Department of Planning and Permitting
6	Gill, Gary	State Department of Health
7	Gornstein, Robert	Kawai Nui Vista Homeowners Association
8	Hamamoto, Patricia	State Department of Education
9	Hibbard, Don	DLNR, State Historic Preservation District
10	Jackson, Debra	Disability and Communication Access Board
11	Leonardi, Attilio	City and County of Honolulu Fire Department
12	Mamiya, Deirdre	Department of Land and Natural Resources
13	Miller, Jacquelin	University of Hawaii Environmental Center
14	Miller, Susan	Kawai Nui Heritage Foundation
15	Minaai, Brian	State Department of Transportation
16	Quinn, Dan	DLNR, Division of State Parks
17	Salmonson, Genevieve	State Office of Environmental Quality Control
18	Smith, Barbara (Hoppy)	Kailua Resident
19	Sonomura, Harold	State Department of Accounting and General Services
20	Sulky, G. & D. Kroll	Kailua Residents
21	Tomita, Kirk	Hawaiian Electric Company
22	Tribble, Gordon	United States Department of the Interior
23	Wong, Donna	Kailua Neighborhood Board Environment Committee
24	Young, George	Department of the Navy

J
LE JARDIN

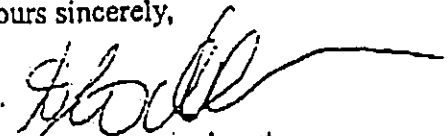
WINDWARD OAHU ACADEMY
917 Kalanianaʻole Highway • Kailua, Hawaii 96734
Phone: (808) 261-0707 • Fax: (808) 262-9339
www.lejardinacademy.com

June 21, 2002

Dear Cheryl D. Soon

My name is Adrian Allan and I am the Headmaster of Le Jardin Windward O'ahu Academy. I would like to support the idea of a path round the edge of the Kawai Nui Marsh and in particular the one that provides a safe route from Castle Hospital to the entrance of Le Jardin Academy. At the moment, there is no safe way for a student to reach our school on foot or by bike. The only route makes them travel along dangerous sections of the Kailua Road, the Pali Freeway and then along Kapaa Quarry Road. In fact, these routes are deemed so dangerous that no student is allowed to come to school by foot or bike. While a footpath would be better than no path in the areas marked T2, we would prefer a bike-path since the distance is quite long from Kailua where 70 percent of our students live. We of course would ideally prefer that the path extends in both directions as shown to the perimeter of Kailua since this would provide students at the school, soon to be a 1000 strong, with a safe route to school from both ends of Kailua.

Yours sincerely,


Adrian Allan, Headmaster

Helber Hastert & Fee
Planners, Inc

July 18, 2003

Mr. Adrian Allan, Headmaster
Le Jardin
Windward Oahu Academy
917 Kalaniana'ole Highway
Kailua, HI 96734



Dear Mr. Allan:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of June 21, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

We note your concern about providing a safe bicycle route for Le Jardin students to reach school. Unfortunately topography and other constraints prevent the use of the southern sections of the pathway for bicyclists.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners

David R. Curry, AICP
Principal

C: Cheryl Soon

DEPARTMENT OF COMMUNITY SERVICES
CITY AND COUNTY OF HONOLULU
715 SOUTH KING STREET, SUITE 311 • HONOLULU, HAWAII 96813
TELEPHONE: (808) 527-5311 • FAX: (808) 527-5490 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR



MICHAEL T. AMII
DIRECTOR

JOHN R. SABAS
DEPUTY DIRECTOR

May 31, 2002

MEMORANDUM

TO: CHERYL D. SOON, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

ATTENTION: MARK KIKUCHI, PROJECT MANAGER

FROM: MICHAEL T. AMII, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
KAWAI NUI MARSH PATHWAY
TMK: 4-2-13:2, 5, 10, 22 AND 38
4-2-16:1, 5 AND 6

Thank you for the opportunity to comment on the subject environmental assessment. We do not have any comments to offer on the proposed project at this time.

A handwritten signature in black ink, appearing to read "Michael T. Amii".

MICHAEL T. AMII
Director

MTA:dk

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Helber Hastert & Fee
Planners, Inc

July 18, 2003

Mr. Michael T. Amii
Director
City and County of Honolulu
Department of Community Services
715 South King Street, Suite 311
Honolulu, HI 96813



Dear Mr. Amii

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of May 31, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

We note that you do not have any comments to offer on the proposed project at this time.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBERT HASTERT & FEE, Planners

David R. Curry

David R. Curry, AICP
Principal

C: Cheryl Soon

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TL via 2-2473 S

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

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OLBERT S. COLOMA-ADARAN, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCES MANAGEMENT

DEPUTIES
ERIC T. HIRANO
LIMMEL NISHOKA

22 JUN 20 12:43

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES
DIRECTOR'S OFFICE
HISTORIC PRESERVATION DIVISION
KAKUHIWEWA BUILDING, ROOM 555
801 KAMOKUA BOULEVARD
KAPOLEI, HAWAII 96707

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE
MANAGEMENT
CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS

June 17, 2002

Cheryl D. Soon, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

LOG NO: 30078 ✓
DOC NO: 0206EJ12

Dear Ms. Soon:

SUBJECT: Chapter 6E-8 Historic Preservation Review - Draft Environmental
Assessment Kawainui Marsh Pathway, April 2002
Kailua, Ko`olaupoko, O`ahu
TMK: (1)4-2-013:002, 005; 010, 022, 038; 4-2-016:001, 005, 006

Thank you for the opportunity to comment on the DEA for the Kawainui Marsh Pathway, a proposed perimeter trail system around Kawainui Marsh. Our review is based on historic reports, maps, and aerial photographs maintained at the State Historic Preservation Division; no field inspection was made of the project areas. We received the DEA for comment from your office on May 23, 2002.

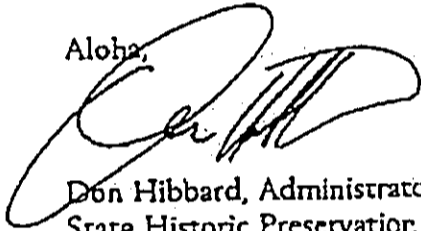
The DEA includes an archaeological assessment for the proposed trail project (*Archaeological Assessment and Background Literature Search for the Proposed Circle-Kawai Nui Marsh Trail Project, Kailua Ahupua`a, District of Ko`olaupoko, Island of O`ahu, CSH December 2000*) which documents the marsh's land use history and historic properties, including prehistoric and historic habitation, agricultural and irrigation systems. Numerous archeological and historic sites are located within the Marsh's boundaries including Site 50-80-11-2029, Archaeological Site 7, Kawainui Marsh which was determined eligible for the National Register of Historic Places in 1979. The archaeological assessment also contains recommendations to ensure that the State of Hawaii historic preservation process is carried out. The DEA includes in section 3.10.0 Archeological Assessment a summary of the historic resources identified to date within Kawainui Marsh. Mitigation measures proposed in this section recognize the need to conduct an archaeological inventory survey within the area of potential effect of the proposed trail system once a final trail alignment is selected. We recommend that an archaeological inventory survey be performed early in the planning phases of the project to determine if historic sites are present and, if so, to gather

Cheryl D. Soon, Director
Page Two

sufficient information to evaluate their significance. A report of the finds should be submitted to the State Historic Preservation Division for adequacy review. If significant historic sites are found during the survey a mitigation plan may need to be developed and executed prior to any ground disturbance connected with pathway construction. We particularly wish to caution that ample time should be left before the start of construction to carry out these actions, because if significant historic sites are found, then mitigation (probably in the form of data recovery) and/or preservation will be needed.

Should you have any questions, please feel free to call Sara Collins at 692-8026 or Elaine Jourdane at 692-8027.

Aloha,



Don Hibbard, Administrator
State Historic Preservation Division

EJ:jk

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Helber Hastert & Fee
Planners, Inc.

July 18, 2003

Ms. Sarah Collins, Acting Division Head
State Historic Preservation Division
State of Hawaii
Department of Land and Natural Resources
Kakuhihewa Building, Room 555
Kapolei, HI 96707



Dear Ms. Collins:

**Kawai Nui Pathway
Draft Environmental Assessment**

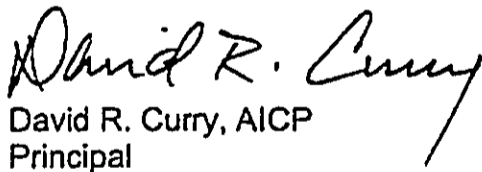
Thank you for your letter of June 17, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

We note your recommendation that an archaeological inventory survey be performed early in the planning phases of the project to determine if historic sites are present, and if so, to gather sufficient information to evaluate their significance. We also recognize that a mitigation plan may need to be developed and executed prior to any ground disturbance.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners


David R. Curry, AICP
Principal

C: Cheryl Soon

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DEPARTMENT OF PLANNING AND PERMITTING
RECEIVED CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET • HONOLULU, HAWAII 96813
TELEPHONE: (808) 525-4414 • FAX: (808) 527-0743 • INTERNET: www.cc.honolulu.hi.us

02 JUN 25 P 1:49

JEREMY HARRIS
MAYOR

DIRECTOR OFFICE
DEPT. OF
TRANSPORTATION SERVICES



HANDALL K. FUJIKI, AIA
DIRECTOR

LORETTA K.G. CHEE
DEPUTY DIRECTOR

2002/ED-3(j1)
2002/SMA-21(j1)

June 24, 2002

MEMORANDUM

TO : CHERYL D. SOON, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

ATTN. : MARK KIKUCHI

FROM : RANDALL K. FUJIKI, AIA, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING *for*

SUBJECT : DRAFT ENVIRONMENTAL ASSESSMENT
KAWAI NUI MARSH PATHWAY
KAWAI NUI MARSH - KAILUA
TAX MAP KEYS 4-2-13: 2, 5, 10, 22, AND 38;
4-2-16: 1, 5, AND 6

We have reviewed the Draft Environmental Assessment (DEA) for the proposed Kawai Nui Marsh Pathway and offer the following comments:

1. Page 1-1, General Information. TMK: 4-2-13: 2 should be changed to TMK: 4-2-103: 18.
2. Page 1-2, Physical Environment and Page 3-8, Mitigation Measures. The Civil Engineering Branch of DPP does not provide design recommendations. It is the responsibility of the final design consultant to comply with the appropriate regulations.
3. Page 2-1, Introduction. Will Oneawa Channel also be transferred to the State?
4. Page 2-10, Pathway Maintenance and Responsibility. Who will maintain the path along Kapaa Quarry Road, a private roadway?
5. Page 2-17, Segment 5. The footbridges may require a flood study, and the bridge crossing Oneawa Channel should clear the 100 year floodway.

Ms. Cheryl D. Soon
Page 2
June 24, 2002

6. Page 3-13, Water Quality. What impact will the construction of the parking lot have on water quality?
7. Page 3-21, Section 3.12. A subsection should be added to indicate how the proposal is consistent with the General Plan.
8. Page 3-26, Zoning. Clarify that the proposed pathway is a permitted use in the P-2 General Preservation District as a public use and structure, as defined in the Land Use Ordinance, and that uses within the P-1 Restricted Preservation District are regulated by the State.
9. Page 3-28, Special Management Area. Describe the expected project impacts (if any) on natural landforms in the area.
10. Page 5-1, Public Facilities. There are no plans for public restrooms or water fountains. Will there be any trash receptacles along the pathway, and if so, who will maintain them?
11. It appears that a portion of the pathway will be constructed within the Kapaa Quarry Road right-of-way, a private roadway. If so, the owner and TMK should be listed on Page 1-1.

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Helber Hastert & Fee
Planners, Inc.

July 18, 2003

Mr. Eric Crispin, AIA, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, HI 96813



Dear Mr. Crispin:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter of June 24, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared. For ease of reference, we will respond to your comments in the order they appear in your letter.

Page 1-1, General Information

The TMK reference will be changed to 4-2-103:18.

Page 1-2, Physical Environment and 3-8, Mitigation Measures

The text of the FEA will be amended to make it clear that the Civil Engineering Branch of the DPP does not provide design recommendations.

Page 2-1, Introduction

The Oneawa Channel will be transferred to the State by cancellation of a previous Executive Order that transferred the Channel to the City. However, it is unknown when this transfer will occur. The transfer of the Oneawa Channel is not related to the pathway project.

Page 2-10, Pathway Maintenance and Responsibility

At this time, ultimate maintenance responsibility for all segments of the proposed pathway remains unresolved, and must be negotiated amongst the agencies involved (City and State). This issue will be identified as unresolved in Section 1.7 of the FEA.

Page 2-17, Segment 5

We note that the footbridges may require a flood study, and we are aware that the bridge crossing the Oneawa Channel should clear the 100-year floodway.

Helber Hastert & Fee
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Mr. Eric Crispin
July 18, 2003
Page 2

We should also point out that the Department of Land and Natural Resources has indicated that a stream alteration permit may be required, and they have also pointed out that bridge clearance should be sufficient for local boat traffic.

The U.S. Coast Guard has issued advanced approval for the proposed pedestrian bridge over the Oneawa Canal, per Title 33, Code of Federal Regulations, Section 115.70. Per Section 10 of the Rivers and Harbors Act of 1899, a USACE permit is required for structures over waters subject to the ebb and flow of tide. USACE will review the final structural plans to ensure park structures meet flood control requirements.

Page 3-13, Water Quality

There are two aspects to anticipated impacts related to the proposed parking lot: (1) construction-period impacts; and (2) operational impacts. In terms of the construction period, impacts to marsh quality can be mitigated by the implementation of best management practices (BMPs) to control storm water runoff and erosion. BMPs could include: placement of a temporary berm to prevent runoff from reaching the marsh; covering exposed soil with appropriate surface as quickly as possible; restricting grading activities to "dry" season. Operational impacts can be mitigated by the use of a more pervious surface for the parking lot to allow greater infiltration of rainfall. In this case, a gravel parking lot surface would be appropriate. The driveway leading to the parking area would probably need to be asphaltic (due to slope considerations and vehicle safety), with runoff from this surface directed to the gravel parking lot. With implementation of such measures, water quality of the marsh should not be negatively impacted.

Page 3-21, Section 3.12

A subsection will be added to indicate how the proposal is consistent with the General Plan.

Page 3-26, Zoning

The text of the FEA will be amended to clarify that the proposed pathway is a permitted use in the P-2 General Preservation District as a public use and structure, as defined in the Land Use Ordinance, and that uses within the P-1 Restricted District are regulated by the State of Hawaii.

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Mr. Eric Crispin
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Page 3

Page 3-28, Special Management Area

A description of the expected project impacts (if any) on natural landforms will be added to this section.

Page 5-1, Public Facilities

Trash receptacles will be placed along the pathway. The specific responsibility to maintain the trash receptacles will depend on agreements that will need to be executed between affected City and State agencies.

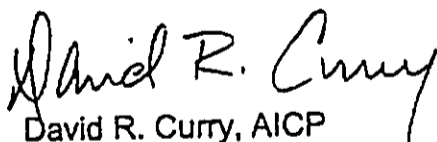
Page 1-1, Kapaa Quarry Road

The section of the Kapaa Quarry Road you are referring to is approximately 1,200 feet long, and overlaps portions of the 4th and 5th segments of the proposed pathway. In this area, the pathway alignment would move to the mauka side of the road, which is part of TMK 4-2-15:6. This parcel is owned in part by the Michael C. Baldwin Trust (1/4), the John C. Baldwin Trust (1/4), the James C. Castle Trust (1/4), and the James C. McIntosh Trust (1/4). This information will be added to page 1-1 of the FEA.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners


David R. Curry, AICP
Principal

C: Cheryl Soon

Jun-28-02 01:40P Traffic Engineering Div 808 523 4621

P.02

TE 4102-2452

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111
http://www.honolulu.org
www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR



LEE D. DONOHUE
CHIEF

ROBERT AU
GLEN KAJIYAMA
DEPUTY CHIEFS

OUR REFERENCE CS-KP

June 18, 2002

TO: CHERYL D. SOON, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: LEE D. DONOHUE, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
KAWAI NUI MARSH PATHWAY
KAILUA, OAHU, HAWAII
TMKS: 4-2-13; 3, 5, 10, 22, AND 38 AND 4-2-16: 1, 5, AND 6

DIRECTOR OF PUBLIC
UTILITY
TRANSPORTATION SERVICES

92 JUN 19 912: 17

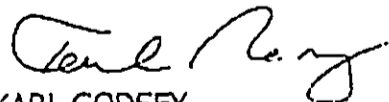
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Thank you for the opportunity to review and comment on the subject project.

Based on the information provided in the document, we do not anticipate any significant impact on police services as a result of this proposal.

If there are any questions, please call Ms. Carol Sodemani of the Support Services Bureau at 529-3658.

LEE D. DONOHUE
Chief of Police

By 
KARL GODSEY
Assistant Chief of Police
Support Services Bureau

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Helber Hastert & Fee
Planners, Inc.

July 18, 2003

Chief Lee D. Donohue
Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, HI 96813



Dear Chief Donohue

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter dated June 18, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

We note that you do not anticipate any significant impact on police services as a result of this proposal.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners

A handwritten signature in cursive script that reads "David R. Curry".

David R. Curry, AICP
Principal

C: Cheryl Soon

TF 6/8/02 - 2289

Rich Figel

801 Kainui Drive, Kailua, HI 96734

E-mail: figeli001@hawaii.rr.com

Phone: (808) 262-5073

June 5, 2002

Mark Kikuchi
Dept. of Transportation Services
650 S. King St., 3rd Floor
Honolulu, HI 96813

Re: KAWAI NUI MARSH PLANS

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02 JUN 7 12:54
DIRECTOR OF PUBLIC
TRANSPORTATION SERVICES

Ever since the Vision Team and Kawai Nui Heritage Foundation pushed through their agenda for "improving" access to the marsh and so-called park that borders residents' homes, there have been a growing number of problems for people who LIVE NEXT TO THE MARSH!

We as homeowners have never been contacted directly by these groups, and when we have voiced our concerns, these people nod and smile, tell us they are listening, THEN PROMPTLY IGNORE OUR REQUESTS!

Example: we warned the Vision Team that a paved walkway through the park area off Kaha Street, would invite kids to use it for skating and skateboarding. As it turns out, they are also using it not only for that, but to race go-peds/mo-peds night and day; ride in go-carts; and adults are riding motorcycles back there as well.

When we asked the Vision Team if signs could be posted to clearly state that MOTORIZED VEHICLES ARE PROHIBITED from using the walkways, we were told to take it up with the city parks department. We have put that request in writing to Stephanie Araki at the Kailua District Park office and made repeated phone calls dating back to before January of this year -- and there is still NO SIGN POSTED!

Each time we get a run-around from her or someone else in the city. Meanwhile, the paved parking lot and walkway has led to another unwelcome group of visitors: drug users. Because they can walk along the levee and keep an eye open for police from a distance, it has become a new hangout for kids on their lunch break who I have seen smoking ice and crack behind our houses.

Don't tell me to call the police. They take at least half an hour to respond to any complaints regarding the marsh area, and have told me it's a low priority because they don't have the man power to police that area. Furthermore, it's futile for them because scofflaws who come in from the Kaha Street entrance know they can just continue

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come in from the Kaha Street entrance know they can just continue down the levee toward the Pali Highway end. This is what the kids on motorized scooters, mopeds and motorcycles do to avoid being caught. And drug users know they can just chuck their paraphernalia into the weeds or canal if the cops come after them.

In addition, "improving" access to the marsh has a far higher cost in terms of impact to the wildlife -- or what's left of it. Now that the parking lot has been paved, it has become a de facto dog park. People are constantly letting their animals run off the leash. The dogs chase after birds and ducks. Needless to say, there are fewer birds and ducks in the very habitat that is SUPPOSED TO BE PROTECTED!

Dogs aren't the only culprits in the assault on wildlife. I have seen kids and teens -- adults too -- carrying slingshots and pellet guns while they take a stroll along the levee. Obviously, they're shooting at something. So there really is no mystery as to why birds are NOT using the manmade islands along the levee. Families also are fishing and dropping nets in the canal, so it won't be long before the fish are gone too.

The bottom line is this: the Vision Team and Foundation really don't care about the wildlife or the people who are directly affected by their desire to "improve" a natural habitat that would have been better off left as it was. They don't live right next to their "improvements" so they aren't subjected to the constant stream of people walking past their back yards and windows at all hours of the day and night. And since there are no signs to remind park users that PEOPLE LIVE HERE, they act as if they can do anything they want.

Furthermore, if you are going to put in more trails and encourage people to use them, then you better have the money and manpower to police those areas. As far as I know, the Kailua police department has never been consulted on these plans to expand the trails -- and they are the ones who will have to enforce rules or regulations that govern the so-called wildlife sanctuary.

Lastly, how much is this all going to cost? We have existing parks and public facilities throughout Kailua and Oahu that are in dire need of repair. Where are our priorities, and who is going to pay for all these grand plans?

Sincerely,



Rich and Isabel Figel

Helber Hastert & Fee
Attorneys At Law

July 18, 2003

Mr. Rich Figel
801 Kainui Drive
Kailua, HI 96734



Dear Mr. Figel:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter dated June 5, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

Your letter contains no specific comments on the contents of the DEA. Rather, you raise some concerns about the appropriateness of a public policy to implement a pathway around Kawai Nui. Specifically, you suggest that: (1) implementation of the proposed pathway will actually degrade the environmental conditions within the marsh; and (2) additional public hiking/biking facilities around Kawai Nui will lead to anti-social behavior associated with the facilities.

We would like to point out that improvements to expand public access to the marsh and its cultural and biological resources have been discussed within the Windward community for well over 20 years. Many studies have been completed, and numerous public/private sector meetings have taken place to move the planning process forward. The completion of the *Kawai Nui Marsh Master Plan* (Department of Land and Natural Resources, July 1994) in 1994 was a clear blueprint for the implementation of public facilities in and around the marsh. The identification of the pathway project as a high priority of the Kailua Vision Team was a logical extension of the planning process for these facilities. The Windward community has long sought better management of and access to Kawai Nui Marsh. The proposed pathway is one element of this vision.

Certainly, there is always an element in any community that chooses not to abide by the accepted rules of the community. Any publicly-owned facility is susceptible to acts of vandalism (trashing, graffiti, etc.). We do not believe that the potential of acts by these thoughtless individuals should prevent the construction of new public facilities. Rather, we need to build adequate security and maintenance measures into the design and operation of the facility. We are confident that these issues will continue to be discussed as Kawai Nui improvements move through the permit approval process.

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Planners, Inc.

Mr. Rich Figel
July 18, 2003
Page 2

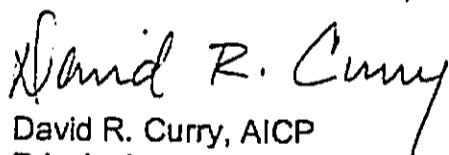
We have included recommendations in the DEA that would require appropriate signage at key locations along the pathway prohibiting motorized vehicles (including mopeds and gopeds). We do not intend to minimize the impacts that occur when individuals choose to ignore accepted norms of behavior. Obviously, there needs to be more of a concerted effort to avoid creating situations that encourage this behavior. We are forwarding your letter to the Mayor's office for follow-up regarding issues concerning your request for a sign at Kawai Nui Neighborhood park, and the use of the park for use of drugs, etc.

We encourage you to stay involved with the planning process in your community and to discuss your concerns with public agencies that are involved in the permitting process and the final design and operation of the pathway.

If you have any further questions regarding this project, please call me.

Sincerely,

HELBER HASTERT & FEE, Planners



David R. Curry, AICP
Principal

C: Cheryl Soon

6/13/2002

Honolulu City & County
Department of Transportation Services
Attn: Mark Kikuchi
650 South King St., Third Floor,
Honolulu HI 96813

Dear Mr. Kikuchi,

On behalf of the Kawainui Vista Homeowners Association (KVHA), I am writing in reference to the plan to construct a perimeter trail around the Kawainui Marsh. We are concerned that the plans are not necessarily the best for the marsh, and, as they relate directly to our neighborhood, have the potential to seriously negatively impact our properties, security, and quality of life.

For your information, KVHA was first formed in 2001 with the completion of the majority of houses in our neighborhood. Much of the preliminary planning for the trail was accomplished prior to our formation, and therefore, we were not able to participate in those early discussions. Notwithstanding the history above, we feel we must, even at this late date, voice our concerns regarding the trail itself as well as the particular portion which runs close to our neighborhood.

We are not convinced that the creation of the trail will have a positive impact upon the sensitive eco-system of the marsh. I, personally, while living in Seattle, was able to observe the creation of a similar trail, and, I can tell you from that experience the impact was not positive. Currently, there are a number of points of access to parts of the marsh where we have adequate evidence of both the positive and negative things that will happen once easy access is granted to the whole perimeter. Many of our neighbors use the existing dike for exercise, and can tell of innumerable instances where dog feces is left on the trail. Other instances include evidence of late night drinking parties and fireworks use. The dike is also the canvas of choice for graffiti "artists".

On the other side of the marsh, one only needs to drive along Kapaun Quarry Road and see the trash, used appliances, and junk cars that are left there on a nightly basis. It is too large an area for the police to adequately patrol, a problem that would only be exacerbated by the increased access to the most sensitive parts of this treasure that it is our responsibility to preserve.

As for the direct impact upon our community, we first have a strong personal interest in the maintenance of the pristine nature of the marsh. Most of our homes look out directly on the marsh, and several of them actually abut the preservation area. We feel we have a unique responsibility to help protect the eco-system. Therefore, we cannot let what we believe to be an unwarranted intrusion go unchallenged. We ask that an adequate environmental impact study by objective and unbiased parties be conducted.

One final concern we have about the planned trail concerns its proximity to the houses that do abut the marsh. There is approximately 120 feet between those five houses and the planned trail. We cannot help but be concerned that the creation of this trail will then allow easy access for the criminal element to enter upon these properties without being observed by those of us living in the rest of the community.

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In conclusion, we are reminded of the instance a few years ago where a plan was put forth to take the land out from under the existing cattle farm to create a viewing platform. Fortunately for the owners of that cattle farm, when the issue became public a different place was found for that viewing platform. At that time it became clear that the rights of an individual were being threatened to satisfy another segment of the community and allow them to have their "perfect" solution. But, thankfully, reason prevailed.

In this case, we believe that, again, a segment of the community has sold what they believe is a perfect solution to a perceived problem - that of having greater access to the last remaining area of its kind on this island. We admire their motives, but we believe that the solution would create just the opposite of the desired effect and eventually lead to serious harm or even destruction. In addition, inadequate attention has been paid to the concerns of those who are most directly impacted by this plan.

We appreciate this opportunity to express our concerns regarding this plan. Please understand that, while we feel there is a security problem, that is only one issue for us. For the community at large, we are seriously concerned that the negative impacts of this increased access will eventually cause the loss of this gift of nature, at least as we know it now.

We, of course, stand ready to discuss these issues personally with you or members of your staff. Please direct any written correspondence to Mr. Cole, our Secretary/Treasurer at 632 Hanalei Place, Kailua, Hawaii 96734. Or, you may phone any of us at the numbers below our signatures below.

Robert J. Gornstein, PhD
President of the Kawainui Vista Home Owners Association
Phone: 262-2477

Michael O. Bingo-Duggins
Vice President
Phone: 262-6050

Albert A. Cole, Jr.
Secretary/Treasurer
Phone: 263-3270

Cc: Steve Holmes
District II Honolulu City Council

John H. Felix
District III Honolulu City Council

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Helber Hastert & Fee
Planners, Inc.

July 18, 2003

Mr. Robert J. Gornstein, Ph.D.
President
Kawai Nui Vista Home Owners Association
626 Hanale Place
Kailua, HI 96734



Dear Mr. Gornstein:

**Kawai Nui Pathway
Draft Environmental Assessment**

Thank you for your letter dated June 13, 2002 on the above draft environmental assessment (DEA). Your letter will be included in the final environmental assessment (FEA) being prepared.

Your letter contains no specific comments on the contents of the DEA. Rather, you raise some concerns about the appropriateness of a public policy to implement a pathway around Kawai Nui. Specifically, you suggest that: (1) additional environmental studies are needed before the project should be allowed to proceed; (2) implementation of the proposed pathway will actually degrade the environmental conditions within the marsh; (3) additional public hiking/biking facilities around Kawai Nui will lead to anti-social behavior associated with the facilities; and (4) there will be an increased risk of property crimes to the homes that have recently been developed in your neighborhood.

In regard to your request for more studies, we would like to point out that the completion of the environmental assessment does not allow the project to be constructed. Two major permits would remain to be approved for the project: a Special Management Area Use Permit (SMA Permit) from the City and County of Honolulu, and a Conservation District Use Permit from the State Department of Land and Natural Resources. Each of these permits will require at least one public hearing (two in the case of the SMA Permit), allowing for public discussion of all aspects of the project. In addition, when applications for any future permits are submitted, information in the environmental assessment will most likely need to be supplemented with additional information and studies. An environmental assessment does not necessarily answer all questions. However, it is supposed to identify subject areas that may need additional study.

We would also like to point out that improvements to expand public access to the marsh and its cultural and biological resources have been discussed within the Windward community for well over 20 years. Many studies have been completed, and numerous public/private sector meetings have taken place to