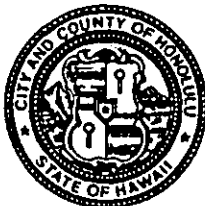


DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

850 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Website: www.cc.honolulu.hi.us

JEREMY HARRIS
MAYOR



TIMOTHY E. STEINBERGER, P.E.
DIRECTOR

40753

November 18, 2003

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

Dear Ms. Salmonson:

Subject: Finding of No Significant Impact (FONSI) for
Foster Botanical Garden Master Plan
Tax Map Keys 1-7-07:1 & 2 and 1-7-08:1 & 2
Honolulu, Oahu, Hawaii

The City and County of Honolulu, Department of Design and Construction, has reviewed and responded to the comments received during the 30-day public comment period that began on April 23, 2002. The agency has determined that this project will not have significant environmental effects and has issued a FONSI. Please publish this notice in the November 23, 2003 Environmental Notice.

Enclosed are a completed OEQC Publication Form and four copies of the final environmental assessment.

Please call Ms. Kimi Mikami Yuen of PBR Hawaii at 521-5631 if you have any questions.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Eugene C. Oka".

for TIMOTHY E. STEINBERGER, P.E.
Director

TES:ei

Enclosures

cc: PBR Hawaii

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QUALITY CONTROL

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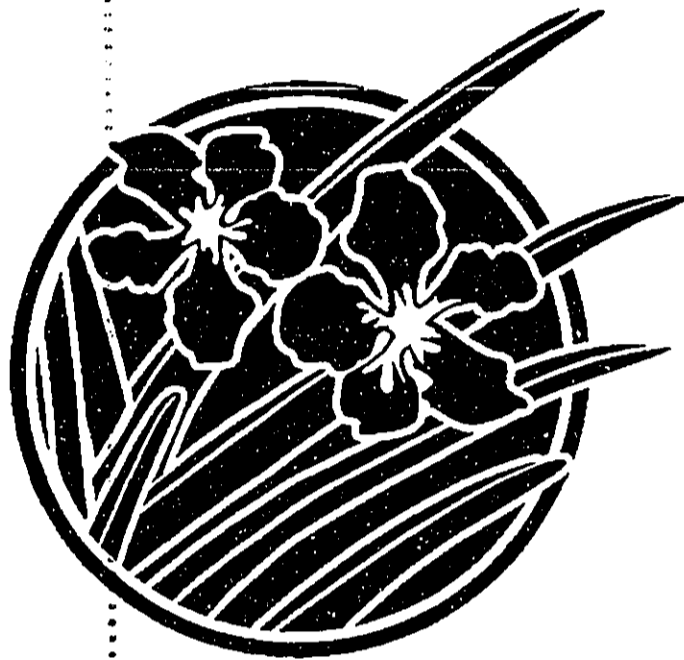
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FOSTER BOTANICAL GARDEN
Master Plan

FINAL ENVIRONMENTAL ASSESSMENT

November 2003



FOSTER BOTANICAL GARDEN Master Plan

FINAL ENVIRONMENTAL ASSESSMENT

Prepared for:
City and County of Honolulu
Department of Design and Construction
Department of Parks and Recreation

Prepared by:
PBR Hawai'i
1001 Bishop Street
Pacific Tower, Suite 650
Honolulu, Hawai'i 96813

November 2003



TABLE OF CONTENTS

1.0 INTRODUCTION.....	1
1.1 PROJECT SUMMARY.....	1
1.2 LOCATION.....	2
1.3 LAND OWNERSHIP.....	2
1.4 IDENTIFICATION OF PROPOSING AGENCY.....	2
1.5 IDENTIFICATION OF ACCEPTING AGENCY.....	2
1.6 IDENTIFICATION OF AGENCIES CONSULTED.....	2
1.7 ENVIRONMENTAL IMPACT STATEMENT LAW (CHAPTER 343, HRS).....	3
2.0 PROJECT DESCRIPTION, PURPOSE & NEED.....	5
2.1 BACKGROUND INFORMATION.....	5
2.1.1 HISTORY.....	5
2.1.2 DESCRIPTION OF THE PROPERTY.....	8
2.1.3 SURROUNDING LAND USES.....	8
2.2 COMMUNITY PLANNING PROCESS.....	8
2.3 PROJECT GOALS.....	10
2.4 DESCRIPTION OF IMPROVEMENTS.....	10
2.4.1 PROJECT DESIGN.....	10
2.4.2 PROJECT COMPONENTS.....	11
2.5 APPROXIMATE COSTS AND PROPOSED PHASING PLAN.....	18
3.0 LAND USE CONFORMANCE.....	21
3.1 STATE OF HAWAII.....	21
3.1.1 STATE LAND USE LAW (CHAPTER 205, HRS).....	21
3.2 CITY AND COUNTY OF HONOLULU.....	21
3.2.1 GENERAL PLAN.....	21
3.2.2 PRIMARY URBAN CENTER DEVELOPMENT PLAN – CURRENT AND PROPOSED.....	22
3.2.3 LAND USE ORDINANCE.....	27
3.2.4 PUNCHBOWL SPECIAL DISTRICT.....	28
3.2.5 SPECIAL MANAGEMENT AREA.....	28
3.2.6 LIST OF PERMITS AND APPROVALS.....	28
4.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT, POTENTIAL IMPACTS OF PROPOSED ACTION, AND MITIGATIVE MEASURES	30
4.1 PHYSICAL CHARACTERISTICS.....	30
4.1.1 CLIMATE.....	30
4.1.2 TOPOGRAPHY.....	30
4.1.3 GEOLOGY.....	31



4.1.4	SOILS.....	31
4.1.5	FLOOD HAZARDS.....	33
4.1.6	NATURAL HAZARDS.....	34
4.1.7	FLORA AND FAUNA	34
4.2	HUMAN ENVIRONMENT	38
4.2.1	ARCHAEOLOGICAL AND HISTORIC RESOURCES	38
4.2.2	TRAFFIC AND CIRCULATION	40
4.2.3	AIR QUALITY.....	41
4.2.4	NOISE.....	42
4.2.5	ECONOMIC IMPACTS	43
4.2.6	SOCIAL IMPACTS.....	44
4.2.7	VISUAL IMPACTS.....	45
4.2.8	INFRASTRUCTURE.....	46
4.2.9	SOLID WASTE DISPOSAL	48
4.2.10	PUBLIC SERVICES.....	49
5.0	DESCRIPTION OF ALTERNATIVES.....	51
5.1	NO ACTION ALTERNATIVE.....	51
5.2	RENOVATION ALTERNATIVE.....	51
5.3	PREFERRED ALTERNATIVE	52
6.0	DETERMINATION, FINDINGS, AND REASONS SUPPORTING THE DETERMINATION	53
6.1	SIGNIFICANCE CRITERIA.....	53
6.2	DETERMINATION	57
7.0	REFERENCES.....	58
8.0	COMMENT LETTERS TO THE DRAFT ENVIRONMENTAL ASSESSMENT AND RESPONSES.....	60



LIST OF FIGURES

Figure No.		Follows Page
1	Regional Location Map	2
2	Tax Map Key/Land Ownership Map	2
3	Foster Botanical Garden Master Plan	10
4	Primary Urban Center Development Plan, Public Facilities Map	23
5	Proposed Primary Urban Center Development Plan, Land Use Map	23
6	Punchbowl Special District Map	27
7	Detailed Land Classification	31
8	SCS Soil Survey	31
9	Agricultural Lands of Importance to the State of Hawai'i (ALISH)	31

LIST OF APPENDICES

Appendix A	Archaeological Archival Research Report
Appendix B	Traffic Impact Assessment



1.0 INTRODUCTION

This Environmental Assessment (EA) has been prepared in compliance with Chapter 343, *Hawai'i Revised Statutes* (HRS) for the proposed Master Plan Improvements for Foster Botanical Garden.

1.1 PROJECT SUMMARY

Project Name:	Foster Botanical Garden Master Plan
Proposing Agency:	Department of Design and Construction, City and County of Honolulu
Landowner:	City and County of Honolulu
Location:	Nu'uuanu, Honolulu, O'ahu, Hawai'i
Tax Map Key:	1-7-07:01 and 02, 1-7-08: 01 and 02
Existing Use:	Public Botanical Garden
Proposed Action:	Master Plan for Foster Botanical Garden
Project Area:	Approximately 13.5 acres.
Land Use Designations:	State Land Use: Urban Development Plan: Primary Urban Center, park Zoning: General Preservation (P-2)
SMA:	The subject property is not in the SMA
Actions Requested:	Compliance with Chapter 343, <i>Hawai'i Revised Statutes</i>
Approving Agency:	City and County of Honolulu, Department of Design and Construction
Determination:	Finding of No Significant Impact (FONSI)



1.2 LOCATION

Foster Botanical Garden is located on the mauka side of Downtown Honolulu on the Island of O'ahu (Figure 1). It is flanked to the southeast by Nu'uaniu Avenue, to the northwest by Nu'uaniu Stream, to the northeast by the H-1 Freeway (Lunalilo Freeway), and to the southwest by Vineyard Boulevard.

1.3 LAND OWNERSHIP

The landowner is the City and County of Honolulu. The property consists of the parcels identified as Tax Map Key: 1-7-07: 01 and 02, 1-7-08: 01 and 1-7-08: 02, with a combined total area of approximately 13.5 acres (Figure 2).

1.4 IDENTIFICATION OF PROPOSING AGENCY

The proposing agency is the City and County of Honolulu Department of Design and Construction.

1.5 IDENTIFICATION OF ACCEPTING AGENCY

The accepting agency is the City and County of Honolulu Department of Design and Construction.

1.6 IDENTIFICATION OF AGENCIES CONSULTED

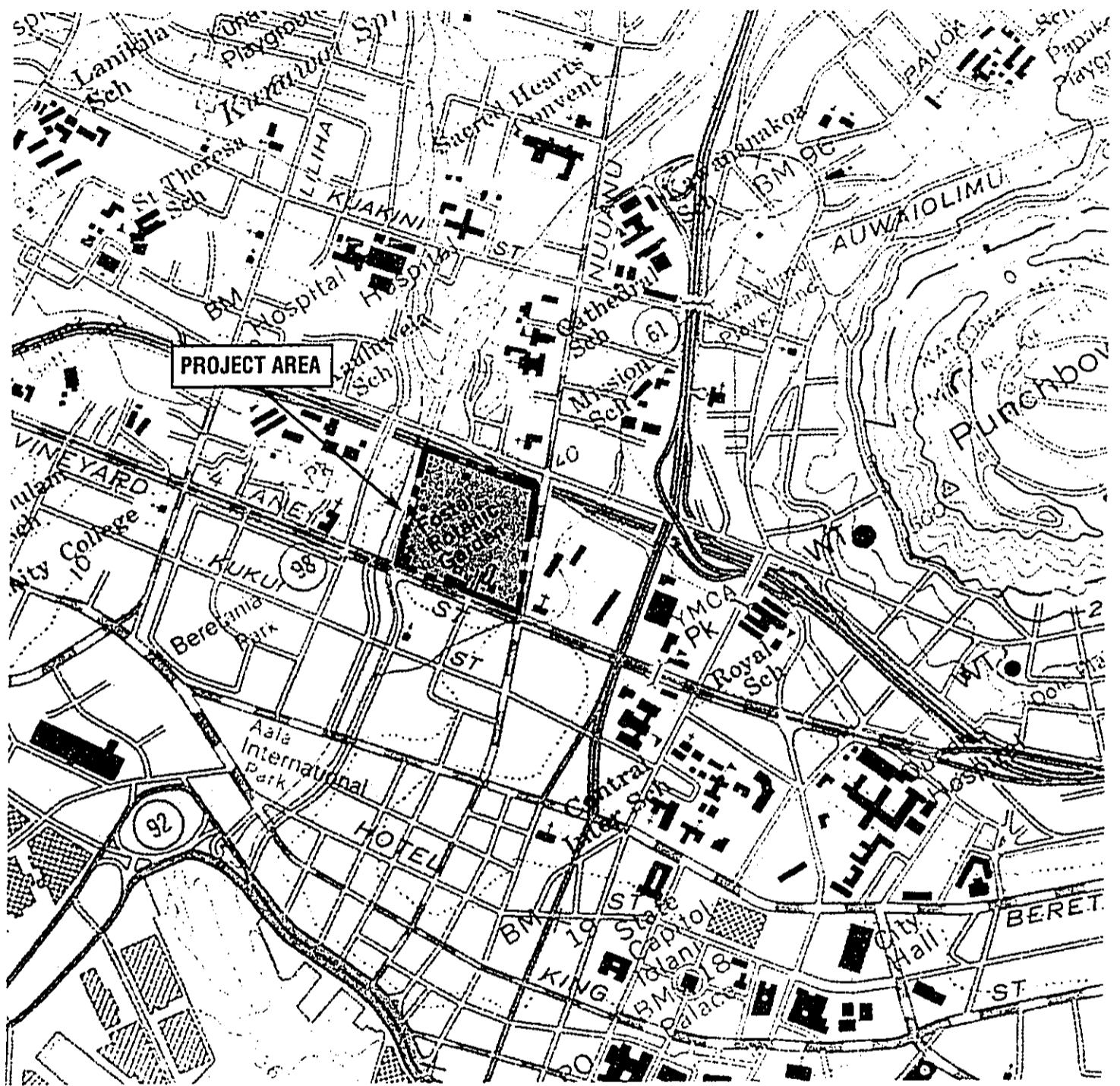
In the course of planning for this project, agencies (or agency documents), community individuals and organizations were consulted and/or provided information for the preparation of the Master Plan and this Environmental Assessment.

CITY AND COUNTY OF HONOLULU

Board of Water Supply
Department of Parks and Recreation
Department of Planning and Permitting
Department of Design and Construction
Department of Transportation Services
Department of Facility Maintenance

STATE AGENCIES

Office of Environmental Quality Control
Office of Planning, DBEDT
Department of Health



LEGEND

 Project Area



Figure 1
Regional Location Map

 FOSTER BOTANICAL GARDEN

Source: USGS Topographic Map



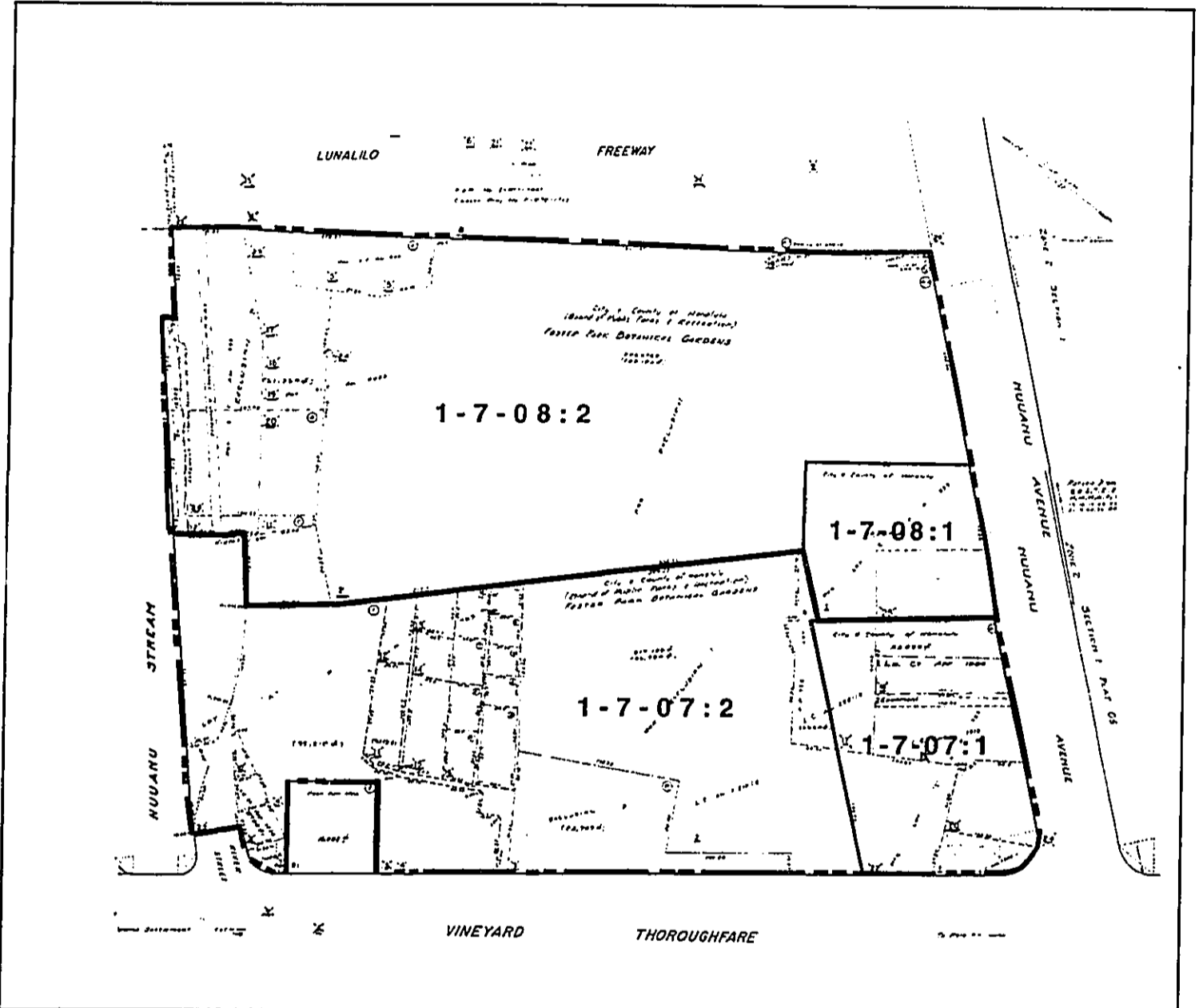

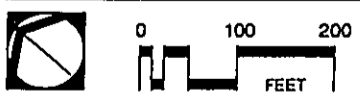


Figure 2
Tax Map Key/Land Ownership Map

LEGEND
 Project Area

Source: Tax Map Key





Department of Land and Natural Resources
State Historic Preservation Division
Department of Transportation
Office of Hawaiian Affairs
Disability and Communication Access Board

FEDERAL AGENCIES

US Department of the Interior, US Fish and Wildlife Service
US EPA - Pacific Islands Contact Office
US Department of the Interior, US Geological Survey

COMMUNITY ORGANIZATIONS

Foster Community Gardeners
Friends of Honolulu Botanical Gardens
Garden Club of Honolulu
Hawai'i Bonsai Association
Hawaiian Botanical Society
Honolulu Orchid Society
Ikebana International
Kaulunani Urban Forestry Program
Landscape Industry Council of Hawai'i
Mālama Hawai'i
Scenic Hawai'i
Suiyobi Bonsai Association
The Outdoor Circle
Waimea Arboretum
Lyon Arboretum
Honolulu Chinatown Lions Club
Sun Yat-Sen Hawai'i Foundation

NEIGHBORHOOD BOARDS

Downtown Neighborhood Board #13
Nu'uano/Punchbowl Neighborhood Board #12
Liliha/Kapālama Neighborhood Board #14
Kalihi/Pālama Neighborhood Board #15

**1.7 ENVIRONMENTAL IMPACT STATEMENT LAW (CHAPTER 343,
HRS)**

In accordance with the State of Hawai'i's Environmental Impact Statement Law, Chapter 343, HRS, there are Agency actions applicable to new development that trigger



the environmental review process. One of these is the use of County lands and/or funds. Because the project will use both county lands and funds, this document is prepared to satisfy the requirement for an environmental assessment.

Because Chapter 343, HRS is applicable to the project, this EA has been prepared to identify whether "significant environmental effects" will result from project development. According to the Department of Health Rules (Title 11, Chapter 200) developed in accordance with Chapter 343, HRS, if "significant environmental effects" are not identified by an Environmental Assessment, preparation of a full Environmental Impact Statement is exempted, and a "finding of no significant impact" (FONSI) is issued by the Accepting Authority. Otherwise, a Notice of Preparation is issued and processing of a full Environmental Impact Statement is required. A FONSI has been issued for this project by the City and County of Honolulu Department of Design and Construction.



2.0 PROJECT DESCRIPTION, PURPOSE & NEED

This section provides background information, identifies the project's goals and objectives, describes the proposed improvements, and delineates construction activities and approximate costs.

2.1 BACKGROUND INFORMATION

2.1.1 HISTORY

In 1851, a young Prussian physician by the name of William Hillebrand found his way to Hawai'i in search of a climate more hospitable to his health problems. Hawai'i apparently did the job for within two years, Hillebrand married, acquired and leased roughly 6 acres, and built a house for his family. While his house was surely pleasant, Hillebrand's love for horticulture helped him create a legendary collection, which was known for its beauty and diversity. He began his gardens by gathering local species and convincing sea captains to bring him outside specimens from their travels. By 1854 he had reportedly collected 160 different species of plants in his gardens and by 1862 had amassed a few acres of land. These plants and lands were the beginnings of the Foster Botanical Gardens of today.

Hillebrand had a successful career as a physician in the islands and eventually was granted the position of personal physician to the royal family, and later the directorship of the Queen's Hospital at its founding in 1859. Later, connections with the Hawai'i Bureau of Immigration and his earlier successes allowed him to travel to Asia in 1865. These trips focused on a search for new labor sources for the growing sugar industry and a possible means to control leprosy which was afflicting the islands. However, during these trips he also sent back plant, bird, and mammal specimens that would be desirable in Hawai'i as part of a commission funded by the Planters Association and the Royal Hawaiian Agricultural Society. In later years, Hillebrand became more focused on native Hawaiian plants and spent his time traveling to other Hawaiian Islands for botanical exploration and making contacts with local botanists who were able to send him specimens.

Years later in 1871, Hillebrand unexplainably left the islands and moved to Europe. He spent his final years in Germany, but continued to work on his Hawaiian flora collection. By the time of his death in 1886, he had finished writing a book entitled *Flora of the Hawaiian Islands*, a culmination of his work with native plants. The book was published in 1888 with the help of his son and dedicated on behalf of Hillebrand to the Hawaiian people. His Hawaiian home was rented during his time away from the



islands until 1880 when it was sold to a young entrepreneur from Nova Scotia named Thomas Foster.

Thomas Foster ran a ship building business in Rhode Island with his brother before the two of them decided to try their hand in the Pacific shipping business. After moving to Hawai'i, Foster married the daughter of another prominent ship builder, James Robinson. Foster and his wife, Mary Elizabeth Mikahala, quickly bought a residence to settle down and begin their life. As it happens, the property they bought bordered the Hillebrand property and they became neighbors. Years later when Hillebrand decided not to return to Hawai'i, he sold the house and gardens to the Fosters.

One of Thomas Foster's first actions as owner was to remove the existing Hillebrand house and build a mansion with a 5-story tower that would allow him to see the ocean and his passing ships. Mary enjoyed the gardens and spent much of her time cultivating them. One of her contributions was the building of an 'auwai, or canal system for irrigation. The gardens remained a place for the Foster family to play and relax.

Thomas died years later and left Mary alone. For several years, Mary chose to live at her sister's home. With the Nu'uano house empty, the Foster gardens fell into a state of disrepair. Mary later returned, but found the tangles of the garden appealing and refused to have them thinned. She continued to add to the gardens and is responsible for the exceptional Bo Tree found in the garden today, a specimen propagated from what is believed to be the oldest historical tree in the world.

Another figure of great importance to Foster Botanical Garden was Harold L. Lyon. Lyon moved to Hawai'i from Minnesota in 1907 to work for the Hawai'i Sugar Planters Association (HSPA). Besides working on projects to cure diseases of sugar cane, Lyon also worked on projects that sought to reforest the watershed areas of the island, an issue important to sugar planters. Lyon was a botanist who specialized in trees and it is understandable how the towering trees of the Fosters' gardens enticed him to seek out Mary Foster and form a formal relationship with the widow. Through encouragement from Lyons, Mary decided the gardens were special, yet were in need of constant maintenance to repair years of neglect. In an agreement that helped the sugar planters, but was also an opportunity for Mary to ensure Lyon would remain on-site to supervise her gardens, Mary offered the HSPA a portion of her property as an addition to their nursery. Her only stipulation required that the HSPA gardens were made to complement her already existing gardens. As a result, one of the first HSPA experiment stations was established at the property. By 1925, Lyon had developed what he considered the best-equipped plant nursery in the Hawaiian Islands.



In 1930, Mary Foster died and left her home and gardens (approximately 5 acres) to the City of Honolulu. However, she placed a stipulation on the transfer of the property which required that the City and County of Honolulu should "accept and forever keep and properly maintain the (gardens) as a public and tropical park to be known and called Foster Park." While this was a generous gift, it was one that the City had a problem accepting. Economic times were slow in Hawai'i and the City was not equipped to maintain a park. It was finally decided that the HSPA would manage the park, seeing as they were using part of it for their nursery already, and Dr. Lyon would become director for the garden. Eventually the Department of Parks was able to assume responsibility for the park.

Lyon was responsible for many improvements to the grounds including thinning of the tangled overgrown areas, replacement of the 'auwai with sprinkler systems, removal of most of the Foster house and the construction of a glass house that contained a large orchid collection. Also created during those first years was the Palm Garden. Through years of service to the park, Lyon is credited for basically designing Foster Botanical Garden as we know it today.

For the next twenty years the garden slowly accumulated more properties through the purchase of the HSPA nursery and several other lots along School Street. Also, in the 1950's, several acres of land were gained from the Bishop Estate along Nu'uuanu Stream. In 1957, Dr. Harold Lyon passed away and Paul R. Weissich filled his position as Director of the Gardens.

Weissich was a landscape architect from California who had been in Hawai'i since 1950 and had consulted with Dr. Lyons on several occasions. As Director, Weissich tried to organize the Foster Garden through the creation of a master plan that set goals for future growth. His plans were altered over the years as small sections of land were added and taken away from the Gardens due to various road construction projects. Eventually, in 1964, the Garden reached its present boundaries with the addition of a two-acre parcel on the corner of Vineyard and Nu'uuanu Street, an area that now houses the Economic Garden. That year also saw the opening of the Harold L. Lyon Orchid Garden, a tribute to the late director's accomplishments in cultivating orchids. Another specialized collection was added a year later in 1965, the Prehistoric Glen, which features large primitive plants.

Weissich retired as Director of the Honolulu Botanical Gardens in 1989. Over the next ten years, Michael S. Kristensen held the office. Heidi Bornhorst, the current Director, was appointed in February 1999.



2.1.2 DESCRIPTION OF THE PROPERTY

Foster Botanical Garden lies on 13.5 acres of gently sloping land in Downtown Honolulu. It ranges in elevation from approximately 43 feet above mean sea level (MSL) at the Upper Terrace to about 12 feet above MSL near the parking entrance at Vineyard Boulevard.

Hundreds of different botanical species from around the world are present in the Garden, including 27¹ Exceptional Trees (ET) that are protected by Hawai'i State law (HRS Chapter 58) and City and County of Honolulu ordinance (ROH 41-13). These trees have been selected for protection and preservation due to their historic or cultural value, age, rarity, location, size, aesthetic quality, or endemic status.

Foster Botanical Garden also houses the main offices for the City's Division of Botanical Gardens and the Friends of the Honolulu Botanical Gardens as well as propagation facilities. The Garden is listed in both the State and National Registers of Historic Places (Site Number 80-14-1389). It was added to the registers in 1988 and 1993, respectively.

2.1.3 SURROUNDING LAND USES

Existing land uses that surround Foster Botanical Garden include religious facilities such as the Kuan Yin Temple and the Harris United Methodist Church, public facilities such as Kauluwela School, and public parks and spaces including Lili'uokalani Botanical Garden, River Street Promenade, College Walk Mall, and Kauluwela Park. There also are various commercial and office spaces (Zippy's, Borthwick Mortuary), and a community center, multi-family residential units (Queen Emma Gardens, Keola Ho'onanea, Kukui Gardens), the Lunalilo (H-1) Freeway, and Nu'uaniu Stream.

2.2 COMMUNITY PLANNING PROCESS

The planning process for this project involved a variety of activities, including information gathering and research, community meetings, and design development. The process began with a review of Foster Botanical Garden's history as well as previous plans, studies, reports, and documents. Several site visits were performed to examine the existing conditions at the Garden. In addition, issues relating to management and operation of the Garden including architectural space program development, operation and maintenance, security, staffing, and financing were discussed and evaluated with the Garden staff and administration. Special design

¹ Changed from 26 to 27 to reflect revised Section 41-13.7 HRS, "Register of exceptional trees." The Rainbow Shower tree (*Cassia x nealiae* 'Wilhelmina Tenney') previously listed in the DEA as a significant tree has been added to the register of Exceptional Trees.



considerations including parking, circulation, and accessibility issues were also analyzed.

In addition to the preliminary research, a series of community meetings was held to gather input from various organizations and community members throughout each stage of development for the Master Plan. Announcements for the community meetings were published in both printed and online Internet editions of local newspapers including the *Downtown Planet*, *Honolulu Star-Bulletin*, *Honolulu Advertiser*, and *MidWeek*. Invitations and meeting reminder notices were mailed directly to community members and representatives of key organizations who have ongoing relationships with Foster Botanical Garden such as the Friends of Honolulu Botanical Gardens, the Outdoor Circle, Hawai'i Bonsai Association, Ikebana International, and Scenic Hawai'i, among others, and to those who participated in the previous master planning effort. These invitations and notices also were sent to neighboring landowners and to the four Neighborhood Boards that border the Garden.

At the first community meeting, background information and previously proposed schemes were presented to attendees. A brainstorming session was held to identify community wants and needs for the Garden and to gather ideas for the Master Plan. Subsequent community meetings involved a presentation of the master plan at each stage of development followed by an open discussion with attendees who shared their comments, questions, ideas, and suggestions for improving the Master Plan. The Draft Master Plan was presented to the Downtown Neighborhood Board and to the Liliha/Kāpalama Neighborhood Board at their monthly meetings in the early part of 2001 for their review and comment. At the last community meeting held on February 7, 2001, the Master Plan was presented for final public review and comment. Since then, the Master Plan has been reviewed by City and County administration and staff and refined to reflect their input.

Throughout the public process, coordination and an open line of communication with City and County staff and administrators played an integral part in ensuring the development of a realistic and effective Master Plan from the perspective of those who will be operating and maintaining the Garden. These included the Directors of the Honolulu Botanical Gardens, Department of Parks and Recreation, Urban Forestry, as well as garden maintenance and office staff, volunteers, the Assistant Director, Project Manager, and staff from the Department of Design and Construction.



2.3 PROJECT GOALS

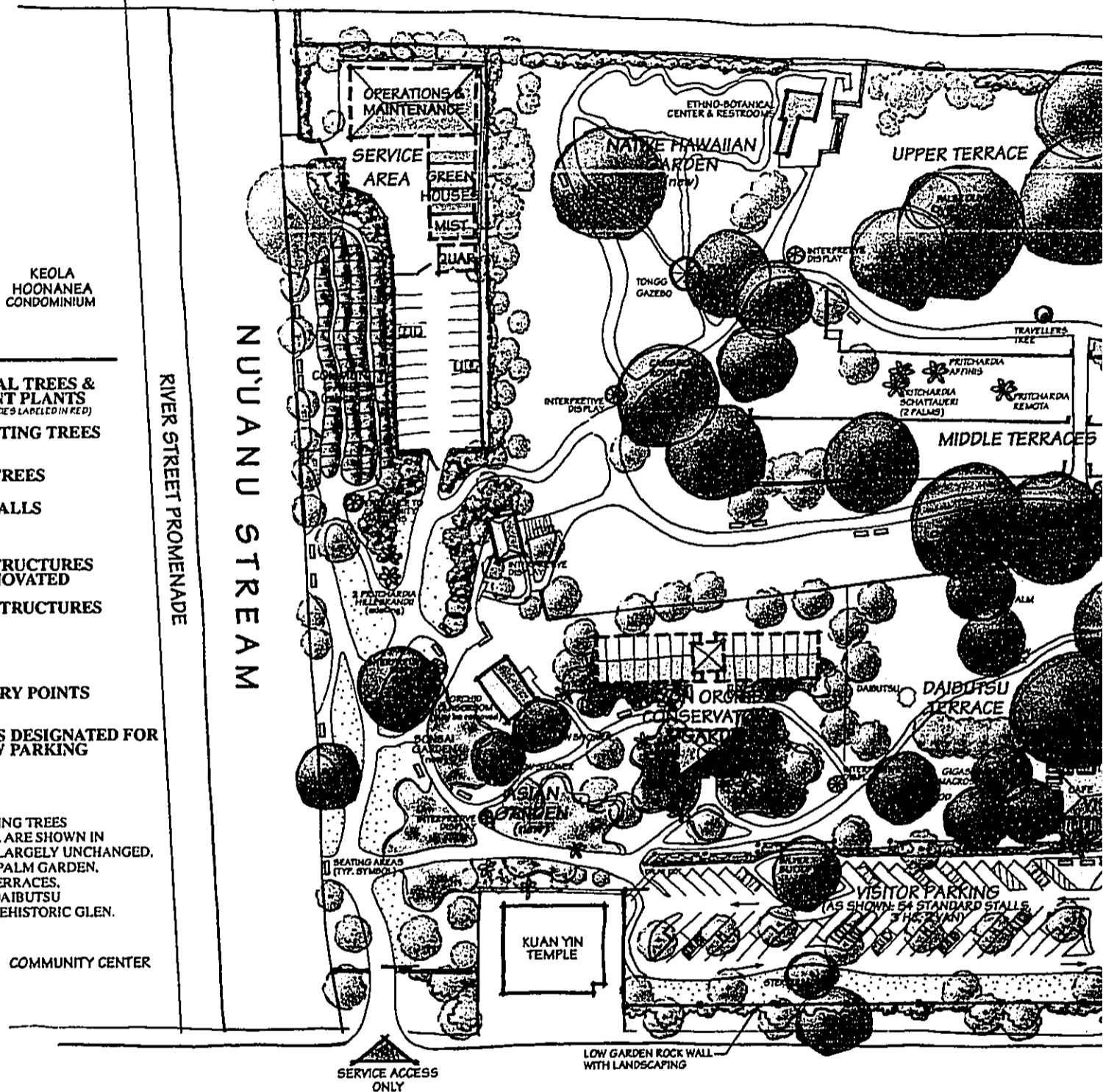
Based on input gathered from staff, City officials, volunteers, local garden clubs, and community members, a range of goals were developed for the master plan. These include:

- * Improve facilities—visitor accommodations, administration offices, and maintenance facilities
- * Protect Exceptional Trees as well as any other significant trees identified by HBG staff
- * Protect historic walls located in the Middle Terraces
- * Increase visitorship, both visitor and kama'aina, and the quality of the visitor experience at the Garden
- * Improve the visibility of the Garden and its main entrance
- * Provide meeting space for both staff and local garden clubs and organizations
- * Improve display space and signage of botanical collections
- * Locate all administrative functions close to each other
- * Create a safe facility that can be secured when not in operation
- * Mitigate noise and visual impacts from the H-1 Freeway
- * Improve orchid display and maintain tribute to Dr. Lyon—protect from theft and natural predators
- * Improve circulation throughout Garden for both visitors and maintenance vehicles—interconnected loop system preferred
- * Provide a variety of garden collections and attractions
- * Provide educational facilities/classrooms/meeting rooms
- * Increase parking
- * Maintain open spaces within the Garden by limiting structures to previously developed areas
- * Develop implementation plan and cost estimates

2.4 DESCRIPTION OF IMPROVEMENTS

2.4.1 PROJECT DESIGN

The master plan for Foster Botanical Garden (Figure 3) attempts to balance the old with the new. It preserves historical elements such as significant trees and the terrace walls from Mary Foster's estate as well as memorable spaces within the Garden such as the Upper Terrace and the Daibutsu Terrace while reinvigorating the Garden by opening up its public façade, improving visitor, botanical, and service facilities, and adding new garden areas. Guided by an understanding of its history and developed with input



LEGEND

- EXCEPTIONAL TREES & IMPORTANT PLANTS (ENDANGERED SPECIES LABELED IN RED)
- OTHER EXISTING TREES
- PROPOSED TREES
- HISTORIC WALLS
- PATHS
- EXISTING STRUCTURES TO BE RENOVATED
- PROPOSED STRUCTURES
- VIEWS
- ACCESS/ENTRY POINTS
- LAWN AREAS DESIGNATED FOR OVERFLOW PARKING
- FENCE

NOTE: NOT ALL EXISTING TREES AND PLANT MATERIAL ARE SHOWN IN GARDEN AREAS LEFT LARGELY UNCHANGED, SPECIFICALLY IN THE PALM GARDEN, UPPER AND MIDDLE TERRACES, ECONOMIC GARDEN, DAIBUTSU TERRACE, AND THE PREHISTORIC GLEN.

VINEYARD BOULEVARD

BORTHWICK MORTUARY

COLLEGE WALK

RIVER ST.



from Garden staff and enthusiasts, the master plan prepares Foster Botanical Garden for an even brighter future.

2.4.2 PROJECT COMPONENTS

2.4.2.1 Visitor Center

No longer hidden behind the Kuan Yin Temple, the main entry and new Visitor Center will be the capstone of the enhanced vista along Vineyard Boulevard. Located at the head of Maunakea Street facing Vineyard Boulevard, the Visitor Center will be the main entry and exit point for visitors and will be the centralized home for administrative personnel, volunteers, the gift shop, a classroom/meeting room, a botanical library, and a café.

The architectural program for the Visitor Center is based on input from current Garden personnel. One of their main requests was to locate administrative and visitor service staff close to each other so that services become more efficient and staff are accessible to assist one another when needed. Currently, the administration and reception staff are scattered in different parts of the Garden—some are stationed at the entrance on the west side of the Garden, volunteers from the Friends of Honolulu Botanical Gardens are located at the north end, and the bulk of the administrative staff are at the opposite (south) end of the Garden. In the new Visitor Center, all of these positions will be grouped together and connected with trellised walkways. In addition, the building is situated in an area previously occupied by the administration offices, the orchid lath house, and various maintenance structures so no prime garden space would be lost to the new Visitor Center.

The architectural program for the Visitor Center includes:

- * Covered Entry and Display
- * Cashier and Information Desk
- * Administrative office space
- * Classrooms/Meeting Rooms
- * Adjoining Classroom Lath House
- * Café
- * Gift Shop
- * Public Restrooms/Phones
- * Friends of Honolulu Botanical Gardens Office
- * Joseph Rock Library
- * Label Room
- * Staff Kitchen/Lounge



The Visitor Center proposed in this master plan would house approximately 9,890 square feet of space. The structure will be located on previously developed land.

2.4.2.2 Service Area

Tucked into an underutilized portion of Foster Botanical Garden, the new Service Area will be the headquarters for all maintenance operations for the Garden. The area will contain an operations and maintenance building, mist house, quarantine house, greenhouses, staff parking, and open storage space. The HBG staff plans to work with state and federal agencies in the use of the quarantine facility, which will be built and maintained to meet all required specifications (including HAR §4-70).

It is recommended that the service structures be built into the existing slope. A ten-foot grade difference between the Service Area and the main garden areas as well as dense planting buffers will help block the facilities from view. The Service Area will be enclosed and secured by fencing and accessed by gates located on both the *makai* and *mauka* ends of the area.

The Operations and Maintenance Building will be the headquarters for the Garden Supervisor and the Garden staff. Locker rooms and shower facilities for both men and women are required due to the use of herbicides and pesticides. Ample storage space is necessary for the equipment used for Garden maintenance and for special events such as the Plant Sale and other anticipated events. In addition, the service area must have covered garage space to protect their mowers and other heavy equipment. The covered garage can be designed much like a carport so that the staff can drive the mowers and trucks directly into the garage. The estimated size of the building is 4,000 SF.

Because only minimal propagation facilities will be located onsite (with the exception of the shadehouse near the Lyon Orchid Conservatory which will house enough orchid nursery space to maintain the exhibit), additional nursery space will be required offsite at one of the City & County's other propagation facilities to support the Garden. The City's Nu'uano Facility on the Pali Highway has been suggested by DPR staff as the primary support facility.

A total of twenty-two parking stalls have been provided in the Service Area parking lot. The Garden currently requires parking for the three trucks, two cars, and five utility vehicles owned by the City & County of Honolulu. In addition, the staff requires at least eight employee parking stalls. It is expected that with the increase in Garden activity and intensity of garden development, additional staff and volunteers will be required. As a result, four additional stalls have been provided. The former main



entrance to the Garden on Vineyard Boulevard near the Kuan Yin Temple will be closed to the public and converted into a service only access point. The service gate on Nu'uaniu Avenue will be maintained as an emergency only access point for staff and maintenance personnel.

2.4.2.3 Lyon Orchid Conservatory

In memoriam to Dr. Harold Lyon, the Lyon Orchid Conservatory and support facilities is proposed to be a 10,000 square-foot facility honoring the Garden's first director, his dedication to the Garden, his works, and his love of orchids. Unlike the existing Lyon Orchid Garden, the Conservatory will include an enclosed display to protect the beautiful plants from predators, particularly the bulbul bird, and airborne disease. The structure will be located mauka of the new parking lot and the Kuan Yin Temple and can be tucked into the slope to minimize the height of the conservatory from the mauka garden area views. If structurally sound and economical, the existing Gift Shop structure should be renovated to serve as an adjunct classroom for the popular orchid classes held at the Garden. Another option is to demolish it to make more space available for garden areas.

2.4.2.4 Visitor Parking Lot

The visitor parking lot will provide 54 striped parking stalls (3 of which are handicap accessible) and 2 large van stalls. During special events when additional parking is needed, roughly 100 cars can be accommodated in designated overflow parking areas on lawns along the service access path. These areas are indicated as stippled grassy areas on the master plan in Figure 3.

Visitor traffic will enter and exit through a single access point on Vineyard Boulevard at the top of Maunakea Street. Vehicles will enter at the large turnaround and travel in a one-way, counterclockwise direction through the new parking lot. For those only wishing to drop off visitors, they may proceed around the roundabout, offload passengers in the main drop off area in front of the Visitor Center, and exit the Garden without circling the entire parking lot. The roundabout should be wide enough to accommodate standing vehicles and full-size buses on the outside of the roundabout as well as passing vehicles on the inside, allowing passengers to be unloaded without blocking or crossing traffic lanes. Taxis also should be allowed to enter and drop off passengers in this area. Colored or special paving materials could be used to beautify this hardscape area.

A key design element of the new visitor parking lot is that it loops carefully around three of Foster Botanical Garden's prized trees, a sprawling silver buttonwood, a unique



sterculia, and the ET Tattale (*Pterygota alata*). Key botanical staff and experts should be consulted in the detailed design of the parking lot around these trees. The silver buttonwood is believed to be one of the oldest specimens brought to Hawai'i from which many propagules have been developed. Careful trimming may be required. However, it is a dramatic specimen tree that should be given ample space in the parking lot to stretch its limbs. Just *makai* of the buttonwood, the sterculia with its buttressed roots and the ET Tattale will also be protected by having the driving lane curve around the sterculia. The parking area should be carefully designed to minimize damage to the tree roots and should include an enlarged planting area around the two trees with a minimum fifteen-foot buffer around the sterculia. Other trees and landscaping will be added to help shade and beautify the parking lot in a park-like setting.

2.4.2.5 New Pedestrian Entrance

Although occupying a full city block and located near a prominent corner near Downtown Honolulu and Chinatown, Foster Botanical Garden does not have an obvious public presence. According to both past and present directors, it is not uncommon to hear local residents admit that they do not know where Foster Botanical Garden is located. With its main frontage along Vineyard Boulevard, the Garden needs to be reoriented towards this street. The Master Plan recognizes this opportunity and locates the main entrance at the top of Maunakea Street. In addition to capitalize on the busy Vineyard Boulevard/Nu'uaniu Avenue intersection, a secondary entry feature is also suggested in the Master Plan at this corner. The two existing *Orbignya martiana* palms located at the corner of Vineyard and Nu'uaniu should be preserved and incorporated into a landmark gateway framing the pedestrian entry at this prominent intersection. A sweeping path and Entrance Garden will extend from the corner to the Visitor Center. All signs that are proposed for the Garden should comply with Article 7 of the City's Land Use Ordinance.

2.4.2.6 New Garden Areas

Many of the existing memorable and important garden areas such as the Upper Terrace, Prehistoric Glen, and the Daibutsu Terrace will remain largely untouched except for general improvements such as irrigation, lighting, and pathway improvements. However, the Master Plan introduces a few new concepts for additional garden areas. These include the Entrance Garden, Asian Garden, Bonsai Garden, and Native Hawaiian Garden. In addition, a condensed Economic Garden is proposed as well as a Rotating Display Garden that will showcase a variety of botanical displays that change over time.



Entrance Garden. Located along Vineyard Boulevard near the corner of Nu'uaniu Avenue, the Entrance Garden acts as the foyer to the main Garden. This garden area will be cleared of dense plantings along the two streets and large expanses of lawn will dominate the area, highlighting the Exceptional Cupang Tree and leading the eye towards the Visitor Center. Any plant masses planned for this area should be colorful and remain relatively low so that views into the Garden from Vineyard Boulevard and Nu'uaniu Avenue are preserved.

Asian Garden. The Asian Garden will be developed on reclaimed land from the existing parking lot. It is located mauka of the Kuan Yin Temple, taking advantage of the beautiful temple and the existing crepe myrtle trees that are seasonally covered with purple and pink flowers. The Asian Garden could be the new home for the existing Fukuoka Yame Lantern and Hiroshima Monument. The Dr. Sun Yat-Sen Hawai'i Foundation has approached the City regarding the placement of a memorial honoring Dr. Sun at the Asian Garden. Additional consideration by the City as well as City Council approval will be required before the memorial can be implemented.

Bonsai Garden. Stemming from the enthusiasm of local bonsai organizations, a permanent bonsai garden is recommended in the master plan. It is located near the Asian Garden. The display is envisioned as an outdoor display where it can receive full sun and be experienced within a larger context. Final design and security issues for the Bonsai Garden should incorporate input from local bonsai organizations.

Native Hawaiian Garden. The space vacated by the orchid display will be transformed into a Native Hawaiian Garden. Perhaps reusing the existing trees, rocks and infrastructure, the garden will provide an introduction to native Hawaiian plants with the existing Friends of Honolulu Botanical Garden Office renovated into an Ethnobotanical Center where interpretive and educational displays will be shown. The location for this garden is ideal for should the link under the H-1 Freeway to Lili'uokalani Botanical Garden be developed, visitors interested in seeing more native Hawaiian plants will be able to walk directly from this garden to nearby Lili'uokalani Botanical Garden, the City's botanical garden devoted to native Hawaiian plants.

Rotating Display Garden – The new garden area at the corner of Nu'uaniu Avenue and Vineyard Boulevard is the ideal area to showcase rotating displays. Limited only by the staff's imagination, the area could be developed into an assortment of interactive gardens such as a Fragrance Garden, Evening Garden, Children's Garden, Braille Garden, Art Garden, or specialized floral displays. Within this garden there is an area tucked in the bend of the pathway roughly 70 feet wide by 50 feet deep that could be developed into an outdoor performance/demonstration area. Located in a prominent



area near the front of Foster Botanical Garden, the Rotating Display Garden has the potential to capture the public's attention and draw people into the Garden.

2.4.2.7 Community Garden

A minor adjustment in the location of the Community Garden has been made in the master plan since the publication of the Draft EA. In the revised master plan, the Community Garden is relocated closer to Nu'uaniu Stream but still near the Service Area. The number of proposed plots has not changed. Currently, there are 60 garden plots available to the public at Foster Botanical Garden and the City has made a commitment to retain the same number of plots in the relocated community garden. The new community garden will need to be constructed prior to the Lyon Orchid Conservatory since it will displace the existing community garden. The majority of the new plots should be handicap accessible.

2.4.2.8 General Park Improvements

Interpretive Plan. Signage and informational displays will play an integral role at Foster Botanical Garden. They help direct visitors to specific destinations, teach and educate, warn of hazards, and tell a story. An interpretive plan will be prepared in conjunction with the master plan improvements to guide the development of the Garden's displays. The interpretive plan will specify educational themes, visitor messages, and physical design tools that will help present the Garden and visitor facilities in an enjoyable and memorable context. An interpretive site plan will be developed to provide a road map for the effective use of visitor communication systems such as informational kiosks, interactive exhibits, educational displays, directional maps and signage, and safety information. These systems will work cohesively to promote visitor understanding and appreciation of the valuable and historic plant collections. In addition to concepts and media methods, the interpretive plan will provide design and construction costs and a phasing plan that corresponds to the overall master plan. A variety of information sources should be referenced for the displays including botanical descriptions, oral histories, and local archives.

Noise Buffer. To reduce the noise and shield the views of the H-1 Freeway, an eight-foot tall wall and dense planting buffer are recommended. The wall and planting buffer will run the entire length of the Garden on its mauka edge minimizing the amount of traffic noise carried through the Upper Terrace and Palm Garden. Depending upon the budget and materials chosen for the wall, the choice of plants can either soften the look of the wall or enhance it. With a rock wall, plant displays may be designed into it and the planting may not need to be so dense. However, with a concrete or standard masonry unit type wall, a denser plant buffer may be desired.



Fencing. The perimeter fencing for the Garden is envisioned to be a low rock or masonry wall with an open fence above to allow views into the Garden. Wrought iron or other lattice fencing that allows views into the Garden from a distance should be used. It is proposed that the existing low rock wall along Nu'uanu Stream remain unchanged or if any renovation of the wall is planned that the new design preserves and respects the views of the stream. All gates and entrances must be lockable so the Garden can be secured when closed to the public.

Garden Lighting. A longstanding wish of the Garden staff and administration is to improve the quality of special events held at Foster Botanical Garden after the sun has set. Historically, for the Garden to host such events, large, noisy generators had to be placed throughout the Garden to power lights and sound systems. In this new Master Plan, lighting will be provided throughout the Garden particularly along main pathways and will accentuate the Garden at night from public viewpoints. Lighting design should complement the design of facilities, garden amenities and interpretive displays, and should illuminate Garden gateways. It should take special care to accent the Garden at night from the neighboring streets, but at the same time, not cause glare upon neighboring properties. In addition, electrical outlets and hookups will be needed throughout the Garden so that electrical equipment brought into the Garden for special events may be powered.

Irrigation. As noted earlier, the Garden currently has water lines running throughout the developed garden areas. The staff must manually attach sprinkler heads, turn valves, and sometimes use hoses to irrigate the Garden. Precious staff time is inefficiently spent watering the grounds. An automatic irrigation system with sophisticated moisture and wind sensors will reduce the time spent by staff watering the Garden and increase water and energy efficiency. Detailed design of the system should be developed with input from Garden staff.

Utilities. To support the lighting and irrigation systems as well as the new facilities planned for the Garden, all basic utilities may need to be upgraded and rerouted accordingly. These include electrical, water, sewer, and telecommunications (including Internet connection). These improvements should be routed and constructed with input from botanical experts such as certified arborists who can help position the lines with minimal harm to the significant plants at the Garden. Directional boring techniques and other suitable construction methods should be considered for these projects.

Accessibility. All buildings, facilities, and sites shall be designed to meet the Americans with Disabilities Act Accessibility Guidelines and the requirements of §103-50 Hawai'i



Revised Statutes (HRS). Buildings, facilities, and sites shall incorporate the best design practices noted in the recommendations from the US Architectural and Transportation Barriers Compliance Board's Regulatory Negotiation Committee Final Report, "Accessibility Guidelines for Outdoor Developed Areas" published in September 1999, or when applicable, other more current documents providing guidelines for outdoor recreational areas. In addition, the State Disability and Communication Access Board recommends the use of the US Access Board's Public Rights-of-Way Access Advisory Committee's final report, "Building a True Community" published in January 2001," which guides public access from surrounding sidewalks, driveways, and public transportation stops. Accessible areas or elements should be indicated throughout the Garden with appropriate signs and markers. Areas and paths, which for the sake of historical preservation, aesthetics, or sensitive plant material, are not fully accessible, should have signs or textured pavements to warn visitors of any potential hazards and physical barriers. Picnic tables, water fountains, and other Garden amenities also should be fully accessible.

2.5 APPROXIMATE COSTS AND PROPOSED PHASING PLAN

The proposed phasing plan for the Foster Botanical Garden Master Plan has been revised since the publication of the Draft EA. Rather than four phases, the development of the Master Plan for Foster Botanical Garden is now recommended to occur in five phases. However, the City may adjust the development phases as needed. The proposed phases are not tied to any specific length of time and can either be modified, condensed or spread out over time depending upon market conditions, staff needs and priorities, and availability of funds. At the same time, there are certain elements that must precede other improvements and these constraints are noted below. Order of magnitude cost estimates for the proposed five-phase implementation plan are summarized below. The detailed cost estimates are included in the Master Plan report (revised version in addendum).

To renew public interest and excitement about the Garden, the first phase involves the construction of the Lyon Orchid Conservatory and related facilities. The new facility has the potential to attract additional visitors to the Garden and initiate momentum that could potentially fuel future funding and encourage donations for subsequent improvement projects. Prior to the construction of the Lyon Orchid Conservatory, however, the community gardens must be relocated to its new area near Nu'uaniu Stream and the future Service Area. The fencing separating the Daibutsu Terrace and the new Conservatory should be removed and temporary fencing should be erected along the *ewa* edge of the Conservatory. The temporary fencing should be attractive and include a gate opening out to the existing parking lot since it will remain in place until the fourth phase when the existing parking lot is demolished and the new Asian



and Bonsai Gardens are completed. Another element that should be completed early in the development process is the archaeological survey in undisturbed areas that are proposed for development as recommended in the archaeological archival research report included in Appendix A. The estimated construction cost for Phase I is \$2.8 million with design fees at \$168,000.

The proposed improvements for Phase II include the construction of the Service Area with the operations and maintenance (O&M) facilities and the new Asian and Orchid Gardens surrounding the Lyon Orchid Conservatory. Once the new O&M facilities are constructed, it is recommended that demolition of three of the existing operations buildings along Vineyard be done so that views into the Garden can be opened up. It should be noted that demolition of existing facilities should not occur until the new O&M facilities are completed so that maintenance operations are not displaced. Also included in this phase are the Interpretive Plan and master plans for lighting and irrigation improvements for the entire Foster Botanical Garden. Construction funds for the first phase of the lighting and irrigation systems are also provided. Estimated construction cost for Phase II is \$3 million and planning and design fees are estimated at \$272,000.

The third phase of improvements will encompass the new visitor center, visitor parking lot, and the beautification of the Garden's frontage along Vineyard Boulevard. The Entrance Garden and the landmark gateway element at the corner of Vineyard Boulevard and Nu'uanu Avenue also will be developed in this phase giving the public a direct view of the changes happening at the Garden. In addition, modification to the traffic signal at the intersection of Maunakea and Vineyard will be required since the new main entry at this intersection will be opened. It should be noted that the Service Area in Phase II must be completed before the area along Vineyard Boulevard can be cleared of the existing maintenance buildings. Also, construction planning for this phase should consider maintaining some of the existing space for administration offices until the new offices are completed in order to reduce the displacement of staff and the need for temporary structures. However, if temporary structures are needed, they could be located in the new Service Area or in the area that will be cleared of the existing greenhouses and plant benches along Vineyard Boulevard. The estimated construction cost for Phase III is \$4.76 million and design fees are estimated at \$480,000.

Phase IV focuses on new garden areas including the Rotating Display Garden, the Economic Garden, and the demolition of the existing parking lot for the proposed Bonsai Garden. In addition, with the larger construction projects completed, more elaborate interpretive displays and signage can now be added to enhance the Garden. Also, the noise buffer along the H-1 Freeway should be implemented. The construction cost for this phase is estimated at \$2.75 million with design fees at \$280,000.



The last phase of improvements involves the renovation of the existing Lyon Garden area into the Hawaiian Garden and the implementation of general pathway improvements and various garden amenities such as additional interpretive displays, benches, water fountains, and trash receptacles. Final irrigation and lighting improvements would also be completed. The connection to Lili'uokalani Botanical Garden should be further studied and constructed if feasible. Estimated construction cost for Phase V is \$1.83 million with design fees estimated at \$200,000.



3.0 LAND USE CONFORMANCE

The State of Hawai'i and the City and County of Honolulu land use plans, policies, and ordinances, as well as private plans, relevant to the Foster Botanical Garden Master Plan are described below.

3.1 STATE OF HAWAII

3.1.1 STATE LAND USE LAW (CHAPTER 205, HRS)

Chapter 205, Hawai'i Revised Statutes (HRS), establishes the State Land Use Commission (LUC) and gives this body the authority to designate all lands in the State into one of four districts: Urban, Rural, Agriculture, or Conservation. Foster Botanical Garden is within the Urban District. Current and proposed uses within the Garden are consistent with uses allowed within the Urban District.

3.2 CITY AND COUNTY OF HONOLULU

Relevant land use plans of the City and County of Honolulu that pertain to the Foster Botanical Garden Master Plan include the *General Plan*, the *Primary Urban Center Development Plan*, and the *Punchbowl Special District*.

3.2.1 GENERAL PLAN

As required by the City Charter, the General Plan for the City and County of Honolulu serves two purposes. The first is a statement of the long-range social, economic, environmental, and design objectives for the general welfare and prosperity of the people of O'ahu. Second, the General Plan is a statement of broad policies that facilitate the attainment of the objectives of the plan.

The proposed improvements to Foster Botanical Garden are in accordance with the following General Plan policies and objectives:

Policy III. Natural Environment

Objective A, Policy 8: *Protect plants, birds, and other animals that are unique to the State of Hawai'i and the Island of O'ahu.*

Objective A, Policy 9: *Protect mature trees on public and private lands and encourage their integration into new developments.*

Objective A, Policy 10: *Increase public awareness and appreciation of O'ahu's land, air, and water resources.*



Objective B, Policy 4: *Provide opportunities for recreational and educational use and physical contact with O'ahu's natural environment.*

Policy VII. Physical Development and Urban Design

Objective E, Policy 7: *Promote public and private programs to beautify the urban and rural environments.*

Objective E, Policy 8: *Preserve and maintain beneficial open space in urbanized areas.*

Policy X. Culture and Recreation

Objective D, Policy 1: *Develop and maintain community-based parks to meet the needs of the different communities on O'ahu.*

Objective D, Policy 2: *Develop and maintain a system of regional parks and specialized recreation facilities.*

Objective D, Policy 3: *Develop and maintain urban parks, squares, and beautification areas in high-density urban places.*

Objective D, Policy 4: *Encourage public and private botanic and zoological parks on O'ahu to foster an awareness and appreciation of the natural environment.*

Discussion: The proposed improvements to the Foster Botanical Garden, and hence the maintenance and upgrading of the Garden, are a direct application of the General Plan policy to "Encourage public and private botanic and zoological parks on O'ahu . . ." The proposed improvements also conform to several other relevant objectives and policies of the General Plan. Specifically, the Garden provides protection to plants, mature trees, birds, and other animals that are unique to O'ahu, and provides education opportunities to increase public awareness and appreciation for O'ahu's resources and natural environment. The Garden also provides needed park space and recreational opportunities in a high-density urban area.

3.2.2 PRIMARY URBAN CENTER DEVELOPMENT PLAN – CURRENT AND PROPOSED

The City and County Development Plans (DPs) represent eight geographic regions that include all areas of O'ahu. Foster Botanical Garden is located in the area designated as the Primary Urban Center. The corresponding development plan for this area is the *Primary Urban Center Development Plan*.

Before 1992, the City Charter required DPs to be "relatively detailed plans" for implementing and accomplishing the development objectives and policies of the General Plan. In 1992, a Charter amendment changed this to require the DPs to consist of "conceptual schemes."



In response to the 1992 Charter amendments, the City and County Department of Planning (now the Department of Planning and Permitting) launched a thorough review of all eight DPs to bring them into conformance with the Charter-mandated conceptual orientation. Currently, the *Primary Urban Center Development Plan* is under revision to bring it into conformance. However, until the proposed plan is adopted by the City Council, the current, more detailed, plan is still in effect. Both the current and proposed plans are discussed below.

3.2.2.1 Current Development Plan

The current *Primary Urban Center Development Plan* includes two parts—a report and maps. The report contains two sections: 1) provisions that are common to all O’ahu development plan areas, and 2) special provisions that are specific to the Primary Urban Center including descriptions, urban design principles, controls and development priorities.

Those sections of the DP Common Provisions and Special Provisions that are applicable to the proposed Foster Gardens improvements are listed and discussed below.

Common Provisions

Section 24-1.4 *General urban design principles and controls.*

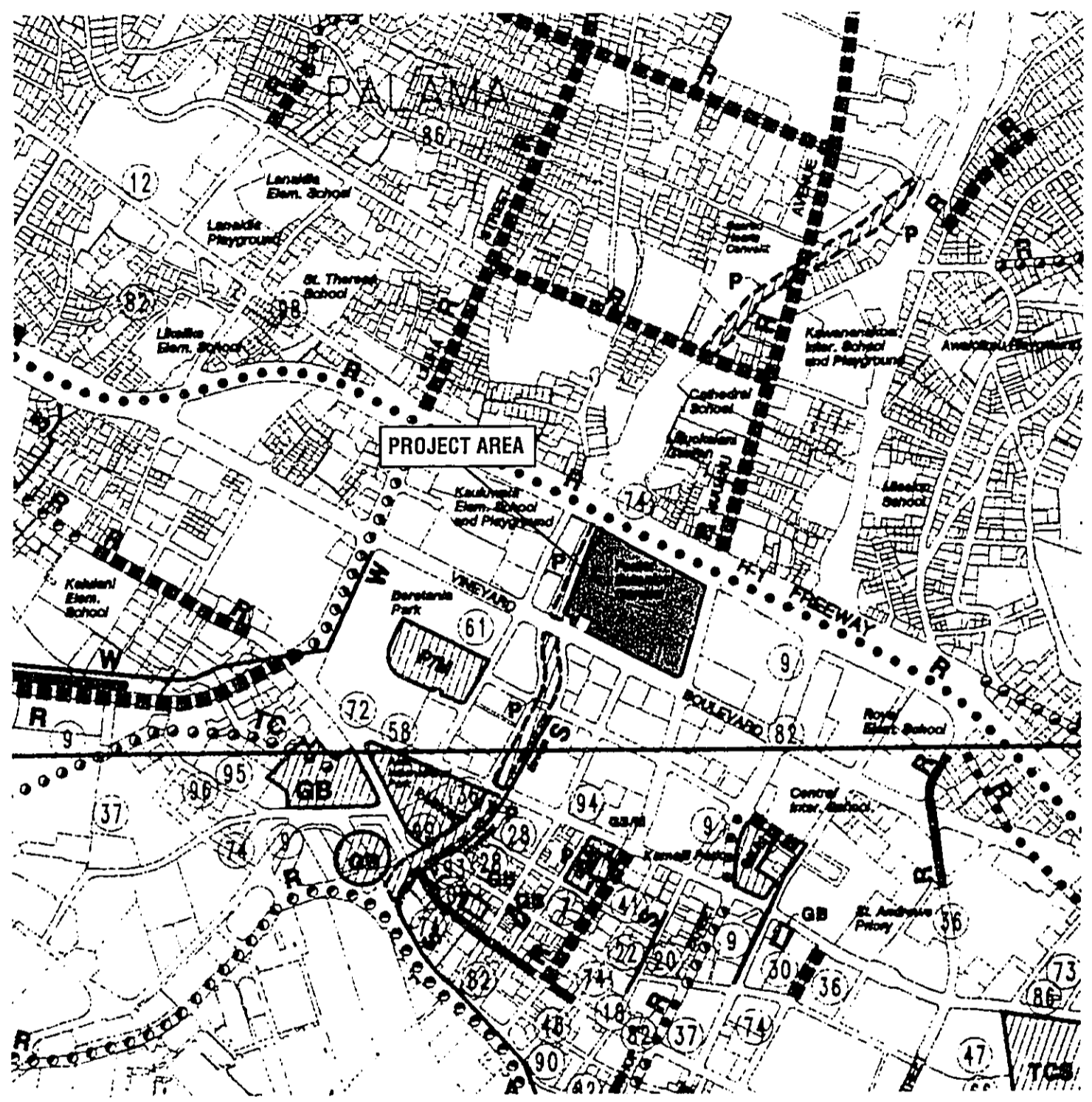
Section 24-1.5 *General principles and controls for parks, recreation and preservation areas.*

Discussion: Foster Botanical Garden is in conformance with urban design principles for protecting public views and preserving open space since it seeks to do just that. It is also in compliance with general principles and controls for parks, recreation and preservation areas. All proposed improvements will also be in conformance with all applicable Development Plan Common Provisions.

Special Provisions

SECTION 24-2.2. URBAN DESIGN PRINCIPLES AND CONTROLS FOR THE PRIMARY URBAN CENTER

- 24-2.2(a) *Specific Urban Design Considerations*
- (1) *Open Space*
 - (2) *Public Views*
 - (3) *Principles and Controls for Special Areas*



LEGEND






-  Project Area
-  Park
-  Public Facility programmed for commencement of land acquisition and/or construction beyond 6 years.

Figure 4
 Primary Urban Center Development Plan
 Public Facilities Map

 FOSTER BOTANICAL GARDEN

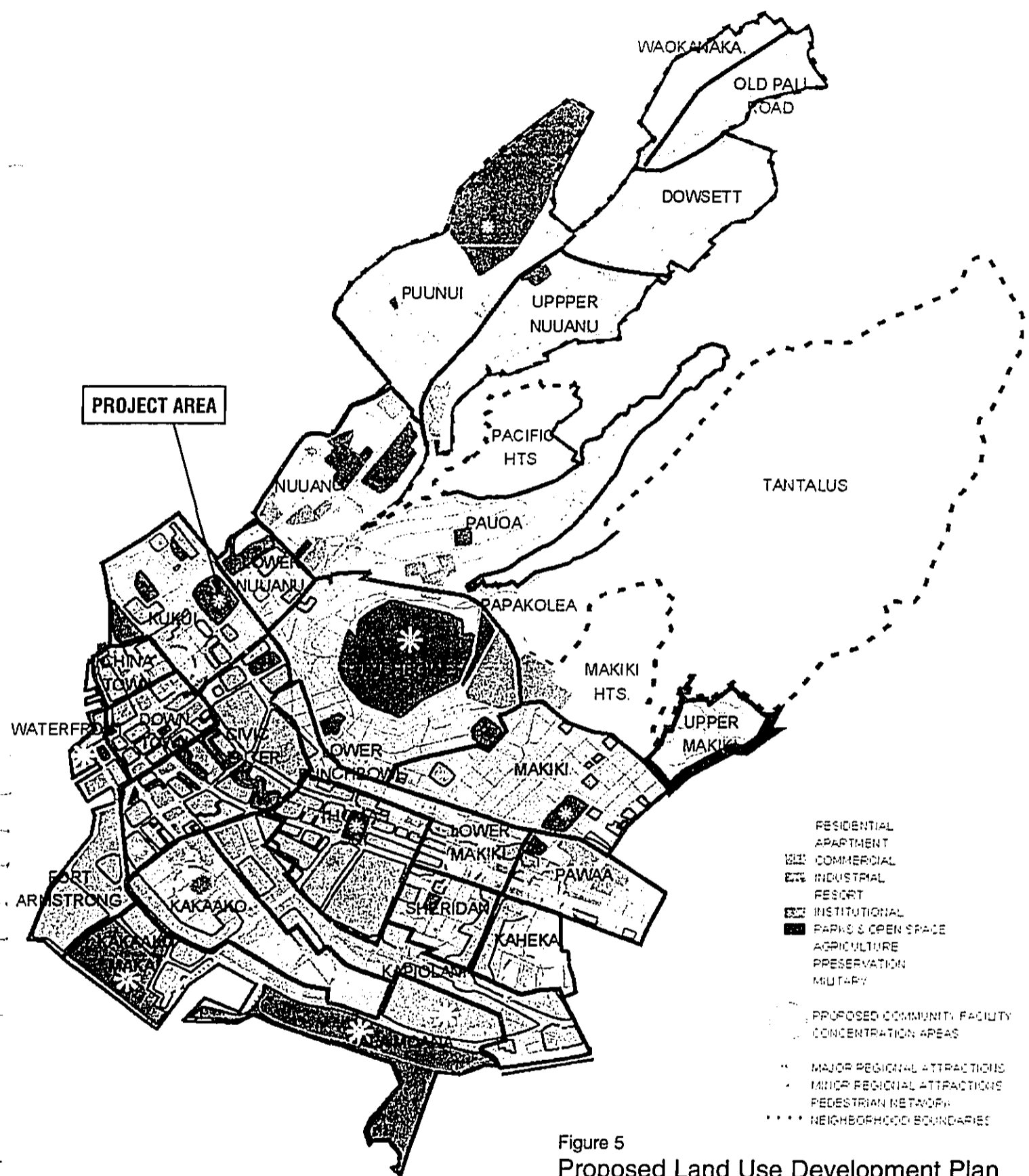




Figure 5
 Proposed Land Use Development Plan
 Ala Moana - Downtown - Nu'uanu District

 FOSTER BOTANICAL GARDEN

Source: The City and County of Honolulu - Map A.8
<http://www.co.honolulu.hi.us/planning/puc>



Discussion: Foster Botanical Garden is in accord with the Primary Urban Center Special Provisions for open space, public views, and principles and controls for open space. In particular, the Garden complies with principle calling for the encouragement of "urban park-like amenities, such as downtown malls, private walkways, landscaping and open space" (Section 24-2.2(b)(G)). All proposed improvements will also be in conformance with all applicable Development Plan Special Provisions.

Development Plan Maps

The current *Primary Urban Center Development Plan* also includes two map elements: 1) the Land Use Map, which defines the area and distributes the various land uses in a manner that implements the General Plan objectives and policies; and 2) the Public Facilities Map, which identifies planned public and private facilities and infrastructure.

Discussion: Foster Botanical Garden is identified on the Primary Urban Center Development Plan Land Use Map and on the Primary Urban Center Development Plan Public Facilities Map. The Public Facilities map (Figure 4) indicates that the area of Nu'uuanu Stream, next to the Garden is designated for use as a park. The Foster Botanical Garden Master Plan reclaims the land adjacent to Nu'uuanu Stream from parking lot use to general garden use. Scenic lookouts, benches, and pathways are planned for this area. Thus the Master Plan is consistent with the Public Facilities Map.

3.2.2.2 Proposed Development Plan

As mandated by the City Charter, the proposed *Primary Urban Center Development Plan* is more conceptual in nature (Figure 5). It includes vision statements, policies, and guidelines to direct the development and improvement of the PUC. At the time this report was printed, the Plan was in the review phase and had not been adopted. As a result, the review draft of the *Primary Urban Center Development Plan* (July 1999) was used to check for the master plan's consistency. The review draft explains how the vision of the PUC "incorporates the elements that are essential to the community's perception of improving the quality of life in the PUC." The Plan recognizes the need to protect the community's natural, scenic, cultural, economic and historic resources. The following land use principles, policies, and guidelines are applicable to the proposed changes to the Foster Botanical Garden. In addition, due to the Garden's close proximity to Nu'uuanu Stream, those principles, policies, and guidelines that relate to Nu'uuanu Stream, particularly the segment adjacent to Foster Botanical Garden, are also included.



Open Space Preservation and Access Existing Conditions, Issues, and Trends:

Natural Resource and Development Constraint Areas: Urban Streams and Wetlands. Within the State Urban District, ...are smaller-scale natural resource elements such as stream segments and wetlands. ...Concrete-lined structures or rip-rap walls and revetments have altered most of the stream channels, and their banks are often devoid of vegetation. ...The purpose of stream modifications was to stabilize banks, provide flood protection for adjacent properties, or accommodate bridges. Due to the urban development that has occurred near streams, it is not feasible to return stream channels to their original state. It is possible and desirable, however, to re-introduce more natural elements to the stream environment — such as shade trees along the banks, rip-rap lining and v-notched or unlined channel bottoms — to mitigate impacts on biological habitat and improve the aesthetic quality and recreational value of urban streams.

Access to the Shoreline, Mountains and Streams: Stream Corridors. Portions of important streams that flow through the primary growth area — Mānoa Stream, Nu'uānu Stream, Moanalua Stream, and Kapālama Stream — have landscaped greenbelts and/or parallel pathways already in place. Extension and improvement of these pathways and greenbelts would complement efforts to reintroduce natural elements to the stream environment and make them a more useful component of the open space network, for recreation use and short walking trips.

Public Parks and Recreation Complexes: Foster Botanical Garden is listed as an Islandwide or Regional Park in the Primary Urban Center.

Open Space Preservation and Access Policy:

Parks and Active Recreation Areas: Develop and maintain parks and other outdoor public spaces in a manner that expands opportunities for both active and passive recreation.

Increase and enhance recreational open space in the Heart of Honolulu and Heart of Pearl Harbor by: Reassessing and reassigning, as appropriate, the use of existing parkland;



Open Space Preservation and Access Guidelines:

Parks and Active Recreation Areas: Maintain a significant amount of open space and area dedicated to passive recreation on all park lands, especially the regional and island wide parks.

Stream Greenbelts Guidelines:

Give priority to the development of the following streamside pathways to improve access to recreation sites and natural areas and provide safer, more convenient pedestrian routes between neighborhoods and major land uses:
Nu'uanu Stream: from Kuakini Street to Honolulu Harbor

Significant Historic and Cultural Sites and Districts:

Downtown: Dillingham Transportation Building; Hawai'i Theater; Alexander & Baldwin Building; C. Brewer Building; Central Fire Station; Podmore Building; McCorriston Building; Portland Building; Aloha Tower; Hawai'i Building; J. Campbell Building; Foster Botanic Garden; Falls of Clyde; Our Lady of Peace Cathedral; St. Peter's Church; Central Intermediate School

Historic Sites and Districts Policies:

Accessibility. Determine the degree of access that would best promote the preservation of the historic, cultural and educational value of the site, recognizing that economic use is sometimes the only feasible way to preserve a site. Public access to a historic site can take many forms, from direct physical contact and use to limited visual contact. In some cases, however, it may be highly advisable to restrict access to protect the physical integrity or cultural value of the site.

Historic Sites and Districts Guidelines:

Preserve the architectural character, landscape setting and visual context of historic landmarks through appropriate zoning standards and development controls, as necessary and public outreach programs such as design guidelines for the maintenance, renovation or expansion of older dwelling.

Allow flexible development standards for historic sites and landmarks.



Promote property reinvestment in historic districts by making public investments that upgrade services, improve security and enhance the appearance of the area, consistent with the historic design theme of the district.

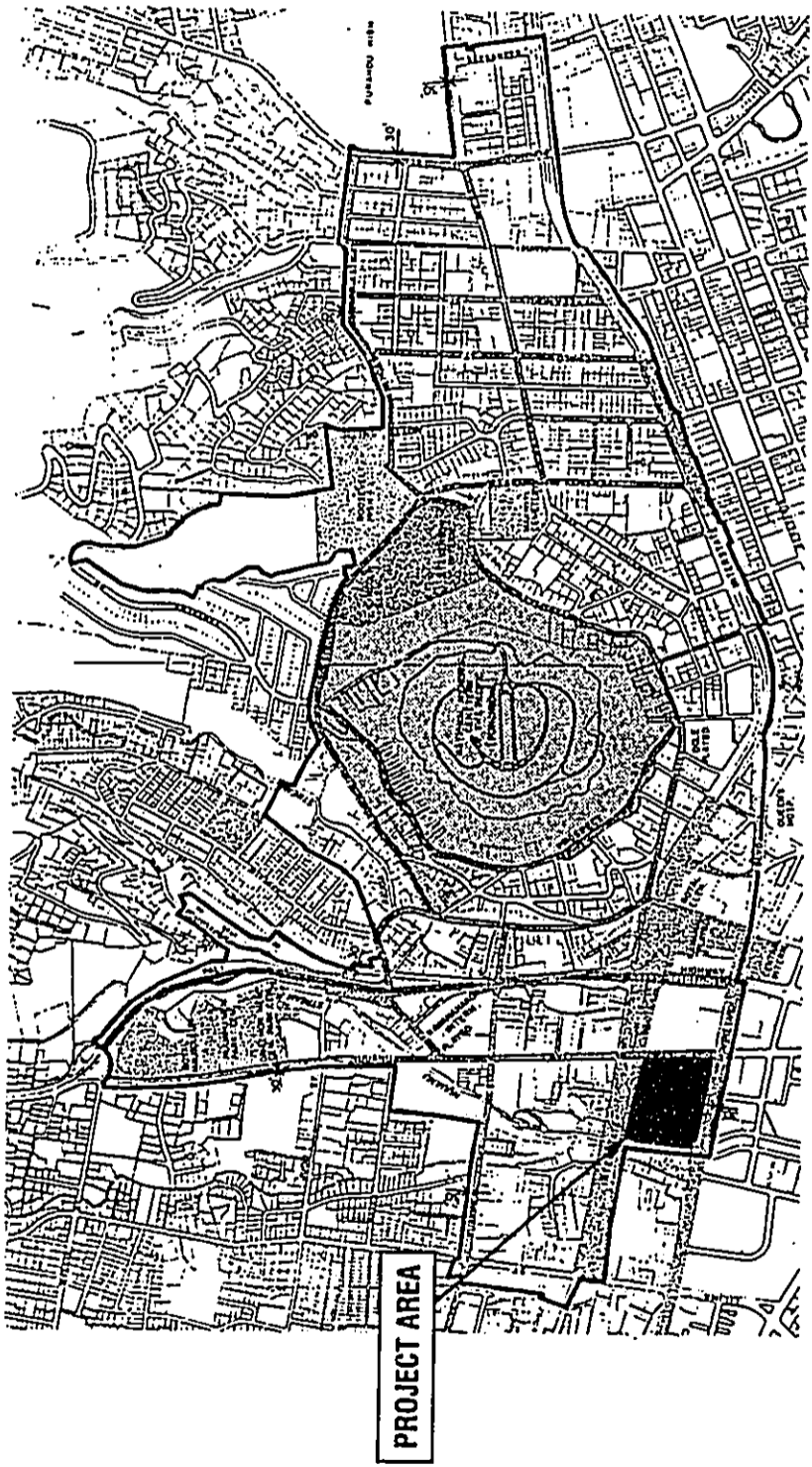
Discussion: Foster Botanical Garden and the proposed improvements are consistent with the policies and guidelines of the proposed *Primary Urban Center Development Plan*. The Garden provides open space and opportunities for passive recreation in the heart of Honolulu. The proposed improvements will help to preserve the landscape and the visual context of a significant historic site in the Primary Urban Center. The Plan specifically calls for "reinvestment in historic districts by making public investments that upgrade services, improve security, and enhance the appearance of the area..." In addition, the Foster Botanical Master Plan proposes improvements to the area adjacent to Nu`uanu Stream including garden improvements, pathways, and benches. Although the improvements will be within Garden grounds, River Street Promenade already exists on the opposite side of Nu`uanu Stream, providing a direct mauka-makai route for pedestrians connecting to College Walk Mall makai of Vineyard Boulevard.

3.2.3 LAND USE ORDINANCE

The Land Use Ordinance (LUO) contains the City and County of Honolulu's zoning ordinance (Chapter 21, Revised Ordinances of Honolulu). It regulates the use of land to ensure that adequate controls and review mechanisms are in place for proposed projects.

The site of Foster Botanical Garden is zoned P-2 (General Preservation). According to the LUO: "the purpose of the preservation districts is to preserve and manage major open space and recreation lands and lands of scenic and other natural resource value." The Foster Botanical Garden site is also within the Punchbowl Special District (see section 3.2.3.1).

Discussion: The current uses and proposed improvements at Foster Botanical Garden are appropriate and permitted uses in the P-2 zone. Based on the architectural program proposed in the master plan, the facilities are not expected to exceed the maximum building area of 5 percent of the total land area of the zoning lot as required by the LUO. Total building area proposed in the master plan is estimated at 28,200 square feet, which is 4.8 percent of the total land area (~590,000 square feet). The City & County of Honolulu will require that the design of all structures and other improvements will comply with the required development standards for the P-2 zone. If any improvements as designed by architects or engineers contracted by the City & County







- LEGEND:**
-  PUNCHBOWL VIEWING SITE
 -  MAJOR STREETS
 -  CORE AREA
 -  DISTRICT BOUNDARY

Figure 6
Punchbowl Special District Map





of Honolulu during the implementation phase of the master plan do not comply with the LUO, appropriate permits or waivers should be sought.

3.2.4 PUNCHBOWL SPECIAL DISTRICT

Foster Botanical Garden is included in the Punchbowl Special District designated by Section 21-9.50, of the Land Use Ordinance, but outside of the District's core area (Figure 6). This District was established in 1975 and expanded in 1978 to preserve and protect the public views of Punchbowl and the appearance of its slopes and surrounding areas. One of the specific objectives of the Punchbowl Special District is to: "Provide landscaping and open space which will enhance views and the general character of the Punchbowl area." To implement the Punchbowl Special District objectives, specific design regulations apply to properties within the district.

Discussion: Proposed improvements will be subject to height limits and architectural design guidelines as set forth in the City and County of Honolulu Land Use Ordinance (LUO) and the Punchbowl Special District Design Guidelines. Since the Garden is subject to a zero-foot height limit, the City & County of Honolulu will need to seek an exception with the Director of the Department of Planning and Permitting (pursuant to §21-9.50-4 of the LUO) in order to construct the proposed facilities such as the Visitor Center and Lyon Orchid Conservatory. If granted, the height limit as determined by the Garden's P-2 zoning is 15' to 25' (with height setbacks for heights over 15') (§21-3.40-1 (d) & (e) LUO).

A Special District Permit—minor will be required for significant improvements to the Garden such as the new visitor center.

The City & County of Honolulu will inform the architects contracted to design the proposed facilities of the design controls and required permits.

3.2.5 SPECIAL MANAGEMENT AREA

The subject property is not in the Special Management Area (SMA).

3.2.6 LIST OF PERMITS AND APPROVALS

The following table presents a list of permits and approvals that will be required as a part of project implementation. The respective agencies are also provided. (The following list is not meant to be comprehensive but informational as the required approvals and permits for each phase of implementation may vary.)



<u>Permit or Approval</u>	<u>Authority</u>
Building Permit	Department of Planning and Permitting (including review by the State Historic Preservation Division)
Grading Permit	Department of Planning and Permitting
Construction Dewatering Permit (Temporary)	Department of Planning and Permitting
Permit for Street Usage	Department of Transportation Services
New, Relocation and Modification of Access Rights into or Rights to Use State Highway Property ²	State Department of Transportation, Highways Division
Permit to work within a State Right-of-Way	State Department of Transportation, Highways Division, Right-of-Way Branch
National Pollutant Discharge Elimination System (NPDES) – General Permit	State Department of Health, Clean Water Branch
Special District Permit—minor	Department of Planning and Permitting
Zoning Waivers	Department of Planning and Permitting
Application to Prune Exceptional Tree(s)/Palm(s)	Department of Parks and Recreation
Cross-Connection Control and Backflow Prevention requirements	Board of Water Supply
Compliance with HRS §103-50	State Disability and Communication Access Board
Form VC-12	State Department of Health Vector Control Branch

² Initial inquiry with the State Department of Transportation, Highways Division, Right-of-Way Branch was made on January 26, 2001. The State DOT reference number is HWY-RM 3.77737.



4.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT, POTENTIAL IMPACTS OF PROPOSED ACTION, AND MITIGATIVE MEASURES

The environment surrounding Foster Botanical Garden includes the physical or natural environment and the human or social environment. This section describes the existing conditions, potential impacts to the environment and mitigation measures.

4.1 PHYSICAL CHARACTERISTICS

4.1.1 CLIMATE

The average temperatures in Downtown Honolulu range from 68 to 88 degrees Fahrenheit with an average annual rainfall of approximately 30 to 40 inches, which ranges seasonally. Trades winds are generally from the northeast. Strong winds do occur at times in connection with storm systems moving through the area. Average relative humidity ranges between 55 and 83 percent throughout the year.

Potential Impacts and Mitigative Measures

The proposed improvements are not expected to have a significant effect on climatic conditions nor are climatic conditions expected to affect the improvements. No mitigative measures are planned.

4.1.2 TOPOGRAPHY

The topography of Foster Botanical Garden consists of gentle slopes and flat terraced areas that are remnants of the old Foster house site. The high point of the Garden is located at the mauka property line on the Upper Terrace, near the Exceptional Tree Queensland Kauri. Here, the site is 43 feet above mean sea level (MSL). The Garden slopes downward towards both Nu'uuanu Stream and Vineyard Boulevard reaching 12 feet above MSL at both edges. The only area of relatively steep slopes (over 30%) is a stretch of land 30 feet wide in the northern corner of the property that runs mauka from the public entrance to the property line.

Potential Impacts and Mitigative Measures

The site already has been extensively modified by improvements related to the gardens. The topography of the site is to remain relatively unchanged except for minor grading for ADA improvements, building pads and the parking lot. Most construction is to



occur in previously disturbed areas and therefore no significant impacts to the topography are anticipated.

4.1.3 GEOLOGY

The City of Honolulu lies upon the Honolulu Plain, which consists of alluvial beds overlying coral reefs, the relatively recent Honolulu Volcanic Series, and the older Ko'olau Volcanic Series. A 767-foot deep well (Well no. 1951-01) dug in 1883 near the center of Foster Botanical Garden reflects the general geological history of the area as well as influences relating to its location near Nu'uuanu Stream. The bottom 27 feet of the well consists of lavas from the Ko'olau Volcanic Series. The next 300 feet or so above these lavas consists of various layers of clays and gravels. At a depth of 410-450 feet below the surface lies a single fossil reef. Newer lavas of the Honolulu Volcanic Series erupted from vents in upper Nu'uuanu and are present at the 14 to 54 foot profile levels. Next, a 6-foot layer of volcanic boulders washed over the area from Nu'uuanu Stream and above that lies a 4-foot layer of ash from Mt. Tantalus laid during the late Pleistocene period. The last four feet consist of clay and clay loam soils that are described in more detail below in Section 4.1.4.

Potential Impacts and Mitigative Measures

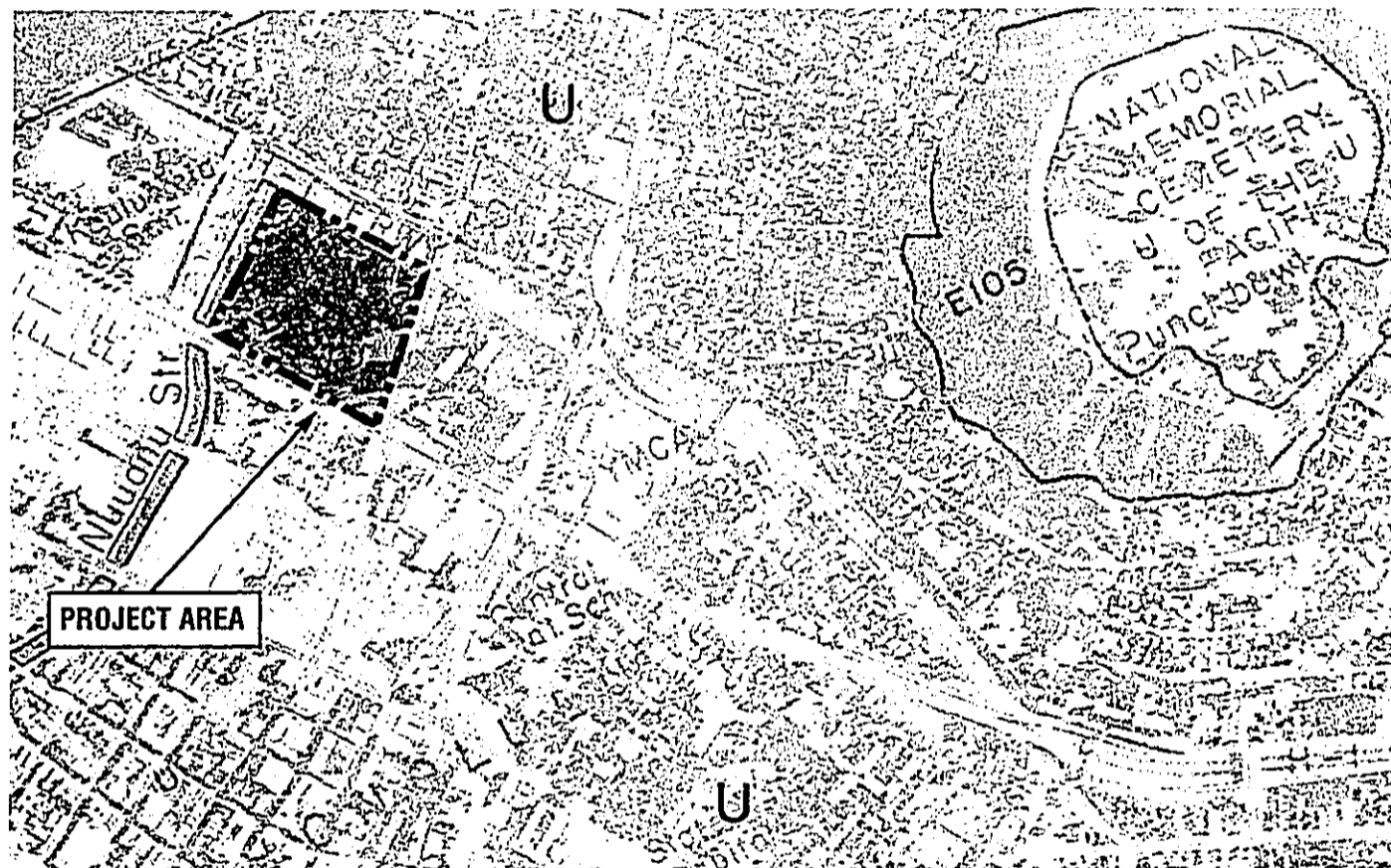
The proposed improvements are relatively insignificant compared to the overall geologic character of the site and the region. As such, significant impacts resulting from the proposed improvements are not expected. Appropriate engineering, design, and construction measures will be undertaken to minimize potential erosion due to grading of soils during construction.

4.1.4 SOILS

There have been three soil suitability studies prepared for Hawai'i whose principal focus has been on describing the physical attributes of land and the relative productivity of different land types for agricultural production. These are (1) the Land Study Bureau Detailed Land Classification, (2) the U.S. Department of Agriculture Soil Conservation Service Soil Survey, and (3) the Agricultural Lands of Importance to the State of Hawai'i (ALISH).

4.1.4.1 Land Study Bureau Detailed Land Classification

The Land Study Bureau Detailed Land Classification (1965 through 1972) series was produced by the Land Study Bureau (LSB) of the University of Hawai'i for each island. The LSB classification system groups land into homogeneous units called Land Types,



LEGEND



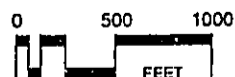
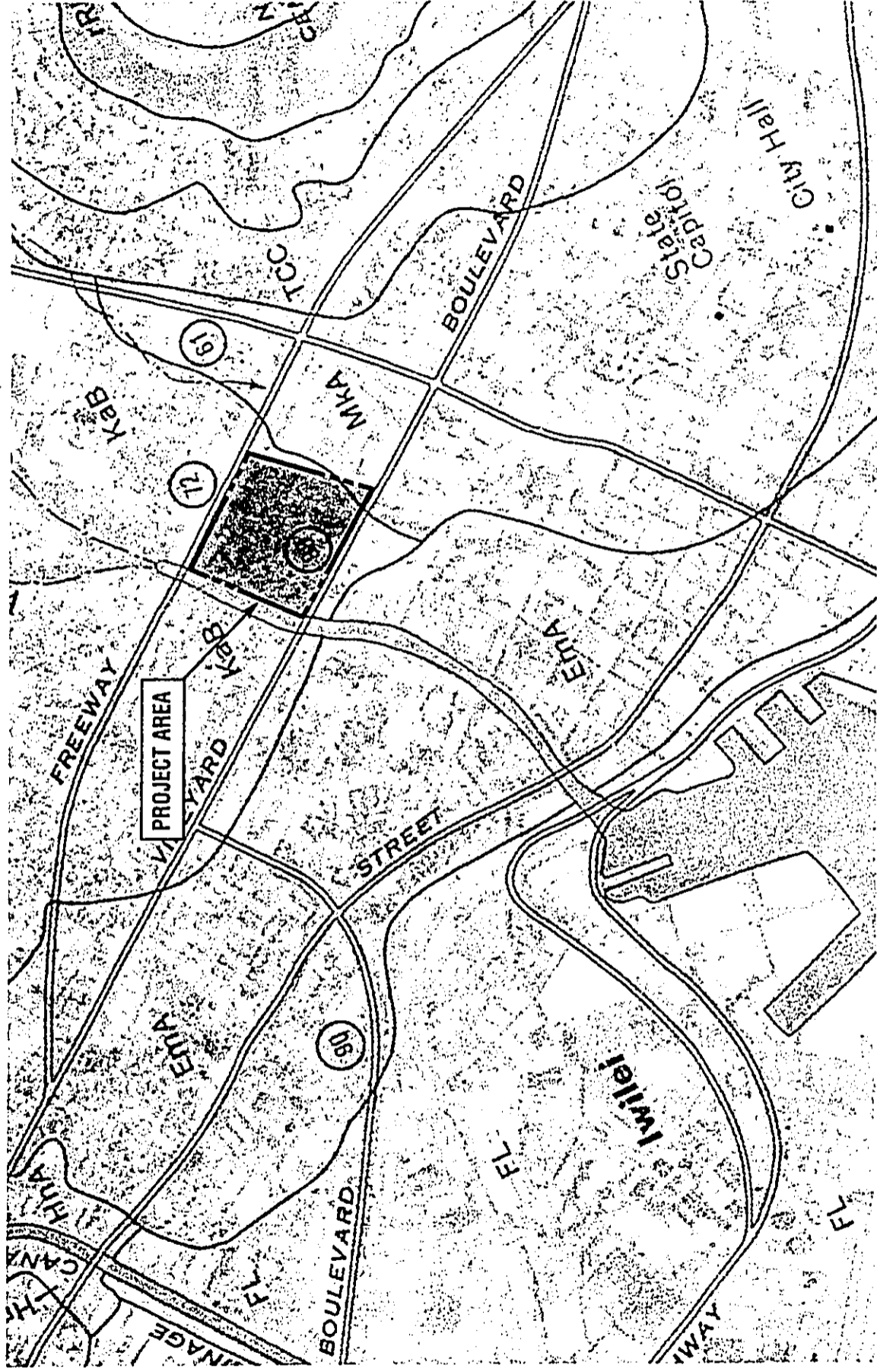
-  Project Area
-  Unclassified

Figure 7
Detailed Land Classification Map



FOSTER BOTANICAL GARDEN





LEGEND

	Project Area		Kawaihāpai Stony Clay Loam
	Ka'ena Clay		Tantalus Silty Clay Loam 8-15% Slope
	Makiki Clay		Rock Land
	'Ewa Silty Clay Loam		Tantalus Silty Clay Loam 15-40% Slope

Figure 8
SCS Soil Survey

FOSTER BOTANICAL GARDEN

Source: USDA, Soil Conservation Service Soil Survey

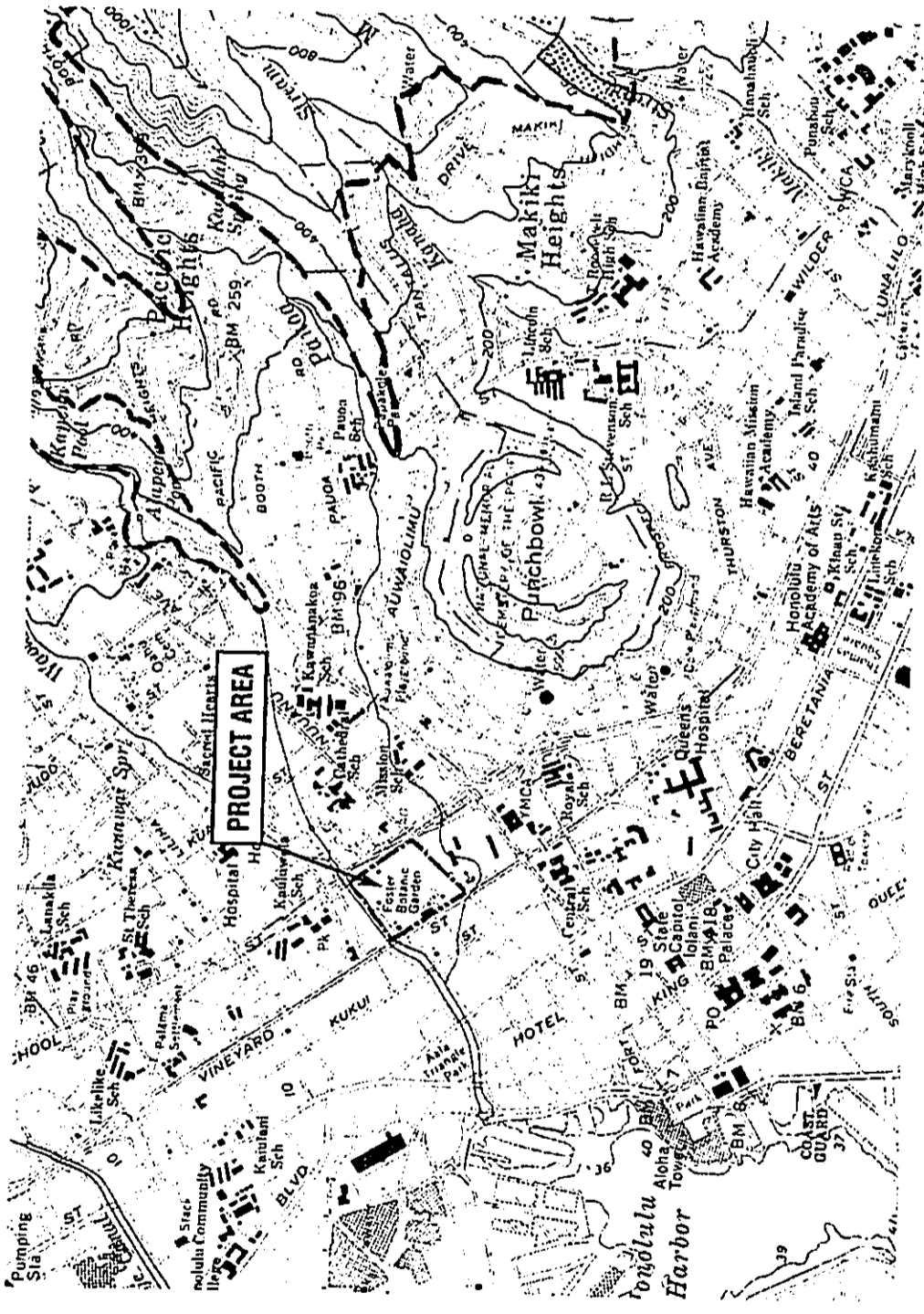
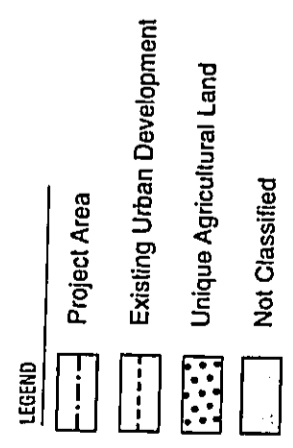


Figure 9
Agricultural Lands of Importance
to the State of Hawaii'i





describes their condition and environment, delineates the areas on aerial photo base maps, rates the lands on their overall quality (productivity) in relation to other lands, and appraises their performance under selected alternative agricultural crops. This series of reports were produced with the intention of developing a land inventory and productivity evaluation based on statewide "standards" of crop yields and levels of management.

The Detailed Land Classification lists Foster Botanical Garden as "urban" (Figure 7).

4.1.4.2 Soil Conservation Service Soil Survey

The Soil Conservation Service Soil Survey (1972) series for each island was prepared by the U.S. Department of Agriculture Soil Conservation Service (SCS) and the University of Hawai'i Agricultural Experiment Station. These reports are somewhat similar to those of the Land Study Bureau, except that they are patterned after a soil classification procedure adapted for nationwide, uniform application. Soil types are ranked according to their suitability for most kinds of crops. Also provided are listings of crops commonly grown on the soil types and their expected productivity under present management.

According to the Soil Conservation Service Survey, the majority of the soils that underlie Foster Botanical Garden are classified as Ka'ena Clay (KaB) (Figure 8). These soils are slightly acid to neutral, have slow runoff, and have a slight erosion hazard. They also have high shrink-swell potential and relatively low corrosivity to steel and concrete.

The southernmost corner of the Garden near the intersection of Vineyard Boulevard and Nu'uuanu Avenue consists of Makiki clay loam, 0 to 2 percent slopes (MkA). These soils were formed in a mix of alluvium and volcanic ash and cinders and are well drained. Permeability is rapid so runoff is slow and the erosion hazard is minimal. They are strongly acidic soils and are moderately corrosive to steel and concrete. They also have a moderate shrink-swell potential.

4.1.4.3 Agricultural Lands of Importance to the State of Hawai'i

The Agricultural Lands of Importance to the State of Hawai'i (ALISH) (1977) system includes the entire state. The ALISH system consists of the mapped identification of three broad classes of agricultural land: Prime, Unique, and Other Important Agricultural Land.



Foster Botanical Garden is located in Honolulu, a designated "Urban" area of the island, and is thus not identified under the ALISH system (Figure 9).

Potential Impacts and Mitigative Measures

The site of the Foster Botanical Garden is in an established urban area. While the site is zoned P-2, it is completely within the State Urban district. Surrounding land uses are urban. Factors of the site limiting its agricultural potential are its: 1) established use as a botanical garden; 2) designation within the State Urban district; and 3) surrounding urban uses. Considering that the project site is within an urban area and that the use of Foster Botanical Garden will not change with the implementation of the Master Plan, no prime agricultural lands or soils will be lost due to improvements to the garden.

During the construction phases of the project, there is a potential for the generation of dust and for water-borne soil erosion. Construction activities will follow erosion control measures specified by applicable Federal, State and City regulations. All grading operations will be conducted in full compliance with dust, erosion control, and other requirements of the City and County of Honolulu Grading Ordinance.

Prior to issuance of a grading permit by the City and County of Honolulu, an erosion control plan and best management practices will be submitted, describing the implementation of appropriate erosion control measures. Also required for the project is a Stormwater Associated with Construction Activity NPDES General Permit from the State Department of Health. After construction, establishment of permanent landscaping will serve as long-term soil erosion control for unpaved areas.

4.1.5 FLOOD HAZARDS

Flood hazards are primarily identified by the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency (FEMA), National Flood Insurance Program. The Flood Insurance Rate Map indicates that the property is in an area designated as Zone X, areas outside the 500-year floodplain and is therefore not expected to be at significant risk for flood. In addition, the project area is not a shoreline property and lies entirely outside of the coastal flood zone attributable to either high wave action or tsunami.

Potential Impacts and Mitigative Measures

Due to the location of the site out of the floodplain, the Foster Botanical Garden is not expected to either affect or be affected by natural flood hazards.



4.1.6 NATURAL HAZARDS

The threat of natural hazards to the project area, such as hurricanes and earthquakes, is no greater than at other locations on O'ahu. Volcanic hazards in the area are considered minimal due to the extinct status of former volcanoes on the island.

The State of Hawai'i has been affected twice in the past 17 years by devastating hurricanes, Iwa in 1982 and Iniki in 1992. While it is difficult to predict these natural occurrences, it is reasonable to assume that future events could be likely given the recent record. The Honolulu area, as the rest of the island or state, is no more or less vulnerable to the destructive winds and torrential rains associated with hurricanes and cyclones.

Potential Impacts and Mitigation Measures

The Foster Botanical Garden improvements will not exacerbate any natural hazard conditions. Landscaping and structures on the site, as on any site in the area, may be subject to damage from hurricanes and possibly from earthquakes.

The potential impact of destructive winds and torrential rainfall of tropical hurricanes on the proposed improvements will be mitigated by compliance with the Uniform Building Code adopted by the City and County. All structures will be constructed for protection from earthquakes and tropical hurricanes in accordance with the requirements of the City and County.

4.1.7 FLORA AND FAUNA

Foster Botanical Garden houses some of the oldest and rarest plant specimens in the Hawai'i Botanical Garden system. Hundreds of different botanical species from around the world are present in the Garden's various collections, including some endangered species and 27³ Exceptional Trees (ET) that are protected by Hawai'i State law (HRS Chapter 58) and City and County of Honolulu Ordinance (ROH 41-13). These trees have been selected for protection and preservation in the master plan due to their historic or cultural value, age, rarity, location, size, aesthetic quality, or endemic status. A complete list of the ETs located at Foster Botanical Garden is provided below. They are alphabetized by common name and their scientific names are provided in parentheses. The approximate decade in which the tree was acquired or planted is provided when

³ Changed from 26 to 27 to reflect revised Section 41-13.7 HRS, "Register of exceptional trees." The Rainbow Shower tree (*Cassia x nealiae* 'Wilhelmina Tenney') previously listed in the DEA as a significant tree has been added to the register of ETs.



known. Also, if federally or internationally listed as an endangered or threatened species, this information is also provided.

- * Baobab (*Adansonia digitata*) – 1930s
- * Bo Tree (*Ficus religiosa*) – 1910s
- * Caribbean Royal Palm (*Roystonea oleracea*) – 1880s
- * Cannonball Tree (*Couroupita guianensis*) – 1930s
- * Chaulmoogra (*Hydnocarpus anthelmintica*) – 1920s
- * Chicle (*Manilkara zapota*) – 1900s
- * Cupang (*Parkia javanica*) – 1920s
- * Doum Palm (*Hyphaene thebaica*) – 1910s
- * Earpod (*Enterolobium cyclocarpum*) – 1850s
- * False Olive (*Cassine orientalis*) – 1850s
- * Giant Crape Myrtle (*Lagerstroemia speciosa*) – 1880s
- * Gigasiphon *Macrosiphon* (IUCN-World Conservation Union red listed endangered species)
- * Guana (*Lonchocarpus domingensis*) – 1880s
- * Hog Plum (*Spondias mombin*) – 1850s
- * Hoop Pine (*Araucaria cunninghamii*) – 1850s
- * Kapok (*Ceiba pentandra*) – 1850s. Two trees
- * Loulu (*Pritchardia lowreyana*) – 1850s
- * Pili Nut (*Canarium vulgare*) – 1880s
- * Pogada (*Mimusops elengi*) – 1880s
- * Rainbow Shower (*Cassia x nealiae* 'Wilhelmina Tenney')
- * Queensland Kauri (*Agathis robusta*) – 1850s
- * Quipo (*Cavanillesia platanifolia*) – 1930s
- * *Sideroxylon obtusifolium*
- * Tattele (*Pterygota alata*)
- * Tropical Almond (*Terminalia catappa*) – 1850s
- * Yokewood Tree (*Catalpa longissima*) – 1920s

In addition, the HBG staff identified 22⁴ other significant trees to be protected at Foster Botanical Garden. Some specimens are of the same species as ETs listed above. However, they also will be preserved due to their historical value, size, aesthetic quality, and/or rarity. Those species that are different from those listed above include:

- * Bombax or Silk Cotton Tree (*Bombax ceiba*)

⁴ Changed from 23 to 22 to reflect revised Section 41-13.7 HRS, "Register of exceptional trees." The Rainbow Shower tree (*Cassia x nealiae* 'Wilhelmina Tenney') previously listed in the DEA as a significant tree has been added to the register of ETs.



- * Calabash Nutmeg (*Monodora myristica*)
- * Chinese Banyan (*Ficus microcarpa*) – 1900s
- * Cigar Box (*Cedrela odorata*) – 1920s
- * Double Coconut (*Lodoicea maldivica*) – 1930s
- * Gold Tree (*Tabebuia donnell-smithii*) – 1969
- * Mindanao Gum (*Eucalyptus deglupta*)
- * Monkeypod (*Samanea saman*)
- * Red Saraca (*Saraca declinata*)
- * Samoan Puakenikeni (*Fagraea berteroaana*) – 1964
- * Sausage Tree (*Kigelia Africana*) – 1920s
- * Silver Buttonwood (*Conocarpus erecta* var. *Sericeus*)
- * Sterculia sp. – 1983
- * Travellers Tree (*Ravenala madagascariensis*) – 1880s
- * Tropic Coral (*Erythrina variegata* 'Tropic Coral')
- * Wax Palm (*Copernicia prunifera*) – 1930s
- * Yellow Shower Trees, two trees (*Cassia fistula* and *Cassia x nealiae* 'Lunalilo Yellow') – 1982 and 1983, respectively

The ETs and Significant Trees are shown on the master plan in Figure 3 as dark green trees and labeled. Detailed descriptions of the Exceptional and Significant Trees are provided in Appendix A of the Master Plan report. In addition, any garden improvements southwest of the new Service Area should incorporate into its design the two existing *Pritchardia hillebrandii* palms commonly known as Loulu lelo. These two specimens were originally planted at Queen's Hospital and relocated to Foster Botanical Garden during the hospital's recent renovation and also should be protected.

Foster Botanical Garden also contains rare and endangered species. The cycads located in the Prehistoric Glen and eight *Pritchardia* palms of various species (*P. remota*, *P. schattaueri*, *P. affinis*, and *P. kaalae*) in the Palm Garden and Middle Terraces have been identified by the City's botanical staff as endangered and will be preserved. They are shown in revised Figure 3 and are labeled in red text. No major improvements or changes are recommended for these garden areas. Only minor improvements such as pathway improvements, lighting, irrigation, and signage have been proposed in these garden areas. Should any improvements be needed near these plants, the design and construction of these elements should involve consultation with and supervision by botanical experts in order to ensure the protection of these rare species.

A variety of birds including the Native Hawaiian Manu o ku (White Tern or Fairy Tern) (*Gygis alba rothschildi*), which is listed as a "threatened bird" species, frequent Foster Botanical Garden. Other birds sighted on the property include the kōlea, and mynas,



Japanese White Eyes, Red-vented Bulbuls, and Brazilian Cardinals. Mammals sighted on the property include mongooses, cats, rats, and mice.

Potential Impacts and Mitigation Measures

All endangered and/or threatened plant species as well as the Exceptional and Significant trees identified by Garden staff will be protected. Design and construction of all improvements should involve consultation with botanical experts, both City staff as well as contracted specialists as needed.

Throughout the design and construction processes of implementation of the master plan, the Department of Parks and Recreation (DPR) staff, specifically the Honolulu Botanical Garden staff and the Arborist Advisory Committee, as well as botanical experts such as certified arborists should be consulted to ensure that existing trees and their tree roots are protected whenever possible. A tree protection plan and a tree assessment that is done by a qualified arborist should be included in the design phase of master plan implementation projects. This will minimize any negative tree impacts as well as clarifying the fate of trees affected by the design of the improvements. Buffer areas around trees should be maintained during construction. The size of these buffers depends upon several factors including the tree species, size, condition of the tree, and site conditions and should be included in the tree protection plan. When removal of an existing tree is required, DPR staff and other specialists consulted will make recommendations on tree significance, transplant possibilities, or other mitigative measures. The City should investigate and utilize whenever possible innovative construction techniques such as directional boring in order to protect existing trees as recommended by botanical experts. In addition, the proposed quarantine greenhouse should be built and maintained to meet all State and Federal regulations and standards on plant quarantine.

Other proposed improvements include new garden areas and circulation and infrastructure upgrades as needed in existing gardens. New garden areas will be created from underused or overgrown areas or from reclaimed land from the existing parking lot. The result of these changes will be more garden areas and a greater diversity of plants. New gardens include an entrance garden, an Asian garden, a Bonsai garden, a Native Hawaiian garden, and a rotating display garden. For descriptions of these areas please see sections 2.4.2.6 and 2.4.2.7. The improved and new gardens will provide a more varied habitat for birds within Foster Botanical Garden.

According to wildlife experts at the State Department of Land and Natural Resources, the manu-o-ku is an ocean forager and the proposed master plan for Foster Botanical



Garden poses no threat to its habitat. However, manu-o-ku have been seen at the Garden. The birds do not build any nests but lay eggs in the branches of trees. Special care will be taken not to remove, damage, or disturb any eggs of the threatened manu-o-ku that may exist at the Garden during construction, as is required by Hawai'i Administrative Rules §13-124-3. The City will consult with the State Department of Land and Natural Resources Division of Forestry and Wildlife in regards to appropriate procedures during construction.

In addition, according to Hawai'i Administrative Rules Chapter 11-26 (HAR §11-26), the City will be required to eradicate any rodents prior to demolition or site clearing activities. The City must notify the Department of Health by submitting Form VC-12 to the local Vector Control Branch when such action is taken. Rodent traps and/or rodenticides should be set out on the project site for at least a week or until the rodent activity ceases.

4.2 HUMAN ENVIRONMENT

4.2.1 ARCHAEOLOGICAL AND HISTORIC RESOURCES

Foster Botanical Garden is a registered historic site on both the National and Hawai'i State Registers of Historic Places. Initial consultation with the State Historic Preservation Division and the City and County of Honolulu Parks and Recreation administration and staff identified the stone terrace walls and Exceptional Trees as historic features of the Garden. The historic landscaping of the garden and its connection with historic individuals of Hawai'i makes this area significant to the history of Hawai'i.

Archival archaeological research was performed by Scientific Consultant Services, Inc. (SCS) in August 2001 and their report is included in Appendix A. According to their findings, no known archaeological inventories have been performed on the site. However, there appears to be the potential for subsurface historic sites to exist. The report reads:

Although no archaeological studies have been conducted within the immediate vicinity of the project area, testimonies recorded during the Māhele (1848) substantiates agricultural use of the project area and its vicinity, as well as confirming habitation sites throughout the region. Documents establish the existence of two 'auwai bordering the original LCA [Land Commission Award] in the late 1800s. It is apparent that agriculture and occupation continued within the project area up to, and including, the recent time period. It also involved the addition of lands bordering the original LCA award that had become the basis



for Foster Botanical Garden. Modifications were made within the lower garden during WWII [World War II] in preparation for an attack. (Scientific Consultant Services, Inc., August 2001)

The report recommends that an archaeological inventory survey be conducted in those areas where new development is proposed by the master plan in previously undisturbed areas. Such survey should provide sufficient information to determine whether historic sites are present and what significance if any the sites may have.

Potential Impacts and Mitigative Measures

The Master Plan protects the stone terrace walls, along with the Exceptional Trees of the Garden. In addition, another 30 significant and endangered trees will be preserved. Major garden areas, such as the Upper Terrace, Palm Garden, award-winning Prehistoric Glen and Daibutsu Terrace are to remain largely unchanged.

One significant change to the site is the construction of a new Visitor Center and the Lyon Orchid Conservatory. The Visitor Center is planned in an area currently occupied by office buildings and the Orchid Lath House and the Conservatory in an underutilized area of the Garden above the community gardens. Also, a new visitor parking lot is planned along Vineyard Boulevard in a section of the Garden that currently contains greenhouses and other service buildings. These improvements are planned so to not affect historic trees and walls in the Garden. A new mauka service area is planned to replace the maintenance structures that will be displaced by the new visitor parking. This area is currently used for compost storage, and the structures will be placed so as to not detract visually from the assets of the Garden (see section 2.4.2.2).

Preliminary review of the Master Plan by the State Historic Preservation Division (SHPD) and archival research of the project area has determined that subsurface historical sites may exist. As a result, similar to SCS recommendations, SHPD recommends that prior to beginning any ground disturbance, an archaeological inventory survey with testing should be carried out at areas proposed for ground disturbance in the Master Plan, primarily in the areas of the proposed Visitor Center, Lyon Orchid Conservatory, parking lot, and maintenance facilities. A report of the findings should be submitted to the SHPD for review and approval. If significant historic sites such as cultural deposits are found to be present, an appropriate mitigation plan will need to be prepared for review and approval by SHPD. Mitigation steps may include archaeological data recovery. SHPD recommends that the survey be commenced in order to allow sufficient time for analysis of results and adequacy review of the inventory report.



In addition, review of architectural concerns by SHPD recognizes that the master plan preserves the significant historic features of the gardens including the exceptional trees and terrace walls. SHPD believes the areas that are proposed for improvements should not affect the characteristics which made the property eligible for the National and Hawai'i Registers of Historic Places.

4.2.2 TRAFFIC AND CIRCULATION

Currently, vehicle access to the garden is through an entrance along Vineyard Boulevard, between the Kuan Yin Temple and Nu'uau Stream. A single driveway here leads to the visitor parking lot where there are 46 stalls, two of which are handicap accessible. There are no designated stalls for bus parking. However, there is a large turnaround area on the mauka end of the parking lot. Garden staff and visitors alike have noted that the parking lot is adequate for the current number of daily visitors, but not for their more popular events such as the Plant Sale. There is street parking in front of Foster Garden on Vineyard Boulevard, which can supplement the Garden parking lot during these events. However, these spaces often fill up by mid morning and do not turn over frequently. The Garden staff also has noted that patrons of the Kuan Yin Temple park in the Garden parking lot without permission. The Kuan Yin Temple has no onsite parking of its own. Temple patrons are easily tempted to park at Foster Botanical Garden since the parking lot is adjacent to the temple and is not regularly monitored.

A second driveway and small parking area is located along Vineyard, across from Maunakea Street. This is currently used for service vehicles, city trucks and staff vehicles. However, onsite staff parking is limited. Eight to ten cars squeeze into the paved area in front of the Horticulture Office by double parking and blocking the driveway. Up to four trucks can be parked in the paved area between the Administration Office and Equipment Storage. Currently, there is not enough space to accommodate all City trucks, utility vehicles, and staff parking in these areas.

Potential Impacts and Mitigation Measures

The Master Plan for Foster Botanical Garden (Figure 3) includes the relocation of the main entrance and Visitor Center to the signalized intersection of Vineyard Boulevard and Maunakea Street. The Master Plan also includes the construction of new visitor parking and staff parking areas. The main visitor parking lot will have 54 striped stalls (3 of which are handicap accessible) and 2 van stalls. During special events, roughly 100 cars can be accommodated in the visitor lot and in designated overflow parking areas indicated by stippled lawn areas in Figure 3. The main passenger drop off area



for other vehicles, including taxis, will be located directly in front of the Visitor Center. Traffic will circulate in a one-way counterclockwise direction around the parking lot.

A gate at the mauka end of the parking lot near the Kuan Yin Temple will be provided so that cars may travel to overflow parking areas along Nu'uaniu Stream and exit through the service driveway at Vineyard and River Street for special events. In addition, to help accommodate the heavy traffic the Garden experiences during the Plant Sale, this gate will allow the Garden staff to set up a drive-through pick up area for visitors who do not wish to park but are picking up people or paid items.

Twenty-two parking stalls have been provided in the Service Area parking lot. The Garden staff currently requires parking for the three trucks, two cars, five utility vehicles, and at least eight employee parking stalls. It is expected that with the increase in Garden activity and intensity of garden development, additional staff and volunteers will be required. As a result, four additional stalls have been provided. The former main entrance to the Garden on Vineyard Boulevard near the Kuan Yin Temple will be closed to the public and converted into a service only access point. The service gate on Nu'uaniu Avenue will be maintained as a secondary access point for staff and maintenance personnel.

Wilson Okamoto and Associates, Inc. conducted a traffic impact assessment on the proposed Master Plan improvements. This report is included in its entirety in Appendix B. Their report concluded that "the proposed improvements at the Foster Botanical Garden are anticipated to have no significant impact on the surrounding roadways since most activities at the project site is expected to occur during off-peak hours." They also reported that "the impact of the main entrance relocation would be mitigated by the construction of an exclusive left-turn lane for vehicles turning left from Vineyard Boulevard into the site and the modification of the existing traffic signal system to accommodate a 4-way intersection."

4.2.3 AIR QUALITY

In general, air quality in Hawai'i is excellent due to the predominant northeast trade winds. Some localized conditions, such as heavy traffic at intersections, can negatively impact air quality. To ensure that existing air quality continues, both Federal and State standards have been established to identify ambient air quality conditions and potential changes as they may occur in the future. Presently, the State of Hawai'i is considered by the U.S. Environmental Protection Agency to be in attainment for all criteria pollutants.



Potential Impacts and Mitigation Measures

Short-term impacts of the Foster Botanical Garden improvements are considered to be those associated with construction activities. During construction, air quality in the area may be impacted by exhaust generated from construction equipment and fugitive dust. All construction activity will maintain strict compliance with State of Hawai'i air pollution control regulations and follow best management practices to reduce any negative air quality impacts. A combination of measures such as watering exposed soils and minimizing the amount of disturbed area will be implemented as appropriate. Exhaust emissions from construction equipment are not likely to exceed established air quality standards. However, if special equipment is required, the City and/or its contractor should check with the State Department of Health to ensure that the equipment complies with air quality requirements or seek the appropriate permit.

4.2.4 NOISE

Primary noise sources for Foster Botanical Garden include the adjacent H-1 Freeway, aircraft flybys, people and vehicles moving along the surrounding roadways, and various equipment used by staff to maintain the Garden. Short-term noise impacts will be generated during construction. No long-term noise impacts emanating from the Garden is expected based on the proposed improvements.

Potential Impacts and Mitigation Measures

All project activities and those activities related to the construction of the proposed improvements shall comply with the Administrative Rules of the Department of Health, Chapter 11-46 on "Community Noise Control" (HAR §11-46). Because the project is located in P-2, preservation zoning district, it falls within Class A, which limits daytime (7:00 AM to 10:00 PM) noise levels to 55 dBA and nighttime noise levels to 45 dBA as specified by HAR §11-46. If noise levels are expected to exceed these limits, the appropriate permit should be sought with the State Department of Health.

Proper mitigating measures (such as including mufflers on all motorized equipment and limiting construction to daylight hours) will be employed to minimize the short-term noise impacts generated during construction. All work will be monitored to comply with State of Hawai'i Department of Health noise limits.

As the Master Plan for Foster Botanical Garden does not change its current use, no long-term noise impacts are expected due to the proposed improvements. The Foster Botanical Garden Master Plan does include the relocation of current maintenance facilities along Vineyard Boulevard to the rear of the garden along H-1 and Nu'uauu



Stream, an area of the garden more affected by outside traffic noise. This change will reduce any previous noise from these activities along Vineyard. Also, both daytime and nighttime events held in the Garden will comply with the noise standards set forth by the State Department of Health.

To decrease the freeway noise experienced in the mauka garden areas of Foster, the Master Plan includes the construction of a noise-buffering wall along the garden's H-1 boundary. The wall, coupled with dense plantings along this buffer area, is expected to make spending time in these areas of the garden more enjoyable.

4.2.5 ECONOMIC IMPACTS

As a publicly funded park, Foster Botanical Garden was not established nor is it maintained for economic reasons, but rather to improve the livability and quality of life in Honolulu by providing natural beauty, open space, recreational and educational opportunities in the heart of the city.

In spite of this, the proposed Foster Botanical Garden Master Plan improvements are expected to provide some short-term economic impacts. The proposed improvements are estimated to cost approximately \$14 million for planning, design, and construction. The primary economic impact will consist of employment (particularly design and construction employment) during each phase of the project. Economic impacts from employment can be characterized as direct and indirect. Direct impacts include purchases made on the materials and wages associated with the design and construction of the proposed improvements. Indirect impacts would be the distribution of the spending and wages from the proposed improvement throughout the statewide economy. Technically, there is little or no true employment "impact," since the funds for the proposed improvements are already in the economy—and the new facilities are not expected to attract substantial additional money from outside Hawai'i.

After completion, the improvements are expected to generate extra revenue for the City's Department of Parks and Recreation due to improved attendance numbers and sales from the gift shop and addition of a café to the Visitor Center, making Foster Garden more economically self-sustaining.

At present, Foster Botanical Garden has a dedicated staff of seven full-time employees who maintain the Garden. They consist of a Supervisor, two Plant Propagators, one Orchid Propagator, and three Nursery Workers. There are eleven full-time Honolulu Botanical Garden staff members including the Director, the Superintendent, two Education/Recreation Specialists, and three administrative staff. One of the Education/Recreation Specialists is the Community Garden Coordinator for the City &



County of Honolulu. Other staff members include a Botanist, Horticulturist, Arborist, and Orchid Horticulturist. All of these employees currently have their home offices located at Foster Botanical Garden. Additional staff will be needed to run the proposed café and maintain the new garden areas. Dependent upon volunteer support, it is not currently clear how many full-time workers will be needed. However, it has been estimated by HBG that at least 3 additional employees (1 propagator and 2 nursery workers) will be added to the staff at Foster Botanical Garden in the near future. As the improvements are implemented, the City will reassess staffing needs and operational budgets.

4.2.6 SOCIAL IMPACTS

As mentioned earlier, the purpose of a public garden is to improve the livability and quality of life in a city by providing natural beauty, open space, recreation and educational opportunities. This matches the goals of the Honolulu Botanical Gardens, as they seek to provide educational and recreational opportunities, and to help preserve rare and endangered plant species of Hawai'i. The importance of educating the public about the natural assets of Hawai'i is explained in the Honolulu General Plan as well. The plan states the following:

"The natural environment of our island, next to our people, is our greatest asset. The pleasures of a year-round mild and amiable climate, beautiful mountains, attractive beaches, scenic vistas, and natural drinking water are enjoyed by those of us who reside in the community as well as those who visit here. The City's policies seek to protect and enhance our natural attributes by increasing public awareness and appreciation of them and by mitigating against the degradation of these assets."

Foster Botanical Garden is the oldest garden of the Honolulu Botanical Gardens and has been open to the people of Hawai'i since 1931. Foster contains many plants which are considered "exceptional." "Exceptional trees" by reason of age, rarity, location, size, aesthetic quality, endemic status or historical and cultural significance are designated by the County Arborist Committee as worthy of preservation. Foster Garden contains 27 of over 100 trees that have been designated exceptional on O'ahu. Foster is also unique in its location in the heart of downtown Honolulu, offering visitors a refreshing change from the chaos of the city.

Potential Impacts and Mitigative Measures

In general, the Foster Botanical Garden Master Plan improvements are not expected to negatively impact the social characteristics of Downtown Honolulu. In fact, they are



expected to contribute toward the area's revitalization by enhancing a wonderful public garden that visitors and residents alike can enjoy. The plan includes improvements to the vistas along Vineyard Boulevard, the construction of additional garden areas, and a noise wall/landscaping buffer along the H-1 border to make spending time in the mauka areas of the Garden more enjoyable.

4.2.7 VISUAL IMPACTS

The master plan seeks to improve Foster Botanical Garden's public façade along Vineyard Boulevard and Nu'uānu Avenue. It relocates the main entrance to the intersection of Vineyard and Maunakea Street and places the Visitor Center in direct view of this entrance. Landscaping along Vineyard Boulevard will open up and frame vistas into the Garden and shield the visitor parking lot from view. A grand gateway with elegant signage and botanical displays flanking the main entrance will herald the Garden to drivers traveling along Vineyard Boulevard and up Maunakea Street from Chinatown. Two existing *Orbignya martiana* palms located at the corner of Vineyard and Nu'uānu will be incorporated into a landmark gateway framing the pedestrian entry at this prominent intersection. Arching above the gateway will be a distinctive "Foster Botanical Garden" sign. New fencing along Vineyard and Nu'uānu Avenue will compliment the design of the gateways and allow views into the Garden. A sweeping Entrance Garden will extend from the pedestrian entrance to the parking lot and the main entrance. Meandering through the Entrance Garden will be a pedestrian path that leads visitors to the new Visitor Center.

Potential Impacts and Mitigative Measures

Because the master plan is conceptual in nature, the detailed design of the above improvements will be developed during the design phases of implementing the master plan. It is the intent of the master plan that these improvements enhance the overall experience and view of the Garden from neighboring streets and properties as well as from within the Garden. All signs that are proposed for the Garden should comply with Article 7 of the City's Land Use Ordinance. Any impact to the street trees that line the median in Vineyard Boulevard should also be minimized in the design of the proposed left-turn lane. If possible, relocation or replanting the median should be considered in the design. In addition to the improvements along Vineyard and Nu'uānu Avenue, the design of the noise buffer planned for the mauka edge of the Garden should take into consideration the view of this wall and/or planting buffer from the H-1 Freeway and properties beyond the freeway. In addition, there are wonderful opportunities to create beautiful internal vistas in the detailed design of the gardens as they are improved.



4.2.8 INFRASTRUCTURE

4.2.8.1 Water System

The subject property is presently serviced by Board of Water Supply potable water transmission lines. Water is drawn from a 12-inch line within Vineyard Boulevard and distributed to the Garden through a 4-inch distribution line. Smaller lines run underground and along fence lines throughout most parts of the Garden to which the staff manually attach sprinkler heads for general irrigation purposes. The master plan proposes that a new, more efficient water conserving irrigation system be installed throughout the Garden. In addition, potable water will need to be distributed to the new Visitor Center, the Lyon Orchid Conservatory, and the maintenance facilities. During the design stage, the City plans to evaluate the existing system and will make appropriate improvements as needed.

During project construction, potable water will be required for control of fugitive dust and to establish project landscaping.

Potential Impacts and Mitigative Measures

Water consumption at the Garden is not expected to increase significantly with the proposed improvements. While the additional facilities, such as the café, may use more water than existing facilities, the irrigation system planned for the Garden may save water, as it will regulate the amount of water used to irrigate planting areas and may contain moisture sensors to control over-watering.

Initial review by the Board of Water Supply has determined that the existing water system is presently adequate to accommodate the proposed improvements at Foster Botanical Garden. The Board of Water Supply will confirm the availability of water when the building permit is submitted for review and approval. If water is made available, the City will be responsible for paying any Water System Facilities Charges. The project also is subject to the Board of Water Supply's Cross-Connection Control and Backflow Prevention requirements. All proposed improvements requiring a water connection should be in compliance with these requirements before the issuance of the building permit application.

4.2.8.2 Wastewater Facilities

Wastewater is collected on-site by a series of 8, 6, and 4-inch sewer laterals and is discharged into the City and County's sewer main via a 10-inch line in Vineyard Boulevard.



Potential Impacts and Mitigative Measures

The planned visitor center and maintenance areas will include restroom facilities. These facilities will be connected to the existing municipal sewer system that currently services the garden facilities. It is believed that the existing on-site sewer system is adequate to handle any increase in wastewater generated by the proposed improvements. However, this will need to be verified during the design stage of the Visitor Center.

4.2.8.3 Drainage

Foster Botanical Garden is outside of any flood boundaries (see section 4.1.5), is not a shoreline property, and lies entirely outside of the coastal flood zone attributable to either high wave action or tsunami.

Potential Impacts and Mitigative Measures

Due to the location of the site, the Foster Garden improvements are not expected to either affect or be affected by natural flood hazards. The improvements will be designed to comply with all federal, state, and county laws regarding drainage, erosion control, and non-point source pollution. During construction phases, any possible impact to water quality will be minimized and mitigated by the implementation of appropriate erosion control requirements and best management practices (BMPs).

4.2.8.4 Electrical and Communication Facilities

Electric power is supplied to the site by Hawaiian Electric Company (HECO) via underground lines which run along Vineyard Boulevard. These lines connect to an onsite transformer box located near the maintenance driveway on Vineyard Boulevard and distribute power throughout the Garden. On the northwestern side of the property *mauka* of the Information Desk and Cashier, the lines transition to overhead lines for a short 310-foot distance. With the proposed location of the new entry and Visitor Center at the top of Maunakea Street, the transformer box will either have to be relocated or appropriately screened.

Telephone and Internet connection are currently provided by Verizon Hawai'i. Internet connection is made using digital subscriber line (DSL) technology that allows existing phone lines to carry both voice and two-way Internet transmissions.



Potential Impacts and Mitigative Measures

Existing utility hook-ups should be adequate for the Foster Botanical Garden improvements. New transmission lines, electrical and phone, will have to be installed on-site as the current lines are old and not of good working order. All new utility lines on Garden grounds should be buried whenever possible, with special measures taken to avoid harming root systems of important plants or trees in the Garden.

4.2.9 SOLID WASTE DISPOSAL

On O'ahu, residential and commercial wastes are hauled to landfills, the incinerator, or transfer stations. A waste-to-energy combustor, H-POWER (Honolulu Program of Waste Energy Recovery) located at the Campbell Industrial Park incinerates about 1,800 tons of combustible waste per day. The electricity generated is bought by Hawaiian Electric Company. Currently, the H-POWER facility receives all residential and commercial packer truck wastes on the island.

Green waste collected from Foster Botanical Garden is composted and mulched on site and stored in the Service Area on the northern corner of the property. It is then reused in the Garden for soil amendments and tree and plant protection.

The Waimānalo Gulch Landfill, which opened in 1989, is the City's primary solid waste disposal facility and is located mauka of Farrington Highway near Kahe Point. The site accepts residential, commercial and nonhazardous industrial solid wastes, demolition debris and ash and residue from the H-POWER waste-to-energy facility. Wastewater treatment sludge, septic tank wastes and cesspool pumpings are accepted, provided such disposal is in accordance with the landfill's operating guidelines. The site also handles special wastes such as spent lime, contaminated foods and asbestos.

Potential Impacts and Mitigative Measures

During construction of the Foster Botanical Garden improvements all solid waste will be disposed of in compliance with all state and county laws and ordinances. After construction is completed, solid waste generated during the operation of the Garden will be collected and disposed of by the City and County Department of Environmental Services, Refuse Division. Foster Botanical Garden will also continue to mulch and compost green waste from the garden for re-use on site.



4.2.10 PUBLIC SERVICES

4.2.10.1 Fire Protection

Fire protection is provided by the Central Fire Station located on South Beretania Street, approximately three blocks away from Foster Botanical Garden.

Potential Impacts and Mitigative Measures

There may be an occasional and unavoidable demand for fire protection services associated with the Foster Botanical Garden improvements. Existing levels of fire protection services and facilities are considered adequate to service the proposed project.

4.2.10.2 Police Protection

Foster Botanical Garden is within the Police Department's District 1, which covers downtown from Liliha Street to Punahou Street. The Police administrative offices are located at the Alapai Headquarters, at 801 S. Beretania Street. The district also maintains a Chinatown Substation at Maunakea and North Hotel Street.

Potential Impacts and Mitigative Measures

Currently, Foster Botanical Garden experiences some problems with homeless transients and theft. The current layout of facilities makes it difficult to observe certain areas of the Garden such as the parking lot and area along Nu'uaniu Stream. Local police frequent the Garden to supplement the limited security there. With the anticipated increase of activity and visitors at the Garden and the relocation and rearrangement of facilities, natural surveillance of these areas will be improved.

There may be an occasional and unavoidable demand for police protection services associated with the Botanical Garden; however, it is anticipated that the existing police service will be sufficient to protect the proposed improvements.

4.2.10.3 Health Care Services

Various health care services in Honolulu provide primary patient care to adults, women, and children. The Foster Botanical Garden is near both Queen's Medical Center on Punchbowl to the east, and Kuakini Medical Center across H-1 to the west. The Queen's Medical Center is the major trauma center for the island of O'ahu, and has a recently renovated Emergency Room with 31 treatment rooms.



Potential Impacts and Mitigative Measures

There will be an unavoidable and occasional need for emergency health care services. However, the proposed improvements are not expected to increase the overall need for emergency medical services.

4.2.10.4 Public Transit

Fixed route bus service is provided to Foster Botanical Garden by the City Department of Transportation Services, which currently contracts with O'ahu Transit Services (OTS) for operation of TheBus. Numerous bus routes pass through the Downtown area and can be reached by a short walk from Foster Garden. The bus route #4 travels along Nu'uaniu Avenue and stops at the Vineyard/Nu'uaniu intersection on its way in and out of Downtown. OTS also operates TheHandi-Van, the Americans with Disabilities Act-required paratransit service for individuals with disabilities. TheHandi-Van provides curb-to-curb service and operates islandwide during the same hours as the fixed route system.

Potential Impacts and Mitigative Measures

Currently, pedestrians who take the # 4 bus to Foster Garden or walk from Downtown bus stops are made to walk the length of the Garden along Vineyard to reach the main entrance. The new Master Plan recommends relocating the main entrance closer to this bus stop and the creation of a pedestrian entrance at the corner of Vineyard and Nu'uaniu that will improve access for those arriving by bus. Full accessibility from all public rights of way should be incorporated in the design development of the proposed entrance improvements along Vineyard and Nu'uaniu Avenue. The planned improvements are not expected to increase the overall need for bus services in the area.



5.0 DESCRIPTION OF ALTERNATIVES

In compliance with the provisions of Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules, Section 11-200-17(f), *the "known feasible" alternatives to the proposed project are limited to those that would allow the objectives of the project to be met, while minimizing potential adverse environmental impacts.* As such, the Master Plan improvements for Foster Botanical Garden have been evaluated in terms of the following.

5.1 NO ACTION ALTERNATIVE

The no action alternative will not accomplish the objectives of the Master Plan for Foster Botanical Garden. The no action alternative would also ignore the suggestions of the Botanical Garden staff and the numerous community-based planning recommendations for improving the Garden.

Also, two goals of the Honolulu Botanical Garden system are to "ensure greater public awareness of world conservation issues and increase understanding of the value of plants" and to create "programs that are appropriate to a botanical garden yet responsive to community needs." The no action alternative does not allow for the Garden to further these goals in a way consistent with community-based planning recommendations for improving the Garden. Foster Botanical Garden has seen dropping attendance numbers in recent years, and would like to see this trend reversed.

5.2 RENOVATION ALTERNATIVE

One alternative to the proposed improvements described in the Master Plan is to renovate the existing buildings at Foster Garden. However, the existing facilities are too small and dispersed to meet the goals of the Garden. Many of the existing structures are aging and deteriorating. Portions of the Botany Office building have actually been declared unsafe by the City and are no longer usable.

Due to limited space, various program uses are scattered among different buildings, which often hampers task-sharing and workload coordination. Currently, the director and her administrative staff are separated from the educational coordinators and the horticulturists. Other facility needs include a larger restroom/shower and locker room for the staff for safety reasons and more storage space for the plant sale and special event equipment.

Renovation of existing buildings would also avoid the issue of poor visibility of the Garden. Although occupying a full city block and located at a prominent corner near



Downtown Honolulu and Chinatown, Foster Botanical Garden does not have an obvious public presence. One reason the Garden remains hidden behind tall mock orange hedges is because the buildings along Vineyard Boulevard are in such poor shape. When those buildings were constructed, no one expected Vineyard Boulevard to be the front of the Garden, much less become a major street. Before the H-1 Freeway was built, the main entrance to the Garden was located on School Street. Before that, visitors entered the Garden from Nu'uanu Street. Vineyard Boulevard literally was the back door of the Garden, used primarily by service and maintenance personnel. Another reason the Garden has no obvious presence is that the current entrance to Foster is somewhat obscured from view for drivers, as it is tucked behind the Kuan Yin Temple on Vineyard Boulevard.

Because of these reasons, renovation of existing buildings is not a viable alternative to achieve the goals and objectives of Foster Botanical Garden.

5.3 PREFERRED ALTERNATIVE

The preferred alternative as shown in Figure 3 and described in Section 2.0 is favored because it best implements the goals and objectives of the Honolulu botanical Garden system, and the suggestions of the Botanical Garden staff and the numerous recommendations gathered from the community-based planning process. Accompanying the public process, review and input various City and County agencies and officials, including the Directors of the Honolulu Botanical Gardens, Department of Parks and Recreation, Urban Forestry, and the Assistant Director and Project Manager from the Department of Design and Construction played an integral part in ensuring the development of a realistic and effective Master Plan from the perspective of those who will be operating and maintaining the Garden.

The proposed Master Plan for the Foster Botanical Garden balances the old with the new. It preserves historical elements such as the terrace walls from Mary Foster's estate as well as memorable spaces within the Garden such as the Upper Terrace and the Daibutsu Terrace. However, the proposed master plan also revitalizes the Garden by improving visitor, botanical and maintenance facilities, beautifying adjacent streetscapes, and adding new gardens areas. Guided by an understanding of its history and supported by City staff and community members, the proposed master plan grooms Foster Botanical Garden for an even brighter future.



6.0 DETERMINATION, FINDINGS, AND REASONS SUPPORTING THE DETERMINATION

To determine whether the proposed action may have a significant impact on the environment, expected consequences, both primary and secondary, and the cumulative as well as short- and long-term effects have been evaluated. Based on the studies performed and research evaluated, a finding of no significant impact (FONSI) is anticipated from the Accepting Authority (City and County of Honolulu Department of Design and Construction) as detailed in this section.

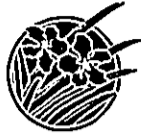
6.1 SIGNIFICANCE CRITERIA

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

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

The site of the Foster Botanical Garden has been used as a public garden since 1931. Based on analysis of previous archaeological studies, archaeological resources may be found in the area. It has been recommended that an archaeological survey be conducted to determine if significant resources may be disturbed by the proposed improvements. If, archaeological resources are discovered, work will cease and the State Historic Preservation Division will be contacted to assess the significance of the find and to recommend appropriate mitigation measures.

The purpose of the Honolulu Botanical Gardens is to help conserve rare and endangered plants in Hawai'i, allowing opportunities for botany and horticulture studies, and for people to view and enjoy these natural resources of the islands. The Master Plan protects over 50 endangered and significant trees and preserves the historic terrace walls of the Foster house site. In addition, improvements to the facilities for maintenance, administration and visitor accommodations are recommended to enhance educational and visitor experiences at the Garden. Therefore, there will be no



irrevocable commitment to loss or destruction of any natural or cultural resources but rather the enhancement of these resources.

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

Foster Botanical Garden is the oldest of the Honolulu Botanical Gardens. One purpose of the Honolulu Botanical Gardens and the Foster Botanical Garden is to allow the public to experience and learn about the natural environment of Hawai'i. The Master Plan for Foster does not change the use of the site, but rather proposes improvements to open up the public façade, improve garden facilities for employees and visitors, and to add new garden areas to be enjoyed. Therefore, the Master Plan improvements will not decrease the uses of the environment at the Garden, but rather improve the experience for visitors.

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

The master plan seeks to enhance and protect one of Hawai'i's historical natural treasures, Foster Botanical Garden. The proposed improvements are consistent with the Environmental Policies established in Chapter 344, HRS since they:

- * Encourage management practices which conserve and protect ... open space areas (HRS 344-4 (2) (D)).
- * Foster the planting of native as well as other trees, shrubs, and flowering plants compatible to the enhancement of our environment (HRS 344-4 (3) (B)).
- * Establish, preserve and maintain scenic, historic, cultural, park and recreation areas, including the shorelines, for public recreational, educational, and scientific uses (HRS 344-4 (4) (A)).
- * Promote open space in view of its natural beauty not only as a natural resource but as an ennobling, living environment for its people (HRS 344-4 (4) (C)).

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

The Master Plan improvements to Foster Botanical Garden are expected to bring positive social and economic impacts to the community by enhancing the Garden's appearance and by improving visitor experience. Foster was the first of the Honolulu Botanical Gardens and observes the overall goal to provide opportunities for "conservation, botany, horticulture, education and recreation." Attendance at Foster Botanical Garden has dropped significantly in recent years. Improvements prescribed in the Master Plan hope to reinvigorate the Garden and increase visitorship. Master



Plan improvements could also make the Garden more financially self-sustaining through the addition of a café and improved gift shop and a sufficient increase in attendance.

(5) Substantially affects public health;

Impacts to public health may be temporarily affected by air, noise, and water quality impacts during construction. However, these will be of a short-term duration and are not expected to be significant. The proposed improvements seek to enhance public health by preserving 13.5 acres of green space in Downtown Honolulu, beautifying public streets, and providing a place where visitors and locals alike can enjoy the majestic trees and botanical displays at Foster Botanical Garden.

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

The improvements of the Foster Botanical Garden Master Plan are not expected to involve negative secondary effects the land use remains unchanged. Planned and established land use patterns within the area will not be negatively or significantly altered and unplanned population changes or impacts to public facilities are not expected as a result of the project. Positive secondary effects are expected in the form of increased social and economic vitality within the Botanical Garden.

(7) Involves a substantial degradation of environmental quality;

The Foster Botanical Garden improvements will not involve a substantial degradation of environmental quality on-site or in the surrounding neighborhoods. The master plan seeks to improve the environmental quality of the Garden and the area around it. The mission of the Honolulu Botanical Gardens is to "plan, develop, curate, maintain and study documented collections of tropical plants in an aesthetic setting for the purposes of conservation, botany, horticulture, education and recreation." As such, all improvements will be conducted in a manner that is sensitive to the mission of the Garden. BMPs will also be employed during construction to minimize any impact of those activities on surrounding properties.

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

The Master Plan for Foster Botanical Garden will not have a cumulative negative effect on the environment, and is expected have positive long term effects due to the commitment of stewardship of the resources there. This Master Plan represents a



renewed effort and commitment to revitalize Foster Botanical Garden, supporting a vision of serving current and future generations of plant enthusiasts with a variety of facilities and garden improvements. The current plan is the result of support from the community, the City Council, and the Department of Parks and Recreation. As such, the Foster Botanical Garden Master Plan is a collaborative project that is not expected to have undesirable cumulative effects.

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

Hundreds of different botanical species from around the world are present in the Garden's various collections, including 27 Exceptional Trees (ET) that are protected by Hawai'i State law (HRS Chapter 58) and City and County of Honolulu ordinance (ROH 41-13). Each of the 27 "exceptional trees" as well as over 30 significant trees and plants identified by Garden staff will be protected during project implementation. Special construction methods will be used to protect trees and tree roots. In addition, care will be taken during construction not to disturb any existing nests of the Native Hawaiian Manu o ku (White Tern or Fairy Tern) (*Gygis alba rothschildi*), which is known to frequent the Garden. As noted earlier, the City will consult with the State Department of Land and Natural Resources Division of Forestry and Wildlife in regards to appropriate procedures during construction.

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

Short-term potential impacts on air quality may result due to construction activity, however, these impacts will be minimized by limiting construction activity to daylight hours and other appropriate construction practices.

As the Master Plan for Foster Botanical Garden does not change its current use, no long-term noise impacts are expected due to these improvements. Any special events or activities that are held at the Garden will need to comply with State noise regulations.

The Botanical Garden will be designed to comply with all federal, state, and county laws regarding drainage, erosion control, and non-point source pollution, therefore the affect on water quality due to the extension is expected to be negligible. During construction phases, any possible impact to water quality will be minimized and mitigated by the implementation of appropriate erosion control requirements.

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



The Foster Botanical Garden is not located in or near an environmentally sensitive area and therefore is not expected to affect flood plains, tsunami zones, beaches, erosion-prone areas, geologically hazardous land, estuaries, or freshwater or coastal waters.

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

The Foster Botanical Garden Master Plan includes the creation of a new Visitor Center and Lyon Orchid Conservatory at the Garden. However, both structures are set back from the public streets and existing tree canopies will likely be much higher than the structures' rooflines. Therefore the new buildings should not protrude into established viewplains identified in county or state plans or studies. The general view of the site however, will be altered by the new visitor entrance and new landscaping, including the Entrance Garden. These changes are expected to beautify the streetscape rather than degrade it.

- (13) Requires substantial energy consumption.

Construction of the proposed project will not require substantial energy consumption relative to other similar projects. Architectural and engineering design of the project should investigate and employ energy-saving elements wherever possible. In fact, the new facilities will be replacing older, less energy efficient buildings already on the site, which may maintain or even reduce energy consumption levels at the Garden.

6.2 DETERMINATION

On the basis of the above criteria, the discussion of impacts and mitigative measures contained in this document, and the comment letters received on the Draft Environmental Assessment, the Accepting Authority (City and County of Honolulu Department of Design and Construction) has determined that the improvements proposed in the Foster Garden Master Plan will not have a significant effect on the environment. Pursuant to Chapter 343, Hawai'i Revised Statutes, the Accepting Authority has issued a Finding of No Significant Impact (FONSI).



7.0 REFERENCES

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8.0 COMMENT LETTERS TO THE DRAFT ENVIRONMENTAL ASSESSMENT AND RESPONSES

Comment letters to the Draft Environmental Assessment were received by the following agencies and community groups. The 30-day public comment period for the Draft EA ended on May 23, 2002. The date of the letter is provided after the name of the agency or organization.

FEDERAL AGENCIES

Water Resources Discipline, USGS, 5/1/2002

STATE AGENCIES

Office of Hawaiian Affairs, 5/1/2002

Historic Preservation Division, Department of Land and Natural Resources, 5/6/2002

Disability and Communication Access Board, 5/15/2002

Department of Transportation, 5/16/2002

University of Hawai'i Environmental Center, 5/23/2002

Department of Health, 5/31/2002

COUNTY AGENCIES

Board of Water Supply, 5/10/2002

Department of Parks and Recreation, 5/17/2002

Department of Transportation Services, 5/20/2002

Department of Planning and Permitting, 5/28/2002

COMMUNITY ORGANIZATIONS

Downtown Neighborhood Board #13, 5/6/2002

Scenic Hawai'i, Inc., 5/10/2002

The Outdoor Circle, 5/22/2002

Anonymous Letter #1, 5/24/2002

Anonymous Letter #2, 5/24/2002

The comment letters and the responses returned are included on the following pages in the above order.



United States Department of the Interior

U.S. GEOLOGICAL SURVEY
WATER RESOURCES DISCIPLINE
677 Ala Moana Blvd., Suite 415
Honolulu, HI 96813
Phone: (808) 587-2400/Fax: (808) 587-2401

May 1, 2002

Ms. Rae M. Loui, P.E. & Mr. Terry Hildebrand
Department of Design & Construction
City and County of Honolulu -
650 South King St., 9th Floor
Honolulu, Hawaii 96813

Dear Ms. Loui and Mr. Hildebrand:

Subject: Draft Environmental Assessment (EA) for the Foster Botanical Garden Master Plan, Oahu, PUC, Tax Map Keys: 1-7-07:1 and 2, 1-7-08:1 and 2

Thank you for forwarding the subject Draft Environmental Assessment (EA) for review and comment by the staff of the U.S. Geological Survey, Water Resources Discipline, Hawaii District office. We regret however, that due to prior commitments and lack of available staff, we are unable to review this document and are returning it for your future use.

We appreciate the opportunity to participate in the environmental assessment review process.

Sincerely,
Gordon Tribble
Gordon Tribble
District Chief

Enclosure

Cc w/o enclosure: Office of Environmental Quality Control
235 S. Beretania St., Suite 702
Honolulu, Hawaii 96813

Kimi Mikami Yuen
PBR Hawaii
Pacific Tower, Suite 650
1001 Bishop Street
Honolulu, Hawaii 96813



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San Francisco Office
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Tel: (415) 774-1111
Fax: (415) 774-1112
Email: info@pbrhawaii.com

May 17, 2002

Mr. Gordon Tribble
District Chief
Water Resources Discipline, Hawaii District
US Geological Survey
United States Department of the Interior
677 Ala Moana Boulevard, Suite 415
Honolulu, Hawaii 96813

SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN
DRAFT ENVIRONMENTAL ASSESSMENT

Dear Mr. Tribble:

Thank you for your letter dated May 1, 2002 concerning the Foster Botanical Garden Master Plan Draft Environmental Assessment. We regret to hear that you will be unable to review the report. However, we are appreciative of your letter and the return of the document.

Thank you for participating in the environmental review process.

Sincerely,
PBR HAWAII

Kimi Mikami Yuen
Kimi Mikami Yuen
Planner

cc: Rae M. Loui, P.E., Director/City & County of Honolulu Dept. of Design & Construction
William D. Balfour, Jr, Director/City & County of Honolulu Dept. of Parks & Recreation
Genevieve Salmonson, Director/Office of Environmental Quality Control
Terry Hildebrand, Project Manager/City & County of Honolulu, DDC-Parks Planning Branch



MAY - 8 2002

GILBERT E. COLONJAGUAKAL, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCES MANAGEMENT
DEPUTIES:
ERIC T. HOLAHO
DANIEL MISHKINA

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
1000 KALANIANA'OLA DRIVE, 16th FLOOR
HONOLULU, HAWAII 96813

AQUATIC RESOURCES
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HISTORIC PRESERVATION
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May 6, 2002

Rae M. Loui, P. E.

Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

LOG NO: 29786 ✓
DOC NO: 0205EJ01

Dear Ms. Loui:

SUBJECT: Chapter 6E-8 Historic Preservation Review - Draft Environmental Assessment (DEA) for the Foster Botanical Garden master Plan Nu'uuanu, Kona, O'ahu
(1) 7-007:001, 002; 1-7-008:001, 002

Thank you for the opportunity to comment on the DEA for the Foster Botanical Garden Master Plan. The Garden is listed on both the National and Hawai'i Register of Historic Places (Site 50-80-15-1389) and we provided comment for the EA in July 2001 (SHPD Log No. 27815). We received your request for comments on the DEA on April 22, 2002.

Archaeological Concerns

Our earlier comments that subsurface historic sites may exist, and our recommendation that archaeological inventory survey be conducted for areas proposed for ground disturbance, have been included in section 4.2.1 of the DEA. Prior to beginning any ground disturbance, an archaeological inventory survey with testing should be carried out at areas proposed for ground disturbance in the Master Plan. A report of the findings should be submitted to the State Historic Preservation Division for review and approval. If significant historic sites such as cultural deposits are found to be present, an appropriate mitigation plan will need to be prepared for review and approval by our office. Mitigation steps can include archaeological data recovery. We recommend that the survey be commenced in order to allow sufficient time for analysis of results and adequacy review of the inventory report.

Rae M. Loui, P. E.
Page Two

Architectural Concerns

The Master Plan preserves the significant historic features of the gardens, exceptional trees and the terrace walls. We believe that the areas that are proposed for improvements should not effect the characteristics, which made the property eligible for the National, And Hawaii Registers of Historic Places.

Thank you for the opportunity to comment. Should you have any questions about archaeology, please feel free to call Sara Collins at 692-8026 or Elaine Jourdane at 692-8027. Should you have any questions about architectural concerns to contact Carol Ogata at 692-80332. Should you have any questions about cultural matters, please feel free to contact Nathan Napoka at 587-0040.

Aloha,

Don Hibbard, Administrator
State Historic Preservation Division

El:jk

C: OEQC
✓Kimi Mikami Yuen, PBR Hawaii, Pacific Tower, Suite 650, 1001 Bishop St.
Honolulu, HI 96813
Nicholas Vaccaro, DLNR, Land Division



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Waipahoehoe Office
53233 Kamaelea Road
Waipahoehoe, Hawaii 96775-2204
Tel: (808) 942-2175
Fax: (808) 942-2800
E-Mail: waipahoehoe@pbrhawaii.com

May 17, 2002

Don Hibbard, PhD, Administrator
Historic Preservation Division
Department of Land and Natural Resources
State of Hawai'i
Kakuhihewa Building, Room 555
601 Kamohila Boulevard
Kapolei, Hawaii 96707

**SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN
DRAFT ENVIRONMENTAL ASSESSMENT**

Dear Dr. Hibbard:

Thank you for your letter dated May 6, 2002 concerning the Foster Botanical Garden Master Plan Draft Environmental Assessment. We appreciate the time taken to review the report. We will include your comments in the Final Environmental Assessment report. Specifically, we will add the following statements to Section 4.2.1 "Archaeological and Historical Resources":

- 1) Prior to beginning any ground disturbance, an archaeological inventory survey with testing should be carried out at areas proposed for ground disturbance in the Master Plan. A report of the findings should be submitted to the State Historic Preservation Division (SHPD) for review and approval. If significant historic sites such as cultural deposits are found to be present, an appropriate mitigation plan will need to be prepared for review and approval by SHPD. Mitigation steps may include archaeological data recovery. SHPD recommends that the survey be commenced in order to allow sufficient time for analysis of results and adequacy review of the inventory report.
- 2) In addition, review of architectural concerns by SHPD recognizes that the master plan preserves the significant historic features of the gardens including the exceptional trees and terrace walls. SHPD believes the areas that are proposed for improvements should not affect the characteristics which made the property eligible for the National and Hawai'i Registers of Historic Places.

Mahalo for participating in the environmental review process.

Sincerely,
FBR HAWAII

Kimi Mitomiy Yuen
Planner

cc: Ree M. Loui, P.E., Director/City & County of Honolulu Dept. of Design & Construction
William D. Balfour, Jr, Director/City & County of Honolulu Dept. of Parks & Recreation
Genevieve Salmonson, Director/Office of Environmental Quality Control
Terry Hildebrand, Project Manager/City & County of Honolulu, DDC-Parks Planning Branch



DISABILITY AND COMMUNICATION ACCESS BOARD

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

May 15, 2002

MAY 17 2002

Thomas S. Witten, ASLA
President
PBR Hawaii
1001 Bishop Street
Pacific Tower, Suite 650
Honolulu, HI 96813-3429

Subject: Foster Botanical Garden Master Plan
Draft Environmental Assessment dated April 2002
TMK: 1-7-07:1 and 2, 1-7-08:1 and 2
Location: Nuuanu, Honolulu, Oahu

Dear Mr. Witten,

The Master Plan and Draft Environmental Assessment for the City and County of Honolulu's Foster Botanical Garden Master Plan has been submitted to our office for review and comment. The purpose of our review is to ensure that the programming, schematic design, and design development for all four phases of this proposed project take into account the accessibility design requirements for persons with disabilities.

The requirement to provide for accessibility in accordance with the Americans with Disabilities Act (ADA) is briefly addressed in the Master Plan. To meet this requirement the State of Hawaii has adopted the Americans with Disabilities Act Accessibility Guidelines (ADAAG) as its standard to address accessibility requirements for all government facilities. There are at this time no specific accessibility standards for outdoor-developed areas such as a botanical garden that have been adopted by either a federal or state agency. However, it is highly recommended to make use of the U.S. Access Board's Regulatory Negotiation Committee's "Final Report on Accessibility Guidelines for Outdoor Developed Areas" published in September 1999. It is also recommended to use the U.S. Access Board's Public Rights-of-Way Access Advisory Committee's final report titled "Building a True Community" published January 10, 2001. This report addresses proposed standards of accessibility within public rights-of-way that may have a direct impact on how to access the gardens from public sidewalks, driveways, public transportation stops, etc., all which have been mentioned in this draft.

As it was previously indicated, this project falls within the scope of the ADA Title II, covering state and local governments. It also is governed by the Hawaii Revised Statutes §103-50. Although the technical requirements are nearly identical, there may be

Thomas S. Witten, ASLA
PBR Hawaii
May 15, 2002
Page 2

areas of difference. Hawaii Revised Statutes §103-50 contains a requirement for a review process by the Disability and Communication Access Board. We suggest you include the Disability and Communication Access Board in the Draft Environmental Assessment under "Section 3.2.6 List of Permits" on page 27. It is also suggested to provide in either "Chapter 1.0 Introduction" or "Chapter 3.0 Land Use Conformance" an additional section such as "Agencies and Organizations to be Consulted During the Design Development Process." In addition it is suggested that the following informational statement be included in "Chapter 2.0 Project Description, Purpose and Need":

"All buildings, facilities, and sites shall be designed to meet the Americans with Disabilities Act Accessibility Guidelines and the requirements of §103-50 Hawaii Revised Statutes (HRS). Buildings, facilities, and sites shall incorporate the best design practices noted in the recommendations from the U.S. Architectural and Transportation Barriers Compliance Board's Regulatory Negotiation Committee Final Report, "Accessibility Guidelines for Outdoor Developed Areas" published in September 1999, or when applicable, other more current documents providing guidelines for outdoor recreational areas."

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

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

Sincerely,

Francine Wai

FRANCINE WAI
Executive Director

c: Terry Hildebrand
Department of Design and Construction
City and County of Honolulu

Rac M. Loui, P.E.
Department of Design and Construction
City and County of Honolulu

Office of Environmental Quality Control



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WALTER S. WATSON, AICP
Executive Director

WALTER S. WATSON, AICP
Executive Director

May 21, 2002

Ms. Francine Wai, Executive Director
Disability and Communication Access Board
State of Hawaii
919 Ala Moana Boulevard, Room 101
Honolulu, Hawaii 96814

**SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN
DRAFT ENVIRONMENTAL ASSESSMENT**

Dear Ms. Wai:

Thank you for your letter dated May 15, 2002 concerning the Foster Botanical Garden Master Plan Draft Environmental Assessment. We appreciate the time taken to review the report. We will include your comments in the Final Environmental Assessment report. Specifically, we will add the following to the report in the sections noted below:

- 1) The following will be added to the table in section 3.2.6, Permit or Approval: "Compliance with HRS §103-50." Authority: "State Disability and Communication Access Board."
- 2) The title for Section 3.2.6 will be changed to "List of Permits and Approvals" and the text will read, "The following table presents a list of permits and approvals that will be required as a part of project implementation. The respective agencies are also provided."
- 3) The following will be added to Chapter 2: "All buildings, facilities, and sites shall be designed to meet the Americans with Disabilities Act Accessibility Guidelines and the requirements of §103-50 Hawaii Revised Statutes (HRS). Buildings, facilities, and sites shall incorporate the best design practices noted in the recommendations from the US Architectural and Transportation Barriers Compliance Board's Regulatory Negotiation Committee Final Report, "Accessibility Guidelines for Outdoor Developed Areas" published in September 1999, or when applicable, other more current documents providing guidelines for outdoor recreational areas. In addition, the State Disability and Communication Access Board recommends the use of the US Access Board's Public Rights-of-Way Access Advisory Committee's final report, "Building a True Community" published in January 2001," which guides public access from surrounding sidewalks, driveways, and public transportation stops."

Page 2
Ms. Francine Wai
SUBJECT: FOSTER BOTANICAL GARDEN DRAFT ENVIRONMENTAL
ASSESSMENT
May 21, 2002

Mahalo for participating in the environmental review process.

Sincerely,

PBR HAWAII

Kimi Mikami Yuen
Planner

cc: Rae M. Loui, P.E., Director/City & County of Honolulu Dept. of Design & Construction
William D. Balfour, Jr., Director/City & County of Honolulu Dept. of Parks & Recreation
Genevieve Salmonson, Director/Office of Environmental Quality Control
Terry Hildebrand, Project Manager/City & County of Honolulu, DDC-Parks Planning
Branch

Chris Smith, FAIA/CJIS Group Architects

BENJAMIN J. CAYETANO
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-6097

BRIAN K. MINAALI
DIRECTOR

MAY 23 2002

BY REPLY REFER TO:

DIR 0693
STP 8.0300

May 16, 2002

Ms. Rae M. Loui
Director
Department of Design & Construction
City & County of Honolulu
650 South King Street, 9th Floor
Honolulu, Hawaii 96813

Attention: Mr. Terry Hildebrand
Dear Ms. Loui:

Subject: Foster Botanical Garden Master Plan
Draft Environmental Assessment (DEA)
TMK: 1-7-07: 1 and 2, 1-7-08: 1 and 2

Thank you for your transmittal requesting our review of the subject project.

We have reviewed the subject Traffic Impact Analysis Report (TIAR) and concur with the recommendations. Specifically, the applicant should be responsible for the following improvements:

1. Modify the existing traffic signal system at the intersection of Vineyard Boulevard and Maunakea Street to accommodate the proposed entrance driveway and 4-way signal operations.
2. Provide an exclusive left-turn lane for vehicles turning left from Vineyard Boulevard into Foster Botanical Garden. There is sufficient median width to accommodate an additional turning lane along Vineyard Boulevard at the intersection with Maunakea Street.
3. Provide adequate sight distance for motorist to safely enter and exit the project driveways.
4. Provide adequate on-site loading areas and prohibit off-site loading operations.
5. Provide an adequate turn-around area for delivery and refuse vehicles to maneuver on the project site. Avoid vehicle reversing maneuvers onto public streets.

Ms. Rae M. Loui
Page 2
May 16, 2002

STP 8.0300

6. Provide sufficient driveway width to accommodate safe vehicle ingress and egress.
We appreciate the opportunity to provide comments.

Very truly yours,

Brian Minaali

BRIAN K. MINAALI
Director of Transportation

c: Ms. Genevieve Salmonson, Office of Environmental Quality Control
Ms. Kimi Mikami Yuen, PBR Hawaii



LAND PLANNING
LANDSCAPE ARCHITECTURE
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Mr. SHANE DUNCAN, ASLA
DIRECTOR OF PLANNING

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Ms. J. ZIMMERMAN, AICP
PLANNER

Ms. J. ZIMMERMAN, AICP
PLANNER

May 23, 2002

Mr. Brian Minaai, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

**SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN
DRAFT ENVIRONMENTAL ASSESSMENT**
(Reference # DIR 0693 STP 8.0300)

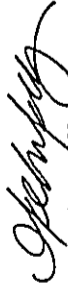
Dear Mr. Minaai:

Thank you for your letter dated May 16, 2002 concerning the Foster Botanical Garden Master Plan Draft Environmental Assessment. We appreciate the time taken to review the report. We will transmit your comments to the City & County of Honolulu to insure that these recommendations are followed during the design development of the implementation of the master plan.

Mahalo for participating in the environmental review process.

Sincerely,

PBR HAWAII


Kimi Mikami Yuchi
Planner

cc: Rae M. Loui, P.E., Director/City & County of Honolulu Dept. of Design & Construction
William D. Balfour, Jr., Director/City & County of Honolulu Dept. of Parks & Recreation
Genevieve Salmonson, Director/Office of Environmental Quality Control
Terry Hildebrand, Project Manager/City & County of Honolulu, DDC-Parks Planning Branch
Tony Macawile, Project Manager/City & County of Honolulu, DDC
Chris Smith, FAIA/CIS Group Architects



UNIVERSITY OF HAWAII
ENVIRONMENTAL CENTER

A UNIT OF THE WATER RESOURCES RESEARCH CENTER

Mr. Terry Hildebrand
Department of Design and Construction
650 South King Street, 9th Floor
Honolulu, Hawaii 96813

Dear Mr. Hildebrand:

Foster Botanical Garden Master Plan
Draft Environmental Assessment
Honolulu, Oahu

The City and County of Honolulu proposes improvements to the Foster Botanical Garden. Major elements of the Master Plan include new garden areas, a new Visitor Center, an orchid conservatory, revised entry and vehicle access, expanded visitor parking, and improved maintenance facilities, garden paths, and noise buffers.

The Environmental Center has reviewed the draft Environmental Assessment (EA) with the assistance of Ray Baker, Lyon Arboretum, Ruth Gay, Botany (emeritus), and Kevin Polloi, Environmental Center.

General Comments

Our reviewers find this master plan to be comprehensive and well thought out, addressing long-standing problems that have detracted from the public's ability to take maximum advantage of the extraordinary resource that is inherent in Foster Botanical Garden. The entry improvements alone will greatly enhance the facility, as will the noise abatement and re-location of the maintenance facilities. However, we note that the connection between the Native Hawaiian Garden and the Lili'uokalani Garden would traverse the proposed maintenance area, and either a screened mauka passage or a longer detour around the makai side would be required.

Overflow Parking

The proposed overflow parking area between the Kuan Yin Temple and the Service area may become unusable during periods of wet weather if grass is employed rather than a more permanent surface. A possible compromise might be use of hollow-tile pavement with grass plugs.

KRAUSS ANNEX 10 • 3500 DOLE STREET • HONOLULU, HAWAII 96822 • (808) 955-7301 • FAX (808) 956-0188
AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER

Mr. Terry Hildebrand
May 23, 2002
Page 2

Endangered Species

The only endangered species explicitly discussed in the draft EA was the White Tern (*Gygis alba*). Our reviewers recall other listed threatened and endangered species present on the Garden grounds, including the Hawaiian Hibiscus in cultivation in one of the greenhouse facilities. Will proposed improvements affect existing plantings of any of these species?

Community Gardens

Displacement of community gardeners poses a sensitive problem, and every effort should be made to accommodate these people. Gardening is a personal connection with the earth, and for the true gardener, severing that connection is quite traumatic. Many of the gardeners are elderly, and a four-year hiatus during phased redevelopment will have a considerable impact on their preferred activities. Every effort should be made to assure full funding and an expeditious project schedule.

Ancillary Uses

Our reviewers note that Foster Garden would be an ideal location for a NOAA cooperative weather station, and inquires with Richard Gazda (271-6233), who manages the program, elicited a positive response. The State Climatologist apparently has indicated an interest in having a station there, and further information may be obtained from Mr. Gazda.

Summary

Our reviewers commend the Department of Design and Construction on a well-executed EA. In particular, we appreciated the historical background of the Garden provided in the appendix, which provided a fascinating insight into the origins of this delightful public resource.

Sincerely,

John T. Harrison, Ph.D.
Environmental Coordinator

c:

OEQC
Kimi Mitsuami Yuen, FBR Hawaii
Ray Baker, Lyon Arboretum
Ruth Gay
Jim Moncur
Kevin Polloi



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 PRESIDENT-ELECT

June 3, 2002

Dr. John T. Harrison, Ph.D.
 Environmental Coordinator
 University of Hawai'i Environmental Center
 2500 Dole Street, Krauss Annex 19
 Honolulu, Hawai'i 96822

**SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN
 DRAFT ENVIRONMENTAL ASSESSMENT**
 (Reference # EA: 285)

Dear Dr. Harrison:

Thank you for your letter dated May 23, 2002 concerning the Foster Botanical Garden Master Plan Draft Environmental Assessment. We appreciate the time taken to review the report. We offer the following responses to your comments:

- 1) **General Comments:** The connection between Foster and Lili'uokalani Botanical Gardens is conceptual at this stage. However, your recommendations will be forwarded to the City & County of Honolulu for consideration during the design development stage of implementation of the master plan.
- 2) **Overflow Parking:** We will forward your recommendation to the City & County of Honolulu for consideration during the design development stage of implementation of the master plan.
- 3) **Endangered Species:** According to the botanical staff at Foster Botanical Garden, there are indeed endangered species located at the Garden. The *Gigastiphan macrostiphan* located in the Daibulus Terrace is an Exceptional Tree and has been designated for protection in the master plan. In addition, the staff have identified the cycads in the Prehistoric Glen and various Pritchardias in the Palm Garden and Middle Terraces as endangered species. No major improvements are proposed in these garden areas in the master plan and should not affect these plants. However, there are pathways, lighting, signage, and irrigation improvements proposed in some of these areas. We will revise Section 4.1.7 of the EA to include this information as well as protective requirements during the design and construction phases of these improvements to protect these plants.

Page 2
 Dr. John T. Harrison
**SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN DRAFT
 ENVIRONMENTAL ASSESSMENT**
 June 3, 2002

The endangered species in cultivation at greenhouse facilities can be easily moved during construction and would not be at risk during implementation of any of the proposed master plan improvements.

- 4) **Community Gardens:** We thank you for your concern for the community gardeners. We will forward your comments to the City & County of Honolulu for consideration during the design development stage of implementation of the master plan.
- 5) **Ancillary Uses:** We will forward your suggestion to the City & County of Honolulu for their consideration.

Mahalo for your support of the master plan and for participating in the environmental review process.

Sincerely,

PBR HAWAII

Kimi Mikami Yuch
 Planner

cc: Rae M. Loui, P.E., Director/City & County of Honolulu Dept. of Design & Construction
 William D. Ballfour, Jr, Director/City & County of Honolulu Dept. of Parks & Recreation
 Genevieve Salmonson, Director/Office of Environmental Quality Control
 Terry Hidebrand, Project Manager/City & County of Honolulu, DDC-Parks Planning Branch
 Tony Macawile, Project Manager/City & County of Honolulu, DDC
 Chris Smith, FAIA/CIS Group Architects

BEULAHIA A. CAVETANO
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96811

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

In Reply, Please Refer to
File #

02-115/epo

MAY - 4 2002

May 31, 2002

Ms. Kimi Mikami Yuen
PBR Hawaii
Pacific Tower
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Yuen:

Subject: Draft Environmental Assessment (DEA)
Foster Botanical Garden Master Plan
Tax Map Key: 1-7-007:01 and 2; 1-7-008:01 and 2

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

Noise, Radiation and Indoor Air Quality (NRIAQ) Branch

All project activities shall comply with the Administrative Rules of the Department of Health, Chapter 11-46, on "Community Noise Control".

If you have any questions, please contact the NRIAQ at (808) 586-4701.

Vector Control Branch (VCB)

The property may be harboring rodents, which will be dispersed to the surrounding areas when any buildings are demolished or the site is cleared. The applicant is required by Hawaii Administrative Rules, Chapter 11-26, "Vector Control", to eradicate any rodents prior to demolition or site clearing activities and to notify the Department of Health by submitting Form VC-12 to the local Vector Control Branch when such action is taken. Rodent traps and/or rodenticides should be set out on the project site for at least a week or until the rodent activity ceases.

Ms. Kimi Mikami Yuen
May 31, 2002
Page 2

If you have any questions, please contact the Vector Control Branch at (808) 831-6767.

Sincerely,


GARY GILL

Deputy Director
Environmental Health Administration

c: NRIAQ
VCB

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



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ROSS S. SUGARMAN, Esq.,
CLIFFORD S. JAMILE,
Manager and Chief Engineer

May 10, 2002

TO: RAY M. LOUI, P.E., DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

ATTN: TERRY HILDERBRAND

FROM: *[Signature]*
for CLIFFORD S. JAMILE

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT OF THE
FOSTER BOTANICAL GARDEN MASTER PLAN,
JMK: 1-7-7: 1 AND 2, 1-7-8: 1 AND 2

The existing water system is presently adequate to accommodate the proposed improvements at Foster Botanical Garden.

The availability of water will be confirmed when the building permit is submitted for our review and approval. When water is made available, the applicant will be required to pay our Water System Facilities Charges for resource development, transmission and daily storage.

The proposed project is subject to Board of Water Supply Cross-Connection Control and Backflow Prevention requirements prior to the issuance of the Building Permit Applications.

If you have any questions, please contact Joseph Kaakua at 527-6123.

cc: Office of Environmental Quality Control
PBR Hawaii



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AND ENVIRONMENTAL STUDIES

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May 17, 2002

Clifford S. Jamile
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN
DRAFT ENVIRONMENTAL ASSESSMENT

Dear Mr. Jamile:

Thank you for your letter dated May 10, 2002 concerning the Foster Botanical Garden Master Plan Draft Environmental Assessment. We appreciate the time taken to review the report. We will include your comments in the Final Environmental Assessment report. Specifically, we will add the following statements to Section 4.2.7.1 "Water System":

- 1) Initial review by the Board of Water Supply has determined that the existing water system is presently adequate to accommodate the proposed improvements at Foster Botanical Garden.
- 2) The Board of Water Supply will confirm the availability of water when the building permit is submitted for review and approval. If water is made available, the City will be responsible for paying any Water System Facilities Charges.
- 3) The project is subject to the Board of Water Supply's Cross-Connection Control and Backflow Prevention requirements and will be in compliance with these requirements before the issuance of the building permit application.

Thank you for participating in the environmental review process.

Sincerely,

PBR HAWAII

[Signature]
Kimi Mikami Yuen
Planner

cc: Rae M. Loui, P.E., Director/City & County of Honolulu Dept. of Design & Construction
William D. Balfour, Jr., Director/City & County of Honolulu Dept. of Parks & Recreation
Genevieve Salmonson, Director/Office of Environmental Quality Control
Terry Hilderbrand, Project Manager/City & County of Honolulu, DDC-Parks Planning Branch

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DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
1000 ULUOHA STREET, SUITE 309, KAPOLD, HAWAII 96707
PHONE: (808) 692-5501 • FAX: 692-5131 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR



WILLIAM D. BALFOUR, JR.
DIRECTOR

EDWARD T. "BOB" DAZ
DEPUTY DIRECTOR

MAY 28 2002

May 17, 2002

TO: RAE M. LOUI, P.E., DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

ATTENTION: TERRY HILDEBRAND

FROM: WILLIAM D. BALFOUR, JR., DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
FOSTER BOTANICAL GARDEN MASTER PLAN

Thank you for the opportunity to review and comment on the Draft Environmental Assessment Master Plan relating to the Foster Botanical Garden.

The Department of Parks and Recreation endorses this Master Plan. Should you have any questions, please contact Mr. John Reid, Planner, at 692-5454.

W.D. Balfour, Jr.
WILLIAM D. BALFOUR, JR.
Director

WDB:cu (10848)

cc: Mr. Don Griffin, Department of Design and Construction
Office of Environmental Quality Control
✓ Ms. Kimi Mikami Yuen, PBR Hawaii

May 28, 2002

Mr. William D. Balfour, Jr., Director
Department of Parks and Recreation
1000 Uluohia Street, Suite 309
Kapolei, Hawaii 96707

SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN
DRAFT ENVIRONMENTAL ASSESSMENT

Dear Mr. Balfour:

Thank you for your letter dated May 17, 2002 concerning the Foster Botanical Garden Master Plan Draft-Environmental Assessment. We appreciate the time taken to review the report. It has been a pleasure working with you and your department throughout this process.

Mahalo for participating in the environmental review process.

Sincerely,

PBR HAWAII

Kimi Mikami Yuen
Kimi Mikami Yuen
Planner

cc: Rae M. Loui, P.E., Director/City & County of Honolulu Dept. of Design & Construction
Genevieve Salmonson, Director/Office of Environmental Quality Control
Terry Hildebrand, Project Manager/City & County of Honolulu, DDC-Parks Planning Branch

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
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TELEPHONE: (808) 531-4319 • FAX: (808) 531-4700 • INTERNET: www.hawaii.gov



JEREMY HARRIS
MAYOR

CHERYL D. SOON
DIRECTOR
GEORGE W. TERRY, JR.
DEPUTY DIRECTOR

May 20, 2002

TPD/02-01552R

MEMORANDUM

TO: RAE M. LOUI, P.E., DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

ATTN: TERRY HILDEBRAND

FROM: CHERYL D. SOON, DIRECTOR

SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN

In response to the April 11, 2002 letter from PBR Hawaii, we reviewed the draft environmental assessment for the subject project. The following comments are the result of this review:

1. Section 4.2.9.4 Public Transit (Page 46) should include a brief discussion of the paratransit service provided by the City. Oahu Transit Services operates TheHandi-Van, the Americans with Disabilities Act-required paratransit service for individuals with disabilities. TheHandi-Van provides curb-to-curb service and operates islandwide during the same hours as the fixed route system.
2. The pedestrian paths from both bus stops on Nuuanu Avenue to the garden should be accessible. Therefore, the street crossing at Nuuanu Avenue and Vineyard Boulevard should also be accessible.

Should you have any questions regarding these comments, please contact Faith Miyamoto of the Transportation Planning Division at Local 6976.

cc: Ms. Genevieve Salomonson
Office of Environmental Quality Control
Ms. Kimi Mikami Yuen
PBR Hawaii

CHERYL D. SOON

May 22, 2002

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

**SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN
DRAFT ENVIRONMENTAL ASSESSMENT**

Dear Ms. Soon:

Thank you for your letter dated May 20, 2002 concerning the Foster Botanical Garden Master Plan Draft Environmental Assessment. We appreciate the time taken to review the report. We will include your comments in the Final Environmental Assessment report. Specifically, we will add the following to the report in the sections noted below:

- 1) In Section 4.2.10.4 Public Transit (revised numbering due to the addition of a new section) we will include the following statement: "OTS also operates TheHandi-Van, the Americans with Disabilities Act-required paratransit service for individuals with disabilities. TheHandi-Van provides curb-to-curb service and operates islandwide during the same hours as the fixed route system."
- 2) We will also add the following to Section 4.2.10.4 under "Potential Impacts and Mitigative Measures": "Full accessibility from all public rights of way should be incorporated in the design development of the proposed pedestrian entrance improvements along Vineyard and Nu'uanu Avenue."

Mahalo for participating in the environmental review process.

Sincerely,

PBR HAWAII

Kimi Mikami Yuen
Planner

cc: Rae M. Loui, P.E., Director/City & County of Honolulu Dept. of Design & Construction
William D. Balfour, Jr., Director/City & County of Honolulu Dept. of Parks & Recreation
Genevieve Salomonson, Director/Office of Environmental Quality Control
Terry Hildebrand, Project Manager/City & County of Honolulu, DDC-Parks Planning Branch
Chris Smith, FAIA/CIS Group Architects

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DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET - HONOLULU, HAWAII 96813
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MAY 29 2002



JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
DIRECTOR
LORETTA K.C. CHIEE
DEPUTY DIRECTOR

2002/ELOG-1081(BA)

May 28, 2002

TO: RAEM. LOUI, P.E., DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

FROM: RANDALL K. FUJIKI, AIA, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
FOSTER BOTANICAL GARDEN MASTER PLAN - NUUANU
TAX MAP KEYS 1-7-007: 1, 2, AND 1-7-008: 1, 2

The Department of Planning and Permitting (DPP) appreciates the opportunity to review the proposed project. We offer the following comments.

Primary Urban Center Development Plan

The proposed project improves the present facility, enhancing open space and offering passive recreational benefits.

The project should further consider the role of the proposed Nuuanu Stream greenbelt and how it could be made a more useful component of the open space network, by allowing public access through the property from Vineyard Boulevard to the Liliuokalani Botanical Garden.

The EA should also discuss how security at the Nuuanu Stream side of the property will be addressed and how these measures (fencing, controlled access, etc.) will affect the physical access and visual connections between the proposed greenbelt and the stream.

Land Use and Zoning

Section 3.2.3, Land Use Ordinance

1. Parking and Landscaping. The EA should discuss the Land Use Ordinance (LUO) requirements for parking lot landscaping, and explain how the proposal complies with such requirements.

Rae M. Loui, Director
Department of Design and Construction
Page 2
May 28, 2002

2. Building Area. The EA should provide information that the LUO development standard requiring the total building area to not exceed 5 percent of the total land area, is being met.
3. Required Yards. Within the P-2 General Preservation District, 30-foot front yards and 15-foot rear yards are required. Fences exceeding six feet in height and structures exceeding 30 inches in height are not permitted within any required yard. The proposed gateway structure and the wall adjacent to the H-1 Freeway may be affected by this requirement.
4. Signage. LUO regulations for the P-2 General Preservation District allow only one non-illuminated or indirectly illuminated sign, not exceeding 12 square feet in area, and can be mounted no closer than 10 feet to the property line fronting a street or be higher than eight feet above finish grade.
5. Lighting. All lighting must be shielded to prevent stray light into public rights-of-way or adjacent properties.

Section 3.2.4, Punchbowl Special District

1. Yards. All required yards must be landscaped.
 - Parking and loading spaces, including "overflow" parking, are not permitted within any required yard.
 - Only necessary walkways and driveways can be located within the side yard adjacent to Nuuanu Stream. The service access road may not be allowed in the required yard.
 - The Freeway is designated as a Punchbowl viewing site. A landscape hedge may be required to screen the wall from view.
2. Height. The property is subject to a zero-foot height limit.
3. Relocation of the project fence along Vineyard Boulevard should be considered to allow for a clear view and identification of the Visitor's Center from Nuuanu Avenue and Vineyard Boulevard.

Section 3.2.6, List of Permits

If the project does not intend to comply with specific standards of the LUO, such variations should be identified in the EA. A zoning waiver may be necessary.

Rae M. Loui, Director
Department of Design and Construction
Page 3
May 28, 2002

As you may be aware, the DPP and the Downtown/Ala Moana Community Vision Group (CVG) are in the early stages of developing a revitalization plan for Chinatown. While the study will focus on the Chinatown community, it will also evaluate its relationship and connections to neighboring areas, including Foster Botanical Gardens. We recommend that the CVG be provided the opportunity to review and comment on this proposal. Please coordinate this review through the City's CVG Facilitator, Salvatore Lanzilotti at 831-4351.

Should you have any questions, please feel free to contact Bonnie Arakawa of my staff at 527-5837.

RKF:lh
dec156714

cc: OEQC
PBR Hawaii
Salvatore Lanzilotti, HES



Wai Paiva Blazer, PASLA
Chairman
Thomas S. Hirose, ASLA
President
P.O. Box 10000, ALA
Honolulu, HI 96810

June 3, 2002

Mr. Randall K. Fujiki, AIA, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

**SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN
DRAFT ENVIRONMENTAL ASSESSMENT
(Reference # 2002/ELOG-1081(BA))**

Dear Mr. Fujiki:

Thank you for your letter dated May 28, 2002 concerning the Foster Botanical Garden Master Plan Draft Environmental Assessment. We appreciate the time taken to review the report. We offer the following responses to your comments:

- 1) **Primary Urban Center Development Plan:** Previous versions of the master plan had proposed a public greenway along Nu'uuanu Stream which would allow access from makai areas through Foster Botanical Garden to Lili'uokalani Botanical Garden. However, the City is reconsidering how best to use this area. There are several issues that need to be resolved before the greenway can be developed. Currently, there is no pedestrian crossing at this point across Vineyard Boulevard and visitors would have to backtrack to the signalized intersection of A'ala Street to cross Vineyard Boulevard. Since this point is so close to A'ala Street, it is unlikely that the State would allow another pedestrian crossing across Vineyard Boulevard to make the link to River Street. Furthermore, there is an existing public pathway, the River Street Promenade, located on the opposite bank of Nu'uuanu Stream. It runs the entire length of the block parallel to Foster Botanical Garden and is closer to the A'ala Street crossing. Other issues of concern include security and public safety. Depending upon the route chosen by the City to cross the H-1 Freeway to Lili'uokalani, the City would need to address potential flooding should the access go below the freeway or the potential visual impacts of a connection that ran above the freeway. In addition, it is not clear whether access would be granted by the State to cross the H-1 Freeway. Finally, there is the administrative problem of controlling access since Foster Botanical Garden has an entrance fee and Lili'uokalani Botanical Garden does not. Therefore, without a more detailed study to determine a feasible and safe access to Lili'uokalani Botanical Garden across the freeway, public access

Page 2
Mr. Randall K. Fujiki, AIA
SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN DRAFT
ENVIRONMENTAL ASSESSMENT
June 3, 2002

through Foster Botanical Garden would lead nowhere. As noted, the City continues to debate this issue. For the master plan, they decided to leave the area as a part of the larger Garden without any major improvements so that they may, at a later date, decide whether or not to open the area along the stream to the public.

The master plan does not propose any changes to the existing stone wall along Nu'uano Stream. Therefore neither physical access nor visual connections will be affected. We will clarify this in Section 2.4.2.8 of the EA.

2) **Land Use and Zoning:** Parking and Landscaping requirements as well as Building Area, Required Yards, Signage, and Lighting will be determined in the design development phase of implementation of the master plan. We will revise the Discussion portion of Section 3.2.3 to read, "The current uses and proposed improvements at Foster Botanical Garden are appropriate and permitted uses in the P-2 zone. Based on the architectural program proposed in the master plan, the facilities are not expected to exceed the maximum building area of 5 percent of the total land area of the zoning lot as required by the LUO. Total building area proposed in the master plan is estimated at 28,200 square feet, which is 4.8 percent of the total land area (~590,000 square feet). The City & County of Honolulu will require that the design of all structures and other improvements will comply with the required development standards for the P-2 zone. If any improvements as designed by architects or engineers contracted by the City & County of Honolulu during the implementation phases of the master plan do not comply with the LUO, appropriate permits or waivers should be sought." In addition, we will forward your comments to the City & County of Honolulu Department of Design and Construction to insure that the LUO is followed for all architectural and engineering designs developed for Foster Botanical Garden.

3) **Punchbowl Special District:** The master plan as shown in Figure 3 is conceptual. We will forward your comments regarding required yards, parking, driveways and walkways, and viewing sites to the City & County of Honolulu for their compliance during the design development of the implementation of the master plan.

We will add the following to Section 3.2.4 of the Environmental Assessment: "Since the Garden is subject to a zero-foot height limit, the City & County of Honolulu will need to seek an exception with the Director of the Department of Planning and Permitting (pursuant to §21-9.50-4 of the LUO)

Page 3
Mr. Randall K. Fujiki, AIA
SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN DRAFT
ENVIRONMENTAL ASSESSMENT
June 3, 2002

in order to construct the proposed facilities such as the Visitor Center and Lyon Orchid Conservatory. If granted, the height limit as determined by the Garden's P-2 zoning is 15' to 25' (with height setbacks for heights over 15') (§21-3.40-1 (d) & (e) LUO)."

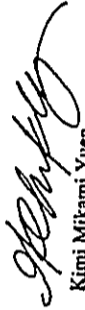
Although fence design will be determined during the design development stage of implementation of the master plan, the master plan has recommended that the fence along Vineyard Boulevard and Nu'uano Avenue be "...a low rock wall with an open fence above to allow views into the Garden..." so that the Visitor Center would be visible from both Vineyard and Nu'uano Avenue.

- 4) **List of Permits:** We will add "Zoning Waivers" to the list of permits.
- 5) We will forward your recommendation to contact the Downtown/Ala Moana Community Vision Group in regards to the proposed improvements at Foster Botanical Garden to the City & County of Honolulu, along with the contact information for Mr. Salvatore Lanzilotti.

Mahele for participating in the environmental review process.

Sincerely,

PBR HAWAII



Kimi Mikami Yuen
Planner

cc: Rae M. Loui, P.E., Director/City & County of Honolulu Dept. of Design & Construction
William D. Balfour, Jr, Director/City & County of Honolulu Dept. of Parks & Recreation
Genevieve Salmonson, Director/Office of Environmental Quality Control
Terry Hildebrand, Project Manager/City & County of Honolulu, DDC-Parks Planning Branch
Tony Macawite, Project Manager/City & County of Honolulu, DDC
Chris Smith, FAIA/CJIS Group Architects



DOWNTOWN NEIGHBORHOOD BOARD NO. 18

44 NEIGHBORHOOD CONGRESS • CITY HALL, ROOM 408 • HONOLULU, HAWAII 96813

May 6, 2002

Ms. Rae M. Loui, P.E.
Department of Design and Construction
City and County of Honolulu
650 S. King Street, 9th Floor
Honolulu, HI 96813

Re: Draft EA, Foster Botanical Garden Master Plan

Dear Ms. Loui:

At its May 2, 2002 meeting, the Downtown Neighborhood Board reviewed the Draft Environmental Assessment for the Foster Botanical Garden Master Plan. We have the following comments:

1. We are concerned about traffic impacts. The traffic mauka bound on Maunakea Street is often backed up because of traffic tie-ups on Vineyard due to the traffic signal at Nuuanu. Where the entrance currently is on Vineyard there are no traffic backups.
2. The new location of the community gardens will pose a hardship on elderly and asthmatic gardeners because of the heavy incense burning at the adjacent Buddhist temple.

Sincerely,

Lynne Matusow

Lynne Matusow, Chair

cc: Terry Hildebrand, Design and Construction
OEQC
Kimi Yuen, PBR Hawaii

MAY - 7 2002



LAND PLANNING
ENVIRONMENTAL STUDIES

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Associate

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May 17, 2002

Ms. Lynne Matusow, Chair
Downtown Neighborhood Board #13
c/o Neighborhood Commission
City Hall, Room 400
Honolulu, Hawaii 96813

SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN
DRAFT ENVIRONMENTAL ASSESSMENT

Dear Ms. Matusow:

Thank you for your letter dated May 6, 2002 concerning the Foster Botanical Garden Master Plan Draft Environmental Assessment. We appreciate the time taken to review the report. We offer the following responses to your comments:

- 1) The potential traffic impacts of the relocated main entry have been studied and analyzed by Wilson Okamoto and Associates, Inc. (Their report was included in full in Appendix B of the Draft Environmental Assessment.) According to their report, "the proposed improvements at the Foster Botanical Garden are anticipated to have no significant impact on the surrounding roadways since most activities at the project site is expected to occur during off-peak hours." The Garden opens to the public at 9:00 AM and the peak morning traffic typically occurs before 8:00 AM. In the afternoons, the Garden closes at 4:00 PM, which overlaps with peak afternoon traffic. However, the majority of traffic generated by the Garden at this time would be exiting the Garden and not traveling mauka on Maunakea Street. There may be some increase in traffic on Vineyard which may affect mauka-bound traffic on Maunakea. However, there will be modifications to the existing traffic signal system that will work to mitigate the situation and maintain an acceptable level-of-service.

- 2) The proposed location of the Community Garden is further away from the Kuan Yin Temple than its current location and is upwind of the temple.

Mahalo for your concern and for participating in the environmental review process.

Sincerely,

PBR HAWAII

Kimi Mikkami Yuen
Kimi Mikkami Yuen
Planner

cc: Rae M. Loui, P.E., Director/City & County of Honolulu Dept. of Design & Construction
William D. Balfour, Jr, Director/City & County of Honolulu Dept. of Parks & Recreation
Genevieve Salmonson, Director/Office of Environmental Quality Control
Terry Hildebrand, Project Manager/City & County of Honolulu, DDC-Parks Planning Branch

SCENIC HAWAII, INC.

P. O. Box 10501 • Honolulu, Hawaii 96816

May 10, 2002

Attn: Kimi Mikami Yuen
PBR Hawaii
Pacific Tower, Suite 650
1001 Bishop Street
Honolulu, Hawaii 96813

Subject: Foster Botanical Garden Master Plan

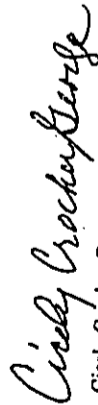
Dear Ms. Yuen,

We appreciate the opportunity to be consulted on the Draft Environmental Assessment for the Foster Botanical Garden Master Plan, and offer the following comments:

1. In addition to the external views towards the Garden, the internal views should also be considered when planning the Garden. There could be some wonderful internal views and vistas that would add to, and enhance, the overall experience of the place.
2. The link to the Liliuokalani Gardens should not be below ground under the freeway unless it is an enclosed automated system (i.e. people mover, etc.) - visitors walking under the freeway in a tunnel would not be desirable. If it is envisioned that the visitors need to walk to the Liliuokalani Gardens, then a connection above the freeway would be a better alternative (i.e. Seattle's Freeway Park).
3. The design of the freeway barrier wall should be sensitive to the view from the freeway and the community from beyond the Garden.
4. Minimize the impact of the left turn lane from Vineyard on the existing street trees.

Again, thank you for allowing us to comment on this project. Scenic Hawaii has and will continue to support efforts like this that will bring improvements to this significant botanical treasure that we have in our community.

Sincerely,



Cately Crocker George
President, Scenic Hawaii Inc.

President
Betsy Crocker
Int'l. President
Cately Crocker George

2nd V. President
Wayne Sasaki
3rd V. President
Mrs. Robert Law

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LAND PLANNING
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL STUDIES

Wm. Frank Blanton, FASLA
Chairman
Thomas S. Witten, ASLA
President
Liliuokalani Gardens
Honolulu, Hawaii 96813

May 20, 2002

Ms. Cately Crocker George, First Vice President
Scenic Hawaii, Inc.
P.O. Box 10501
Honolulu, Hawaii 96816

**SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN
DRAFT ENVIRONMENTAL ASSESSMENT**

Dear Ms. George:

Thank you for your letter dated May 10, 2002 concerning the Foster Botanical Garden Master Plan Draft Environmental Assessment (DEA). It has been a pleasure working with your organization throughout the master plan process. We also appreciate the time taken to review the DEA. We offer the following responses to your comments:

- 1) Because the master plan is conceptual in nature, the detailed design of internal views and vistas will be developed during the design phases of implementing the master plan. We agree that there are wonderful opportunities to create beautiful internal vistas in the detailed design of the gardens as they are improved. We will pass on your comment to the City & County of Honolulu for their consideration during the subsequent design development phases.
- 2) The connection to Liliuokalani Botanical Garden is conceptual at this stage. We will forward your ideas to the City & County of Honolulu for their consideration during design development.
- 3) The view and appearance of the freeway barrier from both the interior of the Garden and from its neighbors are important aspects of the design of the barrier. We will relay your concern to the City & County of Honolulu.
- 4) Although it cannot be guaranteed that the existing street trees on Vineyard Boulevard will not be affected by the left-turn lane proposed at the intersection of Maunakea Street, we will request that the City & County of Honolulu minimize any impacts to the trees whenever possible. If relocation or replanting of the trees is possible, we will ask them to consider these options during the design development stage of this improvement.

We will also add a subsection to Section 4.2 of the Final Environmental Assessment to address the visual impacts noted in your comments.

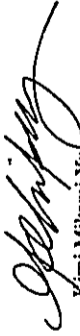
To Protect The Scenic and Visual Beauty of Hawaii

Page 2
Ms. Cicely Crocker George
SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN DRAFT
ENVIRONMENTAL ASSESSMENT
May 20, 2002

Mahalo for your support and for participating in the environmental review process.

Sincerely,

PBR HAWAII



Kimi Mikami Yuen
Planner

cc: Rae M. Loui, P.E., Director/City & County of Honolulu Dept. of Design & Construction
William D. Balfour, Jr, Director/City & County of Honolulu Dept. of Parks & Recreation
Genevieve Salmonson, Director/Office of Environmental Quality Control
Terry Hildebrand, Project Manager/City & County of Honolulu, DDC-Parks Planning
Branch



THE OUTDOOR CIRCLE

1314 South King St., Suite 306 • Honolulu, HI 96814
Phone: 808-593-0300 Fax: 808-593-0375

MAY 24 2002

May 22, 2002

Established 1912
A Non-profit Organization

BRANCHES

O'AHU

Kaunohi
Lani-Kaha
North Shore
Waialeale-Kahala

HAWAII

Hilo
Kauai
Kona
Waikoloa Village
Waimea

KAUAI

MAUI

GARDEN CIRCLE

Lani-Kaha

Ms. Ray M. Loui, P.E.
Director
Department of Design and Construction
City and County of Honolulu
650 South King Street
Honolulu, HI 96813

RE: Foster Botanical Garden Master Plan/Draft Environmental Assessment

Dear Ms. Loui:

Thank you for the opportunity to comment on the above referenced Master Plan/Environmental Assessment (EA). Upon review of the document, we believe the following should be addressed in the Final Environmental Assessment (FEA) before a Finding of No Significant Impact (FONSI) is given:

General Comments:

Although the Foster Botanical Garden has certified arborists on staff, those people have other jobs which keep them busy on a day-to-day basis. The Environmental Assessment does not include a detailed commitment to tree protection nor does it call for the hire of a consulting/qualified arborist who would be available throughout the design and construction process. In order to avoid conflict of interest, this person should be an employee of the City and not the contractor. Please include a statement in the FEA which calls for the services of a qualified arborist during construction.

In addition, the community should have input into the final design of the visitor's center and administration buildings. The FEA should include a figure which compares current square footage being used as visitor center/admin to the proposed 9,890 gross square feet.

2.4.2.2 Service Area

Please describe what "intensity of garden development" means as referred to in this section.

Sec. 2.4.2.4 Visitor Parking Lot

Figure 3 does not show stippled grassy areas to indicate overflow parking.

Provide tree protection specifications during construction for the three "prized trees" around which the new visitor parking will be located. Also, please provide

Ms. Rae Loui
May 23, 2002
Page 2

the amount of space you consider as "ample clearances" from the bases of the trees to the parking lot. A 10-15 foot buffer is not an acceptable clearance for these magnificent trees.

Sec. 2.4.2.5 New Pedestrian Entrance:

We would like to see the FEA contain a commitment to signs that are in keeping with the City's Land Use Ordinance and not oversized.

Sec. 2.4.2.7 Community Garden:

Please indicate in the FEA how many community garden plots exist now and how many will be available to the public after implementation of the Master Plan.

Sec. 2.4.2.8 General Park Improvements

Please provide more information about the noise barrier.

The new lighting plan must be carefully designed to avoid tree roots while trenching. The FEA should include a commitment to do this with the utmost of care and with the project's certified arborist present.

Sec. 3.2.6 List of Permits:

The list of permits does not include ones for work being done on or near Exceptional Trees. If those trees, or their roots, will be impacted in any way, please add that to the list of permits required.

Sec. 4.1.4 Flora and Fauna:

We believe that the special construction methods which will be used to protect trees and tree roots during construction should be well stated in the FEA and that a commitment should be given up front to stay at least 20-feet from the base of any tree.

Sec. 4.2.1 Archaeological and Historic Resources:

The Master Plan makes it sound as if only the exceptional trees and the 23 significant trees that have been identified by staff will be preserved. Please clarify that many other trees in Foster Garden will remain as well. If others are slated for removal, the document should contain an inventory delineating the fates of all the trees. A large number of tree removals most definitely would have a negative impact on our environment.

Sec. 4.2.5 Economic Impacts:

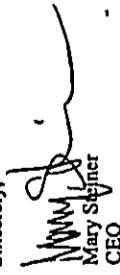
We believe the Environmental Assessment lacks information about the planned café at the Visitor Center. Without specific details, it is impossible to have a discussion about its impacts. Outstanding questions such as how many people are expected to be served each day, will service be sit down or self-serve, what sort of kitchen requirements will the café have, and what will be done with the solid waste produced by the café, are just some of the questions that should be resolved prior to releasing the FEA. These issues are important in making a reasonable attempt to judge the cumulative environmental impacts of the project.

Ms. Rac Loui
May 23, 2002
Page 3

Sec. 4.2.7.4 Electrical and Communication Facilities:
We believe that if all wires in the Garden are currently underground, all new utility lines should be also be placed underground.

Thank you for the opportunity to comment. We look forward to your response.

Sincerely,


Mary Steiner
CEO

CC: Office of Environmental Quality Control
PBR Hawaii



LAND PLANNING
LANDSCAPE
ENVIRONMENTAL STUDIES

WM FRANK BLANDIN, PLSA
Chairman

Thomas A. Wilson, ASLA

Thomas A. Wilson, ASLA

Thomas A. Wilson, ASLA

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Thomas A. Wilson, ASLA

Thomas A. Wilson, ASLA

June 10, 2002

Ms. Mary Steiner, CEO
The Outdoor Circle
1314 South King Street, Suite 306
Honolulu, Hawai'i 96814

**SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN
DRAFT ENVIRONMENTAL ASSESSMENT**

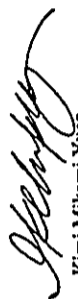
Dear Ms. Steiner:

Thank you for your letter dated May 22, 2002 concerning the Foster Botanical Garden Master Plan Draft Environmental Assessment (DEA). We appreciate the time taken to review the report. We offer the following responses to your comments:

- 1) **General Comments:** We will add the following statement to section 4.1.7: "Throughout the design and construction processes of implementation of the master plan, the Department of Parks and Recreation (DPR) staff, specifically the Honolulu Botanical Garden staff and the Arborist Advisory Committee, as well as botanical experts such as certified arborists should be consulted to ensure that existing trees and their tree roots are protected whenever possible. When removal of an existing tree is required, DPR staff and other specialists consulted will make recommendations on tree significance, transplant possibilities, or other mitigative measures."
- 2) **2.4.2.2 Service Area:** "intensity of garden development" refers to the additional garden areas proposed in the master plan.
- 3) **2.4.2.4 Visitor Parking Lot:** Figure 3 does indeed show stippled grassy areas: on the mauka side of the parking lot near the low rock wall facing Vineyard Boulevard and along the service access/pedestrian paths near Nu'uuanu Stream.

The buffer size was specified by a consulting arborist who inspected the trees with Honolulu Botanical Garden staff during the master plan development. However, we will revise the EA to read "with a minimum fifteen-foot buffer around the sterculia."
- 4) **2.4.2.5 New Pedestrian Entrance:** We will add the following: "All signs that are proposed for the Garden should comply with Article 7 of the City's Land Use Ordinance." We will add a similar statement to the new section 4.2.7 Visual Impacts.

- 5) **2.4.2.7 Community Garden:** The following statement will be added:
"Currently, there are 60 plots available to the public. The City has made a commitment to retain the same number of plots in the relocated community garden."
- 6) **2.4.2.8 General Park Improvements:** Since the master plan is conceptual in nature, additional details of the noise buffer is not known at this time and will be developed during the design stage of this improvement.
We will add the following statements to Section 2.4.2.8: "These improvements should be routed and constructed with input from botanical experts such as certified arborists who can help position the lines with minimal harm to the significant plants at the Garden. Directional boring techniques and other suitable construction methods should be considered for these projects."
- 7) **3.2.6 List of Permits:** In Section 3.2.6, we will add "Application to Prune Exceptional Tree(s)/Palm(s)" under "Permit or Approval" and the authority will be listed as "Department of Parks and Recreation."
- 8) **4.1.4 Flora and Fauna (referenced Section number incorrect):** In addition to the statement to be added in section 4.1.7 as noted in Item 1, the following statement will be added to section 4.1.7: "The City should investigate and utilize whenever possible innovative construction techniques such as directional boring in order to protect existing trees as recommended by botanical experts."
According to DPR staff, the buffer distance around a tree that is maintained depends upon several factors including the tree species, size, condition of the tree, and site conditions. A tree protection plan and a tree assessment that is done by a qualified arborist should be included in the design phase of master plan implementation projects. This will minimize any negative tree impacts as well as clarifying the fate of trees affected by the design of the improvements.
- 9) **4.2.1 Archaeological and Historic Resources:** Section 4.2.1 focuses on the exceptional trees (ET) in direct response to the State Historical Preservation Division's records on Foster Botanical Garden. As noted in the master plan, no major improvements or changes are recommended for the Upper Terrace, Daibutsu Terrace, Prehistoric Glen, Palm Garden and Middle Terraces. As a result, the master plan graphic (Figure 3 of the DEA and Figure 10 of the Master Plan report) simplifies these areas and highlights only the exceptional

- and significant trees to aid legibility of the plan. Existing trees and plants in these areas should be preserved unless specified by the Honolulu Botanical Garden staff during the design development stage of implementation of the master plan. On the other hand, in the areas where the proposed improvements are concentrated, please note that in addition to the ETs and significant trees, existing trees that are recommended for preservation are illustrated with a dashed outline, dotted center, and yellow-green color. Until the architectural design is developed in the implementation phase of the master plan, it is unknown which trees will be affected. However, we will include your concern regarding tree removal in section 4.1.7 Flora and Fauna as noted in Items 1 and 8.
- 10) **4.2.5 Economic Impacts:** The Master Plan report contains a detailed description of the cafe as conceptualized in the Master Plan on pages 31-32 under the "Visitor Center and Administrative Offices Architectural Design and Program" section. The proposed cafe would have sit-down service with approximately 30-40 seats indoors. Additional seating may be provided on a lanai depending upon the final architectural design of the facility. The proposed size of the cafe is approximately 1,000 square feet with the kitchen occupying about half of that space.
- 11) **4.2.7.4 Electrical and Communication Facilities:** As noted in section 4.2.7.4, there are existing overhead electrical wires near the existing Information Desk and Cashier. We also state in section 4.2.7.4 that "All new utility lines on Garden grounds should be installed underground whenever possible, with special measures taken to avoid harming root systems of important plants or trees in the Garden." (Please note that the section numbering will be changed to 4.2.8.4 in the Final EA due to the addition of a new section.)
- Mahalo for participating in the environmental review process.
- Sincerely,
- PBR HAWAII
- 
- Kimi Mikami Yuen
Planner

Page 4
Ms. Mary Siciner
SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN DRAFT
ENVIRONMENTAL ASSESSMENT
June 10, 2002

cc: Rac. M. Loui, P.E., Director/City & County of Honolulu Dept. of Design & Construction
William D. Balfour, Jr., Director/City & County of Honolulu Dept. of Parks & Recreation
Genevieve Salmonson, Director/Office of Environmental Quality Control
Terry Hildebrand, Project Manager/City & County of Honolulu, DDC-Parks Planning
Branch
Tony Macawile, Project Manager/City & County of Honolulu, DDC
Chris Smith, FAIA/CJS Group Architects

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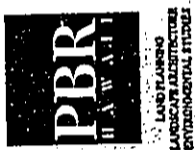
Hand-delivered by anonymous woman to NH.

MAY 24 2002
MAY 28 P1:10
RECEIVED
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

Office of Environmental Quality Control
235 South Baretania Street, Suite 702
Honolulu, Hawaii 96813

SUBJECT: Needs for protecting the integrity of the EIS process. I am concerned by a trend that suggests the EIS process is becoming adversarial, using numerous technical arguments to cover up potential significant impacts (probably not totally intentional). Specifically, I'll use the current Foster Botanical Garden Master Plan as an example of a dEIA I perceive as a sound original plan overshadowed by special interests not averse to reducing the resource, the user community, the integrity of pertinent laws, regulations, and policies, using "tax" dollars.

1. A quarantine greenhouse is proposed but the structure and uses not described. The State Department of Agriculture strictly enforces regulations regarding quarantine including greenhouse construction, as well as the law regarding plant importation. Hopefully the Foster plan is not to reduce or avoid such cooperative efforts.
 2. Exceptional and significant trees are substituted for State and federal rare, threatened or endangered plant species. Species on the endangered list but not the exceptional or significant lists are not mentioned, e.g. some 'o'ulu palms. Hawaiian gardens, including Foster, also work with endangered species in their greenhouses. Thirdly, a listing of international endangered species would be pertinent, although probably exempt from state and county jurisdictions.
 3. The increase in building areas compromises or conflicts with the Urban Center Plan open space preservation policy to maintain or increase open space. Current and proposed total square feet of buildings (plus parking and roads) are not given. A third alternative could be included where the orchid conservatory becomes the dominant attraction of the visitor center, the administrative offices move into some of the adjacent classroom space, and perhaps little if any reduction in operation and maintenance buildings would present a scenario in accord with maintaining or increasing open space. Also, is it adequate in a master plan or EA to say, "it is not currently known if or how many additional operational jobs will be needed to staff the improved facilities"?
 4. Inconsistencies also can obscure impacts, i.e. the economic garden will undergo "redevelopment" during Phase IV, will be reduced by more than half as shown in Figure 3, and/or will be "left largely unchanged" according to the note next to Figure 3.
- Needs increase for OEQC to effectively advise applicants to follow EIS guidelines. I hope my remarks offer something you can use, and I thank you for your efforts to perpetuate this valuable planning procedure.



June 10, 2002

Anonymous Letter submitted to OEQC
Dated: May 24, 2002
Received at OEQC: May 28, 2002

**SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN
DRAFT ENVIRONMENTAL ASSESSMENT**

To Whom It Concerns:

Thank you for your letter dated May 24, 2002 concerning the Foster Botanical Garden Master Plan Draft Environmental Assessment. We appreciate the time taken to review the report. We offer the following responses to your comments:

- 1) The quarantine greenhouse will be built to meet State of Hawai'i Department of Agriculture specifications and regulations. Based on information from Foster Botanical Garden staff, they will be working with both State and Federal Agriculture agencies in the use of this facility. This information will be included in the environmental assessment.
- 2) The EA has been revised to include a description of the endangered plant species that are currently at Foster Botanical Garden. It also will contain measures to ensure the protection of these plants. Please refer to Section 4.1.7 of the Final EA.
- 3) Although the total building area has increased in the master plan, these developed, non-garden areas will be more compact and will actually open up more of the 13.5 acres to the public at Foster Botanical Garden. For example, existing service areas which are currently closed to the public occupy nearly 106,000 square feet. The proposed service area in the master plan will occupy only 30,000 square feet. The existing visitor parking lot occupies approximately 30,000 square feet and is located such that Nu'uuanu Stream, a picturesque amenity, is cut off from the Garden. The proposed visitor parking lot will occupy roughly the same square footage (32,000 square feet) but provides more parking (+13 stalls). Its new location is in an area currently occupied by service facilities which are closed to the public and underutilized areas. As a result, the area occupied by the existing parking lot will be recaptured for new garden areas which will increase open space. The community garden and the area around it occupies over 57,000 square feet. This area is physically separated from the main garden by fences and therefore is not usually explored by Foster Botanical Garden visitors. In the

Page 2
Anonymous Letter
SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN DRAFT
ENVIRONMENTAL ASSESSMENT
June 10, 2002

master plan, this area will be developed as new garden areas and will include the new Lyon Orchid Conservatory. The new Visitor Center is located where existing service and administration buildings stand.

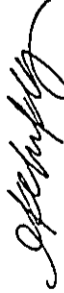
The alternative proposed in your letter does not satisfy the goals of the master plan and the needs of the staff or participating community members. Current administration and operational facilities are inadequate in both size and function. Reducing classroom facilities hurts the goal of improving and increasing educational programs and supporting local botanical clubs and organizations. We have revised the discussion on staffing needs.

- 4) We have revised the note in Figure 3.

Mahalo for participating in the environmental review process.

Sincerely,

PBR HAWAII



Kimi Mikami Yuet
Planner

cc: Rae M. Loui, P.E., Director/City & County of Honolulu Dept. of Design & Construction
William D. Balfour, Jr, Director/City & County of Honolulu Dept. of Parks & Recreation
Genevieve Salmonson, Director/Office of Environmental Quality Control
Terry Hildebrand, Project Manager/City & County of Honolulu, DDC-Parks Planning Branch
Tony Macawile, Project Manager/City & County of Honolulu, DDC
Chris Smith, FAIA/CIS Group Architects

Terry Hildebrand
City Department of Design
and Construction
650 So. King Street
Hon, HI 96813

Dear Ms. Hildebrand:

On April 29, 2002, I read an article in the Advertiser that made my worst day of my life. The RENOVATION of Foster Gardens. THIRTEEN MILLION DOLLARS. FOUR PHASES. WILL THIS BE FOUR YEARS????? And why the deadline to respond?

One reason why I have loved my apartment for over 20 years is that it looked over Foster Gardens. This was one quiet place that one could find solace. All the trees, no buildings immediately in front. The 2 nice bright yellow trees. Then the downfall. You started charging an admission fee. That took away immediately my being able to go over there on a weekly basis.

Nuuamuu Avenue WAS a quiet OASIS. Which by the way, is soon going to become a race way for bikers. One of the things I thought about over the years, was that people from JAPAN would buy it and turn it into condominiums. Or that the trees would be killed from all the garbage you put under the trees. The park was one reason I have resisted moving since our way of living was ravaged at our apartment complex. . Then I thought nah, none of this is ever going to happen.

THEN THEN

Where did the city get \$13 million anyway? THE CITY IS SUPPOSEDLY GOING BROKE!!!!!!

However, the worst is about to happen. The entrance closer to Nuuanuu more cars. BUSES. Construction noise, dust, chain saws, back up beepers, pile drivers (?), cement trucks, the whole ball of wax, for four years?

Usually no construction manager knows his salt. [As evidenced by the construction at the Church and former Chock Pang Clinic] No dust barriers, no watering down of dirt, NOISE, NOISE, NOISE, Plastic flapping in the wind.. Loaded trucks are not diverted down Vineyard, the [freeway]. Rather they turn onto Nuuanuu. All we do in our apartment is CLEAN, CLEAN, CLEAN.

This is short street. If you think that we don't get our share of NOISE, here is a list of the noise we have to put up with on a daily basis:

Heavy traffic, air brakes of buses, squealing brakes of trucks. 3am roarings of motorcycles and mopeds. Sirens of ambulances, medical Helicopters, fire trucks and police. JUST pretend that this is going on under your living area windows.

It is interesting to note that there were relatively NO SIRENS THE WEEK OF NEW YEARS. NOW SIRENS are back on schedule at precisely 8:00 am, 4:30 to 5PM. You can set your clock by the sirens, and wouldn't be too far off. At 1:00 am time slot the ambulance drivers can see for blocks that there is NO TRAFFIC at the intersections but they still continue to blow the siren. Would it be staff trying to get home early to the other side of the island.

Isn't it during the holidays when there are MORE accidents rather than LESS. THEREFORE THERE should have been more sirens during the 4 day holiday?

More noise: Airplanes, New Years fire crackers, Chinese new years, protest parades, lawn mowers foster gardens, Harris church, Queen Emma gardens cutting tractors, tractor blowers [foster gardens] weed whackers, edge trimmers, hedge trimmers, tree trimmers, tree branch mulching, lawn/sidewalk blowers, garbage trucks, traffic over large steel street plates, man holes being ripped up every three months, roofs being treated with tar [the smell!!!!]. Roads being torn up and patched every three months.

Crazy people walking up and down Nuuanuu screaming. Boom boxes, car door slamings, back up beeping, car security systems going off, trolley cars filled with screaming people, wedding horns, screaming children, construction big flapping sheets of plastic in the wind! [former Chock Pang Clinic, near Zippy's] I think you get the picture!!!! This is just on the outside of the apartment building.

Inside the apartment building: constant moving in and out of residents. Banging, building, air hammers, bad cooking smells, bad cigarette smells, water being turned off, elevators not working, power being turned off.

Leave the administrative buildings where they are. Expand them if necessary to the left or right, don't move the position. We can't see the potting shed, it is covered with foliage. Will we be looking down on roof tops now??? Leave the parking where it is near the stinky canal. Most of the people in the old folks home are too deaf to hear the car door slams. Why do architects plan things, with NO CONSIDERATION for the people living next to these projects.

I HOPE THESE CHANGES NEVER, EVER HAPPEN.



LAND PLANNING
URBAN ARCHITECTURE
ENVIRONMENTAL STUDIES

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August 5, 2002

Anonymous Letter 2

Submitted to: Terry Hildebrand, City Dept. of Design & Construction
Received at DDC: May 24, 2002

**SUBJECT: FOSTER BOTANICAL GARDEN MASTER PLAN
DRAFT ENVIRONMENTAL ASSESSMENT**

To Whom It Concerns:

Thank you for your letter concerning the Foster Botanical Garden Master Plan Draft Environmental Assessment. We appreciate the time taken to review the report. We offer the following responses to your comments:

- 1) The four phases proposed in the Master Plan for Foster Botanical Garden are not tied to any specific length of time nor is the City tied to developing the proposed improvements in four phases. The timing of the phases will be determined by available funding such as the City's annual capital improvement projects budget and donations.
- 2) It has not been determined at this time whether any changes will be made to the admission fees. However, the City currently offers an annual family pass with unlimited entrance to Foster Botanical Garden and the Honolulu Zoo for \$25.
- 3) The inconveniences created by construction cannot be avoided but are temporary. Contractors are required to follow all State laws regarding noise limits and dust abatement and to obtain all required permits prior to construction commencement.
- 4) The existing buildings and layout of the Garden's facilities including the parking lot are not adequate to meet the needs of the Garden visitors and staff. Removal of mature trees will be minimized whenever possible and the proposed buildings will be designed to blend with the Garden. The existing location of the parking lot cuts the Garden off from Nu'uuanu Stream which is valued as an asset to the Garden. The proposed location of the new parking lot uses an underutilized portion of the Garden and allows for a more efficient parking layout. It is the City's intent to improve the Garden for visitors, residents, and neighbors alike and will mitigate foreseeable impacts to neighboring properties as required.

Mahalo for participating in the environmental review process.

Page 2
Anonymous Letter 2
August 5, 2002

Sincerely,

PBR HAWAII

Kimi Mikami Yuen
Planner

cc (via fax): Rae M. Loui, P.E., Director/City & County Dept. of Design & Construction
William D. Balfour, Jr., Director/City & County Dept. of Parks & Recreation
Genevieve Salmonson, Director/Office of Environmental Quality Control
Terry Hildebrand, Project Manager/City & County of Honolulu, DDC
Tony Macawile, Project Manager/City & County of Honolulu, DDC
Chris Smith, FAIA/CIS Group Architects

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ABSTRACT

At the request of PBR Hawaii, Scientific Consultant Services, Inc. (SCS) was contracted to conduct background and archival research for the Foster Botanical Garden Master Plan and Environmental Assessment (EA) consisting of 13.5 acres (TMK:1-7-07:01, 02 and 1-7-08:01, 02). The background and archival research consisted of reviewing and summarizing maps, and archaeological and historical documents pertinent to land use in and around the project area. This included research on past Land Court Awards and land management in the vicinity of the project area, as well as a review of other documents and journals emphasizing early historical settlement patterns and activities in the area. Archival information indicated early historic habitation and agricultural activities within the project area. It is recommended that an archaeological inventory survey be conducted in undisturbed areas proposed for development.

SCS Project No. 1023

ARCHIVAL RESEARCH FOR
THE FOSTER BOTANICAL GARDEN MASTER PLAN
AND ENVIRONMENTAL ASSESSMENT (EA)

OF 13.5 ACRES,
IDENTIFIED AS TMK:1-7-07:01, 02 AND 1-7-08:01, 02

Prepared by:
Leana McGerty, B.A.
and
Robert L. Spear, Ph.D.
August 2001

Prepared For:
PBR Hawaii

SCIENTIFIC CONSULTANT SERVICES, Inc.

711 Kapiolani Blvd., Suite 1475, Honolulu, Hawaii 96813

TABLE OF CONTENTS

ABSTRACT i

TABLE OF CONTENTS ii

LIST OF FIGURES iii

INTRODUCTION 1

HISTORICAL BACKGROUND 1
 HONOLULU 3

PRE-CONTACT AND EARLY HISTORIC LAND USE IN NUUANU 4

NĀ MO'OLELO 8

THE MÁHELE 12

THE GARDEN 20

PREVIOUS ARCHAEOLOGY 23

DISCUSSION 25

RECOMMENDATIONS 25

LIST OF FIGURES

Figure 1: USGS Honolulu Quadrangle Map Showing Project Area 2

Figure 2: Russian Map of Honolulu in 1817 Showing Approximate Location of the Project Area (Kolzebug 1821) 5

Figure 3: Map of Honolulu City 1890 Showing Project Area and Streams (Hawai'i State Archives) 6

Figure 4: The Vineyard Near the Project Area (Ghaast 1973) 11

Figure 5: Honolulu Circa 1847 Showing Project Area (Hawai'i State Archives) 13

Figure 6: 1855 Map of Honolulu by Lapasse of the Ship L'eurdyrice Showing Project Area 14

Figure 7: Fire Insurance Map of Honolulu 1891 (Hawai'i State Archives) 15

Figure 8: Portion of Map of Honolulu 1897 (Hawai'i State Archives) 16

Figure 9: LCA Awards Within the Project Area with an Overlay of 1893 House Sites (Reg. Map 1715 State Survey Office) 19

Figure 10: Map of Honolulu 1901 Showing Project Area by M.D. Monsarrat (State Survey Office) 21

INTRODUCTION

At the request of PBR Hawaii 'i, Scientific Consultant Services, Inc.(SCS) was contracted to conduct background and archival research for the Foster Botanical Garden Master Plan and Environmental Assessment (EA) of 13.5 acres, identified as TMK:1-7-07:01, 02 and 1-7-08:01, 02. The background and archival research consisted of reviewing and summarizing maps, and archaeological and historical documents pertinent to land use in and around the project area. This included research on past Land Court Awards and land management in the vicinity of the present gardens, as well as review of other historic documents and journals emphasizing early historical settlement patterns and activities in the area.

One of five garden sites that come under the heading of Honolulu Botanical Gardens, Foster Botanical Garden is situated in optimum conditions for sub-tropical plants, some rare and endangered, from all over the world. The project area is located on the Island of O'ahu, on the mauka side of the downtown business section of Honolulu (Figure 1). It is bounded on the east by the Lunalilo Freeway, to the south by Nu'uauu Avenue, to the west by Vineyard Boulevard, and to the north by Nu'uauu Stream. The surrounding region has been extensively developed over the past 150 years, leaving little of the original physical environment intact.

HISTORICAL BACKGROUND

Traditional Hawaiian subsistence was based on agricultural production, marine exploitation, animal husbandry, and wild plant and bird collecting. Several terms, such as *moku*, *ahupua'a*, *'iwi* or *'iwi 'āina* were used to delineate various land sections. A district (*moku*) contained smaller land divisions (*ahupua'a*) which customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua'a* were, therefore, able to harvest from both the land and the sea. Ideally, this situation allowed each *ahupua'a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *'iwi 'āina* or *'iwi* were smaller land divisions next to importance to the *ahupua'a* and were administered by the chief who controlled the *ahupua'a* in which it was located (Ibid.:33; Lucas 1995:40). The project area is located in the *ahupua'a* of Honolulu, *'iwi* of Waikāhala, on the leeward side of the Island of O'ahu. Honolulu included Nu'uauu and

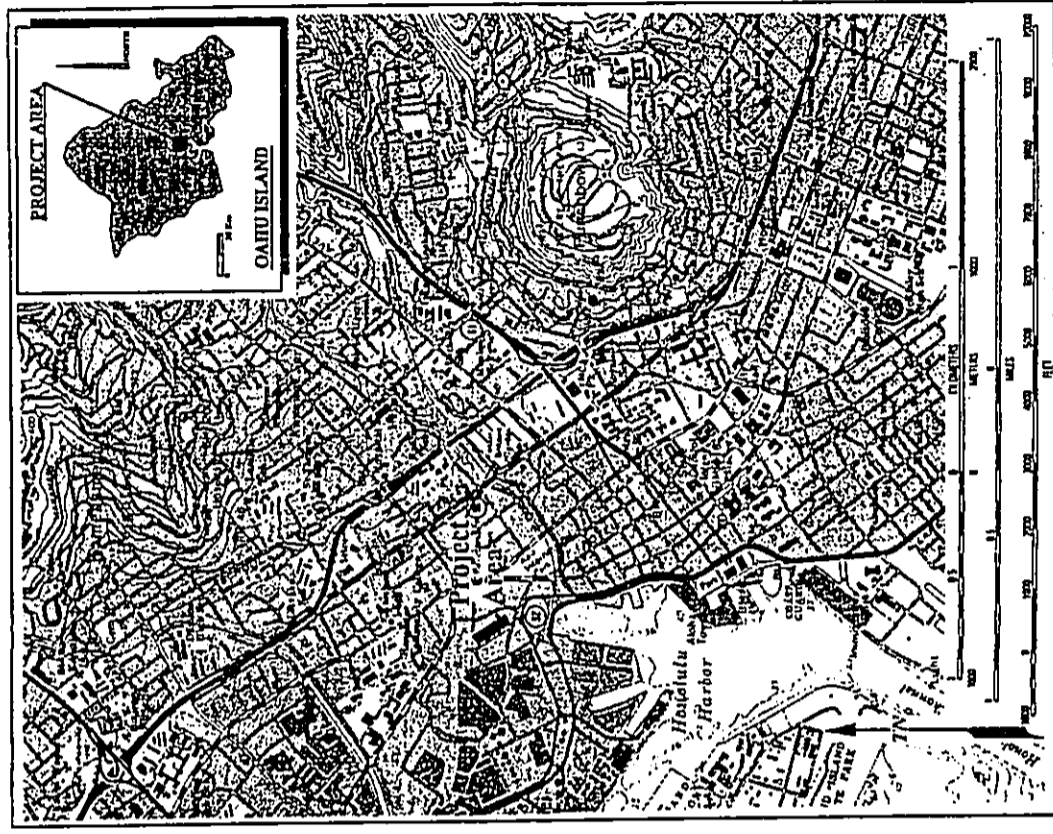


Figure 1: USGS Honolulu Quadrangle Map Showing Project Area.

Pauoa Valleys, Pacific Heights, a portion of Makiki and Tantalus. Its borders extended from Kapālama Stream to the western edge of Mānoa Valley, approximately two-and-one-half miles.

HONOLULU

Honolulu Harbor and nearby settlement was originally called "Kou" by the Hawaiians but it wasn't until 1794 that Captain William Brown sailed his British Merchant ship, the *Bitterworth*, through its narrow channel and into the bay, locating the only "all weather" anchorage for western ships on the south coast of all the Hawaiian Islands (Grantham 1998:10). In the late 1800s, as western ships arrived more frequently seeking a sheltered harbor, the *ali'i* moved from Waikīki to be near the center of foreign trade. By 1810, Kamehameha I had established his residential complex containing his family, chiefs, and retainers, in the vicinity of the great Pākāka Heiau near a canoe landing and Nu'uau Stream. From this, the village quickly grew.

Honolulu town is situated on a sedimentary deposit (approximately one thousand feet thick), with low permeability and containing large quantities of fresh water grading to seawater that has a small storage capacity. The sediments act as cap rock retarding the movement of fresh groundwater from the more permeable underlying aquifers to the sea (Armstrong 1973:42). Fresh water was abundant from the many streams bringing water from the interior and coastal springs, creating excellent conditions for agriculture. Fish ponds were constructed and lined this region of the leeward coast (Kirch 1985).

Honolulu village originally consisted of the flat land between the lower ends of Nu'uau and Pauoa Valleys, the harbor, and included the very rich farm land near what is now Liliha and School Streets (close to the present project area). The farm land was reportedly under the control of a chief named Honolulu (Handy 1940; Handy and Handy 1972:479). McAllister defined the area known traditionally as Kou in lower Honolulu, extending from Nu'uau Avenue to Alakea Street and from Hotel Street to the ocean (1933). A major trail led from the village of Kou over the Pali pass and onto the windward coast of the island (Handy and Handy 1972).

In 1828, Laura Fish Judd recorded her first impression of Honolulu, notable for its comparison to her New England home:

There! I see the town of Honolulu, a mass of brown huts looking precisely like so many haystacks in the country; not one white cottage, no church spire, not a garden not a tree to be seen save the grove of coconuts [1966:5].

Otto Von Kotzebue, of the Russian Imperial Navy, visited Hawai'i several times.

Figure 2 shows his map of Honolulu including the area where the present project is located under cultivation. Between 1815 and 1824, Kotzebue recorded:

Waojoo [O'ahu] is the most fertile of the Sandwich Islands, from which Owhyee [Hawai'i] receives a part of the taro necessary for its consumption. The cultivation of the valleys behind Hanarua [Honolulu] is remarkable; artificial ponds support, even on the mountains, the taro plantations, which are at the same time fish ponds; and all kinds of useful plants are cultivated on the intervening dams [1821 Vol. 3:236].

PRE-CONTACT AND EARLY HISTORIC LAND USE IN NU'UANU

In pre-Contact Hawai'i there were primarily two types of agriculture, wetland and dryland, both of which are dependent upon geographical conditions. Nu'uau, meaning "cool terrace" or "cool height" had perfect environmental factors for both wet and dry agriculture (Puku'i et al. 1974:167; Lyons 1901:181). Inland rains continuously provided fresh water which poured down from many valleys in the Kō'olau Mountain range, feeding the main stream at the bottom of the valley. Two waterfalls, Makua and Waikahalulu, were located in Nu'uau Stream. Pūhūehu Stream joins Nu'uau Stream just below the Waikahalulu Falls (Figure 3).

Taro producing lands extended from what is now downtown Honolulu to at least halfway to the upper end of Nu'uau Valley (Handy and Handy 1972:475). Banana and sugar cane were planted on both sides of the embankment which also contained *lo'i* (irrigated pond fields), some of which were 160 feet square (Handy 1940). These pond fields were enclosed by basalt-rock walls and were also used as fish ponds. Rains provided enough moisture for sweet potato plantations built on the steep cinder-covered sides of Round Top and Makiki Heights (*Ibid.*:478).

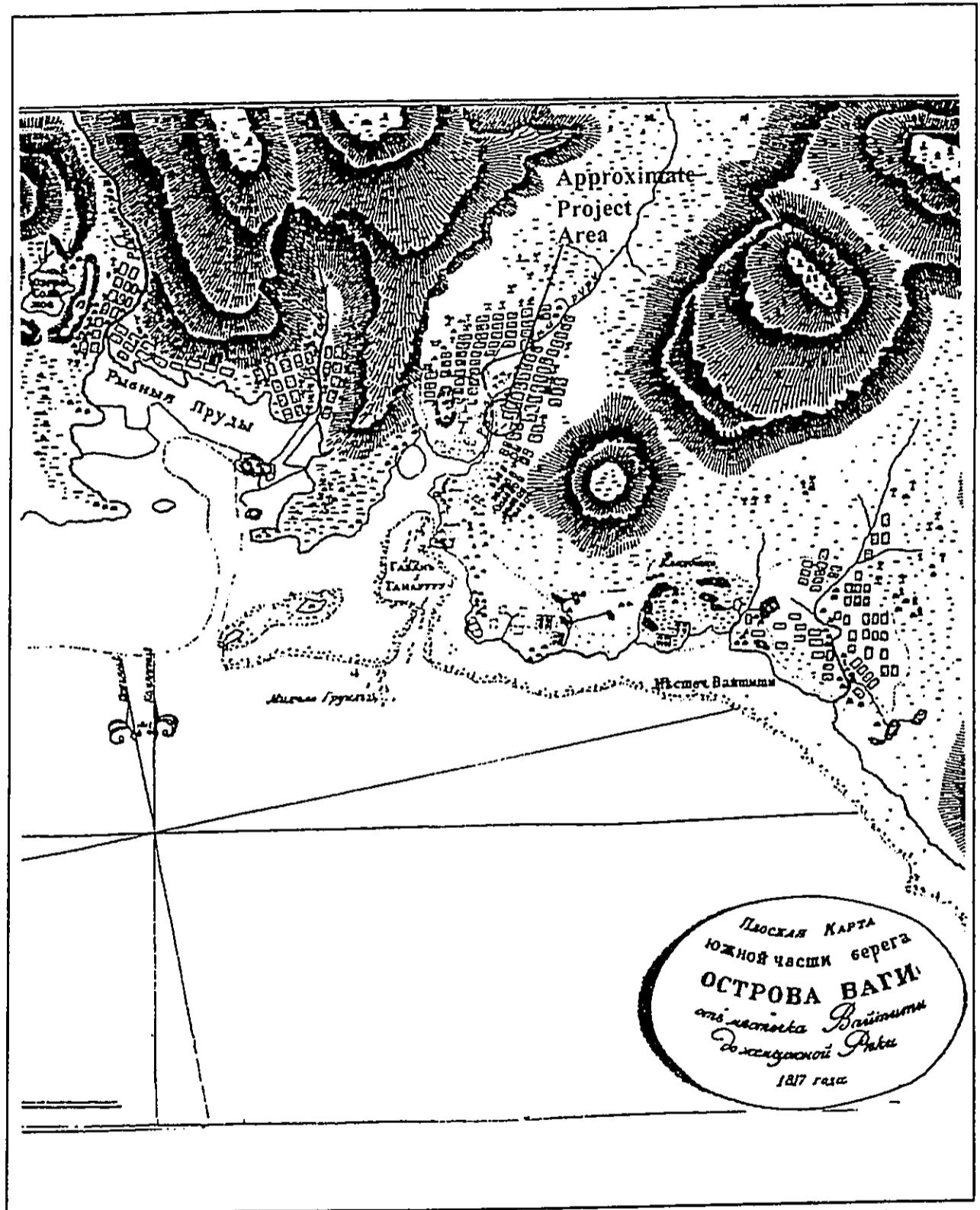


Figure 2: Russian Map of Honolulu in 1817 Showing Approximate Location of the Project Area (Kotzebue 1821).

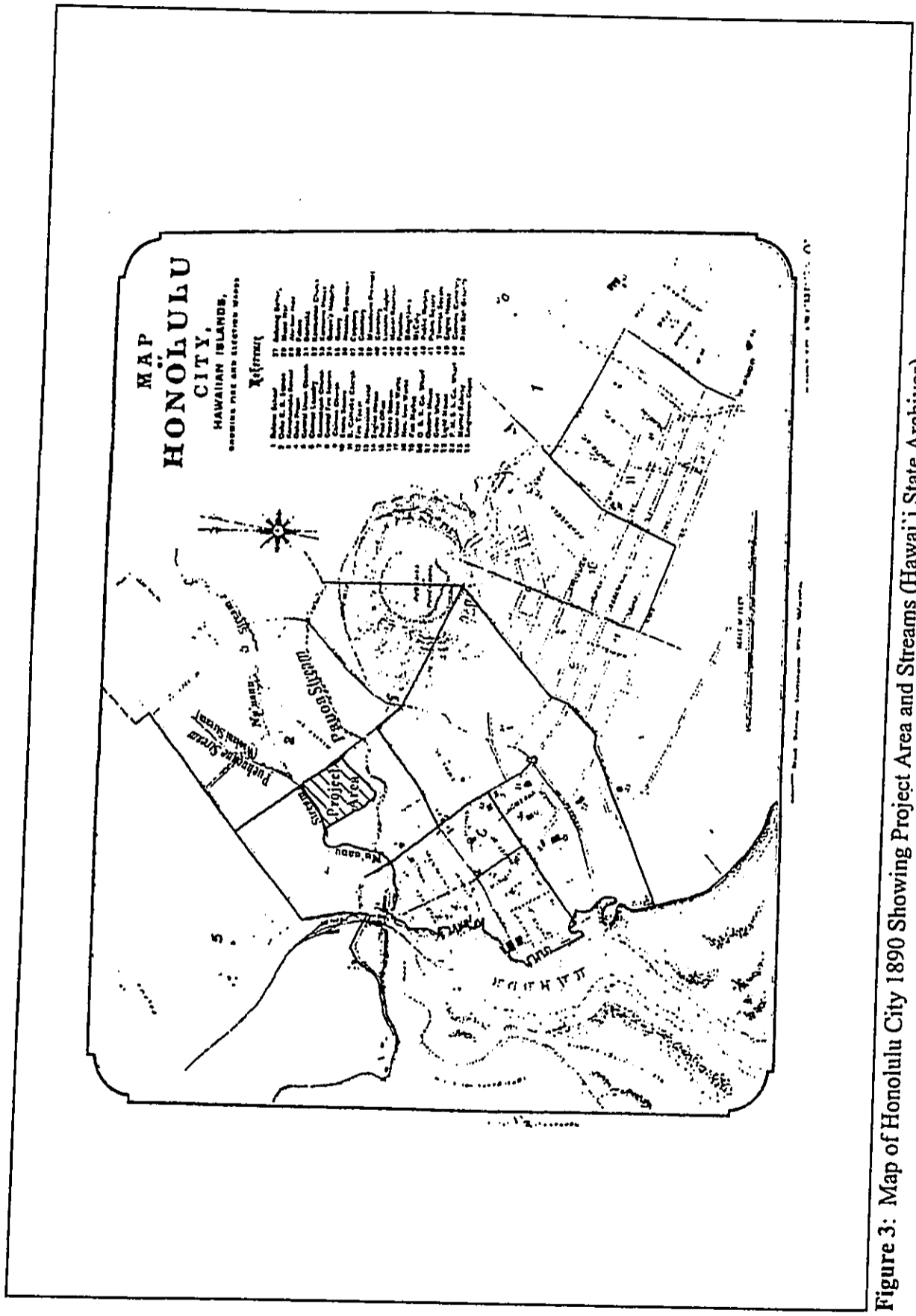


Figure 3: Map of Honolulu City 1890 Showing Project Area and Streams (Hawai'i State Archives).

An article in the *Hoku-o-Hawaii* mentions an ancient taro patch named "Kamanuawai" located near the junction of Nu'uaniu and Beretania Streets. Handy suggests that *lo'i* may have been constructed as far *makai* as Hotel Street (June 22, 1865; Handy 1940:79; McAllister 1933).

A trail leading to Nu'uaniu originated near Hotel Street by Nu'uaniu Stream and led north across Beretania Street to a little stream flowing out of Kamanuawai pond near the junction of Nu'uaniu and Beretania Streets ('I: 1959:92). Skirting the edge of the pond, the trail came up on the bank of Waiakehi and continued on to Wa'a'akekupua, along the bank of taro patches to Pauoa Stream, then to Bates Street (near Liliha and Nu'uaniu Streets) and, finally, on to the pass in the Pali

NĀ MO'OLELO (STORIES AND LEGENDS)

Nu'uaniu, is full of fascinating stories and legends. For a more in depth review of these *mo'olelo*, the reader is referred to Westervelt's *Hawaiian Legends of Old Honolulu (1991)* and *Sites of O'ahu* by Sterling and Summers (1978). A few of the more pertinent references illustrating the importance of Honolulu and Nu'uaniu are listed below.

It was said that the first *heiau*, which became the prototype for all such structures, was built by Wākea (progenitor of the Hawaiian people) and Haumea at Waolani in Nu'uaniu (in back of the O'ahu Country Club (Kamakau 1991:30-31). Wākea was born in Waolani and its people were referred to as *no ka lāhui kāmaka 'e'epa* (extraordinary, persons with miraculous powers; *Ibid.*:30, 129). It is recorded that *menehune* also dwelt at Waolani, having been brought there by Kane and Kanaloa (*Ibid.*; Handy and Handy 1972:476). The goddess Mo'oinanea, Queen of the *mo'ō* made her home in Nu'uaniu after having traveled from Kahiki. Many of her mischievous subjects also lived there, giving rise to stories and legends, names of places and natural phenomenon.

Closer to the project area, Kamakau notes that a famous breadfruit tree once grew on the east bank of Nu'uaniu Stream where the stream was crossed by a bridge at Puehuhu (now known as Waolani Stream) located at the northeast end of the project area. Kamakau writes:

Kamehameha was said to have revived the use of these areas by having the whole hillside cultivated with sweet potato plants (Fomander 1918-1919: 532). In 1810, John Papa 'I'i recorded a yam farm (*kapāhā*) located west of the project area from to Beretania Street down to Nu'uaniu and King Streets ('I: 1959:65, 92).

In 1935, Handy recorded:

In upper Nuuanu there are many small valleys which open into the main valley on either side of its stream. Traces of ancient terraces have been discovered in several valleys on the steep slopes above the stream beds, below the falls, and on small flat areas along the sides of streams. Probably all these small valleys were used for planting taro in ancient times; Luakaha [stream] doubtless had many inland gardens; but there were no wet terraces that far up. In the Dowsett Tract below Nuuanu Stream there were formerly terraces. How far terraces extended up Waolani, in the Oahu Country Club area, is difficult to determine...From Waolani to Kapalama the terraces were continuous on the level and gently sloping land between the Nuuanu and Waolani streams, past Wylie and Judd Streets and throughout the section on the north side of the valley, down what is now Liliha Street. In many vacant lots, yards, and gardens above and below Judd Street traces of terraces may still be seen...(1940:78, 79)

Kamehameha, himself, was known to work in the gardens of Nu'uaniu. When John Papa 'I'i was a child, he accompanied his family to a new garden area:

...The places Kamehameha farmed and the houses he lived in at those farms were show places. His farmhouses in Nuuanu stood...[on] a knoll...to enable him to look both inland and seaward to his food patches [1959:68-69].

'I'i noted that a large garden was started in Nu'uaniu by Kamehameha and the governor of O'ahu extending from Luakaha (near the country home of Kamehameha III) to the gulch of Puwahanui (*Ibid.*:153). Around 1850, a great irrigation ditch was built to carry water from above Luakaha to a new *kalo lo'i* near the cemetery. It is recorded that this project employed 700 men (Perry 1913:95-96). Parallel to Nu'uaniu Stream was an *aiuwai* and another *aiuwai* brought water from above Waikahalulu Falls, back to Nu'uaniu Stream in the vicinity of Don Marin's vineyard below what is now Vineyard Street (Hackler 1986:8).

On my going to see the place where the breadfruit stood, whereby Kamehameha became a goddess, I found it at Nini, a short distance above Waikahalulu (the project area). This breadfruit became a deity, known as Kamehameha, a goddess famous from Hawaii to Kauai, for its power and ability to overthrow governments. It was one of the deities of Oahu and was taken by the chiefs of Maui at Hana, and became a deity of Kamehameha when he ruled the land [Kamakau in McAllister 133:83].

The location where Vineyard Street crosses Nu'uaniu, the southwestern boundary of the project area, was named "Pele ula" (Emerson 1925:168). It was here that the famous game of *kilu* was played between the sister of Pele, Hi'iaka, and Pele's lover, Lohiau (*Ibid.*).

Historically, Nu'uaniu is most popularly known for the last major battle (1795) in Kamehameha's efforts to unite the islands under his rule. As Kamehameha's authority spread in the late 1700s, Kalanikūpule, the son of Kahekili, retreated to O'ahu. Kamehameha pursued, and it is said, his fleet covered the sea from Wai'alea to Waikāi (Desha 2000:407). Upon arrival on O'ahu, Kamehameha visited the *heiau* of Lomikūpali in Kapālama to drink *awa* and then returned to his troops in Waikāi. Kalanikūpule's army was located inland, above Honolulu and, as the fighting began, they withdrew up Nu'uaniu Valley on the trail to the *pali*. Kamehameha had positioned one division of warriors on the ridge between Pauoa and Nu'uaniu Valley, and another division on the Waolani Valley side (*Ibid.*:412). Isaac Davis and John Young, supporters of Kamehameha, pulled cannons to the top of the ridges of Pauoa and Waolani valleys, respectively, and fired on Kalanikūpule's warriors below. Kamehameha and his army fought their way up the center of Nu'uaniu Valley to the very edge of the *pali* where victory over the O'ahu forces was achieved (*Ibid.*:413).

As was traditional, Kamehameha distributed the conquered lands (*'āina panalā'au*) to his supporters. Although he officially kept Nu'uaniu/Honolulu for himself, through the years he granted many pieces of land to his friends, queens and retainers which eventually became fee simple and privately owned lands after the Māhele. Kamehameha settled in Kou, now called Honolulu, and the village became the seat of royalty until his departure in 1812. Upon Kamehameha's death in Kailua on Hawai'i Island in 1819, the capital switched between Honolulu and Lahaina until finally, Honolulu became the permanent seat of government (Daws 1968).

In the early part of the 19th century, the British missionary William Ellis traveled through the region in back of Honolulu village near the project area.

The mouth of the valley [Nu'uaniu], which opens immediately behind the town of Honouliuli, is a complete garden, carefully kept by its respective proprietors in a state of high cultivation; and the ground being irrigated by the water from a river that winds rapidly down the valley, is remarkably productive [Ellis 1969:13].

Don Francisco de Paula Marin was an early settler to the Hawaiian Islands in 1793 or '94 (Gast 1973:5). Marin's career in Hawai'i included serving Kamehameha throughout his life in various capacities including interpreter, business adviser, accountant, and physician. Through the years, Marin introduced dozens of plants from different areas in the Pacific to the islands, kept a large herd of dairy cattle, raised goats, hogs, and rabbits on Ford Island, and experimented with raising pineapples, sugar and grapes for wine (Day 1984:94-95). In September of 1815, cuttings were planted in what he referred to as his "new vineyard" on land that had originally been allotted to Jonathan Winship (Figure 4; LCA 2938) located in the *'if* of Kalāwahine, *makai* of the project area. Marin noted in his journal that after having planted the cuttings, there was "great havoc in the vines committed by Captain Winship's hogs" and, Marin complained, "many branches of grapes have been carried off" (Gast 1973:50). However, by July of 1815, he was able to make wine and stated "I drew off 38 gallons" (*Ibid.*).

The vineyard was described by Tyerman and Bennet in 1822 as being:

...trained after the Spanish fashion in bushes, flourish luxuriantly. The proprietor tells us that they would bear three crops in the year, though he prudently prevents the third lest it should too much exhaust the stocks [1831:413].

In the 1820s, C.S. Stewart visited the vineyard and observed:

We had scarcely passed a hundred rods from the village before we found something new to admire in the yard of Mr. Marini. After crossing a small stream which bounds it on one side, our path led us the whole length of another. It is well planted and cultivated, and yields grapes sufficient to make considerable quantities of wine. Along the fences in some parts are bushes of the damask rose in full bloom, which appeared to fine advantage, in contrast with the pale yellow blossom of the cotton tree, with which they are interspersed. The vineyard is also skirted with pineapples, in different stages of maturity...[Gast 1973:54]

This endeavor proved extremely successful to the point where he had two harvests every year. For the next twenty years, the vineyard was well known and construction of a road adjacent to the garden's *maka* boundary became known as "Vineyard Street". Figure 5, drawn in 1847, shows Vineyard established as a straight road extending from Nu'uano Avenue (Street) to a pathway that was to become Liliha Street. Figure 6 shows cultivation in the project area in 1855, but no defined streets. An 1891 fire insurance map (Figure 7) depicts Vineyard as having disintegrated into a short, crooked lane. By 1897, it is straight once more and connects to Nu'uano Stream (Figure 8).

THE MAHELE

Immense changes began to occur to Hawaiian traditional society with the intrusion of foreign lifestyles, first introduced on January 19, 1778 with the arrival of Capt. James Cook on Kauai.

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kamehameha III was forced to establish laws changing the traditional Hawaiian society to that of a market economy (Daws 1968:111; Kuykendall Vol. I, 1938:145 footnote 47, 152, 165-6, 170; Kame'eleihiwa 1992:169-70, 176; Kelly 1983:45, 1998).

Among other things, the foreigners demanded private ownership of land to secure their island investments (Kuykendall Vol. I, 1938:138, 145, 178, 184, 202, 206, 271; Kame'eleihiwa 1992:178). The Great Mahele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were thus made available and private ownership was instituted, the *maka āina* (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. These claims, however, could not include any previously cultivated or presently fallow land, *okipa* 'u, stream fisheries, or many other resources traditionally necessary for survival (Kelly 1983, Kame'eleihiwa 1992:295, Kirch and Sahlins 1992). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent after which they could then take possession of the property (Chinen 1961:16).

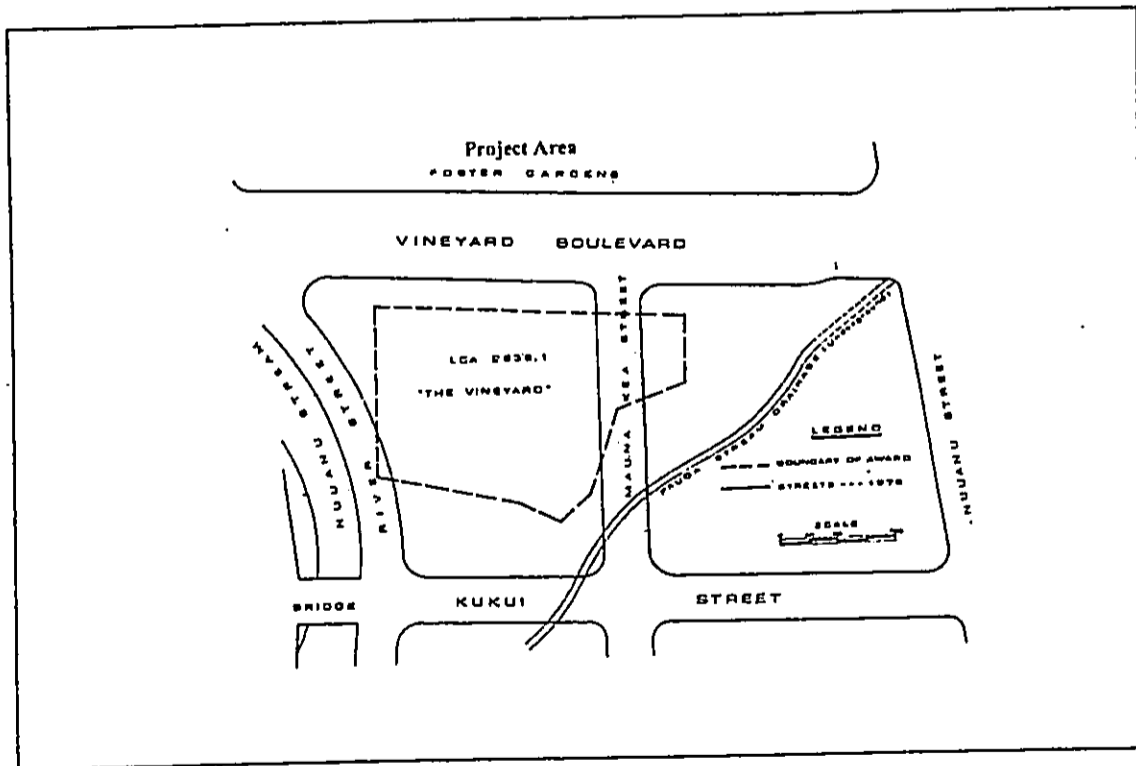


Figure 4: The Vineyard Near the Project Area (Ghast 1973).

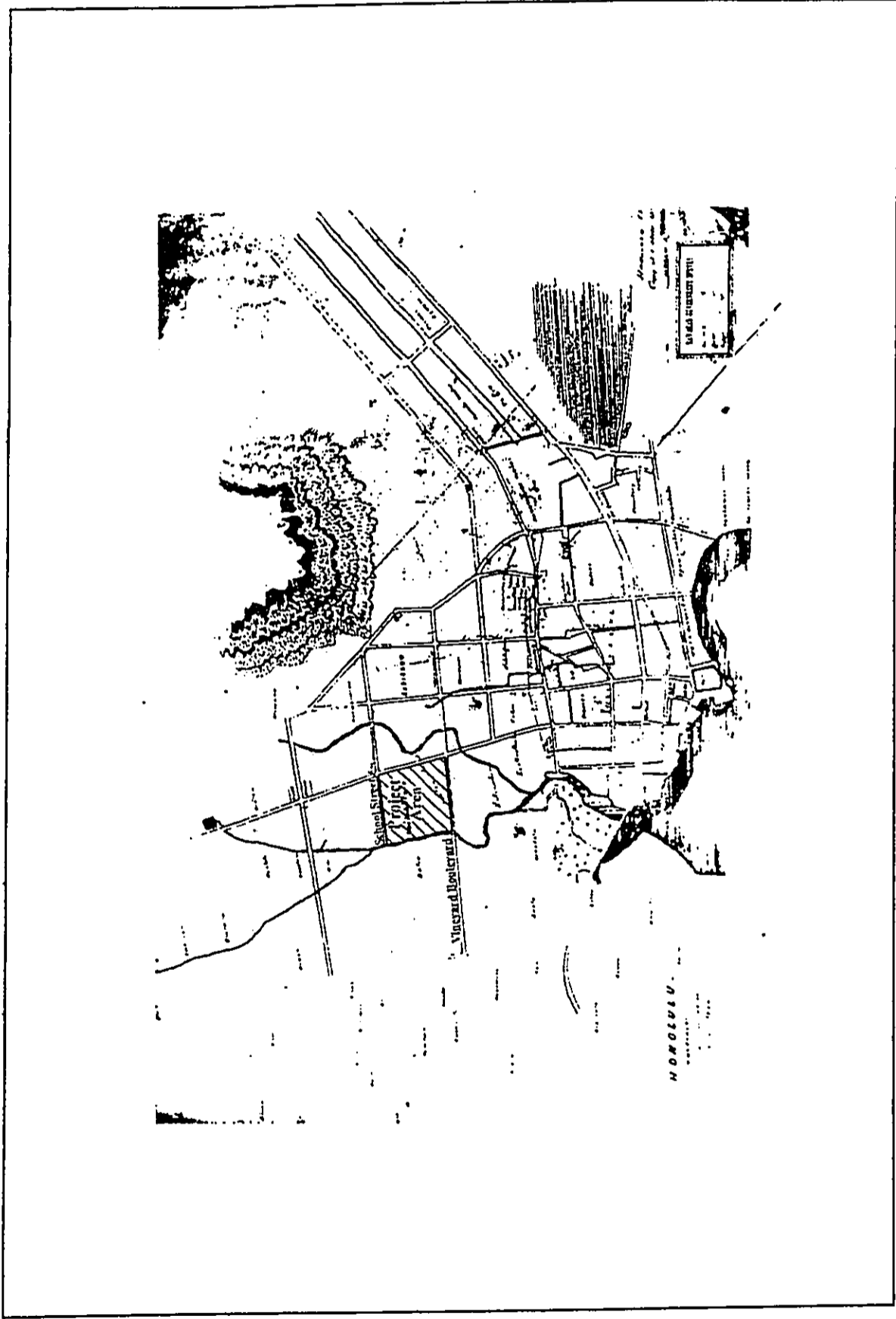


Figure 5: Honolulu Circa 1847 Showing Project Area (Hawai'i State Archives).

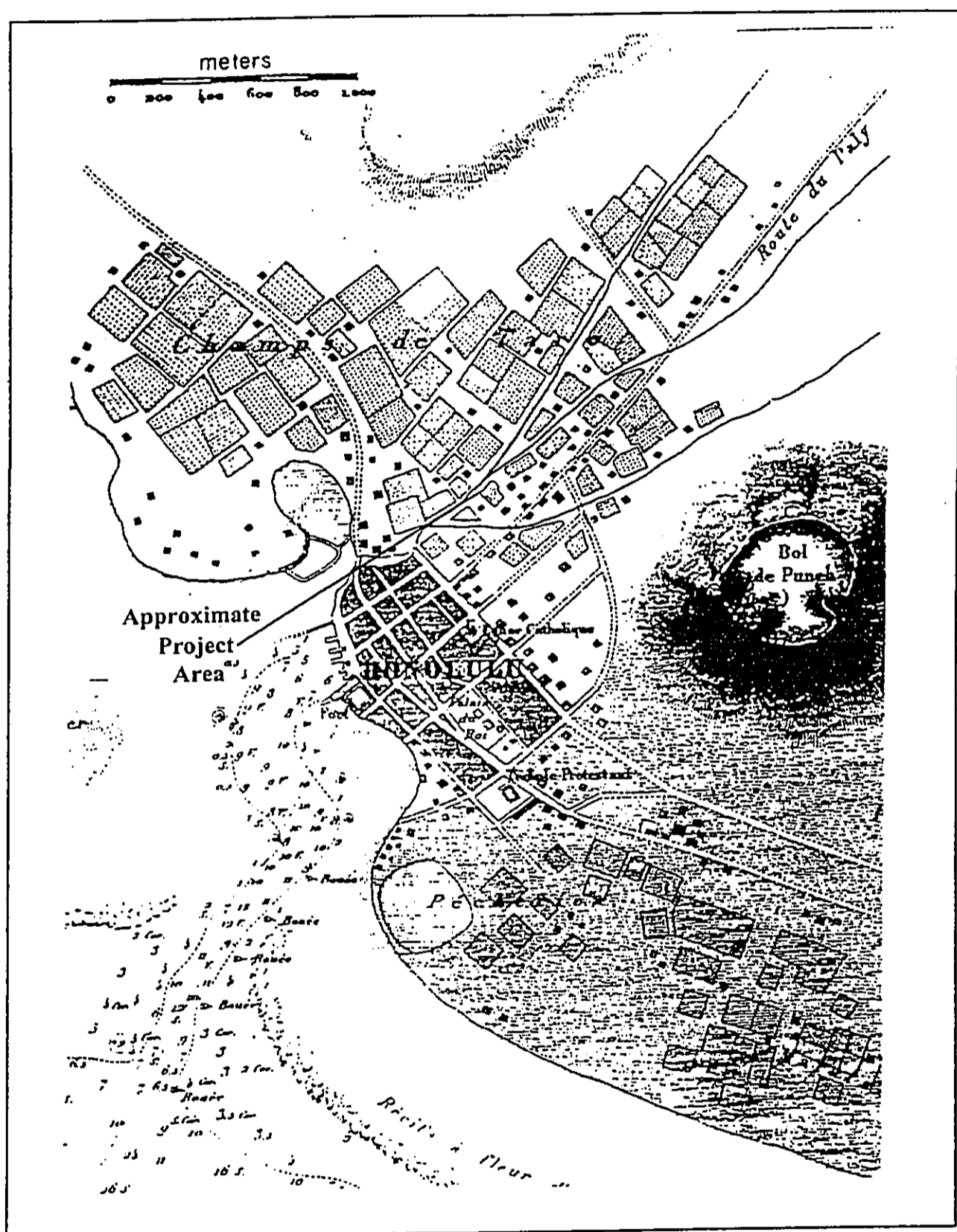


Figure 6: 1855 Map of Honolulu by Lapasse of the Ship L'eurydice Showing Project Area.

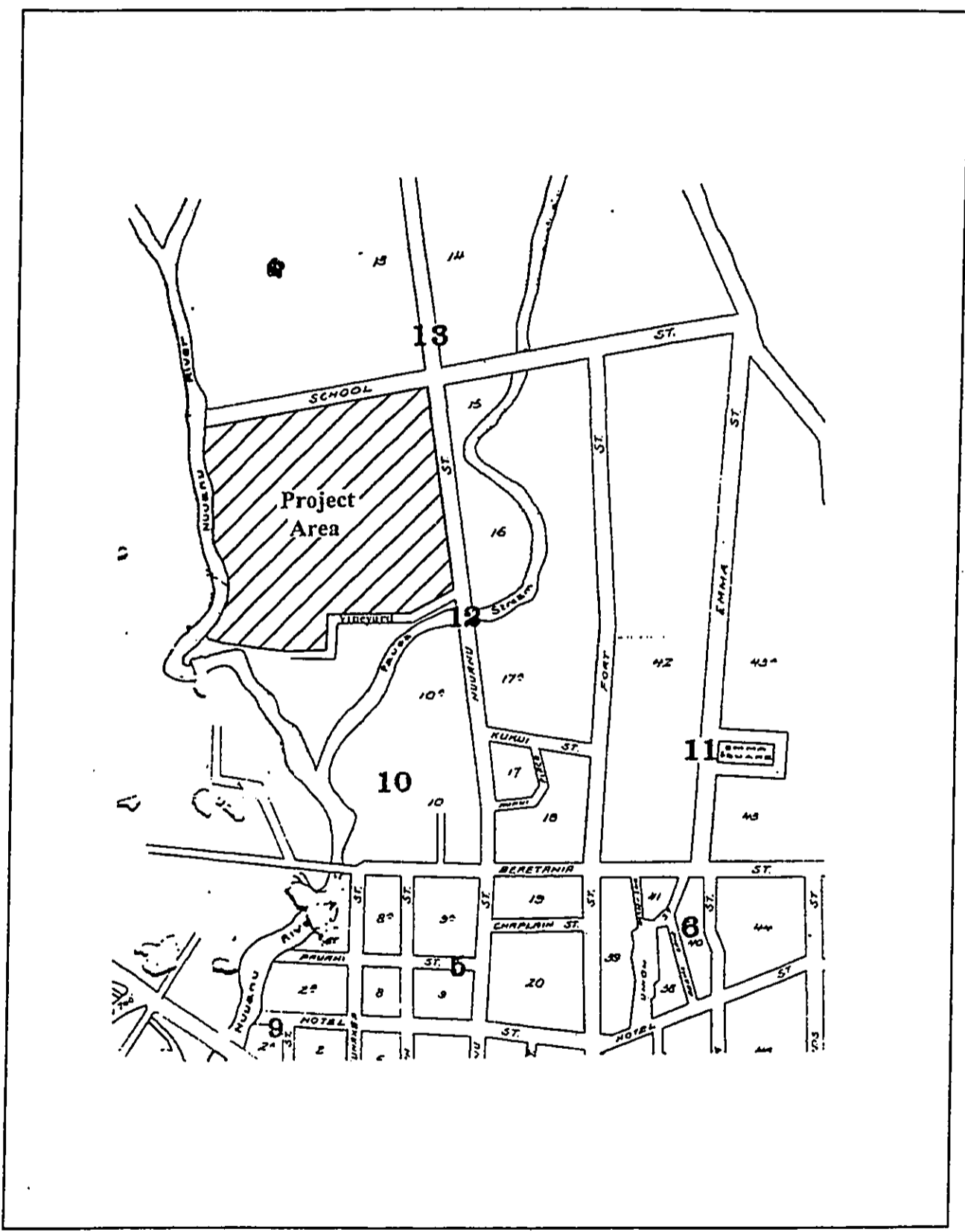


Figure 7: Fire Insurance Map of Honolulu 1891 (Hawai'i State Archives).

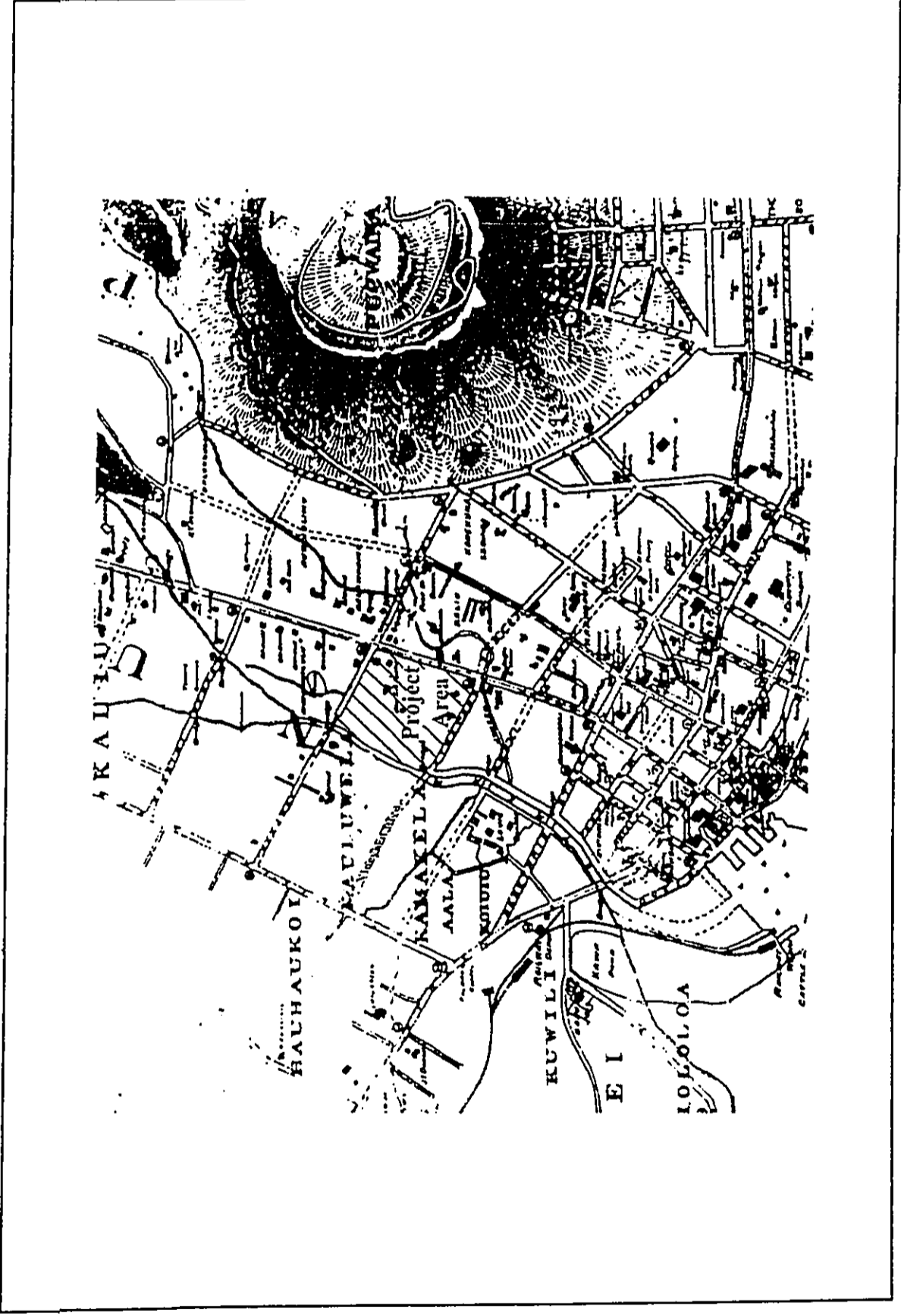


Figure 8: Portion of Map of Honolulu 1897 (Hawai'i State Archives).

A total number of 1,389 LCAs were awarded in the *ahupua'a* of Honolulu, including Nu'uaniu (Waihona Aina Corporation, 2000, Mahele Database). According to an 1893 map (Figure 9), there were 22 LCA awards in the vicinity of the project area (between what is now School Street and Vineyard and Nu'uaniu Stream and Nu'uaniu Street). Kamehameha III (Kauikaouli) gave the *'i'i* of Waikahalulu, extending *mauka-makai* on the Waikiki side of Nu'uaniu Stream, to his wife, Queen Kalama (LCA 4452). The *'i'i* of Kalawahine, located *makai* of Queen Kalama's land was awarded to Kei'i'iahonui (LCA 11215), son of the king of Kaua'i and husband of Ka'ahumanu. This was bisected by a piece of Auwailoimu which was designated as Crown Lands (Hackler 1986:15).

Table 1 lists LCA information including land use for awards extending from School Streets to Beretania and between Nu'uaniu Stream and Nu'uaniu Street. Those most closely associated with the project area are LCA No. 141, 698, 715, 727, 942, 795, 935, 942, 1162, 1282, 1286, 1336, 2061, 4452, 4678, 5046, 5580, 5957, 5960, 10613, 11082, 11215 (see Figure 9).

Table 1: LCA Land Use in Vicinity of Project Area

LCA No.	Awardee	'i'i of the Ahupua'a	Land Use	'Apana
00141	Makapuu	Kalawahine	house lot, garden, <i>laukalo</i> trees, <i>pili</i> grass	3 (1.32 acre)
00218	Kaunahoula	Waikemi	house lot (5 small ones)	1 (0.54 acre)
00696	Hale	Auwailoimu	house lot, 2 <i>lo'i</i> or <i>mo'o</i>	1 (0.22 acre)
00698	Hale	Kalawahine	house lot, 1 <i>lo'i</i> or <i>mo'o</i>	2 (2.42 acre)
00715	Kalama	Kalawahine	<i>taro lo'i</i> , pasture house lot	1 (0.05 acre)
00727	R. Kunene	Waikahalulu Kalawahine	house lot, <i>taro</i> land (<i>fa'alo</i>)	2 (1.33 acre)
00795	Kaunahoula	Kalawahine	14 <i>lo'i</i> or <i>mo'o</i> , house lot	2 (0.95 acre)
00824	Ni'u	Kakopua	house lot, <i>taro</i>	3 (0.96 acre)
00935	Kaka	Kalawahine Waikahalulu	6 <i>lo'i</i> or <i>mo'o</i> , 2 house lots	1 (0.83 acre)
00942	Kapukoa	Waikahalulu	8 <i>lo'i</i> or <i>mo'o</i> , house lot	2 (1.62 acres)
00995	Kuasina	Kauluwela	1 <i>lo'i</i> or <i>mo'o</i> , house lot	2 (1.47 acres)
01090	Kapena, Iona Pelelia	Kaliu	4 <i>lo'i</i> or <i>mo'o</i> , 1 <i>fa'alo</i> , 1 house lot	1 (1.40 acre)

LCA No.	Awardee	'i'i of the Ahupua'a	Land Use	'Apana
01162	Kunhina	Waikahalulu	6 <i>lo'i</i> or <i>mo'o</i> , 1 <i>fa'alo</i> , house lot	1 (0.67 acres)
01282	Kei'itikanakoa	Kalawahine	10 <i>lo'i</i> or <i>mo'o</i> , house lot	5 (1.06 acres)
01286	Piho	Waikahalulu	5 <i>lo'i</i> or <i>mo'o</i> , house lot	2 (1.09 acres)
01312	Kamaikat	Auwailoimu	2 <i>lo'i</i> or <i>mo'o</i> , 1 <i>fa'alo</i> , house lot	1 (0.50 acre)
01316	Kahua	Auwailoimu	7 <i>lo'i</i> or <i>mo'o</i>	1 (0.27 acre)
02061	Kuana	Auwailoimu	<i>taro mo'o</i> or 6 <i>lo'i</i>	2 (3.36 acre)
02938	Huana for Lahilahi	Kalawahine	farm in vineyard, <i>mo'o</i> , coconut, w/	1 (2.31 acres)
04452	Queen Kalama	The 'i'i of Waikahalulu	not listed	entire 'i'i
04678	Puwa	Kalawahine	5 <i>lo'i</i> or <i>mo'o</i>	1 (0.34 acre)
05046B	Kacawai and Kalawaia	Auwailoimu	7 <i>lo'i</i> or <i>mo'o</i>	1 (0.39 acre)
05580	Kaoni	Kalawahine	3 <i>fa'alo</i> patches	1 (0.32 acre)
05957	Makuaia	Kalawahine	3 <i>lo'i</i> , house lot	2 (0.28 acre)
05960	Mahana	Kalawahine	house lot, 5 <i>lo'i</i> , 1 <i>fa'alo</i> (pasture)	2 (0.81 acre)
08321	Kamaile	Kalawahine (Paooa)	2 <i>lo'i</i>	1 (0.24 acres)
10613	Paki	Kalawahine	2 <i>lo'i</i>	1 (0.43 acres)
11082	Kaukoke	Kalawahine	house lot, <i>lo'i</i> , sugar cane <i>mo'o</i>	3 (0.63 acre)
11215	Kei'iahonui	Kalawahine	pasture	16 <i>apana</i>

Native Register Vol. 1, 2, 3, 4, 5; Foreign Testimony Vol. 1, 2, 3, 10, 16

Although LCA records establish historic land use, many recipients indicated continuous occupation through generations reflecting uninterrupted patterns of traditional land management. Six awardees testified their land had been received by a progenitor from Kamehameha I, who did not have control of O'ahu lands until 1795. Three stated the land had come into the family in the 1820s, fifteen claimed occupation since the 1830s, and five reported ownership within the 1840s. All represent traditional Hawaiian agricultural practices and land use.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



APPENDIX A

ABSTRACT

At the request of PBR Hawaii, Scientific Consultant Services, Inc. (SCS) was contracted to conduct background and archival research for the Foster Botanical Garden Master Plan and Environmental Assessment (EA) consisting of 13.5 acres (TMK:1-7-07:01, 02 and 1-7-08:01, 02). The background and archival research consisted of reviewing and summarizing maps, and archaeological and historical documents pertinent to land use in and around the project area. This included research on past Land Court Awards and land management in the vicinity of the project area, as well as a review of other documents and journals emphasizing early historical settlement patterns and activities in the area. Archival information indicated early historic habitation and agricultural activities within the project area. It is recommended that an archaeological inventory survey be conducted in undisturbed areas proposed for development.

SCS Project No. 18-1

ARCHIVAL RESEARCH FOR
THE FOSTER BOTANICAL GARDEN MASTER PLAN
AND ENVIRONMENTAL ASSESSMENT (EA)
OF 13.5 ACRES
IDENTIFIED AS TMK:1-7-07:01, 02 AND 1-7-08:01, 02

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TABLE OF CONTENTS

ABSTRACT i

TABLE OF CONTENTS ii

LIST OF FIGURES iii

INTRODUCTION 1

HISTORICAL BACKGROUND
HONOLULU 3

PRE-CONTACT AND EARLY HISTORIC LAND USE IN NU'UANU 4

NĀ MO'OLELO 8

THE MÁHELE 12

THE GARDEN 20

PREVIOUS ARCHAEOLOGY 23

DISCUSSION 25

RECOMMENDATIONS 25

LIST OF FIGURES

Figure 1: USGS Honolulu Quadrangle Map Showing Project Area 2

Figure 2: Russian Map of Honolulu in 1817 Showing Approximate Location of the Project Area (Kotzebue 1821) 5

Figure 3: Map of Honolulu City 1850 Showing Project Area and Streams (Hawai'i State Archives) 6

Figure 4: The Vineyard Near the Project Area (Ghast 1973) 11

Figure 5: Honolulu Circa 1847 Showing Project Area (Hawai'i State Archives) 13

Figure 6: 1855 Map of Honolulu by Lapasse of the Ship L'curydrice Showing Project Area 14

Figure 7: Fire Insurance Map of Honolulu 1891 (Hawai'i State Archives) 15

Figure 8: Portion of Map of Honolulu 1897 (Hawai'i State Archives) 16

Figure 9: LCA Awards Within the Project Area with an Overlay of 1893 House Sites (Reg. Map 1715 State Survey Office) 19

Figure 10: Map of Honolulu 1901 Showing Project Area by M.D. Monsarrat (State Survey Office) 21

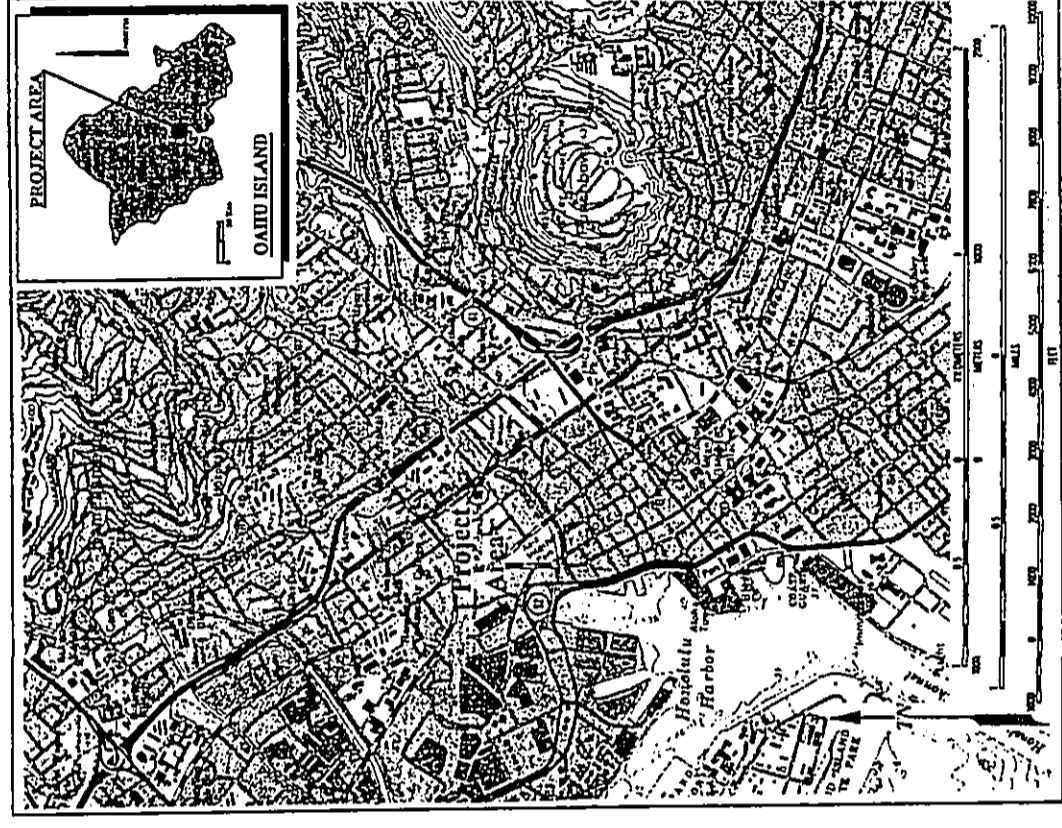


Figure 1: USGS Honolulu Quadrangle Map Showing Project Area.

INTRODUCTION

At the request of PBR Hawai'i, Scientific Consultant Services, Inc. (SCS) was contracted to conduct background and archival research for the Foster Botanical Garden Master Plan and Environmental Assessment (EA) of 13.5 acres, identified as TMK:1-7-07:01, 02 and 1-7-08:01, 02. The background and archival research consisted of reviewing and summarizing maps, and archaeological and historical documents pertinent to land use in and around the project area. This included research on past Land Court Awards and land management in the vicinity of the present gardens, as well as review of other historic documents and journals emphasizing early historical settlement patterns and activities in the area.

One of five garden sites that come under the heading of Honolulu Botanical Gardens, Foster Botanical Garden is situated in optimum conditions for sub-tropical plants, some rare and endangered, from all over the world. The project area is located on the Island of O'ahu, on the mauka side of the downtown business section of Honolulu (Figure 1). It is bounded on the east by the Lunalilo Freeway, to the south by Nu'uano Avenue, to the west by Vineyard Boulevard, and to the north by Nu'uano Stream. The surrounding region has been extensively developed over the past 150 years, leaving little of the original physical environment intact.

HISTORICAL BACKGROUND

Traditional Hawaiian subsistence was based on agricultural production, marine exploitation, animal husbandry, and wild plant and bird collecting. Several terms, such as *moku*, *ahupua'a*, *'iif* or *'iia* were used to delineate various land sections. A district (*moku*) contained smaller land divisions (*ahupua'a*) which customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua'a* were, therefore, able to harvest from both the land and the sea. Ideally, this situation allowed each *ahupua'a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *'iia* or *'iia* were smaller land divisions next to importance to the *ahupua'a* and were administered by the chief who controlled the *ahupua'a* in which it was located (*ibid.*:33; Lucas 1995:40). The project area is located in the *ahupua'a* of Honolulu, *'iia* of Waikahaulu, on the leeward side of the Island of O'ahu. Honolulu included Nu'uano and

Pauoa Valleys, Pacific Heights, a portion of Makiki and Tanialua. Its borders extended from Kapālama Stream to the western edge of Mānoa Valley, approximately two-and-one-half miles.

HONOLULU

Honolulu Harbor and nearby settlement was originally called "Kou" by the Hawaiians but it wasn't until 1794 that Captain William Brown sailed his British Merchant ship, the *Butterworth*, through its narrow channel and into the bay, locating the only "all weather" anchorage for western ships on the south coast of all the Hawaiian Islands (Grantham 1998:10). In the late 1800s, as western ships arrived more frequently seeking a sheltered harbor, the *ali'i* moved from Waikī to be near the center of foreign trade. By 1810, Kamehameha I had established his residential complex containing his family, chiefs, and retainers, in the vicinity of the great Pākāka Heiau near a canoe landing and Nu'uaniu Stream. From this, the village quickly grew.

Honolulu town is situated on a sedimentary deposit (approximately one thousand feet thick), with low permeability and containing large quantities of fresh water grading to seawater that has a small storage capacity. The sediments act as cap rock retarding the movement of fresh groundwater from the more permeable underlying aquifers to the sea (Armstrong 1973:42). Fresh water was abundant from the many streams bringing water from the interior and coastal springs, creating excellent conditions for agriculture. Fish ponds were constructed and lined this region of the leeward coast (Kirch 1985).

Honolulu village originally consisted of the flat land between the lower ends of Nu'uaniu and Pauoa Valleys, the harbor, and included the very rich farm land near what is now Liliha and School Streets (close to the present project area). The farm land was reportedly under the control of a chief named Honolulu (Handy 1940; Handy and Handy 1972:479). McAllister defined the area known traditionally as Kou in lower Honolulu, extending from Nu'uaniu Avenue to Alakea Street and from Hotel Street to the ocean (1933). A major trail led from the village of Kou over the Pali pass and onto the windward coast of the island (Handy and Handy 1972).

In 1828, Laura Fish Judd recorded her first impression of Honolulu, notable for its comparison to her New England home:

There! I see the town of Honolulu, a mass of brown huts looking precisely like so many haystacks in the country; not one white cottage, no church spire, not a garden not a tree to be seen save the grove of coconuts [1966:5].

Otto Von Kotzebue, of the Russian Imperial Navy, visited Hawai'i several times.

Figure 2 shows his map of Honolulu including the area where the present project is located under cultivation. Between 1815 and 1824, Kotzebue recorded:

Wojjoo [O'ahu] is the most fertile of the Sandwich Islands, from which Owhyee [Hawai'i] receives a part of the taro necessary for its consumption. The cultivation of the valleys behind Hananura [Honolulu] is remarkable; artificial ponds support, even on the mountains, the taro plantations, which are at the same time fish ponds; and all kinds of useful plants are cultivated on the intervening dams [1821 Vol. 3:236].

PRE-CONTACT AND EARLY HISTORIC LAND USE IN NU'UANU

In pre-Contact Hawai'i there were primarily two types of agriculture, wetland and dryland, both of which are dependent upon geographical conditions. Nu'uaniu, meaning "cool terrace" or "cool height" had perfect environmental factors for both wet and dry agriculture (Puku'i et al. 1974:167; Lyons 1901:181). Inland rains continuously provided fresh water which poured down from many valleys in the Ko'olau Mountain range, feeding the main stream at the bottom of the valley. Two waterfalls, Makua and Waikahalulu, were located in Nu'uaniu Stream. Pūhuchuu Stream joins Nu'uaniu Stream just below the Waikahalulu Falls (Figure 3).

Taro producing lands extended from what is now downtown Honolulu to at least halfway to the upper end of Nu'uaniu Valley (Handy and Handy 1972:475). Banana and sugar cane were planted on both sides of the embankment which also contained *lo'i* (irrigated pond fields), some of which were 160 feet square (Handy 1940). These pond fields were enclosed by basalt-rock walls and were also used as fish ponds. Rains provided enough moisture for sweet potato plantations built on the steep cinder-covered sides of Round Top and Makiki Heights (*ibid.*:478).

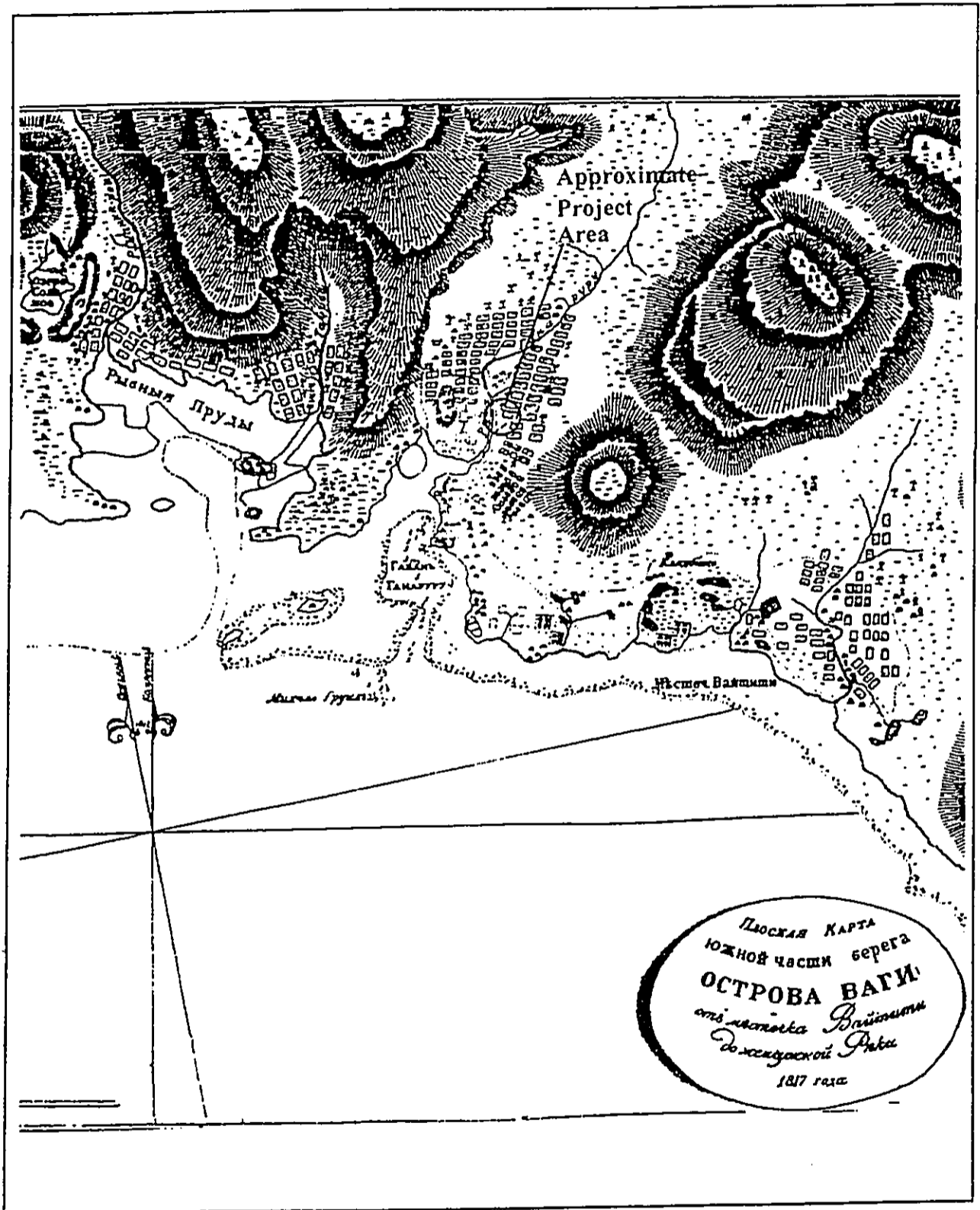


Figure 2: Russian Map of Honolulu in 1817 Showing Approximate Location of the Project Area (Kotzebue 1821).

Kamehameha was said to have revived the use of these areas by having the whole hillside cultivated with sweet potato plants (Formander 1918-1919: 532). In 1810, John Papa 'Ōi recorded a yam farm (*kapāhihi*) located west of the project area from to Beretania Street down to Nu'uano and King Streets ('Ōi 1959:65, 92).

In 1935, Handy recorded:

In upper Nuuanu there are many small valleys which open into the main valley on either side of its stream. Traces of ancient terraces have been discovered in several valleys on the steep slopes above the stream beds, below the falls, and on small flat areas along the sides of streams. Probably all these small valleys were used for planting taro in ancient times; Luakaha (stream) doubtless had many inland gardens; but there were no wet terraces that far up. In the Dowsell Tract below Nuuanu Stream there were formerly terraces. How far terraces extended up Waolani, in the Oahu Country club area, is difficult to determine...From Waolani to Kapalama the terraces were continuous on the level and gently sloping land between the Nuuanu and Waolani streams, past Wylie and Judd Streets and throughout the section on the north side of the valley, down what is now Liliha Street. In many vacant lots, yards, and gardens above and below Judd Street traces of terraces may still be seen... (1940:78, 79)

Kamehameha, himself, was known to work in the gardens of Nu'uano. When John Papa 'Ōi was a child, he accompanied his family to a new garden area:

...The places Kamehameha farmed and the houses he lived in at those farms were show places. His farmhouses in Nuuanu stood...[on] a knoll...to enable him to look both inland and seaward to his food patches [1959:68-69].

'Ōi noted that a large garden was started in Nu'uano by Kamehameha and the governor of O'ahu extending from Luakaha (near the country home of Kamehameha III) to the gulch of Puwahanui (*Ibid.*:153). Around 1850, a great irrigation ditch was built to carry water from above Luakaha to a new *kalo lo'i* near the cemetery. It is recorded that this project employed 700 men (Perry 1913:95-96). Parallel to Nu'uano Street was an *auwai* and another *auwai* brought water from above Waikahalulu Falls, back to Nu'uano Stream in the vicinity of Don Marin's vineyard below what is now Vineyard Street (Hackler 1986:8).

An article in the *Hoku-o-Hawaii* mentions an ancient taro patch named "Kamanuwai" located near the junction of Nu'uano and Beretania Streets. Handy suggests that *lo'i* may have been constructed as far *makai* as Hotel Street (June 22, 1865; Handy 1940:79; McAllister 1933).

A trail leading to Nu'uano originated near Hotel street by Nu'uano Stream and led north across Beretania street to a little stream flowing out of Kamanuwai pond near the junction of Nu'uano and Beretania Streets ('Ōi 1959:92). Skirting the edge of the pond, the trail came up on the bank of Waikemi and continued on to Wa'a'akekupu'a, along the bank of taro patches to Pauoa Stream, then to Bates Street (near Liliha and Nu'uano Streets) and, finally, on to the pass in the Pali

NA MO'OLELO (STORIES AND LEGENDS)

Nu'uano, is full of fascinating stories and legends. For a more in depth review of these *mo'olelo*, the reader is referred to Westervelt's *Hawaiian Legends of Old Honolulu (1991)* and *Sites of O'ahu* by Sterling and Summers (1978). A few of the more pertinent references illustrating the importance of Honolulu and Nu'uano are listed below.

It was said that the first *heiau*, which became the prototype for all such structures, was built by Wākea (progenitor of the Hawaiian people) and Haumea at Waolani in Nu'uano (in back of the O'ahu Country Club (Kamakau 1991:30-31). Wākea was born in Waolani and its people were referred to as *no ka lāhui kānaka 'e'epa* (extraordinary, persons with miraculous powers; *Ibid.*:30, 129). It is recorded that *menehune* also dwelt at Waolani, having been brought there by Kane and Kanaloa (*Ibid.*; Handy and Handy 1972:476). The goddess Mo'oinanea, Queen of the *mo'ō* made her home in Nu'uano after having traveled from Kahiki. Many of her mischievous subjects also lived there, giving rise to stories and legends, names of places and natural phenomenon.

Closer to the project area, Kamakau notes that a famous breadfruit tree once grew on the east bank of Nu'uano Stream where the stream was crossed by a bridge at Puchuehu (now known as Waolani Stream) located at the northeast end of the project area. Kamakau writes:

On my going to see the place where the breadfruit stood, whereby Kamehameha became a goddess, I found it at Nini, a short distance above Waikahalulu (the project area). This breadfruit became a deity, known as Kamehameha, a goddess famous from Hawaii to Kauai, for its power and ability to overthrow governments. It was one of the deities of Oahu and was taken by the chiefs of Maui at Hana, and became a deity of Kamehameha when he ruled the land [Kamakau in McAllister 133:83].

The location where Vineyard Street crosses Nu'uaniu, the southwestern boundary of the project area, was named "Pele'ula" (Emerson 1925:168). It was here that the famous game of *kilu* was played between the sister of Pele, Hi'iaaka, and Pele's lover, Lohiau (*Ibid.*).

Historically, Nu'uaniu is most popularly known for the last major battle (1795) in Kamehameha's efforts to unite the islands under his rule. As Kamehameha's authority spread in the late 1700s, Kalanikūpule, the son of Kamehameha, retreated to O'ahu. Kamehameha pursued, and it is said, his fleet covered the sea from Wai'aleale to Waikiki (Desha 2000:407). Upon arrival on O'ahu, Kamehameha visited the *heiau* of Lonikekūpali in Kapalama to drink *awa* and then returned to his troops in Waikiki. Kalanikūpule's army was located inland, above Honolulu and, as the fighting began, they withdrew up Nu'uaniu Valley on the trail to the *pali*. Kamehameha had positioned one division of warriors on the ridge between Pauoa and Nu'uaniu Valley, and another division on the Waolani Valley side (*Ibid.*:412). Isaac Davis and John Young, supporters of Kamehameha, pulled cannons to the top of the ridges of Pauoa and Waolani valleys, respectively, and fired on Kalanikūpule's warriors below. Kamehameha and his army fought their way up the center of Nu'uaniu Valley to the very edge of the *pali* where victory over the O'ahu forces was achieved (*Ibid.*:413).

As was traditional, Kamehameha distributed the conquered lands (*āina panaloa au*) to his supporters. Although he officially kept Nu'uaniu/Honolulu for himself, through the years he granted many pieces of land to his friends, queens and retainers which eventually became fee simple and privately owned lands after the Māhele. Kamehameha settled in Kou, now called Honolulu, and the village became the seat of royalty until his departure in 1812. Upon Kamehameha's death in Kailua on Hawaii Island in 1819, the capital switched between Honolulu and Lahaina until finally, Honolulu became the permanent seat of government (Daws 1968).

In the early part of the 19th century, the British missionary William Ellis traveled through the region in back of Honolulu village near the project area.

The mouth of the valley [Nu'uaniu], which opens immediately behind the town of Honolulu, is a complete garden, carefully kept by its respective proprietors in a state of high cultivation; and the ground being irrigated by the water from a river that winds rapidly down the valley, is remarkably productive [Ellis 1969:13].

Don Francisco de Paula Marin was an early settler to the Hawaiian Islands in 1793 or '94 (Gast 1973:5). Marin's career in Hawai'i included serving Kamehameha throughout his life in various capacities including interpreter, business adviser, accountant, and physician. Through the years, Marin introduced dozens of plants from different areas in the Pacific to the islands, kept a large herd of dairy cattle, raised goats, hogs, and rabbits on Ford Island, and experimented with raising pineapples, sugar and grapes for wine (Day 1984:94-95). In September of 1815, cuttings were planted in what he referred to as his "new vineyard" on land that had originally been allotted to Jonathan Winship (Figure 4; LCA 2938) located in the *ifi* of Kalāwahine, *makai* of the project area. Marin noted in his journal that after having planted the cuttings, there was "great havoc in the vines committed by Captain Winship's hogs" and, Marin complained, "many branches of grapes have been carried off" (Gast 1973:50). However, by July of 1815, he was able to make wine and stated "I drew off 38 gallons" (*Ibid.*).

The vineyard was described by Tyerman and Bennet in 1822 as being:

...trained after the Spanish fashion in bushes, flourish luxuriantly. The proprietor tells us that they would bear three crops in the year, though he prudently prevents the third lest it should too much exhaust the stocks [1831:413].

In the 1820s, C.S. Stewart visited the vineyard and observed:

We had scarcely passed a hundred rods from the village before we found something new to admire in the yard of Mr. Marini. After crossing a small stream which bounds it on one side, our path led us the whole length of another. It is well planted and cultivated, and yields grapes sufficient to make considerable quantities of wine. Along the fences in some parts are bushes of the damask rose in full bloom, which appeared to fine advantage, in contrast with the pale yellow blossom of the cotton tree, with which they are interspersed. The vineyard is also skirted with pineapples, in different stages of maturity...[Gast 1973:54]

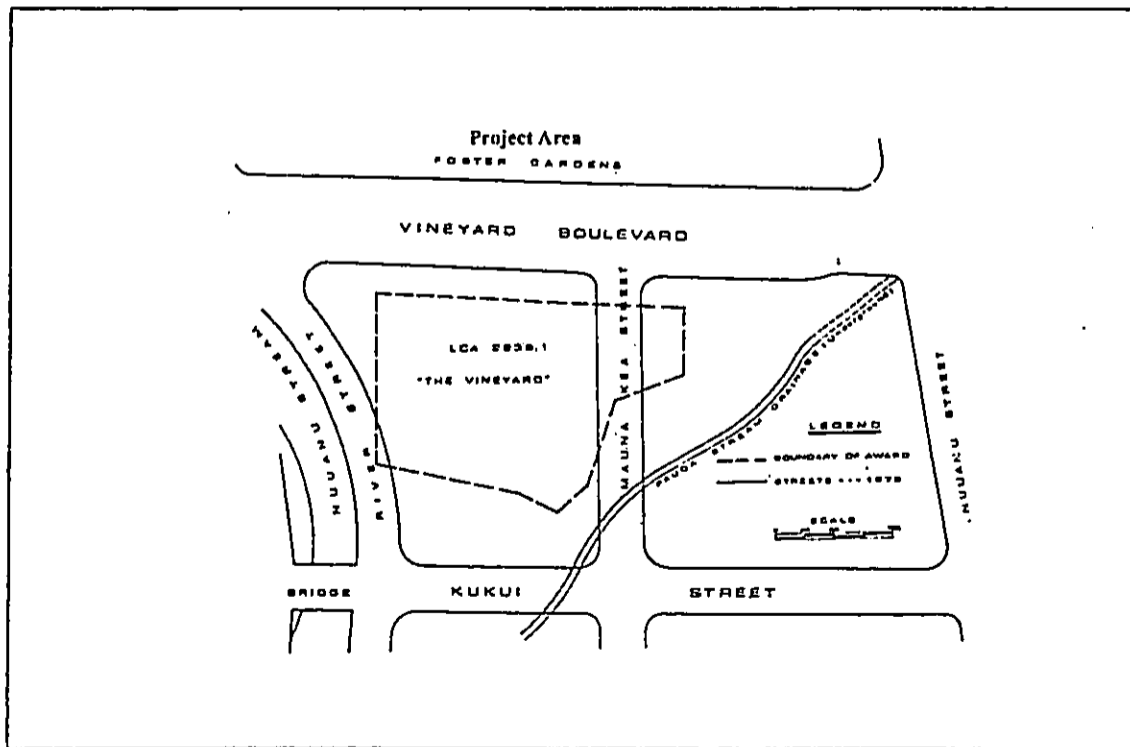


Figure 4: The Vineyard Near the Project Area (Ghast 1973).

This endeavor proved extremely successful to the point where he had two harvests every year. For the next twenty years, the vineyard was well known and construction of a road adjacent to the garden's *maui* boundary became known as "Vineyard Street". Figure 5, drawn in 1847, shows Vineyard established as a straight road extending from Nu'uauu Avenue (Street) to a pathway that was to become Liliha Street. Figure 6 shows cultivation in the project area in 1855, but no defined streets. An 1891 fire insurance map (Figure 7) depicts Vineyard as having disintegrated into a short, crooked lane. By 1897, it is straight once more and connects to Nu'uauu Stream (Figure 8).

THE MĀHELE

Immense changes began to occur to Hawaiian traditional society with the intrusion of foreign lifestyles, first introduced on January 19, 1778 with the arrival of Capt. James Cook on Kauai.

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kamehameha III was forced to establish laws changing the traditional Hawaiian society to that of a market economy (Daws 1968:111; Kuykendall Vol. I, 1938:145 footnote 47, 152, 165-6, 170; Kame'eleihiwa 1992:169-70, 176; Kelly 1983:45, 1998).

Among other things, the foreigners demanded private ownership of land to secure their island investments (Kuykendall Vol. I, 1938:138, 145, 178, 184, 202, 206, 271; Kame'eleihiwa 1992:178). The Great Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were thus made available and private ownership was instituted, the *maka'āinana* (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. These claims, however, could not include any previously cultivated or presently fallow land, *okipū'u*, stream fisheries, or many other resources traditionally necessary for survival (Kelly 1983, Kame'eleihiwa 1992:295, Kirch and Sahlins 1992). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent after which they could then take possession of the property (Chinen 1961:16).

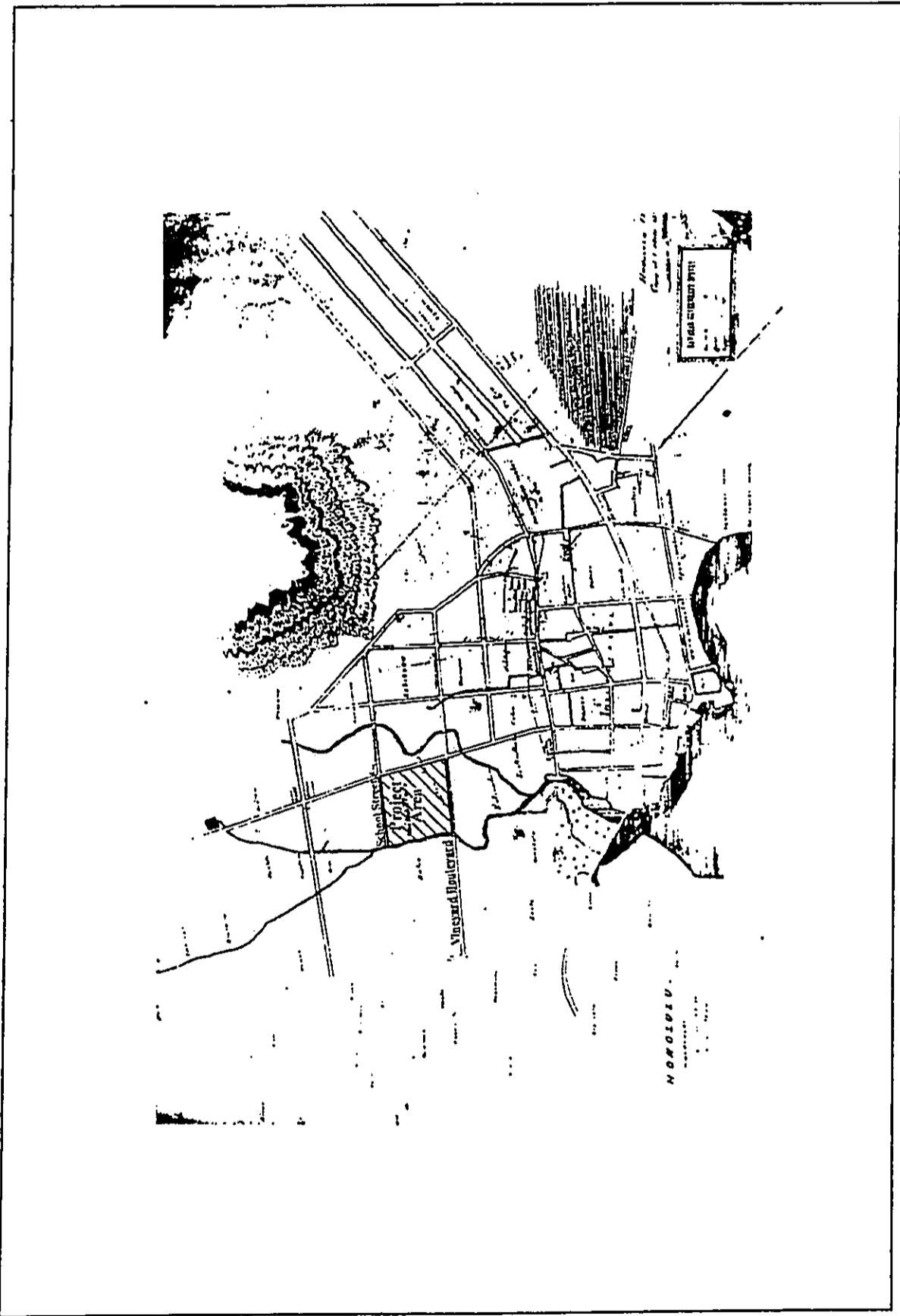


Figure 5: Honolulu Circa 1847 Showing Project Area (Hawaii State Archives).

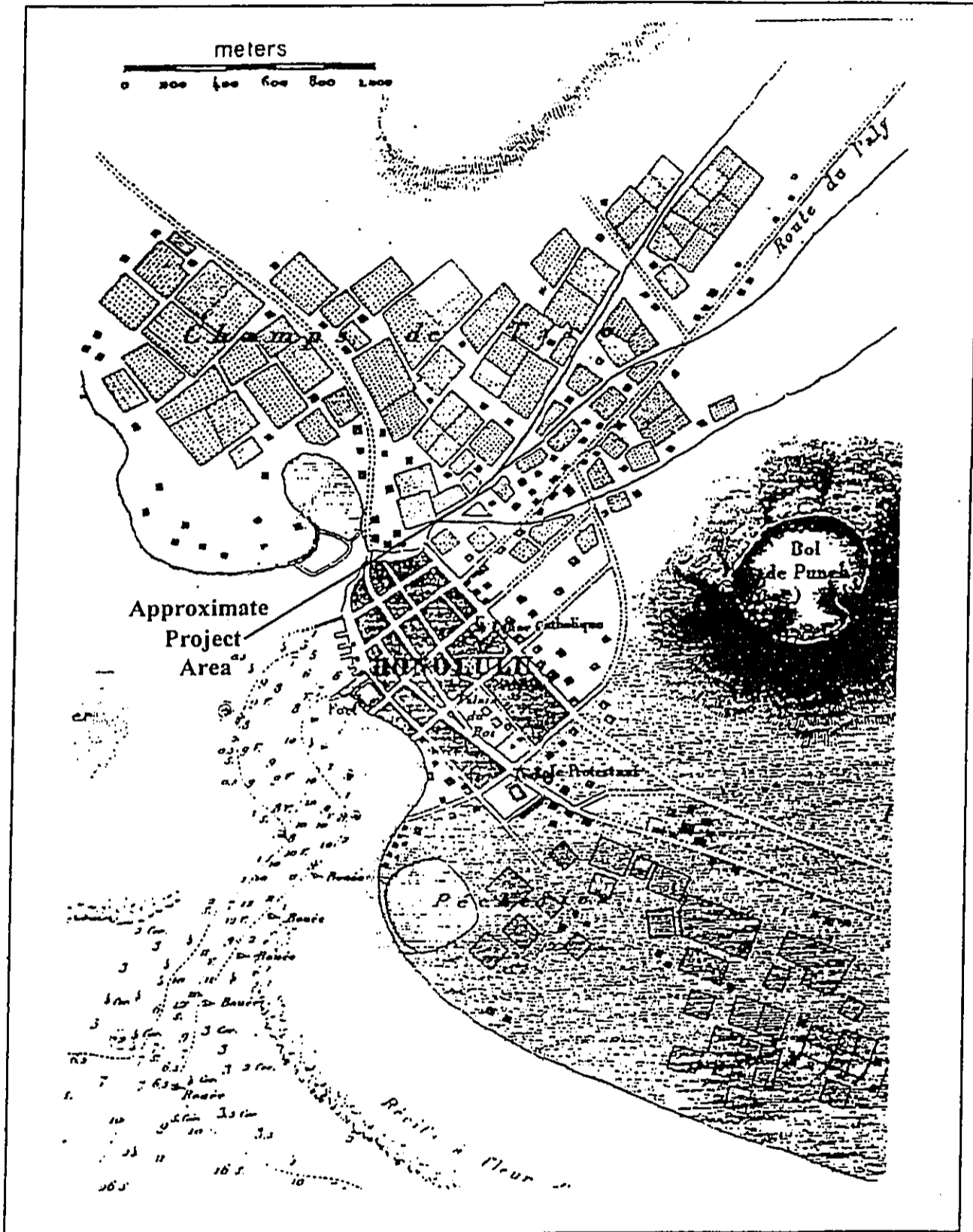


Figure 6: 1855 Map of Honolulu by Lapasse of the Ship L'eurydric Showing Project Area.

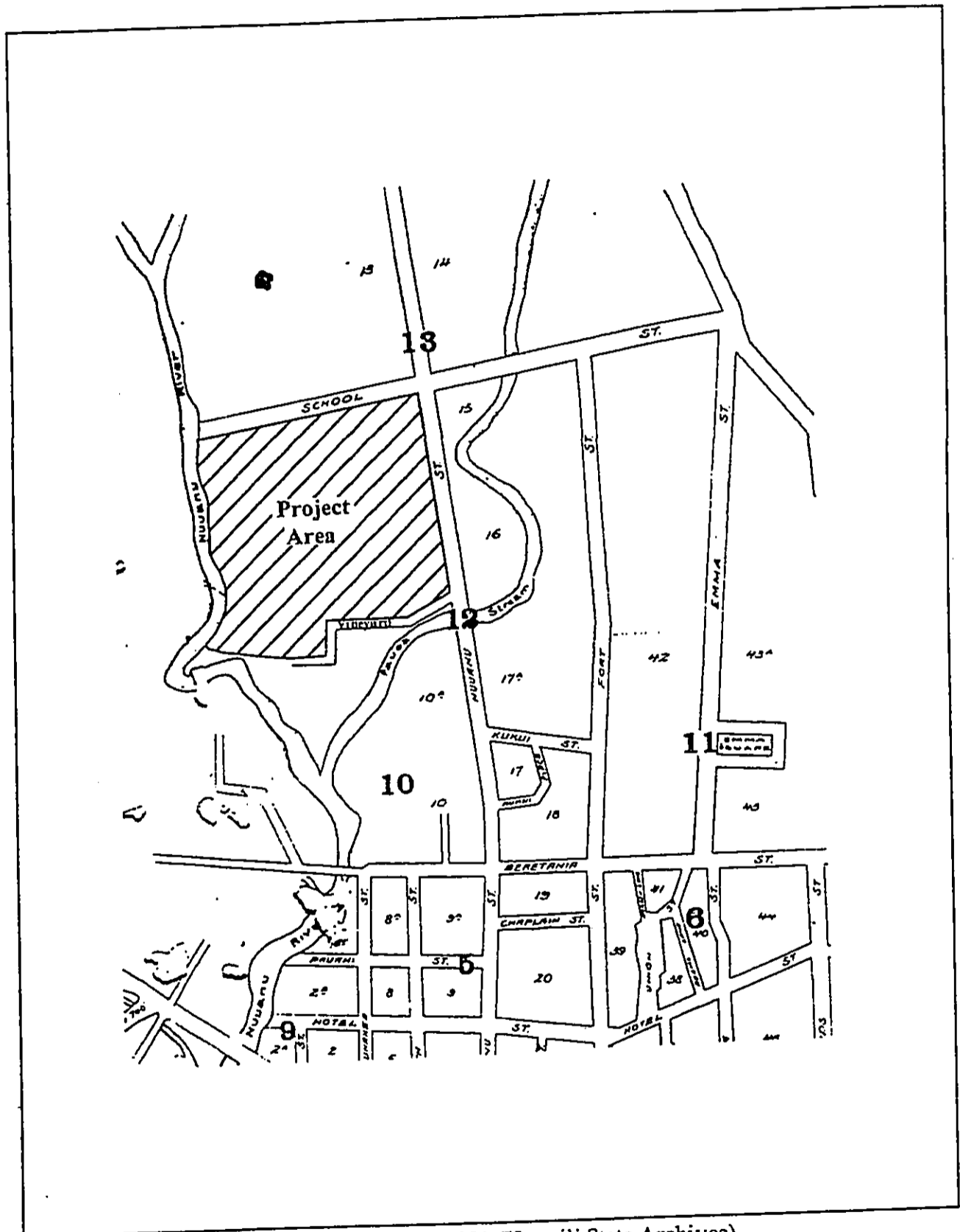


Figure 7: Fire Insurance Map of Honolulu 1891 (Hawai'i State Archives).

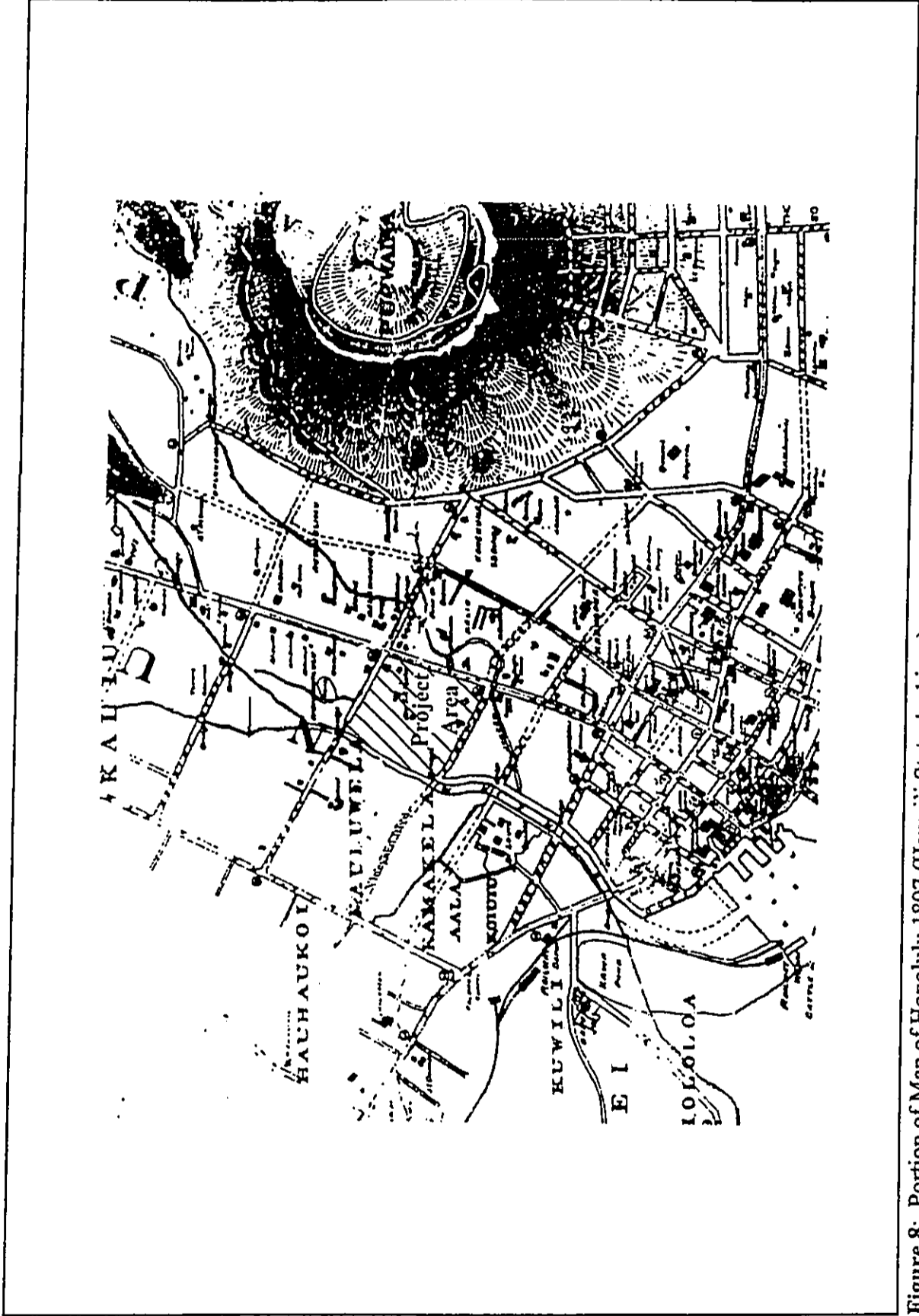


Figure 8: Portion of Map of Honolulu 1897 (Hawai'i State Archives).

A total number of 1,389 LCAs were awarded in the *ahupua'a* of Honolulu, including Nu'uano (Waihona Aina Corporation, 2000, Mahele Database). According to an 1893 map (Figure 9), there were 22 LCA awards in the vicinity of the project area (between what is now School Street and Vineyard and Nu'uano Stream and Nu'uano Street). Kamehameha III (Kauikaouli) gave the *ʻiʻi* of Waikahalulu, extending *mauka-makai* on the Waikīkī side of Nu'uano Stream, to his wife, Queen Kalama (LCA 4452). The *ʻiʻi* of Kalawahine, located *makai* of Queen Kalama's land was awarded to Keli'iahonui (LCA 11215), son of the king of Kaua'i and husband of Ka'ahumanu. This was bisected by a piece of Auwailimu which was designated as Crown Lands (Hackler 1986:15).

Table 1 lists LCA information including land use for awards extending from School Streets to Bereitania and between Nu'uano Stream and Nu'uano Street. Those most closely associated with the project area are LCA No. 141, 698, 715, 727, 942, 795, 935, 942, 1162, 1282, 1286, 1336, 2061, 4452, 4678, 5046, 5580, 5957, 5960, 10613, 11082, 11215 (see Figure 9).

Table 1: LCA Land Use in Vicinity of Project Area

LCA No.	Awardee	'iʻi of the Ahupua'a	Land Use	'Āpana
00141	Māhōpu	Kalawahine	house lot, garden, <i>ʻāhala</i> trees, <i>pili</i> grass	3 (1.32 acre)
00218	Kaunahāhā	Waikēni	house lot (5 small ones)	1 (0.54 acre)
00696	Hāle	Auwailimu	house lot, 2 <i>loʻi</i> or <i>moʻo</i>	1 (0.22 acre)
00698	Hēlela	Kalawahine Kamakā	house lot, 1 <i>loʻi</i> or <i>moʻo</i>	2 (2.42 acre) 1 (0.05 acre)
00715	Kalana	Kalawahine	<i>taro loʻi</i> , pasture house lot	2 (1.33 acre)
00727	R. Kumano	Waikahalulu	house lot, <i>taro land (laia)</i>	2 (0.95 acre)
00795	Kaunahāhā	Kalawahine	14 <i>loʻi</i> or <i>moʻo</i> , house lot	2 (0.96 acre)
00824	Niʻau	Kakopua	house lot, <i>taro</i>	1 (0.83 acre)
00935	Keska	Kalawahine Waikahalulu	6 <i>loʻi</i> or <i>moʻo</i> , 2 house lots	2 (0.22 acre)
00942	Kapuka	Waikahalulu	8 <i>loʻi</i> or <i>moʻo</i> , house lot	2 (1.62 acres) 2 (1.47 acres)
00995	Kuana	Kauhāwela	1 <i>loʻi</i> or <i>moʻo</i> , house lot	1 (1.47 acres)
01090	Kapena, Jona	Kaliu Pelelia	4 <i>loʻi</i> or <i>moʻo</i> , 1 <i>kaia</i> , 1 house lot	1 (1.40 acre)

LCA No.	Awardee	'iʻi of the Ahupua'a	Land Use	'Āpana
01162	Kunihina	Waikahalulu	6 <i>loʻi</i> or <i>moʻo</i> , 1 <i>kaia</i> , house lot	1 (0.67 acres)
01282	Kelikaʻa e	Kalawahine	10 <i>loʻi</i> or <i>moʻo</i> , house lot	5 (1.06 acres)
01286	Piho	Waikahalulu	5 <i>loʻi</i> or <i>moʻo</i> , house lot	2 (1.09 acres)
01312	Kamākau	Auwailimu	2 <i>loʻi</i> or <i>moʻo</i> , 1 <i>kaia</i> , house lot	1 (0.50 acre)
01336	Kahua	Auwailimu	7 <i>loʻi</i> or <i>moʻo</i>	1 (0.27 acre)
02061	Kuana	Auwailimu	<i>taro moʻo</i> or 6 <i>loʻi</i>	2 (3.6 acres)
02938	Hunua for Lahilahi	Kalawahine	farm in vineyard, <i>moʻo</i> , coconut, w/	1 (2.31 acres)
04452	Queen Kalama	The 'iʻi of Waikahalulu	not listed	entire 'iʻi
04678	Puwa	Kalawahine	5 <i>loʻi</i> or <i>moʻo</i>	1 (0.34 acre)
05046B	Kaewai and Kalawala	Auwailimu	7 <i>loʻi</i> or <i>moʻo</i>	1 (0.39 acre)
05580	Kaonui	Kalawahine	3 <i>kaia</i> patches	1 (0.32 acre)
05937	Mākūla	Kalawahine	3 <i>loʻi</i> , house lot	2 (0.28 acre)
05960	Mahana	Kalawahine	house lot, 5 <i>loʻi</i> , 1 <i>kaia</i> (pasture)	2 (0.81 acre)
08321	Kamāle	Kalawahine (Paeoa)	2 <i>loʻi</i>	1 (0.24 acres)
10613	PAI	Kalawahine	2 <i>loʻi</i>	1 (0.43 acres)
11082	Kauōke	Kalawahine	house lot, <i>loʻi</i> , sugar cane <i>moʻo</i>	3 (0.63 acre)
11215	Keli'iahonui	Kalawahine	pasture	16 <i>āpana</i>

Native Register Vol. 1, 2, 3, 4, 5; Foreign Testimony Vol. 1, 2, 3, 10, 16

Although LCA records establish historic land use, many recipients indicated continuous occupation through generations reflecting uninterrupted patterns of traditional land management. Six awardees testified their land had been received by a progenitor from Kamehameha I, who did not have control of O'ahu lands until 1795. Three stated the land had come into the family in the 1820s, fifteen claimed occupation since the 1830s, and five reported ownership within the 1840s. All represent traditional Hawaiian agricultural practices and land use.

Settlement patterns revealed in the LCA records illustrate multiple land use in the region of the project, integrating agriculture and habitation. Twenty-four (83%) of the twenty-nine awards contained either *lo 'i* or *mo 'o* gardens. Eighteen (62%) of the awards contained house lots, several with multiple buildings and one with as many as five structures on the lot (LCA 00218). Six (21%) were awarded *kula* or pasture and some claims were made for *pūhala* (*Pandanus tectorius*), *pili* grass, coconut, sugar cane *mo 'o*, and *wī* (*Tamarindus indica*), an historic introduction marking a shift to foreign crops (For additional LCA use information see Hackler 1986 Appendix).

THE GARDEN

An in-depth history of Foster Botanic Garden was completed by Rhoda Hackler in 1986. Briefly, in 1855 Dr. William F. Hillebrand, a member of the Royal Agricultural Society, leased land in the *'i'i* of Waikahalulu belonging to Queen Kalama (LCA 4452), from Chief Charles Kana'ina, her uncle and agent (Hackler 1986:20). As this was an inland parcel, Hillebrand purchased an eleven-foot right of way on the *makai* side of his property. Here, he began to cultivate his botanical collection. Through the next fifteen years, Hillebrand continued to purchase more lots, including the original leased land, until he had acquired over four acres of land. LCA 11215, awarded to Keli'ihonui and located on the *makai* side of Hillebrand's property, contained pasture and was purchased in 1859 from Levi Ha'alelea. In 1860, 17/100 of an acre within LCA 935 was purchased and in 1861, LCA 727:1 was purchased. Both parcels were obtained from the original awardees (*ibid.*:29).

Hillebrand and his family left Hawai'i in 1871, and in 1880, all of his land holdings in the *'i'i* of Kalawahine and Waikahalulu were sold to a neighbor, Thomas R. Foster, a shipbuilder, and his wife Mary Robinson Foster (*ibid.*:39). Hillebrand's land was adjacent to the Foster's land, and in 1884, the Fosters' built a new two-story house where the Hillebrand cottage had originally been located (*ibid.*). Thomas Foster died in 1889, leaving the large estate to his wife who continued to purchase additional adjoining land. Habitations in 1893 within the block that would eventually become The Foster Botanic Garden are shown in Figure 9. Figure 10 illustrates five buildings on the block in 1901.

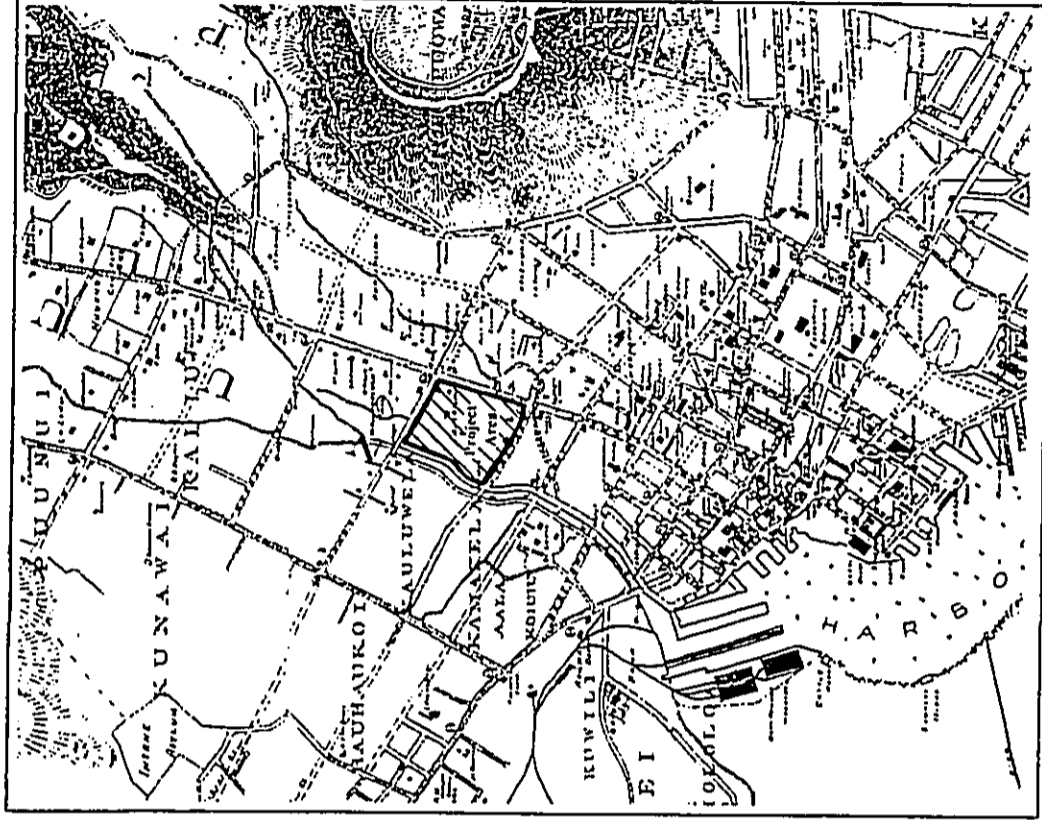


Figure 10: Map of Honolulu 1901 Showing Project Area by M.D. Monsarrat (State Survey Office).

As the original garden begun by Hillebrand had been neglected, Mrs. Foster requested Dr. Harold Lyon, head of the Dept. of Botany and Forestry at the Hawaii Sugar Planters' (HSPA) Association, to bring order to her garden. He leased some of the garden with an entrance on Vineyard Street to the Hawaiian Sugar Planters' Association for a nursery site and eventually persuaded Mrs. Foster to consider establishing a park (*Ibid.*:68-70). On her death in 1930, Mary Foster bequeathed her home and garden to the City of Honolulu, stipulating that the property be named "Foster Park". A year later, land containing Foster Park and the HSPA nursery became Foster Garden (*Ibid.*:77). In 1939, the Park Board purchased the 105,690 square feet of land that had been leased by the HSPA, permanently incorporating it into Foster Garden (*Ibid.*:82).

Through the years, several alterations occurred to the original garden areas. During WWII, the Office of Civilian Defense installed "as many bomb shelters as could possibly be crowded into the area" in the lower and newer section of the garden (Lyon in Hackler 1986:85). These were crushed and covered with soil at the end of the war in an attempt to restore the garden to its original condition. The Fosters' land had originally had 'airwai' (irrigation ditches) extending along either side of their property diverting water from the Nu'uaniu Stream (*Ibid.*:90). In 1897, Mrs. Foster gave the Republic of Hawaii all the water rights to the 'airwai in return for perpetual rights to a one-inch pipe from the public water supply for her use. However, in 1949, after the property was turned over to the City and County of Honolulu, the Department of Parks and Recreation began paying for the water (*Ibid.*:91).

It was while investigating the feasibility of purchasing two lots on School Street in 1950 that the Park Board learned the Territorial Highway Department was planning a 200-foot freeway parallel to School Street which would claim 140 feet of the original Foster Park, as well as the two lots under consideration (*Ibid.*:92). As this project was not to begin for 15 years, the Board decided to purchase the land anyway, placing the public entrance into the Garden on School Street with a turnstile on Nu'uaniu Avenue for the convenience of bus travelers. The widening of Nu'uaniu Avenue claimed ten feet of garden land, Vineyard Street took another 75 feet, and 140 feet were required for the proposed freeway on the mauka side (*Ibid.*:95). On the Vineyard side, 11, 236 square feet of Keali'i ahonui's land award (LCA 11215:2) was covered with asphalt and on the School street side, a part of Mary Foster's original bequest, LCA 4452 (awarded to Queen Kalama), LCA 1286, LCA 942, and LCA 1162 were also developed (*Ibid.*:104).

The widening of Vineyard Street demolished the original glass structure used for quarantine and shade houses and had to be rebuilt in other parts of the garden. With the money received for the highway land, new lands were acquired along Nu'uaniu Avenue and Vineyard Street. By 1961 a new quarantine, seed germination, and lath houses had been completed (*Ibid.*:112). Foster Botanical Garden now incorporated a complete block of land bordered by Vineyard Street, Nu'uaniu Street, Lunaliilo Freeway, and Nu'uaniu Stream, except for 10,000 square feet housing the Kuan Yin Temple on the Vineyard Street side (*Ibid.*:107). The original five acres has now developed into 20 acres of garden with over 10,000 species of plants being propagated (*Ibid.*:120).

PREVIOUS ARCHAEOLOGY

J. Gilbert McAllister conducted one of the first studies of archaeological sites on O'ahu in 1933. Various features were identified in Nu'uaniu and included *heiau*, petroglyphs, a *hōiua* slide, culturally significant *pōhaku*, trails, *piko* stones, burial caves, and a fortress (1933:80-90). A more recent synthesis by Sterling and Summers have relocated many of the early sites and incorporated new ones (1978:293-319). Some of the more significant sites are listed below:

Reportedly, three artificial cuts were made at Nu'uaniu Pali as part of fortifications for war (McAllister 1933:88; Kirch 1985:273). Overlooking the trail connecting the windward and leeward side of the island, the Pali was an important position in time of war. McAllister recorded petroglyphs on the west bank of Nu'uaniu Stream (McAllister 1933:83).

Waolani Stream (formerly Puchuehu Stream) joins Nu'uaniu Stream just above the project area on the northeast. The valley of Waolani was considered culturally important as it was reportedly the birth place of Wākea and contained many sacred sites including several *heiau*. Kawaluna was a *tuakini heiau* (for human sacrifice and only built by paramount chiefs) located in the area behind O'ahu Country Club. This is said to be the oldest and most important *heiau* in the region, having been consecrated by Kuai'i in the 1600s (McAllister 1933:85; Handy and Handy 1972). Four other *heiau* were located in and about the 'iri of Waolani (Handy and Handy 1972). A *hōiua* slide was located on a ridge between Waolani and Nu'uaniu (McAllister 1933:83). Across Nu'uaniu valley on the ridge between Nu'uaniu and Pauoa, were two *heiau*, Kaheiki and Kahuoi both of the husbandry class (McAllister 1933:82). Handy and Handy reported a *heiau* at 2712 Nu'uaniu Avenue (1972; McAllister 1933:86).

Sterling and Summers recorded two *heiau* located near the vicinity of 2290 Liliha Street, north of the project area (Sterling and Summers 1978) and Mauna Heiau was said to be located in back of Queen's Hospital on the side of Pu'u o waina (Punchbowl) to the south. Kamakau recorded that *menehune* lived on Pu'u o waina (1961). He also stated:

Formerly there was an 'imu ahi', a fire oven for burning men on this hill. Chiefs and common people were burned as sacrifices in that noted place. Men were brought for sacrifice from Kauai, Oahu, and Maui, but not from Hawaii. People could be burned in this place for violating the tabus of the tabu divine chiefs [Kamakau in Westervelt 1991:18].

McAllister recorded that the great stone on the top of Punchbowl Hill was the place for the burning of men (1933:82).

Many archaeological studies have been conducted in Nu'uano, as well as the city of Honolulu since the 1970s (Lebo 1997:5). However, only two projects are somewhat near the project area. Most recently, an archaeological inventory survey was conducted in the *ʻiif* of Luakaha (Alewa Heights) east of the project area (Dixon et al. 1994). Features identified were associated with nineteenth-century occupation and included three retention walls, one possible boundary wall, one house foundation, one trash dump, and stone bathhouse. Twentieth-century landscaping remnants were also identified. One radiocarbon date of A.D. 1428-1955 was reported from a burned zone at the base of a stone wall and may be the residue from forest clearing associated with pre-Contact agriculture or early post-Contact construction of the wall.

An archaeological assessment in the Liliha Housing Project in Kapālama was conducted in 1995 (Erkelens 1995). This study determined the likelihood of intact archaeological deposits present in portions of the project area, such as taro pond fields, irrigation canals, habitation remains and possible burials. It was recommended that subsurface test excavations be completed to determine the presence of such remains, their extent and significance.

DISCUSSION

Early records and maps have established the boundaries of the village of Kou and of Honolulu city proper during the 18th and 19th centuries and reported agricultural land existing east of Hotel street. Although no archaeological studies have been conducted within the immediate vicinity of the project area, testimonies recorded during the Māhele (1848) substantiates agricultural use of the project area and its vicinity, as well as confirming habitation sites throughout the region. Documents establish the existence of two *'auwai* bordering the original LCA in the late 1800s. It is apparent that agriculture and occupation continued within the project area up to, and including, the recent time period. It also involved the addition of lands bordering the original LCA award that had become the basis for Foster Botanical Garden. Modifications were made within the lower garden during WWII in preparation for an attack. As the city expanded, portions of the garden were claimed by the City and County for development.

RECOMMENDATIONS

Based on the above information there appears to be potential for subsurface historic sites to exist. It is recommended that an archaeological inventory survey be conducted in undisturbed areas proposed for development in order to determine if historic sites are present and to gather sufficient information in order to evaluate their significance.

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APPENDIX B

**WILSON
OKAMOTO
& ASSOCIATES, INC.**



**ENGINEERS
PLANNERS**
1007 S. BERETANIA, S1
SUITE 400
HONOLULU, HI 96826
PH (808) 846-7277
FAX (808) 846-7253

April 5, 2001

Mr. Thomas S. Witten, ASLA
PBR Hawaii
1001 Bishop Street, Suite 650
Honolulu, HI 96813

Subject: Foster Botanical Garden
Traffic Impact Assessment

Dear Mr. Witten:

As requested, we are submitting the results of the traffic impact assessment that was conducted for the proposed Foster Botanical Garden improvements.

Project Description

Foster Botanical Garden is located near downtown Honolulu and is bounded by Vineyard Boulevard, Nuuanu Avenue, the H-1 Freeway, and Nuuanu Stream. The main entrance to the site is located along Vineyard Boulevard across from River Street. There are also two existing service access driveways located along Vineyard Boulevard. One is located between Nuuanu Avenue and Maunakea Street and the other at the intersection with Maunakea Street. Foster Botanical Garden currently employs approximately 20-25 staff personnel and is open to the public during the hours of 9:00 AM and 4:00 PM.

The current draft of the master plan as provided by PBR Hawaii (see Exhibit A) outlines the following improvements to the site:

- Relocation of the main entrance to the intersection of Vineyard Boulevard and Maunakea Street (to replace existing service access driveways).
- Conversion of the existing main entrance to a service access driveway.
- Construction of a new visitor parking lot (100 stalls total).
- Construction of an employee parking lot (15 stalls total).
- Construction of a new Visitor Center.
- Relocation of the existing orchid lath house, quarantine house, mist house, green house, and various maintenance structures located near the makai edge of the project site.

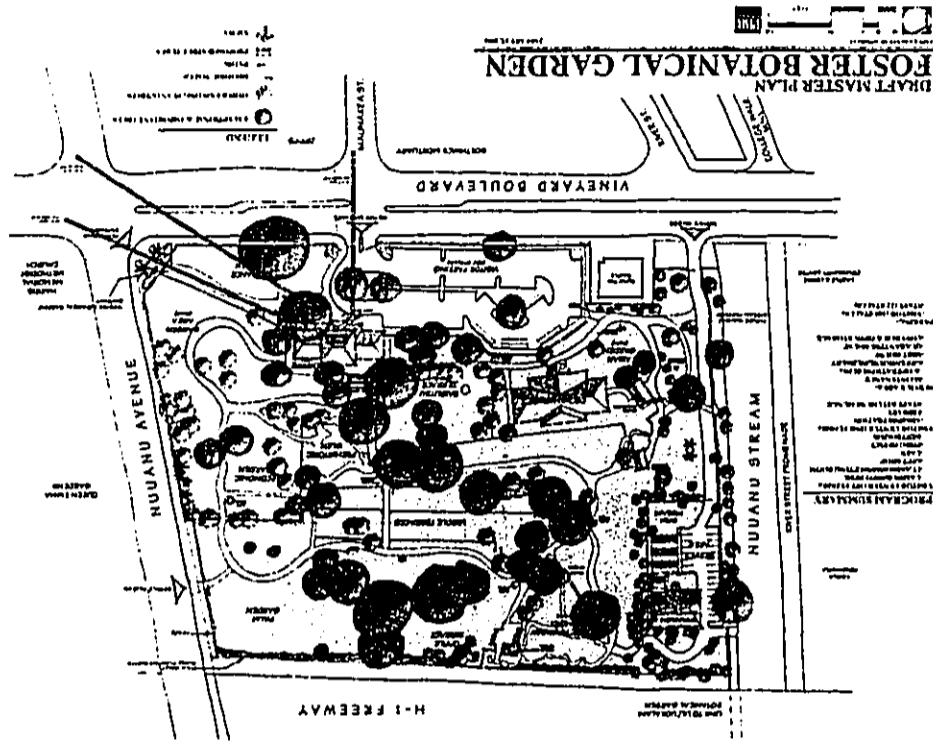


Exhibit A

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6475-01
April 5, 2001
Letter to Mr. Witten
Page 3

The proposed Visitor Center will house the cashier, information desk, gift shop, various offices, and the Joseph Rock Library currently scattered throughout the project site. In addition, the proposed Center will offer a new café, meeting rooms, and classrooms.

The master plan improvements should be completed by the Year 2007, after which, Foster Botanical Garden anticipates hiring approximately 5-10 new employees. In addition, meetings, classes, and other events would be held occasionally at the site after normal operating hours. However, these events would not be scheduled until after the afternoon peak hour of traffic.

Trip Generation

Based upon the methodology developed by the Institute of Transportation Engineers (ITE), trip generation rates for the project site were developed empirically by correlating the total number of vehicle trips with the total square feet of development. Utilizing this rate, an increase in site-generated trips was projected based upon the proposed increase in total square feet of development due to the new Visitor Center.

Project Impacts

The proposed improvements at the Foster Botanical Garden are anticipated to have no significant impact on the surrounding roadways since most activities at the project site is expected to occur during off-peak hours. Traffic operations at the intersections of Vineyard Boulevard with Nuuanu Avenue, Maunakea Street, and River Street should continue to operate at acceptable levels-of-service during the AM and PM peak hours of traffic after the completion of the proposed master plan improvements. The impact of the main entrance relocation would be mitigated by the construction of an exclusive left-turn lane for vehicles turning left from Vineyard Boulevard into the site and the modification of the existing traffic signal system to accommodate a 4-way intersection.

Recommendations

Based upon the analysis of the traffic data the following are the recommendations of this study:


1. Modify the existing traffic signal system at the intersection of Vineyard Boulevard and Maunakea Street to accommodate the proposed entrance driveway and 4-way signal operation.

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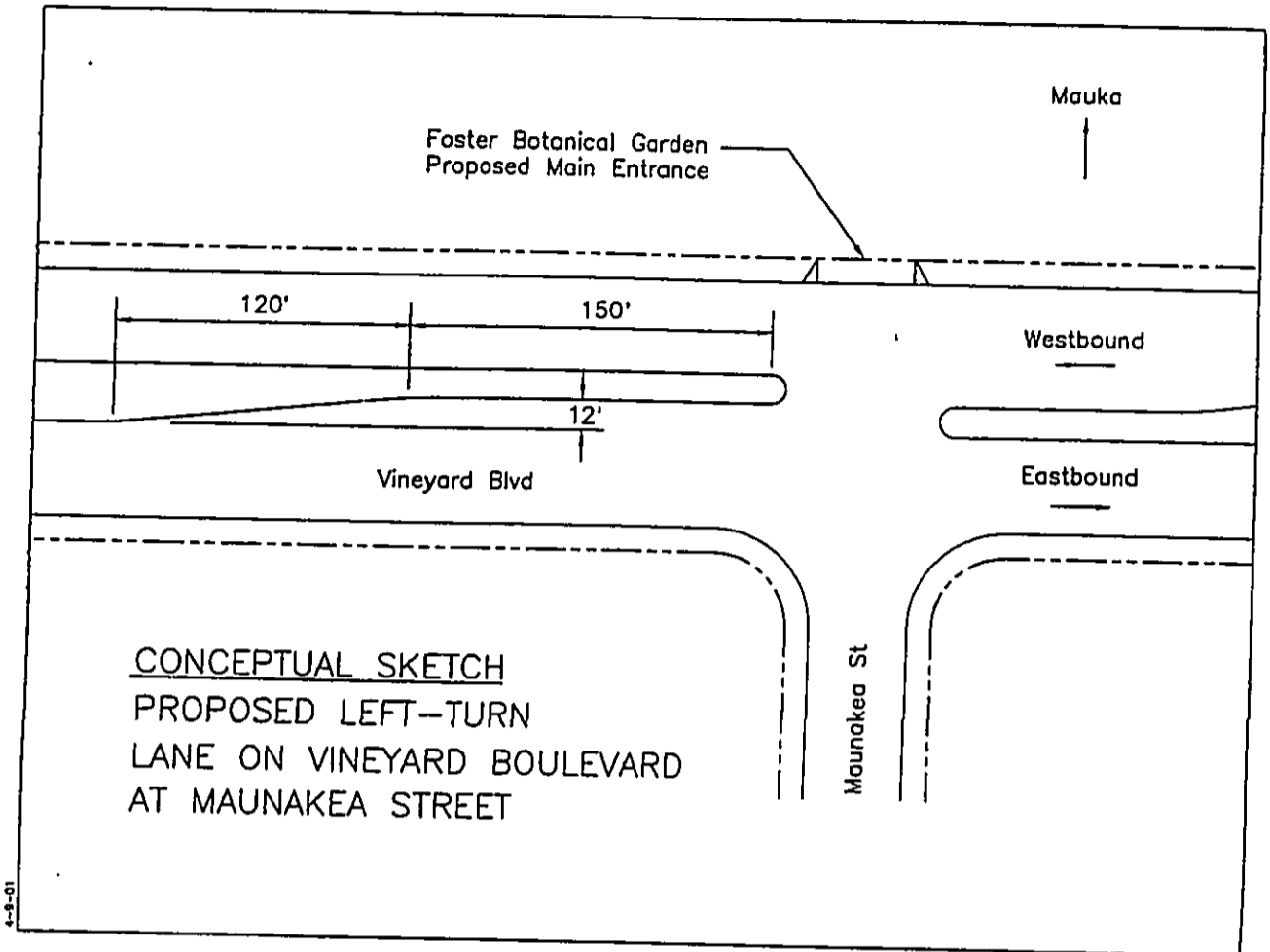
6475-01
April 5, 2001
Letter to Mr. Witten
Page 4

2. Provide an exclusive left-turn lane for vehicles turning left from Vineyard Boulevard into Foster Botanical Garden. There is sufficient median width to accommodate an additional turning lane along Vineyard Boulevard at the intersection with Maunakea Street.
 3. Provide adequate sight distance for motorists to safely enter and exit the project driveways.
 4. Provide adequate on-site loading areas and prohibit off-site loading operations.
 5. Provide an adequate turn-around area for delivery and refuse vehicles to maneuver on the project site. Avoid vehicle reversing maneuvers onto public streets.
 6. Provide sufficient driveway width to accommodate safe vehicle ingress and egress.
- If you have any questions or require clarification, please call me at 946-2277.

Sincerely,


Cathy Leong

Encl. (Attachments)



Wilson Okamoto & Associates, Inc.
1907 S. Beretania St., Suite 400
Honolulu, HI 96826

Counter: D1-0768/D1-0769
Counted By: TI/RT/IQ
Weather: Clear
Other:

File Name : Mauvina
Site Code : 00000002
Start Date : 03/14/2001
Page No : 1

Groups Printed - 1 - Unshifed

Start Time	Dwy Southbound				Vineyard Blvd Westbound				Maunakea St Northbound				Vineyard Blvd Eastbound				Int. Total
	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
06:30 AM	0	0	0	0	12	66	0	78	16	0	24	40	0	236	19	255	373
06:45 AM	0	0	0	0	15	79	0	94	16	0	23	39	0	297	30	327	460
Total	0	0	0	0	27	145	0	172	32	0	47	79	0	533	49	582	833
07:00 AM	0	0	0	0	9	108	0	117	25	0	20	45	0	318	41	357	519
07:15 AM	0	0	0	0	20	102	0	122	30	0	34	64	0	247	19	266	452
07:30 AM	0	0	0	0	23	122	0	145	27	0	21	48	0	284	34	318	511
07:45 AM	0	0	0	0	19	131	0	150	33	0	27	60	0	254	44	298	508
Total	0	0	0	0	71	463	0	534	115	0	102	217	0	1101	138	1239	1990
08:00 AM	0	0	1	1	18	121	0	139	26	0	25	51	0	247	37	284	475
08:15 AM	0	0	0	0	28	104	0	132	20	0	25	45	0	258	43	301	478
Grand Total	0	0	1	1	144	633	0	977	193	0	199	392	0	2139	267	2406	3776
Approch %	0.0	0.0	100.0		14.7	85.3	0.0		48.2	0.0	50.8		0.0	88.9	11.1		
Total %	0.0	0.0	0.0	0.0	3.8	22.1	0.0	25.9	5.1	0.0	5.3	10.4	0.0	56.6	7.1	63.7	

Start Time	Dwy Southbound				Vineyard Blvd Westbound				Maunakea St Northbound				Vineyard Blvd Eastbound				Int. Total
	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																	
Intersection	07:00 AM				07:45 AM				07:15 AM				07:00 AM				
Volume	0	0	0	0	71	463	0	534	115	0	102	217	0	1101	138	1239	1990
Percent	0.0	0.0	0.0	0	13.3	86.7	0.0		53.0	0.0	47.0		0.0	88.9	11.1		
07:00 Volume	0	0	0	0	9	108	0	117	25	0	20	45	0	318	41	357	519
Peak Factor																	
High Int.	6:15:00 AM				07:45 AM				07:15 AM				07:00 AM				
Volume	0	0	0	0	19	131	0	150	30	0	34	64	0	318	41	357	0.959
Peak Factor								0.890				0.848				0.868	

Wilson Okamoto & Associates, Inc.
1907 S. Beretania St., Suite 400
Honolulu, HI 96826

Counter: D1-0768/D1-0769
Counted By: IQ/TI/RT
Weather: Clear
Other:

File Name : mauvnp
Site Code : 00000002
Start Date : 03/14/2001
Page No : 1

Groups Printed: 1 - Unshifted

Start Time	Dwy Southbound				Vineyard Blvd Westbound				Maunakea St Northbound				Vineyard Blvd Eastbound				Int. Total
	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
04:00 PM	0	0	1	1	14	184	0	198	65	0	52	117	0	270	29	299	615
04:15 PM	0	0	0	0	15	223	0	238	59	0	35	94	0	251	44	295	627
04:30 PM	0	0	0	0	16	193	0	209	97	0	47	144	0	252	35	287	640
04:45 PM	0	0	0	0	23	192	0	215	79	0	46	125	0	218	39	257	507
Total	0	0	1	1	68	792	0	860	300	0	180	480	0	991	147	1138	2479
05:00 PM	0	0	0	0	10	160	0	170	67	0	51	118	0	200	52	252	540
05:15 PM	0	0	1	1	17	158	0	175	67	0	42	109	0	239	51	290	575
05:30 PM	0	0	0	0	21	158	1	180	53	0	50	103	0	245	46	291	574
05:45 PM	0	0	0	0	25	150	0	175	59	0	67	126	0	193	41	234	535
Total	0	0	1	1	73	626	1	700	246	0	210	456	0	677	190	1067	2224
Grand Total	0	0	2	2	141	1418	1	1560	546	0	390	936	0	1868	337	2205	4703
Approch %	0.0	0.0	100.0		9.0	90.9	0.1		58.3	0.0	41.7		0.0	84.7	15.3		
Total %	0.0	0.0	0.0	0.0	3.0	30.2	0.0	33.2	11.6	0.0	8.3	19.9	0.0	39.7	7.2	46.9	

Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1

Start Time	Dwy Southbound				Vineyard Blvd Westbound				Maunakea St Northbound				Vineyard Blvd Eastbound				Int. Total
	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	
Intersection 04:00 PM					88	792	0	880	300	0	180	480	0	991	147	1138	2479
Volume	0	0	1	1	7.9	92.1	0.0		62.5	0.0	37.5		0.0	87.1	12.9		
Percent	0.0	0.0	100.0		16	193	0	209	97	0	47	144	0	252	35	287	640
04:30 Volume	0	0	0	0													0.968
Peak Factor																	
High InL 04:00 PM					04:15 PM				04:30 PM				04:00 PM				
Volume	0	0	1	1	15	223	0	238	97	0	47	144	0	270	29	299	
Peak Factor				0.250				0.903				0.833				0.952	

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Honolulu, HI 96826

Counter: D1-0525/D1-0527
Counted By: FL/PS
Weather: Clear
Other:

File Name : rivina
Site Code : 00000003
Start Date : 03/14/2001
Page No : 1

Groups Printed: 1 - Unshifted

Start Time	Dwy Southbound				Vineyard Blvd Westbound				River St Northbound				Vineyard Blvd Eastbound				Int. Total
	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
06:30 AM	0	0	0	0	0	79	0	79	0	0	1	1	0	259	0	259	339
06:45 AM	0	0	0	0	0	97	1	98	0	0	0	0	0	313	0	313	411
Total	0	0	0	0	0	176	1	177	0	0	1	1	0	572	0	572	750
07:00 AM	0	0	0	0	0	128	1	129	0	0	3	3	0	359	0	359	491
07:15 AM	0	0	0	0	0	131	0	131	0	0	6	6	0	302	0	302	439
07:30 AM	0	0	0	0	0	149	0	149	0	0	5	5	0	316	0	316	470
07:45 AM	0	0	0	0	0	155	0	155	0	0	3	3	0	299	0	299	457
Total	0	0	0	0	0	563	1	564	0	0	17	17	0	1276	0	1276	1857
08:00 AM	0	0	1	1	0	137	2	139	0	0	3	3	0	286	0	286	429
08:15 AM	0	0	1	1	0	109	1	110	0	0	7	7	0	280	0	280	398
Grand Total	0	0	2	2	0	885	5	890	0	0	28	28	0	2414	0	2414	3434
Approch %	0.0	0.0	100.0		0.0	99.5	0.5		0.0	0.0	100.0		0.0	100.0	0.0		
Total %	0.0	0.0	0.1	0.1	0.0	28.7	0.1	28.8	0.0	0.0	0.8	0.8	0.0	70.3	0.0	70.3	

Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1

Start Time	Dwy Southbound				Vineyard Blvd Westbound				River St Northbound				Vineyard Blvd Eastbound				Int. Total
	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	
Intersection 07:00 AM					0	563	1	564	0	0	17	17	0	1276	0	1276	1857
Volume	0	0	0	0	0.0	99.8	0.2		0.0	0.0	100.0		0.0	100.0	0.0		
Percent	0.0	0.0	0.0	0.0	0	128	1	129	0	0	3	3	0	359	0	359	491
07:00 Volume	0	0	0	0													0.946
Peak Factor																	
High InL 6:15:00 AM					07:45 AM				07:15 AM				07:00 AM				
Volume	0	0	0	0	0	155	0	155	0	0	6	6	0	359	0	359	
Peak Factor								0.910				0.708				0.889	

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Honolulu, HI 96826

Counter: D1-0525/D1-0527
Counted By: FL/PS
Weather: Clear
Other:

File Name : rivinp
Site Code : 00000003
Start Date : 03/14/2001
Page No : 1

Groups Printed: 1 - Unshifted

Start Time	Dwy Southbound				Vineyard Blvd Westbound				River St Northbound				Vineyard Blvd Eastbound				Int. Total
	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
04:00 PM	0	0	3	3	0	244	2	246	0	0	10	10	0	292	0	292	551
04:15 PM	0	0	2	2	0	271	1	272	0	0	4	4	0	308	0	308	566
04:30 PM	0	0	2	2	0	283	1	284	0	0	9	9	0	291	0	291	586
04:45 PM	0	0	1	1	0	275	0	275	0	0	10	10	0	269	0	269	555
Total	0	0	8	8	0	1073	4	1077	0	0	33	33	0	1160	0	1160	2278
05:00 PM	0	0	0	0	0	230	0	230	0	0	12	12	0	272	0	272	514
05:15 PM	0	0	1	1	0	223	1	224	0	0	11	11	0	265	0	265	501
05:30 PM	0	0	0	0	0	200	0	200	0	0	23	23	0	265	0	265	488
05:45 PM	0	0	0	0	0	193	0	193	0	0	12	12	0	244	0	244	449
Total	0	0	1	1	0	846	1	847	0	0	58	58	0	1046	0	1046	1952
Grand Total	0	0	9	9	0	1919	5	1924	0	0	91	91	0	2206	0	2206	4230
Apprch %	0.0	0.0	100.0		0.0	99.7	0.3		0.0	0.0	100.0		0.0	100.0	0.0		
Total %	0.0	0.0	0.2	0.2	0.0	45.4	0.1	45.5	0.0	0.0	2.2	2.2	0.0	52.2	0.0	52.2	

Start Time	Dwy Southbound				Vineyard Blvd Westbound				River St Northbound				Vineyard Blvd Eastbound				Int. Total
	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:00 PM				04:30 PM				04:00 PM				04:15 PM				
Volume	0	0	8	8	0	1073	4	1077	0	0	33	33	0	1160	0	1160	2278
Percent	0.0	0.0	100.0		0.0	99.6	0.4		0.0	0.0	100.0		0.0	100.0	0.0		0.972
04:30 Volume	0	0	2	2	0	283	1	284	0	0	9	9	0	291	0	291	586
Peak Factor	0.687				0.948				0.825				0.942				
High Int. Volume	04:00 PM				04:30 PM				04:00 PM				04:15 PM				
Peak Factor	0.687				0.948				0.825				0.942				

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1907 S. Beretania St., Suite 400
Honolulu, HI 96826

Counter: D1-0526/D1-0528
Counted By: TM/TF
Weather: Clear
Other:

File Name : nuuvina
Site Code : 00000001
Start Date : 03/14/2001
Page No : 1

Groups Printed: 1 - Unshifted

Start Time	Nuuanu Ave Southbound				Vineyard Blvd Westbound				Nuuanu Ave Northbound				Vineyard Blvd Eastbound				Int. Total
	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
06:30 AM	15	50	7	72	36	47	34	117	15	37	27	79	38	223	29	290	558
06:45 AM	32	84	11	127	29	52	27	108	27	60	37	124	42	242	32	316	675
Total	47	134	18	199	65	99	61	225	42	97	64	203	80	465	61	606	1233
07:00 AM	33	80	17	130	31	81	34	146	23	60	42	125	44	285	29	358	759
07:15 AM	38	168	14	218	43	88	17	148	19	74	59	152	50	185	13	228	745
07:30 AM	47	140	17	204	45	84	27	156	17	106	63	186	48	269	21	338	884
07:45 AM	43	151	17	211	50	112	18	180	20	94	33	147	52	242	30	324	862
Total	159	539	65	763	169	365	96	630	79	334	197	610	194	961	93	1248	3251
08:00 AM	40	175	15	230	49	80	21	150	22	75	46	143	37	207	30	274	797
08:15 AM	33	114	21	168	48	83	20	151	21	63	44	126	39	232	29	300	747
Grand Total	278	962	119	1360	331	627	198	1156	164	569	351	1084	350	1855	213	2428	6028
Apprch %	20.5	70.7	8.8		28.8	54.2	17.1		15.1	52.5	32.4		14.4	76.8	6.8		
Total %	4.6	16.0	2.0	22.6	5.5	10.4	3.3	19.2	2.7	9.4	5.8	18.0	5.8	30.9	3.5	40.3	

Start Time	Nuuanu Ave Southbound				Vineyard Blvd Westbound				Nuuanu Ave Northbound				Vineyard Blvd Eastbound				Int. Total
	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																	
Intersection	07:30 AM				07:45 AM				07:30 AM				07:30 AM				
Volume	183	590	70	813	192	359	86	637	80	338	186	604	176	950	110	1236	3290
Percent	20.0	71.3	8.8		30.1	56.4	13.5		13.2	56.0	30.8		14.2	76.9	8.9		0.930
07:30 Volume	47	140	17	204	45	84	27	156	17	106	63	186	48	269	21	338	884
Peak Factor	0.884				0.865				0.812				0.914				
High Int. Volume	08:00 AM				07:45 AM				07:30 AM				07:30 AM				
Peak Factor	0.884				0.865				0.812				0.914				

Wilson Okamoto & Associates, Inc.
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Honolulu, HI 96828

Counter: D1-0528/D1-0528
Counted By: TM/TF
Weather: Clear
Other:

File Name : nuuvinp
Site Code : 00000001
Start Date : 03/14/2001
Page No : 1

Groups Printed - 1 - Unshifted

Start Time	Nuuanu Ave Southbound				Vineyard Blvd Westbound				Nuuanu Ave Northbound				Vineyard Blvd Eastbound				Int. Total
	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
04:00 PM	17	54	14	85	33	160	69	262	48	140	86	272	58	271	21	350	
04:15 PM	32	58	14	104	28	162	48	238	43	198	91	332	44	246	20	310	
04:30 PM	22	50	18	90	28	168	57	251	43	206	92	341	68	242	22	332	
04:45 PM	32	49	15	96	53	154	64	271	33	213	111	357	53	196	16	265	
Total	103	211	61	375	140	644	238	1022	165	757	380	1302	223	955	79	1257	
05:00 PM	20	59	8	87	39	124	50	213	37	205	66	308	56	238	26	318	
05:15 PM	20	48	17	85	52	128	51	231	28	205	61	292	64	224	21	309	
05:30 PM	14	60	16	90	54	143	35	232	21	222	66	309	63	220	24	307	
05:45 PM	16	50	14	80	46	135	65	248	24	143	64	251	56	239	32	327	
Total	70	217	55	342	191	530	201	922	108	775	277	1160	239	919	103	1261	
Grand Total	173	428	116	717	331	1174	439	1944	273	1532	657	2462	462	1874	182	2518	
Apprch %	24.1	59.7	16.2		17.0	60.4	22.6		11.1	62.2	26.7		18.3	74.4	7.2		
Total %	2.3	5.6	1.5	9.4	4.3	15.4	5.7	25.4	3.6	20.0	8.6	32.2	6.0	24.5	2.4	33.0	

Start Time	Nuuanu Ave Southbound				Vineyard Blvd Westbound				Nuuanu Ave Northbound				Vineyard Blvd Eastbound				Int. Total
	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	LT	TH	RT	App. Total	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:00 PM				04:45 PM				04:00 PM				04:00 PM				3956
Volume	103	211	61	375	140	644	238	1022	165	757	380	1302	223	955	79	1257	
Percent	27.5	56.3	18.3		13.7	63.0	23.3		12.7	58.1	28.2		17.7	76.0	6.3		
04:30 Volume	22	50	18	90	26	168	57	251	43	206	92	341	68	242	22	332	
Peak Factor																	
High Int. Volume	04:15 PM				04:45 PM				04:45 PM				04:00 PM				1014
Peak Factor	32	58	14	104	53	154	64	271	33	213	111	357	58	271	21	350	
	0.801				0.943				0.912				0.898				0.975

HCS2000: Signalized Intersections Release 4.1

Analyst: CL
Agency: 3/19/2001
Date: AM Peak
Period: Existing
Project ID: N/5 St: Nuuanu Ave
E/W St: Vineyard Blvd

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	3	0	1	3	0	1	3	0	1	2	0
LC Config	L	TR		L	TR		L	TR		L	TR	
Volume	1194	961	93	1169	365	96	179	334	197	159	539	65
Lane Width	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	7
RTOR Vol	9			10			20					

Duration 1.00 Area Type: All other areas

Phase Combination	Signal Operations					
	1	2	3	4		
EB Left	A	A	A	NB Left		
EB Thru	A	A	A	EB Thru		
EB Right	A	A	A	EB Right		
Peds				Peds		
WB Left	A	A	A	SB Left		
WB Thru	A	A	A	WB Thru		
WB Right	A	A	A	WB Right		
Peds				Peds		
NB Right				NB Right		
SB Right				SB Right		
Green	20.0	8.0	55.0	15.0	7.0	45.0
Yellow	0.0	0.0	4.0	0.0	0.0	4.0
All Red	0.0	0.0	1.0	0.0	0.0	1.0

Cycle Length: 160.0 secs

Intersection Performance Summary

Appr/ Lane Gp	Lane Capacity	Adj Sat	Ratios		Approach	
			v/c	g/c	Delay LOS	Delay LOS
Eastbound L	316	1805	0.71	0.17	69.4	E
Eastbound TR	2018	5124	0.60	0.39	38.9	D
Westbound L	365	1805	0.53	0.47	28.8	C
Westbound TR	1732	5039	0.30	0.34	38.5	D
Northbound L	169	1805	0.57	0.09	73.9	E
Northbound TR	1376	4891	0.45	0.28	47.6	D
Southbound L	248	1805	0.74	0.14	78.0	E
Southbound TR	1147	3529	0.60	0.32	46.1	D

HCS2000: Signalized Intersections Release 4.1

Analyst: CL Inter.:
 Agency: 3/19/2001 Area Type: All other areas
 Date: 3/19/2001 Jurisd:
 Period: PM Peak Year: Existing
 Project ID: N/S St: Nuuanu Ave
 E/W St: Vineyard Blvd

	SIGNALIZED INTERSECTION SUMMARY											
	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	3	0	1	3	0	1	3	0	1	2	0
LG Config	L	TR		L	TR		L	TR		L	TR	
Volume	223	955	79	1140	644	238	165	757	380	103	211	61
Lane Width	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
RTOR Vol	8		24			38						6

Duration 1.00 Area Type: All other areas

Phase Combination	Signal Operations											
	1	2	3	4	5	6	7	8				
EB Left	A	A	A		NB Left	A	A	A				
Thru	A	A	A		Thru	A	A	A				
Right	A	A	A		Right	A	A	A				
Peds					Peds							
WB Left	A				SB Left	A						
Thru	A				Thru	A						
Right	A				Right	A						
Peds					Peds							
NB Right					EB Right							
SB Right					WB Right							
Green	25.0	5.0	40.0		15.0	10.0	50.0					
Yellow	0.0	0.0	4.0		0.0	0.0	4.0					
All Red	0.0	0.0	1.0		0.0	0.0	1.0					

Intersection Performance Summary
 Cycle Length: 155.0 secs

Appr/ Lane Grp	Lane Capacity	Adj Sat Flow Rate (s)	Ratios			Lane Group	Approach
			v/c	g/C	Delay LOS		
Eastbound							
L	349	1805	0.71	0.19	65.3	E	54.9 D
TR	1490	5133	0.77	0.29	52.7	D	
Westbound							
L	398	1805	0.37	0.42	31.3	C	50.9 D
TR	1289	4993	0.71	0.26	54.0	D	
Northbound							
L	291	1805	0.62	0.16	64.7	E	42.6 D
TR	1904	4918	0.63	0.39	39.3	D	
Southbound							
L	175	1805	0.65	0.10	76.1	E	49.3 D
TR	1119	3470	0.26	0.32	39.0	D	

HCS2000: Signalized Intersections Release 4.1

Analyst: CL Inter.:
 Agency: 3/19/2001 Area Type: All other areas
 Date: 3/19/2001 Jurisd:
 Period: AM Peak Year: Existing
 Project ID: N/S St: Haunakea St
 E/W St: Vineyard Blvd

	SIGNALIZED INTERSECTION SUMMARY											
	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	3	0	1	3	0	1	0	1	0	0	0
LG Config	TR			L	TR		L					
Volume	1101	138	171	463	1115	102	12.0	12.0	12.0	10		
Lane Width	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	10		
RTOR Vol	14											

Duration 1.00 Area Type: All other areas

Phase Combination	Signal Operations											
	1	2	3	4	5	6	7	8				
EB Left					NB Left	A						
Thru					Thru	A						
Right					Right	A						
Peds					Peds							
WB Left	A				SB Left							
Thru	A				Thru							
Right	A				Right							
Peds					Peds							
NB Right					EB Right							
SB Right					WB Right							
Green	20.0	70.0			60.0							
Yellow	0.0	4.0			4.0							
All Red	0.0	1.0			1.0							

Intersection Performance Summary
 Cycle Length: 160.0 secs

Appr/ Lane Grp	Lane Capacity	Adj Sat Flow Rate (s)	Ratios			Lane Group	Approach
			v/c	g/C	Delay LOS		
Eastbound							
TR	2235	5108	0.61	0.44	35.0	C	35.0- C
Westbound							
L	226	1805	0.34	0.13	64.8	E	23.3 C
T	2918	5187	0.17	0.56	16.9	B	
Northbound							
L	677	1805	0.19	0.38	33.7	C	33.6 C
R	606	1615	0.17	0.38	33.5	C	

HCS2000: Signalized Intersections Release 4.1

Analyst: Inter.:
 Agency: Area Type: All other areas
 Date: 3/19/2001 Jurisd:
 Period: PM Peak Year : Existing
 Project ID: N/S St: Maunakea St
 E/W St: Vineyard Blvd

	SIGNALIZED INTERSECTION SUMMARY											
	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	3	0	1	3	0	1	0	1	0	0	0
LGConf5g	TR			L	T		L	R				
Volume	991	147		68	792		300	180				
Lane Width	12.0			12.0	12.0		12.0	12.0				
RTOR Vol	15						18					

Phase Combination	Area Type: All other areas											
	Signal Operations			Signal Operations			Signal Operations			Signal Operations		
	1	2	3	4	5	6	7	8				
EB Left									NB Left	A		
Thru									Thru	A		
Right									Right	A		
Peds									Peds			
WB Left	A								SB Left			
Thru	A								Thru			
Right									Right			
Peds									Peds			
NB Right									EB Right			
SB Right									WB Right			
Green					20.0	50.0						
Yellow					0.0	4.0						
All Red					0.0	1.0						

Intersection Performance Summary											
Appr/Lane	Lane	Adj Sat	Flow Rate	Capacity	v/c	g/c	Delay LOS	Approach	Delay LOS	Delay LOS	secs
TR	2123	5095	0.61	0.42	27.9	C	27.9	C			
Westbound											
L	301	1805	0.25	0.17	43.9	D					
T	3026	5187	0.29	0.58	12.6	B	15.1	B			
Northbound											
L	602	1805	0.59	0.33	34.6	C					
R	538	1615	0.36	0.33	30.7	C					
Southbound											

Cycle Length: 120.0 secs

HCS: Unsignalized Intersections Release 3.1c

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst: CL
 Intersection: River St/Vineyard Blvd
 Count Date: Existing
 Time Period: AM Peak

Intersection Orientation: East-West Major St.

Vehicle Volume Data:

Movements:	2	5	6	9
Volumes:	1276	563	1	17
HT:	1434	619	1	24
HT:	0.89	0.91	0.91	0.71
HTV:	0.02	0.02	0.02	0.02

Pedestrian Volume Data:

Movements:
 Lane width:
 Walk speed:
 Blockage:
 Median Type: None
 # of vehicles: 0

Flared approach Movements:

of vehicles: Northbound 0
 # of vehicles: Southbound 0

Lane usage for movements 1,213 approach:

Lane 1	Lane 2	Lane 3
L	L	L
T	T	T
R	R	R
N	N	N
Y	Y	Y
H	H	H

Channelized: N

Grade: 0.00

Lane usage for movements 4,516 approach:

Lane 1	Lane 2	Lane 3
L	L	L
T	T	T
R	R	R
N	N	N
Y	Y	Y
H	H	H

Channelized: N

Grade: 0.00

Lane usage for movements 7,819 approach:

Lane 1	Lane 2	Lane 3
L	L	L
T	T	T
R	R	R
N	N	N
Y	Y	Y
H	H	H

Channelized: N

Grade: 0.00

Lane usage for movements 10,1112 approach:

Lane 1	Lane 2	Lane 3
L	L	L
T	T	T
R	R	R
N	N	N
Y	Y	Y
H	H	H

Channelized: N

Grade: 0.00

HCS: Unsignalized Intersections Release 3.1c
 TWO-WAY STOP CONTROL(TMSC) ANALYSIS

Analyst: CL
 Intersection: River St/Vineyard Blvd
 Count Date: Existing
 Time Period: PM Peak
 Intersection Orientation: East-West Major St.

Vehicle Volume Data:

Movements:	2	5	6	9	12
Volume:	1160	1073	4	33	8
PHF:	0.94	0.95	0.95	0.83	0.67
PHV:	0.02	0.02	0.00	0.02	0.00

Pedestrian Volume Data:

Movements:

Flow:
 Lane width:
 Walk speed:
 Blockage:

Median Type: None

of vehicles: 0

Flared Approach Movements:

of vehicles: Northbound 0

of vehicles: Southbound 0

Lane usage for movements 1,2&3 approach:

Lane 1	Lane 2	Lane 3
L	L	L
T	T	T
N	N	N
Y	Y	Y
M	M	M
H	H	H

Channelized: N

Grade: 0.00

Lane usage for movements 4,5&6 approach:

Lane 1	Lane 2	Lane 3
L	L	L
T	T	T
N	N	N
Y	Y	Y
M	M	M
H	H	H

Channelized: N

Grade: 0.00

Lane usage for movements 7,8&9 approach:

Lane 1	Lane 2	Lane 3
L	L	L
T	T	T
N	N	N
Y	Y	Y
M	M	M
H	H	H

Channelized: N

Grade: 0.00

Lane usage for movements 10,11&12 approach:

Lane 1	Lane 2	Lane 3
L	L	L
T	T	T
N	N	N
Y	Y	Y
M	M	M
H	H	H

Channelized: N

Grade: 0.00

Data for Computing Effect of Delay to Major Street Vehicles:

	Eastbound	Westbound
Shared in volume, major st vehicles:	0	0
Shared in volume, minor st vehicles:	0	0
Sat flow rate, major st vehicles:	1700	1700
Sat flow rate, minor st vehicles:	1700	1700
Number of major street through lanes:	3	3

Length of study period, hrs: 1.00

Worksheet 4 Critical Gap and Follow-up time calculation.

Critical Gap Calculations:

Movement	9
t c,base	6.9
t c,hv	2.0
P hv	0.02
t c,q	0.1
G	0.00
t c,lt	0.0
t c,rt	0.0
l stage	0.00
t c	6.9
l stage	6.9

Follow Up Time Calculations:

Movement	9
t f,base	3.3
t f,hv	1.0
P hv	0.02
t f	3.3

Worksheet 6 Impedance and capacity equations

Step 1: RT from Minor St. 9 12

Conflicting Flows	478
Potential Capacity	534
Pedestrian Impedance Factor	1.00
Movement Capacity	534
Probability of Queue free St.	0.96

Worksheet 10 delay, queue length, and LOS

Movement 1 4 7 8 9 10 11 12

v (mph)							
C (m/vph)							
v/c							
95% queue length				24			
Control Delay				534			
LOS				0.01			
Approach Delay				12.1			
Approach LOS				B			

Data for Computing Effect of Delay to Major Street Vehicles:

	Eastbound	Westbound
Shared in volume, major th vehicles:	0	0
Shared in volume, major rt vehicles:	1700	1700
Sat flow rate, major th vehicles:	1700	1700
Sat flow rate, major rt vehicles:	3	3
Number of major street through lanes:		

Length of study period, hrs: 1.00

Worksheet 4 Critical Gap and Follow-up time calculation.

Critical Gap Calculations:

Movement	9	12
t _{c,base}	6.9	6.9
t _{c,hv}	2.0	2.0
P _{h,v}	0.02	0.00
t _{c,q}	0.1	0.1
G	0.00	0.00
t _{c,t}	0.0	0.0
t _{c,T}	0.0	0.0
l stage	0.00	0.00

Follow Up Time Calculations:

Movement	9	12
t _{f,base}	3.3	3.3
t _{f,hv}	1.0	1.0
P _{h,v}	0.02	0.00
t _f	3.3	3.3

Worksheet 6 Impedance and Capacity equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	411	379
Potential Capacity	590	625
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	590	625
Probability of Queue free St.	0.93	0.98

Worksheet 10 delay, queue length, and LOS

Movement	1	4	7	8	9	10	11	12
v (vph)					40			
C (vph)					590			
v/c					0.07			
95% queue length					11.5			
Control delay					B			
LOS					B			
Approach Delay					11.5			
Approach LOS					B			

HCS2000: Signalized Intersections Release 4.1

Analyst: CL
 Agency: 3/19/2001
 Date: 3/19/2001
 Period: AM Peak
 Project ID: W/out Project
 E/W St: Vineyard Blvd
 H/S St: Nuuanu Ave
 Inter.:
 Area Type: All other areas
 Jurisd: Year 2007

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	3	0	1	3	0	1	3	0	1	2	0
Lane Config	L	TR		L	TR		L	TR		L	TR	
Volume	1212	1050	102	1185	399	105	186	365	215	174	589	71
Lane Width	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
RTOR Vol			10			11			22			7

Duration 1.00 Area Type: All other areas

Phase Combination	Signal Operations			
	1	2	3	4
EB Left	A	A	A	Left
Thru	A	A	A	Thru
Right	A	A	A	Right
Peds				Peds
WB Left	A	A	A	Left
Thru	A	A	A	Thru
Right	A	A	A	Right
Peds				Peds
NB Right				Right
SB Right				Right
Green	20.0	8.0	50.0	15.0
Yellow	0.0	0.0	4.0	0.0
All Red	0.0	0.0	1.0	0.0

Intersection Performance Summary

Appr/ Lane Grp	Lane Capacity	Adj Sat Flow Rate (s)	V/c	Sat Ratios	Lane Group		Approach Delay LOS
					Delay LOS	Delay LOS	
Eastbound L	316	1805	0.77	0.17	75.0	E	49.7 D
Eastbound TR	1857	5124	0.71	0.36	45.0	D	
Westbound L	331	1805	0.64	0.44	42.2	D	42.6 D
Westbound TR	1575	5039	0.36	0.31	42.7	D	
Northbound L	169	1805	0.62	0.09	76.8	E	48.5 D
Northbound TR	1529	4892	0.44	0.31	44.1	D	
Southbound L	248	1805	0.81	0.14	86.9	F	52.2 D
Southbound TR	1257	3528	0.60	0.36	42.9	D	

HCS2000: Signalized Intersections Release 4.1

Analyst: CL Inter.:
 Agency: 3/19/2001 Area Type: All other areas
 Date: 3/19/2001 Jurisd:
 Period: PM Peak Year : Year 2007
 Project ID: w/out Project N/S St: Nuuanu Ave
 E/W St: Vineyard Blvd

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	3	0	1	3	0	1	3	0	1	2	0
LGConfig	L	TR		L	TR		L	TR		L	TR	
Volume	1244	1044	86	1153	704	260	180	827	415	1113	231	67
Lane Width	12.0			12.0			12.0			12.0		
RTOR Vol	9			26			42			7		

Duration	Area Type: All other areas		
	1.00	2	3
Phase Combination	A	A	A
EB Left	A	A	A
Thru	A	A	A
Right	A	A	A
Peds	A	A	A
WB Left	A	A	A
Thru	A	A	A
Right	A	A	A
Peds	A	A	A
NB Right			
SB Right			
Green	25.0	5.0	45.0
Yellow	0.0	0.0	4.0
All Red	0.0	0.0	1.0

Appr/Lane Gp	Lane Capacity	Adj Sat Flow Rate	Intersection Performance Summary		
			v/c	g/c	Approach
Eastbound					
L	349	1805	0.78	0.19	70.7 E
TR	1656	5133	0.75	0.32	49.0 D
Westbound					
L	398	1805	0.41	0.45	29.4 C
TR	1450	4993	0.69	0.29	50.2 D
Northbound					
L	291	1805	0.68	0.16	67.8 E
TR	1745	4919	0.76	0.35	46.0 D
Southbound					
L	175	1805	0.72	0.10	82.4 F
TR	1007	3470	0.32	0.29	43.2 D

Cycle Length: 155.0 secs

HCS2000: Signalized Intersections Release 4.1

Analyst: CL Inter.:
 Agency: 3/19/2001 Area Type: All other areas
 Date: 3/19/2001 Jurisd:
 Period: AM Peak Year : Year 2007
 Project ID: w/out Project N/S St: Maunakea St
 E/W St: Vineyard Blvd

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	3	0	1	3	0	1	0	1	0	0	0
LGConfig	TR			L	T		L		R			
Volume		1203	151	78	506		1126		111			
Lane Width	12.0			12.0			12.0			12.0		
RTOR Vol	15						11					

Duration	Area Type: All other areas		
	1.00	2	3
Phase Combination	1	2	3
EB Left			
Thru			
Right			
Peds			
WB Left			
Thru			
Right			
Peds			
NB Right			
SB Right			
Green	20.0	75.0	55.0
Yellow	0.0	4.0	4.0
All Red	0.0	1.0	1.0

Appr/Lane Gp	Lane Capacity	Adj Sat Flow Rate	Intersection Performance Summary		
			v/c	g/c	Approach
Eastbound					
TR	2394	5108	0.62	0.47	32.4 C
Westbound					
L	226	1805	0.37	0.13	65.2 E
T	3080	5167	0.17	0.59	14.8 B
Northbound					
L	620	1805	0.22	0.34	37.5 D
R	555	1615	0.20	0.34	37.1 D
Southbound					

Cycle Length: 160.0 secs

HCS: Unsignalized Intersections Release 3.1c
 TWO-WAY STOP CONTROL (TWSC) ANALYSIS

Analyst: CL
 Intersection: River St/Vineyard Blvd
 Count Date: Year 2007 w/out Project
 Time Period: AM Peak
 Intersection Orientation: East-West Major St.

Vehicle Volume Data:

Movements:	2	5	6	9
Volumes:	1395	615	1	19
HFR:	1567	676	1	27
PHF:	0.89	0.91	0.91	0.71
PHV:	0.02	0.02	0.00	0.02

Pedestrian Volume Data:

Movements:
 Flow:
 Lane width:
 Walk speed:
 # Blocks:
 Median Type: None
 # of vehicles: 0
 Flared approach Movements:
 # of vehicles: Northbound 0
 # of vehicles: Southbound 0

Lane usage for movements 1,213 approach:

Lane	1	2	3
L	Y	N	N
T	N	Y	N
R	N	N	Y

Channelized: N
 Grade: 0.00

Lane usage for movements 4,516 approach:

Lane	1	2	3
L	Y	N	N
T	N	Y	N
R	N	N	Y

Channelized: N
 Grade: 0.00

Lane usage for movements 7,819 approach:

Lane	1	2	3
L	Y	N	N
T	N	Y	N
R	N	N	Y

Channelized: N
 Grade: 0.00

Lane usage for movements 10,11,12 approach:

Lane	1	2	3
L	Y	N	N
T	N	Y	N
R	N	N	Y

Channelized: N
 Grade: 0.00

HCS2000: Signalized Intersections Release 4.1

Analyst: CL
 Agency: 3/19/2001
 Date: 3/19/2001
 Period: PM Peak
 Project ID: w/out Project
 E/W St: Vineyard Blvd
 Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2007
 H/S St: Maunakea St

SIGNALIZED INTERSECTION SUMMARY

	Eastbound		Westbound		Northbound		Southbound	
	L	T	R	L	T	R	L	T
No. Lanes	0	3	0	1	3	0	1	0
LGConfig	TR			L	T		L	R
Volume	1083	161	74	866	1328	197	12.0	12.0
RTOR Vol	16			12.0	12.0	20		

Duration 1.00 Area Type: All other areas

Phase Combination	Signal Operations			
	1	2	3	4
EB Left				
Thru				
Right				
Peds				
WB Left				
Thru				
Right				
Peds				
NB Right				
SB Right				
Green	20.0	50.0		40.0
Yellow	0.0	4.0		4.0
All Red	0.0	1.0		1.0

Intersection Performance Summary

Appr/ Lane Grp	Capacity	Adj Sat	Flow Rate (s)	Ratios		Lane Group	Approach
				v/c	g/C		
Eastbound							
TR	2123	5095	0.67	0.42	29.0	C	29.0 C
Westbound							
L	301	1805	0.28	0.17	44.2	D	
T	3026	5187	0.32	0.58	12.9	B	15.3 B
Northbound							
L	602	1805	0.64	0.33	36.3	D	34.4 C
R	538	1615	0.39	0.33	31.1	C	

Cycle Length: 120.0 secs

Data for Computing Effect of Delay to Major Street Vehicles:

	Eastbound	Westbound
Shared in volume, major th vehicles:	0	0
Shared in volume, major ct vehicles:	1700	1700
Sat flow rate, major th vehicles:	1700	1700
Sat flow rate, major ct vehicles:	3	3
Number of major street through lanes:		
Length of study period, hrs:	1.00	

Worksheet 4 Critical Gap and Follow-up time calculation.

Critical Gap Calculations:

Movement	g	l2
t, c, base	6.9	6.9
t, c, hv	2.0	2.0
P, hv	0.02	0.00
t, c, g	0.1	0.1
G	0.00	0.00
t, c, lt	0.0	0.0
t, c, T	0.00	0.00
l stage		
t, c	6.9	6.9

Follow Up Time Calculations:

Movement	g	l2
t, f, base	3.3	3.3
t, f, hv	1.0	1.0
P, hv	0.02	0.00
t, f	3.3	3.3

Worksheet 6 Impedance and capacity equations

Step 1: RT from Minor St.

	9	12
Conflicting Flows	450	614
Potential Capacity	557	593
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	557	593
Probability of Queue free St.	0.92	0.98

Worksheet 10 delay, queue length, and LOS

Movement	1	4	7	8	9	10	11	12
vivph)					43			
C mi/vph)					557			
v/c					0.08			
95th queue length								593
Control Delay								
LOS					12.0			
Approach Delay								
Approach LOS					12.0			

HCS2000: Signalized Intersections Release 4.1

Analyst: CL
 Agency: 3/19/2001
 Date: 3/19/2001
 Period: AM Peak
 Project ID: w/ Project
 E/W St: Vineyard Blvd
 Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2007
 N/S St: Nuuanu Ave

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	3	0	1	3	0	1	3	0	1	2	0
LGConfig	L	TR		L	TR		L	TR		L	TR	
Volume	1212	1050	102	185	400	105	186	365	215	1174	589	71
Lane Width	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
RTOR Vol	10			11			22			7		

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	A	A						
Thru	A	A						
Right	A	A						
Peds								
WB Left	A							
Thru	A							
Right	A							
Peds								
NB Right								
SB Right								
Green	20.0	8.0	50.0		15.0	7.0	50.0	
Yellow	0.0	0.0	4.0		0.0	0.0	4.0	
All Red	0.0	0.0	1.0		0.0	0.0	1.0	

Intersection Performance Summary

Appr/Lane Gp	Lane Capacity	Adj Sat Flow Rate	Ratios		Lane Group	Approach	Delay LOS
			v/c	g/c			
Eastbound							
L	316	1805	0.77	0.17	75.0	E	49.7 D
TR	1857	5124	0.71	0.36	45.0	D	
Westbound							
L	331	1805	0.64	0.44	42.2	D	
TR	1575	5039	0.36	0.31	42.6	D	42.6 D
Northbound							
L	169	1805	0.62	0.09	76.8	E	
TR	1529	4892	0.44	0.31	44.1	D	48.5 D
Southbound							
L	248	1805	0.81	0.14	86.9	F	
TR	1257	3528	0.60	0.36	42.9	D	52.2 D

HCS2000: Signalized Intersections Release 4.1

Analyst: CL Inter.:
 Agency: 3/19/2001 Area Type: All other areas
 Date: 3/19/2001 Jurisd:
 Period: PM Peak Year : Year 2007
 Project ID: w/ Project N/S St: Huuamu Ave
 E/W St: Vineyard Blvd

SIGNALIZED INTERSECTION SUMMARY											
Eastbound			Westbound			Northbound			Southbound		
L	T	R	L	T	R	L	T	R	L	T	R
1	3	0	1	3	0	1	3	0	1	2	0
No. Lanes											
LGCNfig L TR L TR L TR L TR											
Volume 246 1051 86 - 1153 706 260 181 827 415 1113 231 67											
Lane Width 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0											
RTOR Vol 9 26 42 7											
Duration 1.00 Area Type: All other areas											
Phase Combination 1 2 3 4 5 6 7 8											
EB Left A A A A A A A A A A A A											
Thru A A A A A A A A A A A A											
Right A A A A A A A A A A A A											
Peds A A A A A A A A A A A A											
WB Left A A A A A A A A A A A A											
Thru A A A A A A A A A A A A											
Right A A A A A A A A A A A A											
Peds A A A A A A A A A A A A											
NB Right A A A A A A A A A A A A											
SB Right A A A A A A A A A A A A											
Green 25.0 5.0 45.0 15.0 10.0 45.0											
Yellow 0.0 0.0 4.0 0.0 0.0 4.0											
All Red 0.0 0.0 1.0 0.0 0.0 1.0											
Cycle Length: 155.0 secs											

Intersection Performance Summary											
Appr/ Lane	Adj Sat	Flow Rate	Capacity	v/c	g/c	Lane Group	Approach	Delay LOS	Delay LOS	Delay LOS	Delay LOS
Eastbound											
L	349	1805	0.78	0.19	71.3	E	53.1	D			
TR	1656	5134	0.76	0.32	49.2	D					
Westbound											
L	398	1805	0.41	0.45	29.4	C					
TR	1450	4993	0.69	0.29	50.2	D	47.3	D			
Northbound											
L	291	1805	0.68	0.16	68.0	E					
TR	1745	4919	0.76	0.35	46.0	D	48.9	D			
Southbound											
L	175	1805	0.72	0.10	82.4	F					
TR	1007	3470	0.32	0.29	43.2	D	54.2	D			

HCS2000: Signalized Intersections Release 4.1

Analyst: CL Inter.:
 Agency: 3/19/2001 Area Type: All other areas
 Date: 3/19/2001 Jurisd:
 Period: AM Peak Year : Year 2007
 Project ID: w/ Project N/S St: Maunakea St
 E/W St: Vineyard Blvd

SIGNALIZED INTERSECTION SUMMARY											
Eastbound			Westbound			Northbound			Southbound		
L	T	R	L	T	R	L	T	R	L	T	R
1	3	0	1	3	0	1	3	0	1	0	1
No. Lanes											
LGCNfig L TR L TR L TR L TR											
Volume 11 1203 151 178 506 1 1126 111											
Lane Width 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0											
RTOR Vol 15 0 11											
Duration 1.00 Area Type: All other areas											
Phase Combination 1 2 3 4 5 6 7 8											
EB Left A A A A A A A A A A A A											
Thru A A A A A A A A A A A A											
Right A A A A A A A A A A A A											
Peds A A A A A A A A A A A A											
WB Left A A A A A A A A A A A A											
Thru A A A A A A A A A A A A											
Right A A A A A A A A A A A A											
Peds A A A A A A A A A A A A											
NB Right A A A A A A A A A A A A											
SB Right A A A A A A A A A A A A											
Green 5.0 10.0 80.0 55.0											
Yellow 0.0 0.0 4.0 4.0											
All Red 0.0 0.0 1.0 1.0											
Cycle Length: 160.0 secs											

Intersection Performance Summary											
Appr/ Lane	Adj Sat	Flow Rate	Capacity	v/c	g/c	Lane Group	Approach	Delay LOS	Delay LOS	Delay LOS	Delay LOS
Eastbound											
L	56	1805	0.02	0.03	75.2	E	20.6	C			
TR	2554	5108	0.58	0.50	28.6	C					
Westbound											
L	169	1805	0.49	0.09	71.1	E					
TR	2917	5186	0.18	0.56	17.1	B	24.3	C			
Northbound											
L	620	1805	0.22	0.34	37.5	D					
R	555	1615	0.20	0.34	37.1	D					
Southbound											

HCS: Unsignalized Intersections Release 3.1c

TWO-WAY STOP CONTROL(TMSC) ANALYSIS

Analyst: CL
 Intersection: River St/Vineyard Blvd
 Count Date: Year 2007 w/ Project
 Time Period: AM Peak

Intersection Orientation: East-West Major St.

Vehicle Volume Data:

Movements:	Z	S	9
Volume:	1396	615	19
HFR:	1569	636	21
PHF:	0.89	0.81	0.71
PRV:	0.02	0.02	0.02

Pedestrian Volume Data:

Movements:
 Flow:
 Lane width:
 Walk speed:
 1 Blockage:
 Median Type: None
 # of vehicles: 0
 Flared approach Movements:
 # of vehicles: Northbound 0
 # of vehicles: Southbound 0

Lane usage for movements 1,263 approach:

L	T	R	L	R	L	T	R
H	Y	N	N	Y	N	N	Y

Channelized: N
 Grade: 0.00

Lane usage for movements 4,516 approach:

L	T	R	L	T	R	L	T	R
H	Y	N	N	Y	N	N	Y	N

Channelized: N
 Grade: 0.00

Lane usage for movements 7,869 approach:

L	T	R	L	T	R	L	T	R
H	N	Y	N	N	H	N	N	N

Channelized: N
 Grade: 0.00

Lane usage for movements 10,1112 approach:

L	T	R	L	T	R	L	T	R
N	H	N	N	N	H	N	N	N

Channelized: N
 Grade: 0.00

HCS2000: Signalized Intersections Release 4.1

Analyst: CL
 Agency: 3/19/2001
 Date: 3/19/2001
 Period: PM Peak
 Project ID: w/ Project
 E/W St: Vineyard Blvd
 Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2007
 N/S St: Maunakea St

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	3	0	1	3	0	0	1	1	0	1	1
LG Config	L	TR		L	TR		LT	R		LT	R	
Volume	15	1083	161	174	866	3	1328	2	197	19	4	6
Lane Width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vol	16			12.0			20					

Duration 1.00 Area Type: All other areas

Phase Combination	Signal Operations			
	1	2	3	4
EB Left	A			
Thru		A		
Right			A	
Peds				A
WB Left	A			
Thru		A		
Right			A	
Peds				A
NB Left				A
Thru			A	
Right				A
Peds				
EB Right				A
WB Right				A
Green	5.0	5.0	50.0	50.0
Yellow	0.0	0.0	4.0	4.0
All Red	0.0	0.0	1.0	1.0

Intersection Performance Summary

Appr/Lane	Lane Group	Adj Sat	Ratios		Lane Group	Approach	
			v/c	g/c		Delay LOS	Delay LOS
Eastbound							
L	75	1805	0.08	0.04	E	55.7	E
TR	2123	5095	0.67	0.42	C	29.0	C
Westbound							
L	150	1805	0.55	0.08	E	57.3	E
TR	2376	5185	0.41	0.46	C	21.8	C
Northbound							
LT	568	1363	0.68	0.42	C	32.0	C
R	673	1615	0.31	0.42	C	23.7	C
Southbound							
LT	638	1532	0.02	0.42	C	20.6	C
R	673	1615	0.01	0.42	C	20.5	C

Cycle Length: 120.0 secs

HCS: Unsignalized Intersections Release 3.1c
 TWO-WAY STOP CONTROL(TMSC) ANALYSIS

Analyst: CL
 Intersection: River St/Vineyard Blvd
 Count Date: Year 2007 w/ Project
 Time Period: PM Peak

Intersection Orientation: East-West Major St.

Vehicle Volume Data:

Movements:	2	5	9	12
Volumes:	1273	1179	36	1
MPH:	1354	1241	43	1
PMF:	0.94	0.95	0.83	1.00
PMV:	0.02	0.02	0.02	0.00

Pedestrian Volume Data:

Movements:

Flow:
 Lane width:
 Walk speed:
 Blockage:
 Median Type: None
 f of vehicles: 0

Flared approach Movements:

f of vehicles: Northbound 0
 f of vehicles: Southbound 0

Lane usage for movements 1,243 approach:

Lane	1	2	3
L	R	L	R
T	R	L	R
Y	N	Y	N

Channelized: N
 Grade: 0.00

Lane usage for movements 4,566 approach:

Lane	1	2	3
L	R	L	R
T	R	L	R
Y	N	Y	N

Channelized: N
 Grade: 0.00

Lane usage for movements 7,869 approach:

Lane	1	2	3
L	R	L	R
T	R	L	R
Y	N	Y	N

Channelized: N
 Grade: 0.00

Lane usage for movements 10,11612 approach:

Lane	1	2	3
L	R	L	R
T	R	L	R
Y	N	Y	N

Channelized: N
 Grade: 0.00

Data for Computing Effect of Delay to Major Street Vehicles:

	Eastbound	Westbound
Shared in volume, major st vehicles:	0	0
Shared in volume, major st vehicles:	1700	1700
Sat flow rate, major st vehicles:	1700	1700
Number of major street through lanes:	3	3

Length of study period, hrs: 1.00

Worksheet 4 Critical Gap and Follow-up time calculation.

Critical Gap Calculations:

Movement 9
 t c,base 6.9
 t c,hv 2.0
 P hv 0.02
 t c,g 0.1
 G 0.00
 t 3,lc 0.0
 t c,T: 0.00
 l stage 0.00

L c 1 stage 6.9

Follow Up Time Calculations:

Movement 9
 t f,base 3.3
 t f,hv 1.0
 P hv 0.02
 t f 3.3

Worksheet 6 Impedance and capacity equations

Step 1: RT from Minor St. 9 12

Conflicting Flows 523
 Potential Capacity 489
 Pedestrian Impedance Factor 1.00
 Movement Capacity 489
 Probability of Queue free St. 0.93

Worksheet 10 delay, queue length, and LOS

Movement	1	4	7	8	9	10	11	12
vivph)					27			
C mlvph)					489			
V/C					0.95			
95% queue length					12.6			
Control Delay					B			
LOS								
Approach Delay					12.6			
Approach LOS					B			

Data for Computing Effect of Delay to Major Street Vehicles:

	Eastbound	Westbound
Shared in volume, major th vehicles:	0	0
Sat flow rate, major th vehicles:	1700	1700
Sat flow rate, major th vehicles:	1700	1700
Number of major street through lanes:	3	3

Length of study period, hrs: 1.00

Worksheet 4 Critical Gap and Follow-up time calculation.

Critical Gap Calculations:

Movement	g	12
t, c, base	6.9	6.9
t, c, hv	2.0	2.0
P, hv	0.02	0.00
t, c, f	0.1	0.1
G	0.60	0.00
t, 3, lt	0.0	0.0
t, c, T	0.00	0.00
1 stage		

t, c

1 stage 6.9 6.9

Follow Up Time Calculations:

Movement	g	12
t, f, base	3.3	3.3
t, f, hv	1.0	1.0
P, hv	0.02	0.00
t, f	3.3	3.3

Worksheet 6 Impedance and capacity equations

Step 1: RT from Minor St.

	9	12
Conflicting Flows	451	414
Potential Capacity	555	593
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	555	593
Probability of Queue free St.	0.92	1.00

Worksheet 10 delay, queue length, and LOS

Movement

	1	4	7	8	9	10	11	12
v/(vph)					43			
C, m/(vph)					555			593
v/c					0.08			
95% queue length								
Control Delay					12.0			
LOS					D			
Approach Delay					12.0			
Approach LOS					B			