Stephen K. Yamashiro
Mayor

Virginia Goldstein
Director

Norman Olesen
Deputy Director

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County of Hawaii

PLANNING DEPARTMENT
25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252
(808) 961-8288 • Fax (808) 961-9615

July 26, 1996

Mr. Gary Gill, Director
Office of Environmental Quality Control
220 S. King Street
Honolulu, HI 96813

Dear Mr. Gill:

Subject: Final Environmental Assessment
Applicant: Hawaii Tropical Botanical Garden
Request: Garden Master Plan for Expansion and Improvements to include Entrance, Trails, Employee Parking Areas, Shelters and Related Improvements
Onomea Bay, Onomea, South Hilo, Hawaii
Tax Map Key: 2-7-9:2, 6, and 10 and 2-7-10:22

Please find enclosed a completed OEQC Bulletin Publication Form and four (4) copies of the Final Environmental Assessment (Final EA) for the above-referenced project. Please publish notice of this determination in the August 8, 1996 Bulletin.

The proposed improvements are located within the State Land Use Conservation district thus triggering Chapter 343, HRS, relating to Environmental Impact Statements.

Should you have any questions, please feel free to contact Susan Gagorik or Alice Kawaha of this office at 961-8288.

Sincerely,

Virginia Goldstein

VIRGINIA GOLDSTEIN
Planning Director

SG:mjs
F:\WP60\MICHELLE\1996\LGILL.SG
Enclosure

8/1/96
Attached form indecates negative declaration. Called Planning Dept. See attached telephone conf. record note (xeroxed on reverse also)

93

1996-08-08-HI-FEA - Hawaii Hawaiian Tropical Botanical Garden AUG -8 1996

Expansion and Improvement to entrance, trails, employee parking, shelter and related improvement

FILE COPY

Conservation District and SMA

FINAL

ENVIRONMENTAL ASSESSMENT

AMENDMENT TO CONSERVATION DISTRICT USE PERMIT HA-1447 AND SPECIAL MANAGEMENT AREA USE PERMIT APPLICATION ENTRANCE, TRAILS, PARKING AND RELATED IMPROVEMENTS MASTER PLAN IMPROVEMENTS AT HAWAII TROPICAL BOTANICAL GARDEN

Alakahi, Kahalii and Onomea, South Hilo, Hawaii
TMK: (3)2-7-9:02, 06, and 10, 2-7-10:22

Applicant:
HAWAII TROPICAL BOTANICAL GARDEN
248 Kahoa Road
Hilo, Hawaii 96720

Prepared by:
Sandra Pechter Schutte
Attorney at Law
101 Aupuni Street, Suite 1014A
Hilo, Hawaii 96720

For Submittal to:
County of Hawaii
Planning Department
and
State of Hawaii
Department of Land and Natural Resources

July, 1996

FINAL ENVIRONMENTAL ASSESSMENT

AMENDMENT TO
CONSERVATION DISTRICT USE PERMIT HA-1447
AND
SPECIAL MANAGEMENT AREA USE PERMIT APPLICATION
ENTRANCE, TRAILS, PARKING AND RELATED IMPROVEMENTS
MASTER PLAN IMPROVEMENTS
AT
HAWAII TROPICAL BOTANICAL GARDEN

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LIST OF EXHIBITS

1. INTRODUCTION

1.1 Identification of the Applicant

The applicant is Hawaii Tropical Botanical Garden, a non-profit Hawaii corporation, that has been designated as a tax exempt public charity under Section 501(c)(3) of the Internal Revenue Code (the "Applicant"). The Applicant's address is 248 Kahoa Road, Hilo, Hawaii 96720. The Applicant is the owner of the property involved in the subject project, designated by State of Hawaii Tax Map Key Numbers ("TMK"): (3)2-7-9:2, 6 and 10 and 2-7-10:22.[1] The Applicant's ownership of the property is evidenced by the following documents:

A. Deed dated December 6, 1993 from Daniel J. Lutkenhouse, Grantor, to Hawaii Tropical Botanical Garden, Grantee, recorded in the Bureau of Conveyances of the State of Hawaii as Document No. 93-214134, for TMK: 2-7-10:22.

B. Quitclaim Deed, dated June 30, 1994, from Bishop Trust Company, Limited, Trustee, Grantor, to Hawaii Tropical Botanical Garden, Grantee, recorded as Document No. 94-119012 for TMK: 2-7-9:06 and 10.

C. Deed, dated December 22, 1995, from Daniel J. Lutkenhouse, Trustee, Grantor, to Hawaii Tropical Botanical Garden, Grantee, recorded as Document No. 96-004764 for TMK: 2-7-9:02.[2]

1.2 Project Summary

The Applicant is seeking to amend State Conservation District Use Permit No. HA-1447 issued by the State of Hawaii Board of Land and Natural Resources ("BLNR") on August 4, 1982, which authorized the establishment of an arboretum and botanical garden (the "Garden") on land within the State Land Use Conservation district. The Applicant is also seeking a Special Management Area use permit from the County of Hawaii Planning Commission in conjunction with this amendment. By these permit applications, the Applicant seeks to make certain immediate improvements to the existing Garden. The Applicant also seeks approval of a master plan for future improvements to and expansion of the Garden. Submission of this master plan was requested by BLNR at its meeting of October 27, 1995. For purposes of this assessment, the improvements being proposed by the Applicant will be

---

[1]Claims have been made by the public regarding the State of Hawaii's ownership of remnants of this property and the Department of Land and Natural Resources is preparing an abstract to determine the validity of such claims. The Applicant believes that the improvements proposed are not located in any land area of dispute. If, however, it is later determined that the Applicant is not the owner of the property on which any improvement is proposed, it will take appropriate action to either acquire the remnant or obtain an easement over the affected property.

[2]TMK 2-7-9:02 had previously been leased to the Applicant under a long term lease, which was canceled upon conveyance of the property to the Applicant by that certain Cancellation of Amended Lease Agreement dated December 22, 1995, recorded as Document No. 96-004763.

called either the "Project" or the "Proposed Action," and the land on which the Project is proposed will be called the "Project Area."

The immediate improvements proposed by this Project include:

A. A new Garden entrance along the Old Mamalahoa Highway, with a wrought iron locked gate, fencing, bulletin board, umbrella rack, tool and utility shed and covered rain shelter, on approximately 1,750 square feet of land.

B. Construction of two new wooden walkways which will be elevated in certain areas; one providing a new entrance into the Garden, approximately 500 feet in length, and the second, a vista trail, approximately 120 feet in length.

C. A covered rain shelter at the bottom of the new entrance trail and another rain shelter at the vista lookout, in addition to the rain shelter at the new Garden entrance.

D. Four covered rest shelters located a various points along the new Garden entrance trail.

E. Two parking areas to be established for Garden employees along the Old Mamalahoa Highway; one with 5 stalls on approximately 2,050 square feet of land, and the other with 4 stalls on approximately 2,000 square feet of land, to be fenced with chain link fencing along the steep banks adjacent to the parking area.

F. A concrete diversion dam located within Onomea Stream, approximately 130 feet downstream from the Old Mamalahoa Highway, to provide water for irrigation, the restroom facilities and circulation within the Garden ponds, and a second diversion dam located within Alakahi Stream, approximately 20 feet downstream from the Old Mamalahoa Highway, to provide water as a backup to the Onomea Stream Dam, when the Onomea Stream Dam is not functioning.

G. Utility poles, utility lines, guy wires and related equipment along the Old Mamalahoa Highway to provide electrical power to the Garden's proposed visitor center on a parcel of land outside of the Project Area.

H. "No Trespassing" signs to be posted at various points along the mauka perimeter of the Garden at the Old Mamalahoa Highway, along the Onomea Access Trail and along the Alakahi Trail.

I. Informational and directional signs to be posted at various points along the Old Government Road remnants, which extend from the Old Mamalahoa Highway to Onomea Stream and which intersect the Garden (the "Onomea Access Trail"), along an access trail extending from the Old Government Road on the Hilo side of Alakahi Stream down to the beach at Alakahi (the "Alakahi Trail"), and within the employee parking areas.

J. Landscaping, in keeping with the natural environment, in front of the new Garden entrance, along the entrance and vista trails and in the employee parking areas.

Future master plan improvements for this Project include:

A. Fencing along portions of the pedestrian shoreline access trail known as the "Donkey Trail" (the "Donkey Trail") on the adjoining parcel, TMK: (3)2-7-10:22, and along a portion of the perimeter of TMK: (3)2-7-10:22, 2-7-9:02, 06 and 10.

B. Landscaping at various locations throughout TMK: (3)2-7-10:22, 2-7-9:06 and 2-7-9:10.

C. A gated, wooden suspension bridge to be constructed over Onomea Stream, to provide pedestrian access between the present improved portion of the Garden on TMK: (3)2-7-9:02 and the future expansion area within TMK: (3)2-7-10:22.

D. Up to three greenhouses to be located in the vicinity of the present Garden nursery area on TMK: (3)2-7-9:02.

E. Two additional restrooms within TMK: (3)2-7-9:02.

F. "No-Trespassing", informational and directional signs to be located at various points along the Donkey Trail and other areas within TMK: (3)2-7-10:22.

1.3 Identification of Approving Agency

This environmental assessment is being submitted in conjunction with an application to the County of Hawaii Planning Commission for a Special Management Area ("SMA") use permit for the Project, in accordance with Section 9-10.4 of the County of Hawaii Planning Commission Rules of Practice and Procedure. It is also being submitted in conjunction with an application to BLNR to amend Conservation District Use Permit ("CDUP") No. HA-1447, in accordance with Sections 13-5-22(b) P-4, P-8, and P-12, 13-5-23(c) L-4 and L-7, and 13-5-24(c) R-5 of the Department of Land and Natural Resources ("DLNR") Administrative Rules. The approving agency for this assessment is the County of Hawaii Planning Director.

1.4 Agencies Consulted in Making Assessment

In August, 1995, twelve federal, state and county agencies and seven community organizations were sent letters from the Applicant asking for comments on the proposed Project. A list of those agencies and organizations consulted, the consultation letter and any responses received are attached as Exhibits 1 through 3, respectively. After receiving the responses from various agencies and organizations, a draft environmental assessment was prepared and published in the Office of Environmental Quality Control ("OEQC") Bulletin on February 8, 1996 and March 8, 1996.

Numerous written comments on the draft assessment were received from government agencies, organizations and individuals. Based on these comments, the original environmental assessment for this Project was withdrawn and revised draft assessment was prepared, with the comments attached attached as Exhibit 4. All of the comments involving environmental concerns addressed under the Environmental Impact Statement Rules, Title 11, Chapter 200 of the Department of Health Administrative Rules, and under Chapter 343, Hawaii Revised Statutes, which are relevant to the Project were considered in preparing the revised draft assessment. The revised draft assessment was published in the OEQC Bulletin on May 23, 1996 and June 8, 1996. Comments to the republished draft assessment and responses are attached as Exhibit 15. This final environmental assessment has also been revised as a result of the comments received on the re-published draft assessment.

In addition to written comments received from agencies, organizations and individuals, the following agencies provided assistance or information in preparing this assessment:

Federal Agencies
U.S. Department of the Interior, National Biological Services, Pacific Islands Science Center

State Agencies
DLNR, Planning and Technical Division
DLNR, Division of Aquatic Resources
DLNR, Division of Forestry & Wildlife, Na Ala Hele Program
Department of Health
Department of Business, Economic Development & Tourism, Land Use Commission

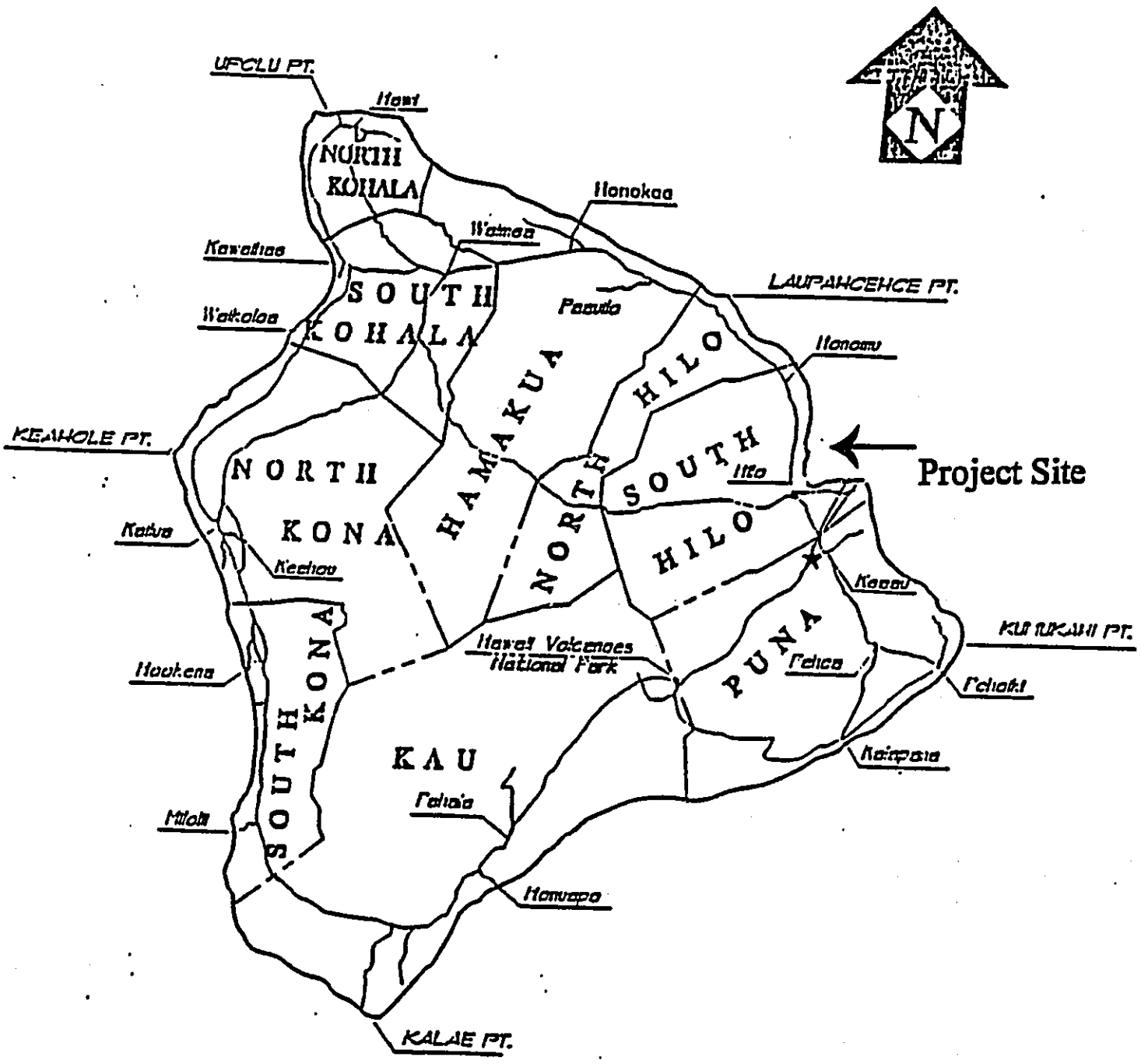
County Agencies
Planning Department
Department of Public Works

Public Utilities
Hawaii Electric Light Company ("HELCO")

2. PROJECT DESCRIPTION

2.1 Location

The Project Area is situated at Onomea Bay, at Alakahi, Kahalii and Onomea, South Hilo, Hawaii (See Figure 1, Location Map.) The property on which the project is located is designated by TMK Nos: (3)2-7-09:2, 6 and 10, and 2-7-10:22, and contains a total area of approximately 38.555 acres. (See Figures 2 and 3, Tax Map Plats 2-7-9 and 2-7-10.) The Project Area is located on the makai or northeasterly side of the Old Mamalahoa Highway, also known as the "4 Mile Scenic Route," approximately two miles north of the Hawaii Belt Road/Old Mamalahoa Highway intersection, and extends to the shoreline at Onomea Bay.



ISLAND OF HAWAII

FIGURE 1 - LOCATION MAP

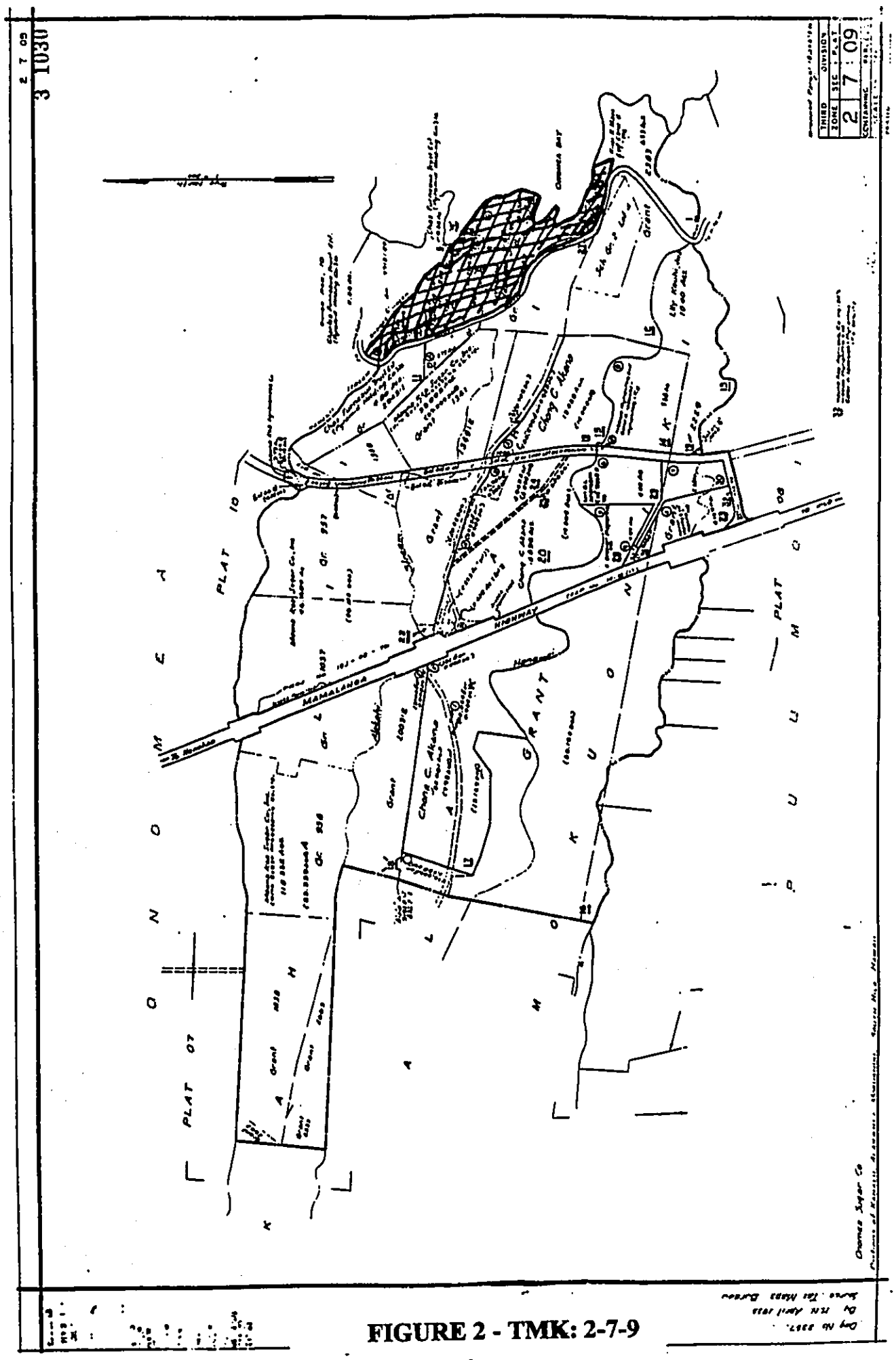


FIGURE 2 - TMK: 2-7-9

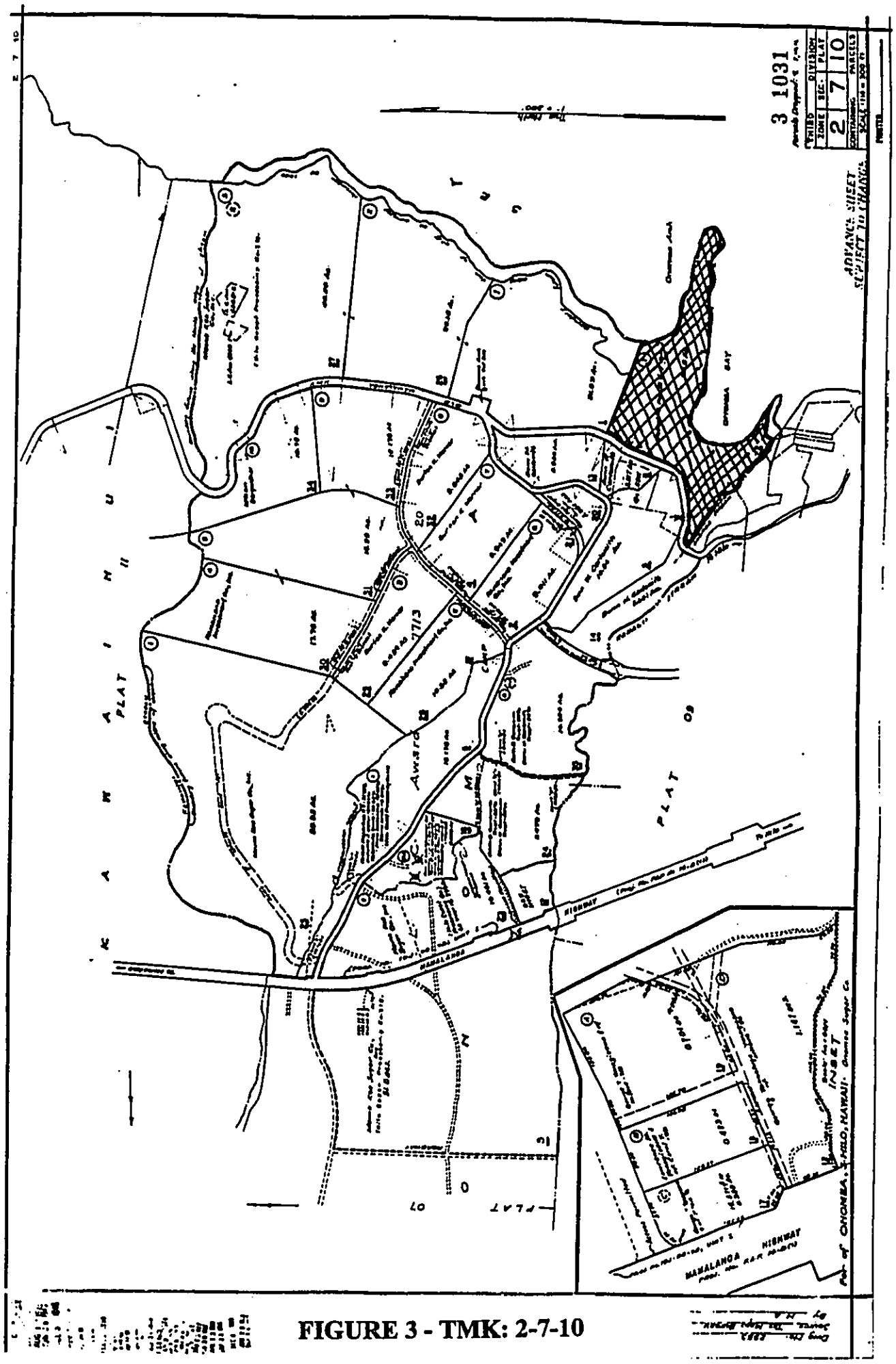


FIGURE 3 - TMK: 2-7-10

2.2 Existing Uses and Activities

Since 1982, the Applicant has been operating its arboretum and botanical garden on the 17-acre portion of the Project Area designated as TMK: 2-7-9:02. At the present time, improvements to the Garden include extensive landscaping, walkways, tool sheds, a green house, two ponds, three bird cages and bird perches, two restrooms, a rain shelter, a bulletin board and informational signs. (See Figure 4, Site Plan of Existing Improvements, inserted in back pocket). Over 1,800 species, most of which are exotic species, are found in the Garden's collection of over 10,000 different plants. Also found in the Garden are koi in the pond known as the Lily Pond, and birds, including macaws, flamingos and ducks.

Over 40,000 persons visit the Garden annually, with most of these visitors paying an admission fee to the Garden. Until 1996, the Garden remained open seven days per week; however, since the beginning of 1996, the Garden has been closed to visitors on weekends. The Applicant's visitor center is presently located one mile south of the Project Area, along the Old Mamalahoa Highway, and Garden visitors are transported from the visitor center in shuttle vans from the visitor center to the Garden down along a jeep road (the Onomea Access Trail) to a turn-around area within the Garden. The Applicant is planning to relocate its visitor center to a parcel of land directly across the highway from the Project Area and has already received all discretionary governmental land use permits for this new visitor center.

Since mid-1995, the Onomea Access Trail, which extends through the Garden, has been open to the general public as a pedestrian access trail on a twenty-four hour basis, seven days per week. Approximately 1,000 feet of this trail extending from the Old Mamalahoa Highway down along the cliff edge is the same jeep road utilized by the Applicant to transport its visitors into the Garden. In early, 1996, the portion of this trail within the Onomea valley floor, which extends to Onomea Stream, was improved and fenced by the DLNR Division of Forestry, Na Ala Hele Program. Subsequently, the shoreline access trail, known as the Alakahi trail, was opened to the public after being improved and fenced by Na Ala Hele. The fencing materials for these trails were provided by the Applicant.[3] An unimproved pedestrian shoreline access trail within the Project Area on TMK: 2-7-10:22, known as the Donkey Trail, is open to the public on a twenty-four hour basis, seven days per week.

2.3 Permits Issued for the Project

All of the existing improvements within the Project Area, except for two diversion dams within Onomea and Alakahi Streams, have been approved by BLNR under CDUP HA-1447, issued on August 4, 1982 and amendment to CDUP HA-1447, issued on March 24, 1994. The original CDUP authorized the development of an arboretum and botanical garden utilizing a mini bus system. The landscaping, walkways, rain shelters, greenhouse, restrooms and fencing were constructed under the original permit, with site plan approval being issued

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[3] $1,200 out of a total cost of materials exceeding $12,000 was an in-kind payment for $1,200 in fines levied by BLNR against the Applicant for violations of its CDUP.

by the BLNR chairperson for the structures. The 1994 amendment to the CDUP granted after-the-fact approval for the bird cages, the bird exhibition stands, the two ponds and Garden signage, including no-trespassing signs.

SMA minor permits were also issued for the existing improvements within the Project Area under SMA Minor Permit No. 79-7, issued on February 2, 1979 for land clearing for the establishment of pathways and trails and for topographical purposes; SMA Minor Permit No. 82-28 issued on July 23, 1982 for the establishment of an arboretum and botanical garden and related improvements; SMA Minor Permit No. 88-20 issued on October 18, 1988 for the construction of two small restrooms and a cesspool; and SMA Minor Permit No. 5 issued on March 11, 1994 for the construction of a new rain shelter, and for the retention of a zoological garden that included macaws flamingos, ducks and a related pond, the retention of an aviary consisting of three bird cages housing macaws and wooden exhibition stands, the retention of the Lily Lake and the retention of portable "no-trespassing" signs.

The Applicant filed a Declaration of Water Usage with the DLNR Commission on Water Resources Management in May, 1989, declaring the usage of the small diversion dam within Onomea Stream and the estimated water usage from the stream of 27,000 gallons per month or 324,000 gallons per year. Applications are presently pending before the Commission on Water Resources Management to authorize the after-the-fact increased diversion of water from Onomea Stream to 398,000 gallons per year in order to provide water for the Garden ponds, the alteration of Alakahi Stream with the installation of the diversion dam, and the diversion of the water from Alakahi Stream for emergency purposes.[4] As of April 15, 1996, water meters have been installed by the Applicant on the intake pipes of the Alakahi and Onomea Stream dams to measure actual water usage from these streams. The Applicant has also installed a water meter at the restrooms to measure the water usage at that facility.

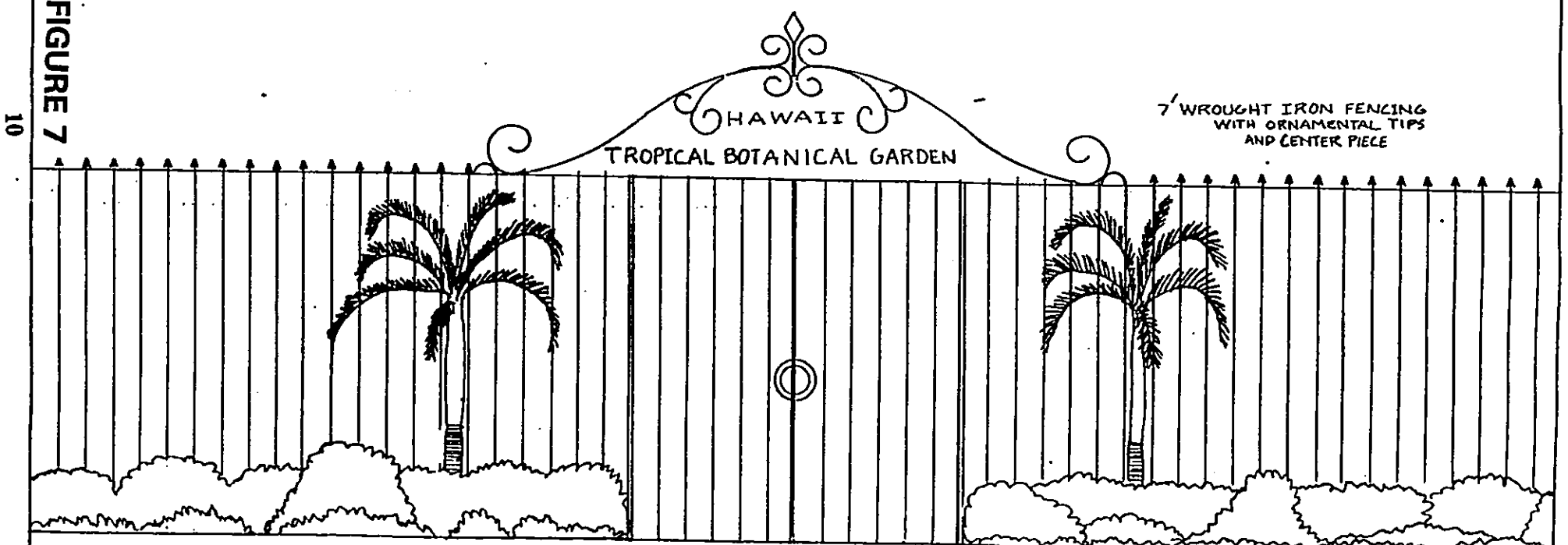
2.4 Proposed Uses and Activities

The Project consists of two phases: immediate improvements which would enable the Applicant to establish a new entrance into the Garden, discontinue shuttle van use along the present entrance through the Onomea Access Trail and legitimize two existing diversion dams; and long term future improvements under a conceptual master plan for the Garden.

Except for the utility poles, lines and equipment, the proposed improvements, both immediate and long range, are shown on an overall Garden site plan designated as Figure 5 (See back pocket for plan), with the walking trail section of the site plan blown up as Figure 6

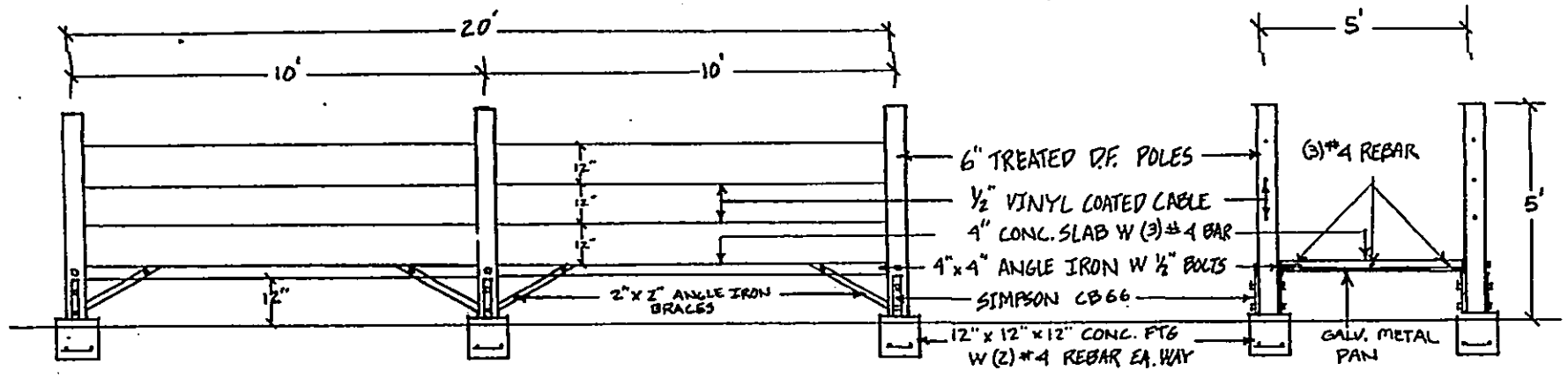
[4]The Commission on Water Resource Management at its meeting of May 8, 1996, assessed civil fines against HTBG for stream alterations and for increased use of stream water without having first obtained the required permits. The Commission has not acted upon HTBG's permit requests because of a contested case hearing request from Share Onomea Access. By letter dated July 17, 1996, Share Onomea Access withdrew its request for a contested case hearing.

FIGURE 7



HAWAII TROPICAL BOTANICAL GARDEN | ENTRANCE PLAN 3/8" = 1'

FIGURE 8A

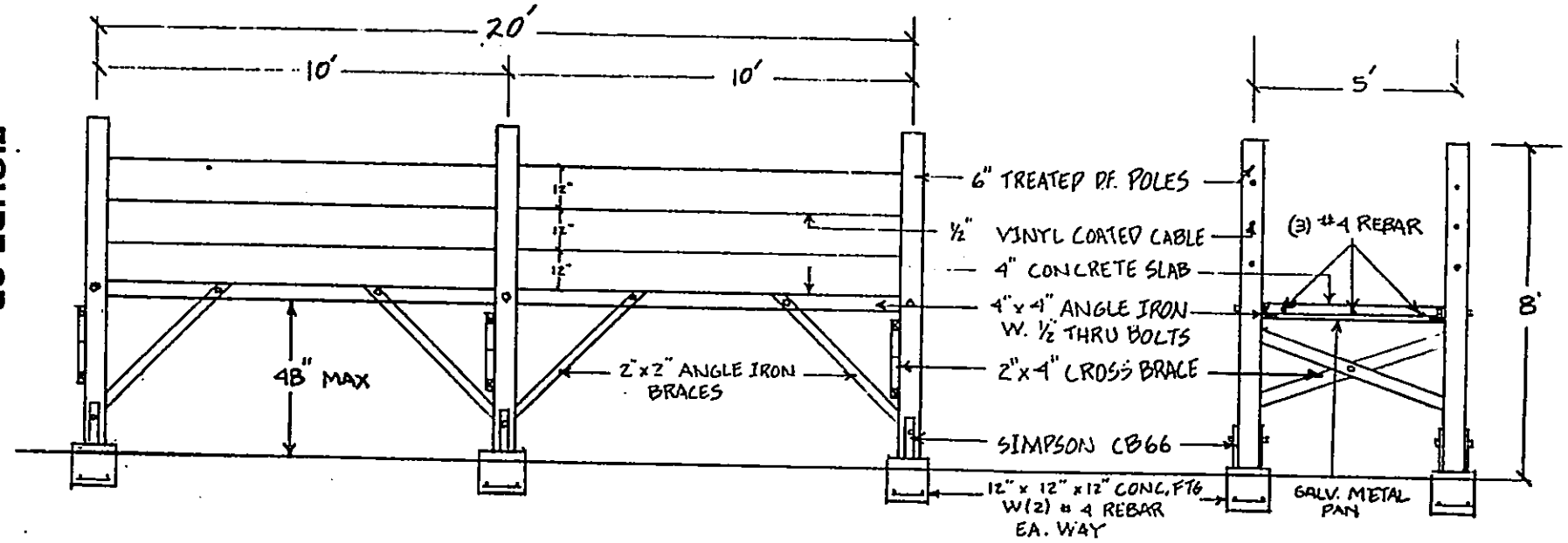


TYP. WALKWAY SECTION
¼" = 1'

END VEIW
¼" = 1'

HAWAII TROPICAL BOTANICAL GARDEN | WALKWAY PLAN

FIGURE 8B

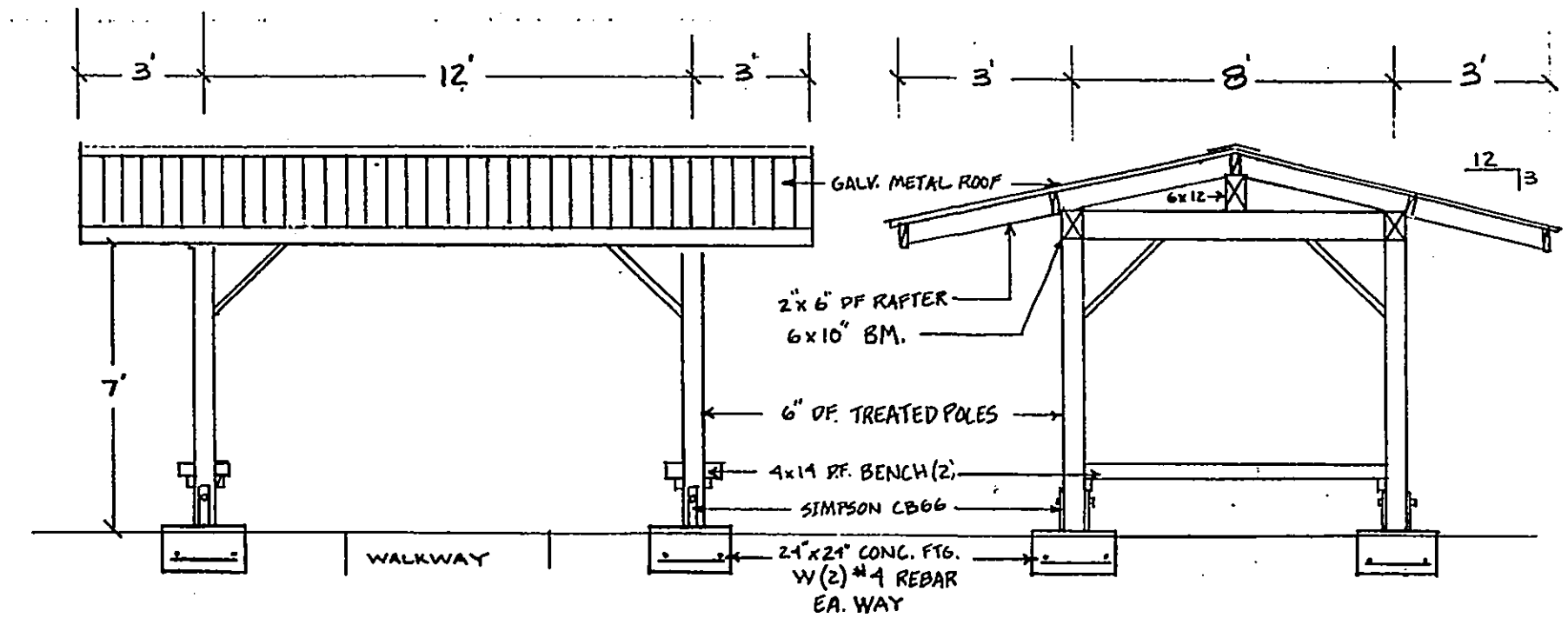


TYP. WALKWAY SECTION
¼" = 1'

END VEIW
¼" = 1'

HAWAII TROPICAL BOTANICAL GARDEN	WALKWAY PLAN	

FIGURE 9

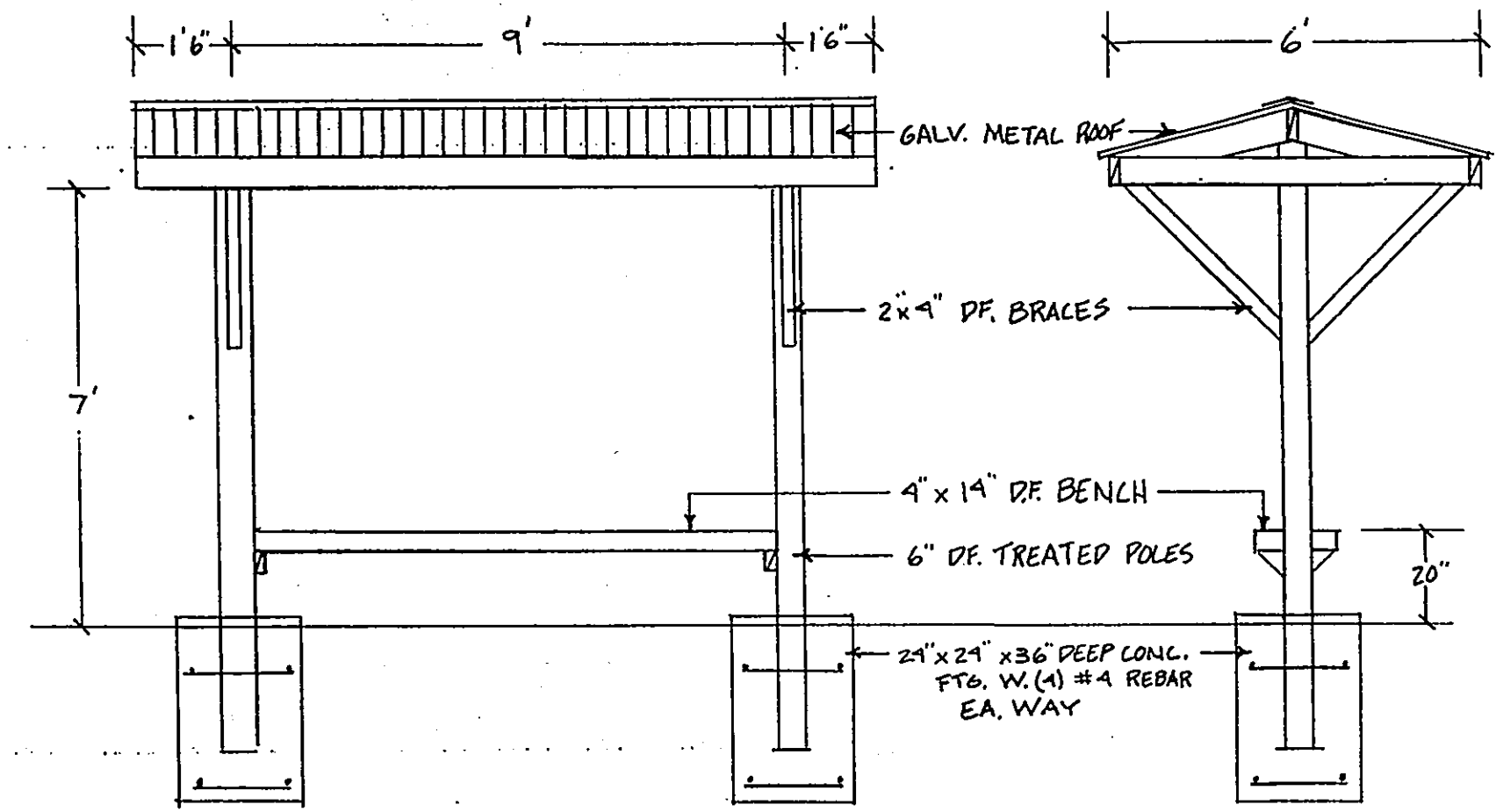


RAIN SHELTER & BENCHES
1/4" = 1'

END VEIW
1/4" = 1'

HAWAII TROPICAL BOTANICAL GARDEN	RAIN SHELTER PLAN	

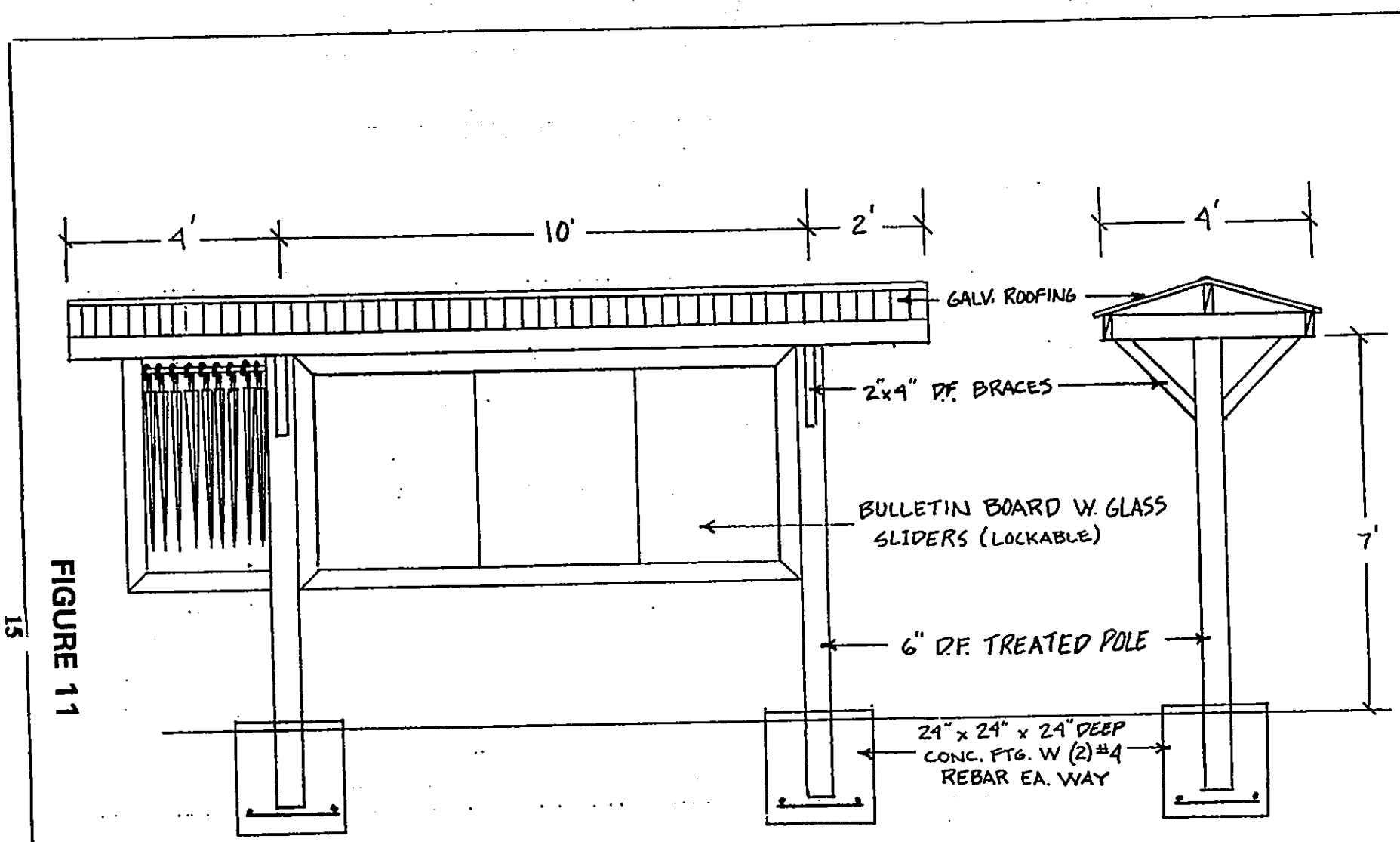
FIGURE 10



REST AREA SHELTER
3/8" = 1'

END VEIW
3/8" = 1'

HAWAII TROPICAL BOTANICAL GARDEN	REST AREA PLAN	



BULLETIN BOARD & UMBRELLA RACK
3/8" = 1"

SIDE VEIW
3/8" = 1'

FIGURE 11

15

HAWAII TROPICAL BOTANICAL GARDEN	BULLETIN BOARD	

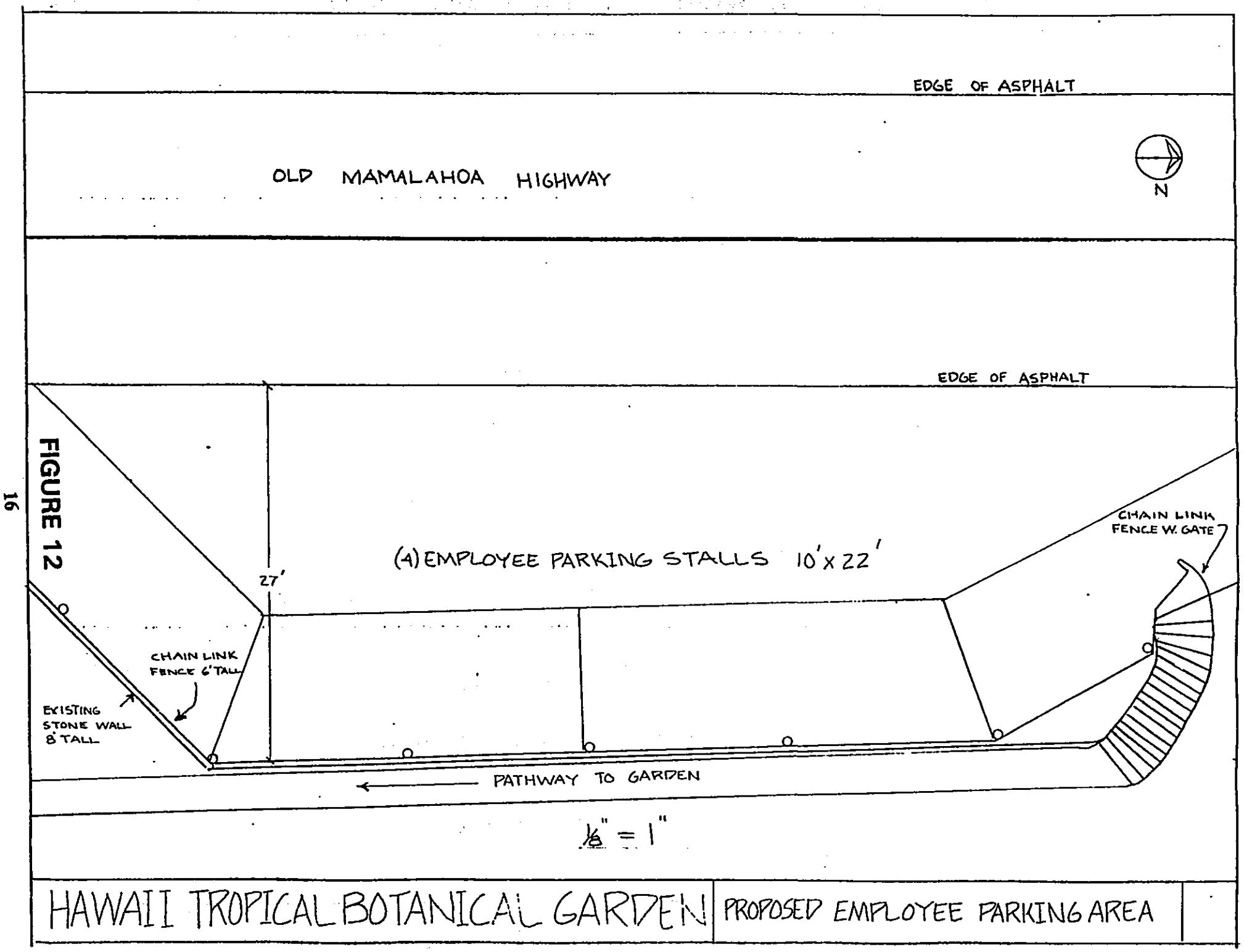

EDGE OF ASPHALT
OLD MAMALAHOA HIGHWAY
N
EDGE OF ASPHALT
(4) EMPLOYEE PARKING STALLS 10'x 22'
27'
CHAIN LINK FENCE W. GATE
CHAIN LINK FENCE 6' TALL
EXISTING STONE WALL 8' TALL
PATHWAY TO GARDEN
1/8" = 1"
HAWAII TROPICAL BOTANICAL GARDEN
PROPOSED EMPLOYEE PARKING AREA

FIGURE 12

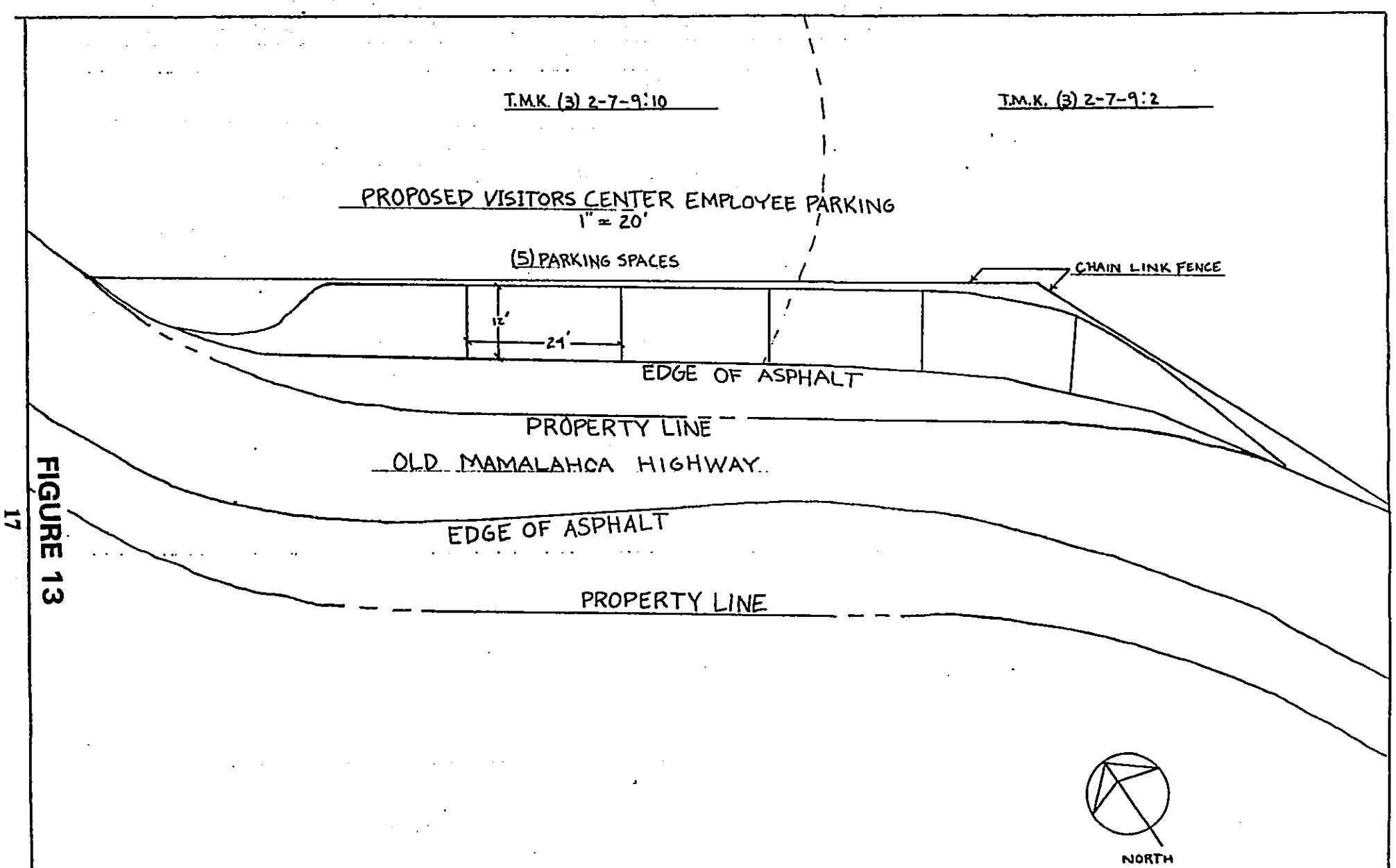
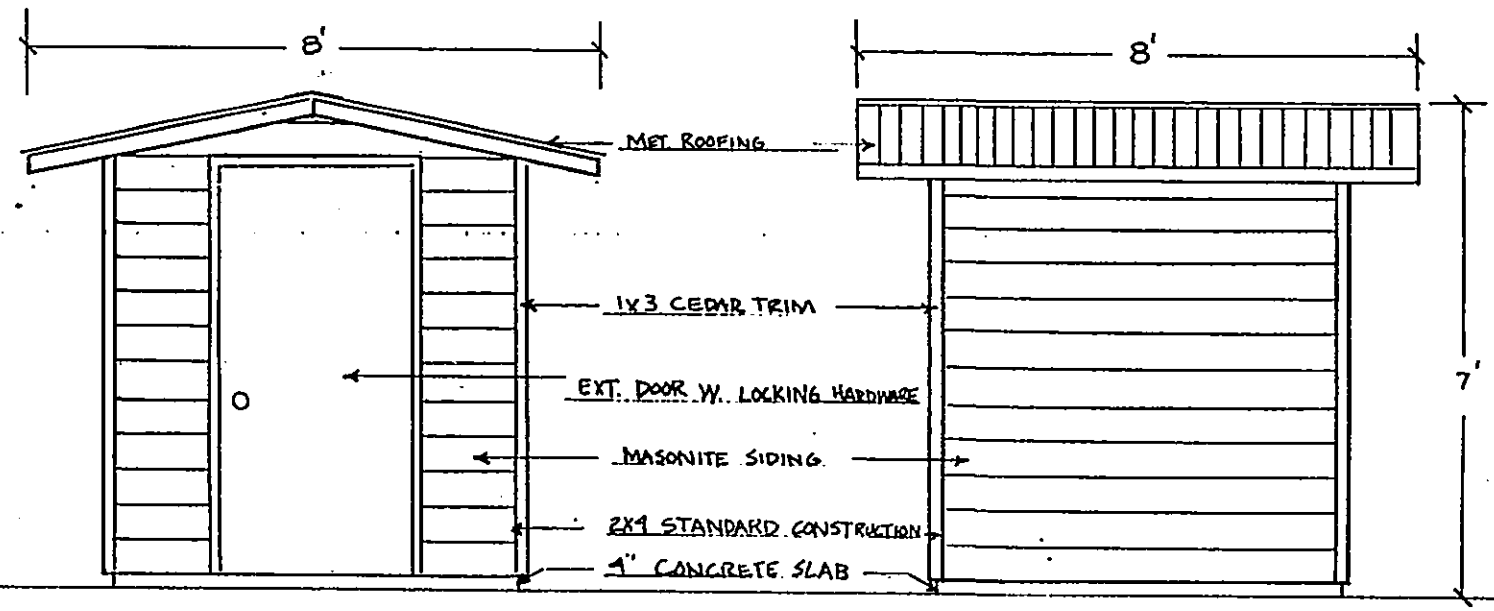


FIGURE 13

HAWAII TROPICAL BOTANICAL GARDEN	VISITORS CENTER EMPLOYEE PARKING	

FIGURE 14

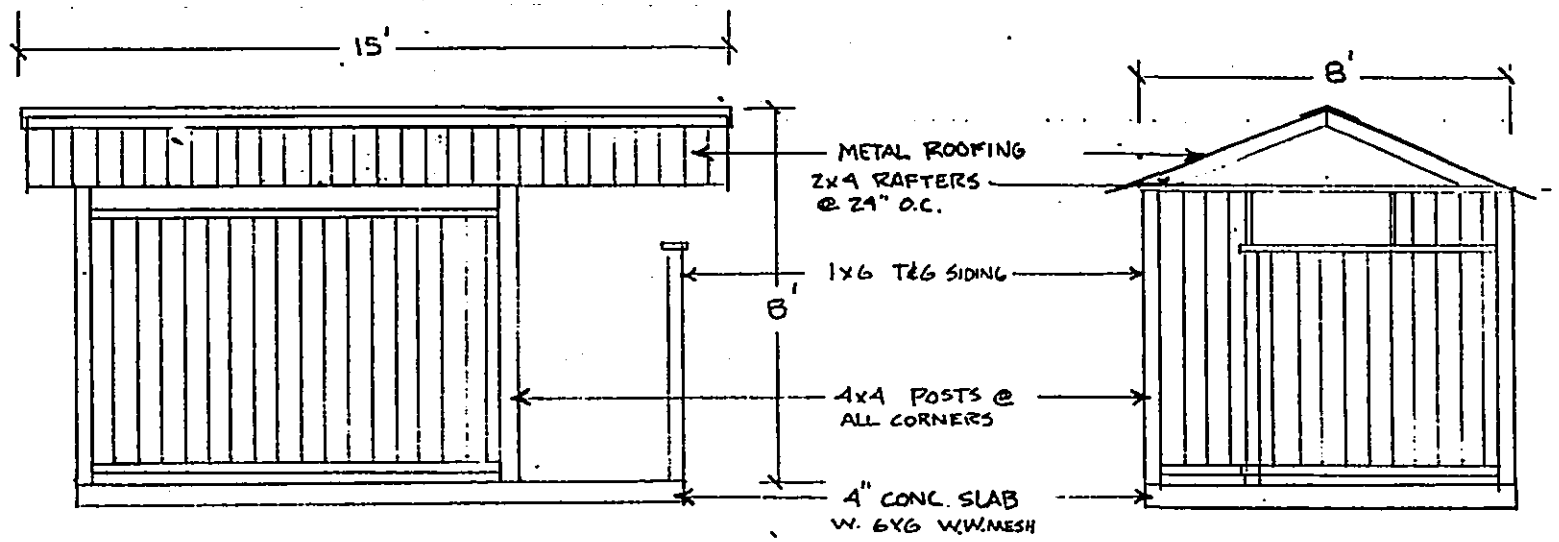


PROPOSED TOOL & UTILITY SHED 64 ☐
3/8" = 1'

HAWAII TROPICAL BOTANICAL GARDEN	TOOL & UTILITY SHED DETAIL	

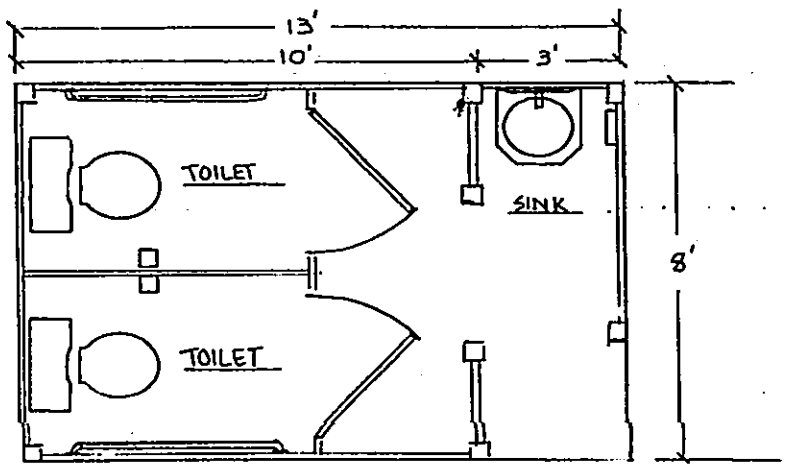
FIGURE 15

(RESERVED)



SIDE VEIW
1/4" = 1' 0"

FRONT VEIW
1/4" = 1' 0"



BATH ROOM PLAN
1/4" = 1' 0"

FIGURE 16

20

HAWAII TROPICAL BOTANICAL GARDEN	BATH ROOM PLAN	

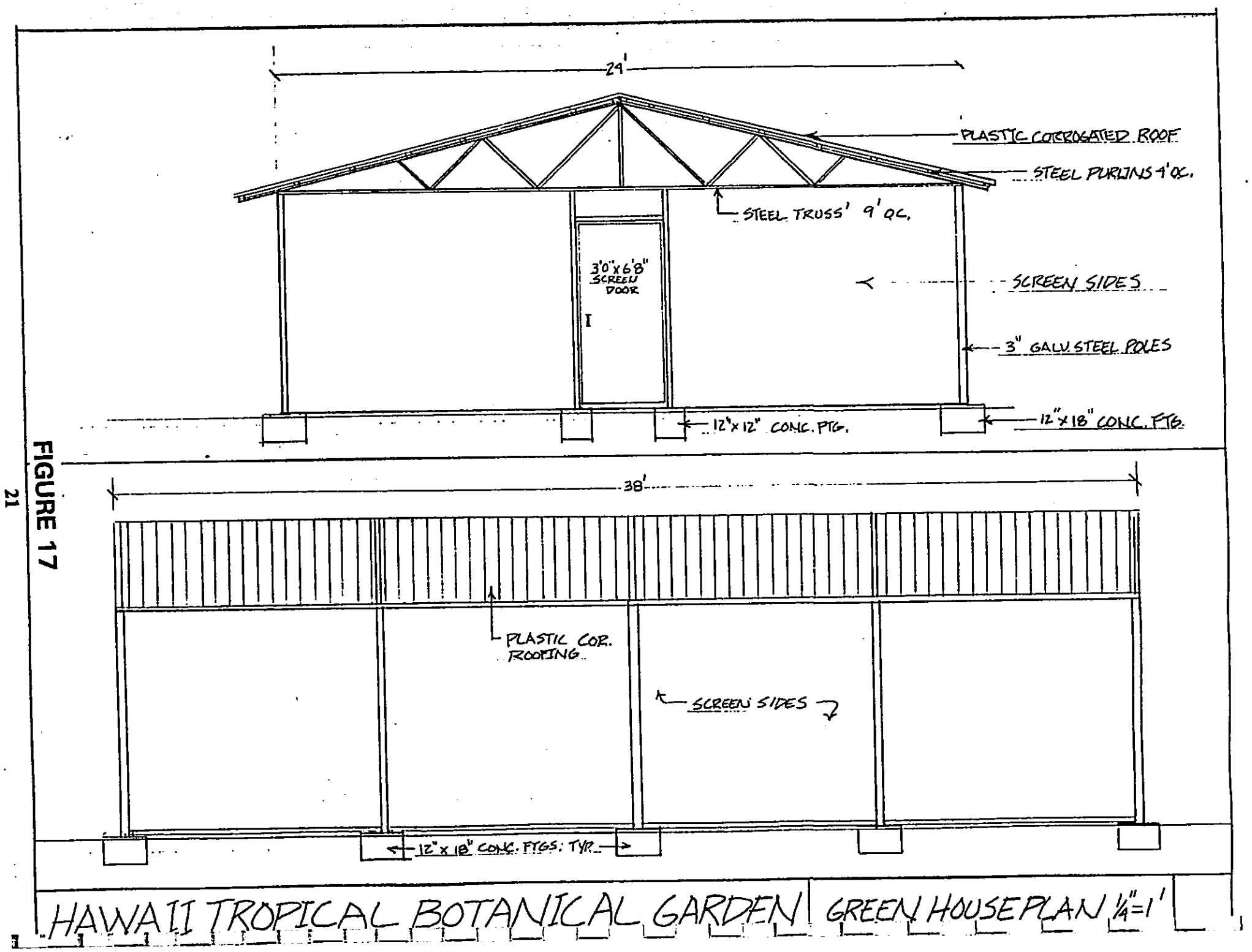
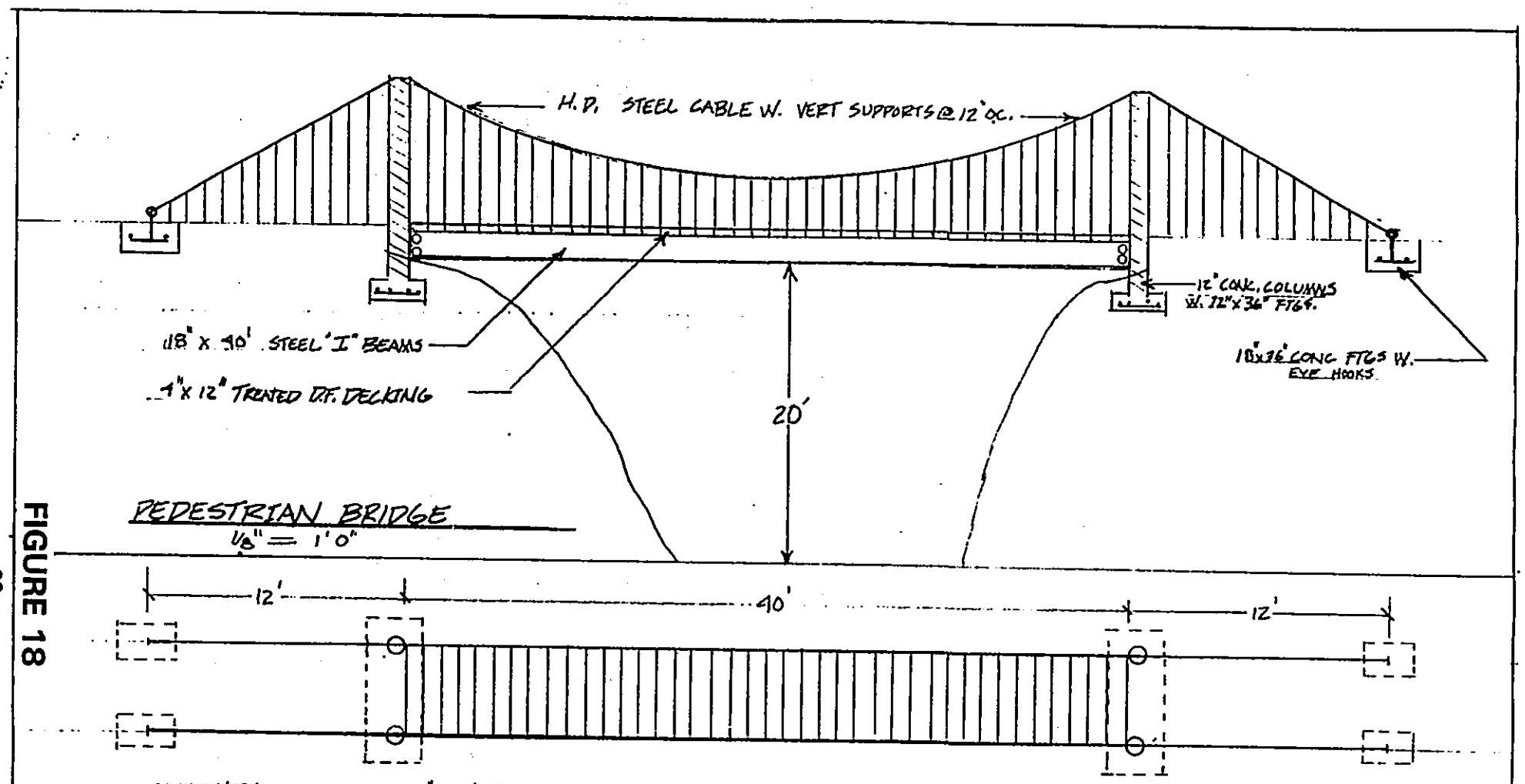

29'
PLASTIC CORRUGATED ROOF
STEEL PURLINS 4'OC.
STEEL TRUSS' 9'OC.
3'0"X6'8" SCREEN DOOR
SCREEN SIDES
3" GALV. STEEL POLES
12"X12" CONC. FTG.
12"X18" CONC. FTG.
38'
PLASTIC COR. ROOFING
SCREEN SIDES
12"X18" CONC. FTGS. TYP.
HAWAII TROPICAL BOTANICAL GARDEN
GREEN HOUSE PLAN 1/4"=1'

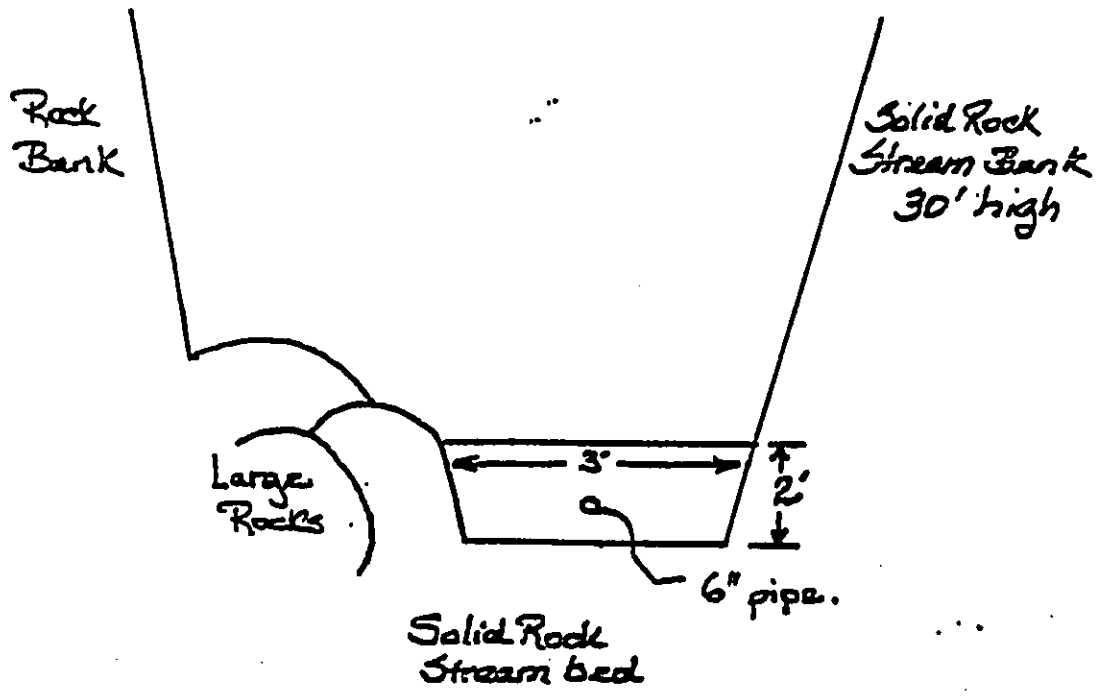
FIGURE 17

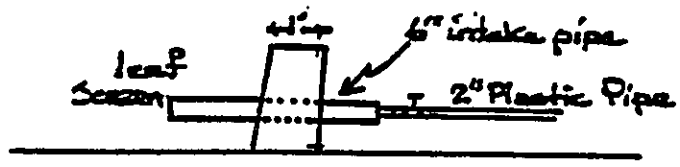
FIGURE 18



HAWAII TROPICAL BOTANICAL GARDEN	PEDESTRIAN BRIDGE	

HAWAII TROPICAL BOTANICAL GARDEN
ONOMEA STREAM WATER SYSTEM





Dam site elevation approximately 140' above sea level.

Approx. 20' elevation

Distance from damsite to the Various uses is 200' to 600'.

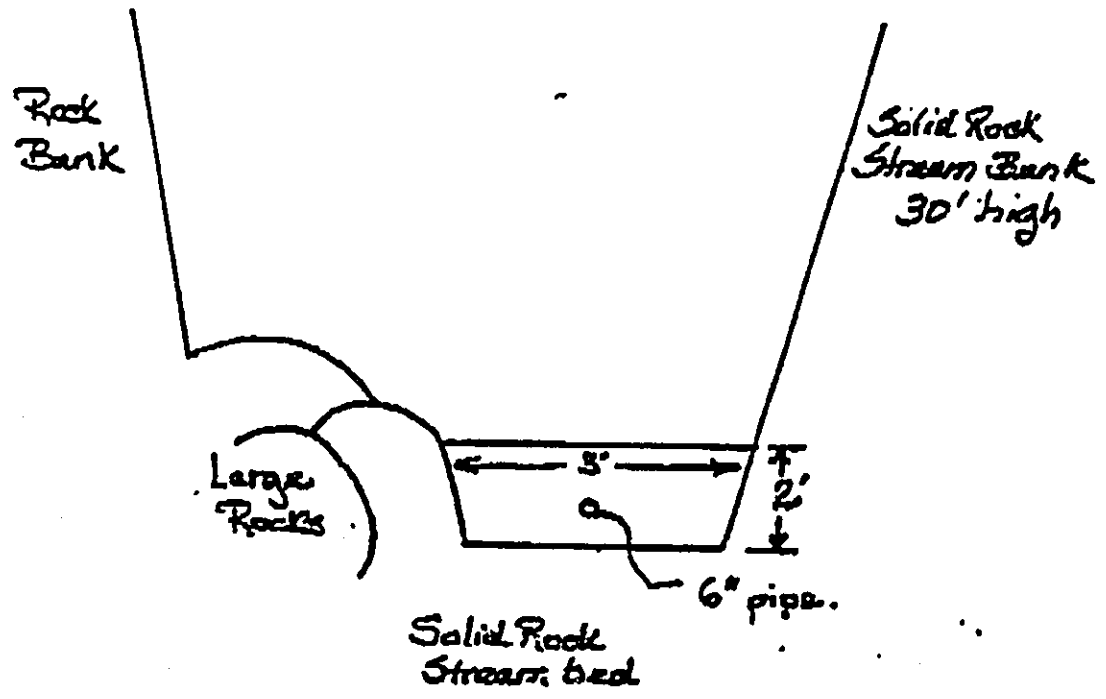
All water uses are at about 20' elevation.

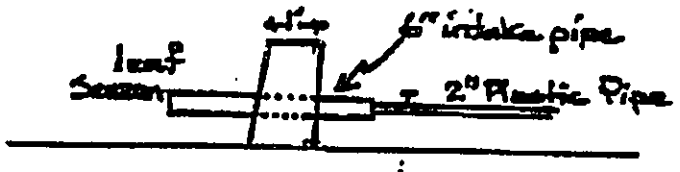
Sea Level

One 2" Plastic pipe feeds all water uses via 1" and ½" plastic pipe system.

FIGURE 19

HAWAII TROPICAL BOTANICAL GARDEN
ALAKAHI STREAM WATER SYSTEM





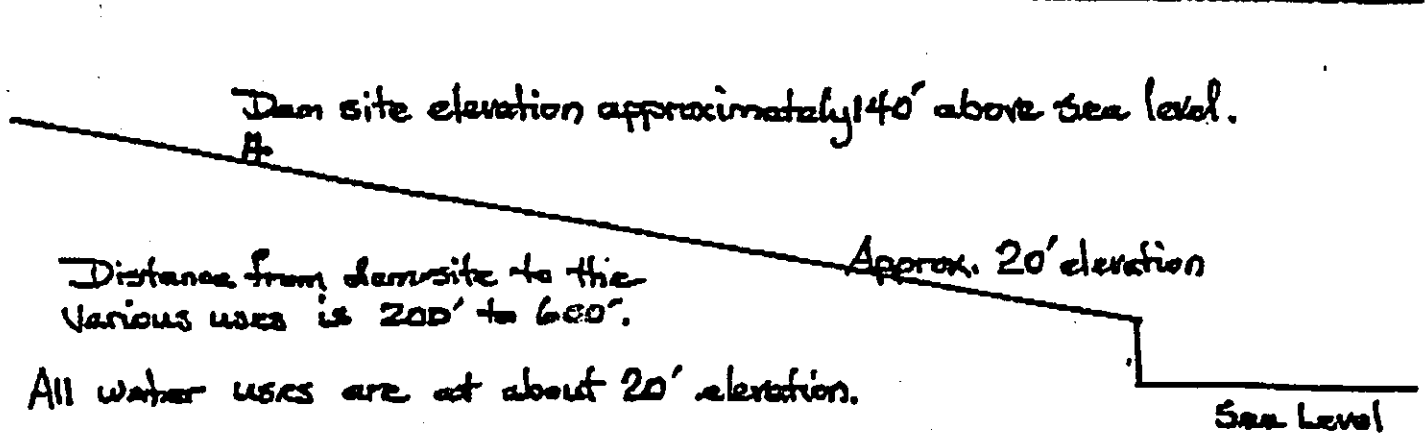


FIGURE 20

(See back pocket for plan). Each of the proposed improvements is coded by a number on the overall site plans, with corresponding conceptual drawings of the improvements included as Figures 7 through 20. The plans for the utility poles, lines and equipment, prepared by HELCO, are shown as Figure 21 (See back pocket for plan).

2.4.1 Immediate Improvements

The immediate improvements proposed include the establishment of a new Garden entrance, new access and vista trails, employee parking areas, rain shelters, rest shelters, utility poles and lines, fencing, signage and landscaping. These improvements were prompted by the need to establish a new entrance and road into the Garden and to resolve a long standing dispute regarding public access to Onomea Bay. Also included is a request to approve an existing concrete diversion dam within Onomea Stream, constructed in 1979, and an existing concrete diversion dam within Alakahi Stream, constructed 1989.

Present access into the Garden for Garden visitors is provided by means of shuttle vans which run along a 10-foot wide jeep road, which, in part, extends along the Onomea Access Trail, and in part is within the Applicant's property. Approximately 800 feet of this access road is bordered by steep banks on the mauka side and steep cliffs on the makai side. During the last 16 years landslides and erosion have caused the jeep road to deteriorate, and the Applicant believes that the road will continue to collapse making it impassable for vehicular traffic into the Garden. The proposed new Garden entrance and related improvements are, thus, intended to provide a safe and reliable access to Garden visitors while creating an environment which would promote and enhance the potential scenic value of the area.

In addition, the public, spearheaded by a community group known as Share Onomea Access ("SOA"), has sought unrestricted pedestrian public access along the Onomea Access Trail and along the Alakahi Trail. Under a mediation agreement reached with SOA and the DLNR, approved by BLNR at its meeting of October 27, 1995, 24-hour unrestricted public pedestrian access will be provided along the Onomea Access Trail and the Alakahi Trail, with the clearing and fencing of these trails accomplished under a site plan approved by DLNR. In order to provide better direction to the public utilizing these trails while protecting Applicant's property, signage along these trails is proposed by the Applicant.

The specific immediate improvements proposed by this Project include the following:

Garden Entrance

A new entrance area is proposed for the Garden to be located on approximately 1,750 square feet of land along the Old Mamalahoa Highway, across the road from the Applicant's newly planned visitor center and administrative office on land situated within the State Land Use Agricultural District, designated by TMK: 2-7-10:14. The entrance area will be graveled and enclosed by wooden guardrails running along the makai edge of the embankment, for a distance of approximately 130 feet. The guardrails will be constructed of 6-inch wooden

posts, 3-feet in height with 6-inch wooden railings. The improvements within the entrance area will include a gate and fencing, a bulletin board and umbrella rack, a rain shelter and tool and utility shed. The land clearing of the entrance area and the construction of all structures is proposed to be done without the use of any heavy equipment. (See Walking Trail Site Plan Detail, Figure 6).

In order to provide for the safety of pedestrians crossing the Old Mamalahoa Highway, the Applicant is proposing that the County of Hawaii establish a crosswalk along the Highway at the Garden entrance. (See Walking Trail Site Plan Detail, Figure 6). The Applicant is also proposing to clear some of the trees along the highway which would improve the sight distance along this road. A sight distance study prepared for the proposed crosswalk, shows that the minimum sight distance standards, required by the County for the establishment of a crosswalk, can be met with the removal of vegetation along the highway and the maintenance of a sight distance easement within the Garden by the Applicant. (See Sight Distance Study Report, Exhibit 13).

A 7-foot high, wrought iron gate is proposed to be erected along the mauka boundary of the property abutting the Old Mamalahoa Highway. The gate will be a swing type gate, opening in the center with two 3-foot wide panels. The top of the gate will have ornamental tips and a center piece with the inscribed words "Hawaii Tropical Botanical Garden". In addition, a 7-foot high wrought iron fence adjoining the gate will be installed for security purposes. The fencing will begin at the Old Onomea Stream culvert and end at the County concrete bridge along the Old Mamalahoa Highway. The total length of the wrought iron gate and fencing will be approximately 140 feet. (See Entrance Plan, Figure 7).

The gated entrance will lead visitors from the visitor center to the new Garden entrance trails. The locked gate will be opened for paying guests during normal business hours from 8:30 a.m. to 5:30 p.m., five days per week. The Applicant presently plans to use a magnetic lock for this gate that could be automatically opened by pressing a button at the visitor center across the highway.

A locked, glass bulletin board with a metal roof and umbrella rack, approximately 7 feet high and 16 feet wide, with a depth of 4 feet, will be constructed on two 4-inch concrete footings and 6-inch wooden posts. This bulletin board is proposed to be identical to the existing bulletin board within the Garden. The bulletin board will be located next to the gated entrance and will be visible only from within the Garden. The side of the bulletin board facing the highway will be landscaped to minimize the visual impact of this structure to persons travelling along the highway. The bulletin board will provide information about the Garden trails and Garden current events. The bulletin board is also intended to contain educational materials regarding the Garden flora and fauna, including materials from the DLNR Division of Aquatic Resources regarding the stream biota. (See Bulletin Board Plan, Figure 11).

The umbrella rack, attached to the bulletin board, will house umbrellas for visitors to use while visiting the Garden when it is raining. This receptacle will also provide for the return of Garden umbrellas in a designated area for visitors exiting the Garden.

A rain shelter, 18 feet by 14 feet in area, is proposed to be located at the edge of the makai area of the Garden entrance. The open-air structure will be constructed with four 6-inch wooden support posts on reinforced, concrete footings, and a pitched galvanized metal roof. The dirt floor of the structure is proposed to be covered with gravel. (See Rain Shelter Plan, Figure 9).

A tool and utility shed, approximately 8 feet by 8 feet or 64 square feet in area is proposed to be located in the northern corner of the Garden entrance area. The shed will be constructed on a 4-inch thick concrete slab, using masonite siding with cedar trim and metal roofing. The appearance of this structure will follow the same plantation style motif as that used for the Garden's visitor center. The shed will be used to store tools and possibly a small golf cart type vehicle, which will be used to transport elderly and disabled visitors along the Garden walkway trails. The specific type of vehicle to be used has not yet been determined by the Applicant. (See Tool and Utility Shed Detail, Figure 14).

Trails

Two new trails are proposed to be constructed within the Garden; a new Garden entrance trail and a new vista trail.

The Garden entrance trail is proposed to be approximately 500 feet long extending from the new mauka entrance of the Garden, makai to the existing improved Garden area. The trail is presently proposed to be a 5-foot wide wooden walkway that will be elevated for the first 300 feet, on a gradual descending grade of approximately 2 inches per foot, until the walkway reaches grade for approximately the last 200 feet. The Garden entrance trail is proposed to run along near the dry Kahalii Stream bed and to cross the stream bed at three locations. (See Walking Trail Site Plan Detail, Figure 6). The elevated portion of the walkway will be about four feet above grade at the highest elevation, except where the trail crosses the Kahalii Stream bed. (See Walkway Plan, Figure 8B). All of the walkway footings will be constructed outside of the stream bed, and no disturbance of the stream bed is anticipated by the construction of this walkway. The location of the proposed footings for this bridge are already marked on the ground.

The Garden vista trail is also presently proposed to be a 5-foot wide wooden walkway, approximately 120 feet in length, running adjacent to the Garden entrance trail at the Garden entrance and extending east of the entrance trail to a lookout area. (See Walking Trail Site Plan Detail, Figure 6). This trail will also be elevated, with the highest point of elevation being approximately 12 inches above grade. (See Walkway Plan, Figure 8A). Some leveling of the ground surface and the removal of a minimal amount of vegetation will be required for this trail.

The elevated portions of both trails are proposed to be constructed using 12 inch square reinforced, concrete footings, with 6 inch thick Douglas Fir treated posts, spaced 10 feet apart, supported with angle iron braces. The walkway will be constructed with 4 inch thick wooden planks. The walkway railing will be approximately 4 feet high with 3 wooden rails between the poles at 12 inch intervals. (See Walkway Plans, Figures 8A and 8B). The at-grade portions of the trails will consist of either blacktop surface or a concrete slab, 4-inches thick, without any railings.

Both of these trails have been designed to accommodate travel along the trails by means of a golf cart type vehicle.

The materials to be used to construct these trails may be changed if a more economical means is found to construct these trails while maintaining the environmental integrity of the Garden.

Rain Shelters/Rest Area Shelters

In addition to the rain shelter proposed at the new Garden entrance, two additional rain shelters and four rest area shelters are proposed to be constructed to allow Garden visitors to rest along the trails.

The rain shelters, proposed to be identical to the rain shelter at the Garden entrance (See Rain Shelter Plan, Figure 9), will be located at the makai end of the Garden entrance trail and at the end of the Vista trail at the lookout area.

The rest area shelters are proposed to be located at various points along the new Garden entrance trail. (See Walking Trail Site plan Detail, Figure 6). Each of the rest area shelters will be 12 feet by 6 feet in area. Each rain shelter will be constructed with two 6-inch Douglas Fir treated posts supported by reinforced, concrete footings, and a galvanized metal roof, with a built-in Douglas Fir bench, extending the entire length of the rest area shelter. The dirt floor of the rest area shelter will be covered with gravel. (See Rest Area Shelter Plan, Figure 10).

Employee Parking Areas

Two parking areas for Garden and visitor center employees are proposed to be located along the mauka embankment of the Garden, abutting the Old Mamalahoa Highway. (See Site Plan, Figure 5 and Walking Trail Site Plan Detail, Figure 6). None of the existing Alexander palms along the highway will be removed to create these parking areas. Both parking areas will be separated from the Garden's steep embankment with a 6-foot high chain link fence. The fencing will extend for approximately 340 feet in length along the embankments.

The 2,050 square foot, graveled visitor center employee parking area will contain five parallel parking stalls, with each stall being 12 feet wide and 24 feet long. (See Visitor Center

Employee Park Plan, Figure 13). Visitor center employees will cross the Old Mamalahoa Highway to access the visitor center.

The 2,000 square foot, graveled Garden employee parking area will contain four parking stalls, with each stall being 10 feet wide and 20 feet long. Garden employees will gain access to the Garden by opening a locked gate at the northern end of the parking area and descend down a new gravel pathway which leads to the nursery area. The new gravel pathway is proposed to be six feet wide. (See Proposed Employee Parking Area Plan, Figure 12).

The parking stall dimensions for each of the parking areas exceeds the minimum parking stall dimensions contained in the Hawaii County Zoning Code. The larger size of the stalls is intended to provide a greater maneuvering area for vehicles parking in these stalls.

Applicant proposes to clear the overgrown brush along the Mamalahoa Highway near these parking areas to provide adequate sight distance for vehicles entering and exiting the proposed parking areas as well as the proposed visitor center on the mauka side of the Mamalahoa Highway. As suggested by the Sight Distance Study for the proposed crosswalk, the Applicant will maintain a sign distance easement over the area to be cleared for sight distance. All of the land clearing for the parking areas and for purposes of sight distance will be by hand, without the use of any heavy equipment.

Diversion Dams

The Applicant is seeking after-the-fact approval for two existing concrete diversion dams; one within Onomea Stream that was constructed in 1979, and the other within Alakahi Stream that was constructed ten years later in 1989.[5] The Onomea Stream dam is sited within the stream approximately 130 feet downstream from the Old Mamalahoa Highway, at an elevation of approximately 100 feet above mean sea level, and the Alakahi Stream dam is sited within that stream approximately 20 feet downstream from the Old Mamalahoa Highway, at an elevation of approximately 40 feet above mean sea level.

Applicant obtains water for the Garden for irrigation, restroom facilities and pond circulation, from the diversion dam within Onomea Stream. Although this dam was in existence in 1982, when the Applicant obtained its CDUP, approval of the dam was not specifically included in the CDUP. Applicant constructed the Alakahi Stream dam in 1989 to provide an alternate source of water for the Garden after an oil spill by an upstream property owner polluted the Onomea Stream, making the water unsuitable for Garden use. The Alakahi Stream dam has been used for an extended period only on two occasions, the first being as a

[5]The Applicant is presently developing a mitigation plan to protect the native fauna and to reduce the exotic species within Alakahi and Onomea Streams, while permitting the Applicant to continue to use the stream water for its Garden. If the mitigation plan requires the removal of one or both dams, the Applicant may withdraw its request for the subject improvement(s).

result of the pollution in Onomea Stream in 1989. This dam is also used for several hours at a time, on an occasional basis, when the Onomea Stream dam is either damaged or is being repaired or cleaned.

Both dams are identical in dimension and construction type. Each measures one foot in width at the top, broadening to approximately two feet in width at the base. Each is two feet high and three feet across at the top, narrowing toward the base as it fits the contours of the rock stream bottom. The concrete structure is fitted with a metal pipe, six inches in diameter, with a valve on the downstream side. The upstream or intake side of the pipe is fitted with a leaf screen. The lower end of the pipe is closed and fitted to a plastic pipe measuring two inches in diameter that feeds down to the Garden. (See Onomea Dam Plan, Figure 19 and Alakahi Dam Plan, Figure 20).

The two-inch wide pipe from each dam connects into one two-inch water line which feeds into other lines for irrigation, restroom use and pond circulation. (See Site Plan of Existing Conditions, Figure 4).

Continued use of the two dams will require permits from the DLNR Commission on Water Resources Management, in addition to the CDUP and SMA use permits being sought by the Applicant. Department of Army Permit Number 96000048 has also been issued for the two dams, subject to a condition requiring that the Applicant work with the DLNR Division of Aquatic Resources to resolve the issue of upstream migration of native fauna.

Utility Poles, Lines and Related Equipment

Several utility poles, together with utility lines, anchors and guy wires are proposed to be installed along the Old Mamalahoa Highway right of way in order to extend the electrical lines to provide electrical power to the Garden's visitor center, located across the highway from the Garden entrance, outside of the Project Area. Detailed plans showing the placement along the highway of the utility poles, lines and related equipment have been prepared by HELCO. (See Utility Plan, Figure 21).

Since most of the utility poles and related equipment are within the Old Mamalahoa Highway right-of-way, the Applicant will be required to obtain the consent of the County of Hawaii for the placement of these improvements.

Signage

"No-trespassing" signs are proposed to be installed at various points along the mauka perimeter of the Garden. Although the exact location of the signs has not yet been determined, it is anticipated that these signs will be spaced at intervals of approximately 100 feet apart. Two "no-trespassing" signs are also proposed to be erected at the intersection of the Onomea Access Trail/Alakahi Trail intersection, and four such signs are proposed to be

installed at the end of the Onomea Access Trail near the mouth of Onomea Stream. (See Site Plan, Figure 5).

Other directional and informational signs are also proposed to be posted at various points along the Onomea Access Trail, the Alakahi Trail and the employee parking areas. The specific location, content and size of these signs has not yet been determined, and the Applicant proposes to submit a site plan for approval by DLNR, in accordance with the DLNR Administrative Rules, prior to the installation of such signs.

Each of the signs, to be installed within the Garden, will meet the guidelines established by Section 13-5-22, P-8 of the DLNR Administrative Rules regarding signage. These guidelines provide that no sign shall exceed twelve square feet in area, and that the sign is to be erected as a self supporting sign no higher than eight feet above finished grade.

Landscaping

The areas surrounding the proposed Garden entrance, along the trails and within the employee parking areas are proposed to be landscaped with shrubs, trees and palms, including native and exotic species. The specific planting areas have not, as yet, been determined. The landscaping will involve the removal of the existing exotic species in these areas.

2.4.2 Future Master Plan Improvements

At its meeting of October 27, 1996, BLNR requested that the Applicant submit a master plan for the Garden in order to provide a broader picture of the future improvements planned for this Garden. In accordance with BLNR's request, the Applicant has prepared a master plan for the Project which provides for continued expansion of the Garden facilities, with additional landscaping, footpaths, fencing and signage. The only major structures proposed are greenhouses, restrooms, and a foot bridge. At the present time the plans for the Garden expansion and the additional structures are only conceptual, and the time frame for completion of the improvements is only a guesstimate. The Applicant proposes to submit detailed site plans and/or construction plans for each of the improvements to DLNR for approval prior to the implementation of any of these improvements.

The components of the master plan for this Project include the following:

Fencing

Fencing is proposed along the Donkey Trail within the parcel designated by TMK: (3)2-7-10:22. (See Site Plan, Figure 5). Although not depicted in the site plan, gates will have to be installed along this fenced area in order to provide Garden visitors with access across the fenced trail. The fencing is proposed to extend down along the Donkey Trail from the Mamalahoa Highway and to end prior to the end a distance back from the shoreline edge. Thus, continued public shoreline access will be maintained with this fencing.

Fencing is proposed along portions of the perimeter boundaries of the present Garden parcel, TMK: (3)2-7-09:2, and along TMK: 2-7-09:6, 10 and 2-7-10:22. The fencing is proposed to be installed only in those areas which would be accessible for entry onto the property. The specific locations for this fencing have not yet been determined, and, therefore, the locations are not depicted in the site plan.

The specific fencing materials to be used for the Donkey Trail fencing and the perimeter fencing have not yet been determined. However, the Applicant will be considering the use of chain link fencing, similar to that installed along the Onomea Access Trail, or a similar type of smooth wire fencing. The Applicant proposes to work with Na Ala Hele program in developing the fencing plans for the Donkey Trail.

Landscaping; Footpaths

Landscaping, with exotic and native plant species, and the establishment of footpaths leading to the landscaped areas, are proposed throughout the Project on the small parcels adjacent to the existing Garden, TMK: (3)2-7-09:2, 6 and 10 and within a small portion of TMK2-7-10:22. The specific location of the landscaping and the footpaths and the type of plant species to be planted have not yet been determined, and are, therefore, not shown on the site plan depicting proposed improvements. The landscaping and footpaths are intended to beautify the Onomea Bay area and to expand the improved Garden area.

The Applicant proposes to clear any new area proposed for landscaping and footpaths without the use of heavy equipment, in order to maintain the contours of the land and to minimize erosion from land clearing activities.

Foot Bridge

A foot bridge is proposed to be constructed over Onomea Stream to provide pedestrian access between the present improved portion of the Garden on TMK: (3)2-7-9:02 and the future expansion area of the Garden within TMK: (3)2-7-10:22. The bridge is presently proposed to be a wooden, suspension foot bridge, which would be gated.

The plans for the bridge provide for 12-inch thick concrete columns set into reinforced concrete footings, with steel cables and vertical supports spaced at 12 inch intervals. The bridge flooring would be constructed with 4-inch thick Douglas Fir treated planks. (See Pedestrian Bridge Plan, Figure 18).

The footings for this pedestrian bridge are proposed to be constructed outside of the Onomea Stream channel, in order to prevent any alteration in the stream flow.

Greenhouses

Up to three greenhouses are proposed to be located in the vicinity of the present Garden nursery area, near the existing greenhouse on TMK: (3) 2-7-9:02. (See Site Plan, Figure 5). The greenhouses are intended to be used primarily for raising and housing a proposed expanded collection of orchids. Many of the orchid species which the Applicant intends to acquire from South East Asia and the Pacific Islands require the protection of a greenhouse, except for limited periods of time. These orchids will, therefore, be housed in the greenhouses, and rotated for display as the plants flower.

The present conceptual plans for these greenhouses depict structures that are similar to the existing greenhouse within the Project Area. Each building will be framed using three inch wide galvanized steel posts set into reinforced concrete footings that are 12 inches by 18 inches in area. The roof of each structure will be constructed with plastic corrugated roofing over steel trusses, with the sides of the structure being screened. (See Greenhouse Plan, Figure 17).

The greenhouses are proposed to be constructed as the need for greenhouse space for the Garden's orchid collection increases.

Restrooms

If warranted, because of greater numbers of Garden visitors, two additional restroom buildings are proposed to be located within the Project Area on TMK: (3)2-7-9:02. (See Site Plan, Figure 5). Each of the buildings is proposed to be approximately 104 square feet under roof. The conceptual plan for each of the buildings provides for a structure finished with tongue and groove siding and a metal roof. (See Bathroom Plan, Figure 15).

Wastewater from the restrooms will be disposed of by means of a wastewater treatment system, as permitted under the State Department of Health Rules regarding wastewater systems (Chapter 11-62, Hawaii Administrative Rules, Wastewater Systems).

Signage

No-trespassing, informational and directional signs are proposed to be located at various points throughout the Project. All signs are proposed to conform to the requirements for signage under Section 13-5-22, P-8 of the DLNR Administrative Rules. The specifics regarding the types of signs and their locations have not yet been determined.

2.5 Timetable for Development

The Applicant proposes to begin work on the immediate improvements within the Project upon receipt of all required permits from the State and County. It is anticipated that these improvements should be completed within six months. The long term master plan

improvements are intended to be started some time after all of the immediate improvements have been completed, based upon the availability of funding for these improvements. It is presently anticipated that all of the long term improvements should be completed within five years, except for the landscaping and footpaths which are anticipated to continue as an ongoing process as part of the development and maintenance of the Garden.

2.6 Applicant's Objectives and Need for the Project

The Applicant has the following objectives with this Project:

(a) To provide visitors with a safe and reliable access point to enter the Garden while preserving the aesthetic, scientific and educational value to the area by means of creating a new Garden entrance;

(b) To afford visitors the opportunity to experience an overview of the Onomea Valley and Bay by means of the lookout areas;

(c) To provide safe, on-site parking for employees of the Garden and Garden visitor center by means of establishment of parking areas;

(d) To improve the safety for pedestrians using the Onomea Access Trail by eliminating the shuttle vans presently using this road for access into the Garden;

(e) To provide a greater degree of security for the Garden property by establishment of fencing and the posting of signs;

(f) To secure rights for stream water to provide for Garden irrigation, restroom facilities and pond circulation; and

(g) To provide for future expansion of the Garden area, with the expanded planting areas, footpaths, footbridge, restrooms, and greenhouses.

There is a need for this Project for several reasons. The present vehicular access route into the Garden has become increasingly unsafe, and the new entrance will provide a reasonable means of access into the Garden for its visitors, in close proximity to visitor parking areas. It will also provide a safer pedestrian public access route, without the Garden shuttle vans, along the Onomea Access Trail. The rain shelters and rest stops will provide needed amenities for Garden visitors. The fencing and signage will provide a greater degree of security for the valuable botanical resources of the Garden. Finally, the future long term expansion of the Garden will allow for the preservation of Onomea Bay while enhancing a facility that is a great asset to Hawaii's visitor industry.

3. ALTERNATIVES CONSIDERED

The alternatives to the proposed action would include a no-action alternative, an alternative of siting the garden entrance and other improvements in a different location, the relocation of the entire Garden facility or the closure of the Garden.

3.1 No-Action Alternative

The no-action alternative would provide for the continued use of the Onomea Access Trail for vehicular access into the Garden, and utilizing the existing facilities, without the additional lookout areas, rain shelters and rest areas, overpass, fencing and signage.

The benefit associated with this alternative would be the economic savings involved in providing no additional improvements for the Garden.

The detriments of the no-action alternative are many. First, the present deteriorating vehicular access route into the Garden would be maintained. If this route collapses during winter storms there will be no access route into the Garden. Secondly, pedestrians are presently using this access route for access to the recreational resources at Onomea Bay. Continued vehicular use of this access route will make it far more hazardous for pedestrians walking along the trail. Third, if the Applicant is prohibited from fencing and signing the Garden, visitors and the public will not be protected from certain hazardous conditions, such as steep embankments. Fourth, the Applicant will not have any means of providing security for its property. Finally, this alternative would prevent the Applicant from providing needed improvements and amenities for its visitors and the community at large.

The no-action alternative would not serve the public interest. Further, it would reduce the economic contribution to the local community to be made by the Applicant.

3.2 Alternative Siting of Improvements

The Applicant has considered siting the improvements in another location within the Project Area; however, this alternative is not viable because of the steep slope of the land.

3.3 Relocation of Garden

The alternative of relocation of the Garden would involve moving the existing botanical garden to a different location. The benefit of this alternative would be to retain Onomea Bay in a more undeveloped condition. The detriment of this alternative would involve the difficulty, extreme expense and the time in relocating the existing Garden improvements, as well as the loss of the aesthetic beauty to Onomea Bay by the relocation of the Garden to a different area. This alternative is also not viable because the uniqueness of the Garden in its specific location.

3.4 Closure of the Garden

This alternative would provide for the closure of the Garden and the return of the valley at Onomea Bay to an untended condition. The advantage of this alternative would be the fact that there would be no intrusion into the environmental resources of the area. The detriments of this alternative would be substantial. These would include the substantial economic loss of this visitor attraction, the loss of the aesthetic value of the Garden, and the loss to the community of the educational resources of this facility. The closure of the Garden would also mean the end to the management of and removal of the noxious plant species in this area. The Applicant is vigorously fighting the intrusion of the noxious Miconia within the Project Area. Miconia is a plant which is threatening the entire Onomea area. Without the continued maintenance by the Applicant, the Project Area will become invaded by Miconia, choking out all other plant species.

3.5 Alternative Analysis Conclusion

The only feasible alternative by which the Applicant can realistically develop the Applicant's property is by means of the proposed action.

4. THE AFFECTED ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES

4.1 Physical Environment

4.1.1 Location

The Project area is located at Alakahi, Kahalii and Onomea, South Hilo District, Island of Hawaii and is designated by TMK: (3)2-7-9:02, 06, 10 and 2-7-10:22. (See Location Map, Figure 1).

4.1.2 Surrounding Land Uses

The Project Area is bounded on the south and west by the Old Mamalahoa Highway, on the east by Onomea Bay and the Pacific Ocean, and on the north by abandoned sugarcane land, presently owned by Lutkenhouse and used as a tree nursery.

4.1.3 Government Road

The Onomea Access Trail essentially follows the path of an old Government Road that is depicted on a survey map prepared A. B. Lobenstein in 1889. An abstract prepared for DLNR by Awana, Inc. concluded that the road dates back to the reign of Kamehameha III. The historical evidence, documented in a report prepared by Paul H. Rosendahl, Ph.D., dated July 21, 1995, concludes that this right-of-way was a government roadway in the 1800's designed to facilitate wheeled vehicular traffic. Based on this data, this roadway became a

public road, under the Highways Act of 1892, presently HRS Section 264-1. Because of the evidence of vehicular use of this roadway and the nature of the roadway, the County of Hawaii and the Applicant believe that the roadway is under the jurisdiction of the County of Hawaii. DLNR, however, claims that this right-of-way is a trail under State jurisdiction. In addition, the Applicant claims ownership over portions of the improved part of this right-of-way near the Mamalahoa Highway, where the improvements appear to be located on private land.

Notwithstanding the ownership of this roadway, under the mediation agreement between DLNR, the County of Hawaii and the Applicant, approved by BLNR on October 27, 1995, this roadway has been designated as a public access trail as part of the State Na Ala Hele trail system.

4.1.4 Climate

The tropical coastal climate of the South Hilo district shoreline and Onomea Bay is primarily influenced by northeasterly winds and an average of 125 to 150 inches of rainfall annually. The mean annual temperature is approximately 75 degrees Fahrenheit.

4.1.5 Topography, Physiography and Geology

The Project Area, totaling approximately 38 acres, slopes down to the ocean shoreline where it is bordered by steep cliffs. The elevations range between 200 feet along the mauka boundary at the Old Mamalahoa Highway, down to 20 feet at the shoreline cliffs. Three streams run through the Project area; Alakahi Stream, Kahalii Stream (presently a dry stream bed, which is considered an intermittent stream), and Onomea Stream.

Four beaches are located along the shoreline of the Project Area; the first abutting an area known as Turtle Bay, the second at the mouth of Alakahi Stream, a third at the mouth of Onomea Stream, and the last along Onomea Bay on TMK: 2-7-10:22. A portion of the beach along the mouth of Onomea Stream has been noted in literature regarding Onomea Bay, specifically, *Beaches of the Big Island* by John R.K. Clark (Univ. Of Hawaii Press,1985) as being a red sand beach. However, in recent years, red sand has not been notably visible at this beach.

The portions of the Project Area where the structures and parking areas are proposed are relatively flat. However, the area where the new access trail is to be constructed is fairly steep. The steepness of this area is the reason for elevation of portions of the access trail.

The soils in the Project Area are classified by the U.S. Department of Agriculture Soil Conservation Service as "RB" or "Rough Broken," with very steep slopes ranging from 35 to 70 percent. This classification is actually a miscellaneous land type referring to steeper precipitous land that is broken by intermittent drainage channels. The depth of this soil type typically ranges from shallow to deep. The presence of numerous rock outcrops suggest these characteristics.

The Land Study Bureau classifies the soil within the Project Area as "E" or "Very Poorly Suited" to agricultural productivity, and the State Department of Agriculture's Land of Importance to the State of Hawaii (ALISH), which lists all of the land in Hawaii with agricultural significance does not classify the area as being either "Prime" or 'Unique Agricultural Land."

Probable Impact: The potential for soil erosion which may occur particularly along the trails during construction is minimal because the site clearing is intended to be done without the use of any heavy equipment. Also, in steep areas where it is possible, only the immediately area where the trail footings and posts are to be installed will be cleared. In addition, site work will be scheduled only where there are periods of minimal rainfall, and areas denuded of vegetation will be replanted or covered as quickly as possible to control erosion. With the application of these practices, it is not anticipated there will be any substantial adverse impact from soil erosion as a result of the Project.

4.1.6 Natural Hazards

The Project Area is not included on the United States Corps of Engineers Flood Insurance Rate Map ("FIRM"). In addition, the County of Hawaii Department of Public Works records indicate that there are no known drainage problems within the Project Area, despite the fact that Onomea and Alakahi Streams continually flow through the site.

The U.S. Geological Survey Tsunami Inundation Map depicts the 100-year tsunami inundation line as extending inland at variable distances to the 20 to 30 foot elevation.

The Property is within Lava Hazard Flow Zone 8 on the U.S. Department of Interior Geological Survey Map. The Geological Survey Map provides eight zones, with Zone 1 being the zone with the highest risk of lava inundation and Zone 8 being the zone with the least risk of such inundation. Zone 8 areas include the lower slopes of Mauna Kea, with most of the area being unaffected by lava flows for the past 10,000 years.

Probable Impact: The proposed improvements within the Project Area, except for possible future landscaping and footpaths, are located a sufficient distance inland from the shoreline. In addition, the vertical basaltic cliffs, are believed to provide significant natural protection from occasional storm waves and tsunami-generated waves. Based on this fact, it is anticipated that there will be no adverse impact upon the Project from the threat of tsunamis. Further, because of the location of the Project Area, these is no adverse impact anticipated on the Project from the threat of volcanic inundation.

4.2 Streams

There are three streams that intersect the Project Area; the Onomea Stream and the Alakahi Stream, which are perennial streams, and the Kahalii Stream, an intermittent stream.[6] A concrete diversion dam has been situated within Onomea Stream since 1979 and a similar concrete diversion dam has been situated within Alakahi Stream since 1989. A detailed description of these dams is contained in Section 2.4.2, *supra*.

The Alakahi and Onomea Streams were identified in *Hawaii Stream Assessment, A Preliminary Appraisal of Hawaii Stream Resources*, State of Hawaii, Commission on Water Resource Management and National Park Service, Rivers and Trails Conservation Assistance Program, December, 1990, Report R8-4. This report was mandated by the 1988 State legislature to identify steams appropriate for protection. Relevant portions of this report are attached as Exhibit 5.

The report includes a resource inventory and assessment which measured the aquatic resources, riparian resources, cultural resources and recreational resources of streams throughout the State. The report does not, however, provide any dates as to when the stream inventories and assessments were conducted. The Onomea Stream was not included in the aquatic resources inventory; however, the aquatic resources within Alakahi Stream were determined to be "substantial," under the six category ranking system, which ranks streams as outstanding, substantial, moderate, limited, without and unknown. (*Id.* at 134, 155). The "substantial" ranking requires a stream to have at least three representatives from the eleven native aquatic species found in streams. These representatives could either be in the group 1 category containing the four rarest species or the group 2 category containing the remaining species. The substantial ranking also requires that a stream contain one or fewer introduced species. (*Id.* at 138).

The riparian resources inventory in this study identified no rare, threatened or endangered plant species, protected areas, wetlands or native forests associated with either Onomea or Alakahi Streams. (*Id.* at 190). However, the inventory did note that the presence of feral pigs were detrimental to the streams.(*Id.*)

The recreational resources inventory in this study ranked Onomea and Alakahi Streams each as a substantial regional resource, under a five category ranking system of outstanding, substantial, moderate, limited and potential. Both of these streams were designated as providing hiking, fishing, swimming, parks, hunting and scenic views recreational opportunities. (*Id.* at 255).

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[6]Per conversation with Donn W. Carlsmith, a former owner and resident of Onomea, during a winter storm in 1949, the northern bank of Kahalii Stream, mauka of the Old Mamalahoa Highway, collapsed, permitting the Kahalii Stream water to cascade down the face of a quarry abutting the stream and eventually reach Onomea Stream, mauka of the Old Mamalahoa Highway. According to Carlsmith, the Kahalii Stream makai of the highway has not flowed since 1949, except for localized runoff during storm conditions.

A stream assessment of a portion of the Alakahi and Onomea Streams, makai or downstream of diversion dams, was conducted by the DLNR Division of Aquatic Resources on March 6, 1996. (See Stream Survey: Alakahi and Onomea Streams, Hawaii Island, Exhibit 6). The native species found in Alakahi Stream included the aholehole (*Kuhlia sandwicensis)*, a nearshore estuarine species; the lower elevation native gobies, the o'opu akupa (*Eleotris sandwicensis)* and the o'opu naniha (*Stenogobius genivittatus)*; a mid-level goby, the o'opu nakea (*Awaous stamineus)*, which appeared to be abundant in the quadrat sample taken; and the upper-level goby, o'opu nopili (*Sicyopterus stimpsoni)*. However, the most common species found in Alakahi Stream was the introduced Tahitian prawn (*Macrobrachium Iar*), which was present in about 86% of the sample quadrats. The native species found in Onomea Stream included the aholehoe, o'opu nakea, and o'opu nopili, with the o'opu nopili being observed in 45% of the stream samples. The Tahitian prawn was not as abundant in Onomea Stream, occurring in only 40% of the sample quadrat.

The 1996 stream assessment concluded that all of the native gobies were present in the Alakahi and Onomea Streams, except for the o'opu alamo'o (*Lentipes concolor)*, which commonly occurs in higher elevations in streams without a terminal waterfall, such as the waterfalls within Alakahi and Onomea.

The Division of Aquatic Resources also conducted a stream assessment in May, 1996 of a portion of the Alakahi and Onomea Streams mauka or upstream of the diversions. Although no written report is available, from conversations with the Division of Aquatic Resources, it is the Applicant's understanding that the only native goby found was the o'opu hi-ukole (*Lentipedes concolor)*.

The stream flow within Onomea and Alakahi Streams, in the vicinity of the dams, was measured by the Applicant in October, 1995, during an extended dry period where the stream flow was very low. The stream flow within Onomea Stream was measured at 22 cfs, while the stream flow within Alakahi Stream was measured at 1.3 cfs. The amount of water diverted by each diversion dam is approximately 0.005 cfs. Thus, approximately 21.995 cfs of water continues to flow through Onomea Stream and approximately 1.295 cfs of water continues to flow through Alakahi Stream when water is diverted by each dam.

There is no known data available for Kahalii Stream regarding any possible stream biota within this stream bed.

No wastewater is presently known to be diverted into either Onomea, Kahalii or Alakahi Streams; nor, is any water proposed to be diverted into these streams by reason of the Project. Wastewater from the existing restrooms is disposed of by means of a cesspool, approved by the Department of Health. The Applicant also understands that the Department of Health will be testing the Onomea Stream water to determine whether there is any leaching into the stream from the cesspools.

The Lily Pond originally was flushed with fresh water on a daily basis, and the overflow from this pond drained out, eventually reaching Alakahi Stream. In April, 1996, the Lily Pond was converted into a self sustaining environment, so that water is not added to this pond; nor, is the pond being drained. The intake and outflow pipes within this pond were capped and the number of fish reduced to create this environment. The remaining pond within the Project Area, identified as a bird pond, continues to be flushed out with water from the Onomea Stream diversion dam on a daily basis. Although the drainage from this pond originally flowed down to Alakahi Stream, the drainage pattern was changed in April, 1996, so that the water flows down to a landscaped area, away from Alakahi Stream, and the water now seeps into the ground in the landscaped area.

Probable Impact: The recent 1996 stream assessment of Onomea and Alakahi Streams have determined that five native aquatic species are present in these streams makai or downstream of the dams, and one native aquatic species mauka or upstream of the dams. The findings of this assessment for Alakahi Stream are actually better than the findings of the assessment published in 1990 in *Hawaii Stream Assessment, A Preliminary Appraisal of Hawaii Stream Resources*, before the dam was constructed in this stream. Nevertheless, the Division of Aquatic Resources believes that the presence of the dams may impact adversely upon the upstream migration of the native gobies. The Division is also concerned that the dams create a pond effect which encourages the spread of the introduced Tahitian prawn. The Applicant intends to work with the Division of Aquatic Resources to develop measures to mitigate the impacts of the use of the stream water upon the migration of native fish species and to reduce the exotic fish populations in the streams. These mitigation measures may include removal of the dams. Thus, the Proposed Action may exclude a request for approval of the dams, if appropriate mitigation measures are not possible to mitigate substantical advserse impacts upon the native fish populations. With mitigation measures, the Proposed Action is not anticipated to result in any substantial adverse impact upon the stream biota.

No wastewater from the Project Area is or will be diverted into the streams, and recent alterations to the pond drainage in the Project Area have lessened the likelihood of any contamination of the ponds. If, as a result of the proposed testing, wastewater is found to be leaching into the streams from the existing cesspool, Applicant will make appropriate corrections to its existing wastewater disposal system, as approved by the Department of Health, to eliminate such leaching. Further, any future wastewater system installed by Applicant for the proposed restrooms will designed to comply with the State Department of Health standards for wastewater disposal. With the implementation of such mitigation measures, the Proposed Action is not anticipated to result in substantial adverse environmental impacts upon the streams that run through the Project Area.

Although the proposed entrance trail will cross over Kahalii Stream in three locations, no portion of this elevated trail will be constructed within the banks of this relatively dry stream bed. There is the possibility that contaminants can fall into the Kahalii Stream bed during construction; however, the threat of such contamination can be mitigated by the use of proper construction practices.

The Division of Aquatic Resources has recommended that three mitigation measures be taken during construction to minimze erosion and siltation of the streams. These are (1) to schedule site work for a period of minimal rainfall; (2) to replant or cover land denuded of vegetation as quickly as possible to control erosion; and (3) to prevent construction materials, petroleum products and debris from falling, blowing or leaching into the aquatic environment. The Applicant proposes to implement these recommended mitigation measures during construction.

4.3 Flora

Vegetation throughout the improved portion of the Garden includes a collection of approximately 10,000 cultivated plants and trees that represent 1,800 species, which are primarily exotic species. Controlled cultivation of the exotic species has prevented any species from spreading outside of the Project Area or becoming a noxious weed.

Vegetation throughout the unimproved portion of the Project Area includes warabi (*Athyrium esculentum*), guava (*Psidium guajava*), African tulip (*Spathodea campanulata*), banyan (*Ficus* spp.), mountain apple (*Syzygium malaccense*), Alexander palm (*Archontophoenix alexandrae*), bamboo (*Phyllostachys* sp.), pothos (*Epipremnum aureum*), banana (*Musa* sp.), trumpet tree (*Cecropia peltata*), mango (*Mangifera indica*), strawberry guava (*Psidium cattleianum*), avocado (*Persea americana*), miconia (*Miconia calvescens*), Octopus tree (*Brassaia actinophylla*), and Laua'e (*Polypodium scolopendria*). None of these species are either endangered or threatened.

Miconia is considered a noxious weed. Since May 21, 1993, Applicant has been attempting to eradicate miconia from the Project Area under a cooperative agreement with the State of Hawaii Department of Agriculture ("DOA"), where DOA provides technical advise and chemical herbicides and the Applicant provides manpower and equipment for herbicide application. Because of State budgetary cuts, DOA is no longer providing the herbicide, and the Applicant has supplied its own herbicide for miconia eradication. The Applicant's method for removal of miconia is to cut down and poison the plants prior to the plants reaching a flowering stage. Thus, the plants may reach a height of six feet before they are cut and poisoned. However, the removal of the plant prior to flowering has prevented the spread of this noxious pest. The Applicant has kept the Project Area relatively free of miconia; however, it has not been able to eradicate this plant because of the substantial infestation on neighboring mauka lands.

Probable Impact: The Proposed Action will not have any adverse impact upon threatened or endangered plant species, since there are no such species within the Project Area. Since the existing flora within the Project Area consists consists primarily of exotic species the land clearing and landscaping proposed by the Project will not have a significant adverse impact upon the plant species of the area. Improvement of the Project Area with new landscaping will actually actually be benefical for the botanical resources of the Onomea area, since the maintenance of this area by the Applicant will help to reduce the spread of miconia.

Although there is the possibility that an introduced exotic plant species may grow out of control and become a noxious weed, that possibility is extremely remote in light of the fact that the Applicant has already operated its Garden for 14 years without this type of problem occurring and the Applicant has proposed to control the growth of the vegetation with its landscaping.

4.4 Fauna

Known mammals in the area include the mongoose, the rat and the house mouse. Also stray dogs and cats are known to roam the area. Although feral pigs are known to contaminate the streams that run though the Project Area, these animals are typically found at higher elevations and have not been sited in the vicinity of the Project Area. The Hawaiian endemic and endangered Hoary Bat (*Lasiurus cinereus semotus*) has been observed in the area. This species forages on insects and roosts solitarily in trees and occasionally lava tubes. Birds found in the area are common exotic species.

Within the improved portion of the Garden, there are presently several caged macaws (*Ara macao*), a native of tropical America, and American Flamingos (*Phoenicopterus ruber*), a bird species originally from Africa, that was introduced to the Hawaiian Islands on the Island of Kauai in 1929. The Flamingos inhabit the bird pond. In addition, there are several ducks (*Manderia* sp.) that inhabit this pond. These ducks were donated to the Garden. Several carp (Koi) have been introduced in the Lily Pond for mosquito abatement, beauty and general enhancement of the aquatic environment of the Garden.

The Orangeblack Hawaiian Damselfly (*Megalagrion xanthomelas)*, a lowland insect species, which is becoming increasingly rare in the State of Hawaii, has been found within Onomea Stream adjacent to the Applicant's property above the Old Mamalahoa Highway and along Alakahi Stream, also above the Old Mamalahoa Highway. Both of these locations are outside of the Project Area. A study conducted for the Bishop Museum in 1995, discusses the habitat for this species in each of the particular locations. (See "The Orangeblack Hawaiian Damselfly, *Megalagrion xanthomelas* (Odonata: Coenagrionidae): Clarifying the Current Range of a Threatened Species," Dan A. Polhemus, *Records of the Hawaii Biological Survey for 1995*, Exhibit 7).

This species is known to occupy a wide range of habitats and has broad ecological tolerances. Although it appears to be widespread on the Big Island, it has been extirpated from the islands of Kauai and Maui and is perilously close to extirpation on Oahu. It is believed that the loss of this species is linked more to the introduction of alien aquatic biota than to outright habitat alteration or destruction. (*Id.*, at 48).

Although populations of the *Megalagrion xanthomelas* have not been found in the Project Area (*Id.* at 45-46), the Applicant is presently working with the National Biological Service, Pacific Islands Science Center to develop a project to attract this species into the Garden ponds, without damaging the existing populations in the mauka areas of Onomea and

Alakahi Streams. (See letter from David Foote from the Pacific Islands Science Center, Exhibit 8). Also, since April, 1996, when the fresh water stopped flowing through the Lily Pond, this species began to congretate at the pond.

Probable Impact: The clearing of the walking trails, and the construction of the requested improvements and landscaping will bring only minimal changes to the existing habitat and will not result in an adverse impact to the native bird and mammal populations. Trees will only be removed if required for safety purposes, with most of the existing trees being left in place. Thus, the removal of any trees in connection with the Proposed Action is not expected to impose any significant impact upon the Hawaiian Hoary Bat.

The proposed improvements are not expected to have any adverse impacts upon the *Megalagrion xanthomelas*, since the populations primarily occur outside of the Project Area. The populations along the streams appear to be thriving with the placement of the small diversion dams downstream. Further, the habitat for this species within the Project Area is expected to be improved with the implementation of the management plan proposed by the Pacific Islands Science Center.

There may be an impact upon the *Megalagrion xanthomelas*, particularly at the Lily Pond, caused by reason of the diazanon fogging used by the Applicant to control mosquitoes in the Garden. However, the fogging is directed away from any of the aquatic habitat, which may mitigate the impacts upon this species. The Applicant is investigating alternatives to the use of diazanon for the reduction of mosquitoes. Also, the Applicant is establishing a monitoring program with the assistance of the Pacific Island Science Center, to determine what effects, if any, the current mosquito abatement program may have on the *Megalagrion xanthomelas*. (See letter from David Foote dated July 2, 1996, Exhibit 14).

With the measures outlined above, the impact upon the *Megalagrion xanthomelas* from the Applicant's existing mosquito abatement practices should be mitigated. Further, the proposed improvements do not appear to result any adverse environmental impact upon the fauna within the Project Area.

4.5 Historical/Archaeological Resources

An archaeological field inspection was conducted within all areas proposed for immediate improvements within the Project Area, except the for area designated for the Onomea Access Trail overpass, by Robert Spear, Ph.D., in May and October, 1995. The May, 1995 report, which included the areas proposed for the Garden entrance, walkways, rain shelters and rest areas, identified no archaeological sites within the inspection area. (See Exhibit 9). The October, 1995 report, which included the parking areas, concludes that no features or cultural material had been identified in Survey Area E (the Garden visitor center employee parking area). Four terraces were identified in Survey Area E (the Garden employee parking areas. Dr. Spear notes that in an earlier survey conducted by Marc Smith of DLNR State Historic Preservation Division (Marc Smith, October 1, 1993), the terraces

adjacent to the highway and above the improved portion of the Garden were identified as being contemporaneous with, and a feature of road construction. Spear concludes that "Features 1 through 4 were a part of this system." (See Exhibit 10).

An archaeological field inspection was also conducted on the portion of the Project Area designated as TMK: (3)2-7-10:22 on May 5, 1991 by Paul H. Rosendahl, Ph.D. No surface structural or portable remains of any kind were identified during the inspection of this portion of the Project Area. However, the report noted that there is always the possibility that potentially significant unidentified subsurface cultural remains or surface structural features may be encountered in the course of future archaeological investigations or subsequent development activities. (See Exhibit 12).

The DLNR State Historic Preservation Division has, in the past, sought a detailed archaeological inventory for the entire Project Area. Due to a limitation of resources, the Applicant has proposed to conduct such a detailed inventory for any future improvements prior to the construction of such improvements. In conjunction with any future inventory, the Applicant also proposes to interview people with a knowledge of the area to obtain more information about the use of this area. The State Historic Preservation Division has recently concurred with this course of action. (See memorandum from Don Hibbard, State Historic Preservation Division, dated June 25, 1995, Exhibit 11).

Probable Impact: Based upon the archaeological field inspections, there are no known archaeological sites within the Project Area that will be affected by the immediate improvements proposed by the Project. Likewise, all of the structures proposed as long range master plan improvements are proposed to be located within the improved areas of the existing Garden. Thus, it is unlikely that a significant historic or archaeological feature would be discovered during the construction of any such structure. Since the remaining improvements are footpaths and landscaping, there will not be a substantial alteration of the ground surface which would disturb any subsurface cultural remains. The impact on any such remains will be mitigated by the fact that no heavy equipment will be used to clear the land. Furter, a detailed archaeological inventory will be conducted for any area proposed for the future long-term improvements, prior to the construction of the improvements. Thus, the impacts upon any archaeological resources can be mitigated. Accordingly, the development of the Project will not have a significant adverse impact upon historical or archaeological resources.

4.6 Air Quality

The northeast trade wind pattern on the windward coast, in which the Project Area is located, is characterized by local up slope-down slope winds from Mauna Kea. This trade wind pattern minimizes the potential for dusty conditions to develop in the area.

The Applicant proposes to utilize a small, three or four wheel golf cart type vehicle to transport elderly guests down the Entrance and Vista trails. The combustion emissions from this type of vehicle would be minimal, perhaps at most comparable to that of a small

gasoline-powered lawn mower. The Applicant has not made a decision on the model or make of the cart to be utilized, and will seek necessary agency approvals prior to the use of any such vehicle.

Probable Impact: Site clearing and construction of the trails and related improvements will be conducted by hand, with no heavy machinery utilized. Because of the damp climate of the Project Area, it is not anticipated that dust will be emitted as a result of construction activities. The combustion emissions from a golf cart type vehicle would be minimal and the discontinuance of the existing shuttle vans will diminish the amount of exhaust being emitted into the atmosphere. Therefore, the Proposed Action is not anticipated to create any substantial adverse impact upon the air quality of the area.

4.7 Noise Quality

The noise generated in the vicinity of the Project Area comes from the existing road traffic along the Old Mamalahoa Highway and from low flying aircraft in the area. Other noise in the Project Area comes from natural sources (ocean and wind) and wildlife.

Probable Impact: Site clearing and construction of the trails and related improvements will be accomplished by hand without the use of heavy equipment. Some minor short-term increase in noise level may be experienced during construction; however, this noise will be confined to normal daylight hours. Since there are no neighbors residing in the vicinity of the Project Area, there is not any substantial adverse impact upon the noise quality anticipated by the construction activities.

4.8 Visual Attributes

The present landscape of the Project Area where the improvements are porposed is characterized by warabi fern and an assortment of introduced exotic trees and shrubs of no particularly outstanding aesthetic value. The Applicant believes that removal of some of the warabi and overgrown shrubbery will enhance the aesthetic value of the Project Area, as well as provide enhanced views through the area. The construction of the vista trail and rain shelter will afford opportunities for visitors to view Onomea Valley and Bay. The installation of utility poles and lines along the Old Mamalahoa Highway will impact views of the area. However, a portion of this scenic road is already lined with utility poles and lines. Also, the construction of a new Garden entrance and gate will impact the views along the Mamalahoa Highway.

The shoreline cliffs and beach areas within the Project Area are outstanding coastal scenic resources. No improvements are proposed within these areas which would damage these resources.

Probable Impact: The Proposed Action is anticipated to change the visual attributes of the Project Area from an overgrown thicket to one of well-designed trails meandering through

an open forest of plants of aesthetic, scientific and educational value. In addition, the construction of the vista trail and outlook will afford increased opportunities to visitors to view Onomea Valley and Onomea Bay. The new Garden entrance and gate will impact the scenice views along the Old Mamalahoa Highway, but that impact can be mitigated by means of the landscaping proposed for the entrance. The installation of ulility poles will also impact the views along the Old Mamalahoa Highway, although the impact is not anticipated to be substantial since there are already utility poles and lines along this scenic route. No improvements are proposed near the coastal cliffs and beach areas, and the existence of a botanical garden adjacent to these areas preserves the scenic quality of the coastal resources. Thus, the Proposed Action will primarily enhance the visual attributes of the Project Area, while preserving existing scenic resources.

4.9 Socioeconomic Considerations

The Garden is a major visitor attraction in the South Hilo area, with nearly 150 tourists visiting each day. It contains a world-class display of over 10,000 tropical plants, representing more than 1,800 species, and provides over $2,000,000 in revenue annually to the local economy. The Proposed Action will provide a safe and permanent means of access to the Garden and other amenities that will enhance this valuable tourist attraction and educational facility.

The Proposed Action will also provide a safer means of pedestrian public access to the recreational resources at Onomea Bay by discontinuing the vehicular traffic of the shuttle vans along the Onomea Access Trail.

4.10 Public Facilities and Services

4.10.1 Transportation Facilities/Traffic

Present access to the Project Area is provided from the Old Mamalahoa Highway, a County owned and maintained road, which has a 17-foot wide paved roadway surface in a designated 30-foot wide right-of-way. Visitors to the Garden presently drive to the Garden's visitor center located one mile south of the Garden along the Old Mamalahoa Highway. Visitors park their vehicles at this site and are then transported to the Garden by means of shuttle vans. The shuttle vans run along the one-mile stretch of the Old Mamalahoa Highway and down the 10-foot wide jeep road, also known as the Onomea Access Trail, to a turn around area within the Garden in Onomea Valley floor.

There is no established crosswalk at the site of the new Garden entrance and the proposed visitor center across the highway. Also, the dense vegetation along the highway makes visibility along this road very poor. The Applicant, however, proposes to clear and maintain vegetation along the Old Mamalahoa Highway to provide adequate sight distance along the highway and to establish a cross walk to provide for pedestrian safety.

Probable Impact: The Garden shuttle vans will stop operating along the Old Mamalahoa Highway and along the pedestrian Onomea Access Trail, because a new visitor center will be constructed immediately across the highway from the proposed new Garden entrance. There will be increased traffic for the one mile between the existing visitor center and the proposed visitor center, since visitors will have to travel the one additional mile along this road, but that increase will be offset somewhat by the decrease in the larger shuttle van usage of the roadway. On the other hand, the safety along the Onomea Access Trail for pedestrians will be substantially improved because pedestrians will no longer have to maneuver along portions of this trail that are too narrow for simultaneous vehicle and pedestrian travel.

The Project, with the new visitor center across the highway, will create additional pedestrian traffic crossing the Old Mamalahoa Highway. With 150 visitors per day, there will be 300 visitor trips per day crossing this road. To provide for the safety of pedestrians, the Applicant will be requesting that the County establish a cross walk between the visitor center and the Garden entrance. The establishment of a cross walk will require the removal of vegetation and trees along the highway, which will also improve the sight distance for vehicular travel. It will also require the establishment of a sight distance easement to be maintained by the Applicant in order to insure continued visibility. The Applicant has already prepared a sight distance study of the highway which shows that the minimum County sight distance standards can be met for the proposed cross walk, assuming that vegetation along the highway is removed and a sight distance easement maintained. (See Sight Distance Study Report, Exhibit 13). With the implementation of these measures, it is anticipated that the Project will not create any substantial adverse impacts upon vehicular or pedestrian traffic.

4.10.2 Water

There is no water from the County of Hawaii municipal water system available to the Project Area. The Applicant presently obtains water for irrigation, the restroom facilities and pond circulation from the diversion dam within Onomea Stream, with a back-up being provided by the dam within Alakahi Stream. It is estimated that water usage for the existing improvements is approximately 398,000 gallons per year of water or approximately 1,090 gpd, although this usage has not been metered for accurate numbers. There is no potable water available to the Project Area.

None of the immediate improvements will require any increased water usage; however, the long term improvements with additional restrooms, greenhouses and landscaping will require water. Based on present estimates, the expanded restrooms and irrigation needs will require approximately 350 gpd of water. Applicant presently proposes to obtain water required for these uses from Onomea and Alakahi Streams, either by means of its existing diversion dams or other means, assuming that any increased usage will be approved by the Commission of Water Resources Management. If such increased usage is not permitted, the Applicant will have to obtain water for these improvements another water source.

Several alternative sources of water have been considered by the Applicant. These include use of water from the County system, development of a ground water source, a catchment system, use of water from a private spring on a neighboring property and use of stream water without the diversion dam.

The use of water from the County system would involve the extension and upgrading of the Papaikou system with a six-inch water line for a distance of approximately 1,000 feet. The cost of this improvement is estimated to be somewhere between $60,000 to $70,000. In addition to the substantial cost of this improvement, the Papaikou system has a limited capacity and water may not be available to the Applicant until the County develops a new water source for the the present system.

The development of a ground water source would involve the drilling of a well. If the development of such a well were feasible the cost of drilling and outfitting a well is estimated to range between $50,000 to $60,000. In investigating this alternative the Applicant understands that any well drilled in the Garden may only produce brackish water, because of the low elevation of the site. Brackish water could not be used for the Applicant's irrigation needs. Further there are significant physical constraints as to the transport of a drilling rig onto the Project Area. In addition, any well would require electrical power for pumping. To extend the electrical lines and obtain power from HELCO would require the installation of underground lines because of the trees throughout the Project Area. The Applicant does not have any cost estimates for such underground installation. However, the Applicant believes that the cost would be prohibitive. The use of a generator for the production of power would be noisy and disrupt the tranquility of the Garden, and is not a favored alternative by the Applicant.

The development of a catchment sytem would require roof lines for collection of water, water tanks and electrical power to pump the water. The Applicant has not obtained any cost estimates for this alternative; however, without adequate roof area for catchment, which is the present situation in the Garden, such an alternative is not feasible. Assuming that the roof area were available, this alternative would be substantiallly less in cost than either a ground water system or connection to the County system. The same constraints regarding electrical power would, however, apply to this alternative.

Based upon a suggestion from a member of the community, the Applicant is exploring the possibility of obtaining water from a private spring belonging to a neighboring landowner. This alternative would require the agreement of a private landowner. Also, approval of the Commission on Water Resource Management may be required. The Applicant has no cost estimate for this alternative at the present time.

The final alternative would be to utilize water from the Onomea and Alakahi Streams, without any dams in place, under management plan that would be approved by the Division of Aquatic Resources. The Applicant has only commenced working on this alternative and has not yet determined the viability of the alternative.

Probable Impact: Since there is not any municipal water service to the Project Area, there will not be any adverse impact upon the municipal system by reason of the Proposed Action. There may be a possible impact upon the stream biota with increased water usage from either the Onomea or Alakahi Stream; however, the Applicant is beginning to develop a stream management plan which would allow Applicant to use stream water while protecting the upstream and downstream migration of the native stream fauna and reducing the introduced species, such as the Tahitian prawns. Any increased stream water usage will require approval of the Commission on Water Resource Management, and at such time that an increase in usage is required by the Applicant, the Applicant will provide this approving agency with appropriate mitigation measures.

Applicant has recently implemented certain measures to conserve its water resources, by making the Lily Pond a self sustained environment without having to flush the pond with fresh water on a daily basis, and by metering the Applicant's actual water usage. Prior to metering the daily water usage, the Applicant estimated that approximately 550 gpd of water was used to flush the Lily Pond. With monitoring and conservation measures, all of the long term improvements proposed by this Project may be implemented with a minimal increase in total water usage.

4.10.3 Wastewater Treatment and Disposal

Wastewater from the existing restrooms is disposed of by means of a cesspool approved by the State Department of Health. Because of concerns raised as to possible contamination of the Onomea Stream, the Department of Health will be testing this cesspool to determine whether the cesspool is leaching into the stream. Under the existing Department of Health Rules (Chapter 11-62 of the Hawaii Administrative Rules regarding Wastewater Systems), a cesspool could also be used for the new restroom facility. When the restrooms are constructed, the Applicant will install dispose of the wastewater by installing a system meeting the requirements State wastewater systems and approved by the Department of Health.

As indicated in Section 4.2 above, there is no wastewater presently being disposed of from the Lily Pond, and the wastewater or overflow from the bird pond is presently being diverted for irrigation, away from any stream.

Probable Impact: By complying with Department of Health wastewater treatment requirements, there is not any substantial adverse impact anticipated to either the streams, the groundwater or the near shore waters by reason of the Proposed Action. If the Department of Health testing of the existing cesspool shows that wastewater is leaching into the Onomea Stream, the Applicant will take appropriate remedial measures as directed by the Department of Health, which may include the installation of an alternative wastewater treatment system.

4.10.4 Utilities

Public utilities, including overhead electricity and telephone, are available to the Project Area; however, neither electricity nor telephone is presently provided to the Garden. Cellular telephone service is available to the Project Area and a cellular telephone is presently available for emergency purposes. The Proposed Action anticipates the installation of utility poles to extend service to the immediate vicinity of the Project Area, but not specifically to the Project Area.

Probable Impact: Except for the visual impact of the additional poles and lines along the Old Mamalahoa Highway, the installation of utility lines will increase the availability of utility service to properties fronting the Old Mamalahoa Highway.

4.10.5 Police and Fire Protection and Emergency Services

Police and fire protection services are provided from the Hilo police station and Central fire station, approximately eight miles east of the Project Area. Advanced life support ambulance units are located in Hilo. Hilo Medical Center also houses a basic life support unit.

Probable Impact: The proposed action is not anticipated to increase the demand for police, fire or emergency services. However, the closure of the Onomea Access Trail to vehicular traffic may create an additional risk in the event of a fire or an injury within the Garden. To mitigate these impacts, the Applicant is looking into the feasibility of acquiring a pump that can be used to pump water from the ponds in the event of a fire. The Applicant is also looking into the feasibility of equipping a golf cart with a stretcher to transport any person who may be injured within the Garden.

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

5.1 State Land Use Law

All lands within the State have been classified into one of four land use districts: urban, rural, agricultural and conservation, by the State Land Use Commission, pursuant to Chapter 205, HRS. The Project Area lies within the State land use conservation district.

Section 205-2, HRS defines the conservation districts as

> Areas necessary for protecting watersheds and water sources; preserving scenic and historic areas; providing park lands, wilderness, and beach reserves; conserving endemic plants, fish and wildlife; preventing floods and soil erosion; forestry; open space areas whose existing openness, natural condition, or present state of use, if retained, would enhance the present or

potential value of abutting or surrounding communities or would maintain or enhance the conservation of natural or scenic resources; areas of value for recreational purposes; other related activities; and other permitted uses not detrimental to a multiple use conservation concept.

Lands located within State land use conservation districts are administered by DLNR, pursuant to Chapter 183C HRS.

5.2 State Administrative Rules Governing Land Uses within Conservation Districts

Title 13 of the Hawaii Administrative Rules ("HAR"), for the Department of Land and Natural Resources, under Subtitle 1, Chapter 5, regulates land uses within the Conservation District. The rules establish five subzones within the Conservation District: the protective, limited, resource, general and special subzones. All land within the Conservation district has been designated within one of the five subzones by BLNR.

The Project area is designated within the resource or (R) subzone. Section 13-5-13, HAR, provides that the objective of this subzone "is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas." The rule also provides that the (R) subzone encompasses:

(1) Lands necessary for providing future parkland and land presently used for national, state, county, or private parks;...
(3) Lands suitable for outdoor recreational uses such as hunting, fishing, hiking, camping and picnicking;..."

Identified land uses within the (R) subzone, under Section 13-5-24, HAR, include:

* Signs, including safety signs, danger signs, no trespassing signs, and other informational signs (P-8)
* Botanical gardens and private parks under an approved management plan (L-2)
* Landscaping, defined as alteration of plant cover, including trees, and removal of noxious plants for maintenance purposes (L-4), (R-5)
* Construction or placements of structures accessory to any existing structures, building or facility under an existing conservation district use permit (L-7).

The uses proposed by the Project are identified land uses within the (R) subzone, under the DLNR rules. Essentially the project expands the existing botanical garden. All structures and signage proposed are accessory to the botanical garden.

5.3 Hawaii State Plan

The Hawaii State Plan, Chapter 226, HRS, establishes a set of goals, objectives and policies to serve as long-range guidelines for the growth and development of the State. The following sections from the Hawaii State Plan contain guidelines that are relevant to the Proposed Action:

Section 226-8. Objective and policies for the economy - visitor industry.

Objective: Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of he objective of the visitor industry that constitutes a major competent of steady growth for Hawaii's economy.

Policies: To support and assist in the promotion of Hawaii's visitor attractions and facilities.

Improve the quality of existing visitor destination areas.

Develop the industry in a manner that will continue to provide job opportunities and steady employment for Hawaii's people.

Foster a recognition of the contribution of the visitor industry to Hawaii's economy and the need to perpetuate the aloha spirit.

Analysis: The economic benefit of the Garden is evident by the employment generated, the number of visitors who visit this facility annually, and the related visitor expenditures into the local economy. The new Garden entrance and walking trails are intended to improve the quality of the Garden by providing a safe and reliable means of access. The other improvements are also intended to enhance this visitor attraction.

Section 226-12. Objective and policies for the physical environment - scenic, natural beauty, and historic resources.

Objective: Planning for the State's physical environment shall be directed toward achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi cultural/historical resources.

Policies: Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, oceans, scenic landscapes and other natural features.

Encourage the design of development and activities that complement the natural beauty of the islands.

Analysis: The Proposed Action will preserve the natural beauty of Onomea Valley, will continue to preserve the aesthetic, scientific and educational value of the area, and will improve upon the beauty by replacing existing weed species with a variety of shrubs, trees and palms, including native Hawaiian species. Also, the improvements proposed will enhance the views and vistas of Onomea Bay.

Section 226-23. Objective and policies for socio-cultural advancement - leisure.

Objective: Planning for the State's socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.

Policy: Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical geological, or biological values while ensuring that their inherent values are preserved.

Analysis: The Proposed Action will promote the continued scientific and educational value of the Garden. It will also expand a valuable scenic recreational facility.

5.4 Hawaii County General Plan

The Hawaii County General Plan is a policy document for the long range comprehensive development of all land within the County of Hawaii. The plan contains goals, policies and standards as well as a set of land use maps, designated as the General Plan Land Use Pattern Allocation Guide ("LUPAG") maps, showing the locations of desired land uses.

The current LUPAG map designates most of the Project Area as "Extensive Agriculture." The Extensive Agricultural designation includes pasture and range lands. The more conservation-oriented Garden use does not conflict with the Extensive Agriculture designation of the General Plan. The area immediately adjacent to the ocean is designated as "Open" on the LUPAG map. The Open designation includes parks and historic sites. No improvements are proposed in the area designated Open on the LUPAG map. Thus, this area will remain in its natural state.

5.5 Hawaii County Zoning

The Project Area is zoned under the Hawaii County Zoning Code (Chapter 25, Hawaii County Code) as Agricultural, with a minimum lot size of 20 acres (A-20a). The Proposed Action is permitted under this zoning district.

5.6 Special Management Area

A portion of the Project Area is located within the Special Management Area (SMA) as defined by Chapter 205A, HRS, and Rule 9 of the County of Hawaii Planning Commission Rules. Although some of the improvements proposed by the master plan for the Project are within the SMA, none of the immediate improvements, except for signage and utility lines and poles are within the SMA. The Applicant will nevertheless, apply for an SMA permit to cover the entire Project.

The relationship of the proposed development to SMA objectives and polices are as follows:

Recreational Resources. The proposed action is consistent with the recreational resources objective and policies by expanding the recreational opportunities accessible to the public regarding the shoreline resources at Onomea Bay. Public access to the shoreline is being provided by means of the Onomea Access Trail, the Alakahi Trail and the Donkey Trail. Further, pedestrian access along the Onomea Access Trail will become safer once the shuttle van use of this road is discontinued with the establishment of a new Garden access road.

Historic Resources. Archaeological inventories were completed for the proposed action area, with no sites of significance being found. As such, the proposed action is not inconsistent with the historic resources objective and policies which require the protection and preservation of natural and man-made historic and prehistoric resources by identifying and analyzing significant resources and maximizing information retention through preservation of remains or salvage operation.

Scenic and Open Space. The open space and scenic resources will be enhanced by the new entrance and vista trails. Likewise, the landscaping of the undeveloped portions of the Garden will enhance the scenic resources of Onomea Bay. The proposed action will, therefore, be consistent with the scenic and open space objective and policy of protecting, preserving and improving the quality of the coastal scenic and open space resources.

Coastal Ecosystems. There are no coastal ecosystems to be affected by the proposed action. Thus, the action will be consistent with the coastal ecosystem objective and policies of protecting and preserving valuable coastal ecosystems and minimizing the adverse impacts on the coastal ecosystems.

Economic Uses. The proposed action essentially preserves the natural resources of Onomea Bay without any major development. Thus, the project is consistent with the economic uses objective and policy which requires that the location and expansion of coastal developments be directed to areas presently designated and used for such development.

Coastal Hazards. The proposed action is not within a designated tsunami inundation area under the U.S. Corps of Engineers Flood Insurance Rate Maps ("FIRM").

Notwithstanding this designation, no structures are proposed be constructed near the shoreline. Therefore, the proposed action is consistent with the coastal hazard objective which requires reduction of hazard to life and property from tsunami, storm waves and flooding.

5.7 Shoreline Setback

The shoreline area of the Project Area is located within the 40-foot shoreline setback area as defined by Rule 8 of the County of Hawaii Planning Commission Rules relating to Shoreline Setback. No improvements are, however, proposed within the shoreline setback area.

5.8 Environmental Impact Statement

Section 343-5(a)(2), HRS, provides that any use that is proposed within any land classified as conservation district land by the State land use commission under Chapter 205, is subject to the Environmental Impact Statement law, Chapter 343, HRS.

Section 343-5(c), HRS, provides that applicants proposing actions subject to Chapter 343, HRS

> ". . . shall prepare an environmental assessment of such proposed action at the earliest practicable time to determine whether an environmental impact statement shall be required."

This environmental assessment has been prepared to fulfill these requirements.

6. DETERMINATION OF SIGNIFICANCE

Based on the analyses presented in this assessment, the Proposed Action will not pose any significant adverse environmental impacts.

LIST OF AGENCIES SENT CONSULTATION LETTER

Hawaii Visitors Burear - Big Island Chapter
250 Keawe Street
Hilo, HI 96720

Japanese C of C & Industry of Hawaii
Waiakea Villas
400 Hualani Street
Hilo, HI 96720

State of Hawaii
Dept. of Land & Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813

State of Hawaii
Historic Preservation Division
1151 Punchbowl Street
Honolulu, HI 96813

Ms. Debbie Ward
Sierra Club - Moku Loa
P. O. Box 1137
Hilo, HI 96721

U.S. Dept. of the Interior
Fish & Wildlife Services
P. O. Box 50156
Honolulu, HI 96850

County of Hawaii
Planning Department
25 Aupuni Street
Hilo, HI 96720

County of Hawaii
Dept. of Parks & Recreation
25 Aupuni Street
Hilo, HI 96720

County of Hawaii
Dept. of Research & Development
25 Aupuni Street
Hilo, HI 96720

Hawaii Audubon Society
212 Merchant Street
Suite 320
Honolulu, HI 96813

State Div. of Water Resources Management
Dept. of Land & Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813

Aquatic Resources Division
State Dept. of Land and Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813

Destination Hilo
P. O. Box 1391
Hilo, HI 96720

Hawaii Island Chamber of Commerce
22 Kamehameha Avenue
Hilo, HI 96720

County of Hawaii
Office of the Mayor
25 Aupuni Street
Hilo, HI 96720

Na Ala Hele Program
State Division of Forestry & Wildlife
P. O. Box 4849
Hilo, HI 96720

EXHIBIT 1

Office of State Planning
250 South Hotel St., 4th Floor
Honolulu, HI 96813

County of Hawaii
Department of Public Works
25 Aupuni Street
Hilo, HI 96720

Paula Helfrich
Hawaii Island Economic Development Board
200 Kanoelehua Ave., Suite 103
Box 281
Hilo, HI 96720

Hawaii Tropical Botanical Garden

A Non-Profit Organization - 501 (c) (3)

Nature Preserve and Sanctuary located at Onomea Bay, 7 miles North of Hilo

RR 143-A • Papaikou, Hawaii 96781 • Telephone (808) 964-5233 • Fax (808) 964-1338

August 21, 1995

_____

_____

_____

_____

Dear _____:

SUBJECT: HAWAII TROPICAL BOTANICAL GARDEN
Onomea Bay, Hawaii
Environmental Assessment for Proposed New Entrance Trail & Related Improvements

Hawaii Tropical Botanical Garden is in the midst of preparing an environmental assessment that will provide the State Board of Land and Natural Resources with supplemental information necessary to review a related conservation district use application (CDUA) for proposed changes to the Garden's entrance. During preparation of the environmental assessment, Title 11, Chapter 200, of the Hawaii Administrative Rules, requires that applicants, e.g. Hawaii Tropical Botanical Garden, should consult with agencies, organizations, citizen groups and individuals having jurisdiction to expertise relating to a proposed project. This letter represents a more formal approach to obtain your concerns and comments prior to preparation of the draft environmental assessment.

Hawaii Tropical Botanical Garden intends to construct a new walking trail to serve as the new entrance to the Garden. The present entrance road to the Garden, known as the "Jeep Road," is gradually eroding and falling into the ocean. At any time the road could become impassable, thus causing the Garden to close.

Along this new trail, it will be necessary to construct several small bridges to span the irregular terrain. These bridges will be low, ranging in height from three feet to five feet, and will vary in length from ten feet to sixty feet. At two locations on the new trail, small wooden rain shelters will be constructed.

Security, wrought iron fencing is proposed to be constructed along a portion of the mauka boundary of the property. Additional chain link fencing will be installed at various locations along the westerly side of the Garden property to discourage trespassing.

EXHIBIT 2

"No Trespassing" signs will need to be installed in some places for security and liability reasons.

With this perspective, we invite you to provide written comments concerning any planning issues or concerns that you have regarding the proposed project. Your input will be reviewed and evaluated by Hawaii Tropical Botanical Garden and its consultants during preparation of the environmental assessment. In addition, your written comments will be incorporated into the draft environmental assessment document.

We thank you for your potential participation in the planning of this project. We would appreciate your response by September 11, 1995, in order to insure that your comments are addressed in the draft environmental assessment. Should you have any questions, please contact me or Scott Lucas, my assistant, at your convenience.

Sincerely,
HAWAII TROPICAL BOTANICAL GARDEN

Dan J. Lutkenhouse
Founder - Director

NA ALA HELE
Hawai'i Trail & Access System

August 22, 1995

Mr. Dan J. Lutkenhouse, Founder - Director
Hawaii Tropical Botanical Garden
RR 143-A
Papaikou, Hawaii 96781

Dear Mr. Lutkenhouse:

SUBJECT: Hawaii Tropical Botanical Garden, Onomea Bay, Hawaii, Environmental Assessment for Proposed New Entrance Trail and Related Improvements

Na Ala Hele is opposed to any favorable action that may be granted to HTBG (Hawaii Tropical Botanical Garden) by the Board of Land and Natural Resources until there is a satisfactory resolution to the present public access problem and use of the government road.

Thank you for the opportunity to comment.

Sincerely,

RODNEY T. OSHIRO
Na Ala Hele

cc: Michael Buck, Division of Forestry & Wildlife Administrator
Cathy Lowder, Na Ala Hele Advisory Council Chairperson
Cathy Tilton, Office of Conservation & Environmental Affairs
Curt Cottrell, Na Ala Hele

EXHIBIT 3

MOKU · LOA · GROUP

SIERRA CLUB · HAWAI'I CHAPTER

August 31, 1995

Dan J. Lutkenhouse
Hawai`i Tropical Botanical Garden
RR 143-A
Papa`ikou, 96781

Mr. Lutkenhouse:

Subject: Hawaii Tropical Botanical Garden, Onomea Bay, Hawaii, Environmental Assessment for Proposed New Entrance Trail and Related Improvements.

Your August 21 letter asks the Moku Loa Group to comment on an unfinished, draft environmental assessment which HTBG is currently preparing. The project description contained in your letter refers to construction of several bridges (some 10 to 60 feet!), iron fencing, chain link fencing, wooden rain shelters, no trespassing signs, a new walking trail, and "...changes to the garden's entrance". Moku Loa Group can only comment when the draft EA is done. For the record, we oppose any such "improvements" at your garden property until the following is accomplished by HTBG:

1) a complete archaeological inventory survey is done as required by the Department of Land and Natural Resources (DLNR); 2) all DLNR Staff recommended fines are paid by HTBG for violations; 3) unrestricted, public access along the entire Onomea shoreline down public trail ("Jeep Road") to Alakahi and along safe shoreline access to Onomea Stream and up "Donkey Trail" is final; 4) HTBG "final site plan" is complete, per Mike Wilson's August 16th letter to you; 5) all pending violations and After-the-Facts be settled with the U. S Army Corp. of Engineers and the State Commission on Water Resource Management involving the filling in of Kahali'i Stream and the illegal water diversion at Alakahi Stream.

When all of the above is accomplished and your draft environmental assessment complete (and we know the details of your project), please send us a copy and we will comment.

Sincerely,

Deborah Ward
Conservation Committee

cc: Mike Wilson, DLNR, Director
Cathy Tilton, DLNR, OCEA
Ross Cordy, SHPD
Rod Oshiro, Na Ala Hele
David Higa, CWRM
Dawn Chang, AG Office

Japanese Chamber of Commerce & Industry of Hawaii

September 13, 1995

Hawaii Tropical Botanical Garden
248 Kahoa Road
Hilo, Hawaii 96720

Attention: Mr Dan J. Lutkenhouse, Founder and Director

Dear Mr. Lutkenhouse:

This concerns your letter to us concerning the Garden's proposed new walking trail and related improvements.

We support these improvements as necessary for the continued successful operation of Hawaii Tropical Botanical Garden. We remain supportive of the Garden. We believe that it will maintain the natural beauty of Onomea Bay. The Garden should be supported and is a valuable asset to our community.

Sincerely,

Robert E. Bethea
President

Waiakea Villas • 400 Hualani Street, Suite 20B • Hilo, Hawaii 96720
Phone: (808) 934-0177 • Fax: (808) 934-0178

Stephen K. Yamashiro
Mayor

Virginia Goldstein
Director

Norman Olesen
Deputy Director

County of Hawaii
PLANNING DEPARTMENT
25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252
(808) 961-8288 • Fax (808) 961-9615

September 14, 1995

Mr. Dan J. Lutkenhouse
Hawaii Tropical Botanical Garden
RR 143-A
Papaikou, HI 96781

Dear Mr. Lutkenhouse:

Draft Environmental Assessment for Proposed Walking Trail to Serve as New Entrance into Hawaii Tropical Botanical Garden
Tax Map Key: 2-7-09:Portion of 2 & 10; 2-7-10:Portion of 22

Thank you for your letter dated August 21, 1995, requesting comments regarding the proposed development of a new walking trail within the Hawaii Tropical Botanical Garden complex, which will also serve as the Garden's new entrance, and the preparation of a draft environmental assessment for the proposed walking trail improvements as required by Chapter 343, Hawaii Revised Statutes (HRS) relating to Environmental Impact Statements.

The Hawaii Tropical Botanical Garden complex, as well as the proposed walking trail alignment, are located on lands designated Conservation by the State Land Use Commission and zoned Agricultural-20 acres (A-20a) by the County. A portion of the Garden and the proposed walking trail alignment are also located within the County's Special Management Area (SMA). The location of the proposed walking trail improvements within the Conservation District will require a Conservation District Use Permit (CDUP) from the Board of Land and Natural Resources as well as compliance with the requirements of Chapter 343, HRS. On the County level, a Special Management Area (SMA) Assessment Application must be submitted to this office for assessment of the proposed improvements against the requirements of Chapter 205A, HRS and Rule No. 9 of the Planning Commission regarding the Special Management Area. We are enclosing an SMA Assessment Application for your use.

We will reserve further comment on the proposed walking trail improvements until we are in receipt of a draft environmental assessment-notice of determination. The information provided within your letter request is insufficient to allow our office to provide any detailed comments on the proposed improvements.

In the meantime, please feel free to contact Daryn Arai of this office should you have any questions.

Sincerely,

VIRGINIA GOLDSTEIN
Planning Director

DSA:mjs
LHTBG01.dsa
Enclosure

xc: Mayor Stephen K. Yamashiro
Mr. Michael Wilson-DLNR (HNL)
OEQC

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

September 7, 1995

LOG NO: 15359
DOC NO: 9508PM25

Mr. Dan J. Lutkenhouse, Founder-Director
Hawaii Tropical Botanical Garden
RR 143-A
Papaikou, Hawaii 96781

Dear Mr. Lutkenhouse:

SUBJECT: Environmental Assessment for Proposed New Entrance Trail and Related Improvements

Thank you for your letter of August 21, 1995 and the opportunity to provide written comments on your proposed project.

The description of the proposed improvements indicate that the project could have an adverse effect on significant historic sites. As we have indicated to you in the past, before undertaking any improvements that could possibly have an adverse effect on significant historic sites you need to conduct an archaeological inventory survey. Because the project area has never been surveyed we are not aware of any historic sites in this area of the garden, but we suspect that some might exist and therefore recommend a survey be done.

A report on the survey needs to be submitted to our office for review and approval. If any significant historic sites are identified in the inventory survey it will then be necessary to develop a mitigation plan to either preserve the sites or mitigate the adverse effects through data recovery.

If you have any questions please contact Pat McCoy (587-0006).

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

PM:amk

Stephen K. Yamashiro
Mayor

Donna Fay K. Kiyosaki
Chief Engineer

Jiro A. Sumada
Deputy Chief Engineer

County of Hawaii

DEPARTMENT OF PUBLIC WORKS
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252
(808) 961-8321 • Fax (808) 969-7138

September 22, 1995

Mr Dan J Lutkenhouse
Hawaii Tropical Botanical Garden
RR 143-A
Papaikou Hawaii 96781

SUBJECT : PROPOSED ENVIRONMENTAL ASSESSMENT
Hawaii Tropical Botanical Garden
New Entrance Trail and Related improvements
Onomea Bay, Kahalii, South Hilo, Hawaii
TMK: 2-07-09: 02 & 10

We acknowledge receipt of your letter concerning the subject improvements, and provide our comments as follows:

1. Any building construction shall conform to all requirements of code and statutes of the County of Hawaii.

2. All development generated runoff shall be disposed on site and shall not be directed toward any adjacent properties.

3. All earthwork and grading shall be in conformance with Chapter 10, Erosion and Sediment Control, of the Hawaii County Code.

4. Any work within the County right-of-way shall be in conformance with Chapter 22, Streets and Sidewalks, of the Hawaii County Code.

5. Any construction within known watercourses shall be in conformance with Chapter 27, Flood Control, of the Hawaii County Code. A flood study maybe required to evaluate the effects to Kahalii Stream and possibly other inundation areas.

Galen M. Kuba, Division Chief
Engineering Division

CKY

cc : Planning Department

BENJAMIN J. CAYETANO
Governor of Hawaii

Chairperson
MICHAEL D. WILSON
Board of Land and Natural Resources

Deputy Director
GILBERT COLOMA-AGARAN

Aquaculture Development
Aquatic Resources
Boating and Ocean Recreation
Bureau of Conveyances
Conservation and Environmental Affairs
Conservation and Resources Enforcement
Forestry and Wildlife
Historic Preservation
Land Management
State Parks
Water and Land Development

REF:OCEA:CT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. Box 621
Honolulu, Hawaii 96809

FILE: 96-97

OCT 10 1995

Mr. Dan J. Lutkenhouse
Founder-Director
Hawaii Tropical Botanical Garden
RR 143-A
Papaikou, Hawaii 96781

Dear Mr. Lutkenhouse:

SUBJECT: Preconsultation on Hawaii Tropical Botanical Garden's Environmental Assessment for a New Entrance Trail and Related Improvements

This is in response to your August 21, 1995, letter regarding the subject matter. According to your information, Hawaii Tropical Botanical Garden (HTBG), proposes the following:

1. Construct a walking trail to serve as the new entrance to HTBG.

2. Construct several small bridges ranging in height from three to five feet, and ranging in length from ten to sixty feet.

3. Construct two small wooden rain shelters at two locations along the proposed new trail.

4. Place security wrought iron fencing along part of the mauka property boundary.

5. Place chain link fencing at various locations along the westerly side of the Garden property to discourage trespassing.

6. Place "No Trespassing" signs in some places for security and liability.

Office of Conservation and Environmental Affairs

We understand that you are currently in mediation with the State and other parties regarding public access to Onomea Bay. The results of the mediation may or may not affect this proposal.

Additionally, there is a pending violation before the Board of Land and Natural Resources (Board) regarding "Condition Compliance" of Conservation District Use Permit HA-1447. Section 13-5-31, HAR, states that "(n)o permit application shall be processed by the department until any violations pending against the subject parcel are resolved." Thus, before submitting a Conservation District Use Application (CDUA) to the Department, the matter of "Condition Compliance" must be resolved by the Board.

Also, the letter provides minimal information regarding the proposed use. Therefore, our comments below are preliminary. We look forward to reviewing your CDUA and accompanying Environmental Assessment (EA) once you submit them to the Department.

1. The EA should include detailed information regarding the methods of trail construction and related improvements.

2. The EA should discuss potential impacts to the existing State-owned trail, aquatic resources, and potential archaeological sites. (For example, if the existing entrance way is closed, how will the closure effect the use of the State-owned trail?)

3. Where will the drop off and turnaround area be for the shuttle buses if the existing entrance way is closed? How will the drop off and turnaround area impact existing traffic along the Mamalahoa Highway?

4. Does HTBG intend to propose additional improvements in the future? If so, then HTBG should prepare a Master Plan for the Garden as part of a CDUA.

Division of Aquatic Resources

No significant impact to aquatic resources is expected from the walking trail and other improvements. However, the applicant should assure reasonably convenient public access to the shoreline for fishermen and other recreational users should the proposed activities interfere with or inhibit traditional movement to and along the shore.

Further, any shoreline improvements or modifications should be adequately described in the EA and the Department should have the opportunity to review all activities that may restrict or discourage the current public use of State shoreline land in this vicinity.

Finally, precautions should be taken to prevent construction debris, petroleum products, eroded material and other potential contaminants from entering the aquatic environment.

Thank you for your cooperation in this matter. We understand that Na Ala Hele and the Historic Preservation Division have forwarded their comments directly to you. Please contact Cathy Tilton of the Office of Conservation and Environmental Affairs at 587-0377, if you have any questions.

Aloha,

MICHAEL D. WILSON

xc: HI Planning Dept.

BENJAMIN J. CAYETANO
GOVERNOR

ESTHER UEDA
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813
Telephone: 587-3822

February 1, 1996

Ms. Virginia Goldstein
Planning Director
County of Hawaii
25 Aupuni Street, Room 109
Hilo, Hawaii 96720-4252

Dear Ms. Goldstein:

Subject: Special Management Area Use Permit Application (SMA 96-1) and Draft Environmental Assessment (DEA) for Hawaii Tropical Botanical Garden, TMK 2-7-09: 2, 6 & 10, and 2-7-10: por. 22

We have reviewed the subject application and DEA transmitted with your memorandum dated January 26, 1996, and confirm that the proposed improvements to the Hawaii Tropical Botanical Garden are located within the State Land Use Conservation District.

We have no further comments to offer at this time. We appreciate the opportunity to comment on this matter.

Should you have any questions, please feel free to call me or Bert Saruwatari of our office at 587-3822.

Sincerely,

ESTHER UEDA
Executive Officer

EU:th

C.1049

EXHIBIT 4

Stephen K. Yamashiro
Mayor

Nelson M. Tsuji
Fire Chief

Edward Bumata
Deputy Fire Chief

County of Hawaii

FIRE DEPARTMENT

777 Kilauea Avenue • Mall Lane, Room 6 • Hilo, Hawaii 96720-4239
(808) 961-8297 • Fax (808) 961-8296

February 1, 1996

To: Virginia Goldstein, Planning Director

From: Nelson M. Tsuji, Fire Chief

SUBJECT: SPECIAL MANAGEMENT AREA USE PERMIT APPLICATION (SMA 96-1)
APPLICANT: HAWAII TROPICAL BOTANICAL GARDEN
REQUEST: MASTER PLAN FOR EXPANSION OF BOTANICAL GARDEN AND ARBORETUM
TAX MAP KEY: 2-7-9:2, 6 & 10 AND 2-7-10:PORTION OF 22

Gates, access road for fire, ambulance and structures shall conform to UFC Section 10.207 (a) to (l).

Water requirements shall conform to UFC Section 10.301 (a) to (f), especially (c). Exception to Section 10.301: NFPA 1231 may be used with fire pumps and standpipes. Standpipes or fixed fire protection system shall conform to UFC Section 10.305.

NELSON M. TSUJI
Fire Chief

NMT/mo

CJ/05

Stephen K. Yamashiro
Mayor

Wayne G. Carvalho
Police Chief

James S. Correa
Deputy Police Chief

County of Hawaii
POLICE DEPARTMENT

349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-2702

February 5, 1996

TO : VIRGINIA GOLDSTEIN, PLANNING DIRECTOR

FROM : WAYNE G. CARVALHO, POLICE CHIEF

SUBJECT: SPECIAL MANAGEMENT AREA USE PERMIT APPLICATION (SMA 96-1)
APPLICANT: HI TROPICAL BOTANICAL GARDEN
REQUEST: MASTER PLAN FOR EXPANSION OF BOTANICAL GARDEN AND ARBORETUM
TMK: 2-7-9:2, 6 & 10 AND 2-7-10:PORTION OF 22

We cannot agree with applicant's contention that vehicular traffic on the Old Mamalahoa Highway will decrease with the elimination of the shuttle service.

If anything, the groups of tourists who were once transported to and from the site by experienced local drivers will now be driving themselves in individual rental vehicles along a circuitous and narrow roadway.

Further, applicant states that "The proposed action is not anticipated to increase the demand for police ... services."

While this may be true, we are uncertain if this means that the applicant is satisfied with the present level of police service.

Relocating his base of operations a mile further along the Scenic Route will delay emergency response, and reduce the likelihood of routine patrol passes.

EO:esk

C/2[illegible]

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

LAWRENCE MIKE
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH

P.O. BOX 916
Hilo
~~XXXXXXXXX~~, HAWAII 96721-0916

DATE: February 9, 1996

TO: Planning Director, County of Hawaii

FROM: Chief Sanitarian, Hawaii District

SUBJECT: Special Management Area Use Permit Application (SMA 96-1)
Applicant: Hawaii Tropical Botanical Garden
Request: Master Plan for Expansion of Botanical Garden and Arboretum
Tax Map Key: 2-7-9:2, 6 & 10 and 2-7-10:Portion of 22

The subject lot(s) are located in a Non-Critical Wastewater Disposal Area where cesspools are allowed under the current rules. More than one cesspool are allowed provided 10,000 sq. ft. per cesspool is available. Each cesspool can dispose of 1,000 gallons per day of wastewater.

For any construction activity that may result in the discharge of storm water to waters of the State, and involves the clearing, grading and excavation of five (5) acres or more of total planned development, a National Pollutant Discharge Elimination System (NPDES) storm water permit is required from the Department of Health. The permit application should be submitted to the Director at least 90 days prior to the commencement of construction.

An NPDES permit is required for any discharge to waters of the State including construction runoff, dewatering activities, hydrotesting water from new water lines or storage tanks, groundwater remediation sites, and cooling

C/D 13

water discharges from air conditioning units. The permit application should be submitted to the Director at least 90 days prior to the commencement of construction.

Our Clean Water Branch (Ph. 586-4309) in Honolulu is responsible for the issuance of the National Pollution Determination and Elimination System (NPDES) permits. If there is a need for additional information please call them.

Aaron Ueno

AARON UENO
Chief Sanitarian, Hawaii District

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

February 22, 1996

Ms. Virginia Goldstein, Planning Director
County of Hawaii Planning Department
25 Aupuni Street
Hilo, Hawaii 96720

LOG NO: 16462
DOC NO: 9602PM06

Dear Ms. Goldstein:

SUBJECT: Special Management Area Use Permit Application (SMA 96-1) Applicant: Hawaii Tropical Botanical Garden Request: Master Plan for Expansion of Botanical Garden and Arboretum Alakahi, Kahalii and Onomea, South Hilo, Hawaii Island TMK: 2-7-9:2, 6, 10; 2-7-10: Por. 22

This is in response to your letter of January 26, 1996 with a request for written comments on the SMA Use Permit. Thank you for also sending us a copy of the Draft Environmental Assessment to amend Conservation District Use Permit HA-1447.

We have reviewed the SMA Use Permit and the Draft EA and have the following comments to make. In the last few years the applicant has funded archaeological surveys of selected areas in the "Garden." In reading the Draft EA we became aware that the applicant had funded yet another small archaeological survey of selected areas covered in the SMA and Draft EA. The latest report, with an addendum covering the latest survey, is still under review by our office. We expect that this report will require a few minor changes before it is accepted.

In comparing the applicant's discussion of immediate and future planned improvements and the areas that have been surveyed for archaeological sites it does not appear that all of the areas slated for new construction or improvements, such as the new visitor center area, have been surveyed. Part of the difficulty in determining what has been surveyed and what has not is that the previous survey areas (designated Areas A, B, and C) are not well defined (Areas B and C have no definite boundaries) in the archaeological inventory survey report.

We recommend that a decision on the SMA Use Permit be deferred until we have had an opportunity to review a map that clearly illustrates the following: (1) immediate planned improvements; (2) future

C2132

planned improvements, and (3) the boundaries of areas that have been subjected to an archaeological inventory survey. We believe that the large map that the applicant included in the SMA petition and Draft EA will suffice if all of this information is clearly presented.

If you should have any questions please call either Patrick McCoy (587-0006) or Marc Smith (933-4346) who is more familiar with the property.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

PM:amk

BENJAMIN J. CAYETANO
GOVERNOR

GARY GILL
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

220 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

February 22, 1996

Mr. Daniel J. Lutkenhouse
Hawaii Tropical Botanical Garden
248 Kahoa Road
Hilo, Hawai'i 96720

Dear Mr. Lutkenhouse:

We submit for your response (required by Section 343-5(c), Hawaii Revised Statutes) the following comments on a December 1995, draft environmental assessment for "Amendment to Conservation District Use Permit HA-1447, Entrance, Trails, Parking and Related Improvements, Master Plan Improvements at Hawaii Tropical Botanical Garden ["HTBG"], Alakahi, Kahalii and Onomea, South Hilo, Hawaii, TMK: (3)2-7-9:02, 06 and 10, 2-7-10:22. The document was submitted by a January 25, 1996, letter to our office by the County of Hawaii Planning Department. Notice of availability of this draft environmental assessment was published in the February 8, 1996, edition of the *Environmental Notice.*

1. Please ascertain and describe in the final environmental assessment whether the State will assert title to the old Government road that traverses the HTBG property.
2. Please discuss in the final environmental assessment the effect on HTBG of the recent Hawaii Supreme Court decision (*Public Access Shoreline Hawaii and Angel Pilago vs. Hawaii County Planning Commission*) and measures proposed to be undertaken in accordance with the decision.
3. Please discuss in the final environmental assessment any direct, indirect or cumulative effects caused by exotic plant or animal species.
4. Please discuss in the final environmental assessment the direct, indirect and cumulative effects of stream water diversion and the placement of diversion structures, especially with respect to diadromous fishes in the families *Eleotridae*, *Gobiidae*, and *Blennidae* (Hawai'ian O'opu).

Please include this letter and your response in the final environmental assessment for this project. If there are any questions, please call Mr. Leslie Segundo, Environmental Health Specialist toll-free at 1-800-468-4644 extension 64185. Thank you.

Sincerely,

GARY GILL
Director

c: Sandra Pechter Schutte, Esq.
Hon. Virginia Goldstein, County of Hawaii, Planning Dept.
Hon. Michael Wilson, Chairperson, Board of Land and Natural Resources

DEPARTMENT OF PUBLIC WORKS
COUNTY OF HAWAII
HILO, HAWAII

DATE : February 26, 1996

Memorandum

TO : Virginia Goldstein, Planning Director
Planning Department

FROM : Galen M. Kuba, Division Chief
Engineering Division

SUBJECT : SMA USE PERMIT APPLICATION (SMA 96-1)
Applicant: Hawaii Tropical Botanical Garden
Location: Onomea, South Hilo, Hawaii
TMK: 2-7-9:2, 6 & 10 and 2-7-10:Portion of 22

We have reviewed the subject application and the Draft Environmental Assesment Report and our comments are as follows:

1. Building shall conform to all requirements of the code and statutes pertaining to building construction.

2. All development generated runoff shall be disposed on site and shall not be directed toward adjacent properties, nor deposited onto adjacent streams.

   The applicant shall be informed that if drywells are included in the subject improvements, an Underground Injection Control (UIC) permit shall be applied for from the Department of Health, State of Hawaii.

3. All earthwork and grading activities shall comply with Chapter 10, Erosion and Sediment Control, of the Hawaii County Code.

4. Contact DLNR and the Corps of Engineers for any proposed stream alterations on Onomea, Kahalii and Alakahi Streams and other watercourses. All violations should be resolved prior to approval.

5. All driveway connections to a County road shall conform to Chapter 22, Streets and Sidewalks, of the Hawaii County Code.

6. The DPW maintains the Old Mamalahoa Highway (Scenic Route). The existing pavement width varies from 16-18 feet and in fair condition. Some portions of the road do not have shoulders and the portions that have shoulders are very narrow.

   DPW has no established right-of-way data around this area. The applicant should be conditioned to provide this data, at both the subject area and the existing roadway down to the garden.

7. Install streetlights/signs/pavement markings at entrances and exits as required by Traffic Division.

8. The applicant shall have a licensed civil engineer do a comprehensive sight distance report, certifying that all requirements are met for all vehicular turning movements at the garden entrance from the Old Mamalahoa Highway, both in and out of the proposed project.

   The applicant shall be responsible for maintaining all required sight distance easements.

   Sight distance and vehicular turning movements shall conform to AASHTO Standards and other applicable standards.

9. The applicant shall have a licensed civil engineer certify that the proposed parking areas meet the sight distance requirements and ample maneuvering spaces as established by County, State and Federal Standards.

10. DPW comments to Special Permit Application (SPP 95-26) dated November 13, 1995 still applies.

CKY/CR

cc: TRF
96-01.SMA

MOKU · LOA · GROUP
SIERRA CLUB · HAWAI'I CHAPTER

March 4, 1996

Hawaii Tropical Botanical Garden
101 Aupuni Street, Suite 1014A
Hilo, Hawaii 96720

Contact: Sandra Pechter Schutte

Subject: Hawaii Tropical Botanical Garden, Hawaii Island
Draft Environmental Assessment: Amendment to CDUP HA-1447

Members of Sierra Club's Moku Loa Group have reviewed the draft EA and have the following comments:

1. **Stream Fauna and Habitats.** The draft EA fails to describe the aquatic life which may be impacted by this project. Specifically:

a. The Application ignores the orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*), Candidate 1 for the Endangered Species List. Breeding populations of this species were documented in June of 1995 along Alakahi and Onomea streams in the vicinity of the proposed headquarters and visitor parking lot. HTBG has already stripped the Onomea stream bank of vegetation in order to see the land "for planning purposes" and also extensively excavated the bank. The damselfly lives along streambanks. We believe some of its habitat may have been destroyed. With respect to this disturbance to the streambank and the fill placed in Kahali`i Stream, we cannot tell if these actions actually harmed the damselfly population, since they took place without proper authorization or environmental assessment.

We realize that this work occurred just outside the Conservation District, but the headquarters project is an integral part of HTBG's overall plan, and impacts in the vicinity of proposed improvements are supposed to be addressed. Please note that item XVI(4) of the CDUA form itself requires the Applicant to "demonstrate that ... the proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area ...."

b. There is no acknowledgment of the aquatic biological resources in any of the streams: native o`opu, `opae and hihiwai, even though Michael Wilson instructed Applicant to address impacts to "aquatic resources" on page 2 of his October 10, 1995 response to HTBG's preconsultation letter.

c. In the list of Applicant's proposed improvements is the dam in Alakahi Stream, although it has been in place for some years (p. 12, Attachment to Amendment to CDUP) and is used for irrigation. The BLNR should designate this dam a violation and impose a fine. State Aquatics Administrator, Bill Devick, has recommended that the Alakahi dam be removed because it threatens this amphidromous stream life (12/1/95 letter to Rae Loui, CWRM), and we concur.

P.O. BOX 1137 · HILO, HAWAI'I · 96721

It should be noted that Applicant claims in this submittal that water has been used from Alakahi on only two occasions (p. 12, Attachment to CDUP Application and again in the EA, p. 19). To quote HTBG's attorney at the CWRM meeting of February 7, 1996, "Alakahi stream's been used on occasion in addition to those two times." It seems clear that the Applicant has given false information to in this submittal about the extent of its use of Alakahi Stream water. We are disappointed to find yet another example of misinformation from HTBG.

d. The Applicant ignores the illegally-constructed dam and diversion in Onomea Stream, which OCEA is currently investigating. We believe this dam is a violation of HTBG's CDUP and a fine should be imposed. State Aquatics also recommends the removal of this structure, for the same reasons as for the Alakahi dam. The Moku Loa Group concurs with State Aquatics on these matters. We believe it is in the best interest of the environment for HTBG to hook up to County water or install a catchment system. (HTBG claims on page 34 of the EA that it has a "catchment system," but we do not think this is true, and such a system is not on the site plan. What catchment system was being referred to?)

HTBG denied that Onomea Stream supplies water to Lily Lake in its October 5, 1994 letter to CWRM. For some reason, this letter was included in Attachment to CDUP Application (as an attachment to Exhibit 12, HTBG's Declaration of Water Use), with no disclosure that the information in it is false. Nor does HTBG disclose that the Declaration itself fails to mention all of its uses of Onomea water.

e. The Applicant's preconsultation letter failed to mention any of the water issues at Onomea, and they receive short shrift in the Application and EA. The Application declares plans for additional restrooms, greenhouses, etc., which would be dependent on taking even more water from streams after the expansion. We strongly object to stream water being used by HTBG now or in the future. County water is nearby, and catchment systems could be installed.

f. The EA refers to Kahali`i Stream as a dry stream bed (p. 10 and p. 30). This is an intermittent stream. The U.S. Army Corps of Engineers maintains that HTBG placed fill in Kahali`i Stream, mauka of the Scenic Route, where the new headquarters is planned. In view of the streamwater's recent, unexplained disappearance and the presence of fill in the stream, we are prompted to inquire whether HTBG needs to disclose the impacts that HTBG's expansion ambitions have had and will have on Kahali`i Stream. We understand that the property's prior owner claimed a landslide in the 1940s caused the stream to stop flowing. However, kama`aina testimony, the presence of stream fauna, the existence of a highwater mark, and more current maps indicating the presence of the stream contradict this claim.

For some reason, the site plans shows Kahali`i Stream as "Old Onomea Stream," which should be corrected. [As an aside, could HTBG make an attempt to properly designate features which have Hawaiian names? Onomea Stream is not Hanawi Stream, for instance. (Hanawi Stream actually does exist nearby, but it does not run through Onomea Valley.) The designations "Rock Island" and "Turtle Bay" on the Master Plan are simply offensive. Where Hawaiian place names still exist, HTBG should learn what they are and use

them, particularly since HTBG claims its mission is, in large part, to perpetuate Hawaiian culture.]

2. State Land in Onomea Valley. According to the Mediation Agreement approved by the BLNR on October 27, 1995, the State is required to survey within one year "...Alakahi, Kahali`i, and Onomea, South Hilo,...in order to resolve the question of ownership of portions of the Garden..." The Application describes extensive improvements: restrooms, cesspool, rainshelters, a toolshed, 620 feet of wooden walking trails, greenhouses, a pedestrian overpass, etc. Since the survey will determine where State land exists within the Garden, we request that all State land be determined before any improvements are made to land which may be publicly owned.

3. Unpermitted Constructions in Onomea Valley. It is HTBG's responsibility to apply for CDU permits when constructions are contemplated in the Conservation District. The DLNR should not have to initiate permits for constructions on HTBG's property--that is HTBG's job. HTBG must bear with delays caused by its own refusal to follow the law.

a. In the Applicant's list of previously obtained permits, there is no mention of HTBG's ever having acquired a CDUP for the existing restrooms within the garden. If none was ever obtained, wouldn't it be appropriate for HTBG to incorporate a request for an after-the-fact permit in this submittal? We are concerned about the adequacy of the restrooms' cesspool, considering the public's recreational use of the nearby shoreline and streams for wading, swimming and fishing and believe that HTBG should have to comply with current Department of Health rules dealing with such sewage. We would like assurance that the cesspool can handle the 150 visitors per day (and more if it is anticipated that the visitor count will increase as a result of the present expansion plan). In addition, do the restrooms' sinks use unchlorinated water from Onomea Stream, and, if so, have you considered the health concerns involved? It would not be fair to expose unsuspecting visitors (who may have cuts on their hands) to the leptospirosis and giardia existing in streamwater.

b. As stated above, the dam and diversion in Alakahi Stream should be deemed a CDUP violation, a fine should be imposed, and the stream put back the way it was.

c. Likewise, the dam and diversion in Onomea Stream should be deemed a CDUP violation, a fine should be imposed, and the stream put back the way it was.

d. There are drainage systems in place through which the effluent from Lily Lake and the flamingo pond is conveyed into Alakahi Stream. We would contend that these systems constitute a construction within the Conservation District and believe this practice should stop and the drainage system should be removed. We would like to call attention to page 39 of the EA, which states that no coastal ecosystems will be affected by HTBG's plans. Effluent piped through Alakahi to the shore has the potential to adversely affect the shore environment (as would the cesspool in 3a above), and, if it is deemed a CDUP violation, the problem would need to be resolved before the present application goes forward.

e. In the Exhibit Map Site Plan, Applicant shows a bridge over Onomea Stream right by what is labeled "Onomea Waterfalls." Is it previously approved by the CWRM, and does it have a CDUP?

The time has come for HTBG to honestly disclose all of the constructions for which it never sought permits. When this is done, once and for all, and all environmentally damaging constructions removed, and mitigations for permissible constructions are in place, only then can HTBG move forward. HTBG has the resources to protect the environment in Onomea Valley by complying with Conservation District rules. It can afford excellent legal advice and has the benefit of an increasingly professional staff. All it needs is the will to work with the DLNR to ensure the sustainability of the true natural and cultural resources of Onomea Valley (which are not koi, not flamingos, not *Miconia*).

4. **Signage**. Applicant is requesting informational and directional signs along the public trails (p. 2, Attachment to CDUP Amendment). The signage along public trails (the old government trail, including the Donkey Trail, and the Alakahi beach trail) has been provided for in the Mediation Agreement, and we concur that portion of the Agreement. Any request for signs on these trails should be stricken from the present Application. Our main concern on the subject of signs is the replacement of the State's public shoreline access signs, which have been repeatedly stolen.

5. **Future Plans**. It is unclear to us whether the proposed future improvements described in the Attachment to the CDUP Amendment are supposed to be addressed in the present EA. If so, the impacts and mitigation measures for each of these proposed future improvements should have been described there. Is the Applicant expecting to go for permits for these improvements when the time is right, or will the Applicant assume it has a permit for all of these proposed future improvements? Preliminarily:

a. One of the future plans is a pedestrian overpass over the public trail. We find this objectionable. It would impede the public from carrying kayaks and fishing equipment and constitute an eyesore in a scenic area.

b. Please note that the proposed future restrooms' cesspool is sited right next to Onomea Stream, with no discussion of how the sewage might affect the stream or the shore area at the stream mouth.

c. Signage along the Donkey Trail has already been provided for by the Mediation Agreement. We see no reason to revisit this issue in the future. The fencing suggested for the Donkey Trail has been inadequately described.

6. **Headquarters and Parking Lot Site**. The Applicant's proposed visitor center and administrative office is planned to be built on agriculturally-zoned land, directly across from the Conservation-zoned proposed new entrance, walkway, etc. We believe that extensive construction on the site mauka of the Mamalahoa Highway would imperil the orangeblack Hawaiian damselfly and should not be attempted.

Unfortunately, it seems that the trail system under review was designed to lead to the new headquarters site. Thus, for the BLNR to allow this trail system may endanger the damselfly by encouraging the construction of the

headquarters and the parking lot, which is planned to be constructed right up to the streambank habitat. Why weren't impacts and mitigation discussed in the EA? (Brooks Harper of U.S. Fish and Wildlife would be a good source of information, as would Dan Polhemus of Bishop Museum. Both are knowledgeable about the site and the rare damselfly and should have been consulted.)

We would also like to call your attention to comments made by Bill Devick, Acting Administrator of the Division of Aquatic Resources:

> We...wonder why the applicant would choose to place a new Administration Building in the vicinity of these streams [Kahali`i and Onomea]. During times of flooding, the Building could be in jeoperdy from possible erosion and other damages including displacement of the Building. This in turn may damage stream habitat.

What assurances are there that this won't happen?

7. **Miconia**. Onomea valley is riddled with *Miconia*, especially the site of the proposed headquarters. This plant pest is one of the paramount environmental threats to our island. As we work more and more on eradication, we discover how important it is to handle these plants correctly, so that the eradication process does not promote its spread. What is being planned to eradicate it in this project, and how is HTBG planning to carry out the eradication? Incidentally, if HTBG has a contract with the Department of Agriculture to eradicate *Miconia*, as HTBG has repeatedly claimed, could it please produce a copy of the contract (perhaps attach it to the EA)? We can find no evidence of any such agreement, although DOA did state that it gave HTBG a free container of herbicide.

8. **Archaeological Inventory Survey**. We note that HTBG has surveyed the sites of only the *immediate* improvements for possible archaeological remains. We would like it on record that the State's Historic Preservation Division requested a survey of the entire garden site and that this is an issue in the pending "condition modification" item not yet acted upon by the BLNR. Michael Wilson's November 28, 1995 permit letter to HTBG's attorney stated that "it is our understanding that the applicant is working towards ... conducting an archaeological inventory survey of HTBG per the State Historic Preservation Division's comments." So far, there is no evidence that HTBG is carrying out the kind of survey requested by SHPD. We await SHPD's comments on the adequacy of the rather minimal archaeological research conducted so far.

The existing restrooms (assuming they have no CDUP) would have surely required an archaeological study in order to have been permitted. The proposed improvements represent sweeping changes in the way HTBG operates, and the proposed future improvements would extend the changes beyond the very few sites studied to date. Moreover, HTBG's expansion does not merely involve buildings. Botanical garden development involves a great deal of hole digging (some quite deep) and emplacement of trees, whose root systems can spread considerably over the years; disturbances on the order required by HTBG's expansion should not be allowed to go further without a thorough archaeological inventory survey of the entire site. It is unconscionable that HTBG has not followed its own stated mission to preserve Hawaiian culture by conducting such a survey.

In light of the above concerns and questions, we request that the Application and the Amended Draft EA be rewritten and distributed over again. We believe that each and every concern outlined above needs to be resolved and ask that the redrafted submittals follow these guidelines:

-- They should contain only truthful statements (and all attachments of prior documents containing untruthful statements should be so annotated).

-- Applicant should concurrently apply for after-the-fact permits for unpermitted constructions within the garden site for which HTBG can show there are absolutely no adverse environmental impacts.

-- All environmental issues (especially the water and aquatic resource issues, which were ignored in the Applicant's preconsultation correspondence and inadequately covered in the submittals), should be addressed with a view to environmentally sound results. It is not enough to rehash broad environmental information from prior permit requests. Specific problems require specific solutions.

-- In-depth consultations should take place with the State Aquatics Division, U.S. Fish and Wildlife, Bishop Museum, the County Water Department, and the many other agencies/organizations likely to have helpful environmental information. HTBG will need knowledgeable assistance in identifying all possible impacts, alternatives, and mitigation measures. This is HTBG's responsibility, and we think HTBG can do it.

-- The draft EA should be available to the interested public at the Office of Environmental Quality Control, and the Hilo and Laupahoehoe Public Libraries. As Moku Loa Group was originally a consulted party, our group expected to receive a copy. Instead, attempts by our members to obtain a copy at OEQC and to view a copy at the public library were futile. A telephone call to the Applicant's contact also yielded no response. It's impossible for the public to respond to a document unavailable for viewing.

-- The true cost to the environment of the <u>overall</u> project -- including the headquarters built on agriculturally-zoned land to service the business in the Conservation District -- has to be revealed. It is an imposition on the public to ask it to respond to an EA as inadequate as this one.

Sincerely,

Deborah Ward

Deborah Ward
Conservation Committee

cc: Michael Wilson, Chairperson, Board of Land and Natural Resources
Dwight Takamine, State House of Representatives
Takashi Domingo, Hawaii County Council
Catherine Tilton, Office of Conservation and Environmental Affairs
Ross Cordy, State Historic Preservation Division
Rodney Oshiro, Na Ala Hele
David Higa, Commission on Water Resource Management
Dawn Chang, Deputy Attorney General
Gary Gill, Office of Environmental Quality Control
Virginia Goldstein, Hawaii County Planning Department

Bill Devick, Division of Aquatic Resources
Ed Johnston, Share Onomea Access
Marjorie Ziegler, Sierra Club Legal Defense Fund
Patricia Tummons, *Environment Hawai`i*

BENJAMIN J CAYETANO
GOVERNOR OF HAWAII

MICHAEL D WILSON
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
GILBERT S COLOMA-AGARAN

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

FILE: HA-1447A

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT
WATER RESOURCE MANAGEMENT

Ms. Virginia Goldstein, Planning Director
County of Hawaii
Planning Department
25 Aupuni Street, Room 109
Hilo, Hawaii 96720-4252

MAR 5 1996

Dear Ms. Goldstein:

SUBJECT: Draft Environmental Assessment to Amend Conservation District Use Permit HA-1447 to Construct Entrance, Trails, Parking and Related Improvements, and Master Plan Improvements at the Hawaii Tropical Botanical Garden, South Hilo, Hawaii (TMK: 2-7-9: 2, 6 & 10; and 2-7-10: 22)

We have reviewed the subject Draft Environmental Assessment (DEA) and have the following comments.

Division of Aquatic Resources

We are concerned about the applicant's requests for some of the improvements planned for the Hawaii Tropical Botanical Garden. Some of the project improvements involve sites along or crossing portions of Onomea, Alakahi, and Kahalii Streams.

The Garden entrance trail is proposed to run along near the Kahalii Stream bed and to cross the stream bed at three locations. The applicant states that all of the walkway footings will be constructed outside of the stream bed and no disturbance of the stream bed is anticipated by the construction of this walkway.

In addition, a bridge is proposed to be constructed over Onomea Stream to provide pedestrian access between the present improved portion of the Garden and the future expansion area. The bridge is presently proposed to be a wooden, suspended foot bridge, which would be gated. The footings for the bridge are proposed to be constructed outside of the Onomea Stream channel.

We are concerned because the project sites include the vicinities of Kahalii and Onomea Streams. According to our records, Onomea Stream harbors significant native freshwater fauna, especially in the middle to upper reaches. Kahalii Stream, even though it is an intermittent stream, contains suitable habitat for native freshwater fauna that recruit from the ocean during times of flow. This is likely because adjacent Onomea Stream has native freshwater fauna.

Construction activities could have impacts on aquatic resources such as temporary turbidity, biota displacement and disturbance. We request the following measures to minimize erosion and siltation during construction:

1. Site work be scheduled for periods of minimal rainfall.

2. Lands denuded of vegetation be replanted or covered as quickly as possible to control erosion.

3. Construction materials, petroleum products, and debris should be prevented from falling, blowing, or leaching into the aquatic environment.

In regard to the existing concrete diversion dam within Alakahi Stream, the Division does not normally condone After-the-Fact permit applications. The diversion constructed by the applicant is presently obstructing the natural flow of the stream causing the water to pool on the upstream side. Alakahi Stream also harbors biologically significant native freshwater fauna.

Obstructing or reducing the flow in the lower portion of the stream would be detrimental for recruitment since our native fauna are amphidromous and recruitment from the ocean is highly dependent upon stream flow. Stream flow into the ocean is essential for hinana (native gobiid postlarvae) and other native aquatic fauna to locate stream habitat.

We feel that leaving the project in place would pose a greater threat to aquatic life than its removal. Therefore, we strongly recommend the removal of the diversion. The applicant should explore other alternative water sources.

Commission on Water Resource Management

We offer the following clarification and comments to the DEA:

1. Page 19. Diversion Dam "The applicant obtains water for use within the Garden for irrigation, restroom facilities and pond circulation, from an approved diversion from within Onomea Stream.

   The term "approved" implies that the diversion dam on Onomea Stream was approved by the Commission. The applicant constructed the Lily Lake

and Flamingo pond after filing the declaration of water use in May 1989. The Commission informed the applicant that the interim instream flow standard must be amended because of the addition of the lake and pond. The petition is now being considered by the Commission, and approval is pending the Commission's evaluation. We would prefer the applicant indicate that HTBG has petitioned the Commission to amend the interim instream flow standard for Onomea Stream.

2. In Section 2.2.2 the applicant indicates that the gardens will be expanded by adding new landscaped areas, restrooms, and greenhouses. The applicant should disclose the source(s) of water to accommodate the expansion, and disclose whether potable water needs to be provided due to the increased public use. If the water for the new uses are to be developed from new or expanded stream diversions, the applicant should disclose the impact to the stream aquatic life.

3. The EA should disclose the volume of wastewater generated from the expanded use of the Gardens. The EA should also disclose how wastewater will be treated and disposed, and whether such wastewater treatment and disposal practices are allowed under current rules.

Planning and Technical Services Branch

The applicant has submitted an amendment to Conservation District Use Permit HA-1447 for the subject work. However, the Department has yet to process the application because portions of the application are incomplete and there are pending violations regarding the stream diversion dams on Onomea and Alakahi Streams. However, upon final disposition of the violations, in addition to completing the subject application, the Department anticipates processing the application.

Additionally, we have the following comments regarding the adequacy of the DEA:

1. Master Plan: The immediate improvements described in the application are well thought out and have substance. Further, we support the concept of the applicant's proposal to submit plans to the Department for review and approval prior to the implementation of any of these improvements.

   The future Master Plan improvements, however, lack detail and may ultimately be subject to further environmental review. For example, the water source, allocation requirements, and their associated impacts for the proposed long-term landscaping plans, the three research green houses, and the two additional restrooms should be disclosed. Additionally, the archaeological field inspection conducted by Robert Spear, Ph.D. limits his study location to the area proposed for immediate improvements. Since no

archaeological review has been conducted of the area identified for long-term improvements, we question the adequacy for environmental determination regarding the historical/archeological resources within the Garden.

2. Safety: With 150 tourists a day seven days a week, plus some of the Garden's employees, we believe the DEA needs to more fully address what safety precautions the applicant intends to employ to ensure the safety of its patrons and employees as they cross the Old Mamalahoa Highway to enter the garden and then return to the Administrative office/visitors' center (results in over 2,000 crossings per day by visitors). (Perhaps discussions with the County Public Works Department or the Department of Transportation would be helpful for the applicant).

3. Stream Diversion Dams: Pending final disposition of the stream diversion dam violations in the Conservation District, the DEA may need to be modified to include the Onomea Stream diversion dam.

4. Figure 3 of the DEA shows cesspool legends immediately adjacent to both Onomea Stream and Alakahi Stream. Please have the applicant address the impacts that the cesspools have on the surrounding aquatic environment (such as the potential for wastewater to leach into the streams, and if the cesspool were to overflow).

5. We have enclosed comments that the Department has received regarding the subject DEA.

Thank you for your cooperation in this matter. Please contact Cathy Tilton of our Planning and Technical Services Branch at 587-0377.

Aloha,

for MICHAEL D. WILSON

Attachments

xc: Mr. Lutkenhouse
Ms. Sandra Schutte
Chris Yuen, Hawaii Board Member
OEQC

March 7, 1996

Ms. Sandra Pechter Schutte
101 Aupuni Street, PH- 1014A
Hilo, Hawai`i, 96720

Re:: Hawaii Tropical Botanical Garden
Amendment to CDUP HA-1447 & DRAFT EA

I am writing on behalf of Share Onomea Access (SOA). Having had the opportunity to review the Draft EA and Amendment to Conservation District Use Permit HA-1447, we are greatly disappointed by the way important issues were either glossed over or totally ignored. These documents miss the point of the whole exercise, which is to identify, assess, discuss alternatives, and mitigation measures for environmental issues in *and around* the project site.

The Application and EA are so inadequate that they should be completely redone and this time address the following issues:

(1) As you know, SOA has called a contested case before the CWRM regarding HTBG's abuse of the stream environment within Onomea Valley. I refer you to our Amended Petition for a Contested Case, which details our concerns. Your EA should include information on assessment, alternatives, mitigation for ***all*** these stream issues, keeping in mind the extent of the ***total*** expansion, including the proposed headquarters site mauka of the Old Mamalahoa Highway. Even though this headquarters site is not in the Conservation District, it is an integral part of this expansion project, and the Draft EA should have assessed the proposed development on that site.

(a) Impacts of the project to Kahali`i Stream should have been described. As part of your EA, please specifically and truthfully indicate the extent and type of the fill HTBG placed in this stream. We know that Kahali`i is an intermittent stream, not a dry streambed. Why doesn't HTBG work with the State Aquatics Division toward restoring this stream to its former state?

(b) Impacts of the project to Alakahi Stream. Please concern yourself with the impacts to streamlife of the unpermitted dam in the stream as well as the health and environmental effects of the effluent from Lily Lake and the flamingo pond. Why was there never a CDUA for the drainage system into this stream? Why has this effluent not been used for irrigation instead of being dumped into the stream?

(c) Impacts of the project to Onomea Stream, including its streamlife. The unpermitted dam and diversion should be addressed. Please also include information on the impacts to the orangeblack Hawaiian damselfly population just mauka of the Old Mamalahoa Highway. The excavation of the streambank mauka of the Scenic Route needs to be explained. Where exactly are you planning to put your building(s) and parking lot on that site? Are you planning to use the land right up to the banks of Onomea Stream (up to where you excavated for instance) and Kahali`i Stream? If so, how will this affect the health of the streams and the streamlife? If not, why doesn't HTBG just make plans to restore Onomea Stream's bank and replant?

(d) Impacts to Kawainui and Onomea streams of HTBG's unauthorized improvements to the old diversion mauka of the highway.

Each and every stream issue should have been addressed in your EA, because HTBG proposes to expand using stream water and plans to place buildings and a parking lot between two environmentally sensitive streams. Please explore the alternatives: catchment systems, County water, effluent irrigation, etc.

(2) If the State owns lands in Onomea, those have to be identified before new plans are implemented. One thing our members are adamant about is that we oppose HTBG's controlling public land any longer or expanding onto what might turn out to be public property.

(3) Take stock of all constructions in the Conservation District for which HTBG never bothered to obtain permits. Why shouldn't these be deemed violations? We are specifically concerned about the restrooms and the dams, drainage and irrigations systems involving the streams. If there are more, HTBG should own up.

(4) We are sorry that the site chosen for the new headquarters (mauka of the Old Mamalahoa Highway) turns out to be environmentally inappropriate. We would like nothing better than for HTBG to stop running vehicles up and down the public trail, and it seemed that the new headquarters and trail would accomplish this. We also hope that, once HTBG ceases to transport customers to the tourist attraction on the public trail, we will no longer have to bear the needlessly antagonistic attitude of HTBG's employees and guards. Perhaps your new draft EA could address how HTBG plans to improve relations with the local public who use the trail?

Unfortunately, we cannot support the development planned for the site mauka of the Old Mamalahoa Highway now that we know that it will endanger the rare orangeblack Hawaiian damselfly. Why wasn't this matter addressed in your EA? The new draft EA must take impacts to the damselfly into account, examine alternatives, and design mitigation measures.

The property mauka of the Old Mamalahoa Highway does not seem large enough to support a parking lot and administration buildings. HTBG might be able to fit a parking lot there, if it could establish mitigation measures to ensure that the damselfly habitat was not harmed. We would like to know exactly where on the site HTBG is planning to put building(s) and a parking lot. Why not put the administrative buildings inside the garden site at some more appropriate spot?

It does seem that the condition of the public trail might shortly become too dangerous for HTBG to continue using it for shuttling visitors. One simple temporary alternative, which would enable HTBG to get tourists into the valley without using the government trail, would be to shuttle tourists to an existing trail further mauka and let them walk in. The proposed employee parking lot (the one for the garden employees, not the administrative employees) could be used as a drop-off and pick-up spot for HTBG's vans. A trail into the garden already exists there, so a minimal amount of work would be needed to implement this change. There is no need for HTBG to shuttle visitors down an eroding trail. Using this other trail would give HTBG time to consider other sites for its headquarters and parking lot. Could you please consider the pros and cons of

this particular alternative? The fact that this trail is not as scenic as the public trail does not preclude HTBG from adopting this alternative. Visitors' safety should be placed above aesthetics.

(5) Historic preservation is of great concern to SOA members. The village of Kahali`i had a remarkable history. Yet, as time goes by, more and more of this history is lost. HTBG has fought to develop the valley with as little archaeological study as possible. Please explain why a complete archaeological survey of the entire garden site, as requested by the State Historic Preservation Division, has not been prepared.

We have received reports of the existence of numerous old graves in Onomea Valley, which appear to have been destroyed. (These graves are in addition to the four more modern graves displayed by HTBG.) Our sources indicate that the graves were in existence in the early 1980s but disappeared during the development of the botanical garden. We are particularly concerned about the siting of the existing restroom (which we assume has a cesspool), for which your Application shows no CDU permit. Preliminary information indicates that the graves were in the general vicinity of this facility. Perhaps your new draft EA could shed some light on this matter, while you clear up the issue of the missing restroom CDU permit.

(6) We would like the new draft EA to include drawings of how the project will change the character and look of the Scenic Route; specifically, around the planned trail's entrance, on both sides of the Mamalahoa Highway. The drawing of the wrought iron gate is a very good start, however, we are concerned that there is no indication of how the proposed 8 ft. x 16 ft. "bulletin board" is going to look there. Judging from the Master Plan, it may look like a billboard from the road. A drawing of the appearance of the headquarters building(s) and parking lot planned across the road will give a better idea of the impact of the total project on the appearance of the Old Mamalahoa Highway.

(7)(6) We can't tell whether the Application's "future plans" are being approved as part of this process, or whether they go through some later application process when the time comes. Could this be clarified? If this is supposed to be the EA for the proposed "future plans," you should really have described these plans in better detail. For now, however, we would like to register the following:

(a) The fencing along the "Donkey Trail" should be fully described if the amended permit is going to cover it.

(b) Please, no more signs along the public trails, either in your immediate or future plans. The Mediation Agreement was supposed to provide for signs. HTBG has repeatedly devised signs that insult and misinform the public, signs that it has to be forced to remove. The less opportunity it has to inflict its signage concepts on the public, the better.

(c) We oppose the 7' pedestrian overpass over the government trail. We don't want to have to walk under it with our gear, and we don't want to have to look at it.

(d) What about the cesspool planned to go right next to Onomea stream? Please remember that our members gather *food* from this stream.

It's clear from the EA that HTBG does not work with consulting agencies or listen to their advice. We would also like to note HTBG's unwillingness to work with the Papaikou community. The Master Plan represents a major and permanent change to the immediate and surrounding lands (including the Mamalahoa Highway). HTBG should have presented the plan at one of the community meetings held regularly along the coast, before it wasted the time and money to prepare this unworkable plan. In addition, SOA has attempted to begin a dialog with HTBG staff in order to express concerns on water and access issues. Our overtures were met with a "no comment" from HTBG.

In conclusion, we respectfully request that you prepare a new application and draft EA dealing with all of these issues.

Very truly yours,

Ed Johnston

Ed Johnston
Share Onomea Access
P.O. Box 636
Pepe`ekeo, HI 96783
961-4953

cc

Gary Gill, OEQC
Bill Devick, State Aquatics
Dawn Chang, AG Office
Cathy Tilton, OCEA
Rod Oshiro, Na Ala Hele
Ross Cordy, SHPD
David Higa, CWRM
Virginia Goldstein, Planning Dept.
Dwight Takamine, State Representaive
Takashi Domingo, County Council
Marjorie Ziegler, Sierra Club Legal
Debbie Ward, Sierra Club, Moku Loa Group
Patricia Tummons, Environment Hawai`i
Alan Murakami, Native Hawaiian Legal Corp.
Al Lerma, Esq.

187-C Hokulani Street
Hilo HI 96720

March 7, 1996

Ms. Sandra Pechter Schutte
101 Aupuni Street, PH-1014A
Hilo HI 96720

Dear Ms. Schutte:

Subject: Environmental Assessment for Improvements at the Hawai'i Tropical Botanical Garden, Onomea, Hawai'i

I appreciate the opportunity to comment on this document. Here are my remarks.

1.1 Identification of Applicant

Here it is stated that the applicant owns the property involved -- specifically the TMKs: 2-7-9:2, 2-7-9:6, and 2-7-9:10, and 2-7-10:22. However, on the large site map (figure 3), TMK 2-7-10:22 is stated to be under lease for 99 years. If this parcel is leased, who is the fee owner? I believe that if the garden is not the fee owner, the fee owner must be identified and his or her approval made a matter of written record in the Conservation District Use Application file.

Also, during the process of mediation concerning public access to the shoreline in this vicinity, I believe it was discovered that the state may have land within the garden area. For the sake of the garden as well as the public, I would like to see ownership questions resolved before any significant capital outlays are made on these proposed improvements.

1.2 Project Summary

I am unclear about the scope of improvements that would be authorized should the Board of Land and Natural Resources approve the requested amendments to CDUA HA-1447. Would the "future master plan improvements" -- sketched out in barest detail in this EA -- be covered? If so, I believe the level of detail in the EA must be greatly increased. For example, if TMK 2-7-10:22 eventually is to become incorporated into the garden, would this lot, too, be irrigated by stream water? Would additional pathways (not mentioned at all in the EA) be constructed through the landscaped areas? How would garden visitors cross the Donkey Trail corridor (proposed to be fenced) to get to the northern side of parcel 2-7-10:22? Or would future improvements on this parcel be limited only to the southern side of the Donkey Trail?

I am most interested in the proposal to construct "up to three research greenhouses." What research is the garden proposing to do? Would there be any commercial use of these greenhouses? For example, the garden does sell tropical bouquets for shipment to the U.S. mainland. Would these greenhouses be used to grow flowers to be sold to visitors? If the area proposed for the "research" greenhouses is now used by the garden's nursery, where would the nursery function be relocated?

1.3 Approving Agency

What is proposed here is an amendment of an existing Conservation District Use Permit, approved under rules existing in 1982. Is it possible to amend that permit under the rules approved in 1994? Would it not be simpler to apply for a new permit? If this were done, there could be no ambiguity in the future about what rules applied or how to deal with violations.

2.2 Proposed Uses

One of the purposes for this application, we are told, is to "legitimize an existing diversion dam," which is later identified as the dam on Alakahi Stream. However, I believe that the dam on Onomea Stream also lacks the required Conservation District permit. And neither dam has received a permit from the Commission on Water Resource Management. Thus, I would suggest amending this paragraph to indicate that both dams -- that on Onomea as well as that on Alakahi -- require legitimization by this application.

And again, I would note that the "long-term future improvements" are so poorly sketched out in this EA that the document can scarcely be called a "conceptual master plan" for the garden. Without some flesh on these bare bones, the DLNR is -- to mix metaphors -- being asked to write the applicant an administrative blank check.

2.2.1 Immediate Improvements

The first paragraph here refers to the "approved diversion dam" within Onomea Stream. I refer to my earlier objection under 2.2 to all references to Onomea Stream dam as "approved."

2.2.1. Garden Entrance

I note that the entrance area is proposed to include a tool and utility shed, a large bulletin board and umbrella rack, a rain shelter, guard rails, and the wrought iron gate and fencing. What seems to be missing is any guard shack, which would seem to be required in order to make sure that visitors to the garden have paid their entrance fee. Without some kind of checkpoint, in other words, what is to prevent non-paying visitors from entering the garden grounds when the gates are unlocked? (The EA states that the gate will be locked and "only opened for paying guest [sic] during normal business hours" -- which still leaves me wondering what the mechanics will be of keeping out unpaying visitors.)

Combination Bulletin Board/Umbrella Rack. I am puzzled as to why a bulletin board of such a large size is needed. Presumably, paying guests will receive garden maps and other information to assist them in enjoying their garden tour when they pay for their admission just across the road at the planned visitors' center. In addition, if it is raining, having the "umbrella rack" located across an unsheltered road crossing is hardly ideal for guests' convenience. (It is unlikely that the weather would change from fair to foul in the time it takes to travel from the visitors' center to the garden entrance, in other words.) It would make much more sense to have both the umbrellas and all the information needed for a safe, enjoyable garden visit be placed in the visitors' center. As it is, I am left with the uncomfortable feeling that this "bulletin board" will be tantamount to a billboard, advertising the garden to such tourists as may happen by while driving down the Old Mamalahoa Highway. If a bulletin board is essential, I would suggest that its face be placed away from the

highway so that there is no danger that the applicant will be using it as a means of circumventing the county sign ordinance.

Tool and Utility Shed. There appears to be an error in describing the area of this improvement. The drawing and the text state it will be 8'x8'; however, the text refers to this as "36 square feet in area". The correct figure would be 64 square feet. In addition, if the shed is to be used to house a golf cart or similar means of transporting infirm guests, it would seem very difficult to house it in the proposed shed, whose door is a mere 32 inches wide (according to the drawing in Figure 7).

The shed's appearance, the EA states, "will follow the same motif as that used for the Garden's visitor center." Without further elaboration, there is no way of knowing what this means, since there is no description whatsoever in this document as to the "motif" that will be used in the design of the visitor center. Will it be English Tudor, Georgian, Neo-Classical, or late Plantation? The drawing itself suggests nothing more than Early Sears.

Trails. On page 10, the walkway is being described as being no higher than "about four feet above grade at the highest elevation." I have a difficult time, however, imagining how the walkway will "cross the stream bed at three locations" without rising more than four feet above grade. I believe that the stream bed cuts through a channel that is somewhat deeper than four feet. Thus, unless the walkway itself will be closely following the contours of the stream channel at the crossing points (which I seriously doubt), I would think it inevitable that -- at least at the points where it crosses the stream channel -- the walkway will indeed rise much higher than four feet above grade. In determining how high the walkway would be, a contour map showing site elevations would be most helpful. (The contour map provided at Figure 13 is on far too large a scale to be useful in figuring out the walkway route in relation to the stream channel topography.)

In describing the vista trail, no mention is made of any clearing of vegetation or trees that may lie outside the trail itself but, if left undisturbed, might block the "vista." Will such clearing be required? If so, there should be some discussion of this. Also, there is the statement that this walkway will be no more than 12 inches above grade. Will this mean that the land will need to be leveled? Again, without a topo or contour map -- in meaningful scale -- it is impossible to know this. If there is leveling required, this should be discussed.

On page 16, after a long and detailed description of the planned walkway construction (involving Douglas Fir lumber, angle iron braces, etc.), there is the following disclaimer: "Materials to be used to construct these trails may be changed if a more economical means is found..." If there is to be any change, it should be subject to review by the Board of Land and Natural Resources, with provision made for community notification of the time and place of the board's planned decision-making on the matter.

Employee Parking Areas. (a) Visitors Center employee parking. The discussion provided in the EA is seriously deficient. Figure 11, purporting to depict the parking area for the visitors center employees, suggests that the property line lies under the asphalt of the Old Mamalahoa Highway. Is this true? Without a metes and bounds description or survey, this seems to be a questionable assertion. On what basis was it made? A memorandum dated July 21, 1982, from Edward Harada, then the chief engineer of the Department of Public Works, to the County Planning Department states that, in this area, the Old Mamalahoa Highway pavement width is 17 feet, while the right-of-way is 50 feet wide. This would indicate that the public right-of-way extends 25 feet on either side of the center line of the highway, or about 16.5 feet beyond the edge of the pavement. This

suggests, in turn, that the entire area proposed for parking for visitors' center employees, lies within the county right-of-way. Unless the applicant is somehow able to demonstrate an error in Mr. Harada's statement, it would seem that the applicant is seriously infringing on the right of the public to use the area alongside the highway as parking during such times as the public may wish to enjoy the hard-won right of unimpeded pedestrian shoreline access down the Jeep Road and Donkey Trail.

Also, I am concerned that the proposed size of the parking stalls (24 feet long by 12 feet wide, or 288 square feet!) is excessive. Even with the stalls designed to accommodate parallel parking, this is far longer than the standard provided by the county in its parallel parking stalls. One cannot help but wonder if the intention here is not so much to provide employee parking as it is (1) to provide parking for tour vans; (2) to prevent parking by residents and others desiring to use the Jeep Road and Donkey Trail for shoreline access; or (3) both of the above.

(b) Garden employee parking. Here, again, I would question the large size (10 x 20 feet) of the proposed parking stalls. And, once more, the diagram purporting to illustrate the parking area is woefully deficient. This one doesn't even pretend to show property lines, much less topography. (As an aside, the scale of the figure -- 1/8" = 1" -- would not seem to be correct.)

Where is the limit of the county right-of-way in this area? If it lies 16.5 feet from the edge of the asphalt, then it would seem that no more than two -- if that -- of the proposed four stalls would lie on private land. Again, this discussion needs serious clarification.

(c) Parking in general. Will any leveling, grading, excavation, or retaining walls be required for construction of the parking areas? Without a topo map, it is impossible to know this. What kind of signage will be provided? This is not discussed in the EA, but is important -- especially if there is any use of county rights-of-way involved in the area to be set aside for employee parking. There is no description at all of what permissions and approvals are needed from the county Department of Public Works for creating a pull-off from a county roadway. In another case involving the founder of the Hawai'i Tropical Botanical Garden, an effort was made to create two private parking areas off a public roadway (fronting 178 Kahoa Road). The owner was cited by the county for illegal construction of a retaining wall, for failure to obtain advance written permission from the Department of Public Works for work within the county right-of-way, for failure to obtain a building permit, and for posting signs indicating (wrongly) that the parking area was off-limits to the public. (Despite the removal of the private-property signage, signs are still posted that request the public to keep off the two parking areas, stating that they are for the use of the residents of 178 Kahoa Road.) I would like to be certain that before any similar off-road parking is constructed in the area of the garden that none of these shortcomings shall be repeated.

Diversion Dam. On page 19, reference is again made to the Onomea Dam as "an approved diversion dam." I am quite certain that after-the-fact approval of this dam is a pending issue before the state Commission on Water Resource Management, just as the Alakahi Dam is awaiting approval. I think it only appropriate, then, that there be adequate discussion in this EA of both dams, not merely the Alakahi dam. Furthermore, the U.S. Army Corps of Engineers has not yet approved either dam.

The stream flow of Alakahi is placed at 1.3 cfs in October 1995. I'm no stream-flow expert, but usually in Hawai'i, stream flow measures, to be useful, must be made over a much longer period of time -- enough time, that is, to allow calculation of what is called the Q90 flow (referring to the

volume of water in the stream 90 percent of the time). Who measured the stream flow? What were the weather conditions in the week preceding the measurement? Without this knowledge, it is difficult to attach any meaning to the October 1995 measure.

The applicant also states that the dam "has only been used to divert water on two occasions." This statement was contradicted, however, in testimony you provided to the Commission on Water Resource Management at the commission's meeting of February 7, 1996. At that time, you stated that Mr. Dan Lutkenhouse had informed you that Alakahi Stream had indeed been used more than twice. How many times? At what volume? These are germane questions and need to be answered in the Final EA.

On the subject of the dams, I would concur with the recommendations of the state DLNR's Division of Aquatic Resources, which recommends that both dams be removed. An alternative water source should be developed for all garden purposes.

Signage. The mediation agreement completed last fall addresses many of the signage issues raised in this EA. This leaves me wondering whether the signage proposed along the Alakahi Trail and the Jeep Road are in addition to the signage allowed under the mediation agreement.

Also, I would object to the placement of a no-trespassing sign on the government land along Mamalahoa Highway. Again, it seems to me the chief result of such signage -- and, most likely, the inspiration behind it -- is to discourage the public from using the area for off-road parking.

2.2.2. Future Master Plan Improvements

As stated at the outset of this letter, the EA is extremely vague on the nature of these improvements and their location. It is difficult to know what type of oversight the DLNR and the County Planning Department could exercise if the applicant were to receive approval for this master plan. Would more detailed site plans and architectural drawings have to be submitted for administrative review? This is suggested on page 23, but given the applicant's repeated failure to meet the conditions of such permits as he has been given in the past (by the DLNR and the County Planning Department), and his sometimes flagrant disregard for the very need to obtain permits, it seems only reasonable that some stricter form of oversight be exercised. In this light, I would suggest that if any of the improvements mentioned in the Master Plan are to be included for approval by the agencies awarding SMA and Conservation District permits, the EA be substantially revised to flesh out these preliminary concepts.

Restrooms. On page 24, the EA states that "two additional restroom buildings are proposed" among the long-term improvements. However, I suspect that the existing restrooms should be included in the after-the-fact improvements in this application. I have reviewed the CDUA files, and can find no reference to any approval by the Board of Land and Natural Resources of a restroom. When the SMA Permit for the existing restrooms was granted in 1988, the applicant informed the county that BLNR approval had been received on September 22, 1988. My review of the files can find nothing to support this. Admittedly, given the stunning scope of the files, I may have missed something. However, I believe it is not unreasonable to ask at this time where and when such approval for the existing restrooms was obtained. If no approval by the BLNR was granted, then I would suggest that the existing restrooms (and cesspool) be included in the after-the-fact improvements to be covered by this amendment to CDUP HA-1447.

4.8.1 Public Facilities

Water is "presently provided from a catchment system and from the Onomea Stream," according to the EA. I am not aware of any catchment system now in use; if one is used, it should be more thoroughly described. I am aware that plans for the visitors center mauka of Old Mamalahoa Highway call for a catchment system to be built; is this the catchment system referred to in the EA? In any event, it seems likely that several of the long-term improvements (greenhouses, restrooms) will require increased use of water from Onomea Stream, Alakahi Stream, or both streams. Among other things, the EA should state what quantities of water are anticipated to be required, and what the expected source is.

In addition, the EA should discuss alternative water sources in more than the dismissive way they are treated in this document. There should be some ballpark estimate of the cost of bringing county water service to the garden and of the cost and feasibility of using well water.

5.6 Special Management Area

The statement is made that "none of the immediate improvements, except for signage are within the SMA." I do not believe this to be the case, and, in fact, was informed by the County Planning Department that this statement is not true. The Alakahi Stream dam, for example, is makai of the Mamalahoa Highway (as is the Onomea Stream dam). One of these improvements *is* included in the short-term (after-the-fact) section of the EA, while the other certainly should have been. Without a map indicating the limits of the SMA, it is impossible to know whether the walkways (including the path from the area proposed for garden employee parking) and the proposed rain shelters (all part of the short-term improvements) lie within the SMA. Such a map should be included in the EA.

In sum, the EA is seriously lacking in many regards and should probably be re-written altogether. In addition to the ridiculous errors (for example, at no point in any of the illustrations is "view" spelled correctly), there are other, more worrisome statements that appear intended to deceive readers and policy-makers.

The Hawai'i Tropical Botanical Garden does not have a distinguished record of cheerful compliance with state, federal, and county laws. That it should produce an EA of such low caliber doesn't give me much hope that there has been any change of heart in its administration. A better EA could only help improve the applicant's standing in the eyes of many in the environmental and regulatory community. As it stands, this one is simply not acceptable.

Sincerely,

Patricia Tummons

Patricia Tummons

cc: Gary Gill, director, Office of Environmental Quality Control
Cathy Tilton, planner, Division of Land Management, DLNR
Chris Yuen, member, Board of Land and Natural Resources
Virginia Goldstein, planning director, County of Hawai'i

Ka Lahui Hawai`i
The Sovereign Nation
P.O. Box 1256
Pahoa, Hawai`i 96778

March 11, 1996

County of Hawaii
Planning Dept.
25 Aupuni St.
Hilo, HI 96720

Gentlemen:
Re: Hawaii Tropical Botanical Garden

Ka Lahui Hawaii requests that you: proposal of Master Plan be established before any future work of this project. Please, no more improvements until you get your Master Plan approved. You are requesting eight (8) new improvements immediately. We Object.

Also, your fencing landscaping for future in the Master Plan.

Please send your EIS report on this project to the undersign.

Mahalo,
Clara L. Kakalia, National Chair, Vice Chair, and Chair, Hawaii Island

CJ49

Hawaii Stream Assessment

A Preliminary Appraisal of Hawaii's Stream Resources

Report R84

Prepared for

COMMISSION ON WATER RESOURCE MANAGEMENT
State of Hawaii

By

HAWAII COOPERATIVE PARK SERVICE UNIT
Western Region Natural Resources and Research Division
National Park Service

Honolulu, Hawaii

December 1990

EXHIBIT 5

JOHN WAIHEE
Governor, State of Hawaii

COMMISSION ON WATER RESOURCE MANAGEMENT
WILLIAM W. PATY, Chairperson
JOHN LEWIN, M.D.
MICHAEL J. CHUN, Ph.D.
ROBERT S. NAKATA
RICHARD H. COX, P.E.
GUY FUJIMURA

DEPARTMENT OF LAND AND NATURAL RESOURCES
WILLIAM W. PATY, Chairperson
Commission on Water Resource Management

MANABU TAGOMORI, P.E.
Deputy for Water Resource Management

NATIONAL PARK SERVICE
James Ridenour, Director

WESTERN REGION
Stanley T. Albright, Regional Director

DIVISION OF PLANNING, GRANTS AND ENVIRONMENTAL QUALITY
James Huddleston

RIVERS AND TRAILS CONSERVATION ASSISTANCE PROGRAM
Martha Crusius

Summary

The State Commission on Water Resource Management (CWRM) recognized the need for a broad-based collection of existing information on Hawaii's rivers and streams to help it make water protection and management decisions. The CWRM initiated the Hawaii Stream Assessment (HSA) through a cooperative agreement with the National Park Service's (NPS) State and Local Rivers and Trails Conservation Assistance Program. This program was established in response to the National Wild and Scenic Rivers Act, which encourages the NPS to assist states to consider needs and opportunities for establishing state and local wild, and scenic, and recreational river areas (Public Law 90-542, Section 11(a)).

The primary task of the HSA was to identify streams appropriate for protection. It makes no attempt to assess existing or potential offstream use. The HSA presents the conservation point of view.

The Hawaii Stream Assessment is to be used as a reference. The products are a physical inventory of Hawaii's 376 perennial streams and working maps; an assessment of resources associated with these streams; and a database.

The HSA will help policy-makers, resource managers, developers, scientists and the interested public to:

- Locate published information for a particular stream;
- Identify and prioritize areas where information is needed;
- Understand stream resources within a statewide context;
- Make management decisions based on data;
- Develop general stream resource protection guidelines;
- Identify specific streams appropriate for protection and enhancement.

This inventory and assessment is of a general nature, is incomplete, and does not take the place of any specific review and study normally required during the review process.

Study Process

The HSA consolidated considerable published information from diverse sources, data in government and private agency files, and, in some cases, information from knowledgeable people on Hawaii's streams and associated resources. The approach was modeled on a process developed by the NPS and used in more than 20 other states, but with certain modifications to meet Hawaii's unique needs. These modifications included 1) Streams were inventoried as complete units, as opposed to segments, and 2) Perennial was defined to include streams perennial in only part of their course.

A study team from NPS and Hawaii Department of Land and Natural Resources (DLNR) coordinated this effort, under the direction of a steering committee. An inventory of perennial streams and their physical characteristics was developed with the assistance of a Physical Resource Committee and a Water Supply Committee and was based on needs defined by potential users of the study. Four resource areas were also identified: Aquatic, Riparian, Cultural and Recreation. Resource committees composed of individuals with expertise in these areas were established. These committees developed the criteria used to assess stream resources and identified reliable sources of information.

Background

The state has a leading role in watershed ownership and management responsibility. Essentially all Hawaii's perennial streams arise in forest reserves or other state-owned areas. These streams provide unique and essential habitat for flora and fauna. Certain environments such as wetlands and estuaries are dependent on them. Their interface with the sea is critically important. Pre-historic cultures settled around water to take advantage of its benefits, which included irrigation, food, recreation and quiet enjoyment. Today's island inhabitants continue to derive these same benefits and more from streams.

Hawaii's streams are small and fragile. They can affect and be affected by action far beyond their boundaries. Instream flows may be affected by distant tunnels and wells; native fishes ten miles upstream by channelization at the stream mouth; runoff and erosion from the mountains and urban areas ends up on the reef and beaches. It is inappropriate to consider management of segments of Hawaii's streams in isolation. Rather, it is necessary to look at the entire stream within the context of its watershed.

Inventory

Perennial Streams

HSA compiled a list of 376 perennial streams using data from various sources. Over one third of these streams do not flow continuously from the mountains to the ocean but do have sections that are perennial. Most of the 376 streams are named but there is not always agreement on the name. Hawaii's streams are evenly distributed on Kauai, but on the other four main islands they are concentrated in certain areas, primarily the windward sides.

Monitoring

Gaging. Historic and current gaging data was collected from the USGS and included in the inventory. One hundred thirty nine streams have been gaged since 1909; 97 are currently gaged.

Water quality. Physical, chemical, biological and/or sediment water quality information has been collected for 65 streams, 14 of those sites are current. The source and type of data is included in the inventory but not the actual water quality results.

Modifications

Water supply. Some beneficial offstream use of streams is addressed, in particular large agricultural companies identified their use of 125 streams and county water suppliers 34 streams for municipal water. A full inventory and assessment must wait for the completion of the water use certification process.

Dams and diversions. The HSA inventory of dams and diversions was of limited scope. While a list of approximately 100 of Hawaii's streams with dams or diversions along their course are presented, the water use certification will be the definitive source of information.

Hydroelectric power. Existing, proposed and potential hydroelectric power projects have been inventoried. There are currently 18 operating hydroelectric plants that supply 1.5% of Hawaii's electrical energy. Eight more projects have been proposed.

Channelization. Approximately 20% of Hawaii's streams, and almost all of Oahu's streams, have been lined or straightened or otherwise channelized according to data collected from several government agencies and reports.

Special Areas

This category includes areas identified as having natural or cultural resources of particular value. These include estuaries, embayments, wetlands, recovery habitats, special management areas, natural area reserves, wildlife refuges and sanctuaries, private preserves, national natural landmarks, historic sites, research and educational sites, parks, and waterfalls.

Resource Inventory and Assessment

Aquatic Resources

Hawaii's streams support a small but unique aquatic fauna most of which have a life cycle involving both the stream and the sea. Of the 176 streams with biological information, seventy were ranked as outstanding based on the presence of certain native species thought to be indicators of high quality habitat. While it is important to note that studies are more often undertaken in larger, high quality streams, HSA found a positive correlation between good aquatic resources and larger streams and a lack of stream modification.

Riparian Resources

While many riparian values may not be directly stream-related, the quality of the riparian environment directly determines the quality of the stream and the nearshore waters. Native species, native forests, waterbird habitat and wetlands were inventoried and assessed due to a lack of watershed information. Thirty streams were ranked outstanding.

Cultural Resources

Archaeological resources, historic sites and current taro cultivation were inventoried. Only archaeological resources were assessed due to a lack of consistent and reliable data, The committee identified 94 streams as sensitive or highly sensitive to development and

named these outstanding. Although archaeological and historical sites correlate somewhat with stream size, their continued existence is not dependent on the condition of the stream. On the other hand, taro culture is dependent on the quantity of water.

Recreational Resources

Boating, camping, fishing, hiking, hunting, nature study areas, parks, scenic views, and swimming were all inventoried. Most of these activities take place from the banks and therefore access and riparian values are important. Eighteen streams were considered to have outstanding recreational resources statewide, 84 streams were ranked regionally (by island) outstanding. Good recreational resources were highly correlated with stream size and a lack of stream channel alteration.

Limitations

The HSA is a broad-based inventory and assessment of the majority of the instream uses described in the state water code. The study does not address important offstream uses of water, water rights, Hawaiian rights, economics, landownership, zoning or navigation, nor does it map or provide location information for the various resources or characteristics. It was based almost entirely on a literature search.

The resource assessment process is based on existing conditions, not past values or potential. Further, there is a higher degree of confidence about those streams ranked as Outstanding than with the other rankings. It may well be that some streams otherwise ranked would qualify as Outstanding if their resources were sufficiently understood. The ranking process should not be used to disregard those streams not ranked as Outstanding.

A rank of "unknown" was assigned to many streams when there was little or no published information available upon which to make an assessment. Streams with missing data should not be interpreted as without resources, but merely as without enough data to support a rank other than unknown.

The user of the report and database is advised to read the descriptions of the recorded data carefully to ascertain where, when and how the information was collected and to remember that this report is merely a snapshot of the state of Hawaii's streams in 1990, and is limited by the data available as of that time.

Hawaii's biological stream resources are not static entities. They can and do change. The information can become outdated quickly. Studies by various authors are not necessary consistent with one another.

Future Actions

Through the HSA a number of possible future actions have been identified.

- **Maintain and enhance the HSA,**
- **Develop long-term stream management strategies,**
- **Institute interim actions to preserve management options.**

Maintain and Enhance the Hawaii Stream Assessment

- **Initiate studies, workshops and development of master plans.**
  - Perform a network analysis of gaging and water quality monitoring programs.
  - Develop a research and management plan for watersheds.
  - Prepare a five year master plan for aquatic research.
  - Commission a statewide hydroelectric master plan.

- **Dedicate a CWRM staff position specifically and exclusively to conservation. The responsibilities of the "stream keeper" would include:**
  - Maintain HSA database;
  - Prepare reports with a conservation point of view for CWRM; and
  - Sponsor and encourage public involvement in stream conservation.

- **Request the Office of State Planning to make streams a theme of the state Geographic Information System.**

Develop Long-Term Stream Management Strategies

- **Adopt a Hawaii Stream Policy which provides that the important natural, cultural and recreational values of Hawaii's streams are protected.**

- **Establish a Hawaii Stream Plan with General Guidelines and a Protected Streams Program.**

General Guidelines

- Review development which affects a stream with reference to HSA resource assessments and special areas.
- Balance offstream water development with preservation of natural, cultural and recreational values.
- Incorporate appropriate types of action for watershed management.
- Consider biota in minimum instream flows.
- Control non-point source pollution.
- Assure publicly accessible stream-related recreational opportunities.
- Target streams with substantial recreational use for water quality enhancement.

Protected Streams

In response to the CWRM mandate to "identify rivers or streams or a portion of a river or stream, which appropriately may be placed within a wild and scenic river system, to be preserved and protected as a part of the public trust" a stream protection program should be established. HSA developed several approaches

toward the identification of streams and appropriate levels of protection. These are outlined in the Candidate Streams for Protection and Future Actions chapters.

Interim Actions to Preserve Management Options

- **Declare a moratorium on development of significant streams.**
- **Use HSA General Guidelines in the interim.**

Resource Inventory and Assessment

One purpose of this study was to identify those streams with the high value stream-related "beneficial uses." These were developed after extensive surveys of users. The first task was to categorize these uses, or "resources," into more manageable units.

- Aquatic Resources
- Riparian Resources
- Cultural Resources
- Recreational Resources

Committees were established to inventory and assess each resource area. The committees consisted of people knowledgeable in the resource area and a state official from the department responsible for the management of the resource.

Each committee identified the elements to be inventoried, and, using those elements, design the criteria for assessing streams. Recommended stream rankings were Outstanding, Substantial, Moderate, Limited, and Unknown. Each committee was given the option of using one or more of these ranks. The Aquatic Committee added a sixth ranking: Without.

The committees reviewed the assessment of the streams, which was based on the inventory data and the criteria, and made adjustments based on their collective expertise. The committees participated in the writing and approved the final report.

Every committee ranked streams reluctantly. The common concern was that users of the report would interpret all streams not ranked Outstanding as being unworthy of protection. This was not the design or intent of the Hawaii Stream Assessment, and neither this report nor the ranks should be used in that way. A ranking of Outstanding was based on good information being available. In some cases streams not ranked Outstanding may have resources as good as those classified as such, but were ranked otherwise because of incomplete or inadequate information. Therefore, it should be emphasized that this report and assessment is general in nature and is a first step. While it should serve as a flag for areas of concern, and may suggest where development might take place, it does not substitute for any review, survey or other study normally required of a project.

Finally, this inventory and assessment was the first attempt at such a task in Hawaii. The inventory elements and criteria represent each committee's best attempt to quantify and qualify enormously complex subjects, and the discussion of how and even if this could be accomplished was intense in every group. The committees did their best, and, after

more than a year of meeting, acknowledge that the results are useful and important, yet imperfect.

Members of the committees agreed to assess, knowing that not every stream in Hawaii can be protected for its stream-related values, but hoping that this study may help protect a few. If some are to be protected, they should be the best ones.

Aquatic Resources

Hawaiian streams support a small but unique aquatic fauna, including freshwater fish, mollusks, crustaceans, and insects. Although the diversity of native species in Hawaii's streams is low, most of those species are found only in the Hawaiian islands.

A number of these unique native stream animals have a life cycle involving both the stream and the sea. This type of life history, in which an animal lives its entire adult life in fresh water and its early larval period in the ocean, is called amphidromy.

The common perception among aquatic biologists is that Hawaii's native stream fauna is limited in abundance and distribution, however these characteristics are not well documented. Better understanding of the life history and habitat requirements of the native aquatic fauna is needed in order to manage the natural resources for their survival.

An inventory and assessment of Hawaii's native aquatic resources were needed to inform and assist managers of those resources. An advisory committee of aquatic biologists and resource managers was formed to obtain expert input on the design and development of such an inventory and assessment. The Aquatic Resources Committee was responsible for overseeing the inventory of the available information and the assessment of streams.

Although the habitat requirements of certain stream animals are not fully understood, the committee assumed that their presence indicated that conditions necessary for their survival were also present. Since at least some of the native species traverse or use the entire length of the stream in their life history, conditions on any part of the stream may affect these species. Therefore, the entire stream was considered important as a single unit and assessment of streams by segments was considered inappropriate.

An important first step for this inventory was a search of all available published literature, unpublished reports and field notes. The Board of Land and Natural Resources contracted with The Nature Conservancy's Hawaii Heritage Program to compile all the literature available on biological resources of Hawaiian streams. Personal observations were obtained from the committee and active aquatic biologists. A complete list of sources consulted is provided.

Available biological information for individual streams was entered on standardized data sheets, (Table 20)and then were entered into the HSA database.

The committee established assessment criteria to identify streams containing ecosystems with potentially high quality aquatic resources. They identified four key native species considered to be indicators of the health of the native aquatic ecosystem. The

assessment criteria were based on the presence and abundance of the indicator species, evidence of their spawning, and on unaltered stream conditions. Based on these criteria, streams were ranked as Outstanding, Substantial, Moderate, Limited, Without, Unknown. Aquatic insects were not considered only because their taxonomy and distribution are poorly understood.

Using the information in the data sheets, the Aquatic Resources Committee reviewed the rankings. In those few cases where the rank derived from the database conflicted with the committee's collective expert opinion, the committee adjusted the rankings.

Of 376 perennial streams, 164 (44 percent) have some biological information. Based on the committee's criteria, 73 streams are ranked outstanding, 19 Substantial, 36 Moderate, 27 Limited, 12 Without, and 212 (56 percent) Unknown.

Background

Prior to human habitation in the Hawaiian islands most continuous streams may have been occupied by one or more native stream species. Adult gobies and certain invertebrates breed in streams or estuaries, and the newly hatched larvae are swept out to sea where they become part of the marine zooplankton. After a protracted period of development the postlarvae enter stream mouths and begin a migration upstream.

Native Hawaiian stream species are often described as "current loving" (rheophylic). Their native habitats include clear, well-oxygenated stream water that flows over boulders, cobbles, and gravel. Gobiid gobies are uniquely adapted to life in turbulent coastal waters and streams, and have modified (fused) ventral fins that function as suction disks. This adaptation allows them to 'climb' waterfalls and colonize stream sections inaccessible to other fishes. Kinzie (in press) has summarized details on the taxonomy, life history, ecology, and management of amphidromous fishes, crustaceans, and mollusks found in Hawaiian streams.

The populations and distributions of amphidromous native stream animals have been reduced in modified streams, especially those in which the physical habitat, flow regime, water temperature and chemistry have been significantly altered. Studies by Timbol and Maciolek (1978) showed that 15 percent (55 of 366) of all perennial streams had been significantly altered by channel modification before 1978 and that the biological quality and condition of nearly 75 percent (275) of Hawaii's perennial streams had been degraded.

The introduction of non-native aquatic species, many of which appear to be highly successful competitors or predators, may have also reduced the original distribution and abundance of Hawaii's unique stream fauna in recent years. Oahu streams appear to be the most affected by stream alterations and introduced species.

Methods

Committee

The Aquatic Resources Committee consisted of seven aquatic biologists and resource managers. They directed all aspects of the inventory and assessment. The committee

approved the procedures for summarizing observations of aquatic fauna and habitat, developed ranking criteria for assessing the biological significance of individual streams, and reviewed all final ranks. They also provided bibliographies, reprints and access to files containing significant information sources on Hawaiian stream fauna.

Aquatic Resource Committee
Chair, Audrey Newman, TNCH
William Devick, DAR, DLNR
John Ford, USFWS
John Harrison, UH Manoa Environmental Center
Luciana Honigman, TNCH
Robert Kinzie, UH Manoa Zoology
James Parrish, UH Cooperative Fishery Research Unit

Inventory

A great deal of relevant literature on aquatic species exists, but it is widely scattered and highly variable. The inventory prepared by the Hawaii Heritage Program is based on literature made available to them up to February 1990.

All available information on the distribution and abundance of freshwater species on the five main Hawaiian islands (Hawaii, Maui, Molokai, Oahu, and Kauai) was compiled. The major references were the limnological surveys by Shima in the 1960s (Shima, unpub). More recent reports included surveys by Archer (1981, 1982, 1983, 1984, 1985), Archer et al. (1980), Ford and Kinzie (unpub.), Heacock (1984, unpub), Kinzie and Ford (1977, 1982), Maciolek (1971, 1972, 1977), Maciolek and Timbol (1981), Norton (1976, 1977), Timbol (1972, 1977, 1979, 1982, 1983, 1986), and Timbol et al. (1980a, 1980b). A complete list of sources consulted, including personal communications, is provided in the bibliography.

Due to the amphidromous nature of the life cycle of the native freshwater fauna and their presumed need to use the entire stream, each stream was considered as a unit, and not in segments. Types of information included in the inventory were presence, abundance and spawning of native species, occurrence and abundance of introduced species, habitat factors, and information sources. In this aquatic report the *u'ina* (glottal stop) is incorporated into the Hawaiian names of aquatic animals only.

Native Species: Eleven native species were classified into two groups, depending on their scarcity (Table 17).

Native Species Group 1 (NG1): Four native freshwater species were classified as "indicator species" and comprised the Native Species Group One (NG1). The committee considered these as representatives of potentially high quality stream ecosystems. They included three gobies and a mollusk. Of the four NG1 Species, only *'o'opu alamo'o* (*Lentipes concolor*) is listed by the USFWS (1989) as a candidate endangered species. However, the Aquatic Resources Committee believes that two other *'o'opu* (*Awaous stamineus* and *Sicyopterus stimpsoni*), as well as the *hihiwai* (*Neritina granosa*) may be declining in Hawaiian streams.

Table 17 Aquatic Species Groups

Native Species Group One (NG1)

Scientific name	Hawaiian name	Type
Awaous stamineus	'O'opu nakea	Goby
Lentipes concolor	'O'opu hinkole	Goby
	'O'opu alamo'o	
Neritina granosa	Hihiwai	Snail
Sicyoptenus stimpsoni	'O'opu nopili	Goby

Native Species Group Two (NG2)

Scientific name	Hawaiian name	Type
Atyoida bisulcata	'O'pae kala'ole	Shrimp
Eleotris sandwicensis	'O'opu okuhe	Eleotrid
	'O'opu akupa	
	'O'apu oau	
	'O'apu owau	
Kuhlia sandvicensis	Aholehole	Kuhliid
Macrobrachium grandimanus	'O'pae 'ocha'a	Prawn
Mugil cephalus	'Ama'ama	Mullet
Stenogobius genivittatus	'O'opu naniha	Goby
Theodoxus vespertinus	Hapawai	Snail

Introduced Species Group One (IG1)*

Scientific name	Common name
Cichlasoma nigrofasciatum	Convict cichlid
Clarias fuscus	Chinese catfish
Corbicula fluminea	Clam
Gambusia affinis	Mosquito fish
Macrobrachium rosenbergii	Malaysian prawn
Micropterus dolomieu	Smallmouth bass
Poecilia spp.	Guppy (Limia, Topminnow)
Tilapia (*Sarotherodon*, *Oreochromis*) spp.	Tilapia
Xiphophorous spp.	Swordtail

* *Macrobrachium lar* is excluded because it is believed to be present in nearly all Hawaiian streams

Introduced Species Group Two (IG2)

All those species not listed in IG1; considered innocuous or accidental.

Native Species Group 2 (NG2): The other seven native species considered more common comprised Native Species Group Two (NG2). These included two stream and two marine fishes, one shrimp, one prawn, and one snail. Presence of these species was considered to be typical of a healthy native stream ecosystem.

Introduced Species: The committee divided the introduced (non-native) species into two groups depending on their potential threat to native species.

Introduced Species Group One (IG1): This group included noxious, non-native stream animals that may prey upon and/or out-compete with native species. *Macrobrachium lar*. (Tahitian prawn), was not included in this group even though it may pose a threat to native stream animals because it is believed to be present in almost all Hawaiian streams. Thus, no stream is "pristine" and the presence of *Macrobrachium lar* cannot be used for comparing stream quality.

Introduced Species Group Two (IG2): This consists of the non-native species considered to be innocuous to Hawaiian streams.

Data Sheets: Available biological information compiled for each stream was summarized in a three-page data sheet (Table 20). These data sheets included the presence and abundance of both native and introduced species. When available, physical information was included. The total numbers of native species observed were then summarized by group (NG1 and NG2) and were this way used to rate the abundance and diversity of native species in the stream.

The second page of the data sheet contained information on presence and abundance of introduced species.

The Factor Summary Table on the third page of the data sheet noted the total number of native and introduced species, along with ratings for diversity, spawning and recruitment, habitat quality, dams, diversions and channelizations (Table 20).

Assessment

To assess and compare the biological quality of individual streams, the Aquatic Resources committee developed a ranking system based primarily on the presence and abundance of the four native species believed to be indicators of potentially outstanding habitat.

Little information is available on aquatic habitat. Because of the data available, almost the only criteria that seemed to be applicable broadly across most streams, were biological, ie. based on presence and abundance of the various species. In large measure, this accounts for the specific criteria chosen for Outstanding (and other) categories.

Concern about the scarcity of *Lentipes concolor* seemed to make any stream where it is at least common a potentially very important resource, i.e. Outstanding.

Observation of egg mass or gravid females constitued evidence of spawning. While it is likely that frequent spawning by NG1 gobies occurs in many streams, not enough about their biology is known to say. Until or unless it becomes clear that there are many such

streams for all the NG1 species, any that are known must be considered especially valuable, i.e. Outstanding.

While there are a good many streams where NG1 species are reported, there are relatively few where each individual species is reported as abundant. Each species is important because of its relative rarity. Abundance suggests strongly that populations are well established and are more likely to be reproducing locally, as opposed to being composed of strays or ephemeral groups. Therefore, the relatively few streams with known strong populations of any NG1 species are very valuable, i.e. Outstanding.

All four NG1 species are reported in relatively few streams. The requirements of some species seem rather different. The presence of all four species suggest high quality habitat, i.e., Outstanding.

Aquatic Resources Ranking Criteria

Outstanding
Either A or B
A. Any of these criteria
-*Lentipes concolor* is common in any reach of the stream.
-Evidence of spawning by any of the NG1 gobies.
-An abundance (abundant or very abundant) of any of the four rare NG1 species anywhere in the stream. (This might indicate special significance for spawning.)
-Presence of all of the four NG1 species in the stream.

B. All of these criteria
-Two or more representatives of NG1 and NG2 each, representing high native species diversity.
-One or fewer IG1 introduced species
-No dams, diversions, or channelization.

Substantial
Both A and B
A. At least three total representatives from NG1 and NG2.
B. One or fewer introduced species IG1.

Moderate
Presence of at least one native species from NG1.

Limited
Presence of at least one NG2.

Without
No native species present.

Unknown
Insufficient biological information available for the stream.

Individual streams were then assigned to one of the six ranking categories. To apply these criteria to large stream systems, observations of the main stream and its tributaries were summarized together, and the highest rank earned by any segment of the stream was assigned to the entire stream. This procedure represents a simplification of the real system, but it acknowledges that amphidromous species may use much of a stream system at some life stage and require suitable habitat there. Other limitations to the assessment are discussed at the end of this report.

The Aquatic Resource Committee reviewed the initial rankings. In a few cases, where appropriate, it changed the rank based on personal observations as well as habitat quality.

Results

Inventory

Biological information was obtained for 178 streams, 45 percent of Hawaii's total of 376 streams. All except 18 of these studies were conducted on continuous streams. Of the total number of streams studied, 63 (K16, O28, Mo2, Ma12, Hi5) were surveyed since 1984, and 122 since 1974 (K36, O29, Mo5, Ma27, Hi25). NG1 species were found to be present in 111 of these streams. Only 6 streams had any records of spawning and only 16 of spawning and/or recruitment, possibly because these events are extremely difficult to observe.

The records of dams, diversions and channelization in the aquatic resources report were taken exclusively from the biological reports, although better sources for this information exist. The Hawaii Stream Assessment has more complete information about these modifications from other sources. Much of the literature suggested that the presence of these modifications may negatively affect native aquatic habitat. Modification information is included in the database for further correlation work. (Tables 7, 10)

Assessment

Of the 178 streams with biological information, 74 fulfilled the criteria for Outstanding. Breaking that down according to specific criteria, the results are as follows: *Lentipes concolor* was common in 44 streams. NG1 were abundant or very abundant in 47 streams (K12, O5, Mo4, Ma15, Hi11), and spawning of NG1 fish was observed in 6 streams. All four NG1 species were recorded in 20 streams. (K10, O0, Mo2, Ma 6, Hi2). Criteria B, which took diversity and habitat into account, was met by 12 streams.

Discussion

Continuous perennial streams are the principal habitat for native stream species. Extensive water development is incompatible with outstanding aquatic resources. The maps and data suggest that outstanding aquatic resources tend to be concentrated in the less developed areas, particularly the north shores of Kauai, Molokai and a small section of Oahu, and several areas on Maui. Survey coverage summarized in this report is geographically more complete for Oahu, Kauai and Maui than for Molokai and Hawaii.

While the concern about the viability of native aquatic species is high, scientific information to guide management efforts is limited. The Aquatic Resources committee endorses Robert Kinzie's expression of concern related to stream management:

> A serious deterrent to the formulation of rational management practices for native amphidromous species is the lack of knowledge of their population biology, larval life history, and genetic structure. Two possible extreme scenarios illustrate the problems involved. In the first instance, while a species may

be found in both large and small streams, only a few or even one breeding population may be responsible for the bulk of the reproductive output of the entire species. In this case, habitat destruction in the majority of the streams would have little impact on the species as a whole, but any degradation of the primary breeding stream could be disastrous. Because so little is known about the genetic structure of any of these species or about the ocean current patterns among the islands, we could not identify which streams would be the important ones if this scenario were true.

At the other extreme, it is possible that each stream with a population of adults contributes recruits to the total species pool in proportion to the adult population size, modified by chance events including unusual streamflow events, offshore currents, and conditions at potential settling sites. In this case, reduction of the suitability of any stream would reduce the reproductive potential of the total population in proportion to the reduction in numbers of adults in the stream.

The actual situation probably lies somewhere between these two extremes, but because of an almost total lack of information, judgements cannot be made about the relative expendability of any potential breeding population. Given this situation, the most careful review should be given to any proposed action that could potentially interfere with the link between the freshwater habitats and the sea. Because we cannot evaluate the potential effects of an action on the species, extreme caution is advised in each instance where any of the native populations are threatened by a proposed activity, particularly in the critical lowland elevations (Robert A. Kinzie III, Amphidromous Macrofauna of Island Streams, 1990).

Similar concerns apply to the aquatic environments that form the interface between streams and the sea. There are no comprehensive studies to define the biological significance for stream fauna of estuaries and embayments. However, the available evidence and general ecological experience suggests that these environments provide important habitat for marine and migrating freshwater animals. A list of estuaries and embayments (Table 14) is in the Special Areas section of this report.

These stream ranking criteria simplify the many complex factors important to native stream ecosystems. For example, physical characteristics may be very important predictors of stream habitat quality for native species. However, it was not possible to use these characteristics uniformly as criteria, because the available information was limited and inconsistent. The presence of aquatic insects was also not considered, as their distributions are not well understood.

While the presence of native species is a good indication of valuable resources, their absence during a limited survey may not mean that they are absent from the stream. Some of the surveys are old and may not reliably indicate the current status of the stream. Others are very selective in their scope, and do not provide complete data for the scope of this study. There is no information for over half of the perennial streams. The percent of coverage for continuous perennial streams, however, is much higher. Therefore, it is important to note that the available data provide only a limited view of the actual distribution of stream animals.

A stream might be inappropriately ranked Limited because only a few species were seen on a single survey, and might actually qualify for higher rank. In contrast, an Outstanding stream is clearly indicated by its high reported species diversity or abundance.

Spawning and recruitment events are unpredictable in time and sometimes occur during periods of flooding, when observation is difficult or hazardous. Thus, the limited observations of spawning and recruitment cannot be interpreted as a statement about the frequency or distribution of these events, only that the information has not been collected.

This Aquatic Resources report represents a summary of available surveys and observations of Hawaiian streams. It should not be construed as a reliable assessment of the quality of stream habitats or of the occurrence and distribution of biota within or between streams. It is not the final arbiter of the biological importance of a given stream. It should not be substituted either for needed research or the proper biological reconnaissance surveys that should be performed and carefully reviewed before development is seriously considered. It is instead a document that should provide valuable source material for future research and for evaluation of potential impacts from developments.

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Figure 3 Native Aquatic Species Illustrations

Eleotris sandwicensis,
'o'opu okuhe or
'o'opu akupa

Figure 1. Eleotris sandwicensis 8.5-cm (SL) male

Figure 2. Stenogobius genivittatus 8.5-cm (SL) male

Stenogobius genivittatus,
'o'opu naniha

Awaous stamineus,
'o'opu nakea

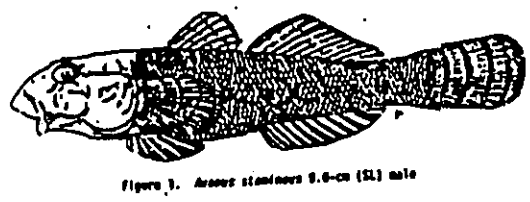

Figure 3. Awaous stamineus 9.6-cm (SL) male

Sicyopterus stimpsoni,
'o'opu nopili

Figure 4a. Sicyopterus stimpsoni 8.5-cm (SL) female

Figure 4b. Sicyopterus stimpsoni 8.5-cm (SL) male

Lentipes concolor,
'o'opu alamo'o or
'o'opu hi'ukole

Figure 6a. Lentipes concolor 6.0-cm (SL) female

Figure 6b. Lentipes concolor 5.0-cm (SL) male

Macrobrachium grandimanus,
'opae 'oeha'a

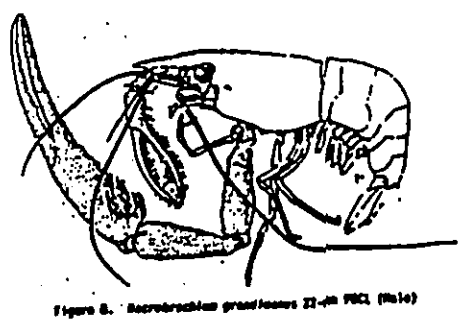

Figure 8. Macrobrachium grandimanus 22-cm POCL (Male)

Atyoida bisulcata,
'opae kala'ole

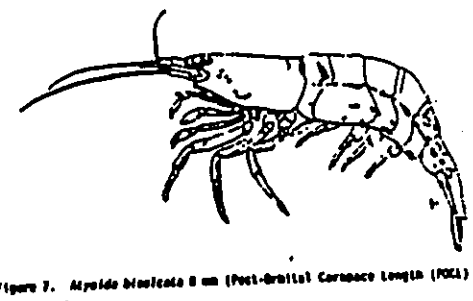

Figure 7. Atyoida bisulcata 8 cm (Post-Orbital Carapace Length (POCL)

Neritina granosa,
hihiwai or wi

Figure 10a. Neritina granosa dextrosum morph 2-cm shell width

Figure 10b. Neritina granosa sinistrum morph 2-cm shell width

Neritina vespertina,
hapawai

Figure 11. Neritina vespertina 1.0-cm shell width

Source: Kinzie, R.S., III, 1989, Species Profiles.

15 April 1996

MEMORANDUM

TO: Bill Devick
FR: Bob Nishimoto
RE: Stream survey: Alakahi and Onomea streams, Hawaii Island

On March 6, 1996 Division personnel conducted an underwater visual survey of the lower sections of Alakahi and Onomea Streams, from the river mouth to the Old Mamalahoa Highway. We used the DAR Point-quadrat survey technique to census the macroorganisms in these streams.

A total of 13 qudrats were sampled in Alakahi stream, ranging from sea level (0 ft.) to 110 ft. elevation. The *aholehole,* a nearshore estuarine species, occurred in the lower stations. The fishes were all juveniles ranging in size from 1 - 2.5 inches total length (TL). Both lower elevation native gobies were also present (*o'opu akupa* , *o'opu naniha*) but were relatively uncommon. The *akupa* was large, averaging 6.5 in. TL. There was only one *naniha* observed. This species prefer the lowest stream section in quiet waters and preferably a sand bottom. The most common goby in this stream was the *o'opu nakea*, a mid-level stream occupant. It occurred in about 20% of the sample quadrat and ranged in size from 2.0 to 5.0 in. TL. The upper-level goby, *o'opu nopili*, was observed in only 1 quadrat. This species prefer a high gradient stream with fast flow. The most common stream organism, by far, was the introduced Tahitian prawn, Macrobrachium lar. They were present in about 86% of our sample quadrats. These prawns, unlike the native *'opae*, prefer a pond habitat.

The lower stream section of Onomea stream, from sea level to 165 ft. elevation, was surveyed. A total of 20 randomly selected quadrats were sampled. Like Alakahi stream, *aholehole* occurred at the stream entrance and were all juveniles, ranging in size from 1.5 to 2.0 in. TL. *O'opu nakea*, common in Alakahi stream, was observed in only one sample. On the contrary, the *o'opu nopili* was very abundant, occurring in 45% of our samples. The Tahitian prawn was not as abundant as in Alakahi stream, occurring in only 40% of the sample quadrat.

All the native gobies, except *o'opu alamo'o*, were present in these streams. The *alamo'o* commonly occurs in the higher elevations in

EXHIBIT 6

streams without a terminal waterfall, such as the Alakahi and Onomea. We plan to survey the upper reaches of these streams in the near future.

Robert Nishimoto jr.
ROBERT T. NISHIMOTO

xc: David Higa
Katherine Luga, Esq.
Scott Lucas

MAULILI
KUKUIKEA
Kawainui
KAWAINUI
Stream
Falls
ONOMEA
Onomea
(Site)
KAHALII
Alakahi
ALAKAHI
Stream
Hanawi
Stream
MOKUONIKI
PUUMOI
Graves
Kalaoa
KALAOA
Stream
Water Tank
ALEAMAI
Kaieie
Stream
KAIEIE
AIEIE HOMESTEADS
PAIHAALOA
Stream
HOMESTEADS
Kuwaukalepa
KAAPOKO
Kalaniānaole Sch
Papaikou
Res
Lae O Puni
Onomea Stream
Alakahi Stream
Onomea Bay
Hokeo Poir
Kukui Po
Heeka Point
Koili Point
T9L
T42
T10
T33
T12
T28
T93.2
T22

Table 1. Table of common and scientific names of macroorganisms surveyed at Alakahi and Onomea streams, March 6, 1996.

COMMON NAME	SCIENTIFIC NAME
O'opu akupa	Eleotris sandwicensis
O'opu naniha	*Stenogobius hawaiiensis*
O'opu nakea	Awaous guamensis
O'opu nopili	Sicyopterus stimpsoni
O'opu alamo'o	Lentipes concolor
'Opae kuahiwi	Atya bisulcata
Tahitian prawn	Macrobrachium lar

The Orangeblack Hawaiian Damselfly, *Megalagrion xanthomelas* (Odonata: Coenagrionidae): Clarifying the Current Range of a Threatened Species[1]

DAN A. POLHEMUS (Hawaii Biological Survey, Bishop Museum, P.O. Box 19000, Honolulu, HI 96817, USA)

Introduction

The Orangeblack Hawaiian Damselfly, *Megalagrion xanthomelas* Selys-Longchamps, formerly occurred in lowland aquatic habitats throughout all the high Hawaiian Islands. Although common at the turn of the century, the species began to experience a progressive decline after World War II, and by the early 1990s had not been seen on Oahu for over 20 years. This fact, coupled with the extensive alteration of lowland habitats in which the species formerly bred, led Polhemus (1993) to conclude that the species was probably extirpated on Oahu when he reviewed the conservation status of *Megalagrion* species for the U. S. Fish and Wildlife Service (USFWS). Based on this assessment, plus the apparent extirpation of the species on Kauai and Maui as well, USFWS (1994) proposed that *M. xanthomelas* be listed as a Threatened species and given protection under the Endangered Species Act.

Given this, it was of great interest when a remnant population of *M. xanthomelas* was discovered in the course of an environmental survey conducted by personnel from the Hawaii Biological Survey in March 1994 at the Tripler Army Medical Center (TAMC), on the outskirts of Honolulu. This population, so far as is known, is the last remaining colony of *M. xanthomelas* on Oahu, and thus a priority target for conservation efforts. The existence of the population was noted in a report to the R.W. Towill Corporation of Honolulu (Evenhuis & Cowie 1994); this report also concluded that the insects were confined to a small gully near the greenhouse at the lower end of the TAMC site, in an area that had the potential for being impacted by proposed construction activities further upslope. It was recommended that in order to ensure the continued survival of the TAMC *M. xanthomelas* colony the population should be relocated to a nearby site that would not be subject to construction impacts or other activities taking place on the TAMC grounds, a task that has recently been accomplished through the construction of an artificial refugium

In order to properly design the refugium for the TAMC population, it was necessary to conduct a detailed investigation of the biology of *M. xanthomelas*, which was poorly known at the time. This involved both detailed studies at TAMC (to be reported in a separate publication), and investigations at sites on other islands where populations of *M. xanthomelas* were still known to persist. This report details the results of those surveys, providing a statewide conservation assessment of this increasingly rare species.

Taxonomy and Historic Distribution of *Megalagrion xanthomelas*

Megalagrion xanthomelas was described by Selys-Longchamps (1876) based on specimens collected by G.F. Matthew of the Royal Navy, and labelled "Sandwich Islands", with no specific island within the group noted on the labels. The location of Selys-Longchamps' types is not currently known, although they may be in the Koninklijk

1. Contribution No. 1996-003 to the Hawaii Biological Survey.

Belgisch Instituut voor Natuurwetenschappen, in Brussels. The species has not been confused with others since its original description, thus its taxonomic history is relatively simple and devoid of synonyms.

The original distribution of *M. xanthomelas* within the Hawaiian Islands is a matter of some speculation. It seems unlikely that the species ever inhabited the small, dry island of Kahoolawe, and its presence on Kauai is open to question, although a single specimen is present from nearby Niihau (see below). Perkins (1899) stated that *M. xanthomelas* "Probably occurs all over the islands", despite the fact that he lacked any collections from Kauai and Lanai. Kennedy (1917), probably following Perkins' statement, listed *M. xanthomelas* from Oahu, Molokai, Maui, Hawaii, Kauai and Lanai, even though once again there were apparently no specimens at hand supporting the latter 2 records. It was only in 1993 that specimens were finally captured on Lanai (Polhemus 1993); and to date the species has never been taken on Kauai.

The ecology of *M. xanthomelas* was discussed anecdotally by Williams (1936), who also illustrated the immatures. They appear to have formerly bred in impounded sections of lowland streams, and in both natural and artificial ponds. The ability of this species to exploit artificial habitats was noted by Perkins (1913), who observed that *M. xanthomelas* was:

> "a common insect in Honolulu gardens and in lowland districts generally, not usually partial to the mountains, though in the Kona district of Hawaii it is common about stagnant pools up to an elevation of about 3000 feet. It is very numerous under conditions changed from the natural; perhaps it now finds more numerous breeding places, and a more abundant prey in the numerous insects that have been introduced by man in the region it frequents."

Williams (1936) also noted that *xanthomelas* bred abundantly in sugar plantation reservoirs at Waianae. Zimmerman (1948), by contrast, remarked that the introduction of *Gambusia* topminnows "has changed the lowland situation considerably in recent years, however, and the species is much less abundant than formerly."

The decline in populations of *M. xanthomelas* noted by Zimmerman in the years after World War II has continued to the present day. The species is now apparently extirpated on Maui, with no records from that island for the last hundred years, and reduced to single known population on Oahu (at TAMC). Molokai is known to support 4 populations, and the species is abundant in artifical golf course ponds on Lanai, although elsewhere on that island it retains only a tenuous foothold in small remnants of its former natural habitat. Only on Hawaii Island is the species still truly widespread, being commonly found in the coastal wetlands of the Puna, Kau and Kona districts.

In the sections below, the current distribution of *M. xanthomelas* is discussed on an island by island basis. The terminology used to describe aquatic ecosystems follows Polhemus *et al.* (1992).

Niihau

A single specimen of *M. xanthomelas* is in the Bishop Museum (BPBM) bearing a Niihau label, collected by L.D. Tuthill on 16 August 1947. No specific locality is given, but the specimen was probably collected along the margin of Halulu Lake, a permanent mixohaline pond fed by basal spring outflows, or from one of the perched springs that occur at Kaali and in Waiokanaio Gulch.

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Kauai

Although *M. xanthomelas* was listed as occurring on Kauai by Kennedy (1917), there are no extant specimens from this island. The presence of the species on Niihau and Oahu, however, makes it virtually certain that it once occurred on intervening Kauai as well, even during historic times. The extensive alteration of basal spring wetlands on this island, particularly those formerly existing on the Mana plain near the present town of Kekaha (which were filled and converted to sugarcane cultivation beginning in the 1920s), appears to have led to the local extirpation of *M. xanthomelas* on Kauai. An extensive search by John Maciolek of the USFWS in the late 1970s failed to uncover any evidence of this species, and subsequent damselfly surveys on the island have been similarly unsuccessful in locating any populations.

Oahu

Tripler Army Medical Center

The present and historic distribution of *M. xanthomelas* on Oahu is summarized in Figure 1. As noted in the introduction, only a single population of this species is known to remain on the island, at the Tripler Army Medical Center (TAMC) on the outskirts of Honolulu. This population occupies a small gully shaded by koa haole (*Leucaena leucocephala*), with a bedrock channel that in this reach forces the base flow to the surface, creating a series of small pools connected by short, shallow runs. The flow into this reach originates from a 48-inch concrete pipe that drains the area around the main hospital buildings upslope, and disappears downslope into a similar culvert, making the Tripler habitat a small island of relatively natural stream channel within a sea of surrounding development. The survival of *M. xanthomelas* at this site appears to have been paradoxically favored due to the presence of the culverts, which have acted as filters to the introduced fishes that are abundant in the lower section of Moanalua Stream into which the Tripler gully eventually drains.

The *M. xanthomelas* population at TAMC appears to be a remnant of much larger and more continuous populations that formerly occupied the wetlands along the inner margin of Pearl Harbor. Five large basal springs previously emerged from the Koolau Aquifer in this area, these being from east to west the Kalauao, Waiau, Waimano, Waiawa and Waikele springs. The combined discharge of these springs in 1932 was over 80 million gallons a day (Stearns & Vaksvik, 1935), and their outflows formed extensive limnetic and mixohaline wetlands. The above authors noted that these springs issued forth in low, swampy areas along the margin of Pearl Harbor and were affected by tides. Similar types of habitats on Hawaii island currently support large populations of *M. xanthomelas*, and the former presence of this species in the Pearl Harbor area is confirmed by specimens in BPBM and the University of Hawaii.

A search was made of these Pearl Harbor springs for *M. xanthomelas* during damselfly conservation status surveys funded by USFWS, and the results are germane to the present study, since they indicate the absence of other *M. xanthomelas* populations in proximity to TAMC. The closest of the springs to TAMC is the Kalauao Spring, which now forms a watercress farm lying between the Kamehameha Highway and the Pearlridge shopping mall. This spring has been extensively modified by watercress cultivation, and contains large numbers of introduced fish and prawns. A search for *M. xanthomelas* here on several occasions during 1994 and 1995 proved fruitless. The Waiau Spring lies immediately upslope of the Kamehameha Highway and behind a Zippy's restaurant. It is also given over to watercress cultivation, and contains numerous introduced fish species. The Waimano Spring formerly emerged at the site now occupied by the Waiau electrical generating station, built in 1945, which exploits the spring's water for cooling. The Waiawa Spring lies below a bluff occupied by the Leeward Community College, in a degraded area containing the Pearl City Peninsula landfill, a highly contaminated EPA Superfund site; it too supports watercress production, and forms an extensive wetland on its seaward side that has yet to be completely surveyed. The Waikele Springs emerge from the east bank of Waikele Stream upstream from the H-1 freeway bridge; these springs are partially diverted by the Oahu Sugar Company, although significant outflows still emerge, providing the majority of base flow in the terminal reach of Waikele Stream. This area was intensively surveyed by Englund (1993), who found high densities of tilapia, *Rana catesbeiana*, and other introduced aquatic vertebrates, but no indication of *M. xanthomelas*. Based on current knowledge, it thus appears that all the basal spring wetlands in the Pearl Harbor area that formerly could have supported *M. xanthomelas* are now physically altered or biologically degraded to the point that they no longer harbor this species. Examination of *M. xanthomelas* specimens in BPBM shows that the last date of collection for this species at Waipahu was in 1925, although a specimen was taken at Pearl City as late as 1977.

Basal spring wetlands similar to those that occurring at Pearl Harbor are also present on the north shore of Oahu to the east of Haleiwa, near the mouth of the Anahulu River. One of these wetlands, surrounding Emerson Spring, is still relatively intact, although it is now traversed by the recently constructed Haleiwa Bypass highway project. An investigation of these wetland systems by Adam Asquith of the USFWS in early 1995 found them to be dominated by alien aquatic species, and to lack populations of *M. xanthomelas*, although specimens taken at Waialua in 1892 are present in BPBM.

Recent surveys thus indicate that *M. xanthomelas* has been extirpated from suitable lowland habitats throughout Oahu, and reinforce the view of the Tripler population as an isolated remnant that has survived through fortuitous circumstances. Since some of the basal spring wetlands formerly occupied by this species still exist, it might be possible in the future to reintroduce this species to suitably managed sites in the Pearl Harbor and North Shore areas, provided that the Tripler population can be maintained in the interim.

Molokai

Pelekunu Valley

Pelekunu Stream is a swift, rocky, perennial stream that begins as a set of plunging streamlets at elevations near 120 m on the sheer northern face of the Molokai Crest. The catchment takes the form of a giant bowl, ringed by peaks including Kaunuohua, Olokui and Kamakou, the latter at 1515 m being the highest point on Molokai. The headwater reaches are nearly vertical, with the stream profile making an abrupt transition to a more moderate gradient at ca. 915 m elevation, which is interpreted as the head of the midreach. From this elevation downstream to the mouth the channel exhibits a moderate but continuous gradient, with numerous riffles and small cascades, and thus retains a midreach character completely to its seaward terminus.

The extreme lower section of Pelekunu Valley consists of a vegetated debris fan, laced by various stream channels that are continually cut off and reoccupied. These aban-

doned channels in many cases contain pools with weak flow that are fed by seepage through the pore spaces in the coarse surrounding alluvium. At the mouth of the stream the debris fan forms a transverse barrier of water-rounded rocks and cobbles, behind which the stream pools to form a small pond before entering the sea via a small rapid. The size of the terminal pond varies according to spates and other stream fluctuations, and at certain times of year a black sand beach is also exposed seaward of the cobble bar that impounds it.

Further upstream at the head of the debris fan the bed narrows and vertical walls of coarse volcanic conglomerate occasionally confine the channel. The basic channel substrate throughout this terminal section consists of rounded cobbles averaging 20–40 cm diameter, alternating with beds of coarse gravel. Except for the large pool at the mouth, the stream profile is composed primarily of erosional zones formed by rapids and riffles. In the first kilometer upstream from the mouth numerous streamlets and rheocrenes enter from the east bank off the steep flanking wall of the Olokui massif, forming swampy areas at the base of the eastern valley wall. To the west of the stream mouth is an extensive complex of abandoned taro fields, now dry and heavily overgrown by introduced grasses.

During an initial visit to lower Pelekunu Valley in 1991, the author captured individuals of *M. xanthomelas* along the margins of the terminal pond formed behind the cobble bar at the stream terminus (Polhemus 1991). This bar was high enough and steep enough that the waves did not overtop it, and thus retained a limentic character despite its proximity to the sea. The adults observed here did not range far from the pond, flying low and perching amid vegetation on the stream margins which offered protection from the sea breeze, and since the species was not encountered elsewhere in the lower valley it was assumed that this terminal pond was the breeding site.

This area was revisited in late August of 1995 and showed a number of changes from its aspect in 1991. The alluvial delta bordering the terminal pond was now heavily overgrown with tall stands of Job's tears (*Coix lachryma-jobi*), and the riparian vegetation further up the valley was also much denser. This revegetation appears to indicate recovery from a major flood that took place immediately prior to the initial 1991 survey. The stream channel itself also exhibited a different configuration, splitting into a D-shaped loop just before its seaward terminus. The previously ponded section now occupied a small area along the outside curve of the D near the point where this side branch rejoined the main channel. The pond, which in its present configuration could more properly be considered a deep, flowing pool, was bordered along its seaward side by the terminal cobble bar covered with *hunohono* (*Commelina diffusa*), along its eastern side by a steep bedrock face, and along its remaining margins by cobble bars overgrown with Job's tears and Guinea grass (*Panicum maximum*). The pond was measured and found to be 11 m in length and 9.5 m in width, with an inflow width of 5.3 m. The maximum depth of the pond was 1.4 m, and the depth at the inflow was 0.5 m. The substrate of the pond consisted of stream-rounded rocks and cobbles sitting on coarse, dark gravel. The water chemistry of this site is summarized in Table 1.

Megalagrion xanthomelas was found once again at the mouth of Pelekunu Valley during the 1995 survey, but only in a small area along the seaward margin of the reduced terminal pond. At least 4 males were observed perching amid marginal vegetation and making short forays over the open water; no females were seen. A detailed search was made of the leaves of the *honohono* that bordered the pond but no oviposition scars were found, although tissues of this plant are known to be a favored oviposition sites for *M. xanthomelas* at TAMC. Other Odonata co-occurring with *M. xanthomelas* at the terminal pond included the introduced damselfly *Ischnura ramburii* (Selys-Longchamps), which was not seen during the 1991 surveys and may be a recent invader in the valley, and the indigenous dragonflies *Anax junius* (Drury) and *Pantala flavescens* (Fabricius).

Of particular note at Pelekunu was the short time duration of *M. xanthomelas* activity during the day. When the survey team arrived at 0900, the weather was clearing after a brief rain shower and the sun was just rising above the rim of the Olokui massif. Although fair and sunny conditions prevailed for the next several hours after this, no *M. xanthomelas* were observed. In the absence of any activity, surveys were made a short distance up the main stream to see if populations might be present there, but none were found, although 3 other *Megalagrion* species, *M. pacificum* McLachlan, *M. blackburni* McLachlan and *M. hawaiiense (McLachlan)*, were observed. The survey party returned to the pond area at ca. 1130 and at this point found adult *M. xanthomelas* to be active, allowing the capture of several specimens. By 1230, a brief shower passed over and activity ceased. Although the remainder of the day was characterized by alternating periods of sun and light showers, no additional *M. xanthomelas* were observed. At this site the total duration activity on the day that surveys were made thus appeared to be ca. 1 h during midday when the valley received its most direct sunlight. This preference for high light conditions corresponds to similar observations made at the Koele Lodge on Lanai (see following section).

Waikolu Stream

Waikolu Stream is a swift, rocky perennial stream occupying an elongate, sheer-sided valley on the northern, or windward, side of eastern Molokai. As in nearby Pelekunu Valley, the Waikolu drainage begins with a steep headwall section dropping rapidly from an encircling rim at ca. 1067 m elevation to the beginning of the midreach at ca. 305 m elevation. This midreach section continues for several km to the stream mouth, following a moderate gradient with numerous small waterfalls and rapids, with the stream entering the sea across a steeply sloping cobble bar. The stream profile throughout the midreach is thus composed primarily of erosional zones, along with a few deep pools found primarily below old water diversion structures, and in the area immediately behind the cobble bar at the stream terminus. The basic channel substrate throughout the mid- and terminal reaches consists of large stream-rounded boulders averaging 1–2 m in diameter, alternating with beds of cobbles and coarse gravel. The stream is shaded in its upper reaches by a closed canopy forest of kukui and guava, but becomes progressively more open as one proceeds downstream. Numerous small tributary rivulets and rheocrenes enter along the midreach, particularly in the area immediately below the pumping station. These spring fed ecosystems provide stable aquatic habitats that are not subject to the sudden and unpredictable variations in discharge rate that characterize the main stream, and thus support diverse aquatic insect communities including some taxa not commonly seen along the main channel. Water temperatures in along the main channel sampled range from 18 °C at 180 m to 21 °C at 80 m, while the water temperature in the spring fed tributaries is 19 °C (Polhemus 1992).

Individuals of *M. xanthomelas* were observed by Adam Asquith along the terminal reach of Waikolu Stream at midday on 19 July 1995. The insects were not abundant, and

flew along the margins of five slow, shallow stream pools lying behind the terminal bar. In general aspect this habitat is thus very similar to Pelekunu.

Palaau Wetland

An extensive basal spring wetland is present at Palaau, 3 km east of Kaunakakai on the southern coast of central Molokai (Fig. 2). At least 6 individual spring outflows of varying sizes are present in this area, many being marked by stands of bulrushes (*Schoenoplectus* sp.), bordered peripherally by expanses of pickleweed (*Batis maritima*), and others emerging along the margins of shallow coastal basins to form large, horizontally stratified mixohaline ponds, most notably the Kaluaapuhi Pond. Most of the larger springs that emerge above sea level have been boxed, although their outflows still reach the ponds, and water from others is being used to supply an expanding series of aquaculture projects, and for cooling and steam generation at the local power plant. The vegetation of the area is highly altered from its original state, being a kiawe (*Prosopis pallida*) savannah along the inland margins, and bearing a thick band of mangroves seaward, the latter having become established after World War II. A more complete vegetative description of this ecosystem type may be found in Wagner *et al.* (1990). Although the Palaau wetland is still partially intact, the continued spread of aquaculture facilities, which are being actively promoted and funded by the County of Maui, will likely alter this area in the near future, both by reconfiguring the mixohaline pools and marshes, and by diverting the spring waters upon which these systems depend.

Megalagrion xanthomelas was present here along the along the inland margins of the wetland, in company with 2 introduced damselfly species, *Ischnura ramburi* and *Ischnura posita*, and 2 larger dragonfly species, *Anax junius* and *Orthemis ferruginea*. Individuals of *M. xanthomelas* were observed along the back edge of Kaluaapuhi Pond, in the nearby mangroves along a flooded trail, and emerging as tenerals from small water pockets at the base of an isolated *Schoenoplectus* clump. Measured salinities in Kaluaapuhi Pond varied from 2 ppt at a small spring inflow to 3 ppt in middle of the pond away from this inlet. Stearns & Macdonald (1947) noted that the entire basal lens underlying west and central Molokai is brackish, thus all basal springs in this area are saline to some degree. The fact that *M. xanthomelas* is breeding in the Palaau wetland, which is supplied by such brackish springs, clearly indicates that the species can tolerate salt concentrations of at least 2 ppt.

This conclusion was reinforced by the discovery of *M. xanthomelas* at a small pond adjacent to the Molokai Sea Farms aquaculture facility at western end of the Palaau wetland complex. This pond occupied an elongate, steep sided basin bordered by pickleweed (*Batis maritima*) and other introduced weeds. The waters of the pond were heavily covered with a layer of duckweed (*Lemna aequinoctialis*), which was maintained by the aquaculture farm as a means of deterring algal growth. The steep sides and elongate form of the basin suggest that it is an artificial modification of a former spring outflow.

Megalagrion xanthomelas was present at this small pond, in association with the same damselfly and dragonfly species seen at Kaluaapuhi pond, but did not occur at the adjacent aquaculture ponds, which lacked floating or marginal vegetation. Individual males were seen perching on sticks and weeds that projected over the water, and a tandem pair was observed ovipositing on the thick duckweed mat. The salinity of the water in this pond was taken and found to be 2 ppt, the same as that of the springs at Kaluaapuhi Pond

(the water chemistry of these sites is summarized in Table 1). This once again clearly demonstrates that *M. xanthomelas* can breed in mildly saline waters.

Kauhako Lake

A single immature specimen of *M. xanthomelas* (which was reared to adulthood at BPBM to confirm its identity) was taken by Dr. Robert Kinzie of the University of Hawaii in late March 1995 along the margins of Kauhako Lake, lying in Puu Uao crater on the Kalaupapa Peninsula of northern Molokai. The salinity of the lake is 15 ppt (R. Kinzie, pers. comm.), although freshwater inflows presumably enter at certain points due to percolation through the volcanic cone, creating a system reminiscent of a very large anchialine pool. The lake is over 250 m deep (Maciolek 1982), and its steep, rocky margins lack emergent aquatic vegetation, although they are heavily shaded in some areas by overhanging tree limbs. No adults were seen at the time the immature was collected.

Table 1: Summary of water chemistry and other physical data for sampling sites on Molokai

Site	Soil pH (2/site)	Water pH (2/site)	Air Temp. (°C)	Soil Temp. (°C)	Water Temp. (°C)	Salinity (ppt)
Palaau:						
Kaluaapuhi	— —	7.2[1] 7.2[1] 7.1[2] 7.1[2]	—	—	24.5	2.0[1] 3.0[2]
Palaau: Molokai Sea Farms Pond	— —	6.6 6.6	—	—	31.0	2.0
Pelekunu Val. breeding site	— —	8.2 8.3	—	—	23.0	0.0

[1] inlet; [2] boat

The distributions of the Molokai populations discussed above are summarized in Figure 2.

Lanai

Koele Lodge

One of the largest populations of *Megalagrion xanthomelas* outside of Hawaii island occurs in a set of ornamental streams and pools at the Koele Lodge on upland Lanai. These habitats, lying at 580 m above sea level, are also the highest elevations from which the species has been recorded in this century. The existence of this population remained undetected until 1993, although the species presumably occupied the ranch pond that was constructed at this site in the late 1800s. The fact that *M. xanthomelas* has been able to colonize an artificial habitat that was constructed within the last 5 years with no consideration to damselflies whatsoever had an important bearing on the situation at TAMC, since it indicated that construction of similar habitats at TAMC might be sufficient to mit-

igate the present threats to the species at this latter site.

The resort complex at Koele, consisting of The Lodge at Koele and The Experience at Koele golf course (referred to subsequently as the Koele Lodge) was constructed in 1990 on the site on the former Koele ranch, at an elevation of 580 m. The development includes ten separate aquatic features, including a large reflecting pool and ornamental stream complex behind the lodge building itself, a putting course nearby with several small ornamental streams, and 8 large ponds scattered around the golf course to serve as water hazards. All of these individual habitats were surveyed, and their water chemistries are summarized in Table 2. For purposes of this study the reflecting pool and inflow stream behind the lodge building were treated as a single aquatic feature, as were the two large ponds at Holes 8 and 9 that are connected by a cascading ornamental stream. Several of these water features are also fed by shared recirculating water systems. Most notable among these are the ponds at Holes 4 and 18, which are widely separated topographically and elevationally (Hole 4 lies at 610 m, Hole 18 at 580 m), but connected hydraulically. Such connections would allow potential transfer of *M. xanthomelas* eggs and immatures from one site to the other. All the water features on the golf course are internally recirculating with the exception of the pond at Hole 17. The pond and streams behind the lodge, Holes 4, 8–9, and 18, and the putting green streams occupy sheltered locations at the base of Lunaihale mountain and are surrounded by tall stands of *Araucaria* and other introduced trees. By contrast, the ponds at Holes 12, 15, 16 and 17 are more exposed to the wind and lack shelter from either topography or trees.

The large pond and its associated inflow streams behind the lodge building, referred to subsequently as the Lodge Pond, has a capacity of 3.5 million gallons, and is not currently subjected to any water treatment protocol. The pond is equipped with a downflow biofilter system, but this has never been used in the 6 years since its emplacement due to technical problems. A high rate sand filter is also installed, but like the biofilter is not currently in use. Instead, occasional treatments of potassium permanganate at 5 ppm concentrations are applied to retard the growth of algae. The pond occupies the site of a previous storage reservoir used by the former Koele Ranch to water cattle, indicating that an artificial aquatic feature has been continuously present at this site for over a century.

The recirculating inflow stream feeding the Lodge Pond originates in a small lily pond upslope from the lodge. This pond occupies a roughly circular basin approximately 4.5 m in diameter and 1 m deep. The surface is covered with numerous floating lily pads, and the western margins are composed of set rock walls bearing a growth of ferns, whose roots hang into the water. This pond previously received applications of Aqua Shade to retard algal growth, but this practice has been discontinued for the last 2.5 years.

The several small streams present on the putting green, immediately east of the lodge building, are swift and unshaded, originating in small ponds lined with ornamental rock walls. They are lined by plantings of exotic flowering plants, and receive an application of Aqua Shade once a month to eliminate algae.

None of the other water features on the golf course are currently subjected to filtration or chemical treatments. Carp were present in the Lodge Pond and at Hole 12, guppies were seen at Holes 12 and 15, and apple snails were present at Hole 15. Apart from this, and the exotic Odonata noted in Table 3, the water features at Koele Lodge seem to be relatively free of introduced aquatic biota.

Table 2. Summary of water chemistry and other physical data for sampling sites on Lanai.

Site	Soil pH (2/site)		Water pH (2/site)		Air Temp. (°C)	Soil Temp. (°C)	Water Temp. (°C)	Salinity (ppt)
Lodge pond	—	—	8.6	8.6	19.1	19.0	21.6	0
Lodge pond			9.1	9.1	20.1	19.5	20.7	0
Putting course	—	—	9.1	9.1	20.9	19.0	21.9	0
Hole 12			8.8	8.9	18.5	19.0	20.1	0
Hole 15			9.8	9.9	18.7	20.0	20.3	0
Hole 16			9.0	9.1	18.1	19.0	20.0	0
Hole 17			9.1	9.2	17.4	19.5	20.4	0
Maunalei Gulch			8.0	8.1	22.5	21.0	24.5	0

Table 3. Distribution of Odonata at sampling sites on Lanai.

Taxon	Locality									
	LG	PC	4	8–9	12	15	16	17	18	WW
M. xantho	x	x	x	x	-	-	-	x	x	-
E. civile	x	x	x	x	x	x	x	x	x	x
I. ramburii	-	-	-	-	x	-	-	x	-	x
A. junius	x	x	-	-	x	x	x	x	x	x
O. ferru	x	-	x	x	x	-	-	x	-	-
P. flaves	x	-	x	x	x	x	x	x	-	-

Explanation of locality codes:
LG = Lodge reflecting pond; PC = putting course, 4 = 4th hole, 8–9 = 8th and 9th holes; 12 = 12th hole; 15 = 15th hole; 16 = 16th hole; 17 = 17th hole, 18 = 18th hole; WW = wastewater treatment plant

Explanation of taxon codes:
M. xantho = *Megalagrion xanthomelas*, E. civile = *Enallagma civile*, I. ramburii = *Ischnura ramburii*, A. junius = *Anax junius*; O. ferru = *Orthemis ferruginea*; P. flaves = *Pantala flavescens*

Populations of *M. xanthomelas* were found at the Lodge Pond and its inflow streams, Holes 4, 8, 9, 17, and 18, and at the small streams on the putting course, but the species was absent at the ponds adjoining Holes 12, 15, and 16 (see Table 3). It was evident that the insects preferred the more sheltered sites, an observation congruent with that made at Ninole Springs in Kau (see following section). Numerous other Odonata were also found in these artificial systems, including the introduced damselflies *Enallagma civile* and *Ischnura ramburi*, and the dragonflies *Anax junius*, *Pantala flavescens* and *Orthemis ferruginea*. No clear correlation was evident between the presence of any of these other species at a site and the absence of *M. xanthomelas*, indicating that competitive interactions are not structuring the Odonata guilds in this system.

Detailed observations were made regarding *M. xanthomelas* behavior at several of the Koele sites. The most robust population appeared to be in the lily pond at the source of the ornamental stream feeding the Lodge Pond. Females were seen ovipositing here on floating lily pads, which exhibited numerous brown oviposition scars, and immatures were taken from the submerged roots of ferns that grew on the rock wall bordering the pool. Adults were also observed emerging from their immature casings at this site. Emergence took 30–60 min, after which the insects flew away from the water to perch in sheltered spots amid vegetation, presumably to allow their cuticle to harden. By contrast, adults in later stages of maturity were active around and above the pond, with males aggressively defending territories ca. 2 m in diameter. These adults quickly ceased activity if the sunlight was interrupted by passing clouds, indicating that *M. xanthomelas*, at least at this elevation, is very photosensitive.

At the Hole 8–9 complex, tandem pairs of *M. xanthomelas* were observed ovipositing in collapsed lily stems that hung into the water, while at Hole 4 a female was observed ovipositing on algal mats in the lowermost of three inflow basins below an ornamental waterfall. The pond at this latter site had relatively open, grass-lined banks, and in this area adults were observed only in areas where small irregularities in the shore line, such as coves formed by large rocks, provided some form of shelter.

Maunalei Gulch

The population of *M. xanthomelas* currently extant at the Koele Lodge occupies artificial habitats that did not exist prior to the early 1990s. The source of the *M. xanthomelas* population that colonized this site must thus lie elsewhere. It is possible that the insects colonized the former Koele Ranch cattle pond from populations inhabiting small springs emerging at the base of Lanaihale mountain, but no such outflows are mentioned by Stearns (1940). Instead, the most logical source from which the colonists could have come is Maunalei Gulch, a deep canyon on the northern side of Lanai that previously contained the only perennial stream on the island. A survey of the upper reaches of this gulch by the author in 1993 revealed that three species of *Megalagrion* damselflies, *M. hawaiiense* (McLachlan), *M. blackburni* McLachlan and *M. calliphya* (McLachlan) still persisted in in this catchment, but *M. xanthomelas* was not seen. In 1994, however, a specimen of *M. xanthomelas* was taken in dry forest near the mouth of Mauanlei Gulch by Dr. Richard Baumann, a visiting entomologist from Brigham Young University. This discovery indicated that a colony of *M. xanthomelas* did indeed persist somewhere in the lower Maunalei system, and an attempt was thus made to locate it during the current investigations on Lanai.

An initial reconnaissance of the coast revealed no wetlands that might support the species. A foray was then made up the lower reaches of Maunalei Gulch, which is at this point a dry bed shaded by kiawe forest. A leak was eventually discovered in a small water pipeline at ca. 120 m above sea level, which created a limited outflow on a bench above and to the south of the gulch bed. *M. xanthomelas* was relatively abundant along this seepage, with many mating pairs present. The water at this site was found to have the following characteristics: temperature, 24.5 °C; salinity, 0.0 ppt; pH, 8.0. This habitat is extremely limited, and could easily be eliminated by repair or replacement of the currently leaking pipeline.

Lopa Fishpond

A good series of *M. xanthomelas* was taken from this remote fishpond near the eastern tip of Lanai by Steve Montgomery of the Bishop Museum in August 1994. Montgomery (pers. comm.) reports that the fishpond was filled with mangroves, and that the damselflies were taken along its inland margin in an area where deer were coming down to water. These observations, coupled with the presence of *M. xanthomelas*, indicate that a permanent mixohaline aquatic habitat nt exists at this site, probably due to weak basal spring percolation into the fishpond basin.

Keomoku

A tandem pair of *M. xanthomelas* was taken by Montgomery at this site on the same day as the specimens from Lopa were captured. The distance between these localities is over three miles, indicating the presence of two separate populations. The only water source at Keomoku is a covered well (Montgomery, pers. comm.), which seems an unlikely breeding habitat for *M. xanthomelas*, although its plumbing system may be providing artificial habitat in a manner similar to the leaking pipeline in Maunalei Gulch. It seems more likely, however, that the species is breeding in small pockets of fresh or brackish water present somewhere in the general area surrounding Keamoku. The water table along the section of the coast between Lopa and the mouth of Maunalei Gulch lies only a few meters above sea level, and in certain areas fresh water can be seen running into the sea at low tide (Stearns, 1940). Some of this water may be collecting in small natural depressions, or in the remnants of trench wells dug by settlers, and thus providing habitat for *M. xanthomelas*.

The distributions of the Lanai populations discussed above are summarized in Fig. 3.

Maui

The only specimens of *M. xanthomelas* known from Maui are four individuals in the BPBM by R.C.L. Perkins from the "West Maui Mountains" in 1894 and 1895. Perkins gave no further locality data, and one can only speculate as to the precise areas he sampled. Since Perkins' collections on West Maui during May 1894 were made entirely in the vicinity of Iao Valley, it seems likely that his specimens of *M. xanthomelas* taken in this year came from the wetlands and sand hills of the Wailuku Plain at the valley mouth, which prior to urban development in this century supported some of the most extensive sets of taro fields in Hawaii.

Another area that appears to have been capable of supporting *M. xanthomelas* was the Loko o Mokuhinia marsh at Lahaina, a basal spring wetland that was filled in for development in 1913. Pictures of Loko o Mokuhinia taken in the mid-1890's (the period when Perkins' collections were made) show a pond with floating vegetation and emergent bulrushes, similar to coastal habitats on Hawaii island in which *M. xanthomelas* breeds at the present time (Klieger *et al.*, 1995).

Recent surveys on Maui have found no evidence of *M. xanthomelas* populations, even at potentially suitable sites such as the coastal Kealia and Kenaha ponds. A complete circuit of the West Maui coastal lowlands was conducted in mid-1995, but failed to uncover any remaining populations, although potential habitat was available at the mouths of Makamaksole, Kahakuloa and Honokohau streams. Surveys of coastal wetlands on leeward Haleakala and at various stream mouths along the Hana Coast have been similarly

unsuccessful. Based on these results, it seems possible that *M. xanthomelas* may have been locally extirpated on Maui.

Hawaii (Big Island)

Ninole Springs

Scattered populations of *M. xanthomelas* are known from coastal wetlands in Puna, Kau and North Kona on Big Island, where limnetic groundwater percolates seaward and mixes with the inland percolating marine water table to form horizontally stratified mixohaline systems. The largest of these coastal *M. xanthomelas* populations is found in a set of limnocrenes, rheocrenes, and mixohaline marshes located at Ninole, Kau, where downslope subsurface percolation from the Ninole Hill drainages emerges just above sea level at the mouth of Ninole Stream. This is the second largest basal spring complex on the island of Hawaii (the largest being Waiakea Pond at Hilo), discharging over 20 million gallons per day in 1946 (Stearns & Macdonald, 1946), although this flow may have been subsequently modified by withdrawls from wells to irrigate sugar cane fields upslope. The water originates from lava tubes in the Kau volcanic series, and represents the subterranean outflow from ancient valleys in the nearby Ninole Hills that were filled by subsequent eruptions from Mauna Loa. Due to its origination in catchments upslope the water is quite cold, with an emergent temperature of 19 °C. This groundwater surfaces along the inland sides of coastal lava basins that have some degree of connection to the sea, creating horizontally stratified mixohaline systems with a zone of freshwater marsh along their inner margins. Similar basal spring wetlands are found at several other points along the Kau coast, including Punaluu, the mouth of Hilea Stream at Hawa Bay, Hawa Springs, and Whittington Beach Park.

The Ninole Spring wetland complex contains an extensive set of limnetic to mixohaline marshes, ponds and creeks lying at the stream mouth and in the area directly to the east, between the Sea Mountain golf course parking lot and the lava coastline. Numerous cold freshwater springs emerge just inland of the coast at the base of an a'a flow, some flowing directly into tidepools, others feeding large ponds and sloughs. One large pond with thick beds of watercress along its margins occupies a lava basin immediately east of the stream mouth, and is separated from the sea by a wall of lava ca. 3 m high, which large waves occasionally overtop. A second, even larger pond lies further to the east, in a basin just above sea level, and enters the ocean via a swift freshwater creek ca. 1 m wide and 15 cm deep. The inland margins of both these ponds grade into marshes dominated by bulrushes (*Schoenoplectus* sp.) and *honohono*; similar marshes are also present in the area between the ponds, in association with smaller spring outflows. The eastern pond also contains water hyacinth (*Eichornia crassipes*) along its inland margin.

Surveys undertaken during early May 1994 found *Megalagrion xanthomelas* to be abundant at Ninole Springs, breeding in all suitable habitats. Numerous mating pairs were observed, and many newly emerged adults were seen along the margins of the westernmost pond. A mating pair was also captured above the standing pool formed behind the cobble bar at the mouth of the stream itself. In addition, the introduced damselflies *Enallagma civile* and *Ischnura ramburi* were present along the margins of the eastern pond, especially in seaward areas exposed to the wind, but *M. xanthomelas* was clearly the dominant damselfly species across the entire Ninole system. In general the introduced damselflies seemed more abundant in open areas, while *M. xanthomelas* flew amid the shelter of vegetation along the slough channels, which were difficult to investigate, being heavily vegetated and often over 1 m in depth. The large dragonflies *Anax junius* and *Pantala flavescens* were also seen throughout the Ninole area.

The salinity of the aquatic features at Ninole Springs varied from limnetic (less than 0.7 ppt) at the outflows to fully euhaline (at least 30 ppt) at the shore, with all degrees of intermediate salinity encountered throughout the ponds and marshes. It is clear from other investigations on Molokai (see previous section) that *M. xanthomelas* can tolerate salinities of at least 2 ppt, thus it is able to breed along much of the inland margin of the Ninole wetland system.

The estuarine marshes and limnocrenes at Ninole Springs and other coastal wetlands in Kau provide extensive breeding habitats for *M. xanthomelas* that are not currently duplicated on the other high islands, although similar systems may once have existed at Pearl Harbor on Oahu prior to its urban development. Throughout such coastal situations, both here and in North Kona, *M. xanthomelas* is typically found in company with the alien *Ischnura ramburi* and *Enallagma civile*, but the competitive interactions among these species, if any, do not seem to preclude the continued presence of *M. xanthomelas* at these sites.

Hilea

A coastal wetland similar in form and origin to that seen at Ninole but of smaller extent occurs at the mouth of Hilea Stream, approximately one mile to the southwest on the opposite (western) side of an intervening lava flow. The habitat consists of several elements, beginning with a long, deep mixohaline pool at the mouth of the stream channel, which runs parallel to the base of the lava flow. This pool is separated from the sea by a cobble bar that is occasionally overtopped by high swells, and experiences a weak tidal flux. No damselflies were seen along this pool. West of the stream mouth are several small limnetic ponds bordered with sedges, grasses, and *honohono*; these ponds supported *Megalagrion xanthomelas*, *Enallagma civile*, *Ischnura ramburi*, *Anax junius*, *Pantala flavescens*, and *Tramea lacerata*. Even further to the west is a large basin, connecting directly to the sea via a narrow mouth, but with a zone of bulrushes at the back, bordered even further inland by an extensive, apparently limnetic marsh thickly overgrown with tall grasses. No damselflies were seen at this latter basin, but it seems likely that *M. xanthomelas* may occur in the marsh.

When this site was visited on 4 June 1994, water was being pumped from the western marsh by squatters, who were using it to irrigate small taro fields. One of these squatters claimed that the mouth of Hilea Gulch previously consisted of a large, swampy estuary, but that a major flood 4 or 5 years earlier had washed in a large amount of sediment, producing the current configuration.

Hawa Springs

This habitat consists of a small limnetic spring outflow emerging at the base of an eroded lava flow, and flowing into a linked series of progressively more saline ponds scattered along a sinuate depression behind the shoreline. The overall impression is one of an interrupted tidal creek, bordered by grasses and sedges. During a survey on 4 June 1994 the limnetic pools near the head of this system supported populations of *Megalagrion xanthomelas* and *Anax junius*; no introduced damselflies were seen. The area appears to be in a relatively natural condition, and does not appear to be frequently visited.

Whittington Beach Park

A single large pond behind the shoreline at Whittington Beach Park receives limnetic inflow along its inland margin, while connecting to the sea via a narrow mouth along the ocean side. A mixohaline gradient appears to exist across the width of this pond, with the seaward portion being essentially euhaline, but changing to mixohaline as one progresses inland. The basin here is similar in extent to the large eastern pond at Ninole, but is not raised above sea level as in the former case. The back margin of the Whittington pond is bordered with low grasses and bulrushes, indicating that a narrow freshwater zone exists as a result of limnetic downslope percolation into the basin. *Megalagrion xanthomelas* was found here on 4 June 1994, with adults flying low amid the shelter of the vegetation along the back edge of the pond. No individuals were seen along the front edge of the pond nearer to the sea. Cattle have disturbed this system, but do not appear to pose a threat to the long term stability of the marsh.

Kaloko Fishpond

A large fishpond and many other smaller anchialine pools are found in this area. David Foote of the National Biological Service, Hawaii Volcanoes National Park, has taken numerous specimens of *M. xanthomelas* from this site and documented their occurrence in the various habitats present.

Kiholo Bay

A complex of wetlands containing numerous anchialine ponds and pools occurs along the margins of Kiholo Bay. Access is difficult due to private ownership, and the area remains poorly surveyed. During the present study it was possible to walk down the shore along the northern end of the bay and sample a large, apparently mixohaline pond that lay immediately behind the beach ridge. One specimen of *Megalagrion xanthomelas* was taken here, in company with *Ischnura ramburii*, which was abundant.

Anaehoomalu Bay

One of the most extensive sets of anchialine pools known on the North Kona coast formerly occurred along the northern margin of Anaehoomalu Bay, at a site now occupied by the Waikoloa resort. These pools were bulldozed in the course of resort development, but similar systems, though smaller in extent, still exist along the southern margin of the bay, in a complex owned by Parker Ranch and known as the "Parker Ponds". In this area the shore forms a high dune ridge, behind which lie a series of depressions, marked by palms, containing mixohaline marshes and bordered by low, halophytic vegetation, predominantly pickleweed (*Batis maritima*). A specimen of *M. xanthomelas* was taken along the margin of one of these basins on 7 June 1994, in company with the introduced *Ischnura ramburi*, which was abundant. Although the salinity of these marshes was not ascertained, females of *Anax junius* were seen ovipositing in them, indicating that in at least some sections it must be quite low.

Beyond the marshy basins to the southwest lies a set of rock rimmed anchialine pools, some forming large ponds with bulrushes along their margins. No damselflies were seen in this area, but two dragonfly species, *Anax junius* and *Tramea lacerata*, were observed. The overall Parker Pond system is relatively undisturbed, and further surveys in the area would be useful in order to localize the sources of limnetic inflow, around which

M. xanthomelas would be likely to congregate. The area has recently been sold by the Parker Ranch, but alteration of the pools and marshes should be discouraged if possible, since they represent the last remaining undisturbed portion of the formerly extensive Anaehoomalu anchialine pool complex, which was described in detail by Maciolek & Brock (1974).

The large Kuualii and Kuhapapa fishponds at the Waikoloa resort were also surveyed, along with a complex of smaller adjacent anchialine pools containing red shrimps. All these habitats proved either too saline or too ecologically altered to support damselfly populations, and a search for further, more limnetic habitats in the general area was unsuccessful. A few *Anax junius* and *Pantala flavescens* were observed, but these may have been strays from populations breeding in nearby golf course ponds. An extensive set of anchialine pools formerly occurred to the north of this site, near Waiulua Bay (Maciolek and Brock, 1974), but these were destroyed in the course of resort development and no longer exist.

Leleiwi Point

A population of *M. xanthomelas* was found breeding in an anchialine pool system at Leleiwi Point by David Foote when he surveyed the area on 20 March 1995. Foote reports that the site consists of a large anchialine pond with a lava rubble and coral sand bottom. The submerged rocks are covered by a layer of light brown algal growth, and the pond margins are set with a dense growth of California grass (*Brachiaria mutica*) that form floating mats in several places. A small patch of *Wedelia trilobata* also occurs along the shore in an area shaded by hau (*Hibiscus tiliaceus*). Water conductivity ranged from 4.86–6.52 mS, and the water temperature averaged 19 °C, indicating the pond is fed by a basal spring. Males of *M. xanthomelas* were observed along the pond margins, along with 1 tandem pair. Other Odonata at this site included the introduced damselflies *Enallagma civile* and *Ischnura ramburii*, and the dragonfly *Anax junius*.

The pond at Leleiwi is part of a very large system of anchialine pools and estuarine limnocrenes that extends from this point westward along the coast to Hilo, and includes Waiakea Pond, the largest basal spring in Hawaii. Individuals of *M. xanthomelas* were observed at Liliuokalani Park within Hilo itself in October 1995, and historical collections are present from Coconut Island immediately offshore, suggesting a long-standing population of *M. xanthomelas* in this area.

Onomea Stream

This is a relatively short catchment heading at approximately 275 m elevation and flowing for 3 km to a seaward terminus in Onomea Bay, north of Hilo. The stream exhibits a steep profile typical of drainages on the Hamakua Coast, descending stair-step fashion via waterfalls in a bed of hard basalt. The seaward terminus, lying within the Hawaii Botanical Garden, consists of a long, flowing freshwater pool impounded behind a cinder beach, with a waterfall at its head. Progressing upstream one encounters a series of falls and plunge pools heavily shaded by introduced figs, palms and bamboo, until the bridge on the Pepeekeo Scenic Drive is reached. Immediately above this road crossing the stream is less confined, and forms long, partially shaded flowing pools, which continue to the base of another high waterfall.

The terminal reach and lower midreach of this system both up and downstream of

the Pepeekeo Scenic Drive were surveyed on 8 June 1995. *Megalagrion xanthomelas* and *M. hawaiiense* were found along the pooled midreach section of the stream at 55 m elevation, just upstream from the road, but no damselflies were seen along the terminal reach in the botanical garden. Individuals of *M. xanthomelas* were observed perching on low ferns, dead palm fronds, and bare rocks along the channel margins. Immatures were not found, but are likely to inhabit the trailing submerged root mats that are well developed here.

Alakahi Stream

This is a short, steep catchment approximately 2 km long, heading at about 230 m elevation and terminating in Onomea Bay adjacent to Onomea Stream. The stream presents a steep profile, descending through a bed of mossy boulders, heavily shaded by a forest of introduced trees. The terminal reach and lower midreach of this system upstream of the Pepeekeo Scenic Drive were surveyed on 8 June 1995. *Megalagrion xanthomelas* and *M. blackburni* were found between 55 and 75 m elevation, up to a point where hau (*Hibiscus tiliaceus*) begins to heavily overtop the stream; the former species was found even in areas of dense shade, an unusual habitat preference (see comments under sections on Lanai and Molokai). No damselflies were seen along the lower section of the stream below the road, in the area where it passes through the Hawaii Botanic Garden, despite the presence of suitable habitat, including a large ornamental pond adjacent to the stream itself.

Kawainui Stream

This is a large volume catchment that flows through a steeply dropping basalt bed and reaches the sea in an incised fjord south of Pepeekeo. At 60 m elevation the stream flows through a natural archway formed by an old lava tube. The lower midreach of this system immediately downstream of the Pepeekeo Scenic Drive was surveyed on 8 June 1995. *Megalagrion xanthomelas* adults and immatures were taken at small side pools in bedrock adjacent to the main channel, and bordered by clumps of yellow flowering *Wedelia trilobata*. Other adults were taken next to seepage fed pools on bedrock shelves along the south bank of the stream immediately across from these side pools. Heavy rains several days later caused the stream to rise appreciably, completely covering the side pool habitats with swiftly flowing water (although the seeps were not affected). It thus appears that at this site *M. xanthomelas* is exploiting temporary habitats on an opportunistic basis.

This and other *M. xanthomelas* populations found along drainages entering Onomea Bay probably represent a northward extension of the populations centered around the estuarine limnocrenes at Hilo. To date *M. xanthomelas* has not been found to the north along the Hamakua Coast past Pepeekeo Point, despite surveys at suitable stream mouths between there and Honokaa. Most of the streams in the Hamakua area end in terminal falls, and of those few that do not the following have been surveyed: Kolekole, Hakalau, Honolii, and Laupahoehoe. Several others, such as Maulua and Nanue, still await surveys, but it is considered unlikely that they harbor *M. xanthomelas* populations based on current findings.

Kapoho

An extensive series of anchialine and mixohaline wetlands fed by basal springs is found along the shoreline to the east of Kapoho Crater, in Puna, developed amid a series of recent lava flows that have been subject to coastal subsidence. Searches were made along the seaward edge of this system between 8 and 9 June 1995, both north and south of Kapoho Point. *Megalagrion xanthomelas* was found in the former area, which is being developed into residential subdivisions, with adults patrolling along the margins of moderately saline (8.0–8.5 ppt) pools. Current USGS maps do not correctly reflect the coastline profile and adjacent wetlands in this area, since extensive subsidence took place after their last update in 1981.

The interior of nearby Kapoho Crater contains a water filled basin known as Green Lake, which has no outlet and appears to be fed by seepage from the surrounding crater walls. This lake, which is essentially circular and ca. 100 m across, has silty, greenish waters with a temperature of 27 °C, and supports an overwhelmingly alien aquatic biota including frogs, topminnows, and numerous introduced aquatic plants. The shores are thickly lined with bamboo, kukui, breadfruit, mango and other exotic vegetation. Two males of *M. xanthomelas* from this locality, taken by F.X. Williams in 1936, are present in the collection of the Hawaii State Department of Agriculture. A survey of the lake and its surroundings in good weather failed to detect any sign of this species, although the introduced damselflies *Ischnura ramburii* and *Enallagma civile* were abundant, in company with the dragonflies *Anax junius* and *Pantala flavescens*. It is assumed that the introduction of alien fishes and frogs at Green Lake has led to the extirpation of this population of *M. xanthomelas*.

The distributions of the Hawaii populations discussed above are summarized in Figure 4.

Summary

The present surveys of *M. xanthomelas* demonstrate that the species occupies a wide range of habitats and has broad ecological tolerances. The most common habitats in which this species occurs are coastal wetlands fed by basal springs, as seen in the Puna, Kau and North Kona districts of Hawaii, at Palaau on Molokai, and formerly at Pearl Harbor on Oahu. This species also occasionally breeds along the terminal and lower midreaches of perennial streams, as illustrated by the populations at Pelekunu and Waikolu streams on Molokai, and at Onomea Bay on Hawaii island. Given the absence of introduced aquatic biota, *M. xanthomelas* can also breed in reservoirs and ornamental ponds, as recorded previously by Williams (1936), and currently documented at the Koele Lodge on Lanai. The species will also opportunistically exploit temporary habitats, as shown by its occupation of ephemeral side pools bordering flashy streams on Hawaii island, and pipeline seepages on Lanai.

Although *M. xanthomelas* has a recorded elevational range of 0–1000 m above sea level (Perkins, 1899), it is generally a lowland species, with most of the known populations now occurring below 60 m, and the highest recent records coming from 610 m, in artificial settings on Lanai. Results from salinity readings taken at Palaau, Molokai demonstrate that the species can tolerate salt concentrations of at least 2 ppt, and circumstantial evidence from habitats in Puna and North Kona indicates that the tolerance may be as high as 8 ppt. Based on results from Lanai the species also does not seem to be

adversely affected by commercial anti-algal treatments such as AquaShade and copper sulphate, which are commonly used in hotel and golf course water features. The species was found breeding in habitats with water temperatures ranging from 20–31 °C, and with pHs ranging from 6.6–9.2.

In terms of interactions with alien aquatic species, *M. xanthomelas* seems to be able to tolerate the presence of carp and apple snails, but does not do well in habitats containing guppies or top minnows. There is no indication of adverse competitive interactions between *M. xanthomelas* and the widespread introduced damselflies *Ischnura ramburii*, *Ischnura posita*, and *Enallagma civile*, with which it frequently co-occurs.

Despite its broad range of ecological tolerances, *M. xanthomelas* is becoming increasingly rare in Hawaii, having apparently been extirpated from two islands, Kauai and Maui, on which it previously occurred, while being perilously close to extirpation on Oahu. Based on our current understanding of the species' biology, this loss of *M. xanthomelas* populations is linked more to the introduction of alien aquatic biota than to outright habitat alteration or destruction. On one hand this is a source of optimism, since this pattern of decline can perhaps be stablized through protection of remaining natural habitats or construction of suitable refugia. On the other hand, it is also a source of pessimism, since the continuing onslaught of alien aquatic species in Hawaii shows no signs of abatement (Eldredge 1994).

Acknowledgments

The surveys on which this report was based could not have been accomplished without the assistance of the following individuals, who provided permits, logistical support, and local knowledge that were essential in locating the remaining populations of *M. xanthomelas*: David Foote, National Biological Service, Volcano; Adam Asquith, USFWS, Honolulu; Robert Kinzie, University of Hawaii, Manoa; Bill Puleloa, Hawaii Division of Aquatic Resources, Molokai; Ed Misaki and Joan Yoshioka, The Nature Conservancy of Hawaii, Molokai; Robert F. Donovan, Michael J. Dixon, Kurt Matsumoto of the Lodge at Koele and The Experience at Koele golf course, Lanai City, Lanai; Ron Englund, Pacific Aquatic Environmental, Honolulu; Bill Devick, Hawaii Division of Aquatic Resources, Honolulu; and Eric Pacheco, Pacific Helicopter Tours, Inc., Kahalui, Maui.

In addition, I wish to acknowledge the support of Neal Evenhuis and Scott E. Miller of the Bishop Museum's Hawaii Biological Survey, who read the initial drafts of this manuscript and encouraged the publication of these results. Finally, particular thanks go to David Preston of the Bishop Museum, who provided competent and enthusiastic assistance on many of the field surveys. Without his help, this study would never have been completed.

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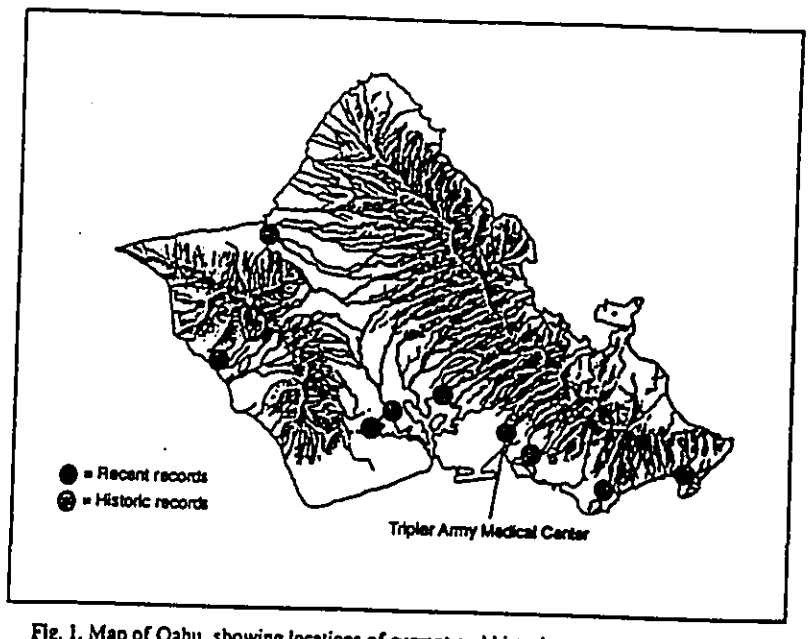

Fig. 1. Map of Oahu, showing locations of current and historic records for *Megalagrion xanthomelas*.

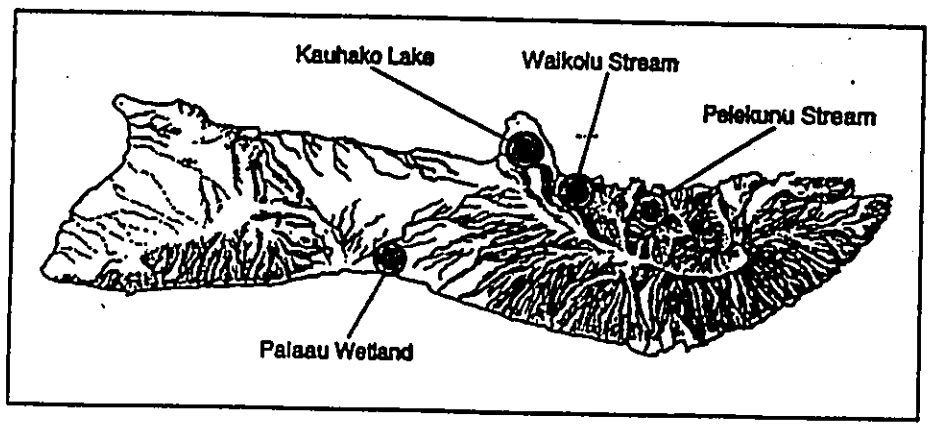

Fig. 2. Map of Molokai, showing currently known populations of *Megalagrion xanthomelas*.

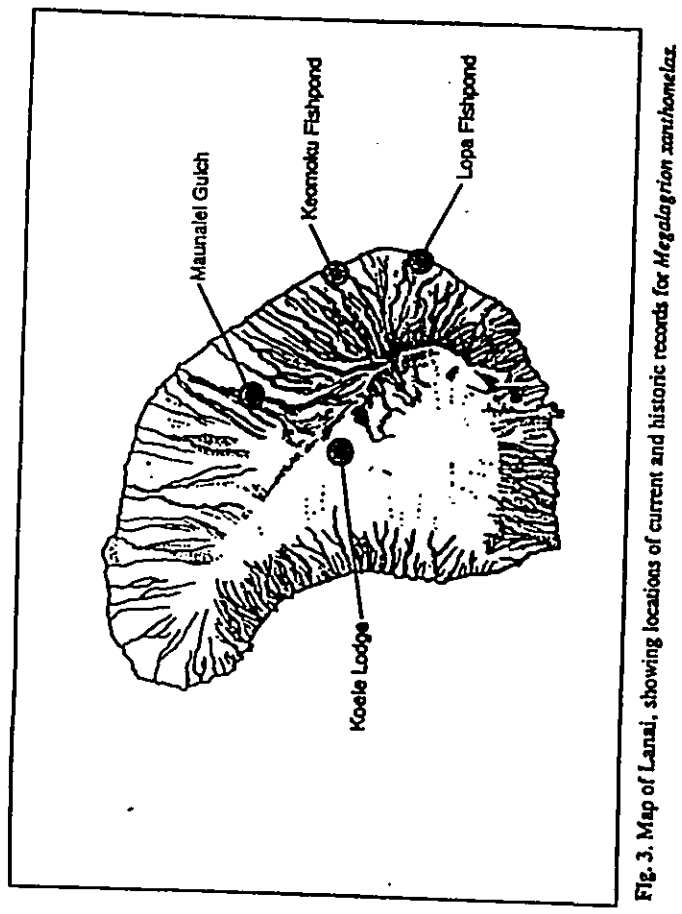

Fig. 3. Map of Lanai, showing locations of current and historic records for *Megalagrion xanthomelas*.

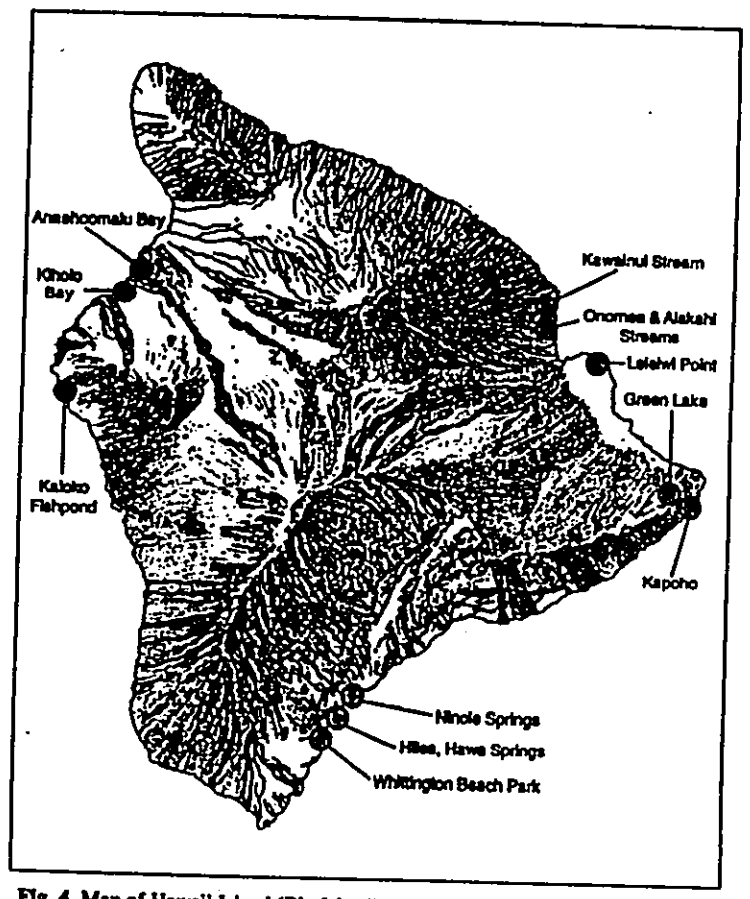

Fig. 4. Map of Hawaii Island (Big Island), showing known populations of *Megalagrion xanthomelas*.

United States Department of the Interior
NATIONAL BIOLOGICAL SERVICE
PACIFIC ISLANDS SCIENCE CENTER
Hawaii National Park Field Station
P.O. Box 52
Hawaii National Park, HI 96718
(808) 967-8211
FAX (808) 967-7153

Mr. Scott Lucas, Assistant Director
Hawaii Tropical Botanical Garden
RR 143-A
Papaikou, Hawaii 76781

Dear Scott,

Based upon our discussions and correspondence during March, I am willing to work with the Hawaii Tropical Botanical Garden (HTBG) to analyze the suitability of aquatic habitat in the gardens, including the koi pond, for use by Megalagrion xantomelas. The results of this study can provide the basis upon which we determine what modifications might need to be made to the existing ponds so that they can support xantomelas damselflies in addition to serving their present uses. I'm also willing to research methods of attracting xantomelas to artificial ponds at existing Megalagrion habitat in the gardens including Onomea Stream so that larval damselflies can be collected and used for translocations to ponds in HTBG.

This project would require the following procedures:

1. A comparative analysis of water chemistry of the ponds and streams in HTBG. This should include a comparison of the HTBG ponds with other artificial ponds currently supporting *Megalagrion xantomelas* near Hilo.

2. A faunal survey of the benthic communities in the gardens and other potential predators of damselflies (e.g. Argiope spiders).

3. A survey of *Megalagrion* populations in the gardens to determine their distribution and relative abundance along Onomea and Alakahi streams.

4. Placement of experimental breeding tubs along the streams for approximately two months to attract *xantomelas* and collect larvae for introduction into HTBG ponds.

5. Follow-up monitoring of the HTBG ponds for approximately four months

6. Preparation of management recommendations based upon results of the survey and translocations for enhancement of *xantomelas* habitat at the gardens.

Please let me know if you need further information.

Sincerely,

David Foote
Acting Station Leader

EXHIBIT 8

ARCHAEOLOGICAL INVENTORY SURVEY OF A PORTION OF HAWAI`I TROPICAL BOTANICAL GARDEN ONOMEA, SOUTH HILO, ISLAND OF HAWAI`I [TMK 2-7-9: 02, 09, AND 10]

Prepared by:
Leann McGerty, B.A.
and
Robert L. Spear, Ph.D.

August 1995

Prepared for:
Mr. Dan Lutkenhouse
Hawai`i Tropical Botanical Garden
P.O. 248 Kahoa Road
Hilo, Hawai`i 96720

SCIENTIFIC CONSULTANT SERVICES, Inc.
711 Kapiolani Blvd., Suite 777 Honolulu, Hawai`i 96813

EXHIBIT 9

INTRODUCTION

At the request of Dan Lutkenhouse, Director of Hawaii Tropical Botanical Garden, Scientific Consultant Services (SCS) conducted an Archaeological Inventory Survey of specific locations within the boundaries of the garden (Figure 1). This work was conducted in May 1995 by Field Director Bee Burgett and Field Assistant John Risedorf, under the overall direction of Robert L. Spear, Ph.D.

The fieldwork was conducted at three specific locations within the garden (Figures 2 and 3). Area A, consisted of a slope first proposed for a tramway system and now under consideration for a walking trail. Area B included a small area to be used as a teaching shelter for children. Area C was adjacent to the gardens Lily Lake.

ENVIRONMENT

The three areas investigated are located within the existing Hawaii Tropical Botanical Garden which is situated between 0-220 ft AMSL (above mean sea level) on the coastline. The garden is bounded by Mamalahoa Highway to the west and south, the ocean on the east, and undeveloped land owned by the garden to the north.

The general description of the project area is Rough Broken Land (RB) as described in Sato et. el. (1973). This miscellaneous land type consists of very steep, precipitous land broken by intermittent drainage channels. The steep gulches have slopes which are predominately 35 to 70 degrees. The soil matrix ranges from very shallow to very deep (Sato et. al. 1973). Rainfall ranges from 50 to more than 150 inches (Giambelcuca et al. 1986).

PREVIOUS ARCHAEOLOGY

Only a limited number of previous archaeological projects have been conducted within Onomea *ahupua`a*. In 1982, Goldstein completed a survey of the existing garden site. With the exception of several probable graves located on the coastline, Goldstein did not identify any archaeological structural remains (Goldstein cited in Walker 1991:2).

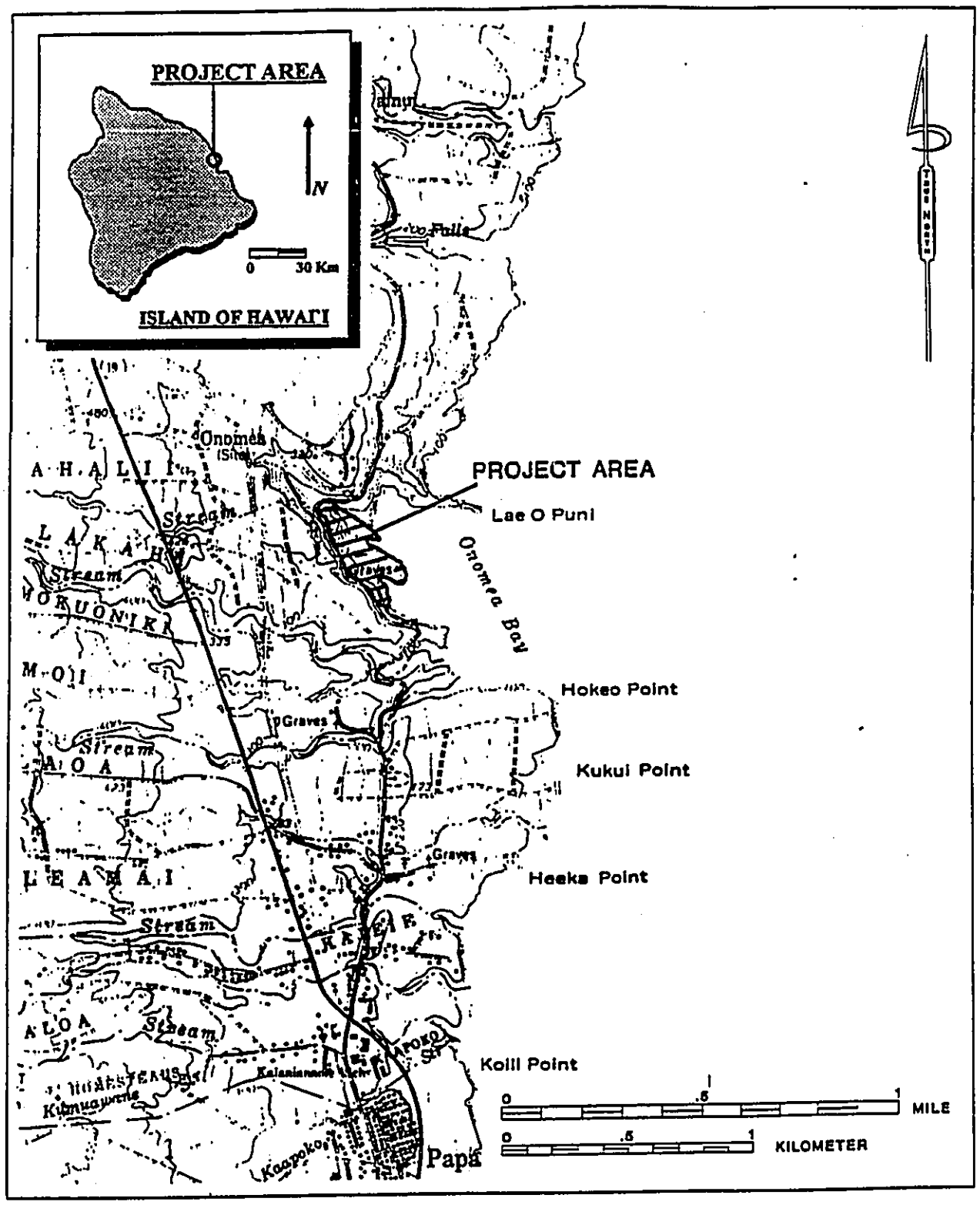

FIGURE 1: USGS PAPAIKOU QUADRANGLE SHOWING PROJECT AREA.

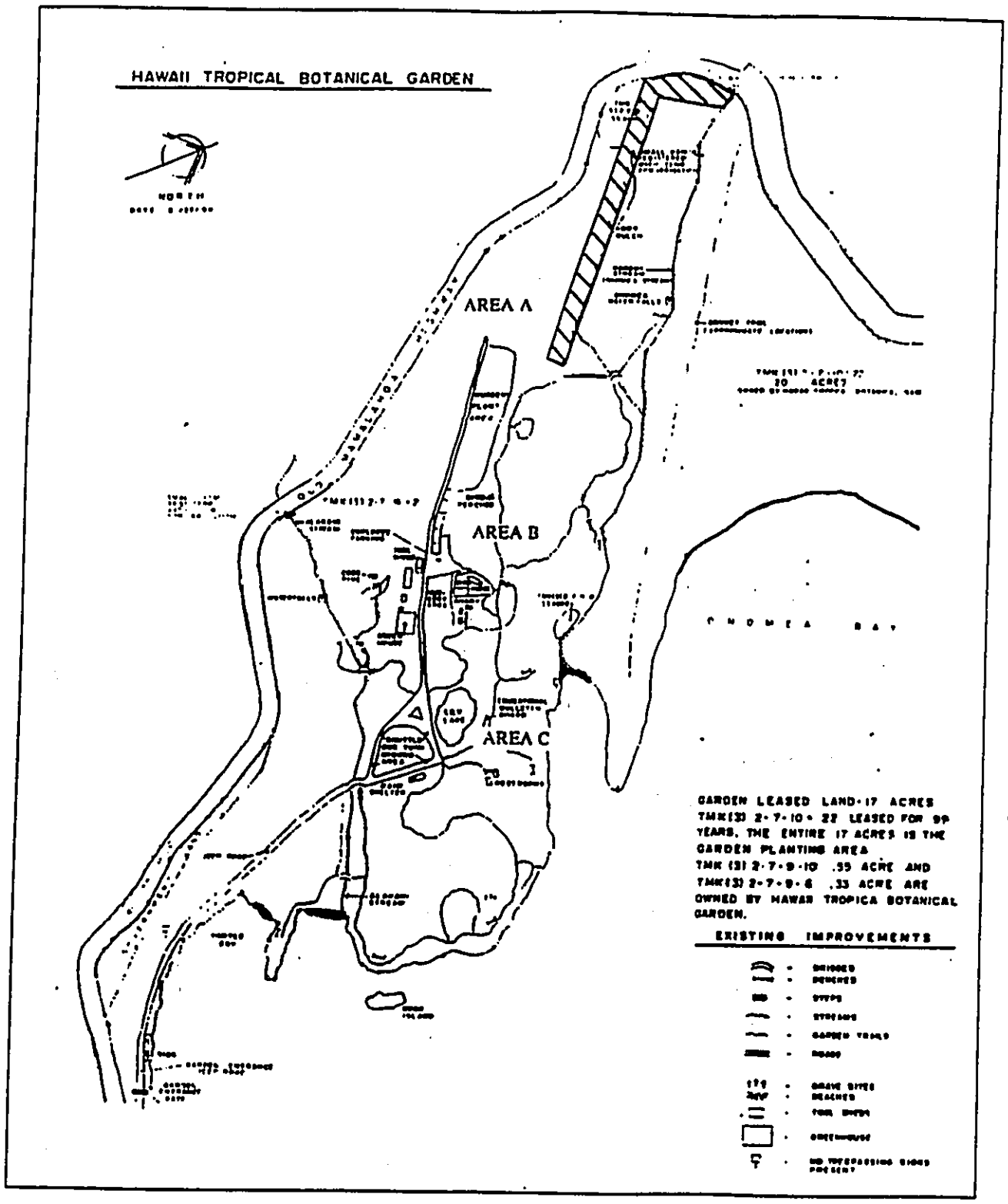

FIGURE 2: MAP SHOWING PROJECT AREAS A, B, AND C.

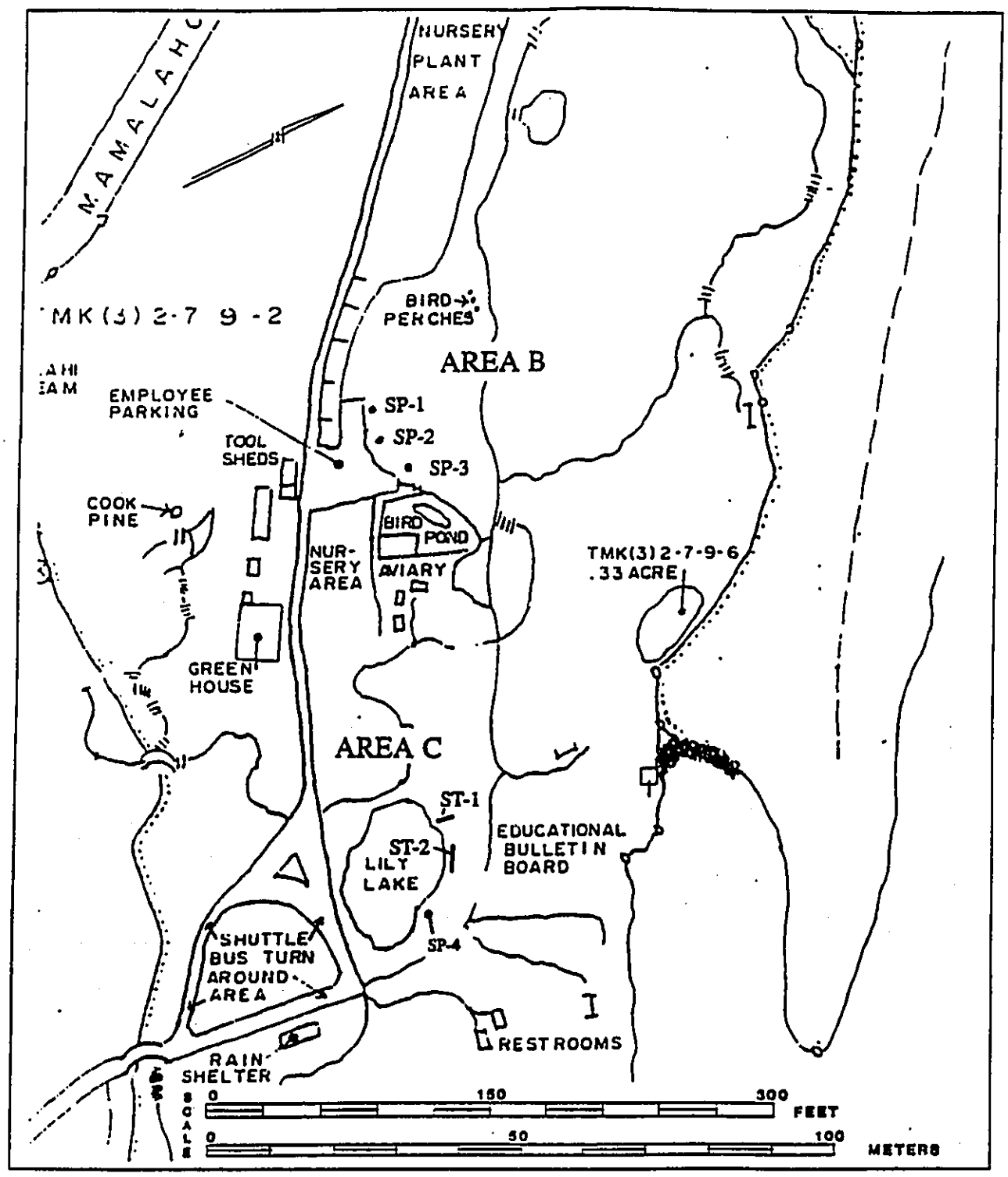

FIGURE 3: PLANVIEW OF AREAS B AND C SHOWING LOCATION OF SHOVEL PROBES (SP) AND STRATIGRAPHY TRENCHES (ST).

In May 1991 PHRI conducted an archaeological field inspection of 40 acres located immediately to the north of the existing park boundaries (Walker 1991). No archaeological sites were identified during this inspection.

In June of 1991 PHRI conducted additional research on the garden in an effort to gather more information on an old government road that may have extended through the garden property at one time (Kalima and Rosendahl 1991).

Other archaeological work conducted in the vicinity of the garden included investigations by Thrum (1907) and Hudson (1932). Thrum listed one *heiau* in the eastern section of the island in the general region of, but not within, the garden. Thrum noted that this *heiau* was situated above a county road, in a sugarcane field, and was in ruins (Thrum 1907).

In the early part of the 1930's Hudson conducted research along the eastern section of the island. Hudson noted the *heiau* recorded by Thrum, but attempts to locate any structural remains failed (Hudson 1932).

HISTORICAL FRAMEWORK

Onomea is described as a village, stream, and bay in Place Names of Hawaii (Pukui et al. 1974:171).

The garden is located where the village of Kahali`i once stood. Formerly a fishing village, Kahali`i became a shipping terminal for schooners and steamers until the railroad line from Hilo to Paauilo was constructed (Clark 1985:9). Lobenstien's 1889 map shows the layout of the small village and the road that is probably now referred to as the "Old Government Road" (Figure 4). Clark notes that, "Although some evidence of the former village remains, the tsunami waves reached heights of 35 feet above sea level in Onomea Bay and scoured the entire area" (Clark 1985:10).

While conducting archaeological research on the eastern portion of the island, Hudson noted that a Hawaiian community still existed at Onomea Bay and produced taro (Hudson 1932). Hudson also reported that some of the houses were built upon stone platforms which

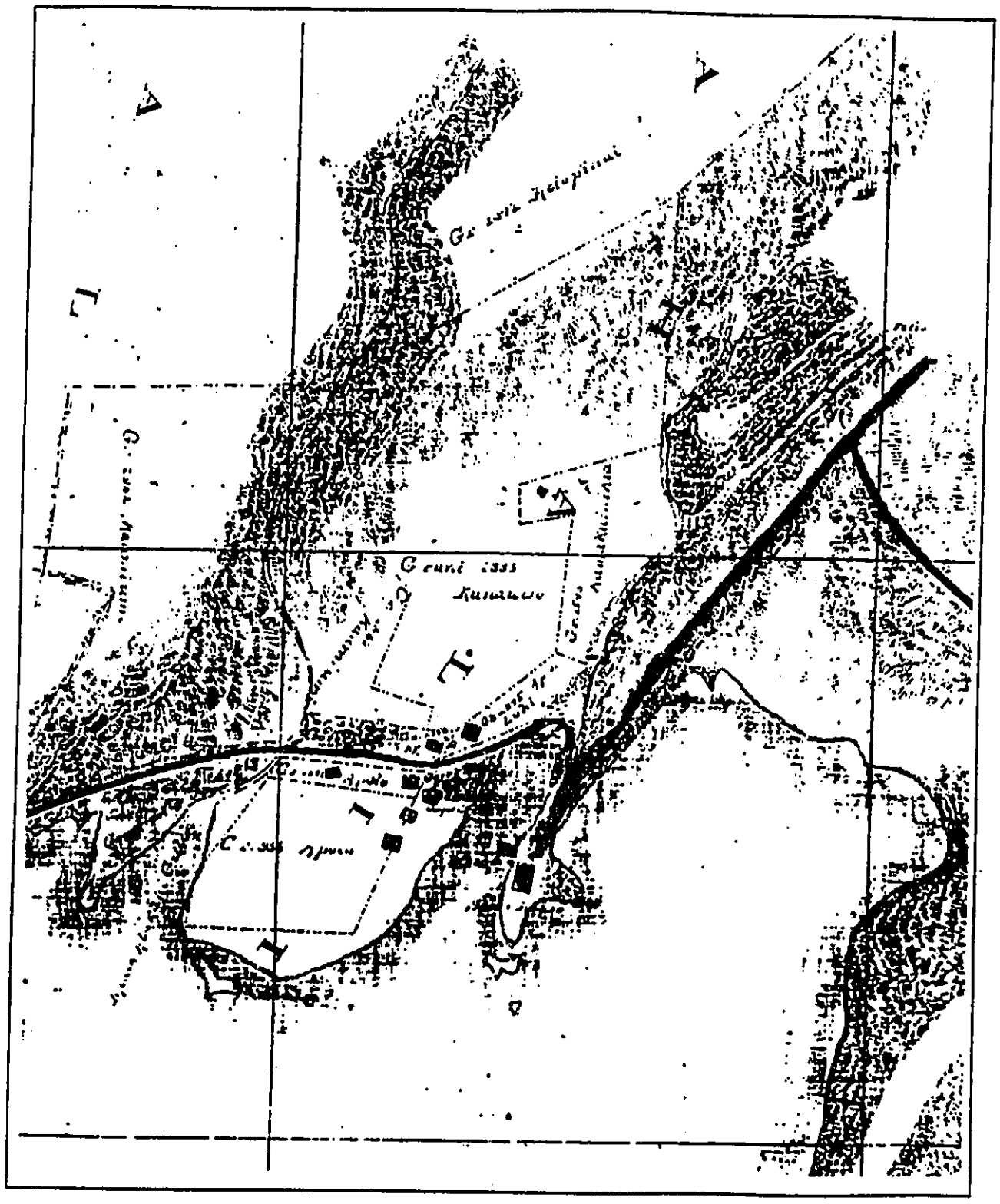

FIGURE 4: PORTION OF AN 1889 MAP BY LOEBENSTEIN SHOWING PROJECT AREA IN ONOMEA.

might have been earlier housesites and that remains of agricultural terraces were present in a gulch where the government road crosses a stream.

The property owner provided information that he had been told by the previous owner, Richard Penhollow, that part of the garden area, including the Lily Lake area, had been used as a *Lilikoi* farm and for grazing cattle. In addition, it appears that sometime after Hudson's work the valley was essentially abandoned except for two people who remaind until about the time of the tidal wave of 1946 (Lutkenhouse personal comm.).

SETTLEMENT MODEL

Tomonari-Tuggle has described the research potential of Windward Valleys in her discussion of North Kohala (Tomonari-Tuggle 1988:28-29). Although the present project area is outside of the area described by Tomonari-Tuggle a similar research potential exists in areas not extensively disturbed by modern activities.

The settlement model for Onomea Bay is based on the limited information available about the project area and extrapolation from Tomonari-Tuggle's discussion of Windward Valleys. The pre-Contact settlement model for Onomea Bay includes the presence of habitation and agricultural features such as stone platforms and terraces. The upland area behind the bay, and outside the garden area, may have included similar features, but could also include formal religious structures.

Post-Contact use of the Onomea Bay shifted when it began to be used as a shipping terminal for schooners and steamers. A small community continued to exist in the valley until at least the early 1930's after which the valley seems to have been essentially abandoned.

METHODS

FIELD METHODS

Surface survey was conducted within the corridor proposed for the tramway/trail area. The corridor was surveyed by two archaeologists who worked their way down the slope space roughly five meters apart. The areas of the teaching shelter and Lily Lake did not require any surface survey.

Excavations were conducted at the proposed rain and teaching shelter (Area B) and Lily Lake (Area C). Excavations consisted of four shovel probes and two stratigraphic trenches. Shovel probes (SP) were excavated by natural layers which are screened through 1/4 and 1/8-inch mesh. Stratigraphic trenches (ST) were excavated by natural layers but not subject to screening.

Survey and excavation data were recorded in the Field Director's field notebook, profile forms, soil record forms, and excavation forms. A Black-and-White photographic record was also kept. Soils and sediments were recorded based on standard soil descriptions and Munsell color charts.

LABORATORY METHODS

Analysis of collected cultural material was conducted at the Scientific Consultant Services, Inc. laboratory facilities in Honolulu, Hawai`i. All artifacts were cleaned prior to analysis and cateloging. Artifacts were assigned sequential accession numbers. All project materials and records are stored at the SCS office in Honolulu.

FIELDWORK RESULTS

A brief guided tour of the entire garden by Mr. Lutkenhouse illustrated a number of surface architectural features in the garden itself. None of these features had been significantly disturbed by the garden activities during the hand construction of trails, steps, and planting. None of the observed surface features were located within the three areas investigated during this project.

AREA A

The corridor for the tramway/trail was completely surface surveyed and no surface architecture was identified (Figures 5 and 6). Given the steepness of the slope in this area, and its rocky nature, no subsurface deposits were believe likely and no excavation was conducted.

AREA B

The rain and teaching shelter area measured approximately 35 by 35 ft. No surface architecture was present at this location. Three shovel probes (SP-1, -2, and -3) were excavated to exam

FIGURE 5: GENERAL PROJECT VIEW OF AREA A.
VIEW TO SOUTHEAST.

FIGURE 6: VIEW ALONG AREA A CORRIDOR
VIEW TO SOUTHEAST.

ine the subsurface deposits at the proposed shelter (see Figure 3). Each probe measured roughly 50 by 50 cm; SP-1 was dug to a depth of 61 cmbs, SP-2 to a depth of 61 cmbs, and SP-3 to a depth of 63 cmbs.

All three probes encountered a single soil layer consisting of a red brown (7.5 YR 3/3, m) silty clay. Towards the bottom of each unit a few pebbles and small cobbles were encountered. These units are illustrated in Figures 7 and 8. No cultural material of any type was recovered or identified in any of the probes.

AREA C

Three excavations were placed in the immediate area of Lily Lake including two stratigraphic trenches (ST-1 and ST-2) and one shovel probe (SP-4) (see Figure 3). The shovel probe measured roughly 50 by 50 cm and extended to a depth of 40 cmbs. The single stratigraphic layer encountered in this excavation consisted of a dark reddish brown (5 YR 3/3, m) silty clay loam.

Stratigraphic Trench 1 measured 2.20 by 0.45 m and was dug to a maximum depth of 35 cmbs. Three stratigraphic layers were identified in the excavation (Figures 9 and 10).

Layer I consisted of redeposited material from the excavation of Lily Lake. This layer consisted of a dark brown (7.5 YR 3/4, m) silt. No cultural material was recoverd from Layer I.

Layer II also consisted of a dark brown (7.5 YR 3/4, m) silt. This layer was the original ground surface prior to the redeposition of the Lily Lake material. No cultural material was recovered from Layer II which was 26 thick.

Layer III consisted of a dark reddish brown (5 YR 3/3, m) clay. The excavation extended into this layer approximately 5 cm; no cultural material was recovered from this layer.

Stratigraphic Trench 2 measured 2.25 by 0.45 m and was dug to a maximum depth of 37 cmbs. Two layers were identified in the excavation.

FIGURE 7: SP-2, AREA B, BASE OF EXCAVATION

FIGURE 8: SP-3, AREA B, BASE OF EXCAVATION

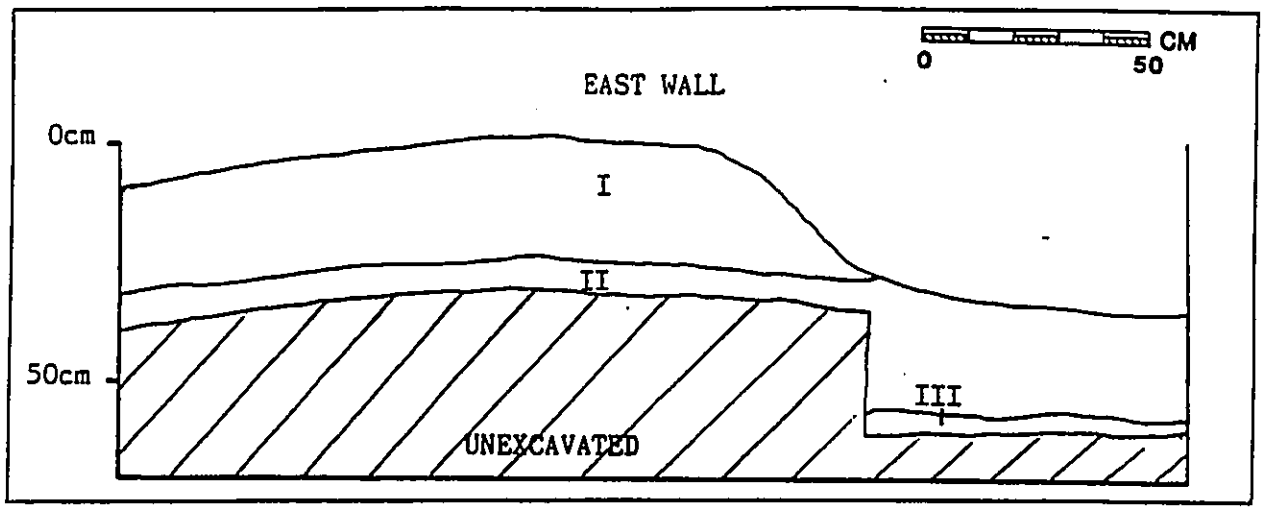

FIGURE 9: EASTWALL PROFILE OF ST-1, AREA C.

FIGURE 10: PLANVIEW OF ST-1, AREA C.

Layer I measured approximately 25 cm thick and consisted of a mottled dark reddish brown (5 YR 3/3,m; mottled 10 R 3/4 & 3/6) silty clay loam. Layer I in ST-2 is stratigraphically the same as Layer II in ST-1 (Figures 11 and 12).

Cultural material recovered from Layer I in ST-2 included *kukui* fragments (5.2 gm), a fragment of unidentified marine shell (1.5 gm), a small piece of charcoal, a single volcanic glass secondary flake, and historic artifacts.

The historic artifacts consisted of a broken white glass bead, a metal paint tube lid, two complete nails and one broken nail, one flathead wood screw, three small pieces of wood, one fragment of slate, and a 1929-S penny. In addition, 30 various colored small fragments of glass and 31 various colored small ceramic pieces were recovered. Most of this material was recovered from the upper half of Layer I with the artifact frequency declining rapidly after that.

Layer II consisted of a dark reddish brown (2.5 YR 3/4, m) loamy clay with some gravel. Excavation extended into this layer a maximum of 10 cm. No cultural material was encountered in this layer.

DISCUSSION AND CONCLUSION

Three specific locations within the Hawaii Tropical Botanical Garden were investigated. Area A, the corridor for the tramway/trail, was surface surveyed with no cultural features being identified.

Area B, the location of the childrens' rain and teaching shelter, was tested through the excavation of three shovel probes. Only a single stratigraphic layer was encountered in these excavations and no cultural material was recovered.

In Area C a single shovel probe and two stratigraphic trenches were excavated immediately adjacent to Lily Lake. Interpretation of the data recovered from Layer I in SP-4 and ST-2 and the redeposited Layer I in ST-1 suggests that a low density cultural deposit was/is present in the area of Lily Lake.

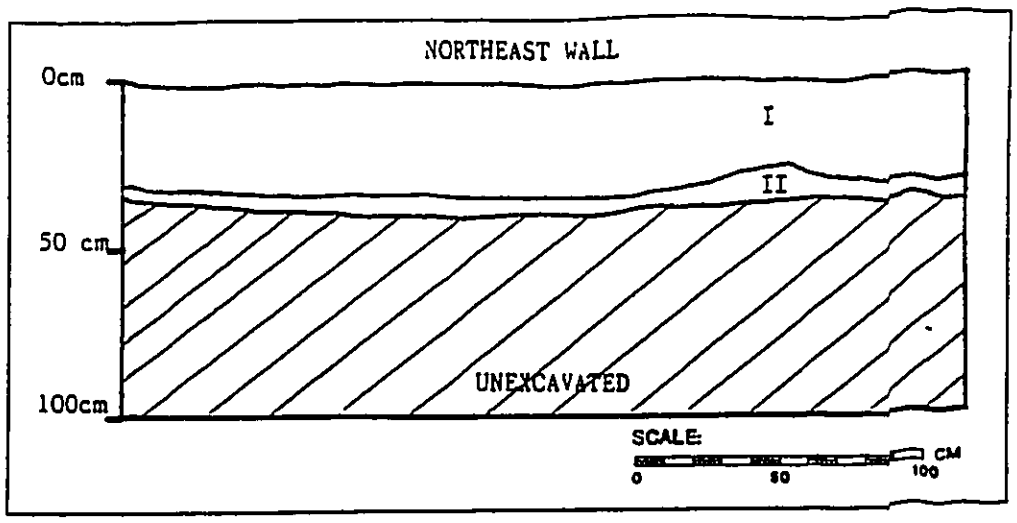

FIGURE 11: NORTHEAST WALL PROFILE ST-2, AREA C.

FIGURE 12: PLANVIEW OF ST-2, AREA C.

This low density deposit included small amounts of *kukui* nut, charcoal, and shell. One volcanic glass flake as well as historic materials were also found. Similar items were reported by several garden staff members as being observed in various areas of the garden.

None of the cultural material was recovered in association with surface or subsurface features. The low density deposit does not appear to reflect a primary habitation area such as a historic house but does suggest that the Lily Lake area was part of the general use area of historic Kahali`i village.

INITIAL SITE SIGNIFICANCE AND RECOMMENDATIONS

It is clear that the Hawaiian Tropical Botanical Garden contains numerous architectural features that, taken as a whole, are significant at least for the information they contain (Criterion D).

Of the three specific areas that were investigated, two (Area A, the tramway/trail and Area B, the childrens' teaching shelter) contained no significant cultural deposits and no additional work needs to be conducted at these two locations.

The area of Lily Lake does contain a low density cultural deposit of historic material making that area significant under Criterion D. The low density of the cultural deposit and the absence of associated features suggests that the immediate area of Lily Lake was not the location of a primary habitation such as a house. The Lily Lake area is interpreted as part of the general use area of historic Kahali`i village.

The data present in the Lily Lake excavations is significant under Criterion D. Sufficient work has been done in the immediate area of the lake that no further work is believed to be necessary.

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ADDENDUM TO:

ARCHAEOLOGICAL INVENTORY SURVEY OF A PORTION OF HAWAI`I TROPICAL BOTANICAL GARDEN ONOMEA, SOUTH HILO, ISLAND OF HAWAI`I [TMK 2-7-9: 02, 09, AND 10]

Prepared by:
Leann McGerty, B.A.
and
Robert L. Spear, Ph.D

August 1995

Prepared for:
Mr. Dan Lutkenhouse
Hawai`I Tropical Botanical Garden
248 Ka'ōa Road
Hilo, Hawai`I 96720

SCIENTIFIC CONSULTANT SERVICES Inc.

711 Kapiolani Blvd. Suite 777 Honolulu, HawaFI 96813

EXHIBIT 10

ADDENDUM

At the request of Mr. Dan Lutkenhouse, Hawai`i Tropical Botanical Garden, Scientific Consultant Services (SCS) conducted an Archaeological Survey of specific locations within the boundaries of the garden, designated Area D and Area E (Figure 1). This work was conducted on October 4, 1995 by Field Director Leann McGerty, under the overall direction of Robert L. Spear, Ph.D.

The fieldwork was conducted at two specific locations (Area D and Area E) adjacent to the old Mamalahoa highway, now most popularly known as the "4-mile scenic route".

A survey of Area D resulted in the identification of four features, all terraces, and historic cultural material (Figure 2).

Area D consisted of a small terraced parcel that is being considered for employee parking vehicles located approximately 100 feet north/west of Alakahi Stream (Figure 3). According to Mr. Lutkenhouse impact would consist of leveling and laying down a gravel bed on a flat area directly adjacent to the highway. A path leading down slope to the Hilo Garden toolsheds from the proposed parking area is also planned.

Feature 1 was a terrace directly abutting the highway measuring 17.30 m long by 7.00 m wide. It was soil surfaced and faced to the east and south with a height of 4.10 m. The facing was in excellent condition (Figure 4). Three narrow terraces were located directly to the south/east were connected to the Feature 1 facing and appeared to continue along the contour of the slope to the south. While mapping the side terraces, historic cultural material was observed eroding out of the earthen terrace in front of Feature 1-A and in the southern section of the rock facing of Feature 2. The material was mainly glass shards and ceramic pieces. More cultural material was evident down this slope and noted in areas below Feature 4.

The surface of the terrace had been cleared of vegetation and contained some pieces of very old rusty metal pipe and a few modern beer bottles. On the highway side of the terrace were berm deposits of disturbed soil. Two shovel probes (SP-1, SP-2) were placed at the north/west and south/east end of the terrace. Both contained the same single layer of soil, a dark reddish brown (5YR 3/3) silt loam. Nothing cultural was recovered from SP-1. Shovel Probe 2 contained rusty metal pieces and three pieces of ceramic.

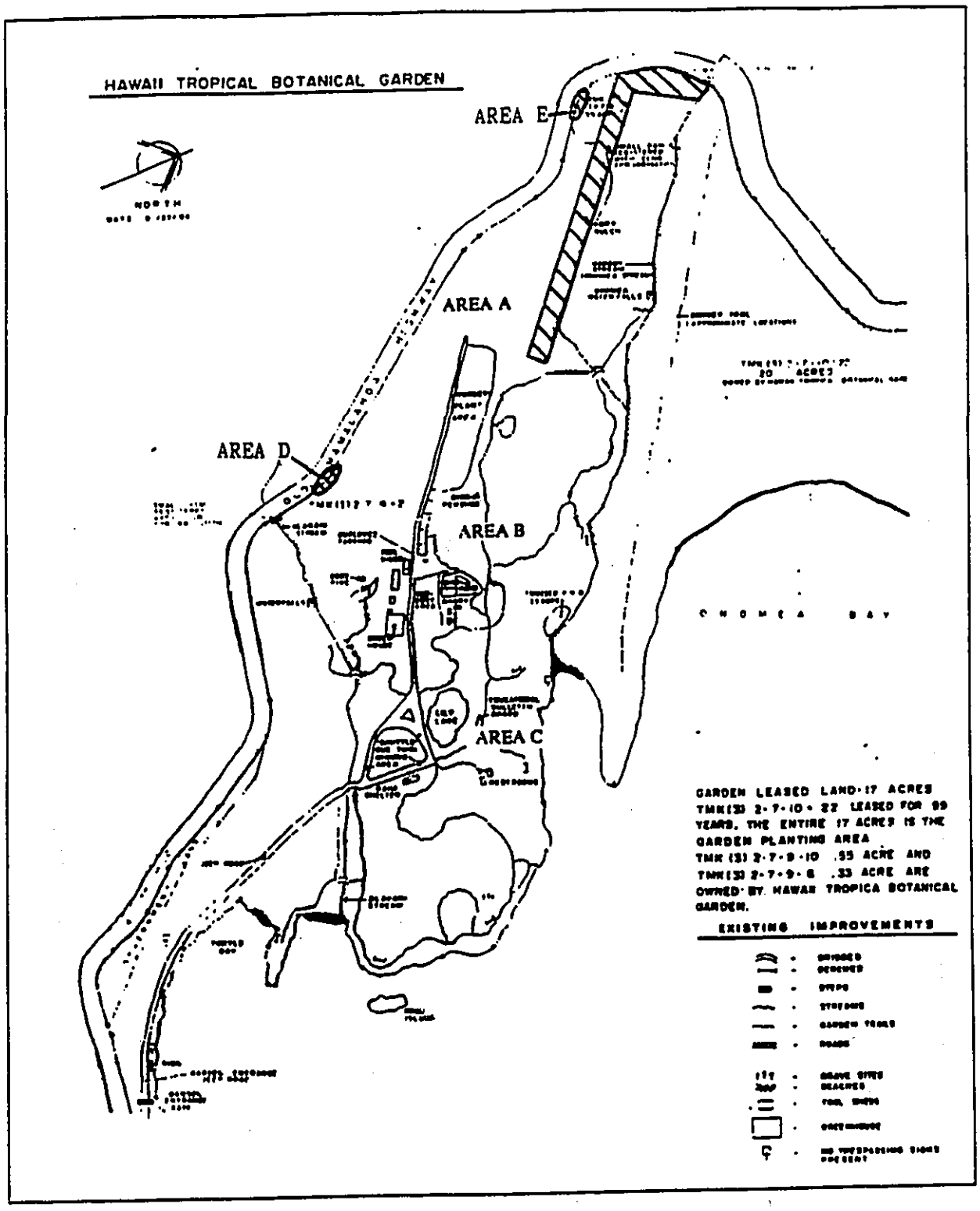

FIGURE 1: MAP SHOWING ADDITIONALLY SURVEYED PROJECT AREAS D AND E.

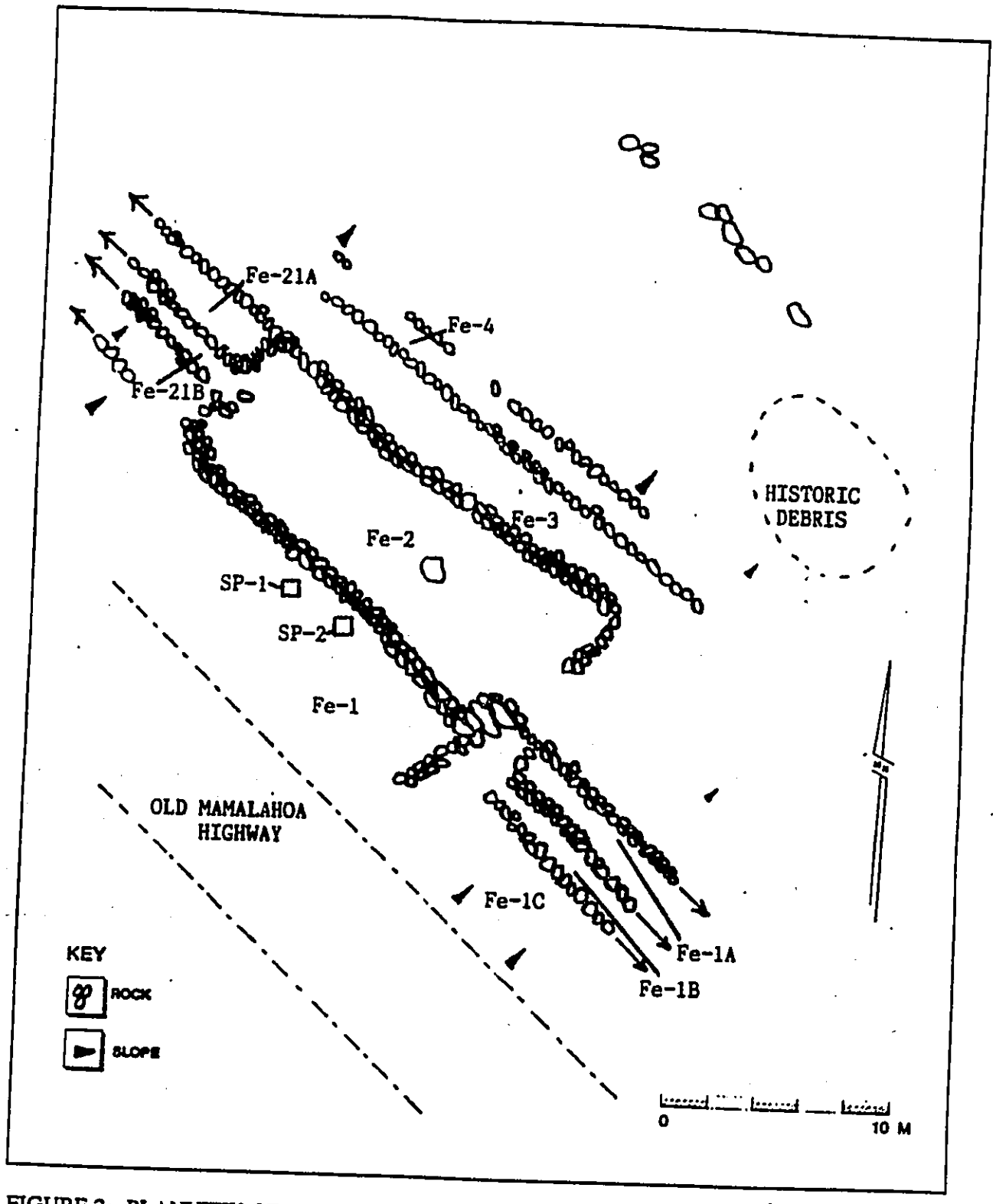

FIGURE 2: PLANVIEW OF AREA D, HAWAII TROPICAL BOTANICAL GARDEN.

FIGURE 3: AREA D BEING CONSIDERED FOR PARKING VIEW TO NORTHWEST.

FIGURE 4: WELL FACED TERRACE RETAINING WALL. VIEW TO SOUTHEAST.

Feature 2 was a soil surfaced, faced terrace on the slope below Feature 1, measuring approximately 19.00 m long by 6.10 m wide. The height of the facing was 3.20 m and it was in excellent condition. A path has been worn down the slope from Feature 1 on to the Feature 2 terrace. Two narrow terraces were located directly to the north/west, connecting with the Feature 2 facing and appeared to continue along the contour of the slope to the north.

Feature 3 was a faced terrace on the slope below Feature 2, measuring 2.00 m wide. This terrace continued along the contour line both to the east and west out of the project area. The height of the facing ranged from 0.98 to 1.25 m. An inkstone fragment was found lying on top of the terrace facing.

Feature 4 was a soil surfaced, faced terrace on the slope below Feature 3, measuring 1.20 m wide. This terrace continued along the contour line both to the east and west out of the project area. The height of the facing ranged from 1.00 to 1.53 m.

On the slope to the south/east of Feature 4 was a concentration of historical material. Whole bottles, glass and ceramic fragments, pieces of earthen ware, hunks of metal tools and rusty machines parts, European and Asian bowl and plate fragments, medicinal bottle pieces were found here, as well as upslope. All of these artifacts appeared to have been washed out of, or down the slope and were in a disturbed context. The field inspection placed most of the material at the turn of the century.

An earlier survey of several areas in Hawaii Botanical Garden was done by Marc Smith of the State Historic Preservation Division in which terraces adjacent to the highway and above the park were identified as contemporaneous with, and a feature of, road construction (Marc Smith October 1, 1993). It was concluded that Features 1 through 4 were a part of this system.

Historical artifacts were eroding from a soil and a rock facing of two of the terraces indicating an historic time frame for construction of the features, as well as indicating the presence of an historical structure or trash deposit in or near Area D.

Ceramic recovered from SP-2 was identified as pieces of the same Japanese tea cup (M. Inada ware). The metal piece was identified in the field as a foot-rest from some piece of equipment (tractor?). The terrace was interpreted as being a road construction feature containing fill and historic debris.

Area E is another small area being considered for future employee parking located approximately 150 feet south of a county bridge crossing Hanawai/Onomea Stream (Figure 5).

Survey of Area E resulted in no features or cultural material being identified. The section of land proposed for the second parking area had been cleared and consisted of push from the construction of the Mamalahoa Highway.

FIGURE 5: GENERAL VIEW OF AREA E.
VIEW TO SOUTHEAST.

GOVERNOR OF HAWAII
RECEIVED
DIVISION OF
LAND MANAGEMENT
JUN 26 2 53 PM '96

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

DEPUTY
GILBERT COLOMA-AGARAN

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

June 25, 1996

MEMORANDUM

LOG NO: 17294
DOC NO: 9606PM39

TO: Dean Uchida, Administrator
Land Division

FROM: Don Hibbard, Administrator
for State Historic Preservation Division

SUBJECT: Chapter 6E-42, Historic Preservation Review -- CDUA HA-1447A.
Hawaii Tropical Botanical Garden
Alakahi, Kahalii and Onomea, South Hilo, Hawaii Island
TMK: 2-7-9: 2, 6 and 10; 2-7-10: 22

It appears that the Applicant is either unwilling or unable to complete an archaeological inventory survey of the "Garden" prior to the start of the planned improvements, and has chosen instead to deal with historic preservation concerns on a project by project basis. The Management Plan indicates that the Applicant is now prepared to conduct archaeological inventory surveys of the following specific improvement project areas: (1) fencing along the Donkey Trail: (2) future landscaping areas; (3) construction of a foot bridge over Onomea Stream; (4) construction of greenhouses, and (5) construction of restrooms. There is also a further commitment in the Management Plan to undertaking archaeological inventory surveys of any other future development areas and submitting the findings in report form to our office for review and approval. This project-by-project review approach is an acceptable approach under the historic preservation laws.

To avoid any possible misunderstanding regarding the extent of historic preservation requirements, the Applicant should understand that in addition to an archaeological survey there may be a need in some cases for mitigation in the form of either preservation or data recovery (e.g. excavations). We suggest that the possibility of such further work and the Applicant's commitment to undertake it be added to wording in the Management Plan.

PM:jk

EXHIBIT 11

PHRI

Paul H. Rosendahl, Ph.D., Inc.
Archaeological • Historical • Cultural Resource Management Studies & Services
305 Mohouli Street • Hilo, Hawaii 96720 • (808) 969-1763 • FAX (808) 961-6998
P.O. Box 23305 • G.M.F., Guam 96921 • (671) 472-3117 • FAX (671) 472-3131

Report 1032-051691

May 5, 1991

Mr. Dan J. Lutkenhouse
Hawaii Tropical Botanical Garden
248 Kahoa Road
Hilo, Hawaii 96720

Subject: ***Archaeological Field Inspection***
Hawaii Tropical Botanical Garden Project Area
Land of Onomea, South Hilo District
Island of Hawaii (TMK:2-7-10:1,22)

Dear Mr. Lutkenhouse:

At your request, Paul H. Rosendahl, Ph.D., Inc. (PHRI) recently conducted an archaeological field inspection of the Hawaii Tropical Botanical Garden project area, located in the Land of Onomea, South Hilo District, Island of Hawaii (TMK:2-7-10:1,22). The survey field work was conducted on May 8, 1991 by Supervisory Archaeologists Alan T. Walker, B.A., and Victoria K. Kai, B.A.. Approximately eight labor-hours were expended in carrying out the field work.

The primary objectives of the survey were (a) to determine the general nature and extent of archaeological remains in the project area, and to determine the implications of any such remains with regard to the feasibility of development, and (b) to estimate the general scope of any subsequent archaeological work that might be required in the course of future development. Such further work could include an inventory-level survey, and if required, further data collection involving detailed recording of sites and features and selected test excavations; and possibly subsequent mitigation—data recovery research excavations, construction monitoring, interpretive planning and development, and/or preservation of sites and features with significant scientific research, interpretive, and/or cultural values.

The project area consists of c. 40 acres situated c. 0-220 ft AMSL (above mean sea level) on the coastline *(Figure 1, attached)*. It is bounded on the west by the old Mamalahoa Highway, on the east by Onomea Bay and the Pacific Ocean, on the north by abandoned sugarcane land, and on the south by Onomea Stream and the existing Hawaii Tropical Botanical Garden. With the exception of a gulch, TMK: 2-7-10:1 consists of abandoned sugarcane land which has been partially cleared and currently used as a tree nursery. TMK: 2-7-10:22 is virtually unaltered. Vegetation in the gulch and TMK: 2-7-10:22 is moderately dense and consists primarily of *'ohi'a lehua* (*Metrosideros collina* [Forst.] Gray), *'ulu* (*Artocarpus communis* Forst.), *hala* (*Pandanus odoratissimus* L.f.), *Ki* (*Cordyline terminalis* [L.] Kunth), guava (*Psidium guajava* L.), *heliconia* (Heliconia spp.), banyan (*Ficus* sp.), mango (*Mangifera indica* L.), and various palms.

The project area terrain varies from gently undulating to very steep; soil in the area falls into two classifications. Soil in TMK:2-7-10:1 is classified as Hilo silty clay loam (20-35% slopes), representing the Hilo series of well-drained silty clay loams which formed in volcanic ash (Sato et al. (1973). Soil in TMK:2-7-10:22 consists of Rough broken land. According to Sato et al., Rough broken land "...is a miscellaneous land type that consists of very steep, precipitous land broken by many intermittent drainage channels. It occurs primarily in gulches, and the slope is [pre]dominately 35 to 70 percent" (1973:51). Rainfall in the project area is c. 125-150 inches per year, and the mean annual temperature is approximately 75 degrees F. (Armstrong 1983:63,64).

Previous archaeological work in the general vicinity of the project area includes investigations by Thrum (1908), Hudson (1932), and Goldstein (pers. comm.). In 1908, Thrum prepared a list of *heiau* and *heiau* sites throughout the

EXHIBIT 12

Hawaiian Islands and he identified one *heiau* in the vicinity of the present project area (Thrum 1908). According to Thrum (1908), this *heiau* was located above a road (probably the old Mamalahoa Highway), in a sugarcane field, and was in ruins. No map is given by Thrum (1908), but judging by other information he presents, it appears this *heiau* was located outside the present project area.

In the early 1930s, Hudson conducted an archaeological investigation of the eastern portion of Hawaii Island, from Waimanu to Ka'u (Hudson 1932). Hudson notes the *heiau* identified by Thrum may have once been in the vicinity, but he [Hudson] was unable to locate any structural remains and no one in the community could provide any definite information on its whereabouts (Hudson 1932).

During his investigation, Hudson noted that Onomea Bay still contained a Hawaiian community which continued to produce *kalo* (*taro*). Hudson (1932) indicated that the area between the government road (probably the old Mamalahoa Highway) and the beach was under cultivation (irrigated terraces). Hudson (1932) also indicated that some of the houses were built atop stone platforms which may be earlier housesites and that remnants of abandoned terraces were noted up a gulch, where the government road crosses a stream.

Also contained within Hudson (1932) is a reference to an account by Kinney (IN Hudson 1932) of a stone sacred to Kane. The stone is located in the ocean opposite the mouth of Onomea gulch and had been placed there by Kane.

In 1982, Goldstein conducted a survey of the existing Hawaii Tropical Botanical Garden site (Goldstein, pers. comm.). With the exception of several features which appeared to be graves (on the immediate coastline), Goldstein did not identify any archaeological structural remains. The approximate location of the possible graves are shown on the USGS 7.5" series quad map ("Papaikou, Hawaii") and are outside the present project area.

The following historical information was compiled by PHRI Historical Researcher Lehua Kalima, B.A.

In *Place Names of Hawaii* (Pukui et al. 1974:171) Onomea is described as a "village, stream, and bay, Honomu qd., Hawaii. A well known sea arch here collapsed in 1958." Several legends as well as historical accounts of Onomea are included in John Clark's description of the area in *Beaches of the Big Island* (1985). The following accounts are taken from that book.

The village of Kahali'i was located on a large point of land which extends into Onomea Bay. Though the village is gone now, former residents of Kahali'i still remembered some of the legends concerning the area's landmarks. One legend tells of the origin of two rock formations at the head of Onomea Bay that are said to have been a young man and woman known as the lovers of Kahali'i (Clark 1985:9):

> One day one of the chiefs of the village spotted many canoes with sails heading shoreward in their direction. Fearing an attack, the chiefs and the family elders held a council to determine a course of action and decided to build a reef to prevent a landing on their beaches. Not having the means to complete the task quickly enough, they asked that a young man and a young woman be the guides and protectors of the village by giving their lives. Two willing individuals were found.
>
> That night a decree was sent to all who lived at Kahali'i to remain indoors from sunset to sunrise without making any light or sound, on penalty of death. During the darkest hour of the night steps were heard walking through the village, and then silence prevailed until morning. In the light of the new day, the people moved down to the shoreline where they were amazed to find the lovers gone, and in their place two gigantic rock formations at the entrance to the bay, along with many other smaller rocks strewn about, as if on guard. The chief informed the people that no canoe could pass the treacherous currents swirling around the rocks unless allowed to do so by the guardians. The lovers and their offspring still stand today, sentinels at the head of the bay (ibid.).

Another legend of Onomea concerns a small cove in the bay which borders the northern side of the Botanical Garden. This cove was cut by Kukilu Stream, the only perennial stream in Onomea Bay (ibid:10). The "Living Waters of Kukilu" is a legend which explains why Kukilu Stream never stops flowing:

> Long ago a family lived near the cliff of Kahali'i Valley. They were not rich and had few material possessions, but were always friendly and kind. One day a tired old man knocked on their door; so they asked him in, saw to his comfort, and bid him stay until he felt better.
>
> Many days passed and it seemed that the stranger ate so much that there would not be enough food to last another meal, but the family never complained, always seeing to the elder's wants. Finally the time came when the man and his wife, Kauwa and Luahine, had to tell the stranger that they had to leave him to seek food. The stranger said to them, "Go and seek what you will find. May the gods be kind to you as you have been to me. Your love and kindness will always be the biggest blessings to you both."
>
> Luahine and Kauwa and their children traveled far and were always received by strangers with warmth and friendship. They finally passed through Waipi'o where the chief himself saw to their comfort. Then the chief presented them with a war club and said, "I have been waiting for you. I know you have spent many days working to feed my father who has gone to see whom he could help before he returns to the gods. You have served him well. Now you must take this war club and return to Kahali'i."
>
> On returning to their home, they found the stranger almost lifeless, but at their approach he opened his eyes and whispered, "My children, you have returned." "Yes," Kauwa replied, "and we will bring you back to life again so that you may remain many months more." The old man answered, "No, do not keep me long. I have done what I have set out to do, but do this for me that you will remember all of my good deeds. When the spirit has left my body, take me to the spot where the *'ili 'ili* are small and soft, with their sand as a cushion. Place me beside the stream covered in tapa that Luahine has made. Then travel to the mountain and find the headwater to the stream. Strike the ground three times. Then return to me and hit the ground where I lie three times also. Nevermore will you need to travel to look for food and water. And there will always be enough to share." So saying, the old man closed his eyes for the last time. Kauwa and Luahine then followed his instructions. That is why Kukilu Stream has never stopped providing water for the gardens and people of Kahali'i (ibid:11).

Isabella Bird, a visitor to the islands in 1873, made a number of trips to some of the remotest parts of the island. One trip she made took her on horseback from Waipio Valley to Hilo, and along the way she spent several days as a guest at a sugar plantation. While in her lodgings, which looked down upon Onomea Bay, she made the following comments:

> This place is grandly situated 600 feet above a deep cove, into which two beautiful gulches of great size run, with heavy cascades, finer than Foyers at its best, and a native village is picturesquely situated between the two. The great white rollers, whiter by contrast with the dark deep water, come into the gulch just where we forded the river, and from the ford a passable road made for hauling sugar ascends to the house.
>
> The plantations in the Hilo district enjoy special advantages, for by turning some of the innumerable mountain streams into flumes the owners can bring a great part of their cane and all their wood for fuel down to the mills without other expense than the original cost of the woodwork. Mr. A. has 100 mules, but the greater part of their work is ploughing and hauling the kegs of sugar down to the cove, where in favourable weather they are put on board of a schooner for Honolulu (Isabella Bird IN Clark 1985:9).

Kahali'i, formerly a fishing village, became a shipping terminal for schooners and steamers until the railroad line from Hilo to Paauilo was finished. The Hawaii Consolidated Railway began in 1899, but was put out of business when the tsunami of 1946 destroyed the entire line. Although some remnants of the village at Kahali'i can still be seen, the tsunami waves reached heights of 35 feet above sea level in Onomea Bay and demolished the entire area (ibid.).

Perhaps the best known landmark in Onomea Area was the former Onomea Arch. Located at the north point of the bay, this sea arch was cut through an old cinder cone remnant by thousands of years of wave action. In the book *The Island of Hawaii* the village and arch at Onomea are described as they appeared in 1913:

> It [the road] passes above the Onomea settlement, one of the more easily accessible typical Hawaiian villages, with grass houses, taro patches, cocoanut, mango and breadfruit trees, canoes, etc. Trails lead down into it on both the north and south side, it being possible to ride down one, and up the other. The north trail continues right up to the railroad station. In the sea makai of the settlement is the kane stone, said to have been placed there by Kane, the Hawaiian creator. The main sight, however, is Onomea Arch, a great natural bridge at the end of the cliff on the north side of the village, which is famous for its beauty and its unique formation (Kinney IN Clark 1985:10).

On the morning of May 24, 1956 the Onomea Arch collapsed as the center portion of the arch cracked, buckled upward, and fell.

When the Great Mahele took place in 1848, the *ahupua'a* of Onomea was awarded to Victoria Kamamalu (Land Commission Award 7713). Being an *ali'i*, Kamamalu was not required, as were the common people, to submit testimony for her awarded lands; thus, no information exists regarding her property. The only other award in this *ahupua'a*, a parcel consisting of one acre, was given to Samuela. The testimony for the award states that it was being disputed and does not give information on land use (Foreign Testimony Vol. 5:26). The award does not appear to be located in the project area.

An interesting feature of the Onomea Bay area is the abundance of Alexandra palms which line the scenic drive overlooking the ocean. These trees were planted between 1912 and 1922 under the direction of Manuel Tavares who was superintendent of public parks for many years on the Big Island (ibid.).

Onomea Bay is one of a few places on the Big Island where red lava is present on the shoreline (ibid.). The waters of Kukilu Stream cut through a vein of red cinder and transport the eroded material to the head of the cove where it forms the only red sand beach on the island of Hawaii (ibid.).

The project area lies in an area which was, prehistorically, a fishing village, and in recent years the area has been a shipping station for sugar cane. Sugar plantation records, as well as other early historical accounts on land use in the project area may exist, but they were not examined as part of the scope of this survey.

The surface survey for the present project consisted of four pedestrian transects. The transects were (a) within the gulch in TMK:2-7-10:1, (b) atop the ridge leading to the fallen arch and Lae O Puni, (c) along the coastline of Onomea Bay, and (d) along the north side of Onomea Stream. Extremely steep ridge slopes were generally not examined. Surface visibility in all transects was moderate to good due to the generally open understory. During the survey, no surface structural or portable remains of any kind were identified. Also, it is unlikely that any archaeological remains are present on the extremely steep slopes that were not inspected during the present survey. As a result of these negative findings, no further archaeological work is necessary in the project area.

Drawing on information found in previous archaeological work and historical documentary information, general settlement patterns for this area of Onomea can be surmised. Because this area of Onomea contains a permanently flowing stream and a variety of offshore reef environments offering a wide range of marine resources, it offered an attractive and ecologically optimal environment for early Hawaiians. Occupation of the Onomea Bay area probably focused on the flatter areas on the south side of the bay (outside the present project area) and marine resource exploitation and irrigated agriculture were probably major subsistence activities. As noted by Hudson (1932), irrigated agricultural terraces were centered around the fresh water streams during the historic period. This is a practice which probably originated during the prehistoric period.

During the early historic period, Onomea Bay continued to support a local Hawaiian population and the village was used as a shipping terminal for transporting sugar cane to Oahu. Eventually, the shipping terminal was replaced in 1899 by the Hawaii Consolidated Railway. Both the railway and the village were subsequently destroyed by the 1946 tsunami.

It should be noted that the evaluations and recommendations presented here are made solely on the basis of a field inspection survey and limited historical documentary research. There is always the possibility that potentially significant, unidentified subsurface cultural remains or surface structural features will be encountered in the course of future archaeological investigations or subsequent development activities. In such situations, archaeological consultation should be sought immediately.

This report constitutes the final report on the field inspection survey. If you have any questions concerning our survey, please contact me at our Hilo office (808) 969-1763.

Sincerely yours,

Alan T. Walker
Supervisory Archaeologist

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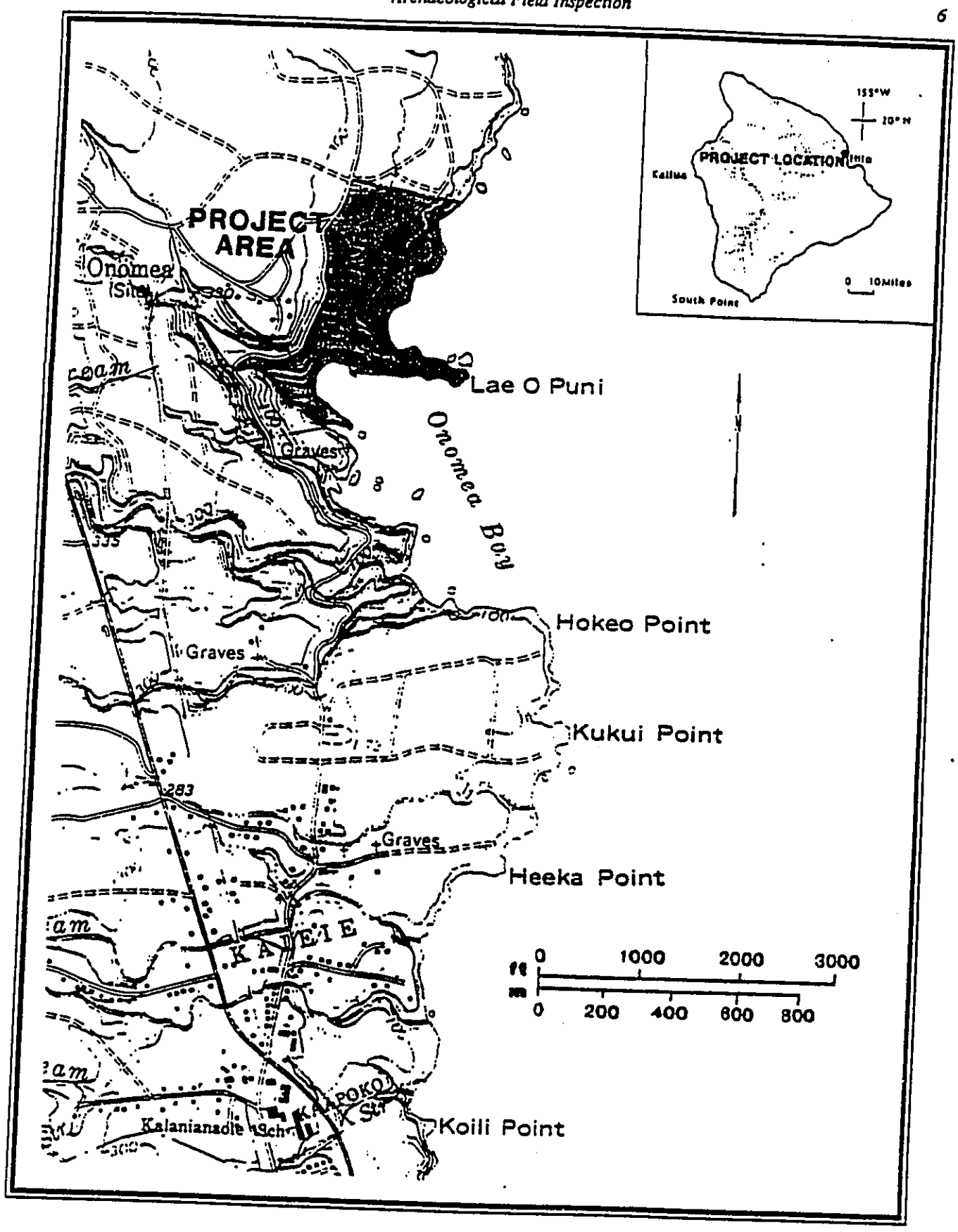


Figure 1. Project Area Location Map

ALI'I ARCHITECTS INC.
ARCHITECTURE • PLANNING • ENGINEERING

SIGHT DISTANCE STUDY REPORT

FOR:

HAWAII TROPICAL GARDEN

March 18, 1996

LOCATION: The Old Mamalahoa Highway(Scenic Road), Hilo, Hawaii

TMK#:(3) 2-7-10:14

ATTACHMENT: Traffic Study Plan

Prepared By:

Ali'i Architects Inc. and Delta Engineering
74-5565 Luhia Street Suite #F
Kailua Kona, Hawaii 96740
Phone: (808) 329-8777

BAHMAN KHERADPEY
LICENSED PROFESSIONAL ENGINEER
No. 7384-CE
HAWAII, U.S.A.

THIS WORK WAS RPEPARED BY ME OR UNDER MY SUPERVISION.

Signature

EXHIBIT 13

GENERAL

The purpose of this report is to analyze the pedestrian and motor vehicle movements generated by the proposed new visitor center for Hawaii Tropical Botanical Garden and to make recommendation to achieve a safe and practical condition.

DISCUSSION AND RECOMMENDATIONS

SITE STUDY

Site investigation has been performed by our office to confirm the exiting conditions. The Old Mamalahoa Highway is a two lane road with speed limits up to 25 mph. A concrete bridge is to the north of the site, forcing the automobiles to slow down while approaching the entrance to the site. From both directions, approaching the site and within 500 feet, there are two 90 degree turns in either directions that also forces the vehicles to slow down. The site inspection has determined that removal of some of existing trees, and also ground and tree maintenance of certain areas will be required in order to provide clear line of sights for both the pedestrians and the vehicles.

DRIVEWAYS

The new visitor's center will have two separate driveways, one to enter the facility and the other will be used to exit the facility. The parking lot has been designed for, and will be used only by passenger vehicles, except for fire emergency cases. This factor has been taken into account for safe exit of the vehicles from the parking lot.

CROSS-WALK

The visitor center will also include a pedestrian cross walk connecting the facility to paths leading to the botanical garden located on the east side of the road. The cross walk shall be painted per attached plan and must be maintained by the Owner.

SIGHT DISTANCE AND MOVEMENT STUDY

To create a safe vehicle operation , lines of sight were measured. For safe operation of vehicles , the State of Hawaii has minimum sight requirements for vehicles to enter a two lane highway. The speed limit on The Mamalahoa Highway is posted at 25 mph. However,

the 30 mph minimum values have been used to compensate for speeding vehicles. Stopping distance for a vehicle traveling at 30 mph is approximately 176 feet. Walking speeds vary with the physical condition and psychological attitude of each individual. Generally it is safe to assume that pedestrians will walk at a speed of 4 feet per second. Utilizing these limitations, appropriate signs will be placed to warn the vehicular traffic of the cross walk.

In this study, four cases have been of most concern as follows:

1-Pedesterians crossing the road away from the visitor's center.

2-Pedestrians crossing the road towards the visitor's center.

3-Cars leaving the parking lot, turning left or right.

4-Cars going north bound on the Mamalahoa Highway, turning into the parking lot.

Due to the curves in the road the actual traveling distances have been used in the calculations. The line of sights for all the above scenarios have been indicated on the attached plan. These lines have formed two areas on the east side of the road which are referred to as: **Sight Distance Easement**, and are shaded on the plan.

RECOMMENDATIONS:

In order to create clear and safe lines of sight , The **Sight Distance Easement** areas shall always be maintained by the Owner at all times based on the following criteria:

(1)-All existing trees within these two areas shall be removed with the exception of a few sparsely located trees allowed to preserve the natural beauty of our conservation land .

These trees shall be plotted on a surveyed map and shall be designated by species and co'ordinants. This map will have to be prepared by a licensed surveyor and certified by us.

(2)-At all times, within these two areas, all the shrub and the branches must be cleared within the two feet and eight feet heights, the nearest center point of the road being the zero height. This is shown on Fig.1 of the plan.

Upon the removal of trees, branches, and shrubs, a final inspection will be performed by our office to confirm the adequacy of the sight distance. The Owner shall be responsible for maintaining the **Sight Distance Easement** areas in the same condition as certified per Special Use Permit #917 requirements.

SIGNAGE:

The following signs will be required as per attached plan:

(1)-**Advance warning** signs for **Pedestrians Crossing.** One in each direction at approximately 400 Ft. from the cross walk. In case of a straight road approaching the cross walk a 500 Ft. distance is usually recommended for this sign. However, in this case the 400 Ft. location creates a more effective advance warning.

(2)-**Pedestrian Crossing** Signs. One in each direction at approximately 150 Ft. from the cross walk.

(3)-**One way Exit** and One **Way Entry** signs will be placed at the driveways.

The Owner will also be required to maintain these signs.

CONCLUSION

Based on our findings, field investigations, and State requirements, we will issue the final certification for traffic and cross-walk safety, pending strict conformance to our recommendations and requirements.

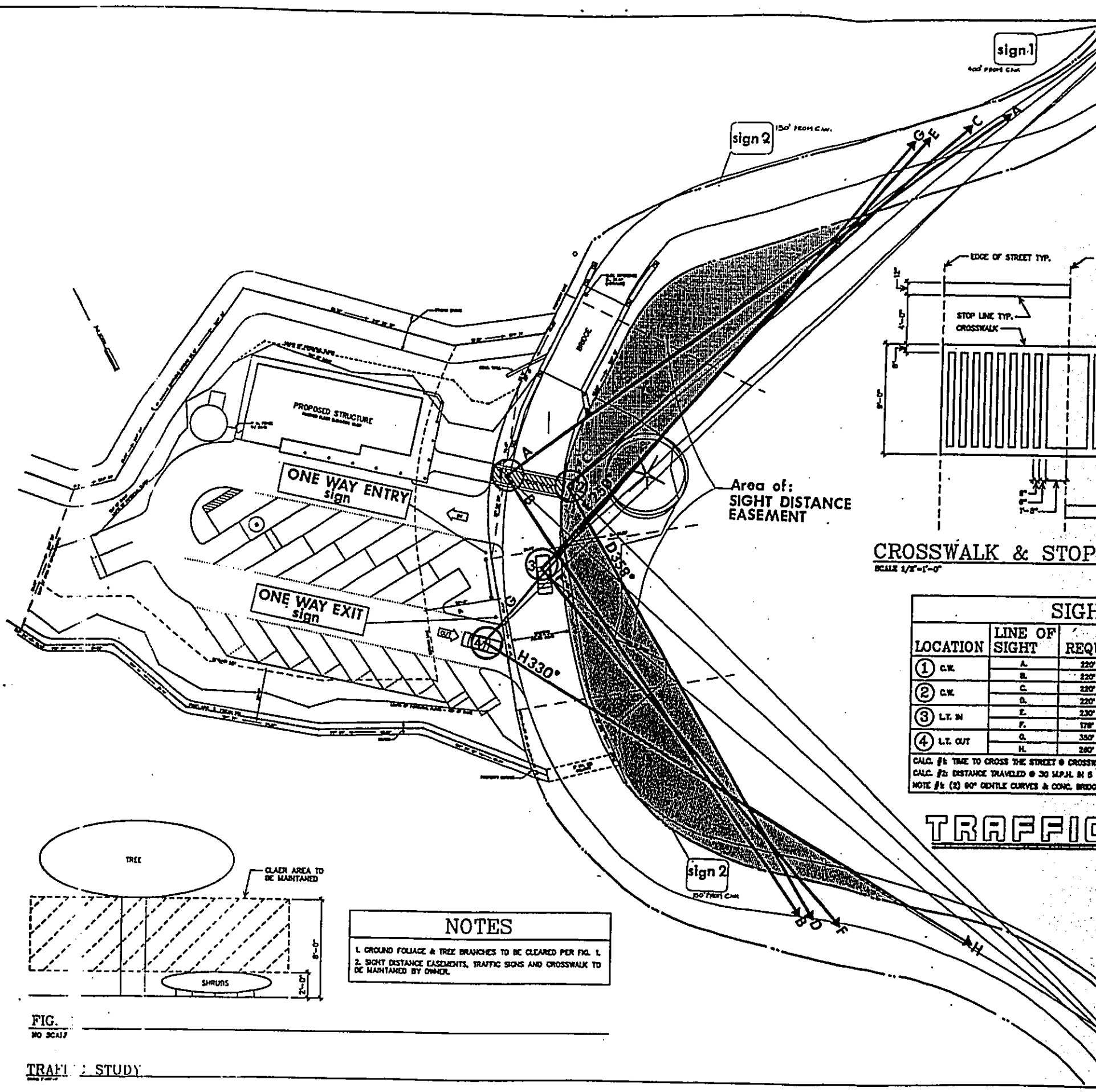
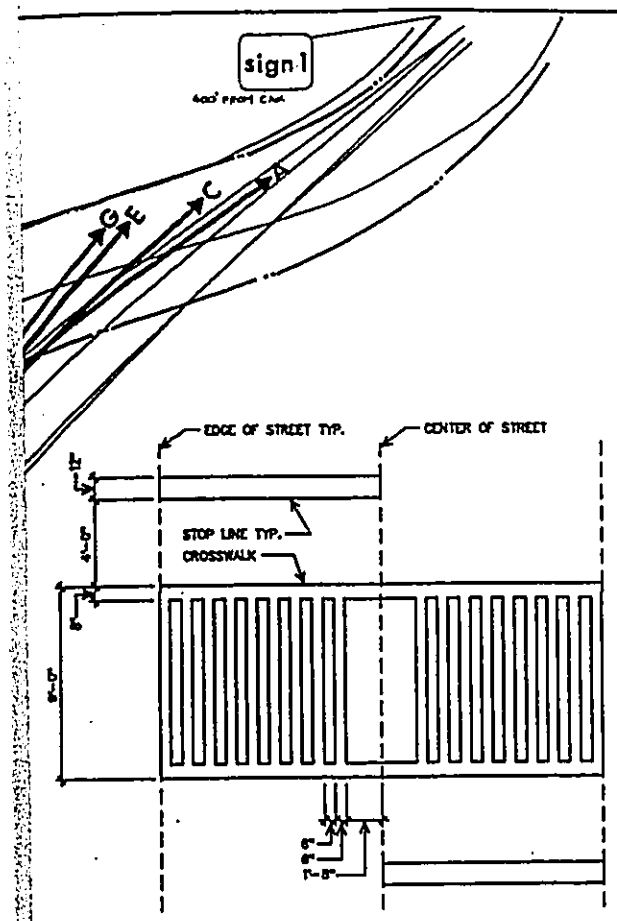


FIG.
NO SCALE

TRAFFIC STUDY



CROSSWALK & STOP LINE

SCALE 1/8"=1'-0"

SIGN LEGEND

SIGN #1
20mph
SIGN #2

NOTES

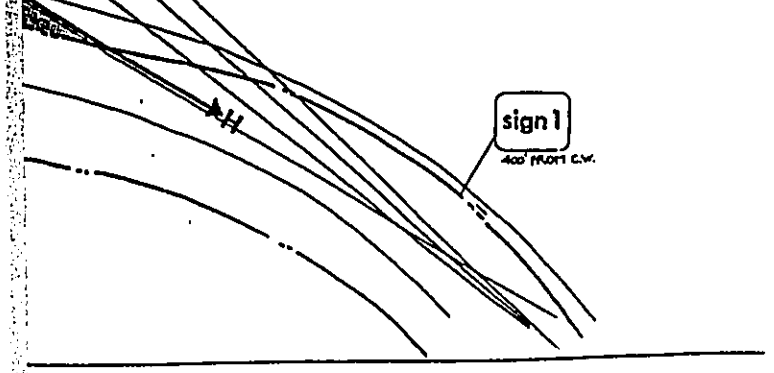
1. PAVEMENT MARKINGS & STRIPING SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS & HIGHWAYS", BY THE FHWA, & AS AMENDED.
2. LAYOUT OF PAVEMENT MARKINGS & STRIPING SHALL BE DONE BY THE CONTRACTOR. THE CONTRACTOR SHALL CHECK LAYOUT OF MARKINGS & STRIPING WITH THE ENGINEER PRIOR TO PERFORMING WORK.

SIGHT DISTANCE CHART

LOCATION	LINE OF SIGHT	REQUIRED DIST.	PROPOSED DIST.	NOTE
(1) C.W.	A.	220' PER CALC. 1 & 2	275'	MEASURED ACTUAL TRAVEL PATH
	B.	220' PER CALC. 1 & 2	230'	MEASURED ACTUAL TRAVEL PATH
(2) C.W.	C.	220' PER CALC. 1 & 2	250'	MEASURED ACTUAL TRAVEL PATH
	D.	220' PER CALC. 1 & 2	230'	MEASURED ACTUAL TRAVEL PATH
(3) L.T. IN	E.	230' PER CHART 5-D	280'	MEASURED ACTUAL TRAVEL PATH
	F.	178' PER CHART 5-D	205'	MEASURED ACTUAL TRAVEL PATH
(4) L.T. OUT	G.	350' PER CHART 5-D	310'	SEE NOTE #1 BELOW
	H.	280' PER CHART 5-D	280'	MEASURED ACTUAL TRAVEL PATH

CALC. #1: TIME TO CROSS THE STREET @ CROSSWALK, =20' X (1 SEC./4') = 5 SEC.
CALC. #2: DISTANCE TRAVELED @ 30 M.P.H. IN 5 SEC. = 220'
NOTE #1: (2) 80° OGIVLE CURVES & CONC. BRIDGE WILL COMPENSATE FOR 40' DEFICIENCY.

TRAFFIC STUDY PLAN



BAHMAN KHERADPEY
LICENSED PROFESSIONAL ENGINEER
No. 7384-CE
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Signature

ALI GHALAMFARSA
REGISTERED PROFESSIONAL ARCHITECT
No. 7498
HAWAII, U.S.A.

PREPARED BY: AUI ARCHITECTS FOR:
TREK CONCEPTS
KEVIN C. GARDNER - PROJECT ENGINEER
P.O. BOX 148 - KAHULUI, HAWAII 96732
808-983-5448

PROJECT:
HAWAII TROPICAL BOTANICAL GARDEN
NEW VISITOR CENTER AND OFFICES
ONOMEA BAY, HAWAII

T.M.K. (3) 2-7-10: 14

DRAWN:
2/3/94
BY: PJP

REVISIONS:

SHEET INFO:
TRAFFIC STUDY

P1

OF 19

United States Department of the Interior
NATIONAL BIOLOGICAL SERVICE
PACIFIC ISLANDS SCIENCE CENTER
Hawaii National Park Field Station
P.O. Box 52
Hawaii National Park, HI 96718
(808) 967-8211
FAX (808) 967-7153

2 July 1996

Mr. Scott Lucas, Director
Hawaii Tropical Botanical Garden
RR 143-A
Papaikou, Hawaii 96781

Dear Scott,

Thank you for your letter dated the 19th of June. I was not aware of your practice of fogging the Hawaii Tropical Botanical Garden (HTBG) with Diazinon when I prepared my recommendations for a study to relocate Megalagrion xantomelas from Onomea Stream to the koi or lily pond (hereafter referred to as the "Lily Pond") I understand that you instruct your staff to avoid the aquatic habitat during their spraying. However, without a monitoring program in place for the damselflies, it is impossible to assess the impact this practice has on their populations. The periodic absence of xantomelas from the lower reaches of Alakahi and Onomea streams (in what otherwise appears to be very good habitat) may be explained by drift from the fogging. I recommend that you investigate alternatives to fogging as a tool for reducing mosquitoes at the gardens.

I have not yet had an opportunity to observe the damselflies at the Lily Pond, but I am very encouraged to learn that you have observed mating and oviposition on Salvina at the pond. I do not believe that any effort is necessary to try and "stock" this pond from Onomea stream, given that the Megalagrion have naturally colonized the area on their own. Given the need for mosquito control in the gardens, the best strategy for maintaining Megalagrion in the area may be to work to preserve the population on Onomea Stream as well, rather than trying to translocate it.

Given these considerations, I recommend revising the project outline that I sent you on the 17th of April as follows:

1. Develop a population monitoring program for Megalagrion xantomelas in the gardens.

EXHIBIT 14

2. Evaluate the impact of Diazinon fogging before and after monthly treatments.

3. Investigate safer alternatives to fogging for mosquito control.

4. Complete a faunal survey of benthic and terrestrial arthropod communities and identify other potential threats to Megalagrion in HTBG (e.g. Argiope spiders).

5. Prepare a management plan for Megalagrion that would summarize results of this study and provide HTBG with specific recommendations on how to preserve native damselflies at the garden.

You indicated today on the telephone that your staff would be able to assist with the population monitoring of Megalagrion. This would be very helpful. The monitoring is not time consuming (perhaps an hour a week for someone properly trained).

We do not have in-house funds to support the project outlined above. If your staff were to take responsibility for population monitoring, I can provide training and a student intern or volunteer who could assist with other aspects of the survey. We could complete a small study over four months that would address the issues listed above for approximately $3,000. This would cover travel and per diem for an assistant and funding for supplies. I will donate my own time in exchange for the help of your staff with the population monitoring.

Please let me know if this project is something that your are interested in supporting. I would be happy to provide any further information you need.

Sincerely,

David Foote

David Foote
Acting Station Leader

cc: Pat Tummons, Environment Hawaii

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
220 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

GARY GILL
DIRECTOR

June 20, 1996

Mr. Daniel J. Lutkenhouse
Hawaii Tropical Botanical Garden
248 Kahoa Road
Hilo, Hawai'i 96720

Dear Mr. Lutkenhouse:

We submit for your response (required by Section 343-5(c), Hawaii Revised Statutes) the following comments on an April 1996, draft environmental assessment for "Amendment to Conservation District Use Permit HA-1447, and Special Management Area Use Permit Application, Entrance, Trails, Parking and Related Improvements, Master Plan Improvements at Hawaii Tropical Botanical Garden ["HTBG"], Alakahi, Kahalii and Onomea, South Hilo, Hawaii, TMK: (3)2-7-9:02, 06 and 10, 2-7-10:22." The document was submitted by an April 24, 1996, letter to our office by the County of Hawaii Planning Department. Notice of availability of this draft environmental assessment was published in the May 23, 1996, and the June 8, 1996, editions of the *Environmental Notice*.

1. Please ascertain and describe in section 4 (entitled "The Affected Environment, Potential Impacts and Mitigation Measures"), title to the old Government road that traverses the HTBG property.
2. Please describe in section 4.8 (entitled "Visual Attributes"), the red sand beach described on page 4, of the May 5, 1991, letter of Paul H. Rosendahl, Ph.D., Inc., to Dan J. Lutkenhouse. Please discuss the direct, indirect or cumulative effects of the proposed action on this visual resource.
3. We note that on page 33, the DEA mentions two diversion dams. Please discuss direct, indirect and cumulative effects on the environment of stream water diversion and the placement of diversion structures, especially with respect to in-stream and nearshore biota.
4. Please discuss in section 4, possible direct, indirect or cumulative effects on the environment caused by landscaping with exotic plants.

EXHIBIT 15

Please submit a copy of this letter and your response to the County of Hawai'i Planning Department for their inclusion in the final environmental assessment for this project. If there are any questions, please call Mr. Leslie Segundo, Environmental Health Specialist toll-free at 1-800-468-4644 extension 64185. Thank you.

Sincerely,

GARY GILL
Director

c: Sandra Pechter Schutte, Esq.
Hon. Virginia Goldstein, County of Hawaii, Planning Dept.
Hon. Michael Wilson, Chairperson, Board of Land and Natural Resources

SANDRA PECHTER SCHUTTE
ATTORNEY AT LAW

101 Aupuni Street, Suite 1014A
Hilo, Hawaii 96720
Telephone: (808) 969-7331
Fax: (808) 934-9819

July 19, 1996

Mr. Gary Gill
Director
State of Hawaii
Office of Environmental Quality Control
220 South King Street, Fourth Floor
Honolulu, Hawaii 96813

Re: Draft Environmental Assessment for Amendment to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; Entrance, Trails, Parking and Related Improvements and Master Plan Improvements at Hawaii Tropical Botanical Garden
Alakahi, Kahalii and Onomea, South Hilo, Hawaii
Tax Map Key Nos.: (3) 2-7-9:2, 6 and 10, and 2-7-10:22

Dear Mr. Gill:

Thank you for reviewing the draft environmental assessment ("DEA") for Hawaii Tropical Botanical Garden's amendment to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; entrance, trails, parking and related improvements and master plan improvements at Alakahi, Kahalii and Onomea, South Hilo, Hawaii. This letter addresses comments contained in your letter dated June 20, 1996 to Daniel J. Lutkenhouse:

Title to the Old Government Road Traversing HTBG Property. The trail depicted in the DEA as the Onomea Access Trail essentially follows the path of an old Government Road that is depicted on a survey map prepared A. B. Lobenstein in 1889. An abstract prepared for DLNR by Awana, Inc. concluded that the road dates back to the reign of Kamehameha III. The historical evidence, documented in a report prepared by Paul H. Rosendahl, Ph.D., dated July 21, 1995, concludes that this right-of-way was a government roadway in the 1800's designed to facilitate wheeled vehicular traffic. Based on this data, this roadway became a public road, under the Highways Act of 1892, presently HRS Section 264-1. Because of the evidence of vehicular use of this roadway and the nature of the roadway, the County of Hawaii and HTBG believe that the roadway is under the jurisdiction of the County of Hawaii. DLNR, however, claims that this right-of-way is a trail under State jurisdiction.

Notwithstanding the ownership of this roadway, under a mediation agreement between DLNR, the County of Hawaii and the Applicant, approved by BLNR on October 27, 1995,

this roadway has been designated as a public access trail as part of the State Na Ala Hele trail system.

The final environmental assessment will be revised to include this information. .

The Red Sand Beach. A small red sand beach, located near the mouth of Onomea Stream, has been noted in literature regarding Onomea Bay, specifically, *Beaches of the Big Island* by John R.K. Clark (Univ. Of Hawaii Press,1985), cited in the May 5, 1991 letter of Paul H. Rosendahl, Ph.D. to Daniel J. Lutkenhouse. The red sand of this beach may have been significant historically; however, it is not notably visible today. Since there are no improvements proposed near this beach, there is no adverse impact anticipated which would affect the remaining visual attributes of this resource. This information will be incorporated in the final environmental assessment.

Impacts of the Diversion Dams. The impacts on the environment of stream water diversion and the placement of diversion structures, were discussed in Section 4.2 of the DEA regarding the streams. Based on discussions with the State Division of Aquatic Resources, additional information and analysis will be provided in the final environmental assessment.

Impact of Landscaping with Exotic Plants. The impact of the use of exotic plant species was discussed in Section 4.3 of the DEA. The landscaping with exotic plant species, is not anticipated to have a substantial adverse impact upon the environment, in light of the fact that the existing flora in the area consists primarily of exotic species and the Applicant controls growth of its vegetation to avoid the spread of any exotic species to areas outside of the landscaped area. The final environmental assessment will include a discussion of the impacts on the environment caused by landscaping with exotic plants.

We appreciate OEQC's comments on HTBG's draft environmental assessment. The final environmental assessment will be revised, as appropriate, because of your comments. Your letter and this response will also be appended to the final environmental assessment to ensure a document that adequately addresses pertinent development and environmental issues.

Very truly yours,

SANDRA PECHTER SCHUTTE

xc: Hawaii County Planning Department
Department of Land & Natural Resources, Land Management
Hawaii Tropical Botanical Garden

Share Onomea Access
P.O. Box 636
Pepe'ekeo, HI 96783
961-4953
June 13, 1996

Ms. Sandra Pechter Schutte
101 Aupuni Street, PH-1014A
Hilo, HI 96720

Re: Hawaii Tropical Botanical Garden
Amendment to CDUP HA-1447 and Second Draft Environmental Assessment

We have read HTBG's latest submittals, and we do not see much effort on its part to address the major concerns raised from the first draft Environmental Assessment. We feel that these documents must not be allowed to stand without major changes or, if HTBG is not willing to change its plans, we feel an environmental impact statement is required.

Before noting the problems, I wish to stress that, despite all HTBG's work to assemble and distribute these plans, it has never (by your own admission) gone out and shared these plans and changes with the very community who will be most impacted. The impacts of HTBG's immediate and future plans will include permanent and major changes to an environmentally, historically, and culturally significant area. How can HTBG plan to impact this rural area so significantly without reaching out to the residents and community groups in the area?

The application asks for current and future improvements to a greatly expanded project site. You have indicated that you are expecting expedited processing of this application (and expecting the State to overlook HTBG ongoing violations), because the State supposedly agreed to this in the October 27, 1995, Mediation Agreement. However, the Mediation Agreement provided for expediting review of a new trail system on TMK #2-9-7: 2 as well as developments on the new headquarters site. Nothing was said about more than doubling the project site by expanding onto TMK #2-7-10: 22 or about circumventing the law by overlooking HTBG's violations or about allowing HTBG to harm the environment, archaeological sites, or public access rights.

We have specific objections to many of your plans. In addition, on the future plans, we will work to make sure nothing gets approved outside public scrutiny. ***All future improvements should be brought before the BLNR in the usual way, after an opportunity for public scrutiny and input.*** HTBG's 1982 CDUP allowed for unfortunate developments (the loss of public property and shoreline access, for one) to occur outside the public sphere, and we do not think this mistake should be repeated.

We are requesting that an environmental impact statement be required, so that the public will have an opportunity to know the impacts of this project and to comment. We understand that, if an EA determines that a proposed action "may have a significant effect on the environment," the state or county must order preparation of an EIS. As with HTBG's first draft EA, we deplore the way important issues were either glossed over or totally ignored in these submittals. Once again, the documents miss the point of the whole exercise, which is to fully disclose, assess, discuss alternatives, and mitigation measures for all environmental issues in and around the project site.

I. *Land Issues*

A. **The issue of State land in Onomea Valley** cannot be avoided. A prior owner of the Onomea lots completed a quiet-title action in the early 1970s in order to bring lot boundaries together and extend makai boundaries out to the shoreline. This action improperly absorbed ceded lands and must not be allowed to stand. The State agreed, and, to remedy this, has committed to an on-the-ground survey of Onomea as well as a certified shoreline survey, but budget considerations have delayed their completion. No development should be permitted until these land considerations are cleared up.

B. **Shoreline Access.** HTBG wishes to bring the 20-acre parcel north of the current garden into its existing permit. The time is therefore right to address **the problem of access to and along the entire shoreline on** that parcel (TMK #2-7-10-22). We do not wish to repeat the past 15 years, in which HTBG held off public access on a State-owned trail to the shoreline, all the while reaping substantial financial benefits from its exclusive control of public property. Over the past 5 years, we fought first for the Donkey Trail, then for the Government Trail, and most recently for access to the shoreline at the mouth of Alakahi Stream (which we got only last month), because trail and shoreline access rights were not in place when HTBG got its first permit in 1982. **Public access to the shoreline north of Onomea Stream must be assured at this time.**

The rocky beach on TMK #2-7-10-22 is especially valuable to throw-net fishermen. **It looks like the proposed fencing of the Donkey Trail would cut off the trail the public uses to get to that shore area.** This must not be allowed. The public has used it continuously to get to the marine resources on that side of Onomea. Old photographs indicate the presence of Hawaiian houses in that area, and a trail existed to get there. We believe that this issue relates to "significance criteria" set forth in H.A.R. Sec. 11-200-12 (b)(2) and (4), as it "curtails the range of beneficial uses of the environment" and "substantially affects the economic or social welfare of the community," and we believe that this issue alone would justify a preparation of an EIS.

Any permits not providing for access to and along that shore would especially impact the native Hawaiian gatherers in Share Onomea Access. HTBG's draft EA should have discussed this shoreline area, as your new plan proposes to bring it within the project site (and, since it was not in the project site last year, it was not covered by the Mediation Agreement). Gary Gill, in responding to HTBG's first draft EA, asked HTBG to discuss how the *PASH* decision affects HTBG, and HTBG neglected to do so. The *PASH* decision pertains to this shoreline issue in a big way. If it is HTBG's plan to cut off access to this shoreline area, HTBG should have disclosed it and should have discussed how the *PASH* decision relates to the plan. (This is only one of many instances where HTBG, in preparing its current submittals, simply ignored comments from public groups and governmental agencies.)

As an aside, HTBG is claiming ownership of the spit of land at the end of the Donkey Trail (called Onomea Landing in old maps), which the fishermen have always used. We cannot overemphasize the importance of a State survey on the ground showing the ownership of all State lands in Onomea, as well as a certified shoreline survey, so that the public may know where they may lawfully walk and so that the Garden may know where it may develop.

C. **Trail Access.** HTBG must take down the gate over the government trail, as they indicated they would do on May 17, 1996 (almost a month ago now). We do not object to vehicular traffic's being blocked from the trail, but this gate blocks kayakers (and others with bulky gear) from pedestrian access on the weekends when the gate is locked. Weekends are the times when most people can get to recreational areas. There is no other place to launch a kayak for miles around. We wrote HTBG on May 26th reminding it of its promise and suggesting that there are any number of cheap and easy barriers which would keep the public from driving down the trail but which HTBG could remove when it needs to run shuttles. Unfortunately, we have seen no action.

There is nothing in the Mediation Agreement to permit HTBG to gate the public trail. The gate is being kept as a convenience, because it permits HTBG to shuttle customers down the trail and yet prevents the general public from driving down. We do not oppose this concept, but this particular gate arrangement is impeding the public from walking down when the gate is locked, because we cannot get kayaks and bulky gear through the small space provided. We would like to remind you that many of SOA's members are elderly; even young, healthy people could strain or otherwise hurt themselves trying to heft kayaks over such a tall gate.

Just as the general public has no right to obstruct a public right of way, we believe HTBG has no right to obstruct a public trail with this gate. HTBG would need a CDUP an SMA permit and formal approval to occupy State land. We note that the "garden entrance gate" is a feature on HTBG's Site Plan of Existing Improvements (Fig. 4) as well as the Site Plan for Proposed Improvements (Fig. 5), but we oppose its being permitted as part of this application. SOA was assured by Michael Wilson at the October 27, 1995, BLNR meeting

that the public would be able to carry kayaks down, and, if this were indeed possible, we would not be making an issue of the gate. As currently configured, the gate would fall under H.A.R.'s significance criteria under Sec. 11-200-12 (b)(2), as it "curtails the range of beneficial uses of the environment," and trigger an EIS.

D. The draft EA proposes two employee parking lots and a new entrance for the botanical garden, but these seem to be planned for the County right-of-way. One thing our members are adamant about is that we oppose HTBG's controlling public land or expanding onto what might turn out to be public property. (See also V below and II B & C below.)

II. *Natural Beauty*

Several of HTBG's proposals would detract from the beauty of the Scenic Route and public areas, and this degradation of the aesthetic environment was not adequately described in the draft EA. In addition to being inconsistent with Conservation District purposes, these plans conflict with the Hawaii County General Plan. HTBG, on p. 54 of its draft EA, mistakenly states that the County General Plan LUPAG map designates the project area as agricultural. Our copy of the LUPAG map indicates that at least a large portion (maybe all) of both TMK 2-7-9:2 and 2-7-10: 22 are designated "Open" in the General Plan and thus are to be protected. Moreover, at pp. 32-33 of the General Plan's Support Documents, the entire project area (Onomea Bay Area as well as Onomea Arch) is cited as one of South Hilo's "examples of natural beauty," for which, the Plan states, "[s]afeguards of this valuable asset are a major consideration of any construction or development which may alter, eliminate, or intrude upon it."

A. HTBG plans to swath the entire garden parcel with **chain-link fencing**. When the fencing is also complete around the new headquarters site (both sides of the Scenic Route), the appearance of the Scenic Route will be vastly changed for the worse. HTBG should have to demonstrate extreme hardship before public views are allowed to be marred in this manner. (It also seems appropriate for HTBG to address the effect of the *PASH* decision on fencing undeveloped property.)

B. HTBG plans to construct **three parking lots** (with chain-link fencing) along the Scenic Route (two for HTBG employees and one for visitors) at three separate sites and inflict the sight on the public. There is no need for three unsightly parking lots to blight our scenic drive. HTBG staff should park in its public parking area, not on the County right-of-way in the Conservation District.

C. From the draft EA, it looks like one of the employee parking lots will require the removal of some **of the historic avenue palms** planted between 1912 and 1922 by Manuel Tavares on behalf of the Territory. The destruction of the palms was never mentioned in the draft EA, but the parking lot is planned right where the palms are now. These palms constitute a major aesthetic feature along the Scenic Route, and their removal would mean a real loss to the community (see V B below). The loss of this palm avenue would be irrevocable and, we believe, should trigger an EIS under H.A.R. Sec. 11-200-12(b)(1, as it "involves an irrevocable commitment to loss or destruction of any natural or cultural resource."

D. The draft EA calls for **numerous no-trespassing signs** (up to 12 square feet in size), many of which seem destined to go inside the proposed fencing (which fencing would seem to be enough of a deterrent). SOA has no objection to reasonable signage designed to keep the general public from entering the garden. However, we believe that gratuitous signage is a needless eyesore. We object to oversized no-trespassing signs erected in such numbers as to detract from our aesthetic appreciation of our Scenic Route, trails and shoreline. Signs should be environmentally appropriate: visible, yet in keeping with the surroundings. As the General Plan Support Document states (p. 32), it is important "that man-made elements are kept in an aesthetic perspective with the physical surroundings."

E. HTBG plans to construct a **pedestrian overpass** just 7 feet above the public trail. SOA will vigorously oppose this. We just got through a months-long mediation with HTBG in which access along the public trail was negotiated, together with a means for HTBG to fence its property while maintaining access to its own trails. Accordingly, at HTBG's insistence, the State fenced the trail at public expense and installed the gates provided for in

the mediation. A 7-foot overpass is unnecessary (as HTBG's customers can use the many gates installed at public expense); it is an impediment to access (the public often has bulky gear), it would be an eyesore to the public.

Additionally, given HTBG's penchant for harassing the public, we question whether the overpass would not be used to more efficiently harass us. As you know, I have received threatening letters (directed to my wife and me) which, the FBI informed me, were sent by a botanical garden employee, who has also made a menacing telephone call to another SOA member. This overpass would give this employee, who works on the weekends when supervision is minimal, a vantage point to make good on his threats as we avail ourselves of the trail we worked hard for many years to access. We take these threats very seriously, but HTBG has refused to have the employee undergo an assessment for dangerousness or lethality.

F. HTBG's planned entrance constructions will detract from the public's views. In addition to HTBG's large gate, the billboard that HTBG is calling a "bulletin board" will obstruct views in the vicinity and force the public to view whatever message HTBG decides to project instead.

G. Electric power lines to the new headquarters site will also detract from the appearance of the area.

The tourists paying to see HTBG will have an enhanced experience from this project, but the rest of us will have a degraded environment to look at, one that advertises and defines HTBG to the exclusion of all other values. H.A.R. Sec. 13-5-30(c)(6) states that, in considering this application, the BLNR should see that the "natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable." We do not think this will be the effect of the proposed improvements. Moreover, we believe an EIS is in order as per H.A.R. Sec. 11-200-12(b)(1-4). We are aware that some of this degradation probably cannot be avoided, but we will oppose all eyesores in the Conservation District.

III. *Stream Issues*

A. SOA has called a contested case before the Water Commission regarding HTBG's abuse of the stream environment within Onomea Valley. We asked, in our response to HTBG's first draft EA, for it to include information on assessment, alternatives, mitigation for the stream issues, keeping in mind the extent of the total expansion, but HTBG failed to adequately discuss any of the stream issues. We believe the project involves impacts of sufficient impact to require an EIS under H.A.R. Sec. 11-200-12(b)(1,5,7,9-11).

B. The stream and water-supply issues become especially important when we realize that the **proposed expansion more than doubles the land to be managed under the permit**, and it also involves planting out quite a few acres of additional land in the original garden parcel. Up until now, HTBG has enjoyed a good run with free stream water, entirely illegally: no permits for the dams, no permits for the piping systems, inadequate water declarations, major misrepresentations when asked for information, etc. HTBG should count itself lucky for getting free water for so long. Now, it's time to get serious.

Show gardens are very intensively cultivated -- plants must look good at all times, and even one day without rain means wilted-looking plants in the afternoon. Tourists do not pay $15 a head to see wilted plants. **This enterprise should not be operated on streamwater.** HTBG has after-the-fact permit applications pending before the Water Commission, which do not disclose HTBG's expansion plans and the need for water which will ensue. HTBG's water usage has not been documented in any credible way (HTBG, by its own admission, has been submitting estimates when asked for information), and no faith can be put in their water declarations.

The draft EA comments from the County Fire Department state that HTBG is required to meet fire code requirements. HTBG says it will attempt to do so by getting a pump to pump pond water out in the event of a fire. HTBG should just get a proper water source.

C. The new draft EA completely mischaracterizes Alakahi Stream. In an attempt to portray this stream as much stronger than it is, HTBG claims that no less than 8 million gallons (!) of water per day are diverted

from this stream to the Lower Hamakua Ditch. This is completely preposterous. The Alakahi Stream that feeds the Hamakua Ditch is located in the Kohala Mountains at the back of Waipio Valley. The Alakahi Stream flowing through Onomea Valley is a low-flowing stream (last measured at 1 cubic foot per second within the garden parcel). HTBG cited the 1990 Hawaii Stream Assessment as documentation for its incredible assertion; HTBG even made excerpts from the Stream Assessment an Appendix in the draft EA. However, it failed to include in this Appendix the pages from the Assessment dealing with the supposed diversion of Alakahi's water into the Lower Hamakua Ditch (pp. 91-92). These pages clearly show that the streams feeding the ditch system constitute "Waipio drainage" and come from the "Waimanu Aquifer System."

Likewise, HTBG claims that Alakahi Stream has more native streamlife in it now than it did before the dam was built. No documentation is cited, much less provided, for this interesting assertion. We can only assume HTBG is referring to the stream survey which was supposed to have been submitted per Condition 29 of the original permit, and which was finally submitted last year (about a decade late). At the time this survey was submitted, Henry Sakuda of the State Aquatics Division dismissed it (in a memorandum to OCEA) as "shoddy even for the time and would have been completely unacceptable by current standards." If HTBG wants the public to rely on assertions in its draft EA, it must back them up with credible and authoritative documentation.

Stream flow information for Alakahi in the new draft EA continues to be inadequate, even though Pat Tummons pointed this inadequacy out in her response to the first draft EA. HTBG is aware that Alakahi's stream flow is highly relevant to any decision the Water Commission might make about permitting the after-the-fact dam and diversion. HTBG should have been having it measured.

We saw no disclosure in HTBG's submittals that the headquarters parcel was under a cease-and-desist order from the U.S. Army Corps of Engineers pending investigation of a number of stream violations and processing of after-the-facts applications. ***The Army Corps, by letter of May 31, 1996, informed HTBG that it is required to implement a plan allowing native fauna migration in Alakahi and Onomea Streams and this plan must be approved by the State Division of Aquatic Resources.*** It has been the Aquatics Division's position that both dams should be removed. Unless this position changes, HTBG will have to find a new water source and should let the public know what it will be, what the impacts will be, what the alternatives are, etc.

Disturbances at the lower elevation of streams (such as the dam and diversion in Alakahi) restrict the abundance and variety of streamlife at every altitude along the stream's extent. Shoreline fish are less plentiful when the larvae and postlarval forms of the stream fauna (which form part of the food chain) are not present in sufficient quantities to nourish and attract ocean predators. The dams and diversions thus affect our ability to gather food within the stream and to catch fish along the shoreline. We believe that the significance criteria listed in H.A.R. Sec. 11-200-12(2,4,6,7, and 11) are relevant to this issue and that an EIS should be done.

D. Health and environmental effects of the effluent from Lily Lake have not been resolved to SOA's satisfaction. We maintained in our contested-case petition to the Water Commission that semi-stagnant effluent containing bird and koi excrement constitutes a serious health hazard and was continuously dumped into Alakahi Stream without a Department of Health permit, through a drainage system constructed without a CDU permit. Apparently, our petition convinced HTBG that they had better cease that practice, and, in April of 1996, they capped the pipe going into the koi lake and diverted the drainage pipe leading out of the flamingo pond to some landscaping nearby. However, the drainage system leading from the koi pond into Alakahi Stream is still in place, in case of unspecified "emergencies." If HTBG wants to legitimize this drainage system, it should describe what possible emergency could justify dumping such effluent into Alakahi Stream and it should do a study on how any effect on Alakahi's water quality would impact public health at the newly-opened recreational area downstream. This issue relates to H.A.R. 11-200-12(b)(5 and 10) and should be addressed in an EIS.

The DLNR should find two violations here: (1) constructing drainage systems without a CDUP; (2) dumping effluent into a stream without a permit. HTBG should be fined and made to take the drainage system out. We would like to emphasize that HTBG, as is its practice with permit violations, took action only after it got

reported. This continued practice just confirms our belief that HTBG does not intend to operate lawfully in the Conservation District of its own volition.

E. Impacts of the project to Onomea Stream, including its streamlife, have not been adequately addressed. The unpermitted dam and diversion should be removed, and it looks like the Army Corps permit condition may bring this about.

F The project's impacts to the orangeblack Hawaiian damselfly population just mauka of the Old Mamalahoa Highway have not been satisfactorily resolved. HTBG apparently doesn't think it is required to disclose its building plans on the headquarters site, as was requested in our comments to the first draft EA. Judging from the drawing in the Sight Distance Study Report, it appears that HTBG is planning to use the land right up to and *into* the banks of Onomea Stream. This relates to the significance criteria listed in H.A.R. Sec. 11-200-12(b)(9) and should be addressed in an EIS.

The present draft EA includes a letter from David Foote of the National Biological Service with plans to attract the damselfly into the garden parcel. However, recent conversations with David Foote indicate that HTBG has taken absolutely no action to implement any of these plans. HTBG has only gone so far as to solicit a plan and a letter (which it could put in its EA to make it look like it's taking action) but has done nothing on its side to mitigate the very real dangers to the damselfly wrought by its project. Moreover, HTBG has had a long-standing practice of regularly fogging the garden parcel with malathion for mosquito control. HTBG did not disclose this piece of highly relevant information to the National Biological Service, and it certainly was not mentioned in the draft EA. It appears that HTBG will not deal plainly with consulting agencies and is seeking only to give the appearance of resolving this issue.

G. We very much object to your submittals' characterization of Kahali'i Stream. Your new draft EA unaccountably continues to indicate that Kahali'i is a dry stream bed, with a grudging admission that some agencies might consider it to be a stream. It has been declared to be a stream by CWRM, the Army Corps of Engineers and U.S. Fish and Wildlife. SOA members have intimate, personal knowledge, gained from many years' residence in the area, that Kahali'i is an intermittent stream, not a dry streambed.

HTBG placed fill in that stream last summer. Then, we noticed that HTBG is putting the word out that Kahali'i is a dry stream bed. At the February Water Commission meeting, HTBG began to claim that Kahali'i's water has been diverted to Onomea Stream since 1949. Now, knowing that Kahali'i is an intermittent stream, and knowing that the lot chosen for HTBG's new headquarters and parking lot isn't really large enough, and knowing how HTBG alters the environment without doing any kind of environmental assessment or applying for permits, I am naturally highly concerned that this stream is not long for this world. These are the same tactics Lutkenhouse used to take our government trail back in the 1970s and that he used to try to take the Donkey Trail in the early 1990s.

Kama'aina SOA members remember the 1949 quarry landslide, but they say that Kahali'i's water simply went around the landslide and that the water continued to flow. We believe that this stream should be followed back to see if there is a diversion to Onomea Stream, where it is in HTBG's interest for Kahali'i's water to flow and where HTBG claims Kahali'i's water has been flowing since 1949 (despite the fact that the garden's own tourist maps show water in Kahali'i Stream). We will ask the BLNR to put a condition on any permit it grants HTBG that HTBG demonstrate to a neutral expert that it has not diverted Kahali'i's water to Onomea Stream.

HTBG states in its Supplement to its Application for Amendment (May 1996) that "there is no known data available for Kahali'i Stream regarding any possible stream biota within this stream bed." HTBG should have investigated it then--that is what "environmental assessment" means. A letter, dated January 19, 1996, from U.S. Fish and Wildlife to Rae Loui states that streamlife exists in Kahali'i: "a site visit conducted by a Service biologist on November 8, 1995, determined that there is flow in Kahalii Stream mauka of the scenic highway, and the presence of aquatic organisms (fish and damselflies) indicates that this flow is permanent." HTBG should have followed up, at least determining what species of damselfly was being referred to.

Even though the place where HTBG placed fill in Kahali'i Stream is just outside the Conservation District (and thus is not strictly under review here), the proposed improvements at issue here directly affect that property, as the new vista trail is designed to lead directly to the parking lot and headquarters on that property. According to H.A.R. Sec. 13-5-30(c)(4), the BLNR is supposed to see that "the proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region." The proposed land use has already led HTBG to place substantial fill in this stream, and HTBG should be required to put it back the way it was and demonstrate that it is not diverting Kahali'i's water.

Each and every stream issue should have been addressed in the current draft EA, because HTBG proposed to expand using stream water. Moreover, alternatives were not explored: catchment systems, County water, well water. That is what the EA process is supposed to be for--to adequately describe alternatives. Notwithstanding your statements to the Water Commission, all these alternatives are available to the project site and should have been investigated.

IV. *Existing Violations*

The draft EA proposes three new greenhouses, however, ***the present greenhouse has no CDUP nor SMA permit.*** This greenhouse is quite a large structure and is obviously a construction in the Conservation District requiring permits. Likewise, the "waterfall observation structure" over Onomea stream appears to be unpermitted. As mentioned before, the drainage systems into Alakahi were unpermitted, as were the irrigation systems from Onomea and Alakahi streams. Operating restrooms for 7 years without County inspections also constitutes a CDUP violation. Moreover, DLNR staff has deemed the diversion dams to be violations of its CDUP. As the Sierra Club mentioned in its comments to the first EA, HTBG is responsible to initiate permits--no one else. Instead of addressing this issue, the draft EA ignored it in an apparent attempt to sweep it under the rug.

HTBG violates its permits and then complains when its violations come to light -- as though they were someone else's fault -- like say, the staff at OCEA. In your letter of January 8, 1996, to Dawn Chang, in which you complain about OCEA pursuing HTBG's violations, you essentially admitted that HTBG will not disclose its violations (and, presumably, will not correct them) unless OCEA catches HTBG red-handed. This is unacceptable. HTBG built those illegal constructions and, in other ways, acted in violation of its 1982 CDUP, and since HTBG is solely responsible for its actions, it must endure the legal consequences. You may feel that, as it stands now, the statutes are shockingly unfair to HTBG, but, if you want HTBG to be above the law, you must get the Legislature to enact a statute to that effect. If that is not feasible, then everyone will be relieved when HTBG assumes the responsibility to disclose and clear up its own violations.

V. *Proposed Parking Areas*

A. Both new employee parking areas appear to be in the County right-of-way. On July 21, 1982, Ed Harada of County Public Works wrote that **the County has a 50 foot right-of-way on that road**; we have seen no evidence to contradict this. The new draft EA just ignores Patricia Tummons' comment requesting that they explain themselves on this issue. The Map in Figure 6 even indicates that HTBG owns a good part of the Mamalahoa Highway (!). Even though Ms. Tummons pointed this out, there is no acknowledgment or correction in the new draft EA. The other employee parking lot map shows no property lines at all. She also pointed this out in her original comment, but there is no attempt to address it in the new draft EA. If the County wants to give public property to HTBG, it must do so in the plain light of day, according to procedures established by law.

B. Aside from the unsightliness of the parking lots themselves, it certainly looks like **HTBG would have to destroy some of the avenue palms** along the site of its proposed parking lot for garden employees. These are a major feature along the Scenic Route. As *Beaches of the Big Island* states:

> Directly above Onomea Bay a colonnade of Alexandra palms lines the scenic drive overlooking the ocean. These magnificent trees were planted between 1912 and 1922 under the direction of Manuel Tavares who for many years was the superintendent of public parks for the Big Island.

We very much oppose any degradation of the visual environment along the Scenic Route brought about by destroying any of our avenue palms or by imposing this parking lot in the Conservation District (see also II above).

C. **The parking stalls in the employee parking lots are long enough to accommodate tour buses.** We have only HTBG's word that the stalls are so long so that employee's will have plenty of maneuvering room and note that, per the Sight Distance Study Report, the visitor parking lot "has been designed for, and will be used only by passenger vehicles, except for fire emergency cases. This factor has been taken into account for safe exit of the vehicles from the parking lot."

Please note that **HTBG's original CDUP prohibits it from offering parking along the Mamalahoa Highway**, and we think that was a wise condition.

VI. *Headquarters Site*

We are sorry that the site chosen for the new headquarters (mauka of the Old Mamalahoa Highway) turns out to be environmentally inappropriate. We would like nothing better than for HTBG to stop running vehicles up and down the public trail, and it seemed that the new headquarters and trail would accomplish this.

Unfortunately, we cannot support the development planned for the site mauka of the Old Mamalahoa Highway now that we know that **it will imperil the rare orangeblack Hawaiian damselfly**, a presence you failed to disclose to the County Planning Commission when it was considering the rezoning on that parcel and failed to disclose to the mediation parties when you asked for special consideration in moving your headquarters to the new site. This issue relates to the significance criterion at H.A.R. Sec. 11-200-12(b)(9), calling for a determination of significant effect when a proposed land use "substantially affects a rare, threatened or endangered species or its habitat."

The new draft EA fails to detail impacts to the damselfly, which are substantial, since it looks like part of the headquarters building may be planned to go into the streambed where the damselfly lives. As to HTBG's proposed mitigation measure, we do not believe HTBG should lure damselflies into the garden -- we know HTBG fogs the place regularly and thoroughly with malathion for mosquito control. It's quite possible that malathion kills damselflies as efficiently as it kills mosquitos; in fact, we think that's why damselflies don't live there now. Even if it were feasible, the National Biological Service reports that HTBG has done nothing to implement the plan they drew up (just as well, since HTBG didn't tell NBS about the malathion).

The property mauka of the Old Mamalahoa Highway does not seem large enough to support a parking lot and administration building. HTBG might be able to fit a parking lot there, if it could establish mitigation measures to ensure that the damselfly habitat was not harmed. We suggested in our comment on the first draft EA that the headquarters building could go inside the garden parcel, however, despite the fact that environmental assessments are supposed to investigate alternatives, this was not explored in your new draft EA. Another possibility is to put the headquarters on the large parcel north of the project site, which is owned by Dan Lutkenhouse but maintained by HTBG.

VII. *Archaeological Inventory Survey*

A. Historic preservation is of great concern to SOA members. HTBG has fought to develop the valley with as little archaeological study as possible, even though the village of Kahali'i is likely to be one of the very few Hawaiian village sites in windward Hawai'i Island still intact enough to study. As the State Historic Preservation Division wrote on October 24, 1991, "any remnants would be extremely important for our information on prehistory

..." In our response to the first draft EA, we asked HTBG to explain why a complete archaeological survey of the entire garden site, as requested by the SHPD, has not been prepared. Our question was ignored in the new draft EA.

B. **Extensive landscaping has the potential to harm archaeological sites.** As the Moku Loa Group's comments to the first draft EA state:

> Botanical garden development involves a great deal of hole digging (some quite deep) and emplacement of trees, whose root systems can spread considerably over the years; disturbances on the order required by HTBG's expansion should not be allowed to go further without a thorough archaeological inventory survey of the entire site. It is unconscionable that HTBG has not followed its own stated mission to preserve Hawaiian culture by conducting such a survey.

C. **We have received reports of the existence of numerous old graves in Onomea Valley, which appear to have been destroyed.** (These graves are in addition to the four more modern graves displayed by HTBG.) Our sources indicate that the graves were in existence in the early 1980s but disappeared **during the development of the botanical garden.** In our comment on the first draft EA, we asked HTBG for an explanation, but there is no mention of it in the second draft EA.

We are going to get to the bottom of this. We are particularly concerned about the siting of the existing restroom (which we assume has a cesspool). Preliminary information indicates that the graves were in the general vicinity of this facility.

In short, it's time that HTBG did the long-awaited archaeological inventory survey of the entire project site, now that it is applying to expand the site, change its mode of operation, and extend its trails. HTBG has already been found in violation of its original CDUP by failing to report archaeological sites. We believe that HTBG will do it again when it finds archaeological sites are in the way of any plan it may have. Please remember that SHPD wrote on March 31, 1993, that cultural deposits were "likely to have been affected by the bird pond, aviary, and Lily Lake after-the-fact improvements, and it is now too late to undertake any mitigative measures."

A thorough study undertaken in conjunction with a new permit may bring to light important archaeological information, and it will put to rest any concern that garden constructions and landscapes are damaging historic sites. We believe the significance criterion at H.A.R. Sec. 11-200-12(b)(1) applies here, as damage may be irrevocable.

VIII. *Landscaping*

A. As stated above, landscape expansion jeopardizes possible archaeological sites. The applicant requests that it be allowed to continue the landscaping without specifying any completion date provided that it submits periodic landscaping plans to the BLNR for approval. This is a license to destroy potentially valuable archaeological sites.

B. HTBG wants to landscape the northern 20 acres (TMK #2-7-10: 22) in addition to developing a large part of the present garden parcel (2-7-9: 2), but it fails to discuss the expected water source or what the extent of its water use will be.

C. HTBG has used landscaping to impede public access to the shoreline and other publicly-owned property and also to effectively absorb public property into the garden. Where will the landscaping be placed with respect to public property?

IX. *Restrooms*

A. The permitting for the present restrooms is irregular, to say the least, and now HTBG is asking for two more. Although the present restrooms were constructed in 1989, HTBG is only now getting the building and plumbing inspections done. We do not even know that there is a cesspool, and, if there is, we wonder if it is

adequate to serve such a large number of people so close to major fishing and recreational sites. HTBG claims in the draft EA that the cesspool has been approved by the Department of Health; however, it does not provide the documentation on the cesspool approval. We would like to see the documentation and believe that H.A.R. Sec. 11-200-12(b)(5) is relevant to this issue.

B. Although the Moku Loa Group, in its comments on the first draft EA, requested that HTBG justify its providing unchlorinated streamwater for customers to wash their hands with, we see no discussion of it in the new draft EA. To quote their comment: "It would not be fair to expose unsuspecting visitors (who may have cuts on their hands) to the leptospirosis and giardia existing in streamwater." Evidently, HTBG proposes to extend to the new restrooms their practice of providing streamwater for handwashing. Once again, we believe H.A.R. Sec. 11-200-12(b)(5) is relevant here.

X. *Miconia*

HTBG has not taken responsibility for its *Miconia* problem; the present draft EA blames neighboring landowners. HTBG has the resources to eliminate its *Miconia* from its properties, yet it has apparently elected not to do so. Despite the State's having given HTBG free herbicide to use on its plants, the project site is riddled with this noxious plant.

HTBG staff gardeners have performed countless hours of work, paid for by the non-profit, on properties belonging to HTBG's President, Dan J. Lutkenhouse. If a small fraction of the staff resources expended on Lutkenhouse's personal properties were instead directed to the removal of *Miconia* on HTBG properties, that plant would be eradicated there.

HTBG's use of a bulldozer to level the headquarters property (which was covered with *Miconia*) is completely irresponsible. It is highly likely that the bulldozer spread *Miconia* seeds to its other job sites.

XI. *Future Plans*

A. **We greatly oppose allowing HTBG to implement any future plan outside of public scrutiny.** Each construction should be permitted in the usual way, allowing for public input, and decided by the Board.

B. **The proposed fencing along the Donkey Trail impedes access to the shore** on the Hamakua side of Onomea and, as drawn, appears to be within the shoreline setback. We will vigorously defend the public's right of access to and along the entire shoreline at Onomea.

C. As to **fencing the perimeter of the project area**, we believe the fencing will be unsightly and should be allowed only if HTBG can demonstrate extreme hardship if it is not built. If it must be constructed, HTBG should put its fencing inside its own property (not within the County right-of-way or on State land or on anyone else's land without their express permission). No fencing should be allowed to go forward outside public scrutiny. We still occasionally find strands of HTBG's razor wire and barbed wire on property we believe to be public.

D. **Please, no more signs along the public trails**, either in the immediate or future plans (see II D above). The Mediation Agreement was supposed to provide for signs. HTBG has repeatedly devised signs that insult and misinform the public, signs that it has to be forced to remove. The less opportunity it has to inflict its signage concepts on the public, the better.

E. The State Historic Preservation Division has found that HTBG constructed paths over existing archaeological features. Now HTBG is proposing to build footpaths without saying where they will be going, without doing the archaeological inventory survey, and without Board-level approval. Where are the paths in relation to the ceded lands? Where are they in relation to the graves or archaeological sites? These issues need to be cleared up before any paths can be permitted.

F. Future plans include greenhouses, however, the water supply has not been discussed. Greenhouse plants need to have water delivered to them. Also, please remember that HTBG apparently never requested approval for the *present* greenhouse. It looks like the present greenhouse could have been approved in a manner similar to what HTBG is proposing for its future plans, but HTBG apparently neglected to follow through, and it has made no moves to correct the situation. We don't think the BLNR should give HTBG carte blanche to carry out its future plans, since it has always neglected its permit requirements.

G. Once again, the draft EA does not discuss the impacts of using streamwater as the water source in the proposed restrooms. What are the possible health effects? Is HTBG proposing that garden visitors *not* wash their hands?

Sewage is, of course, a major issue for SOA, since our members use the streams and shore for gathering, fishing and recreation. We do not believe that a cesspool would be adequate to preserve the public health where numerous tourists are using the restrooms throughout the day. Better sanitation methods exist, and the draft EA should have discussed these alternatives.

XII. *Socioeconomic Considerations*

A. **HTBG's overstates its socioeconomic value to the community**, and it does so without documentation or substantiation of any kind. It simply picks a figure out of the air ($2,000,000) and apparently expects everyone to believe it. How much of HTBG's income circulates in the local economy as a net increase is a matter for debate.

B. **It is our belief that this organization costs the public money.** HTBG is exempt from almost all Federal, State, and County taxes, but it is a heavy user of publicly-funded goods and services. HTBG has cost this State untold dollars in regulatory oversight, by its refusal to follow the law. In 1992 the County had to defend a lawsuit when it tried to overlook some of HTBG's chicanery. In 1995 the State has also had to defend a lawsuit brought by HTBG, spent heavily to fence the trail (HTBG claims to have paid for the fencing, but it was bought in lieu of paying fines for violations), and the Attorney General's staff time to get the public access in the mediation was expensive. HTBG has also been investigated by the State Labor Department, the Federal Labor Department and the IRS and forced to change many of its unsavory practices. Hawai'i can't afford too many more enterprises like HTBG.

C. **Beautiful views, historic sites, good shoreline fishing, healthy streams, and heritage trails provide positive economic benefits** As the General Plan Support Document states, at p. 32, "[n]atural and scenic beauty has economic ramifications." The concessions HTBG is asking the public to make -- possible permanent loss of historic sites, stream habitat degradation, loss of nearshore marine fish productivity, aesthetic degradation of public lands, and the loss of shoreline access -- **all could be avoided with no harm to HTBG. It does not have to damage our environment in order to survive.** In fact, HTBG would be better off if it simply followed the law and good management practices -- tourists *want to see* archaeological sites, they *want to see* native streamlife and flora. HTBG should encourage their guests to enjoy the shoreline with the local populace (tourists *want to see* the local populace). There is no advantage to HTBG in stubbornly holding to its damaging mode of operation.

D. HTBG has several lofty missions which it has used to justify its non-profit, tax-exempt status: it is supposed to be formed for educational purposes and research, preservation of Hawaiian culture, and as a nature preserve and sanctuary. However, none of HTBG's four submittals discuss how this expansion plan relates to any of these important missions. This is because, instead of mustering its resources in the service of these missions, HTBG is almost completely focussed on bringing in paying tourists to the theme park and funnelling tourists to the gift shop.

1. HTBG announced last spring that it would no longer be offering itself as a field trip site for school children. How it can claim to be primarily an educational institution and yet not offer school visits is

anybody's guess. Perhaps the tourists receive some instruction at HTBG, but no more than they would receive at any for-profit show garden in the state.

2. HTBG also has claimed to be devoted to research. However, in all its years of existence, there has never been any research published from HTBG, and no one ever employed by HTBG had the background necessary to perform or supervise botanical research (usually a Ph.D.). Nor is there a plan indicated in the draft EA or attendant documents to actually institute a research program. (Where, for instance, are the plans for the laboratories?). To quote a 1991 professional assessment of HTBG, its "educational value in the strict sense is extremely limited, and its scientific value is essentially nonexistent." This is still a fair assessment.

3. HTBG's mission statement would be more accurate if it said it exists for the *destruction* of Hawaiian history and culture. We refer to its having neglected to report archaeological findings during garden construction, having constructed gravel trails, steps, and plank bridges over existing archaeological features, and having illegally dredged Lily Lake so that whatever was there is now destroyed. We are highly concerned about the fate of the graves in the valley as well.

4. HTBG also claims to be a "nature preserve and sanctuary." Instead, it damages the stream habitat for our native fish and rare damselflies, while promoting exotic flora and fauna.

It may be that, one day, HTBG will be operated in accordance with its stated purposes and with accepted botanical garden principles. However, in the meantime, HTBG needs strict oversight and ought not to be accorded any special concessions out of concern for its supposed socioeconomic importance or environmental mission.

In short, HTBG should, at the very least, be required to prepare an environmental impact statement on this project. In the alternative, it should withdraw this draft EA, develop a plan which reflects an environmental focus in keeping with its siting in the Conservation District (and with the missions it was supposedly formed to fulfill), and start environmental review process over again.

Very truly yours,

SHARE ONOMEA ACCESS

Ed Johnston

cc Gary Gill, Office of Environmental Quality Control
Bill Devick, Division of Aquatic Resources
Dawn Chang, Attorney General's Office
Cathy Tilton, OCEA
Ed Henry, OCEA
Rod Oshiro, Na Ala Hele
Ross Cordy, State Historic Preservation Division
David Higa, Commission on Water Resource Management
Virginia Goldstein, Hawaii County Planning Department
Dwight Takamine, State Representative
Takashi Domingo, County Council
Paul Ciesla, Environmental Protection Agency
Marjorie Ziegler, Sierra Club Legal Defense Fund
Deborah Ward, Sierra Club, Moku Loa Group
Patricia Tummons, Environment Hawai'i
Palikapu Dedman, Pele Defense Fund
Alan Murakami, Native Hawaiian Legal Corporation
Al Lerma, Esq.
Scott Lucas, Hawai'i Tropical Botanical Garden

SANDRA PECHTER SCHUTTE
ATTORNEY AT LAW

101 Aupuni Street, Suite 1014A
Hilo, Hawaii 96720
Telephone: (808) 969-7331
Fax: (808) 934-9819

July 19, 1996

Mr. Ed Johnston
Share Onomea Access
P.O. Box 636
Pepeekeo, Hawaii 96783

Re: Draft Environmental Assessment ("DEA") for Amendment to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; Entrance, Trails, Parking and Related Improvements and Master Plan Improvements at Hawaii Tropical Botanical Garden ("HTBG")
Alakahi, Kahalii and Onomea, South Hilo, Hawaii
Tax Map Key Nos.: (3) 2-7-9:2, 6 and 10, and 2-7-10:22

Dear Mr. Johnston:

Thank you for reviewing the DEA for HTBG's amendment to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; entrance, trails, parking and related improvements and master plan improvements at Alakahi, Kahalii and Onomea, South Hilo, Hawaii. This letter addresses comments contained in your letter dated June 13, 1996:

State Land in Onomea Valley. The Department of Land and Natural Resources ("DLNR") is presently preparing an abstract of the HTBG property to determine whether there are any remnants owned by the State of Hawaii in Onomea valley. Although this abstract has not yet been completed, HTBG believes that the land areas of possible dispute are located near the shoreline where no improvements are being proposed. Notwithstanding the lack of definite information on this issue, HTBG believes that it is preferable to proceed with the permitting for its proposed improvements. If it is later determined that some of the improvements are situated on land that is not owned by HTBG, appropriate measures will be taken to either acquire the remnants or obtain easements over the affected property. The final environmental assessment will be revised to note this issue.

Shoreline Access on TMK: 2-7-10:22. There is presently shoreline access along the beach on TMK 2-7-10:22 by means of the Donkey Trail, which extends from the Mamalahoa Highway, down to the shoreline. This access is open on a 24-hour basis and HTBG has not prevented individuals from fishing or gathering along the beach cliffs. No restriction of shoreline access is suggested by the proposed future fencing of the Donkey Trail. As shown

on Figure 6 of the DEA, the fencing does not extend all the way to the shoreline; rather, it ends before the shoreline point. Thus, Figure 6 shows that this shoreline area would remain accessible for public use. Figure 6 will be color coded in the final environmental assessment to distinguish the immediate improvements from the future improvements, and with this color coding, the unimproved shoreline area within TMK: 2-7-10:22 can be more readily distinguished. It should also be pointed out that the fencing of the donkey trail and the landscaping of TMK: 2-7-10:22 is a proposed future master plan improvement which may not be implemented for the next four to five years.

Gate Across the Onomea Access Trail. HTBG intends to remove the gate that extends across the Onomea Access Trail at the junction with the Old Mamalahoa Highway immediately upon completion of its new entrance trail. At such time it will be the responsibility of the State Na Ala Hele program to install some type of post or barricade to keep vehicles from traveling down this right-of-way. Although HTBG examined the possibility of removing the gate prior to the opening of its new entrance trail, it was not feasible to remove the gate while the HTBG's shuttle vans are using the right-of-way. If kayakers desire to bring down their kayaks and other heavy gear during this interim period while the gate is in place, HTBG is willing to consider making special accommodations for these individuals.

Employee Parking Areas. In response to your question as to whether the placement of the two employee parking areas are within the County right-of-way, HTBG is not proposing any parking areas within the County right-of-way. The areas proposed for the two employee parking areas are situated within HTBG's property. These areas are overgrown and do not provide adequate space for parking at the present time. Although Figure 13 of the DEA may give the impression that the visitor center employee parking area is within the County right-of-way by abutting the highway, the parking area is actually within HTBG's property. Based on the metes and bounds descriptions of TMK Nos. 2-7-9:2 and 2-7-9:10, which were plotted on the ground by a surveyor, the physical alignment of the County roadway encroaches upon HTBG's property. This type of encroachment or improper roadway alignment is often found along many of the older roadways throughout the Big Island.

With respect to your concern regarding the preservation of Alexander palms, none of these palms will be removed by creating the employee parking areas. The entrance to the garden staff parking area is, in fact, situated between a break in the Alexander Palms along the highway.

With respect to your question as to whether the parking areas will be used for tour buses, HTBG has no intention of attracting any tour buses to its botanical garden. The parking spaces in the employee parking areas are larger than the minimum County parking stall requirements in order to provide greater parking maneuverability and to minimize the need to back out of these parking areas onto the highway.

With respect to your concern regarding the unsightliness of vehicles parked along the highway, there is no way that the vehicles can be hidden from view. However, the fencing proposed is planned for the rear of the parking area, a distance away from the highway. That fencing will be covered with vegetation to mitigate the visual impacts of the improvement.

Appropriate revisions to the description of the employee parking areas will be made in the final environmental assessment to incorporate this information.

Chain Link Fencing HTBG is not intending to install fencing around the entire perimeter of its property. This fencing will only be installed for security purposes in areas that would be easily accessible from points outside of HTBG's property. The final environmental assessment will be revised to reflect this information. It should also be pointed out that the perimeter fencing is proposed by HTBG as a long term future improvement, and will not be installed in the next two to three years. Also, prior to installation of the fencing, HTBG will be required to submit to the Chairperson of the Board of Land and Natural Resources ("BLNR"), for approval, construction plans for this fencing, showing the location and type of fencing to be used.

No-Trespassing Signs. Although the DEA states that the no-trespassing signs proposed by HTBG will not be larger than twelve square feet in size, HTBG agrees that twelve square feet is large for a no trespassing sign. The dimension cited in the DEA was the maximum dimension allowed under the Department of Land and Natural Resources ("DLNR") administrative rules regarding signage (Section 13-4-22, P-8, Hawaii Administrative Rules). In all likelihood, the signs will be substantially smaller than the maximum permitted. HTBG believes that the installation of such signs at certain locations is required because it has found that the County police will refuse to pursue criminal charges against trespassers if there are not signs posted warning these individuals that they are trespassing.

Assuming that these signs are permitted under the requested permit, the specific size, wording and placement of these signs will require prior approval of the BLNR Chairperson. HTBG is also concerned that the placement of too many signs would detract from the aesthetic attributes of the area.

Pedestrian Overpass over Onomea Access Trail. You questioned the propriety of the proposed pedestrian overpass or bridge over the Onomea Access Trail. Based on the comments received regarding the pedestrian overpass, HTBG has withdrawn its request for this improvement. HTBG will continue to use the gates erected in conjunction with the fencing of the Onomea Access Trail to cross the trail. The final environmental assessment will be revised to reflect this change.

Garden Entrance and Bulletin Board. You raised the issue of whether the proposed botanical garden entrance will detract from the public's views. You also question whether the bulletin board would obstruct views in the vicinity and force the public to view whatever message HTBG decides to project. There is no question that the public views will be changed by the construction of a new garden entrance. However, HTBG proposes to landscape the entrance to mitigate the impacts of this change. Except for the addition of an umbrella rack, the proposed bulletin board will be identical to the existing bulletin board within the botanical garden. The existing bulletin board is a locked, glass case, which displays information regarding the botanical features of the garden. Also displayed on the existing bulletin board are informational materials published by State agencies. The side of the new bulletin board facing the Old Mamalahoa Highway will be landscaped to provide a visual buffer for this structure along the highway. Only the side of this structure visible from within the garden will be used for bulletin board purposes. In addition, this structure will be setback from the highway. The final environmental assessment will be revised to clarify that landscaping will buffer the bulletin board on the highway side of the structure.

Visibility of Electrical Power Lines. HTBG agrees that the installation of electrical power lines along the Old Mamalahoa Highway will detract from the appearance of the area. Electrical lines already exist along portions of the Old Mamalahoa Highway, and the lines proposed will allow HTBG to extend these lines to obtain electrical power for its visitor center. It would be preferable from a visual standpoint to place the electrical lines underground; however, the cost of underground lines would be prohibitive.

Impacts, Alternatives and Mitigation Measures for the Streams. As you requested, the final environmental impact statement has been revised to include additional information regarding alternatives to stream water usage and possible mitigation measures for the streams. The requirements of the Army Corps of Engineers permit will also be incorporated into the final environmental assessment.

Alakahi Stream at Waipi'o Valley. You point out an error in Section 4.2 of the DEA which referenced the Alakahi Stream at the back of Waipi'o Valley, instead of the Alakahi Stream that runs through HTBG's property. The final environmental assessment will be revised to remove the first paragraph on page 43 as it references Alakahi Stream at Waipi'o Valley. The remaining references to Alakahi Stream in section 4.2 of the DEA refer to the stream located at South Hilo.

Reference to Prior Biological Survey of Alakahi Stream. You indicate that no documentation is cited in the DEA as to the source of the prior biological survey of Alakahi Stream referred to in the DEA, and suggest that it may be an unacceptable survey that was supposed to have been submitted per Condition 29 of HTBG's original conservation district use permit. The information regarding the survey cited in the DEA was taken from a State

publication, dated December, 1990, prepared by the Commission on Water Resource Management and the National Park Service, entitled *Hawaii Stream Assessment, A Preliminary Appraisal of Hawaii Stream Resources*, Report R84. Relevant excerpts from this publication were attached to the DEA as Exhibit 5. Also, this report was cited in Section 4.2 of the DEA regarding the streams. The date on which the Alakahi Stream survey was conducted and the name of the individual who conducted the survey were not included in the report. However, since the reference was a State Commission on Water Resource Management publication, it was believed that the publication was credible in the absence of any other historical biological data regarding this stream.

Adequacy of Stream Flow Information. You question the adequacy of the stream flow information in the DEA and point out that this information is highly relevant to any decision the Commission on Water Resource Management may make about permitting the after-the-fact dam and diversion. Stream flow information is contained in Section 4.2 of the DEA, which was obtained through measurements taken by the Applicant. Although not included in the DEA, the Commission on Water Resource Management staff also took measurements of the stream flow in these streams which resulted in similar stream flow data. These stream flow figures have not been added to the final environmental assessment because HTBG does not have complete data from this second measurement.

Pond Drainage. You raise a concern regarding the capping of the Lily Pond and the possible emergency drainage of the pond into Alakahi Stream. The drainage line from the Lily Pond has been capped. It will no longer drain anywhere. The final environmental assessment will be revised to delete reference to emergency drainage of this pond.

Orange Black Damselfly (*Megalagrion xanthomelas*). You have raised a concern that HTBG's building plans for its visitor center are not disclosed in the DEA, with respect to the orange black damselfly. The property on which the visitor center is proposed is outside of the conservation district and outside of the Project Area covered by the DEA. Without specifically referring to the construction of the visitor center, Section 4.4 of the DEA indicates that HTBG is working with the National Biological Service, Pacific Islands Science Center to (1) develop a project to attract this species into the Garden ponds and (2) prevent damage to existing populations in the mauka areas of Onomea and Alakahi Streams. The mauka Onomea Stream area is adjacent to the visitor center.

You also raised a concern regarding the spraying of insecticide for mosquito abatement. HTBG presently uses fogging with diazinon for mosquito control. Although no spraying is being done near any aquatic habitat, HTBG is investigating alternatives to fogging as a tool for reducing mosquitos at the botanical garden. HTBG is also working with David Foote, of the Pacific Islands Science Center, in establishing a monitoring program which will determine what effects, if any, the current mosquito abatement program, involving fogging with diazinon may

have on the damselfly population. The final environmental assessment will be revised to incorporate this information.

Kahalii Stream. The description you objected to of Kahalii Stream will be revised in the final environmental assessment. With respect to your request that an inventory of the biota within Kahalii Stream be conducted, since no improvements are proposed to be made within this stream bed and mitigation measures are proposed to be implemented to prevent degradation of the stream bed, HTBG determined that an inventory of the biota within the stream bed, although interesting, would not be necessary. HTBG is not proposing any action which would affect any stream biota within Kahalii Stream.

The Commission on Water Resource Management is the state agency responsible for any issue regarding the diversion of Kahalii Stream and any required reconstruction of that stream. The Commission, at its meeting of May 3, 1996, levied a fine against HTBG for its actions regarding Kahalii Stream. Based upon the representations of the Commission's staff, HTBG was not required to reconstruct any portion of the stream in conjunction with the penalty assessed.

Permits Issued for Existing Improvements; CDUP Violations. Although you question whether permits have been issued for all of the existing improvements, permits have been issued for all of the existing Garden improvements, except for the dams within Onomea and Alakahi Streams. A request for after-the-fact approval of these two dams is part of the pending conservation district use application. With respect to the existing greenhouse, waterfall observation area, and irrigation system, these improvements were portions of the botanical garden and arboretum authorized under CDUP HA-1447 issued to HTBG on August 4, 1982, and under SMA Minor Permit No. 82-86 issued by the County of Hawaii Planning Director on July 23, 1982

Despite the allegations in your letter that there continue to be violations of CDUP HA-1447 due to improvements that were made by HTBG many years ago, HTBG has made reasonable efforts to resolve all of these violations. On March 18, 1092, HTBG was cited by DLNR for certain violations of the conservation district rules for the placement of three large exhibit cages with two birds in each cage, the construction of three exhibit stands for the birds, the construction of Lily Lake with fish, the construction of a small pond with flamingoes and ducks, and several signs, including no-trespassing signs. This citation was issued after the DLNR staff conducted a site inspection on March 3, 1992, finding all other improvements to have been made in accordance with the CDUP issued. Fines were paid by HTBG for those violations and after-the-fact permits obtained for these improvements. Subsequently the DLNR staff prepared a detailed condition compliance report for HTBG, by report dated March 24, 1994. This report led to action by BLNR requiring the opening of the Onomea Access Trail with resulting litigation that was finally resolved by mediation.

After completing an exhaustive mediation process and preparing a conservation district use application for improvements, pursuant to the terms of the mediation agreement, HTBG was again cited by DLNR in December, 1995, for a violation of the conservation district rules due to the construction of the Alakahi and Onomea Stream dams without a conservation district use permit. The portion of this last citation regarding Onomea Stream dam was of particular concern to HTBG, since it had already paid a fine for the use of the water from this dam when it first obtained its conservation district use permit in 1982. Nevertheless, HTBG sought a speedy resolution of the violations regarding the dams because it wanted to resolve the access issue into the botanical garden. Assurances were also provided by the DLNR staff that additional violations would not be found to delay the processing of HTBG's present conservation district use application.

HTBG resolved the Alakahi and Onomea Stream dam violations by paying the maximum amount of the fine imposed by DLNR under the DLNR administrative penalty system known as Hearing Office/Administrative Penalty System (HOAPS). The HOAPS system provides for the payment of an administrative penalty for an alleged violation without the payment being construed as an admission of fault. The amount paid by HTBG for these fines was $500.00 per violation or a total of $1,000.00, which was accepted by DLNR under HOAPS on March 7, 1996. DLNR only began to process the pending conservation district use application after this violation was resolved.

Unfortunately it appears that after all known violations are been resolved by HTBG new issues continue to be raised creating questions as to additional violations. HTBG would hope that at some point this practice would end. HTBG acknowledges that there were substantial problems with government permitting and community relations in the past. However, HTBG is presently trying to proceed with its permits in accordance with the law and to build a better working relationship with the community.

Headquarters Site. You raise concerns regarding the fact that the site chosen for the new headquarters or visitor center is environmentally inappropriate. As indicated above, this site is outside of the conservation district. Thus, it was outside of the scope of the DEA. You suggest an alternative of siting the headquarters within the botanical garden. This building was not sited within the garden because buildings are not necessarily compatible uses within the conservation district resource subzone. The siting of the building outside of the conservation district, but across the road from the garden, appeared to make better sense from an environmental standpoint. With respect to your concern regarding the population of the orange black damselfly near the headquarters site, as indicated above, HTBG will be implementing a mitigation plan to protect this species, prior to the commencement of construction.

Archaeological Inventory Survey. In response to your concern regarding the preservation of archaeological sites, the State Historic Sites Preservation Division, after reviewing the information in the DEA, is of the opinion that the improvements described in the DEA will have no effect on significant historic sites. It has, however, asked that at some point a systematic archaeological inventory survey of the entire Garden be conducted and that as part of the survey, some effort should be made to interview people with a knowledge of the area to obtain more information about the use of this area.

In conjunction with its conservation district use application, HTBG submitted a management plan for its botanical garden to the Department of Land and Natural Resources. This management plan proposes, in part, to inventory any future area proposed for development, prior to commencing the development in that area. HSPD has recently accepted this proposal. HTBG will interview people with knowledge of the area in conjunction with any inventory conducted. This information, together with a memorandum dated June 25, 1996 from HSPD will be incorporated into the final environmental assessment.

Landscaping. In response to your concerns regarding landscaping, particularly on TMK: 2-7-10:22, as indicated above, prior to the commencement of any landscaping on the property, an archaeological inventory will be conducted to insure that no significant site is jeopardized. The DEA gave the impression that the entire 20 acre parcel would be landscaped. Most of the 20-acre parcel is extremely steep, and only a small area within this parcel, would lend itself to being landscaped. In addition, the limited landscaping proposed is in the distant future. The final environmental assessment will be revised to reflect this information.

Restrooms. You have raised questions as to the legality of the cesspool and the existing restrooms. These restrooms and associated cesspool were inspected by the Department of Health on December 21, 1988 and March 2, 1989. In addition, the required conservation district use permit and special management area use permit were obtained for this facility. A sign posted in the restroom are informs individuals that the water provided for hand washing is stream water. In addition, the Department of Health has informed HTBG that it is not violating any regulations by providing unchlorinated stream water for washing of hands.

Based upon concerns raised over contamination of the adjoining streams, the Department of Health will soon be testing the cesspool to determine whether there is any leaching from the cesspool into the streams. If such leaching is found, HTBG will take appropriate remedial action, as directed by the Department of Health, to correct this problem.

The proposed restrooms are planned as long range improvements. If a purer source of water is available to service the restroom sinks at the time this improvement is made, that

source will be used. Sewage from these restrooms will be disposed of by means of a wastewater treatment system that is approved by the Department of Health in accordance with Chapter 121-62 of the Hawaii Administrative Rules regarding Wastewater Systems.

Miconia. Although you contend that HTBG has not taken responsibility for the miconia problem on its property, the site visit conducted by BLNR on July 11, 1996 showed that the HTBG property was relatively free from miconia. The site visit also showed that the neighboring lands, some of which are owned by large landowners, are infested with miconia.

HTBG has controlled miconia on its property for many years by cutting down and poisoning the miconia plants prior to the plants reaching a flowering stage. Thus, the plants may reach a height of six feet on HTBG property before the plants are cut and poisoned. However, the removal of the plant prior to flowering prevents the spread of this noxious pest. Notwithstanding HTBG's efforts to control the spread of miconia on its property, as long as the severe miconia infestation remains in the Onomea area mauka of the botanical garden, there is no way that HTBG can totally eradicate all of the miconia within its property. The final environmental assessment will be revised to include this additional information regarding HTBG's miconia control.

Over the past year, HTBG has worked with the Mayor and the Hawaii County Council to develop legislation that would require landowners to eradicate miconia on the Big Island. HTBG would urge Share Onomea Access to support such legislation.

Future Plans. The future master plan improvements were included in the pending conservation district use application based upon a request by BLNR at its meeting of October 27, 1995 that HTBG provide it with a master plan for future improvements. Thus, the improvements are somewhat of a wish list of possible future improvements. Except for the greenhouses, which are intended to be used for research purposes, the likelihood of these improvements is remote. Also, HTBG does not object to public input on these improvements at a later date, when more detailed plans for the improvements are formulated. With respect to your substantive concerns regarding certain future improvements, those concerns are addressed in the above responses.

Socioeconomic Considerations. Your concern regarding HTBG's benefit or cost to the community is noted.

Preparation of an Environmental Impact Statement. Although you have requested that an environmental impact statement be prepared for HTBG's proposed improvements, HTBG believes that with appropriate mitigation measures as outlined in the DEA supplemented in the final environmental assessment based upon comments received on the DEA, its proposed

action would not have a significant effect on the environment. Thus, an environmental impact statement should not be required in this case.

We appreciate Share Onomea Access' comments on HTBG's draft environmental assessment. The final environmental assessment will be revised, as appropriate, because of your comments. Your letter and this response will also be appended to the final environmental assessment to ensure a document that adequately addresses pertinent development and environmental issues.

Very truly yours,

SANDRA PECHTER SCHUTTE

xc: Hawaii County Planning Department
Department of Land & Natural Resources, Land Management
Hawaii Tropical Botanical Garden

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

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

MICHAEL D. WILSON
Chairperson
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
DILBERT B. COLOMA-AGARAN

REF:LD:EH

JUN 19 1996

Ms. Virginia Goldstein, Director
Planning Department
County of Hawaii
25 Aupuni St.
Hilo, HI 96720

Dear Ms. Goldstein:

SUBJECT: Departmental Comments on Draft Environmental Assessment For Amendment to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; Entrance, Trails, Parking and Related Improvements and Master Plan Improvements at Hawaii Tropical Botanical Garden, Alakahi, Kahalii and Onomea, S. Hilo, Hawaii (TMK: 2-7-9:2, 6 & 10; and 2-7-10:22)

We have reviewed the subject Draft Environmental Assessment (DEA) and would like to offer the following comments:

Land Division:

The DEA identifies on pages 52 and 53, that a number of land uses are "permitted" in the Resource Subzone of the State Conservation District, as provided by Title 13, Chapter 5, Section 24, Hawaii Administrative Rules (HAR).

Please note that Title 13, Chapter 5, HAR does not include a listing of "permitted" land uses in any subzone designation. Rather, the correct terminology is that Title 13, Chapter 5 HAR contains specific "identified land uses" for each subzone designation. Further, the same references are made in the documents related to the Conservation District Use Permit Amendment Application. The connotation between the words "permitted" and "identified" land use is misleading and should be corrected.

Commission on Water Resource Management:

Pages 42 and 43 of the document refers to excerpts from the Hawaii Stream Assessment regarding Alakahi Stream. The applicant should be aware that there are two "Alakahi" streams on the Island of Hawaii. The Alakahi Stream referenced on page 43 is for the Alakahi Stream at Waipio Valley, not the Alakahi Stream

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at South Hilo. The Alakahi Stream at HTBG's site is not diverted into the Lower Hamakua Ditch. HTBG should correctly reference these streams in future documents.

On page 50 of the DEA, HTBG discloses that long term improvements to the gardens will require an additional 350 gallons per day. HTBG also acknowledges that both the present use and the future increased usages are subject to approval from the Commission, and that if the Commission does not grant approval, the applicant will have to obtain water either from catchment or from a ground water source. The DEA should disclose the cost of providing alterative sources of water.

HTBG proposes to construct bridges, fences, signage, trails, and other facilities which may affect the bed or banks of streams. HTBG should be keenly aware that the alteration of stream channels are subject to stream channel alteration permits under Hawaii Administrative Rules 13-169-50.

Division of Aquatic Resources:

Division staff on the Big Island have done a recent survey (5/96) of Alakahi Stream above Mamalahoa Highway and have found o'opu hi'ukole (Lentipes concolor) in the stream. Again, as stated previously, the water diversion caused by the dams on the Alakahi and Onomea Streams are a major concern as they: 1) are an impediment to the inland migration of postlarvae gobies and native crustaceans; 2) create a pond habitat, which is conducive to the exotic Tahitian prawn, and 3) dampen natural stream flows and thus impact the migration inland of natives and the reduction of exotics. Again, as previously stated, we strongly recommend the removal of the diversions on the Alakahi and Onomea Streams.

Also, findings from a prior survey on the Alakahi Stream prior to dam construction were noted as not being as good as a later survey conducted by the Division of Aquatic Resources, but there is no reference to date or who conducted the survey.

Previous attached comments (dated December 1, 1995 and February 21, 1996) remain applicable.

(Comments of February 21, 1996)

We are concerned about the applicant's requests for some of the improvements planned for the Hawaii Tropical Botanical Garden. Some of the project improvements involve sites along or crossing portions of Onomea, Alakahi, and Kahalii Streams.

The Garden entrance trail is proposed to run along near the Kahalii Stream bed and to cross the stream bed at three locations. The applicant states that all of the walkway footings

will be constructed outside of the stream bed and no disturbance of the stream bed is anticipated by the construction of this walkway. In addition, a bridge is proposed to be constructed over Onomea Stream to provide pedestrian access between the present improved portion of the Garden and the future expansion area. The bridge is presently proposed to be a wooden, suspended foot bridge, which would be gated. The footings for the bridge are proposed to be constructed outside of the Onomea Stream channel. We are concerned because the project sites include the vicinities of Kahalii and Onomea Streams. According to our records, Onomea Stream harbors significant native freshwater fauna, especially in the middle to upper reaches. Kahalii Stream, even though it is an intermittent stream, contains suitable habitat for native freshwater fauna that recruit from the ocean during times of flow. This is likely because adjacent Onomea Stream has native freshwater fauna. Construction activities could have impacts on aquatic resources such as temporary turbidity, biota displacement and disturbance. We request the following measures to minimize erosion and siltation during construction:

1) site work be scheduled for periods of minimal rainfall;

2) lands denuded of vegetation be replanted or covered as quickly as possible to control erosion;

3) construction materials, petroleum products, and debris should be prevented from falling, blowing, or leaching into aquatic environment.

In regard to the existing concrete diversion dam within Alakahi Stream, the Division does not normally condone After-the-Fact permit applications. The diversion constructed by the applicant is presently obstructing the natural flow of the stream causing the water to pool in the upstream side. Alakahi Stream also harbors biologically significant native freshwater fauna. Obstructing or reducing the flow in the lower portion of the stream would be detrimental for recruitment since our native fauna are amphidromous and recruitment from the ocean is highly dependent upon stream flow. Stream flow into the ocean is essential for hinana (native gobiid postlarvae) and other native aquatic fauna to locate stream habitat. We feel that leaving the project in place would pose a greater threat to aquatic life than its removal. Therefore, we strongly recommend the removal of the diversion. The applicant should explore other alternative water sources.

(Comments of December 1, 1995)

The applicant, Hawaii Tropical Botanical Garden, has constructed a small diversion dam to provide water for two restrooms,

irrigation of plants during dry weather, freshening water in Lily Pond, and irrigation in greenhouse from Alakahi Stream, just downstream of the bridge on Mamalahoa Highway. The purpose of building this diversion dam is to provide an alternate source for water for the Garden in emergency cases such as when Onomea Stream (the primary water source normally used) is polluted from upstream. The diversion dam is constructed of concrete and measures approximately one foot in thickness at the top, widening to 2 feet thickness at the base, following the contour of the rock stream bed. The dam is 2 feet high. There is a 6 inch pipe serving as intake, with two inch plastic pipe feeds down into the cultivated portion of the property where it feeds smaller pipes that service the restrooms, overhead sprinklers, Lily Lake and the Flamingo Pond.

The Division of Aquatic Resources does not normally condone the submission of After-the-Fact permit applications. The applicant states that Alakahi Stream is an intermittent stream. Our records list it as a perennial stream. Recent investigation of the area by our Big Island personnel confirms that it is continuously flowing (perennial) stream.

The diversion constructed by the applicant is presently obstructing the natural flow of the stream causing the water to pool on the upstream side. According to our records the stream does harbor significant native freshwater fauna, especially in the middle to upper reaches. Obstructing or reducing the flow in the lower portion of the stream would be detrimental for recruitment since our native fauna are amphidromous and recruitment from the ocean is highly dependent upon stream flow. Stream flow into the ocean is essential for hinana (native gobiid postlarvae) and other native aquatic fauna to locate stream habitat.

We feel that leaving the project in place would pose a greater threat to aquatic life than its removal. Therefore, we strongly recommend the removal of the diversion. The applicant should explore other alternative water sources. The diversion dam on Alakahi Stream listed by the applicant as only freshwater resources on the property is not an acceptable alternative since this stream is also considered good quality. We recommend the removal of this diversion as well.

<u>Historic Preservation Division</u>:

In our review of the SMA Use Permit Application (letter of February 26, 1996, from Don Hibbard to Virginia Goldstein) we asked for a better map showing the proposed improvements and the boundaries of the areas that have been archaeologically surveyed. No such map is provided in the revised DEA. The revised document indicates that the following areas that will be affected by

immediate improvements have been archaeologically surveyed: (1) the Garden entrance; (2) walkways; (3) rain shelters; (4) rest areas, and (5) parking areas. The area of the proposed pedestrian overpass and bridge has not been surveyed, but according to the information presented, this area has already been improved, and is thus unlikely to contain significant historic sites. Based on the new information presented and our own staff's monitoring of the recent trail clearing and fence building we believe that both the immediate and long range improvements described in the revised DEA will have "no effect" on significant historic sites. We still believe, however, that a systematic archaeological inventory survey of the entire "Garden" should be undertaken at some point. As part of the survey, some effort should be made to interview people with a knowledge of the area to obtain more information about the use of this area.

Na Ala Hele Program:

Upon review of the DEA, Na Ala Hele is primarily interested in the future master plan improvements which include the fencing of the Donkey Trail alignment. It is the intent of Na Ala Hele to have access to the peninsula and adjacent shoreline unimpeded and we look forward in working with Hawaii Tropical Botanical Garden as detailed material specifications and site plans are developed.

We appreciate the opportunity to provide input on the subject Draft Environmental Assessment. Should you have any questions, or require further information, please contact assigned staff planner, Edward Henry, at 587-0377.

Aloha,

for MICHAEL D. WILSON

cc: DAR, HPD, Na Ala Hele
CHRM

SANDRA PECHTER SCHUTTE
ATTORNEY AT LAW

101 Aupuni Street, Suite 1014A
Hilo, Hawaii 96720
Telephone: (808) 969-7331
Fax: (808) 934-9819

July 19, 1996

Mr. Michael D. Wilson
Chairperson
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Re: Draft Environmental Assessment ("DEA") for Amendment to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; Entrance, Trails, Parking and Related Improvements and Master Plan Improvements at Hawaii Tropical Botanical Garden ("HTBG")
Alakahi, Kahalii and Onomea, South Hilo, Hawaii
Tax Map Key Nos.: (3) 2-7-9:2, 6 and 10, and 2-7-10:22

Dear Mr. Wilson:

Thank you for reviewing the DEA for HTBG's amendment to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; entrance, trails, parking and related improvements and master plan improvements at Alakahi, Kahalii and Onomea, South Hilo, Hawaii. This letter addresses comments contained in your letter dated June 19, 1996 to Ms. Goldstein:

Terminology of Title 13, Chapter 5, Hawaii Administrative Rules. The term "permitted" land uses contained in the DEA will be changed to "identified" land uses, as requested by the Land Division, when referring to Title 13, Chapter 5, Hawaii Administrative Rules.

Alakahi Stream at Waipi'o Valley. The Commission on Water Resource Management points out an error in Section 4.2 of the DEA which referenced the Alakahi Stream at the back of Waipi'o Valley, instead of the Alakahi Stream that runs through HTBG's property. The final environmental assessment will be revised to remove the first paragraph on page 43 of the DEA, as it references the Alakahi Stream at Waipi'o Valley. The remaining references to Alakahi Stream in Section 4.2 of the DEA refer to the stream located at South Hilo.

Cost of Providing Alternative Sources of Water. The Commission on Water Resources Management also asks that the DEA disclose the cost of providing alternative sources of water. The option of providing water from the County of Hawaii municipal water system

would involve the extension and upgrading of the County waterline with a six-inch transmission line for a distance of approximately 1,000 feet. The waterline installation would cost somewhere between $60,000 to $70,000. Further, the Papaikou system has a limited capacity and water may not be available to HTBG without the expansion of the capacity of this system.

If it were feasible to drill a well on HTBG's property, the cost of drilling and outfitting such a well is estimated to be in the range of $50,000 to $60,000. The difficulty in finding fresh, as opposed to brackish water at the highest elevation of HTBG's property is questionable. Further, the physical constraints as to the transport of a drilling rig onto the property and the provision of electrical power for the required well pump may eliminate this option as an alternative.

HTBG has not made a cost analysis of the alternative of a catchment system. However, such a system would require roof lines for water collection. It would also require electrical power which may be both difficult and environmentally disfavored.

The final environmental assessment will incorporate the requested costs for these water source alternatives.

Alterations of Stream Channels. HTBG is aware that the construction of its proposed improvements may affect the bed or banks of streams. HTBG has planned its improvements so as not to interfere with the stream beds and banks. However, if any of the construction is proposed to affect any of the streams, HTBG will apply to the Commission on Water Resources Management for a stream alteration permit, pursuant to Rules 13-169-50, Hawaii Administrative Rules, prior to commencement of construction.

Use of the Diversion Dams. The Division of Aquatic Resources has expressed concern regarding the continued placement of the Onomea and Alakahi Stream dams because the Division is concerned that the dams 1) are an impediment to the inland migration of postlarvae gobies and native crustaceans, 2) create a pond habitat, which is conducive to the exotic Tahitian prawn, and 3) dampen natural stream flows. It is also recommending removal of the diversions on both streams.

HTBG acknowledges the concerns raised by the Division of Aquatic Resources regarding the effect of the diversion dams in Onomea and Alakahi Streams on the ability of native fauna to migrate upstream. To accommodate this concern, HTBG is retaining a biologist to prepare a mitigation plan that would permit HTBG to continue use of stream water for its botanical garden while protecting the native fauna and reducing the introduced species. If the mitigation plan requires removal of one or more of the dams, HTBG will delete its request for these improvements from its conservation district use application.

The final environmental assessment will be revised to include this information.

Reference to Prior Biological Survey of Alakahi Stream. The Division of Aquatic Resources has asked for the date and the name of the person who conducted the prior biological survey of Alakahi Stream referred to in the DEA. The information regarding this survey was taken from a State publication, dated December, 1990, prepared by the Commission on Water Resource Management and the National Park Service, entitled *Hawaii Stream Assessment, A Preliminary Appraisal of Hawaii Stream Resources*, Report R84. The dates on which the Alakahi Stream survey were conducted and the name of the individual who conducted the survey were not included in this report.

Mitigation Measures to Protect Steams During Construction. The Division of Aquatic Resources recommended that the following measures be taken to minimize erosion and siltation of the streams during construction:

1) Site work be scheduled for period of minimal rainfall;
2) Land denuded of vegetation be replanted or covered as quickly as possible to control erosion; and
3) Construction materials, petroleum products, and debris should be prevented from falling, blowing, or leaching into aquatic environment.

HTBG agrees to follows these mitigation measures and the final environmental assessment will be revised to include this information.

Alternative Water Sources. The Division of Aquatic Resources has also requested that HTBG explore alternative water sources. As indicated above, the alternatives include obtaining County municipal water, development of a ground water source, and use of a catchment system. Each of these alternatives present significant problems. HTBG is also examining the use of water from a private spring. However, such an alternative would require the agreement of the landowner and possibly approval from the Commission on Water Resource Management. Finally, HTBG is examining the alternative of the use of stream water without a diversion dam. These alternatives will be included in the final environmental assessment.

Future Archaeological Survey of Garden. The Historic Sites Preservation Division has indicated that based on the information received it is Division's opinion that the improvements described in the DEA will have no effect on significant historic sites. It has, however, asked that at some point a systematic archaeological inventory survey of the entire Garden be conducted and that as part of the survey, some effort should be made to interview people with a knowledge of the area to obtain more information about the use of this area.

In conjunction with its conservation district use application, HTBG submitted a management plan for its botanical garden to the Department of Land and Natural Resources. This management plan proposes, in part, to inventory any future area proposed for development, prior to commencing the development in that area. HSPD has recently accepted this proposal. HTBG will interview people with knowledge of the area in conjunction with any inventory conducted. This information, together with a memorandum dated June 25, 1996 from HSPD will be incorporated into the final environmental assessment.

Working With Na Ala Hele on the Donkey Trail Fencing. Na Ala Hele indicates that it would like to work with HTBG as detailed material specifications and site plans are developed for the Donkey Trail fencing. HTBG appreciated the efforts of Na Ala Hele in the construction of the Onomea Access Trail and anticipates a continued working relationship with Na Ala Hele in the future.

We appreciate the Department of Land and Natural Resource's comments on HTBG's draft environmental assessment. The final environmental assessment will be revised, as appropriate, because of your comments. Your letter and this response will also be appended to the final environmental assessment to ensure a document that adequately addresses pertinent development and environmental issues.

Very truly yours,

SANDRA PECHTER SCHUTTE

xc: Office of Environmental and Quality Control
Hawaii County Planning Department
Hawaii Tropical Botanical Garden

P.O. Box 636
Pepeekeo, HI 96783
961-4953
June 24, 1996

Ms. Sandra Pechter Schutte
101 Aupuni Street, PH-1014A
Hilo, HI 96720

Re: Hawaii Tropical Botanical Garden
Amendment to CDUP HA-1447 and 2nd Draft Environmental Assessment

Dear Ms. Schutte:

I have read the draft environmental assessment and would like to comment.

I note with dismay that the 7-foot overpass proposed in the first draft EA was not deleted from HTBG's plans. I understand that my husband, Ed Johnston, met last Thursday with Scott Lucas and Bob Williams of HTBG and was informed that HTBG had not dropped the plan for the overpass. I wish to inform you that this overpass is completely unacceptable.

I was included in one of the threatening letters, which, the FBI informs us, HTBG employee Sean Callahan was responsible for sending anonymously to Ed. I will use every legal means at my disposal to fight this overpass, because it could be used by Callahan as a unique vantage point to harm me when I use the public trail. I participated in a 5-year fight for that trail, and I intend to use it. No part of HTBG's expansion plan will proceed until the overpass issue is addressed. My interest in this matter is compelling and clearly "distinguishable from that of the general public." I can assure you that I can provide evidence which will substantially assist the State and County agencies in their decision-making on this subject.

Please be aware that we have requested that Sean Callahan sign an FBI privacy waiver, which would allow us to receive the written FBI report. We received written notification from HTBG last week that Callahan, who has maintained that the FBI never even discussed these letters with him, would sign the waiver. However, he now refuses to sign it. If Callahan were not under suspicion by the FBI (which has been HTBG's stance), then there is no credible reason for Callahan to refuse now to sign the waiver.

I would like to remind you that Callahan made an anonymous, menacing telephone call to Deborah Ward. Additionally, Rick Warshauer believes that Callahan bashed the front of his truck with a garden vehicle on a day that Rick drove down the public trail and parked on the valley floor. Callahan's alcohol problems are well known in the community.

You will recall that, back in January, Ed requested that HTBG provide Callahan with counseling and an assessment for dangerousness. This reasonable request was met with a "no comment" from HTBG, and HTBG broke off all communication with Share Onomea Access for some months after that request. HTBG's pattern of harassment of public trail/shoreline users leads me to believe that HTBG President, Dan Lutkenhouse, influenced Callahan to threaten us by promoting an atmosphere at HTBG of anger and hostility directed toward those of us who pressed for the restoration of public property. I understand that Scott Lucas described at Thursday's meeting how other HTBG employees admitted to him that they also harassed public trail users. Even if HTBG were to fire Callahan, I would still contest this overpass, as an atmosphere of menace and of hostility is widespread at HTBG.

I do not intend to find out what Callahan (or any other HTBG operative) will do from the vantage point of an overpass on the public trail.

In your response to this comment, please describe the impacts and assess all alternatives to this overpass. Please also discuss what legal right HTBG would have to usurp the air space above a state-owned trail for its own exclusive, commercial purpose. It is my understanding that government entities construct overpasses over public rights-of-way and that such overpasses are for public use, whereas the proposed overpass would be used only by HTBG customers and staff. The EA provided an inadequate review (virtually none) of this proposed use of state property.

In addition, I believe HTBG should conduct a proper investigation into its staff's mistreatment of the public, which investigation should include a professional assessment of Callahan for dangerousness, and disclose the results in an EIS.

I have seen HTBG's written response to SOA's objection to the overpass, in which HTBG describes our safety concern as "ridiculous." HTBG is going to have to address this seriously; it is not going to succeed in just brushing it off. The question of the overpass will be disposed of before HTBG's expansion plan moves forward.

Very truly yours,

Helen Rogers

Helen Rogers

cc: Gary Gill, Office of Environmental Quality Control
Dawn Chang, Attorney General's Office
Ed Henry, OCEA
Rodney Oshiro, Na Ala Hele
Virginia Goldstein, Hawaii County Planning Department
Deborah Ward, Sierra Club, Moku Loa Group
Patricia Tummons, *Environment Hawai'i*
Palikapu Dedman, Pele Defense Fund
Al Lerma, Esq.
Rick Warshauer
Scott Lucas, Hawaii Tropical Botanical Garden
Bob Williams, Hawaii Tropical Botanical Garden
Dave Smith, *Hawaii Tribune-Herald*
Wayne Carvalho, Hawaii County Police Department

SANDRA PECHTER SCHUTTE
ATTORNEY AT LAW

101 Aupuni Street, Suite 1014A
Hilo, Hawaii 96720
Telephone: (808) 969-7331
Fax: (808) 934-9819

July 19, 1996

Ms. Helen Rogers
P.O. Box 636
Pepeekeo, Hawaii 96783

Re: Draft Environmental Assessment ("DEA") for Amendment to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; Entrance, Trails, Parking and Related Improvements and Master Plan Improvements at Hawaii Tropical Botanical Garden ("HTBG")
Alakahi, Kahalii and Onomea, South Hilo, Hawaii
Tax Map Key Nos.: (3) 2-7-9:2, 6 and 10, and 2-7-10:22

Dear Ms. Rogers:

Thank you for reviewing the DEA for HTBG's amendment to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; entrance, trails, parking and related improvements and master plan improvements at Alakahi, Kahalii and Onomea, South Hilo, Hawaii. This letter addresses comments contained in your letter dated June 24, 1996:

Pedestrian Overpass. Based on the comments received regarding the pedestrian overpass or bridge over the Onomea Access Trail and meetings held with representatives from the South Hilo community, HTBG has withdrawn its request for this improvement. HTBG will continue to use the gates erected in conjunction with the fencing of the Onomea Access Trail to cross the trail. These gates were approved by the Chairperson of the Board of Land and Natural Resources as part of the construction plans for the Onomea Access Trail. The final environmental assessment will be revised to reflect this change.

HTBG Staff Conduct. You have asked that HTBG should conduct a proper investigation of its staff's mistreatment of the public and specifically, a professional assessment of one employee. It has been and continues to be HTBG's policy that any improper conduct by its staff be investigated and appropriate measures taken. The new director of HTBG, Scott Lucas, has met with all HTBG staff and has instructed them to accord Garden guests and the general public with the utmost courtesy and respect. If you are aware of any problems in the future with the HTBG staff, it is recommended that you immediately contact Mr. Lucas about the problem.

With respect to the problems with the particular employee you mention, your complaints suggest criminal conduct which HTBG cannot substantiate. It is suggested that you pursue any complaint you may have of this nature with the Hawaii County prosecutor's office.

Since the issues you raise regarding employee conduct are not environmental issues, the final environmental assessment will not include a discussion of this subject.

We appreciate your comments on HTBG's draft environmental assessment. The final environmental assessment will be revised, as appropriate. Your letter and this response will also be appended to the final environmental assessment to ensure a document that adequately addresses pertinent development and environmental issues.

Very truly yours,

SANDRA PECHTER SCHUTTE

xc: State Office of Environmental Quality Control
Hawaii County Planning Department
Department of Land & Natural Resources, Land Management
Hawaii Tropical Botanical Garden

University of Hawai'i at Mānoa

Environmental Center
A Unit of Water Resources Research Center
Crawford 317 • 2550 Campus Road • Honolulu, Hawai'i 96822
Telephone: (808) 956-7361 • Facsimile: (808) 956-3980

June 25, 1996
EA:00144

Sandra Pechter Schutte
Hawaii Tropical Botanical Garden
101 Apuni Street, Suite 1014A
Hilo, Hawaii 96720

Dear Ms. Schutte:

Draft Environmental Assessment (EA)
Hawaii Tropical Botanical Garden Improvements
Hilo, Hawaii

The referenced EA proposes a Master Plan for certain immediate and future improvements to the Hawaii Tropical Botanical Garden. The proposed improvements are within the State Land Use Conservation District, with portions in the Special Management Area (SMA). Immediate improvements include a new garden entrance along the Old Mamalahoa Highway, construction of two new wooden walkways, construction of a covered rain shelter, and concrete diversion dams to be located within Onomea Stream and Alakahi Stream. Other improvements include a pedestrian overpass for visitors, related utility equipment, "no trespassing" and directional signs, and landscaping. Future improvements include fencing, landscaping, a gated wooden suspension bridge, three research greenhouses, an additional restroom facility, and additional "no trespassing" and directional signs.

This review was completed with the assistance of George

Curtis, UH Hilo; and Tom Hawley, Environmental Center.

This draft EA replaces an earlier EA published in the February 8, 1996 *Environmental Notice*. We appreciate the improvements made in the second document, and we believe it adheres much more closely to both the letter and the spirit of environmental review laws. We also appreciate the greater quantity of helpful information about the proposed project which has been included in the second document. Nevertheless, there are still areas of concern in the new document which must be addressed in further detail in the final EA.

Community and Government Relations

We note that the applicant has a long history of poor relations with the surrounding community. Much of this is due to access disputes to Onomea Bay and the applicant's use of the jeep road, (Onomea Access Trail), for access to the Garden. Our reviewers point out that the road and the trail were most likely under Kingdom and/or Territorial jurisdiction at some time in the past, which has led to the current controversies over present-day land ownership and usage. While part of the problem relates to the State's failure to limit liability of landowners who allow public use of their property for access to other areas, we urge the applicant to resolve all land-ownership issues in Onomea Valley, (as called for in the state Board of Land and Natural Resource's October 27, 1995 Mediation Agreement) prior to commencing with the proposed improvements. Once improvements are undertaken, activities on the part of the applicant must not interfere with public rights of access to Onomea Bay.

Other concerns relate to native flora and fauna populations in the project area, water quality in Onomea, Alakahi, and Kahalii streams, and the presence of archaeological and historical features within the Garden which may have been destroyed during previous development. In addition, community groups have noted what might be termed an "adversarial stance" on

the part of the applicant toward those who seek to submit their input on the proposed improvements.

Government agencies with jurisdiction over the proposed improvements and the project area also have expressed dissatisfaction with the applicant's compliance both with permit stipulations and more generally with permit requirements. Several prior actions on the part of the applicant, in particular the construction of diversion dams across Onomea Stream and Alakahi Stream, occurred in violation of the applicant's CDUP or in the absence such a permit altogether. Have these violations been resolved with the Board of Land and Natural Resources? If not, all plans for immediate and future actions at the Garden should be suspended. Other agencies, including the State Historic Preservation Division, the Na Ala Hele program, and the County of Hawaii Police Department have expressed various levels of dissatisfaction with the proposed improvements. All relevant and substantive concerns raised by the involved government agencies must be resolved prior to commencement of improvements at the Garden.

We remain concerned that widely-voiced opposition to the proposed project suggests a troubling disregard for the importance of cooperative action on the part of the applicant. Such cooperation must be regarded as an integral part of any development action, especially in relation to project permitting and other required governmental approvals. Indeed, the need for cheerful cooperation and meaningful dialogue with affected parties is even more crucial when important environmental issues are at stake, and when the public seeks to address these issues through legally established input processes such as those contained in Chapter 343, HRS. It is unfortunate that the applicant in the past has chosen to disregard these important elements of project planning and implementation, and we look forward to a greater appreciation for the spirit of participatory planning in the future.

Historical and Archaeological Resources

With regard to archaeology, it should be noted early on that the Garden occupies an area which formerly was a shipping port for the mauka sugar plantation and was mostly abandoned years before the Garden was begun. Thus, it is of particular concern that the applicant has not taken adequate measures to both inventory and protect archaeological resources in the area of the proposed improvements. In a letter from the State Historic Preservation Division dated September 7, 1995, it was noted that the proposed project could have an adverse effect on area archaeological sites. The lack of, and more to the point, the need for a complete survey in the project area prior to any improvements to the Garden was explicitly stated in this letter. A second letter from SHPD, dated February 22, 1996, contains the following:

> In comparing the applicant's discussion of immediate and future planned improvements and the areas that have been surveyed for archaeological sites it does not appear that all of the areas slated for new construction or improvements, such as the new visitor center area, have been surveyed. Part of the difficulty in determining what has been surveyed and what has not is the previous survey areas (designated Areas A, B, and C) are not well defined (Areas B and C have no definite boundaries) in the archaeological inventory survey report.

The letter concludes with a recommendation from SHPD that the Planning Department defer action on the applicant's SMA Use Permit until these ambiguities have been resolved. For purposes of evaluating the adequacy of the draft EA, it would be helpful to know what action the applicant has taken to address the concerns raised by SHPD. Have the survey areas been delineated with greater clarity? Has the applicant satisfied the Preservation Division's request for adequate archaeological information?

Location of Visitor Center

On page 30 of the draft EA, the applicant states, "In order to provide for the safety of pedestrians crossing the Old Mamalahoa Highway, the applicant is proposing the County of Hawaii establish a crosswalk along the Highway at the Garden entrance." We are concerned that the sight distance in the area may render a crosswalk inadequate to ensure the safety of Garden visitors. We would like the applicant to consider the safer alternative of constructing a walkway over the Old Mamalahoa Highway.

General Comments and Concerns

Our reviewers pointed out several general concerns about the draft EA which must be resolved in the final EA.

1. Figures 4 and 5 of the draft EA, which should clarify the description of the present and proposed improvements, do not do so. The legends are not clear, and the difference between "present" improvements and "future" improvements is difficult to ascertain. One good diagram, professionally done and included in the final EA, would solve the problem and avoid misunderstanding.

2. Reference should be made to the Hawaii Environmental Risk Ranking Report, which indicates that, especially in areas such as this, alien species are the major problem and a managed natural area minimizes their impact.

3. The author of the report should be indicated in the final EA.

4. The 1946 and the 1960 tsunami events, (and probably other tsunamis as well) affected the area significantly. The present usage of the area is a good one for an inundation zone.

In summary, we support many of the activities undertaken by the Hawaii Tropical Botanical Garden. In particular, efforts on the part of the applicant to eradicate the noxious *Miconia* in the Onomea Bay area are to be commended. Still, it is important for the applicant to follow all established governmental permitting procedures and to recognize the value and importance of community concerns before implementing any of the proposed improvements.

Thank you for the opportunity to comment.

Sincerely,

John T. Harrison
Environmental Coordinator

cc: OEQC
Roger Fujioka
Planning Department, County of Hawaii
George Curtis
Tom Hawley

SANDRA PECHTER SCHUTTE
ATTORNEY AT LAW
101 Aupuni Street, Suite 1014A
Hilo, Hawaii 96720
Telephone: (808) 969-7331
Fax: (808) 934-9819

July 19, 1996

John T. Harrison
Environmental Coordinator
University of Hawaii at Manoa
Environmental Center
Crawford 317
2550 Campus Road
Honolulu, Hawaii 96822

Re: Draft Environmental Assessment ("DEA") for Amendment to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; Entrance, Trails, Parking and Related Improvements and Master Plan Improvements at Hawaii Tropical Botanical Garden ("HTBG")
Alakahi, Kahalii and Onomea, South Hilo, Hawaii
Tax Map Key Nos.: (3) 2-7-9:2, 6 and 10, and 2-7-10:22

Dear Mr. Harrison:

Thank you for reviewing the draft environmental assessment for Hawaii Tropical Botanical Garden's amendment to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; entrance, trails, parking and related improvements and master plan improvements at Alakahi, Kahalii and Onomea, South Hilo, Hawaii. This letter addresses comments contained in your letter dated June 25, 1996:

Community and Government Relations. The long standing history of poor relations between HTBG and the community is acknowledged. However, significant progress has been made between HTBG, the community and governmental agencies since the latter part of 1995. On October 27, 1995, the Board of Land and Natural Resources ("BLNR") approved a mediation agreement entered into between HTBG, the County of Hawaii, the Department of Land and Natural Resources ("DLNR") and Share Onomea Access. This agreement provided for the improvement and fencing of two pedestrian public access trails; the Onomea Access Trail, which is the jeep road extending from the Old Mamalahoa Highway through HTBG's botanical garden until it reaches Onomea Stream, and the Alakahi Stream Trail, a trail extending from the Onomea Access Trail along the Hilo side of Alakahi Stream until it reaches the beach at the mouth of Alakahi Stream. HTBG provided the fencing materials for these trails, while DLNR's Na Ala Hele program improved the trails and installed the fencing. The County of Hawaii also participated by clearing and paving an area providing five parking stalls along the mauka shoulder of the Old Mamalahoa Highway. Implementation of the mediation

agreement has provided unrestricted pedestrian access on a 24-hour basis to the resources at Onomea Bay. Once HTBG's requested entrance trail is approved by BLNR and constructed, the use of the HTBG shuttle vans along the Onomea Access Trail will be discontinued providing greater safety to pedestrians using this trail.

In addition, HTBG's new director, Scott Lucas, has made substantial efforts to meet with community representatives and to respond to community and government concerns. For example, HTBG's request for the overpass over the Onomea Access Trail, proposed in the DEA, has been withdrawn based upon concerns raised by the community. Likewise, all possible alternatives to the use of the dams in Onomea and Alakahi Streams is being closely examined, based upon the concerns raised by the DLNR Division of Aquatic Resources and the community. Thus, efforts are being made to develop a mitigation plan for the protection of the native stream fauna and the reduction of the introduced species (the Tahitian prawns). HTBG recognizes that one or both of its dams may have to be removed as a result of the required mitigation measures. HTBG is also working with the Department of Health to test its existing cesspool for leaching into the streams, based upon community concerns. In addition, HTBG is developing a mitigation plan, in conjunction with the U.S. Department of the Interior, National Biological Service, Pacific Islands Science Center, to protect the orange black damselflies in the vicinity of the botanical garden.

In April, 1996, water meters were installed at the Alakahi and Onomea Stream dams and the restrooms to monitor water usage with accuracy. Also, water conservation measures were taken by converting the Lily Pond into a self contained environment which no longer needs fresh water flushed through the pond on a daily basis. This self-containment also prevents the flow of pond water into Alakahi Stream. The flow of water from the other pond in the Garden, has been diverted away from Alakahi Stream and into an area for plant irrigation, in order to prevent any contamination of the stream.

HTBG has finally cleared up all of its prior violations and is proceeding with its permit request in accordance with all State and County laws. During this process, HTBG is continuing to listen to the concerns of the community and governmental agencies and attempting to respond to those concerns.

It is acknowledged that with the long history of poor community relations, it will take time to develop trust and a working relationship between HTBG, the community and governmental agencies. However, the efforts made during this last year show significant progress in reaching such a relationship.

Land Ownership Disputes. The land ownership dispute issue involves two areas. The first relates to the ownership of the government road remnants, identified in the DEA as the Onomea Access Trail, and is essentially moot as a result of the mediation agreement between HTBG, DLNR, the County and Share Onomea Access. The second involves the possible

existence of remnant State parcels throughout HTBG's property, which HTBG believes should not delay the requested conservation district use permit.

The trail depicted in the DEA as the Onomea Access Trail essentially follows the path of an old Government Road that is depicted on a survey map prepared A. B. Lobenstein in 1889. An abstract prepared for DLNR by Awana, Inc. concluded that the road dates back to the reign of Kamehameha III. The historical evidence, documented in a report prepared by Paul H. Rosendahl, Ph.D., dated July 21, 1995, concludes that this right-of-way was a government roadway in the 1800's designed to facilitate wheeled vehicular traffic. Based on this data, this roadway became a public road, under the Highways Act of 1892, presently HRS Section 264-1. Because of the evidence of vehicular use of this roadway and the nature of the roadway, the County of Hawaii and HTBG believe that the roadway is under the jurisdiction of the County of Hawaii. DLNR, however, claims that this right-of-way is a trail under State jurisdiction. In addition to the State-County dispute, HTBG claims ownership of portions of the improved portion of that trail along the cliffs that appear to be within HTBG's property.

Notwithstanding the ownership of this roadway, under the mediation agreement between DLNR, the County of Hawaii, HTBG and Share Onomea Access, approved by BLNR on October 27, 1995, this roadway has been designated as a public access trail as part of the State Na Ala Hele trail system. Thus, the ownership dispute is moot.

With respect to the land remnant issue, the Department of Land and Natural Resources ("DLNR") is presently preparing an abstract of the HTBG property to determine whether there are any remnants owned by the State of Hawaii. After the abstract is prepared, the areas in dispute will have to be surveyed. It is doubtful whether the State will complete this work in the near future, and it is imperative that HTBG establish a new walking trail into the garden discontinue use of its shuttle vans along the Onomea Access Trail.

Although the State abstract has not yet been completed, HTBG believes that the land areas of possible dispute are located near the shoreline where no improvements are being proposed. Notwithstanding the lack of definite information on this issue, HTBG believes that it is preferable to proceed with the permitting for its proposed improvements. If it is later determined that some of the improvements are situated on land that is not owned by HTBG, appropriate measures will be taken to either acquire the remnants or obtain easements over the affected property.

CDUP Violations Regarding the Dams. The conservation district violations involving the construction of the Onomea and Alakahi Stream dams were resolved by HTBG under the DLNR administrative penalty system known as Hearing Officer/Administrative Penalty System (HOAPS). Under this system, an administrative penalty can be paid for an alleged violation, but the payment is not construed as an admission of fault. An administrative penalty of $500.00 per violation or a total of $1,000 was paid by HTBG, which was accepted by DLNR

under HOAPS on March 7, 1996. DLNR did not proceed to process HTBG's conservation district use application until this violation was resolved.

Historical and Archaeological Resources. In response to your inquiry as to whether HTBG has satisfied the State Historic Preservation Division's ("SHPD") request for adequate archaeological information, by memorandum from Don Hibbard to Dean Uchida, Administrator of the DLNR Land Division, dated June 25, 1996, SHPD has found acceptable HTBG's proposal to inventory each area proposed for future development, namely, (1) the fencing of the Donkey Trail, (2) future landscaping areas, (3), construction of a foot bridge over Onomea Stream, (4) construction of greenhouses, and (5) construction of restrooms. An inventory of all of the areas proposed for immediate improvements has been completed. As such, HTBG believes that it has satisfied SHPD's request for adequate archaeological information. A copy of the SHPD memo will be appended to the final environmental assessment.

Crosswalk on the Old Mamalahoa Highway. You have expressed a concern that the sight distance in the area proposed for the crosswalk described in the DEA would be inadequate to ensure the safety of Garden visitors; however, the sight distance study prepared by Ali'i Architects, Inc. and Delta Engineering in conjunction with the subject application (Exhibit 13 to the DEA) shows that there is adequate sight distance at the proposed crosswalk location along the Old Mamalahoa Highway.

All crosswalks in the County of Hawaii are established by County ordinance. An ordinance is not proposed to the County Council by the County Department of Public Works, unless the proposed crosswalk can meet a minimum site distance requirement. The sight distance chart, of the crosswalk study prepared for HTBG, plots the sight distances at various locations and compares the proposed sight distances with the minimum County standards. Except at one location, all of the line of sight points for the proposed crosswalk exceed the County minimum standards. The study indicates that the disparity in the one point may be compensated for by the two 90 degree gentle curves and the concrete bridge. It should be pointed out that the sight distances established under this study are only possible if some of the vegetation along the roadway is removed.

Based on the sight distance study, minimum required sight distances are met which would permit the County enact an ordinance establishing a crosswalk along the Old Mamalahoa Highway between the HTBG botanical garden entrance and its new visitor center. The final environmental assessment will be revised to include this information.

HTBG has not obtained any cost estimates for the construction of a pedestrian overpass which would cross the Old Mamalahoa Highway. However, HTBG believes that this improvement would be a substantial expense. Also, the pedestrian overpass crossing the Onomea Access Trail was strongly opposed by the community, and HTBG believes that an

overpass across the highway would also be poorly received by the community. Thus, HTBG believes that an overpass is not a viable alternative.

Clarification of Site Plans. In response to your request for a site plan that clarifies the description of the present and proposed improvements, the site plan identified as Exhibit 5 will be color coded in the final environmental assessment to distinguish the immediate proposed improvements and the long term future improvements.

Hawaii Environmental Risk Ranking Report. You recommend that reference should be made to the Report of the Hawaii Environmental Risk Ranking Study to the State Department of Health, dated 1992, because the report notes that alien species are major problems in an area such as Onomea and that a managed natural area minimizes the impact of alien species. The report consists of four parts: Part 1 identifies risks to human health from environmental pollution; Part 2 identifies risks to natural ecosystems from human activities; Part 3 presents case studies that demonstrate how extended benefit-cost analysis can evaluate impacts of environmental degradation on economic welfare and the quality of life; and Part 4 contains technical appendices. Neither Onomea nor any other portion of South Hilo is evaluated in this report. Although the report does contain a general statement regarding the threat of alien species, since there is no specific reference in the report to any area near HTBG's property, a reference to this report will not be inserted in the final environmental assessment.

Author of Report. This final environmental assessment will include the author's name.

We appreciate the University of Hawaii at Manoa, Environmental Center's comments on HTBG's draft environmental assessment. The final environmental assessment will be revised, as appropriate, because of your comments. Your letter and this response will also be appended to the final environmental assessment to ensure a document that adequately addresses pertinent development and environmental issues.

Very truly yours,

SANDRA PECHTER SCHUTTE

xc: Office of Environmental Quality and Control
Hawaii County Planning Department
Department of Land & Natural Resources, Land Management
Hawaii Tropical Botanical Garden

187-C Holuluni Street
Hilo HI 96720

June 2, 1996

Ms. Sandra Pechter Schutte
101 Aupuni Street, Suite 1014A
Hilo HI 96720

Dear Ms. Schutte:

Re: Hawaii Tropical Botanical Garden Environmental Assessment

Thank you for sending me the revised draft EA. I note in the Environmental Notice published by the Office of Environmental Quality Control that this draft EA has now been formally submitted for processing. I offer the following comments:

The Hawai'i Tropical Botanical Garden is listed as the owner of the land for which permits are being sought. However, as I mentioned in my earlier comments on the previous document, there is a bona fide dispute over ownership of some portions of the parcels in question. I believe that this should be acknowledged in the draft EA.

In the third paragraph of Section 2.2, the statement is made: "The fencing materials for this trail were provided by the Applicant." I believe that if the applicant wishes to take credit for this, then the circumstances under which the materials were provided should be mentioned as well -- namely, that the applicant did so in lieu of payment of a fine for past Conservation District violations. In other words, the fencing materials were not donated as a gesture of good will (as is suggested by this statement), but were required to be provided.

Also, since publication of this document, the Alakahi trail has been opened to the public.

A further point: the language in this section suggests that the jeep trail, though open to the public, crosses garden property. I object to this characterization. It is well established that the trail is an old government road, title to which is vested in the state of Hawai'I. It does not cross the applicant's property so much as it bisects it.

Concerning Section 2.3 -- Permits Issued, I am not certain that all existing improvements (with the exception of the dams) have in fact been approved and permitted. Specifically, I do not believe that the current greenhouse has been permitted.

I object to the proposed pedestrian bridge over the Onomea Access Trail. Apart from being unsightly, I believe that as designed, it would pose difficulties for persons with disabilities and thus might expose the garden to lawsuits filed under the Americans with Disabilities Act. Might I suggest an alternative? Why not put turnstiles on gates leading into the garden? The garden could give its paying guests magnetic cards that would operate the turnstiles (such as the cards in common use at Metro stations and elsewhere). This would allow garden visitors full use of the public trails while allowing the garden to keep members of the non-paying public out of its private areas.

I repeat my prior objections to the "billboard"-cum-umbrella rack fronting the Scenic Route. As I mentioned before, if the garden wishes to provide visitors with umbrellas, the logical place to keep them is on the mauka side of the road, at the planned visitors' center. Otherwise, if it rains, visitors will have to run several dozens of yards -- across a highway -- and through a massive gate before they get their umbrellas. Apart from the inconvenience factor, I think the garden would have some liability concerns about causing pedestrians to hurry across Mamalahoa Highway in inclement conditions, in their haste to seek the cover of an umbrella.

All this leads me to speculate, as before, that the "umbrella stand" feature of the so-called bulletin board is merely the flimsiest of excuses to build a structure whose primary purpose is to serve as an advertisement for the garden. Given its size (16 feet long by 4 feet high) and the fact that it will be facing the highway, I again question whether the structure, as proposed, complies with the laws regulating billboards and public signs.

On page 30 of the DEA, it is stated that the proposed 7-foot-high wrought iron fence "will begin at the Old Onomea Stream culvert and end at the County concrete bridge..." On the map provided at Figure 6, the county bridge is identified as the bridge over Onomea Stream. The culvert at the opposite end of the proposed fence is stated to be for "Old Onomea Stream (Dry Bed)." I object to the nomenclature here. First, the stream is obviously Kahali'i, not "Old Onomea Stream." Second, it is properly characterized as intermittent, but not dry.

I would again call your attention to the drawing of the "tool shed," which, according to the text, is to house a "golf-cart type vehicle." No golf cart I know of -- or golf-cart type vehicle, for that matter -- could possibly fit through a 32-inch wide door.

The previous Draft EA did not include a topographical map of any meaningful scale; nor does this present document. This makes it very difficult to assess the placement of the proposed boardwalk-type trail with respect to natural topography. Will any cuts need to be made to accommodate the boardwalk? If so, these should be disclosed. As it is, the map provided at Figure 6 suggests the walkway will follow closely the alignment of Kahali'I Stream -- but Kahali'I Stream has relatively steep banks, I believe, that, without alteration, might not accommodate the proposed five-foot-wide boardwalk. It is imperative that a good topographical map be included in the final EA, and that the proposed walkway be overlaid on the topo map, so reviewers might have these reasonable questions answered.

As before, I object to shoulder areas along the Scenic Route becoming designated parking areas for garden employees. The shoulders belong to the public. If the garden wants to develop off-road parking for its employees on garden land, this must be done *without* blocking any use of the shoulders by the public. As the plans now stand, the public would be deprived of the use of 140 linear feet of shoulder parking. As you know, the public already faces difficulty in finding adequate parking for use of the Shuttle Road and Donkey Trail.

Further on the subject of roadside parking, I raised the question in my previous comments about the garden's claim to own portions of the paved roadway (see Figure 13). On what basis is this claim made? Has the garden done a survey that would substantiate its claim to land under the pavement? In addition, I am aware that the old palms lining the Old Mamalahoa Highway were planted by the territorial government when the road was built. From the drawings provided in the draft EA (none of which refers to the palms), it seems as though the garden anticipates cutting down these trees in order to put in its employee parking. Again, I would object. If the garden so desperately needs to accommodate employee parking, it could have, and should have, taken this into account in configuring its visitor center site. The public road is just that: public. No "private" parking or designated stalls are permissible.

I object to the use of stream water for garden purposes. Both the Alakahi and the Onomea dams were built surreptitiously, without the required government permits. Alternative water sources can and should be sought. The range of options includes drilling private wells, hooking up to county water, or using catchment (as is proposed for the visitor center). In addition, the garden's current water usage could be cut back. Instead of having standard flush toilets, for example, the garden could install composting toilets, which would actually be more environmentally friendly, given the location of the restrooms near the streams and ocean. I believe that so long as the "free" stream water is available, the garden will have no incentive to watch its consumption, and garden convenience will inevitably take precedence over the need for water to protect instream values. Even if the Onomea Dam is allowed to remain, I strongly object to the Alakahi Dam being allowed to stay. The garden's founder has stated he has no intention of using water from Alakahi stream. I say, if this is true, then he should have no objection to the dam being taken out. So long as it is there, the temptation to use it will remain.

On page 37, it is stated that wastewater from new restrooms "will be disposed of by means of a new cesspool, which is presently permitted un der the Department of Health rules." This bothers me. It suggests that the garden seeks to do no more than minimally comply with rules rather than to implement best management practices, which in this case would be either installation of a septic tank or use of composting toilets. At a garden where the overriding theme is the celebration of nature's wonders, I should think greater attention would be paid to seeking to exceed merely the minimum legal requirements in terms of environmental disturbances.

On page 39, there is a discussion of alternatives considered. Under heading 3.2, "Alternative Siting of Improvements," it is stated that alternative locations for the improvements were rejected "because of the steep slope of the land." I would reiterate my earlier point: without a topo map, reviewers have no way of assessing the validity of this remark. On page 41, even the present alignment of the proposed new walkway is referred to as "fairly steep." This again underscores the need for a topo map.

In the discussion of "Steams" [sic] on pages 42-43, the Alakahi Stream feeding into Onomea Bay is apparently confused with the Alakahi Stream at the back of Walpi'o Valley. This confusion needs to be cleared up in any final EA.

On page 44, it is stated that "findings of [a recent] assessment for Alakahi Stream are actually better than the findings of the prior assessment before the dam was constructed in this stream." I have no reason to doubt that, but I should like to see this statement documented. References should be provided. Furthermore, the statement that "the dams constructed ... will not result in any adverse impact upon the biological resources of the Alakahi and Onomea Streams" is at variance with the expert opinion of staff at the state Division of Aquatic Resources. I believe this claim requires elaboration.

I am baffled by conflicting statements on page 46 concerning the orangeblack damselfly. It is at first stated that "populations of the [damselfly] have not been found in the project area." But the last sentence in the same paragraph states, "this species has been seen near the Lily Pond..." Isn't the Lily Pond within the project area? Please clarify. Moreover, should there not be some discussion of the impact that current garden insect management practices may have on the damselfly? I believe, for instance, that the garden routinely and frequently sprays to control mosquitos.

On page 49 (and elsewhere), reference is made to improving the "site distance for vehicular travel" in the area of the planned visitors center. As a former copy editor, I would note that the correct spelling is "sight" and would ask that this be corrected in the final EA.

In the discussion of wastewater treatment and disposal (pages 50-51), there is repeated reference to Department of Health rules allowing cesspools. The applicant should indicate specifically those sections of the DOH rules that are being referred to here. As I understand it, tight restrictions exist on the use of cesspools in (1) areas that are near the coast and (2) areas that receive heavy use. Please provide the appropriate references to those DOH rules that would permit construction of new cesspools.

This concludes my remarks on the draft EA. Thank you, again, for the opportunity to comment.

Yours truly,

Patricia Tummons

Patricia Tummons

cc: Office of Environmental Quality Control
Department of Land and Natural Resources

SANDRA PECHTER SCHUTTE
ATTORNEY AT LAW

101 Aupuni Street, Suite 1014A
Hilo, Hawaii 96720
Telephone: (808) 969-7331
Fax: (808) 934-9819

July 19, 1996

Ms. Patricia Tummons
187-C Hokulani Street
Hilo, Hawaii 96720

Re: Draft Environmental Assessment ("DEA") for Amendment to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; Entrance, Trails, Parking and Related Improvements and Master Plan Improvements at Hawaii Tropical Botanical Garden ("HTBG")
Alakahi, Kahalii and Onomea, South Hilo, Hawaii
Tax Map Key Nos.: (3) 2-7-9:2, 6 and 10, and 2-7-10:22

Dear Ms. Tummons:

Thank you for reviewing the DEA for HTBG's amendment to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; entrance, trails, parking and related improvements and master plan improvements at Alakahi, Kahalii and Onomea, South Hilo, Hawaii. This letter addresses comments contained in your letter dated June 2, 1996:

Land Ownership Dispute. The Department of Land and Natural Resources ("DLNR") is presently preparing an abstract of the HTBG property to determine whether there are any remnants owned by the State of Hawaii. Although this abstract has not yet been completed, HTBG believes that the land areas of possible dispute are located near the shoreline where no improvements are being proposed. Notwithstanding the lack of definite information on this issue, HTBG believes that it is preferable to proceed with the permitting for its proposed improvements. If it is later determined that some of the improvements are situated on land that is not owned by HTBG, appropriate measures will be taken to either acquire the remnants or obtain easements over the affected property. The final environmental assessment will be revised to note this issue.

HTBG's Payment for Fencing Materials for Public Access Trails. On October 27, 1995, the Board of Land & Natural Resources ("BLNR") adopted the "Mediation Agreement on Onomea Access Through Hawaii Tropical Botanical Garden," under which the public access trails through HTBG's botanical garden were to be improved and fenced by the Na Ala Hele program, with the fencing materials being provided by HTBG. At the same meeting, BLNR imposed fines against HTBG totaling $1,200 for certain permit violations, and authorized HTBG to pay these fines by in-kind contribution of fencing materials for the public access trails. The cost of the fencing materials exceeded $12,000 which was far more than the $1,200 levied in

fines. Accordingly, the final environmental assessment will be revised, as you requested, to indicate that a small portion of the fencing costs was an offset for fines imposed by BLNR.

Opening of Alakahi Trail. The final environmental assessment has been revised to reflect the completion of the Alakahi Trail improvements and the opening this coastal access trail for use by the general public.

Characterization of Jeep Trail. You question the characterization of the jeep trail in Section 2.2 of the DEA, because you believe that the language implies that it is private property as opposed to a public road or trail. The Project Summary in Section 1.2 K of the DEA specifically defines the Onomea Access Trail as the Old Government Road remnants which extend from the Old Mamalahoa Highway to Onomea Stream and which intersect the Garden. This definition will remain the same in the final environmental assessment.

Permits Issued for Existing Improvements. Although you question whether permits have been issued for all of the existing improvements and specifically note the greenhouse, permits have been issued for all of the existing Garden improvements, except for the dams within Onomea and Alakahi Streams. A request for after-the-fact approval of these two dams is part of the pending conservation district use application. With respect to the greenhouse, that structure was an improvement authorized under CDUP HA-1447 issued to HTBG on August 4, 1982, and under SMA Minor Permit No. 82-86 issued by the County of Hawaii Planning Director on July 23, 1982. Further, the construction plans for this improvement were specifically approved by the BLNR chairperson.

Pedestrian Overpass over Onomea Access Trail. You questioned the propriety of the proposed pedestrian overpass or bridge over the Onomea Access Trail. Based on the comments received regarding the pedestrian overpass, HTBG has withdrawn its request for this improvement. HTBG will continue to use the gates erected in conjunction with the fencing of the Onomea Access Trail to cross the trail. The final environmental assessment will be revised to reflect this change.

Bulletin Board and Umbrella Rack. You question whether the proposed bulletin board is actually an advertising billboard for HTBG. You also question why an umbrella rack cannot be located at the planned visitor center across the road. Except for the addition of the umbrella rack, the proposed bulletin board will be identical to the existing bulletin board within the botanical garden. The existing bulletin board is a locked, glass case, which displays information regarding the botanical features of the garden. Also displayed on the existing bulletin board are informational materials published by State agencies. There are no State or County sign laws which would affect the bulletin board, since it will not be visible from the highway.

The side of the bulletin board facing the Old Mamalahoa Highway will be landscaped to provide a visual buffer for this structure along the highway. Only the side of this structure

visible from within the garden will be used for bulletin board purposes. The final environmental assessment will be revised to clarify that landscaping will buffer the bulletin board on the highway side of the structure.

An umbrella rack was intended, in part, as a receptacle for return of umbrellas when visitors are exiting the Garden. This information was contained in 2.4.1 of the DEA regarding the Garden entrance. This structure is proposed to provide a convenience to visitors. It will permit visitors to return to their vehicles directly from the Garden, rather requiring them to go back to the visitor center to return umbrellas before entering their vehicles.

Descriptions of Streams on Figure 6. You question the accuracy of the term on the label in Figure 6 of "Old Onomea Stream (Dry Bed)." This term will be replaced with "Kahali'i Stream" on Figure 6 in the final environmental assessment.

Width of Doorway for Tool Shed. You question whether the 32-inch wide door to the tool shed is wide enough for a golf cart. The conceptual site plan for the tool shed, shown as Figure 14 of the DEA, depicts the door of this structure, including the frame as being 36-inches in width. The tool shed is intended to house tools and a small golf-cart type vehicle. If the door needs to be wider for a golf cart, this detail will be shown in the construction plans which must be approved by the BLNR chairperson prior to the commencement of construction, pursuant to Section 13-2-21(a)(7) of the DLNR Administrative Rules.

Topographic Map/Alignment of Walkway. You suggest that a good topographic map be included in the final environmental assessment, with the proposed walkway overlaid over this map. You also mention in your letter that such a map would verify the steep slope of the land. The preparation of the map you suggested would involve a substantial expenditure at this stage of the permitting. If a topographic map is required as part of the construction plans for the walkway, after the conservation district use permit for the walkway is approved, HTBG will submit such a map to the BLNR Chairperson. Despite the lack of such a map, HTBG conducted a field survey of the areas proposed for the Garden entrance and vista trails to determine the best course for these trails. The location proposed for the placement of each post was marked on the ground during the field survey. Any posts near Kahali'i Stream can be placed outside of the stream banks, without making any cuts in the land.

Based on the measurements taken during the field survey, as described in the DEA, the entrance trail will be elevated for the first 300 feet, on a gradual descending grade of approximately 2 inches per foot, until the walkway reaches a grade for approximately the last 200 feet. No cuts or leveling of the ground surface is anticipated. The vista trail, which is not located near any stream, will require some leveling of the ground surface and the removal of a minimal amount of vegetation.

Employee Parking Areas. You object to the employee parking areas along the Old Mamalahoa Highway on the basis that these parking areas would deprive the public of the use of 140 linear feet of shoulder parking. Also, you question how a paved portion of the Old Mamalahoa Highway is owned by HTBG. Finally, you are concerned about the removal of the Alexander palms along the highway with the establishment of the employee parking areas.

HTBG is not proposing any parking areas within the Government right-of-way. The areas proposed for the two employee parking areas are situated within HTBG's property and are presently overgrown. At the present time, it is not possible to park in these areas. There are no Alexander palms presently located within the areas to be cleared for employee parking. Thus, no palms will be removed as a result of this improvement.

The public parking problem along the Old Mamalahoa Highway was recognized by all parties during the mediation conducted regarding the public access to Onomea Bay. As a result of this mediation, the County of Hawaii cleared and paved an area along the mauka side of the Old Mamalahoa Highway, that provides parking for up to five vehicles. This parking area can be used for individuals using either the Donkey Trail or the Onomea Access Trail.

With respect to the location of the Old Mamalahoa Highway within the bounds of HTBG's property, the metes and bounds descriptions of the boundaries, as contained in the deeds for TMK: 2-7-9:2 and 2-7-9:10, were plotted on the ground by a surveyor. The survey shows that the physical alignment of the roadway encroaches upon HTBG's property. This type of encroachment or improper roadway alignment is often found along many of the older roadways throughout the Big Island.

Use of Stream Water. You object to the use of stream water and suggest that alternative water sources should be sought. You also object to the use of the dams, particularly the Alakahi Dam, since these structures were constructed without permits. In addition, you state that it is your belief that as long as the stream water is free, there would be no incentive for HTBG to control is water consumption.

The conservation district use permit being sought seeks the after-the-fact approval for the diversion dams constructed within Alakahi and Onomea Streams, and HTBG acknowledges that these structures were constructed without permits. HTBG has also paid $1,000 in fines to DLNR for the construction of these dams without permits.

Approval for the use of the stream water is not being sought by the permits requested by HTBG. In Hawaii, landowners have riparian water rights, which means they have the right to use water from the streams that run through or adjacent to their properties. These riparian rights have, however, been limited under a 1978 amendment to the Hawaii Constitution, (Article XI, Section 7), which provides for the creation of a water resources agency to protect, control and regulate the use of Hawaii's water resources. Under this Constitutional mandate, the

Commission on Water Resources Management ("CWRM") was established under HRS Chapter 174C. This commission regulates the use of all stream and ground water sources. With respect to use of stream water, the amount of water used must be declared and that amount approved by the CWRM. Thus, uncontrolled consumption of stream water by a riparian landowner, such as HTBG, is no longer permitted.

HTBG is making substantial efforts to protect the stream resources, while using water for its botanical garden. In April, 1996, HTBG installed water meters at the Onomea and Alakahi Stream dams and at the restrooms, for the purpose of monitoring the actual amount of water usage from the two sources and the actual amount of water usage for non-irrigation purposes. HTBG further converted the Lily Pond to a self sustained environment, eliminating the daily use of water for flushing that pond. In addition, HTBG is working with the DLNR Division of Aquatic Resources by preparing a mitigation plan for the Division of Aquatic Resources that will protect the native fauna in the streams while reducing the introduced species such as the Tahitian Prawn. If the mitigation plan requires the removal of one or both of the dams and utilization of water from the streams in a different manner, HTBG will delete its request for approval of the dams in the pending conservation district use application.

There is presently no alternative water source which could be used by HTBG to provide water to its botanical garden. The transmission lines of the County water system at Papaikou end approximately 1,000 feet away from HTBG's property. The cost to upgrade the County water system with a six-inch transmission line would be approximately $60,000 to $70,000. Further, the capacity of the County water system at Papaikou is limited, and the usage proposed by HTBG may not be possible.

A catchment water system, although theoretically possible, is also unworkable. A catchment system requires the water to be collected off of roof lines. Except for the greenhouse, there are no buildings within the botanical garden. If the water could be collected, it would have to be stored in a tank and a pump would be required to pump the water from the tank. Electricity is not presently available for such a pump. Nor, does HTBG desire to have electrical lines run through the botanical garden, and interfere with the scenic views. A generator could be used to provide power for this pump; however, the noise of a generator would disrupt the tranquility of the botanical garden.

Your suggested use of a well does not appear to be a feasible alternative. The cost of drilling a well is prohibitive. Further, there is no guaranty of the quality of water obtained. If, for example, the well produced brackish water, which is not unusual at lower elevations, the brackish water could not be used for irrigation of the garden vegetation. Also, a pump would be required for the well which would necessitate either a generator or other means of power. The noise from the pump would interfere with the tranquility of the garden.

Wastewater Disposal from Restrooms. You express a concern that the use of a cesspool for the proposed restrooms would only "minimally" meet the Department of Health Standards, and that the best management practices would suggest that either a septic tank or composting toilet should be used. On page 37 of the DEA, it was stated that a cesspool or other individual wastewater treatment system, meeting the requirements of the State Department of Health will be installed for the new restroom. Chapter 11-62 of the Hawaii Administrative Rules regarding Wastewater Systems provide stringent guidelines for the disposal of wastewater in order to protect the health, safety and welfare of the public. A cesspool will only be installed for the restrooms if this means of wastewater disposal meets the requirements of Chapter 11-62.

Alakahi Stream at Waipi'o Valley. You point out an error in Section 4.2 of the DEA which referenced the Alakahi Stream at the back of Waipi'o Valley, instead of the Alakahi Stream that runs through HTBG's property. The final environmental assessment will be revised to remove the first paragraph on page 43 as it references Alakahi Stream at Waipi'o Valley. The remaining references to Alakahi Stream in section 4.2 of the DEA refer to the stream located at South Hilo.

Documentation Regarding Alakahi Stream Assessments. You ask that references be provided for the statement that the findings of the recent stream assessment are better than a prior assessment before the dam was constructed. The documentation to support this statement was contained in the DEA. The report from the stream survey conducted on Alakahi and Onomea Streams by DLNR, Division of Aquatic Resources on April 15, 1996 was attached as Exhibit 6 to the DEA. Also, excerpts from the *Hawaii Stream Assessment, A Preliminary Appraisal of Hawaii Stream Resources*, State of Hawaii, Commission on Water Resource Management and National Park Service, Rivers and Trails Conversation Assistance Program, December, 1990, Report R84, containing the results of the Alakahi Stream assessment conducted as part of that report, was attached as Exhibit 5 to the DEA. It should be noted that there is no date provided for the Alakahi Stream assessment contained in Report R84.

Impacts of the Dams Upon the Aquatic Resources. You indicate that the statement in the DEA that the dams constructed will not result in any adverse impact on the biological resources of the Alakahi and Onomea Streams is at variance with the opinion of staff at the Division of Aquatic Resources and requires elaboration. Since preparing the DEA, HTBG has discussed the stream impacts with the staff of the Division of Aquatic Resources. Based on these discussions, HTBG understands that there may be impacts upon the stream resources because of the dams. HTBG is exploring measures to mitigate these impacts in a manner that would be acceptable to the Division of Aquatic Resources. The analysis regarding stream impact will, therefore, be revised in the final environmental assessment.

Orange Black Damselfly (*Megalagrion xanthomelas*). With respect to your confusion over what you believe are conflicting statements as to why the DEA states first that "populations of the [damselfly] have not been found in the project area," but later states that "this species has

been seen near the Lily Pond since fresh water has stopped flowing through the pond", these are not conflicting statements. Until April, 1996, there were no damselflies found within the project area, although this species was found in the Onomea Stream adjacent to HTBG's proposed visitor center site, on the mauka side of the Old Mamalahoa Highway. In April, 1996, shortly before the DEA was finalized, HTBG stopped flushing the Lily Pond within the project site. Within two weeks after the fresh water flow was stopped in this pond, the damselflies began to congregate at the Lily Pond.

With respect to your inquiry regarding the spraying to control mosquitos, HTBG presently uses fogging with diazinon for mosquito control. Although no spraying is being done near any aquatic habitat, HTBG is investigating alternatives to fogging as a tool for reducing mosquitos at the botanical garden. HTBG is also working with David Foote, of the U.S. Department of Interior, Pacific Islands Science Center, in establishing a monitoring program which will determine what effects, if any, the current mosquito abatement program, involving fogging with diazinon may have on the damselfly population. The final environmental assessment will be revised to incorporate this information.

Spelling Errors. The spelling errors you found in the DEA will be corrected in the final environmental assessment.

Citation to Department of Health Rules. References to the Department of Health Rules in the DEA will be revised in the final environmental assessment, as you requested, to cite the applicable provision, which is Chapter 11-62 of the Hawaii Administrative Rules regarding Wastewater Systems.

We appreciate your comments on HTBG's draft environmental assessment. The final environmental assessment will be revised, as appropriate, because of your comments. Your letter and this response will also be appended to the final environmental assessment to ensure a document that adequately addresses pertinent development and environmental issues.

Very truly yours,

SANDRA PECHTER SCHUTTE

xc: Office of Environmental and Quality Control
Hawaii County Planning Department
Department of Land & Natural Resources, Land Management
Hawaii Tropical Botanical Garden

MOKU·LOA·GROUP
SIERRA CLUB • HAWAI'I CHAPTER

June 23, 1996

Sandra Pechter Schutte
101 Aupuni St. Suite 1014A
Hilo HI 96720

RE: Hawaii Tropical Botanical Garden-Environmental Assessment

Dear Mrs. Schutte,

We are receipt of the revised draft of the HTBG Environmental Assessment completed in April. Our comments appear, appended, in that draft. However, we did not find that the draft answered our queries, nor was documentation produced to show that permits in question are, in fact, in place. Unfortunately, assurances no longer suffice.

We attach our original comments, and request that specific answers and documentation be provided.

We continue to be concerned that a survey to document the extent of state land in the valley has yet to be completed. We fail to see how the proposed changes can legally be implemented without this survey.

We have recently learned that the Garden is regularly fogged with Diazinon, a poison toxic to the orangeblack Hawaiian damselfly, and that this practice further jeopardizes the habitat for this lowland native stream species, proposed for listing as an endangered species.

We have met recently with Scott Lucas, garden director, and have learned that the restrooms presently in use still have neither CDU nor Department of Health permits.

Our members oppose the pedestrian overpass over the public trail, and request that other options for visitor management be described.

We look forward to your response. Thank you.

Sincerely,

Deborah Ward

Deborah Ward
Conservation Committee
Moku Loa Group, Sierra Club Hawaii Chapter

P.O. BOX 1137 · HILO · HAWAII · 96721

MOKU·LOA·GROUP
SIERRA CLUB · HAWAI'I CHAPTER

March 4, 1996

Hawaii Tropical Botanical Garden
101 Aupuni Street, Suite 1014A
Hilo, Hawaii 96720

Contact: Sandra Pechter Schutte

Subject: Hawaii Tropical Botanical Garden, Hawaii Island
Draft Environmental Assessment: Amendment to CDUP HA-1447

Members of Sierra Club's Moku Loa Group have reviewed the draft EA and have the following comments:

1. Stream Fauna and Habitats. The draft EA fails to describe the aquatic life which may be impacted by this project. Specifically:

a. The Application ignores the orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*), Candidate 1 for the Endangered Species List. Breeding populations of this species were documented in June of 1995 along Alakahi and Onomea streams in the vicinity of the proposed headquarters and visitor parking lot. HTBG has already stripped the Onomea stream bank of vegetation in order to see the land "for planning purposes" and also extensively excavated the bank. The damselfly lives along streambanks. We believe some of its habitat may have been destroyed. With respect to this disturbance to the streambank and the fill placed in Kahali'i Stream, we cannot tell if these actions actually harmed the damselfly population, since they took place without proper authorization or environmental assessment.

We realize that this work occurred just outside the Conservation District, but the headquarters project is an integral part of HTBG's overall plan, and impacts in the vicinity of proposed improvements are supposed to be addressed. Please note that item XVI(4) of the CDUA form itself requires the Applicant to "demonstrate that ... the proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area ...."

b. There is no acknowledgment of the aquatic biological resources in any of the streams: native o'opu, 'opae and hihiwai, even though Michael Wilson instructed Applicant to address impacts to "aquatic resources" on page 2 of his October 10, 1995 response to HTBG's preconsultation letter.

c. In the list of Applicant's proposed improvements is the dam in Alakahi Stream, although it has been in place for some years (p. 12, Attachment to Amendment to CDUP) and is used for irrigation. The BLNR should designate this dam a violation and impose a fine. State Aquatics Administrator, Bill Devick, has recommended that the Alakahi dam be removed because it threatens this amphidromous stream life (12/1/95 letter to Rae Loui, CWRM), and we concur.

P.O. BOX 1137 · HILO, HAWAI'I · 96721

It should be noted that Applicant claims in this submittal that water has been used from Alakahi on only two occasions (p. 12, Attachment to CDUP Application and again in the EA, p. 19). To quote HTBG's attorney at the CWRM meeting of February 7, 1996, "Alakahi stream's been used on occasion in addition to those two times." It seems clear that the Applicant has given false information to in this submittal about the extent of its use of Alakahi Stream water. We are disappointed to find yet another example of misinformation from HTBG.

d. The Applicant ignores the illegally-constructed dam and diversion in Onomea Stream, which OCEA is currently investigating. We believe this dam is a violation of HTBG's CDUP and a fine should be imposed. State Aquatics also recommends the removal of this structure, for the same reasons as for the Alakahi dam. The Hoku Loa Group concurs with State Aquatics on these matters. We believe it is in the best interest of the environment for HTBG to hook up to County water or install a catchment system. (HTBG claims on page 34 of the EA that it has a "catchment system," but we do not think this is true, and such a system is not on the site plan. What catchment system was being referred to?)

HTBG denied that Onomea Stream supplies water to Lily Lake in its October 5, 1994 letter to CWRM. For some reason, this letter was included in Attachment to CDUP Application (as an attachment to Exhibit 12, HTBG's Declaration of Water Use), with no disclosure that the information in it is false. Nor does HTBG disclose that the Declaration itself fails to mention all of its uses of Onomea water.

e. The Applicant's preconsultation letter failed to mention any of the water issues at Onomea, and they receive short shrift in the Application and EA. The Application declares plans for additional restrooms, greenhouses, etc., which would be dependent on taking even more water from streams after the expansion. We strongly object to stream water being used by HTBG now or in the future. County water is nearby, and catchment systems could be installed.

f. The EA refers to Kahali'i Stream as a dry stream bed (p. 10 and p. 30). This is an intermittent stream. The U.S. Army Corps of Engineers maintains that HTBG placed fill in Kahali'i Stream, mauka of the Scenic Route, where the new headquarters is planned. In view of the streamwater's recent, unexplained disappearance and the presence of fill in the stream, we are prompted to inquire whether HTBG needs to disclose the impacts that HTBG's expansion ambitions have had and will have on Kahali'i Stream. We understand that the property's prior owner claimed a landslide in the 1940s caused the stream to stop flowing. However, kama'aina testimony, the presence of stream fauna, the existence of a highwater mark, and more current maps indicating the presence of the stream contradict this claim.

For some reason, the site plans shows Kehali'i Stream as "Old Onomea Stream," which should be corrected. [As an aside, could HTBG make an attempt to properly designate features which have Hawaiian names? Onomea Stream is not Hanawi Stream, for instance. (Hanawi Stream actually does exist nearby, but it does not run through Onomea Valley.) The designations "Rock Island" and "Turtle Bay" on the Master Plan are simply offensive. Where Hawaiian place names still exist, HTBG should learn what they are and use them, particularly since HTBG claims its mission is, in large part, to perpetuate Hawaiian culture.]

2. State Land in Onomea Valley. According to the Mediation Agreement approved by the BLNR on October 27, 1995, the State is required to survey within one year "...Alakahi, Kahaii I, and Onomea, South Hilo,...in order to resolve the question of ownership of portions of the Garden..." The Application describes extensive improvements: restrooms, cesspool, rainshelters, a toolshed, 620 feet of wooden walking trails, greenhouses, a pedestrian overpass, etc. Since the survey will determine where State land exists within the Garden, we request that all State land be determined before any improvements are made to land which may be publicly owned.

3. Unpermitted Constructions in Onomea Valley. It is HTBG's responsibility to apply for CDU permits when constructions are contemplated in the Conservation District. The DLNR should not have to initiate permits for constructions on HTBG's property--that is HTBG's job. HTBG must bear with delays caused by its own refusal to follow the law.

a. In the Applicant's list of previously obtained permits, there is no mention of HTBG's ever having acquired a CDUP for the existing restrooms within the garden. If none was ever obtained, wouldn't it be appropriate for HTBG to incorporate a request for an after-the-fact permit in this submittal? We are concerned about the adequacy of the restrooms' cesspool, considering the public's recreational use of the nearby shoreline and streams for wading, swimming and fishing and believe that HTBG should have to comply with current Department of Health rules dealing with such sewage. We would like assurance that the cesspool can handle the 150 visitors per day (and more if it is anticipated that the visitor count will increase as a result of the present expansion plan). In addition, do the restrooms' sinks use unchlorinated water from Onomea Stream, and, if so, have you considered the health concerns involved? It would not be fair to expose unsuspecting visitors (who may have cuts on their hands) to the leptospirosis and giardia existing in streamwater.

b. As stated above, the dam and diversion in Alakahi Stream should be deemed a CDUP violation, a fine should be imposed, and the stream put back the way it was.

c. Likewise, the dam and diversion in Onomea Stream should be deemed a CDUP violation, a fine should be imposed, and the stream put back the way it was.

d. There are drainage systems in place through which the effluent from Lily Lake and the flamingo pond is conveyed into Alakahi Stream. We would contend that these systems constitute a construction within the Conservation District and believe this practice should stop and the drainage system should be removed. We would like to call attention to page 39 of the EA, which states that no coastal ecosystems will be affected by HTBG's plans. Effluent piped through Alakahi to the shore has the potential to adversely affect the shore environment (as would the cesspool in 3a above), and, if it is deemed a CDUP violation, the problem would need to be resolved before the present application goes forward.

e. In the Exhibit Map Site Plan, Applicant shows a bridge over Onomea Stream right by what is labeled "Onomea Waterfalls." Is it previously approved by the CWRM, and does it have a CDUP?

The time has come for HTBG to honestly disclose all of the constructions for which it never sought permits. When this is done, once and for all, and all environmentally damaging constructions removed, and mitigations for permissible constructions are in place, only then can HTBG move forward. HTBG has the resources to protect the environment in Onomea Valley by complying with Conservation District rules. It can afford excellent legal advice and has the benefit of an increasingly professional staff. All it needs is the will to work with the DLNR to ensure the sustainability of the true natural and cultural resources of Onomea Valley (which are not koi, not flamingos, not *Miconia*).

4. Signage. Applicant is requesting informational and directional signs along the public trails (p. 2, Attachment to CDUP Amendment). The signage along public trails (the old government trail, including the Donkey Trail, and the Alakahi beach trail) has been provided for in the Mediation Agreement, and we concur that portion of the Agreement. Any request for signs on these trails should be stricken from the present Application. Our main concern on the subject of signs is the replacement of the State's public shoreline access signs, which have been repeatedly stolen.

5. Future Plans. It is unclear to us whether the proposed future improvements described in the Attachment to the CDUP Amendment are supposed to be addressed in the present EA. If so, the impacts and mitigation measures for each of these proposed future improvements should have been described there. Is the Applicant expecting to go for permits for these improvements when the time is right, or will the Applicant assume it has a permit for all of these proposed future improvements? Preliminarily:

a. One of the future plans is a pedestrian overpass over the public trail. We find this objectionable. It would impede the public from carrying kayaks and fishing equipment and constitute an eyesore in a scenic area.

b. Please note that the proposed future restrooms' cesspool is sited right next to Onomea Stream, with no discussion of how the sewage might affect the stream or the shore area at the stream mouth.

c. Signage along the Donkey Trail has already been provided for by the Mediation Agreement. We see no reason to revisit this issue in the future. The fencing suggested for the Donkey Trail has been inadequately described.

6. Headquarters and Parking Lot Site. The Applicant's proposed visitor center and administrative office is planned to be built on agriculturally-zoned land, directly across from the Conservation-zoned proposed new entrance, walkway, etc. We believe that extensive construction on the site mauka of the Mamalahoa Highway would imperil the orangeblack Hawaiian damselfly and should not be attempted.

Unfortunately, it seems that the trail system under review was designed to lead to the new headquarters site. Thus, for the BLNR to allow this trail system may endanger the damselfly by encouraging the construction of the headquarters and the parking lot, which is planned to be constructed right up to the streambank habitat. Why weren't impacts and mitigation discussed in the EA? (Brooks Harper of U.S. Fish and Wildlife would be a good source of information, as would Dan Polhemus of Bishop Museum. Both are knowledgeable about the site and the rare damselfly and should have been consulted.)

We would also like to call your attention to comments made by Bill Devick, Acting Administrator of the Division of Aquatic Resources:

> We...wonder why the applicant would choose to place a new Administration Building in the vicinity of these streams (Kahali'i and Onomea). During times of flooding, the Building could be in jeopardy from possible erosion and other damages including displacement of the Building. This in turn may damage stream habitat.

What assurances are there that this won't happen?

7. Miconia. Onomea Valley is riddled with *Miconia*, especially the site of the proposed headquarters. This plant pest is one of the paramount environmental threats to our island. As we work more and more on eradication, we discover how important it is to handle these plants correctly, so that the eradication process does not promote its spread. What is being planned to eradicate it in this project, and how is HTBG planning to carry out the eradication? Incidentally, if HTBG has a contract with the Department of Agriculture to eradicate *Miconia*, as HTBG has repeatedly claimed, could it please produce a copy of the contract (perhaps attach it to the EA)? We can find no evidence of any such agreement, although DOA did state that it gave HTBG a free container of herbicide.

8. Archaeological Inventory Survey. We note that HTBG has surveyed the sites of only the *immediate* improvements for possible archaeological remains. We would like it on record that the State's Historic Preservation Division requested a survey of the entire garden site and that this is an issue in the pending "condition modification" item not yet acted upon by the BLNR. Michael Wilson's November 28, 1995 permit letter to HTBG's attorney stated that "it is our understanding that the applicant is working towards ... conducting an archaeological inventory survey of HTBG per the State Historic Preservation Division's comments." So far, there is no evidence that HTBG is carrying out the kind of survey requested by SHPD. We await SHPD's comments on the adequacy of the rather minimal archaeological research conducted so far.

The existing restrooms (assuming they have no CDUP) would have surely required an archaeological study in order to have been permitted. The proposed improvements represent sweeping changes in the way HTBG operates, and the proposed future improvements would extend the changes beyond the very few sites studied to date. Moreover, HTBG's expansion does not merely involve buildings. Botanical garden development involves a great deal of hole digging (some quite deep) and emplacement of trees, whose root systems can spread considerably over the years; disturbances on the order required by HTBG's expansion should not be allowed to go further without a thorough archaeological inventory survey of the entire site. It is unconscionable that HTBG has not followed its own stated mission to preserve Hawaiian culture by conducting such a survey.

In light of the above concerns and questions, we request that the Application and the Amended Draft EA be rewritten and distributed over again. We believe that each and every concern outlined above needs to be resolved and ask that the redrafted submittals follow these guidelines:

-- They should contain only truthful statements (and all attachments of prior documents containing untruthful statements should be so annotated).

-- Applicant should concurrently apply for after-the-fact permits for unpermitted constructions within the garden site for which HTBG can show there are absolutely no adverse environmental impacts.

-- All environmental issues (especially the water and aquatic resource issues, which were ignored in the Applicant's preconsultation correspondence and inadequately covered in the submittals), should be addressed with a view to environmentally sound results. It is not enough to rehash broad environmental information from prior permit requests. Specific problems require specific solutions.

-- In-depth consultations should take place with the State Aquatics Division, U.S. Fish and Wildlife, Bishop Museum, the County Water Department, and the many other agencies/organizations likely to have helpful environmental information. HTBG will need knowledgeable assistance in identifying all possible impacts, alternatives, and mitigation measures. This is HTBG's responsibility, and we think HTBG can do it.

-- The draft EA should be available to the interested public at the Office of Environmental Quality Control, and the Hilo and Laupahoehoe Public Libraries. As Moku Loa Group was originally a consulted party, our group expected to receive a copy. Instead, attempts by our members to obtain a copy at OEQC and to view a copy at the public library were futile. A telephone call to the Applicant's contact also yielded no response. It's impossible for the public to respond to a document unavailable for viewing.

-- The true cost to the environment of the <u>overall</u> project -- including the headquarters built on agriculturally-zoned land to service the business in the Conservation District -- has to be revealed. It is an imposition on the public to ask it to respond to an EA as inadequate as this one.

Sincerely,

Deborah Ward
Conservation Committee

cc: Michael Wilson, Chairperson, Board of Land and Natural Resources
Dwight Takamine, State House of Representatives
Takashi Domingo, Hawaii County Council
Catherine Tilton, Office of Conservation and Environmental Affairs
Ross Cordy, State Historic Preservation Division
Rodney Oshiro, Na Ala Hele
David Higa, Commission on Water Resource Management
Dawn Chang, Deputy Attorney General
Gary Gill, Office of Environmental Quality Control
Virginia Goldstein, Hawaii County Planning Department

SANDRA PECHTER SCHUTTE
ATTORNEY AT LAW

101 Aupuni Street, Suite 1014A
Hilo, Hawaii 96720
Telephone: (808) 969-7331
Fax: (808) 934-9819

July 22, 1996

Ms. Deborah Ward
Moku Loa Group
Sierra Club, Hawai`i Chapter
Conservation Committee
P. O. Box 1137
Hilo, Hawaii 96721

Re: Draft Environmental Assessment for Amendment ("DEA") to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; Entrance, Trails, Parking and Related Improvements and Master Plan Improvements at Hawaii Tropical Botanical Garden ("HTBG")
Alakahi, Kahalii and Onomea, South Hilo, Hawaii
Tax Map Key Nos.: (3) 2-7-9:2, 6 and 10, and 2-7-10:22

Dear Ms. Ward:

Thank you for reviewing the revised DEA for HTBG's amendment to Conservation District Use Permit HA-1447 and Special Management Area Use Permit Application; entrance, trails, parking and related improvements and master plan improvements at Alakahi, Kahalii and Onomea, South Hilo, Hawaii. This letter addresses comments contained in your letter dated June 23, 1996:

You ask that specific answers be provided to your comments to the first draft assessment prepared for this project. It should be pointed out that a revised DEA was prepared for this project specifically to address many of your original comments. Notwithstanding this fact, we respond to your initial comments as follows:

Stream Fauna and Habitats. You state that the DEA fails to described the aquatic life which may be impacted by this project. The description you requested was contained in Section 4.2, Streams and 4.4, Fauna of the revised DEA. Section 4.2 includes a discussion of the native Hawaii aquatic species, particularly the gobies, found in Onomea and Alakahi Streams. Section 4.4 discusses the orange black damselfly (*Megalagrion xanthomelas*) found in the Alakahi and Onomea Streams mauka of the Project Area.

Orange Black Damselfly. You indicate that the DEA ignores the orange black damselfly, although a discussion is contained in Section 4.4 of the revised DEA. You also

claim that the stripping of the banks of Onomea Stream by HTBG has destroyed some of the habitat for this species. In "The Orange black Hawaiian Damselfly, *Megalagrion xanthomelas* (Odonata: Coeagrionidae): Clarifying the Current Range of a Threatened Species," Dan A. Polhemus, *Records of the Hawaii Biological Survey for 1995*, it is noted that this species is known to occupy a wide range of habitats and has broad ecological tolerances. The author further indicates that the loss of this species is linked more to the introduction of alien aquatic biota than to outright habitat alteration or destruction. *Id.*, at 48. Based on this study, the stripping of the Onomea Stream bank should not have damaged the habitat for the orange black damselfly. This information was noted in the revised DEA.

In addition, HTBG is working with the National Biological Services, Pacific Island Center to develop a mitigation plan to protect the population of orange black damselfly in the vicinity of the visitor center, despite the fact that this area is outside of the Project Area proposed for HTBG's conservation district use permit.

It should also be pointed out that since the Lily Pond within the botanical garden was converted into a self-sustained environment without flowing water, the damselfly has begun to congregate at this pond. HTBG's mitigation plan will contain measures to protect and enhance the damselfly population beginning to appear at this pond.

This information is in the revised DEA and will be contained in the final environmental assessment.

Aquatic Biological Stream Resources. You indicate that there has been no acknowledgment of the aquatic biological resources in any of the streams. Section 4.2 of the revised DEA discusses inventories of the aquatic resources within Alakahi and Onomea Streams, conducted by the DLNR Division of Aquatic Resources in March, 1996. Also discussed is a prior aquatic inventory of Alakahi Stream that was contained the *Hawaii Stream Assessment, A Preliminary Appraisal of Hawaii Stream Resources*, State of Hawaii Commission on Water Resource Management and National Park Services, Rivers and Trails Conservation Assistance Program, December, 1990. The final environmental assessment will include a discussion of an inventory conducted in May, 1996, by the Division of Aquatic Resources of the area upstream of the dams.

CDUP Violations for Placement of Alakahi and Onomea Stream Dams. You express a concern regarding the violations that have occurred as a result of the construction of the Onomea and Alakahi Stream dams without permits. In December, 1995, DLNR cited HTBG for violations of the conservation district rules because of the construction of these dams without a conservation district use permit. Further, under the DLNR rules, HTBG's conservation district use application could not be processed until these violations were satisfied. HTBG resolved these violations in accordance with the DLNR administrative penalty

system known as Hearing Officer/Administrative Penalty System (HOAPS). Under this system, an administrative penalty can be paid for an alleged violation, but the payment is not construed as an admission of fault. An administrative penalty of $500.00 per violation or a total of $1,000 was paid by HTBG, which was accepted by DLNR under HOAPS on March 7, 1996.

It should also be pointed out that the Commission on Water Resource Management also fined HTBG, under its rules, for the construction of the Alakahi Stream dam at its meeting of May 8, 1996. No violation was found regarding the Onomea Stream dam because this structure was included in the declaration provided to the Commission by HTBG in 1989, when the Commission was first obtaining such declarations regarding the existing use of stream water.

Removal of Dams and Use of Alternative Water Sources You expressed your opinion that the dams should be removed because they are illegally constructed and they threaten the stream life. HTBG is preparing a mitigation plan which is intended to permit HTBG to continue using stream water, while protecting the upstream migration of the native fauna and reducing the introduced species, such as the Tahitian prawn. If mitigation measures require the removal of one or both dams, HTBG will withdraw its request for approval of the dam or dams under its conservation district use application, and will remove the structures. This information is incorporated in greater detail in the final environmental assessment.

Water Issues. You indicate that the water issues received short shrift in the conservation district use application and the DEA. You also indicate that water can be obtained from alternative sources, including County water which is nearby. The issue of water is discussed in Section 4.10.2 of the DEA. The final environmental assessment was expanded to include a discussion of the possible alternatives to the use of stream water and the known costs of some of the alternatives.

Thus, several alternatives have been considered by HTBG. These include use of water from the County system, development of a ground water source, a catchment system, use of water from a private spring on a neighboring property and use of stream water without the diversion dam.

The use of water from the County system would involve the extension and upgrading of the Papaikou system with a six-inch water line for a distance of approximately 1,000 feet. The cost of this improvement is estimated to be somewhere between $60,000 to $70,000. In addition to the substantial cost of this improvement, the Papaikou system has a limited capacity and water may not be available to HTBG until the County develops a new water source for the present system.

The development of a ground water source would involve the drilling of a well. If the development of such a well were feasible the cost of drilling and outfitting a well is estimated to range between $50,000 to $60,000. In investigating this alternative HTBG understands that any well drilled in the Garden may only produce brackish water, because of the low elevation of the site. Brackish water could not be used for HTBG's irrigation needs. Further there are significant physical constraints as to the transport of a drilling rig onto the Project Area. In addition, any well would require electrical power for pumping. To extend the electrical lines and obtain power from HELCO would require the installation of underground lines because of the trees throughout the Project Area. HTBG does not have any cost estimates for such underground installation. However, HTBG believes that the cost would be prohibitive. The use of a generator for the production of power would be noisy and disrupt the tranquility of the Garden, and is not a favored alternative by HTBG.

The development of a catchment system would require roof lines for collection of water, water tanks and electrical power to pump the water. HTBG has not obtained any cost estimates for this alternative; however, without adequate roof area for catchment, which is the present situation in the Garden, such an alternative is not feasible. Assuming that the roof area were available, this alternative would be substantially less in cost than either a ground water system or connection to the County system. The same constraints regarding electrical power would, however, apply to this alternative. HTBG is also considering installation of a catchment water system for its visitor center.

Based upon a suggestion from a member of the community, HTBG is exploring the possibility of obtaining water from a private spring belonging to a neighboring landowner. This alternative would require the agreement of a private landowner. Also, approval of the Commission on Water Resource Management may be required. HTBG has no cost estimate for this alternative at the present time.

The final alternative would be to utilize water from the Onomea and Alakahi Streams, without any dams in place, under management plan that would be approved by the Division of Aquatic Resources. HTBG has only commenced working on this alternative and has not yet determined the viability of the alternative.

Based upon a review of the alternative water resources, HTBG has concluded that its botanical garden would need to continue to use stream water, either from the existing dams, or from another means in order to survive. This information is incorporated in the final environmental assessment.

Characterization of Kahali'i Stream. The final environmental assessment describes Kahali'i Stream as an intermittent stream, as you indicate. Intermittent streams are, however,

sometimes dry. The final environmental assessment also contains a footnote which describes the 1949 landslide that affected this stream.

Correction of the Site Plan. The site plans, Figures 4 and 5, have been revised to correct the name of Kahali'i Stream on these plans. We believe that this error was made because the concrete bridge which is over the Kahali'i Stream bed along the Old Mamalahoa Highway is labeled "Onomea Stream".

State Land in Onomea Valley. You are requesting that prior to improvements be made on HTBG's land, any State owned land remnants should be determined. The DLNR is presently preparing an abstract of the HTBG property to determine whether there are any remnants owned by the State of Hawaii in Onomea valley. Although this abstract has not yet been completed, HTBG believes that the land areas of possible dispute are located near the shoreline where no improvements are being proposed. Notwithstanding the lack of definite information on this issue, HTBG believes that it is preferable to proceed with the permitting for its proposed improvements. If it is later determined that some of the improvements are situated on land that is not owned by HTBG, appropriate measures will be taken to either acquire the remnants or obtain easements over the affected property. The final environmental assessment will be revised to note this issue.

Existing Restrooms. You have raised a question as to legality of the restrooms. These improvements were approved under the original conservation district use permit issued for the Garden, CDUP HA-1447A issued on August 4, 1982. SMA Minor Permit No 88-20 was issued on October 18, 1988 for the restrooms. The construction plans for the restrooms were further approved by the BLNR chairperson.

The cesspool for this facility was inspected by the Department of Health on December 21, 1988 and March 2, 1989, with this agency approving the cesspool for use. Although you have requested copies of permits issued to verify the existence of these permit, providing copies of all of the permits you requested would be voluminous. Therefore, we have omitted attaching these documents to this letter.

Water for hand washing is provided by the stream water. A sign is posted in the restroom informs individuals that the water provided for hand washing is stream water. Thus, contrary to your letter, visitors are informed about the water in the sinks. In addition, the Department of Health has informed HTBG that it is not violating any regulations by providing unchlorinated stream water for washing of hands.

Based on the concern raised by the community that the cesspool is leaching into the streams, the Department of Health is conducting tests of the cesspool, to determine the extent,

if any, of such leaching. If the leaching is found, HTBG will take appropriate remedial action, as directed by the Department of Health to correct the problem.

Drainage of the Lily Lake (Pond) and Flamingo Pond. You raise a concern regarding the drainage of the Lily Lake (called the Lily Pond in the DEA) and the Flamingo Pond into Alakahi Stream. Section 4.2 of the revised DEA states there is no drainage from either of these ponds which ends up in Alakahi Stream. In April, 1996, the Lily Pond was converted into a self sustained environment. Thus, stream water no long enters this pond; nor, is the pond water drained. Although the Flamingo Pond is still flushed out with fresh stream water on a daily basis, the drainage pattern of this water has been changed from one where it eventually reached Alakahi Stream to a course which leads the water to a landscaped area within the Garden. This information is also contained in the final environmental assessment.

Signage. HTBG acknowledges your comment asking that all signs along the public trails be stricken from its conservation district use application. HTBG has worked with Na Ala Hele regarding the placement of signs along these trails. It will continue to work with Na Ala Hele whether the signs are Na Ala Hele signs or HTEG signs approved by DLNR. Notwithstanding your objection, HTBG will continue to pursue its request for approval of signage in the pending application.

Pedestrian Overpass over Onomea Access Trail. You have objected to the proposed pedestrian overpass over the Onomea Access Trail. Based on the comments received regarding the pedestrian overpass, HTBG has withdrawn its request for this improvement. HTBG will continue to use the gates erected in conjunction with the fencing of the Onomea Access Trail to cross the trail. The final environmental assessment will be revised to reflect this change.

Cesspool for Proposed Restroom. You noted that the cesspool for the restroom was sited next to the Onomea Stream. The revised DEA correctly sited the cesspool next to the proposed restrooms and away from Onomea Stream. Although a cesspool is depicted on the site plan, HTBG will, at the time that the restrooms are constructed, install a wastewater disposal system which complies with Chapter 121-64 of the Hawaii Administrative Rules regarding Wastewater Systems. Such a disposal system will require approval from the State Department of Heath. The final environmental assessment will incorporate this information.

Miconia. You have inquired as to what measures are being taken by HTBG to eradicate miconia within its property. HTBG has controlled miconia on its property for many years by cutting down and poisoning the miconia plants prior to the plants reaching a flowering stage. Thus, the plants may reach a height of six feet on HTBG property before the plants are cut and poisoned. However, the removal of the plant prior to flowering prevents the spread of this noxious pest. Notwithstanding HTBG's efforts to control the spread of miconia

on its property, as long as the severe miconia infestation remains in the Onomea area mauka of the botanical garden, there is no way that HTBG can totally eradicate all of the miconia within its property. The final environmental assessment will be revised to include this additional information regarding HTBG's miconia control.

It should also be pointed out that the site visit conducted at the Garden property by BLNR on July 11, 1996, showed that the HTBG property was relatively free from miconia. The site visit also showed that the neighboring lands, some of which are owned by large landowners, are infested with miconia.

Over the past year, HTBG has worked with the Mayor and the Hawaii County Council to develop draft legislation that would require landowners to eradicate miconia on the Big Island. HTBG would urge the Moku Loa Group to support such legislation.

Archaeological Inventory. In response to your concern regarding the preparation of an archaeological inventory survey, the State Historic Sites Preservation Division, after reviewing the information in the revised DEA, is of the opinion that the improvements described in the DEA will have no effect on significant historic sites. It has, however, asked that at some point a systematic archaeological inventory survey of the entire Garden be conducted and that as part of the survey, some effort should be made to interview people with a knowledge of the area to obtain more information about the use of this area.

In conjunction with its conservation district use application, HTBG submitted a management plan for its botanical garden to the Department of Land and Natural Resources. This management plan proposes, in part, to inventory any future area proposed for development, prior to commencing the development in that area. The Historic Sites Preservation Division has recently accepted this proposal. HTBG will interview people with knowledge of the area in conjunction with any inventory conducted. This information, together with a memorandum dated June 25, 1996 from the Historic Sites Preservation Division will be incorporated into the final environmental assessment.

Rewriting the Redistributing DEA. You requested that the DEA be rewritten and distributed to address the concern in you raised. The DEA was rewritten as you requested and most of the information you requested was contained in the revised DEA.

Truthful Statements. Your comments regarding the truthfulness of the statements contained in the DEA is acknowledged. The statements contained in the document are truthful to the best of our information and belief.

After the Fact Permits. Other than the dams within Onomea and Alakahi Streams, HTBG understands that all of the existing improvements within its garden are permitted

improvments that have been authorized under its CDUP. It knows of no after-the-fact approvals required.

Distribution of DEA and Final Environmental Assessment. You suggested distribution of the DEA in a similar manner to that of an environmental impact statement. Environmental assessments are not generally distributed to libraries. If any library or individual requests a copy of the DEA or final environmental assessment, a copy of the document will be provided.

In your letter of June 23, 1996, you raise two issues. First you raise the issue of the State abstract and survey of possible State owned land remnants, which was addressed above. Secondly, you raise the issue of the fogging of the Garden with diazinon. HTBG presently uses fogging with diazinon for mosquito control. Although no spraying is being done near any aquatic habitat, HTBG is investigating alternatives to fogging as a tool for reducing mosquitos at the botanical garden. HTBG is also working with David Foote, of the Pacific Islands Science Center, in establishing a monitoring program which will determine what effects, if any, the current mosquito abatement program, involving fogging with diazinon may have on the damselfly population. The final environmental assessment will be revised to incorporate this information.

We appreciate The Sierra Club Moku Loa Group's comments on HTBG's draft environmental assessment. The final environmental assessment will be revised, as appropriate, because of your comments. Your letter and this response will also be appended to the final environmental assessment to ensure a document that adequately addresses pertinent development and environmental issues.

Very truly yours,

SANDRA PECHTER SCHUTTE

xc: Hawaii County Planning Department
Department of Land & Natural Resources, Land Management
Hawaii Tropical Botanical Garden

OVERSIZED DRAWING/MAP

PLEASE SEE 35MM ROLL

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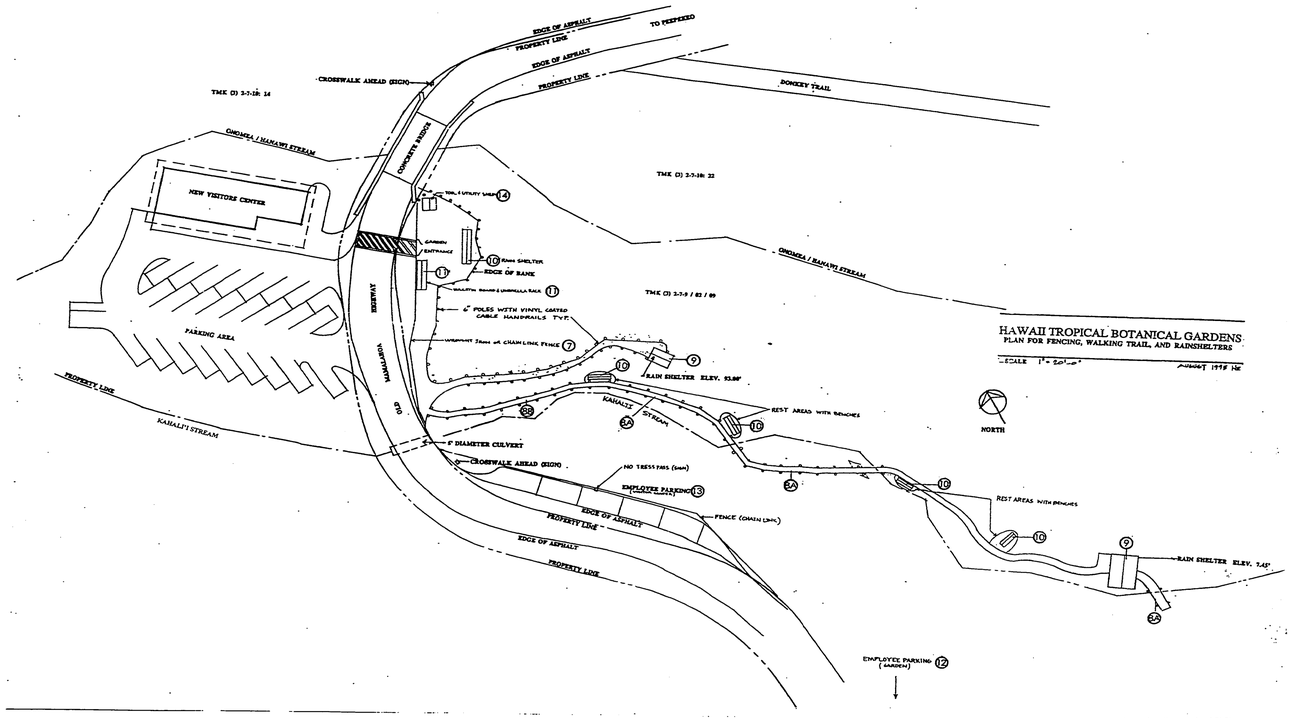


FIGURE 6

OVERSIZED DRAWING/MAP

PLEASE SEE 35MM ROLL

D048 B

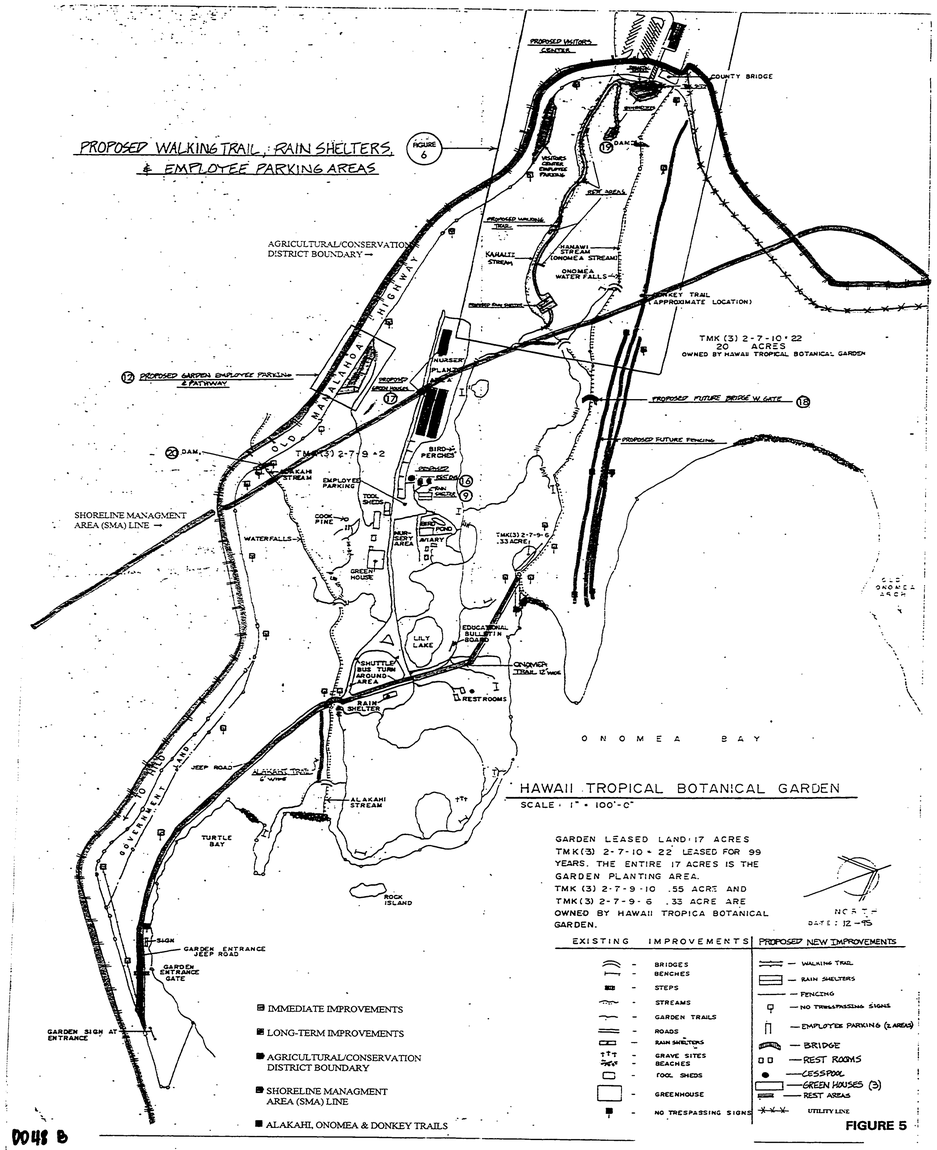


FIGURE 5

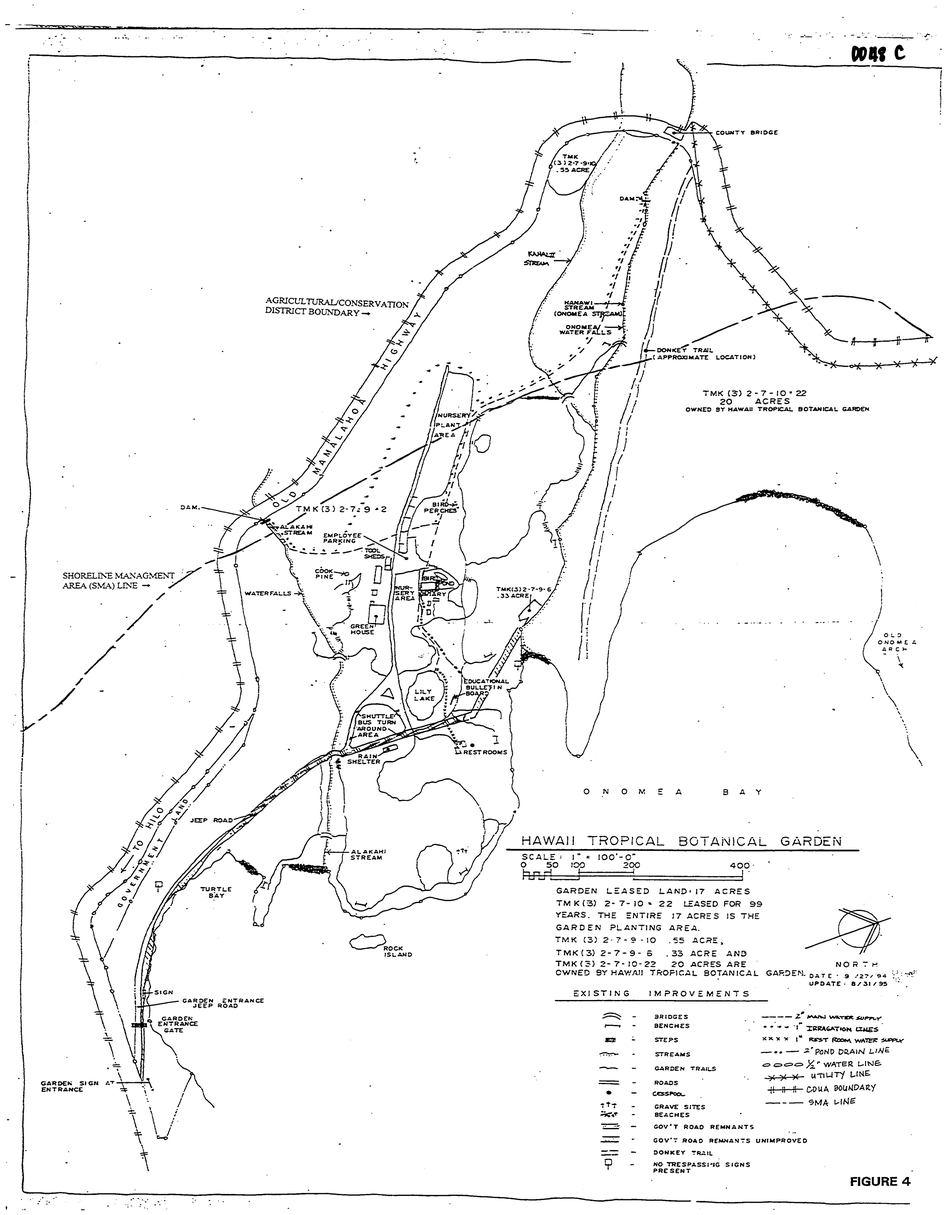
DOUS B

OVERSIZED DRAWING/MAP

PLEASE SEE 35MM ROLL

D048 e

DOAS C



HAWAII TROPICAL BOTANICAL GARDEN

SCALE: 1" = 100'-0"
0 50 100 200 400

GARDEN LEASED LAND: 17 ACRES
TMK(3) 2-7-10:22 LEASED FOR 99 YEARS. THE ENTIRE 17 ACRES IS THE GARDEN PLANTING AREA.
TMK (3) 2-7-9-10 .55 ACRE,
TMK(3) 2-7-9-6 .33 ACRE AND
TMK(3) 2-7-10-22 20 ACRES ARE OWNED BY HAWAII TROPICAL BOTANICAL GARDEN.

NORTH

DATE: 9/27/94
UPDATE: 8/31/95

EXISTING IMPROVEMENTS

- BRIDGES
- BENCHES
- STEPS
- STREAMS
- GARDEN TRAILS
- ROADS
- CESSPOOL
- GRAVE SITES
- BEACHES
- GOV'T ROAD REMNANTS
- GOV'T ROAD REMNANTS UNIMPROVED
- DONKEY TRAIL
- NO TRESPASSING SIGNS PRESENT
- 2" MAIN WATER SUPPLY
- 1" IRRAGATION LINES
- 1" REST ROOM WATER SUPPLY
- 2" POND DRAIN LINE
- ½" WATER LINE
- UTILITY LINE
- COUA BOUNDARY
- SMA LINE

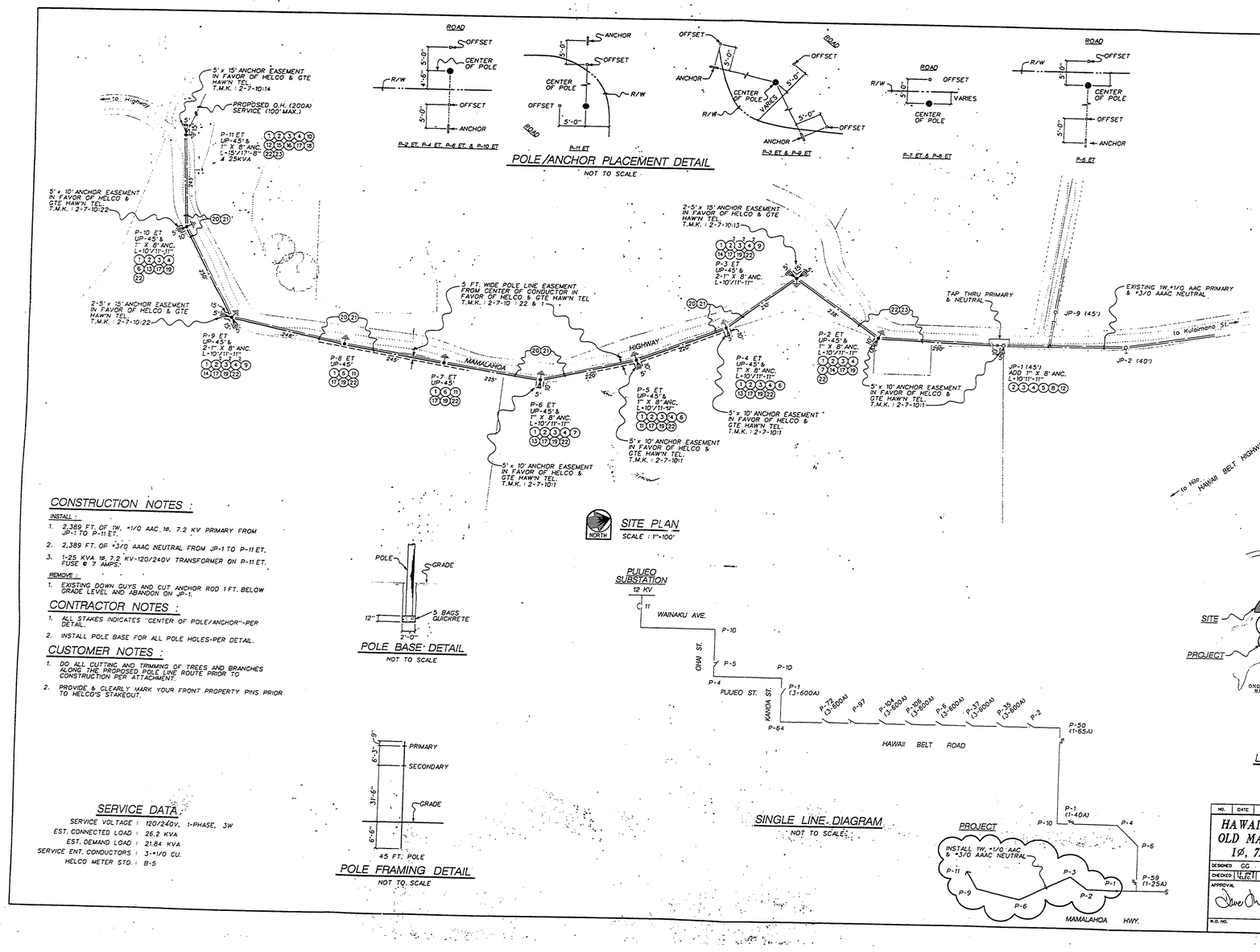
FIGURE 4

OVERSIZED DRAWING/MAP

PLEASE SEE 35MM ROLL

0048 D

DOUG D



POLE/ANCHOR PLACEMENT DETAIL

NOT TO SCALE

LINE	SMU NO.		QTY.
1	1-5000	45 FT. POLE	11
2	3-4120	1" x 8" ANCHOR (AREA "A")	11
3	3-4100	5/8" DGS 39'	11
4	3-4100	5/8" DGS 46'	11
5	7-2049	FIG. 1	1
6	7-2049	FIG. 2 (LESS C/O)	5
7	7-2049	FIG. 3	2
8	7-2049	FIG. 6 S.D.E.	2
9	7-2049	FIG. 6 D.D.E.	1
10	7-2049	FIG. 9	2
11	5-1009	FIG. 1	1
12	5-1009	FIG. 3	3
13	5-1009	FIG. 4	2
14	5-1009	FIG. 5	3
15	10-2100	25 KVA (7.2 KV)	3
16	10-2040	SECONDARY LEADS (**1/0 CU.)	1
17	12-5201	OBJECT MARKER	10
18	12-1020	FIG. 2	1
19	12-1020	FIG. 3	9
20	1-2040	*1/0 AAC	263*
21	1-2040	*3/0 AAAC	486*
22	POLE BASE		10
23	SECONDARY CLEVIS		1

CONSTRUCTION NOTES :

INSTALL :

1. 2,389 FT. OF 1W, *1/0 AAC, 1Ø, 7.2 KV PRIMARY FROM JP-1 TO P-11 ET.
2. 2,389 FT. OF *3/0 AAAC NEUTRAL FROM JP-1 TO P-11 ET.
3. 1-25 KVA 1Ø, 7.2 KV-120/240V TRANSFORMER ON P-11 ET. FUSE @ 7 AMPS.

REMOVE :

1. EXISTING DOWN GUYS AND CUT ANCHOR ROD 1 FT. BELOW GRADE LEVEL AND ABANDON ON JP-1.

CONTRACTOR NOTES :

1. ALL STAKES INDICATES "CENTER OF POLE/ANCHOR"-PER DETAIL.
2. INSTALL POLE BASE FOR ALL POLE HOLES-PER DETAIL.

CUSTOMER NOTES :

1. DO ALL CUTTING AND TRIMMING OF TREES AND BRANCHES ALONG THE PROPOSED POLE LINE ROUTE PRIOR TO CONSTRUCTION PER ATTACHMENT.
2. PROVIDE & CLEARLY MARK YOUR FRONT PROPERTY PINS PRIOR TO HELCO'S STAKEOUT.

SERVICE DATA :

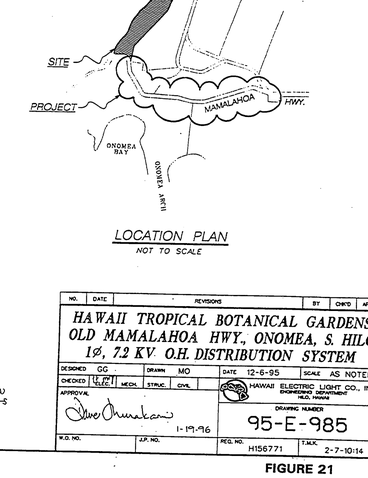
SERVICE VOLTAGE :	120/240V, 1-PHASE, 3W
EST. CONNECTED LOAD :	26.2 KVA
EST. DEMAND LOAD :	21.84 KVA
SERVICE ENT. CONDUCTORS :	3-*1/0 CU.
HELCO METER STD. :	B1-S

SITE PLAN

SCALE : 1"=100'

SINGLE LINE DIAGRAM

NOT TO SCALE



LOCATION PLAN

NOT TO SCALE

POLE BASE DETAIL

NOT TO SCALE

POLE FRAMING DETAIL

NOT TO SCALE

NO.	DATE	REVISIONS	BY	CHK'D	APP'D

HAWAII TROPICAL BOTANICAL GARDENS OLD MAMALAHOA HWY., ONOMEA, S. HILO 1Ø, 7.2 KV O.H. DISTRIBUTION SYSTEM

DESIGNED GG	DRAWN MO	DATE 12-6-95	SCALE AS NOTED
CHECKED [illegible]	MECH. STRUC. CIVIL	HAWAII ELECTRIC LIGHT CO., INC. ENGINEERING DEPARTMENT HILO, HAWAII	
APPROVAL 1-19-96		DRAWING NUMBER 95-E-985	
W.O. NO.	J.P. NO.	REG. NO. H156771	T.M.K. 2-7-10:14

FIGURE 21