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CITY AND COUNTY OF HONOLULU

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OFC. OF ENVIRONMENTAL
QUALITY CONTROL

DCP 2000-309

May 11, 2000

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

Dear Ms. Salmonson,

SUBJECT: **FINAL ENVIRONMENTAL ASSESSMENT (EA) AND FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR THE CENTRALIZED WASTEWATER SYSTEM AT KUALOA REGIONAL PARK;**
TMK: 1-4-9-04:01 AND 11

The City and County of Honolulu, Department of Design and Construction, has reviewed the comments received during the 30-day public comment period, which began on January 24, 2000, and has determined that this project will have no significant environmental effect. A Finding of No Significant Impact (FONSI) determination has been issued. Please publish a notice of this determination in the May 23, 2000, edition of *The Environmental Notice*.

We have enclosed four copies of the Final EA/FONSI, a completed OEQC Bulletin Publication Form, a draft cover letter to participants, and the Final EA/FONSI distribution list. Please contact Robert Miyasaki of the Division of Planning and Programming at 527-5159 or our consultant, Jeff Overton of Group 70 International, at 523-5866 should you have any questions.

Sincerely,

FOR GARY Q.L. YEE, AIA
Director

Enclosures

cc: Westley Chun – Engineering Solutions
Jeff Overton – Group 70 International

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2000-05-23-OA-FEA-

Centralized Wastewater System at Kualoa Regional Park

Ko'olau Poko District, O'ahu, Hawai'i

Final Environmental Assessment and Finding of No Significant Impact (FONSI)

Proposing Agency:

City and County of Honolulu
Department of Design and Construction

May 2000

Gary Q. L. Yee, AIA, Director
Department of Design and Construction

5/11/00
Date

Centralized Wastewater System at Kualoa Regional Park

Ko'olau Poko District, O'ahu, Hawai'i

Final Environmental Assessment and Finding of No Significant Impact (FONSI)

Proposing Agency:

City and County of Honolulu
Department of Design and Construction

Prepared By:

Group 70 International, Inc.
Architecture • Planning • Interior Design • Environmental Services
925 Bethel Street, 5th Floor
Honolulu, Hawai'i 96813

May 2000

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A. **Letters from the State Historic Preservation Division and State Office of Hawaiian Affairs**

B. Archaeological Assessment for Reconstruction of Wastewater Systems at Kualoa Regional Park, Kualoa, Ko'olau Poko, O'ahu (TMK: 4-9-04:01) (Cultural Surveys Hawai'i, Inc., October 1999)

C. Archaeological Monitoring Plan for Reconstruction of Wastewater Systems at Kualoa Regional Park, Kualoa Ahupua'a, Ko'olau Poko, O'ahu, Hawai'i, O'ahu (TMK: 4-9-04:01) (Cultural Surveys Hawai'i, Inc., April 2000)

D. Ethnographic Study of Kualoa Ahupua'a, Ko'olau Poko, O'ahu, Hawai'i, O'ahu: Executive Summary (TMK: 4-9-04:01) (Cultural Surveys Hawai'i, Inc., May 2000)

Section 1.0
Introduction

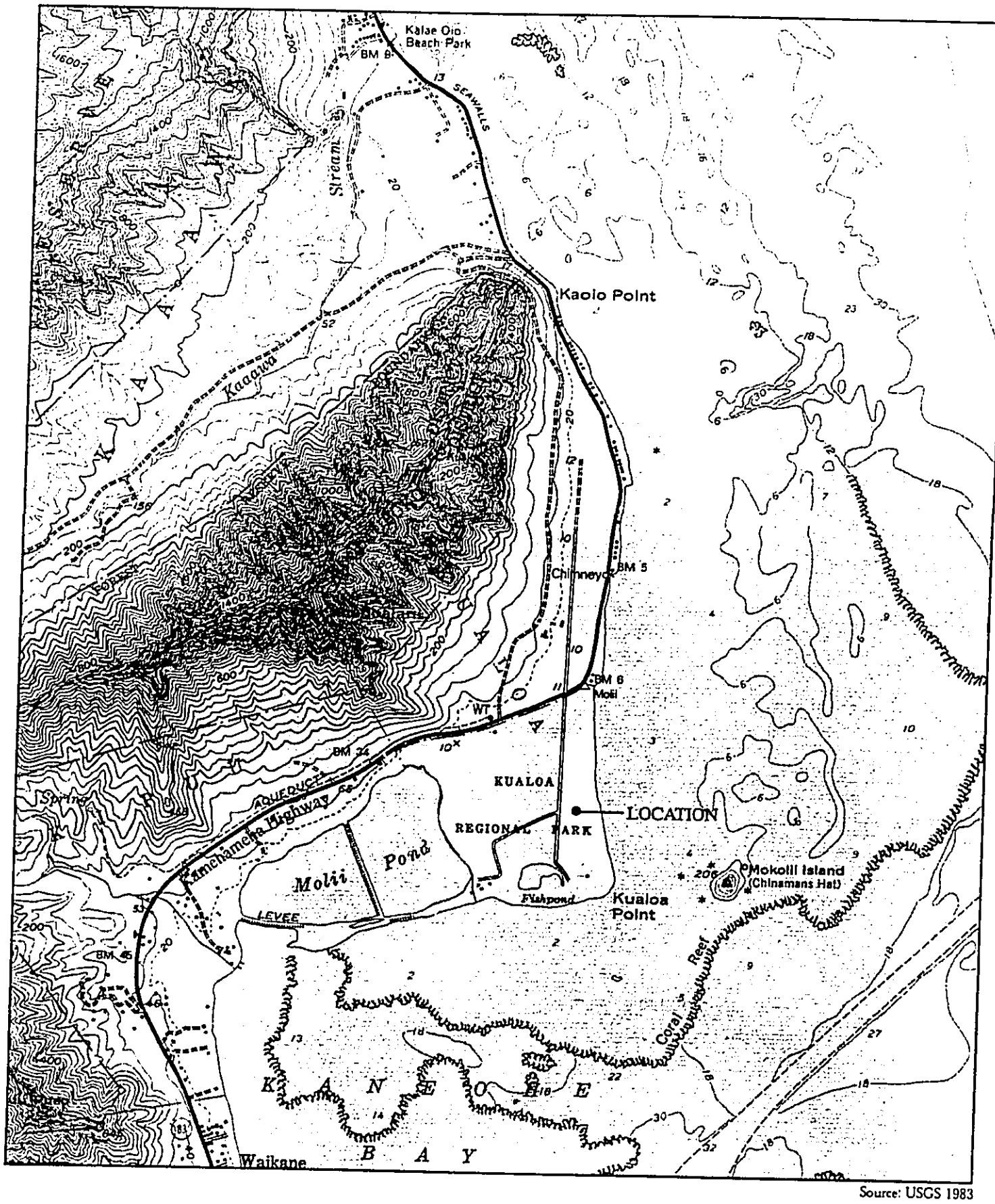
1.0 INTRODUCTION

1.1 PURPOSE OF THE DOCUMENT

This Environmental Assessment (EA) has been prepared for the City and County Department of Parks and Recreation to evaluate the potential environmental impacts of the proposed emergency repair of the wastewater system at Kualoa Regional Park. The proposed action calls for the use of City land and funds which subjects the proposed action to Chapter 343, Hawai'i Revised Statues and Hawai'i Administrative Rules, Title 11, Ch. 200, HAR, Dept. of Health.

1.2 PROJECT INFORMATION SUMMARY

Project Name:	Centralized Wastewater System for Kualoa Regional Park
Applicant:	City & County of Honolulu, Dept. of Design and Construction 650 South King Street, 14th Floor, Honolulu, Hawai'i 96813 Contact: Robert Miyasaki, P.E. Tel: 808-527-5159
Agent:	Group 70 International, Inc. 925 Bethel Street, Fifth Floor, Honolulu, Hawai'i 96813 Contact: Jeffrey Overton, AICP Tel: 808-523-5866
Accepting Authority:	City & County of Honolulu, Dept. of Design & Construction 650 South King Street, Honolulu, Hawai'i 96813
Approving Authority:	City and County of Honolulu, Dept. of Parks & Recreation 650 South King Street, Honolulu, Hawai'i 96813
Anticipated Determination:	Finding of No Significant Impact (FONSI)
Project Location:	Kualoa Regional Park, 49-479 Kamehameha Highway Kualoa, Ko'olau Poko District, Oahu
Landowner:	City and County of Honolulu
Tax Map Key:	TMK: 1-4-9-04:01
Land Area:	147 acres
City/ County Zoning:	P-2 General Preservation District
City/ County Development Plan:	Ko'olau Poko Development Plan – Park, Preservation (fish pond)
State Land Use District:	Agricultural and Conservation (fishpond)



Source: USGS 1983

Centralized Wastewater System
at Kualoa Regional Park
Location Map

0' 1000' 2000' 4000'

GROUP 70

1.3 OVERVIEW OF THE PROPOSED PROJECT

Kualoa Regional Park is located on the windward shore of Oahu, approximately 25 miles from downtown Honolulu. The park is bounded to the north by Kamehameha Highway, to the east and south by Ko'olau Bay, and to the west by Molii Pond. The park is generally used by the public for picnics, swimming and camping, with campers representing the highest percentage use group at the park.

Existing facilities include four comfort stations, a food service building, a recreation/administrative building, and a caretaker's cottage. Picnic areas are located throughout the park. The park has large lawn areas which are popular for group picnics. There is a narrow beach fronting most of the shoreline of the park.

The individual wastewater systems currently serving the park facilities are clogged, require frequent pumping, and periodically overflow. The preloader unit and Cavitette system for each comfort station are currently pumped at least once a week and with greater frequency during peak park usage. Clogging of the leaching fields has also caused the existing preloader units to overflow. In addition, the shoreline has eroded significantly in the vicinity of the leaching field for Comfort Station #3. These problems in turn force the closure of the malfunctioning comfort station and surrounding areas of the park.

The malfunctioning systems become particularly problematic during summer months when camping usage peaks. During the summer camping season and long weekends, the City brings in portable toilets to Comfort Station #4 to handle the heavy usage of that facility by campers. These toilets require frequent pumping to keep them operational. To address this problem, the proposed project involves emergency repair and upgrade of the existing wastewater system with new collection lines, force mains, low-pressure pump stations and a centralized disposal system. These emergency repairs are needed to protect the public health and environment.

1.4 AGENCIES CONTACTED IN PRE-CONSULTATION

Listed below are the agencies or parties contacted regarding the proposed project prior to publication of this Draft Environmental Assessment. The City and County of Honolulu Department of Design and Construction is the accepting authority for this proposed action. The project approving authority is the Department of Parks and Recreation.

State Agencies
Department of Land & Natural Resources, Historic Preservation Division
Department of Health, Division of Wastewater Management
Office of Environmental Quality Control (OEQC)

City & County of Honolulu Agencies
Department of Parks and Recreation
Department of Design and Construction
Department of Planning & Permitting, Land Use Approval Branch

1.5 EXEMPTION LIST AND DISCUSSION OF REQUIREMENT FOR EA PREPARATION

Repair and replacement of wastewater facilities that serve existing facilities are exempt from requirements regarding preparation of an environmental assessment pursuant to the "Comprehensive Exemption List for the City and County of Honolulu, Department of Parks and Recreation, as reviewed and concurred by the Environmental Council on December 9, 1998", Exemption Class #1, Item #10; Exemption Class #2, Item #6; and Exemption Class #3, Item #3.

The *ahupua'a* of Kualoa is listed on the National Register of Historic Places. This listing emphasizes the high cultural significance of Kualoa Point and the entire *ahupua'a* of Kualoa. Due to this, the City has undertaken pre-consultations with the State Historic Preservation Office and other agencies, and prepared and filed this Environmental Assessment. The EA includes appropriate technical studies of cultural resources.

1.6 CONTENTS OF THE FINAL ENVIRONMENTAL ASSESSMENT

This Environmental Assessment evaluates the potential impacts on the natural and human environment resulting from the proposed Kualoa Regional Park Reconstruction of Wastewater Systems project. This document is presented in six sections. Section 1.0 contains the introduction and project overview. Section 2.0 describes the proposed project and Section 3.0 addresses the environmental, social and economic setting of the proposed project. Alternatives to the proposed project are presented in Section 4.0. A review of the appropriate existing State and County policies and plans is contained in Section 5.0. Section 6.0 contains a statement of anticipated determination, findings and reasons supporting the anticipated determination. References used in the preparation of this document are attached. There are three appendixes including copies of the archaeological reconnaissance report, archaeological monitoring report, and an executive summary from an ethnographic study of the Kualoa *ahupua'a* (incomplete at the time of EA preparation).

Section 2.0
Project Description

2.0 PROJECT DESCRIPTION

2.1 PROJECT LOCATION AND SITE CHARACTERISTICS

Kualoa Regional Park is located in the Kualoa agricultural region of Oahu's windward coast at the northern end of Kaneohe Bay. The Kualoa area is bounded by the Ko'olau Mountain Range to the south and west, Kaneohe Bay and the Pacific Ocean to the east, and Ka'a'awa Valley to the north. The area is within the rural, agricultural and residential communities of the Ko'olau Poko District. The community of Ka'a'awa is located several miles to the north.

The area of Kualoa Regional Park has been modified in the past as a result of different land uses. Prior to World War II the lands were part of the sugarcane plantation of Kualoa. The lands were converted to a fighter airfield during the World War II period, and reverted to grazing use after the war. The City and County of Honolulu condemned the land in the 1970's and converted it into a park.

Kualoa Regional Park is a 147-acre beach park administrated by the Department of Parks and Recreation (DPR) of the City and County of Honolulu. The estimated attendance at Kualoa Regional Park for 1995 was 215,628 persons. The park has facilities for daytime picnic use and overnight camping. Other characteristics of the park include programs for student groups, conservation areas and a wildlife refuge. The southern section of the park is reserved for organized camping by children's groups. Coastal facilities consist of restrooms, water and sewer utilities, a road, and parking areas.

The white sandy beach at Kualoa is a particularly valuable resources with good facilities and water conditions in the Kane'ohe Bay area. Other than Kualoa Regional Park, public shoreline access opportunities in the Kane'ohe Bay area is limited with two small city parks and one state park.

2.2 EXISTING FACILITIES AND WASTEWATER SYSTEMS

Existing facilities within the park consists of four comfort stations (#1 to 4), a Food Service Building, a Recreation/Administrative Building, and a Caretaker's Cottage. Picnic areas are located throughout the park. A brief description of the existing facilities and wastewater systems follows.

Comfort Station #1 to #4. The comfort stations were constructed in the 1970's and consist of separate men's and women's restrooms. Stations #1 to #3 include shower areas. Wastewater generated by each comfort station is discharged via a 4-inch cast iron pipe to an individual wastewater system. The treatment system serving each comfort station included a 1,200-gallon preloader unit and a 1,250-gallon aerated Cavitette system. The aeration equipment has since been removed. With the removal of the aeration system, the existing systems essentially operate as a septic system.

Gray water generated by the showers and hose bibbs are collected by trench drains and then dispersed on to the surrounding lawns.

Food Service Building. This building is used for food preparation throughout the year, primarily during summer camping. The building was constructed in 1986, and includes one bathroom. Wastewater generated from this building is discharged via a 4-in. pipe to a trash and grease tank. Wastewater is then transferred to three vertical aerobic units in parallel via 6-inch pipes, then to a disposal pit and then to leaching fields. Aeration equipment has also been removed at this facility, therefore, the system operates essentially as a septic system.

Recreation/Administrative Building. The building is occupied by three full-time employees and one part-time employee, and includes two bathrooms and a kitchen. Wastewater from this building is discharged via 4-inch cast iron pipe to a 6-foot diameter cesspool. Overflow from the cesspool is discharged via a 4-inch cast iron pipe to an 8-foot diameter, 8-foot deep cesspool.

Caretaker's Cottage. This single-family dwelling home includes a bathroom and kitchen, and is occupied by a family of five. Wastewater from the cottage is discharged via 4-inch cast iron pipe to the cesspool system serving the recreation/administration building.

The shoreline has eroded significantly in the vicinity of the leaching field for Comfort Station #3. In addition, the preloader unit and Cavitette system for each comfort station require frequent pumping. Each system is currently pumped at least once a week and with greater frequency during peak park usage. Clogging of the leaching fields has caused the existing preloader units to overflow. Also, during the summer camping season and long weekends, the City brings in portable toilets to Comfort Station #4 to handle the heavy usage of that facility by campers.

2.3 DESCRIPTION OF THE PROPOSED PROJECT

The existing wastewater collection, treatment and disposal systems serving Kualoa Regional Park are inadequate and/or damaged such that the system experiences frequent sewage overflows during normal park operations. The City and County of Honolulu is seeking to repair and improve the reliability of the existing wastewater systems to meet and comply with current State of Hawaii Department of Health's requirements under Title 11, Chapter 62 of the Administrative Rules. The proposed project is to repair and replace the existing wastewater system with a centralized treatment and disposal system that connects to the four existing comfort stations and support facilities. A warning system (SCADA) will be installed to alert City personnel of system failures, and allow for a timely response by maintenance personnel.

2.3.1 Wastewater Flows

Design flows from the existing facilities were calculated taking into account the number of people using each facility and wastewater flow rate generated per person dependent on the type of facility. The following design flows were used for each facility.

Facility	Wastewater Flow (gpd)
Comfort Station #1	4,032
Comfort Station #2	6,532
Comfort Station #3	6,532
Comfort Station #4	6,789
Recreation/Admin. Building	60
Caretaker's Cottage	600
Food Service Building	7,200
Total Wastewater Flow	31,745

Future Park Usage. The City has future development plans within Kualoa Regional Park, as expressed in their draft Master Plan, including a cultural center, administrative offices and information center, as well as various agricultural and cultural theme areas. The proposed reconstruction and upgrade of the existing wastewater systems takes into consideration these future developments, but they are not designed to handle their wastewater flows. The new centralized septic wastewater system will service the existing facilities, and has been designed to allow easy expansion and upgrade in the future. Therefore, it serves as an interim versus long-range solution.

2.3.2 Centralized Septic Treatment System

In this instance, it was determined that a centralized dual septic tank system will service the existing facilities at Kualoa Regional Park in a new central location, as shown in Figures 2 and 5. Wastewater from each of the generating facility will be conveyed by newly installed collection lines (gravity and force main) and low-pressure pumps. A schematic diagram and layout for the distribution system is shown in Figures 2, 3, 4 and 5.

The centralized treatment system will consist of two clusters of septic tanks (3 per cluster) which are capable of accommodating the anticipated wastewater flows. Each of the two septic tank clusters handles about one-half of the total wastewater flow.

In general, the two types of simple, individual wastewater treatment systems available are septic and aerobic. Septic systems or tanks provide treatment at a slower rate in the absence of oxygen and are typically used for smaller flows (<14,500 gpd). Aerobic systems actively introduce oxygen through aeration to accelerate treatment and are typically used to provide a higher level of treatment or to treat higher flows. The State Department of Health prefers to have aerobic systems along low-lying shoreline areas where there is the possibility of infiltration into the groundwater. Although the flow handled by each septic tank cluster exceeds 14,500 gpd, it is still within the allowable flow range that may be treated by septic tanks. Up to 15,000 gpd or more may be treated cost effectively using septic tanks according to

the "Manual of Septic Tank Practice" published by the U.S. Department of Health, Safety and Welfare (Public Health Service). In addition, there will be no impact to potable groundwater resources. By using septic tanks, maximum flexibility is also provided to expand and upgrade the system in the future. Excavation depths for installation of the septic tanks will be approximately eight feet below grade. Pre-cast concrete septic tanks will be utilized.

It is noted that the centralized septic system is only an interim solution. A centralized aerobic system would have capacity to accommodate future expansion. This system will be addressed in a subsequent EA/EIS process. This interim solution (septic tanks) was selected because of the emergency repair need, cost, operation and maintenance issues, and need for significantly more archaeological investigation in the desired site for a centralized aerobic treatment plant.

The interim system includes a gravity sewer, force main, low-pressure pumps, septic tanks, SCADA warning system, and electrical/communications conduit.

2.3.3 Collection System

Wastewater collection lines from the comfort stations and other park facilities are connected by new 8-inch PVC gravity sewer lines and 2-inch force main lines to convey wastewater to the centralized treatment facility. The total length of the new collection system will be approximately 3,900 feet, including 3,270 feet of 2-inch force main. Excavation depth for the collection system is approximately 18 inches.

Each comfort station will have its own pump station, consisting of two low-pressure grinder pumps. Although the force main diameter is proposed to be 2 in., the pump station manufacturer uses force mains as small as 1.25 in. diameter in similar applications. If one grinder pump is disabled, the second grinder pump will be available to keep the station operational. In addition, two grinder pump units will be available as backup. In general, maintenance of the pump stations will be minimal, and specified in an operation and maintenance manual that will be prepared during construction. Pump stations will be inspected periodically, and grinder pumps will require service at periodic intervals (Figure 6).

The force main should not be difficult to maintain. Air relief valves will be installed at high points and drain valves will be installed at low points. In addition, progressive cavity pumps will be used that should break up temporary blockages in the line.

2.3.4 Disposal System

An absorption bed located next to the treatment system will dispose of the treated wastewater. The absorption bed area is designed at approximately 5,700 sq. ft., which is the area required to accommodate the anticipated treated effluent flows. Elevations and percolation rates for the soils in the southwest portion of the park meet State Department of Health standards for this type of system.

The absorption bed will consist of perforated 4 in. diameter PVC pipe laid within a layer of granular material. This system requires minimum subsurface disruption for installation.

Excavation depth is approximately two feet for the absorption bed. Clean outs will be provided along each run of pipe to facilitate system maintenance.

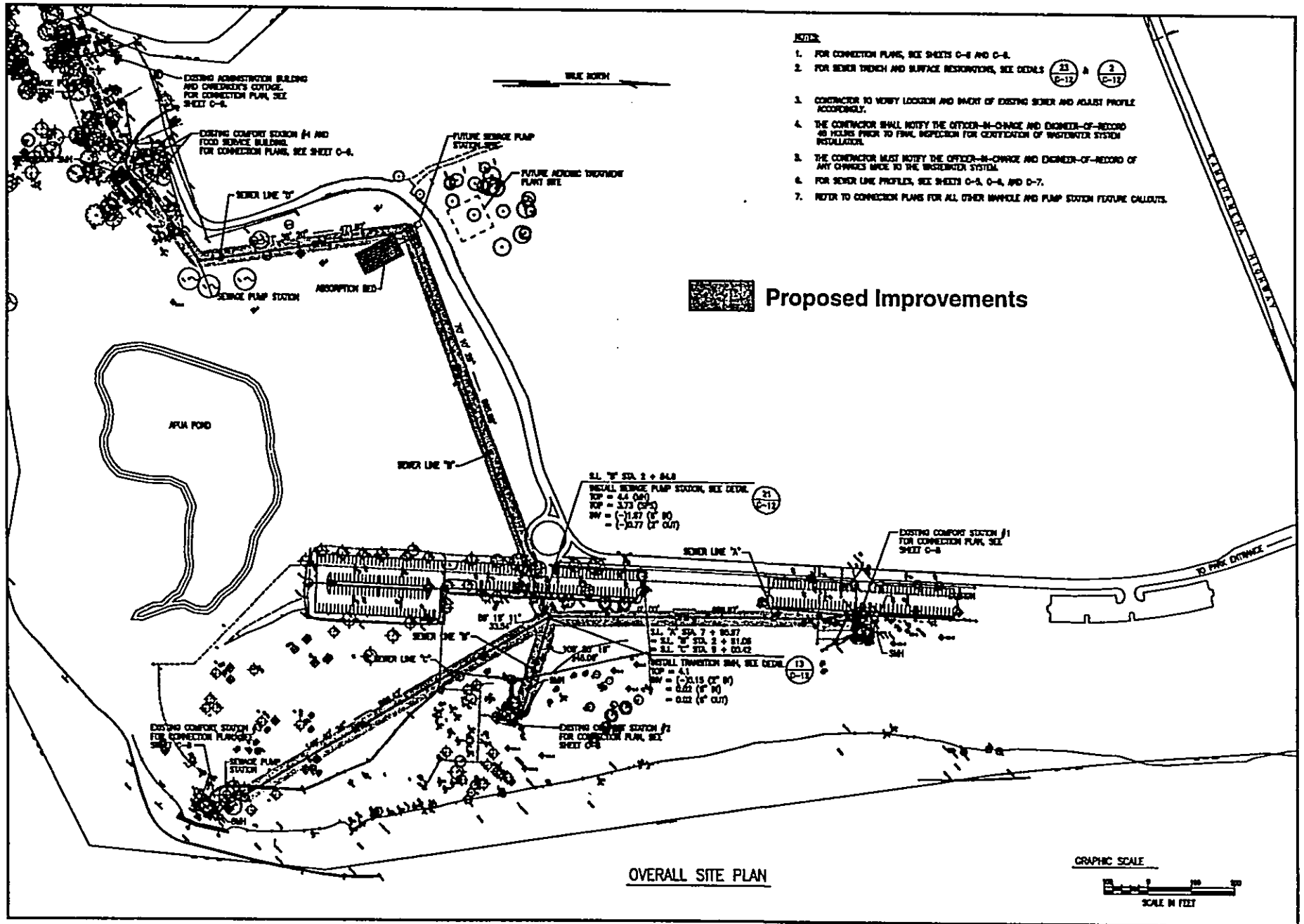
2.3.5 SCADA Warning System

A Supervisory Control and Data Acquisition (SCADA) system will be installed and connected to the City's monitoring operations headquarters located at the Sand Island STP control room. This facility is manned 24 hours per day, 7 days per week. The SCADA system would monitor the pump stations, and set off a local alarm and signal the SCADA headquarters when the liquid level in the wet well rises above a pre-set high water level. The appropriate operational managers would be notified immediately to respond to the situation. There are redundant pumps at all pump station locations.

2.4 PROJECT DEVELOPMENT COSTS AND SCHEDULE

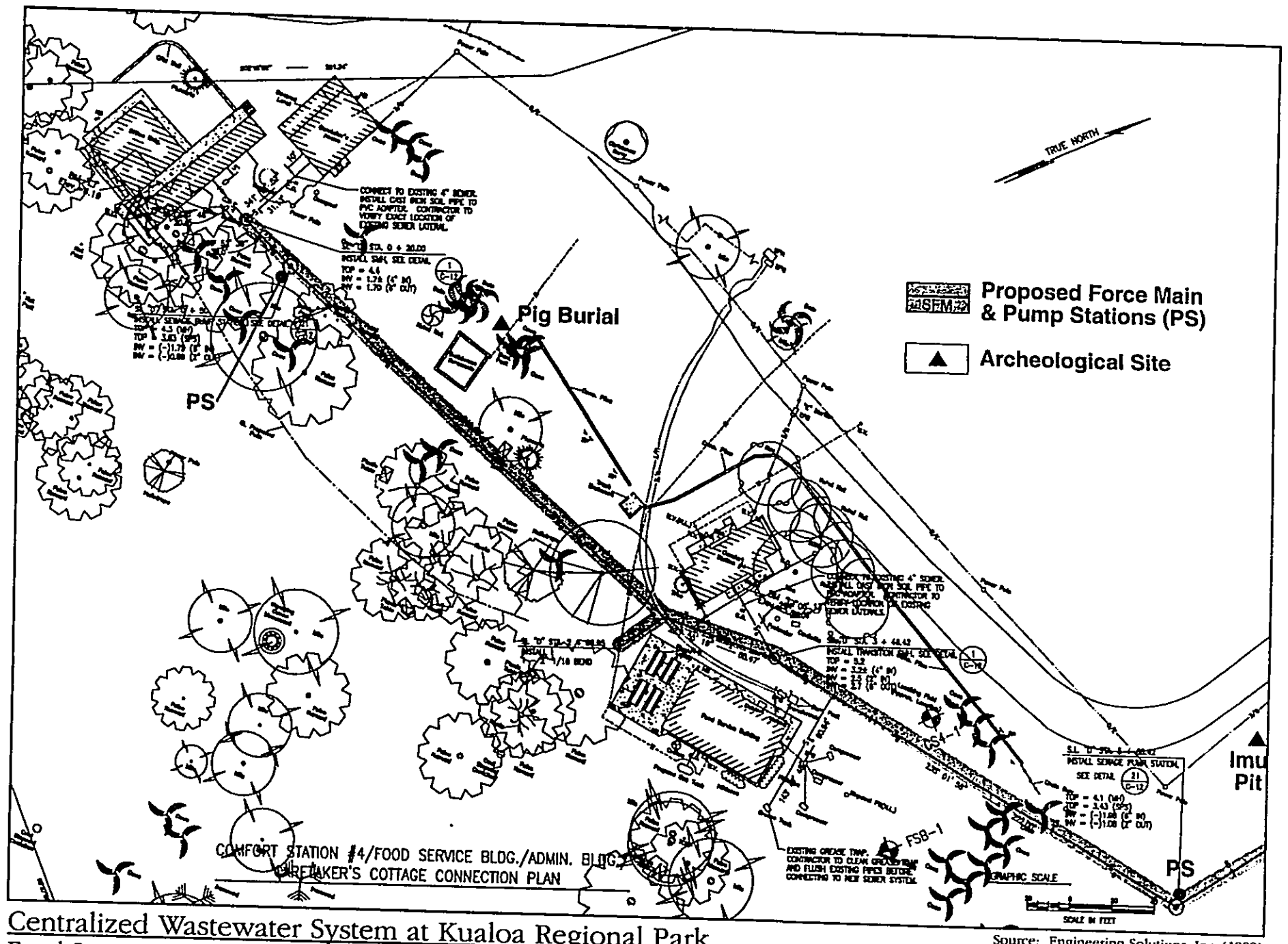
The total project cost is estimated at $650,000. The costs include removal or abandonment of the various systems components and installation of the new wastewater systems.

The anticipated timing for installation of the new system is FY 2000-2001. Construction will require less than six months.



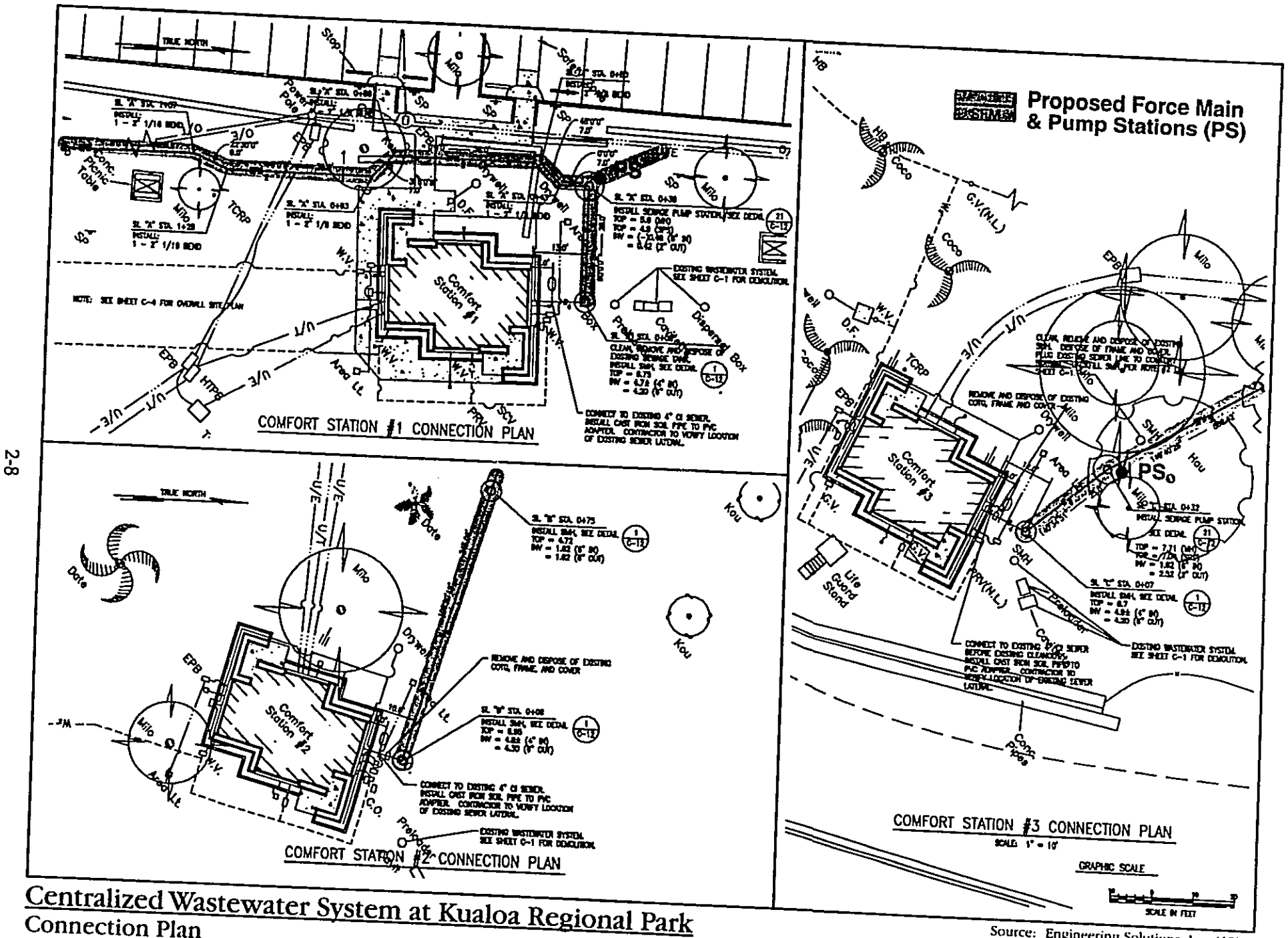
Centralized Wastewater Systems at Kualoa Regional Park
Overall Site Plan

Source: Engineering Solutions, Inc. (1999)
Figure 2



Centralized Wastewater System at Kualoa Regional Park
Food Service Building/Administration Building/Caretakers Cottage Connection Plan

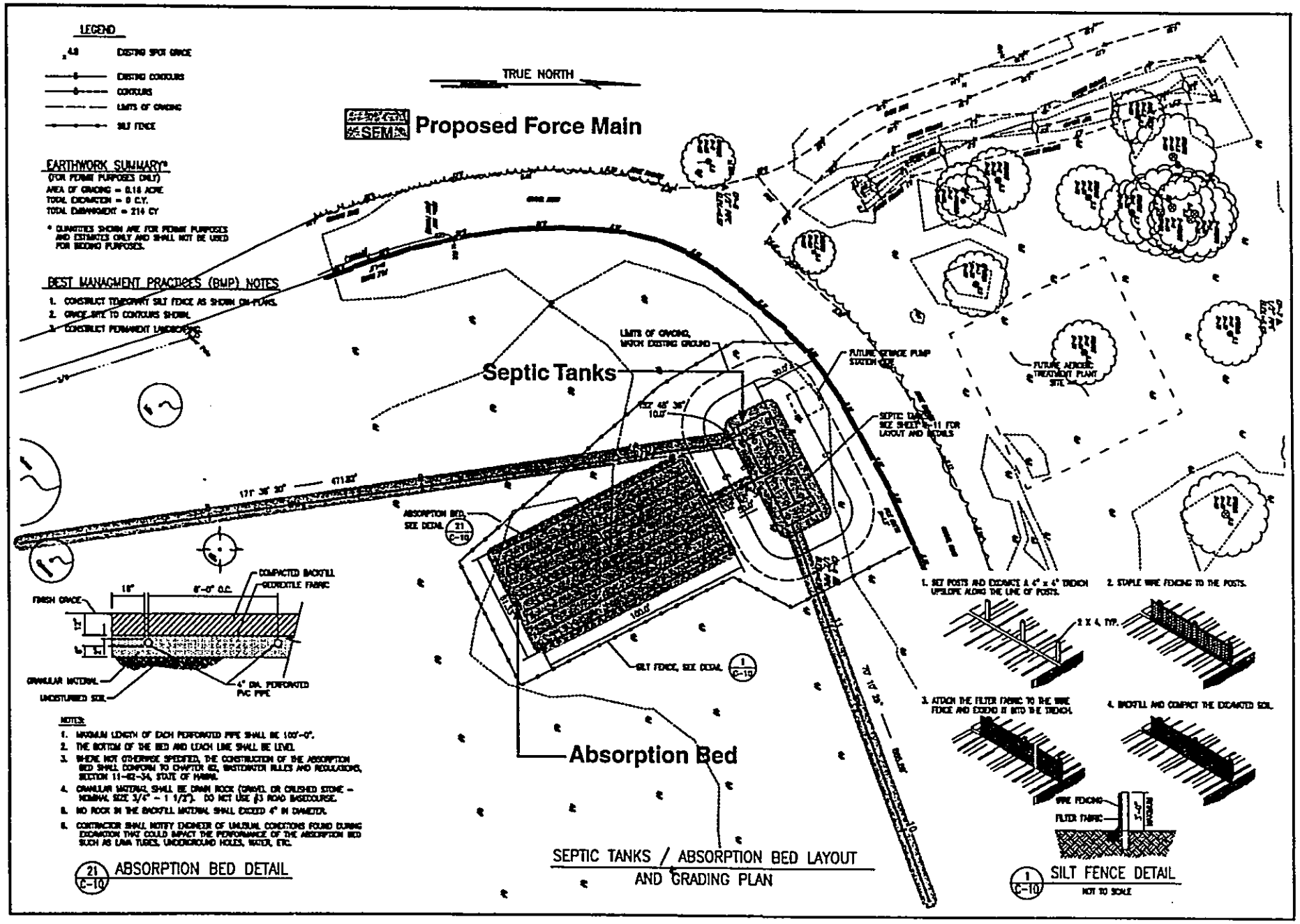
Source: Engineering Solutions, Inc. (1999)
Figure 3



Centralized Wastewater System at Kualoa Regional Park
Connection Plan

Source: Engineering Solutions, Inc. (1999)

Figure 4

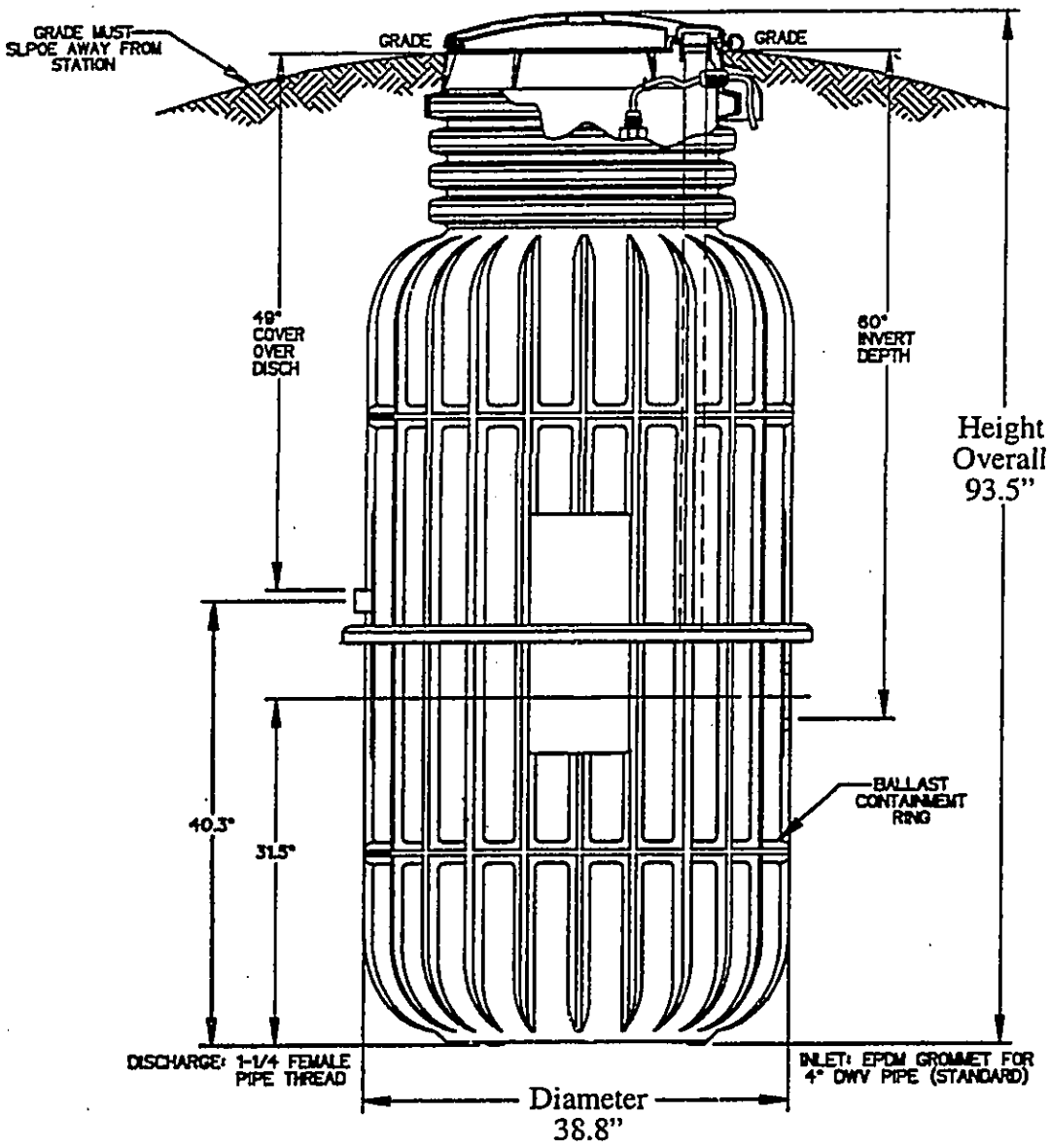


Centralized Wastewater System at Kualoa Regional Park

Septic Tanks/Absorption Bed Layout and Grading Plan

Source: Engineering Solutions, Inc. (1999)

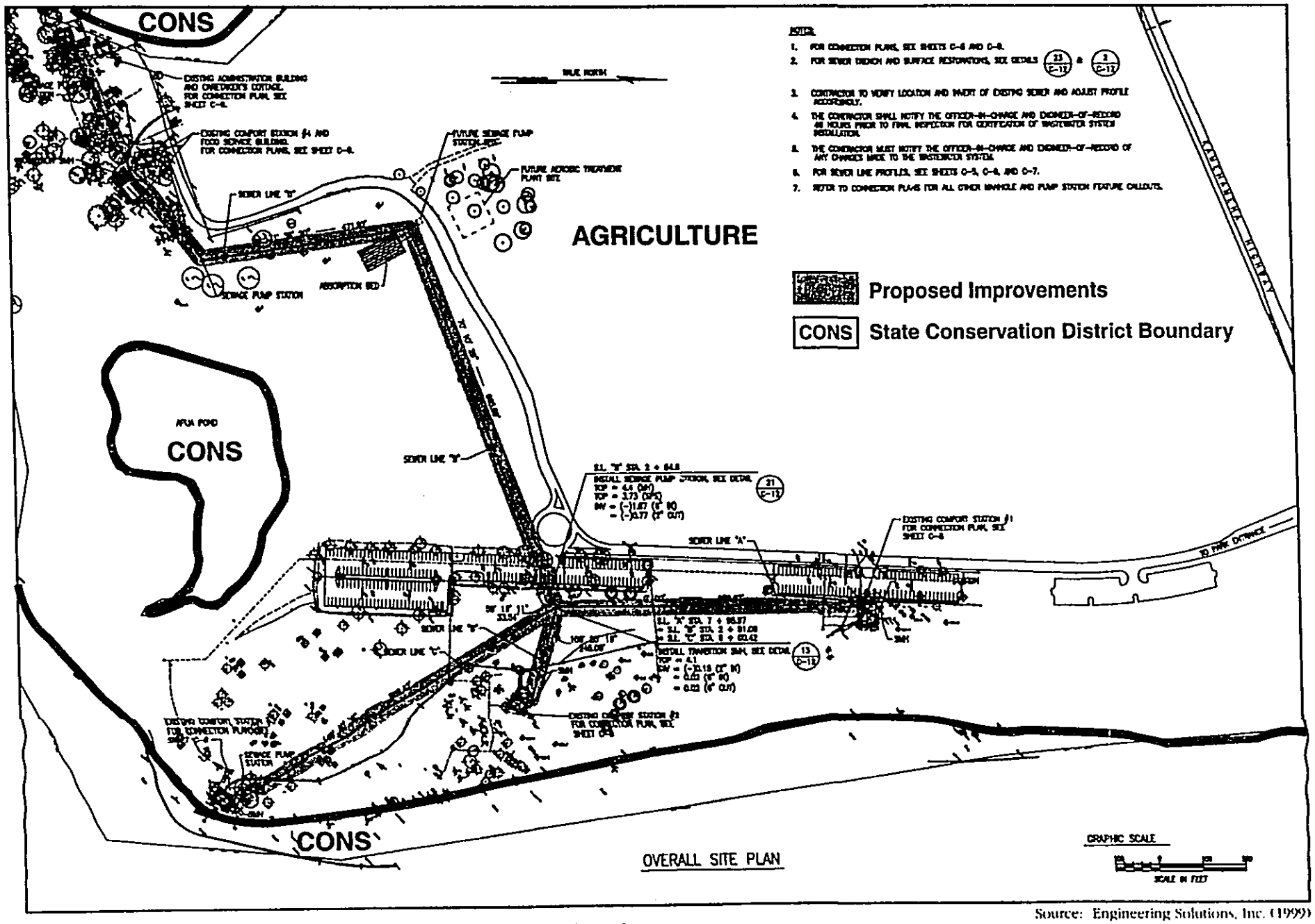
Figure 5



Centralized Wastewater Systems at Kualoa Regional Park

Typical Wastewater Pump Station

Figure 6



Source: Engineering Solutions, Inc. (1999)

Centralized Wastewater System at Kualoa Regional Park

Relationship to Conservation District Boundary

Section 3.0

Description of the Environmental Setting, Potential Impacts, and Mitigative Measures

3.0 DESCRIPTION OF THE ENVIRONMENTAL SETTING, POTENTIAL IMPACTS, AND MITIGATIVE MEASURES

Addressed below are the environmental setting, potential impacts and mitigative measures for the proposed emergency repair of the wastewater systems at Kualoa Regional Park.

3.1 CLIMATE

Existing Conditions
The climate of Oahu is mild and semitropical with prevailing northeast trade winds. Average daily minimum and maximum temperatures range from the low 60's (degrees Fahrenheit) to the low 90's, depending upon the time of day and the season. Precipitation is seasonal with the most rainfall typically occurring from October through April. Annual rainfall on Oahu varies with elevation and geography. Annual rainfall in the Kualoa Regional Park area varies between 50 and 75 inches per year, with about 70 percent of the annual rainfall occurring during winter months.

Anticipated Impacts and Mitigative Measures
The proposed project will have no effect on climatic conditions, therefore no mitigative measures are required.

3.2 TOPOGRAPHY

Existing Conditions
The surface configuration of Kualoa Regional Park is generally flat with an average elevation of 6 feet above mean lower low water (MLLW). The 3.2 acre 'Apua Pond, located in the southern portion of the park, and a fairly large linear depression in the center of the park are believed to be the remains of an old taro pond. These are the only areas in the park that are below sea level.

Anticipated Impacts and Mitigative Measures
The proposed project will not substantially alter the overall existing topography of the project site. Significant grading will not be necessary, and only occur to level disturbed ground in excavation areas, and to increase the ground surface elevation over the new septic tanks by approximately two feet and less than one foot above the absorption bed. Excavation of the wastewater system components will be limited to the route of the collection lines and the treatment and disposal area. No substantial fill or excavation is being proposed for the project. Mitigative measures related to soils and grading are described in the following section.

3.3 GEOLOGY AND HYDROLOGY

Existing Conditions
Kualoa Regional Park is located on the northeastern edge of the Ko'olau mountain range on the fringe of the ancient Ko'olau volcano. The original caldera of the volcano extended from near Waimanalo at the southeast to beyond Kane'ohe at the northwest. The mountain range stretches from near Waimanalo to Kahuku. Although major volcanic activity occurred about 2.5 million year ago, marine, subaerial erosion, and isostatic sinking of the island formed the mountain range into a series of valleys and bays. In addition to erosion, changes in the sea level resulting from the advance and retreat of prehistoric glaciers developed and modified the fringing, patch, and barrier reefs into its present form.

Kualoa Regional Park sits atop a sand spit overlying a coralline substrate extending into Kane'ohe Bay. Evidence indicates that the development of Kualoa Point may be a recent geological event, induced by the construction of Moli'i Fishpond. Unconsolidated sand dunes consisting of skeletal matter from coral organisms originating at and within the barrier reef, were deposited by littoral and wind forces along the seaward boundaries of the mountains and the fishpond. The accumulated sand production within the bay, and weathered rock from the Ko'olau mountain cliffs combined to form the plain upon which the park is located today.

The project site is a peninsula surrounded by the Pacific Ocean to the east, Kane'ohe Bay to the south, and Moli'i Fishpond to the west. The park lies within the Kahana aquifer system and is characterized as a high level, unconfined type where fresh water is not in contact with seawater and where the water table is the upper surface of the saturated aquifer. The Kahana aquifer is categorized as aquifers in dike compartments.

Anticipated Impacts and Mitigation
The wastewater improvements project will have no significant adverse effect on the geology and hydrology of the Kualoa peninsula. Treated wastewater will be disposed through infiltration lines and there is no potential for leached effluent to reach potable drinking water aquifer.

3.4 SOILS AND GRADING

Existing Conditions
The project site is covered with Jaucas Series, typical beach sand seen on coastal lines throughout the Hawaiian islands (SCS, 1972). The surface layer may extend as deep as 60 inches or more. The sand, also called Jaucas loamy fine sand, is usually single grain, has excellent permeability with low runroff potential, and is capable of supporting some vegetation such as pasture grass and sugarcanes. Vegetation with deep root systems are often present with the soil and can provide moderate stability. The soil has high potential to wind and ocean wave erosion when vegetation is not present.

Grading operations will be conducted in compliance with dust and erosion control requirements of the City and County of Honolulu Grading Ordinance. A Grading Permit will

be obtained from the City and County of Honolulu in order to begin construction. During Grading Permit review and approval, the grading plans are reviewed by the City and specific conditions may be attached at that time.

Primary fugitive dust control methods that will be implemented include regular watering of exposed soil areas, good housekeeping on the job site, and prompt landscaping, covering or paving of bare soils in areas where construction is completed. The impact of construction activities on soils will be mitigated by practicing strict erosion control and dust control measures, particularly those specified in the following:

- City and County of Honolulu Grading Ordinance
- State of Hawaii, Department of Health, Water Quality Standards, Chapter 37-A, Public Health Requirements (1968);
- USDA Soil Conservation Service, Erosion and Sediment Control Guide for Hawaii (1968).

3.5 SURFACE WATER AND DRAINAGE

Existing Conditions
No rivers or streams cross the park. Kamehameha Highway represents the northern border of the park and any runoff from upper elevations must first cross the highway before it reaches the park generally percolates through the porous ground material before reaching the ocean.

The existing flood zones were reviewed using the National Flood Insurance Program, Flood Insurance Rate Map (FEMA, 1987). The improvements on the park site are primarily located within areas designated as "Other Flood Areas - Zone X: Areas determined to be outside 500-year flood plain." Improvements located in the area designated as 100-year flood hazard area Zone AE are limited to the vicinity of Comfort Station #3, where base flood elevation is five feet, and the recreation/administration building and caretaker's cottage, where base flood elevation is four feet. Improvements in this area are located underground with all access ways located above the base flood elevation. Historical data indicates that tsunami run-up at Kualoa point is 5 feet or less. For a 100-year tsunami, inundation elevation 200 feet inland of the coastline was calculated to be five feet.

The nearshore ocean water of Kaneohe Bay is classified by the State Department of Health as high quality (Class AA) waters. There is an existing potential for surface runoff to convey contaminants from overflowing disposal systems at Kualoa Regional Park, which poses a potential public health risk and water quality impact. Subsurface disposal of partially treated effluent from the current system may also leach some organic nutrients into coastal waters. The magnitude of the current problem has not warranted beach closure.

Anticipated Impacts and Mitigative Measures
There will be no changes to surface water and drainage as a result of the proposed project. Excavation areas will be restored to their former condition following the emergency repairs of existing wastewater facilities, except in the area of new septic tanks and adsorption bed where

an average of one foot of fill will be provided. The project does not require construction in flood hazard areas, except for a small area at Comfort Station #3.

There is the slight potential for short-term runoff of suspended soil material to coastal waters during construction, therefore, construction mitigation measures will be implemented, such as silt fencing. Ocean water quality will beneficially affected by the proposed emergency repair improvements to Kualoa Regional Park's wastewater system, which will eliminate the potential release of untreated or partially treated effluent via surface runoff. The level of treatment provided by the septic tank/absorption bed disposal system will be an improvement over the current level of treatment and disposal.

3.6 FLORA AND FAUNA

Existing Conditions

The park is largely dominated by introduced species. A 1993 survey (Weissich, 1993) noted four species of native plants, nine species of plants introduced by the Hawaiians, and 34 species of recent introduction. The coastal area of the park is dominated by large expanses of grass with interspersed coconut palms and introduced trees. There were no native or rare polynesian introduced species either near the shoreline or in the vicinity of any of the proposed coastal structures. Several coconut palms near the east beach are threatened if erosion continues along this coastline. Along the south beach, near the property boundary, accreting sand has provided substrate for the growth (primarily) of young Ironwood trees. These trees increase in size and age, as a function of distance from the beach. There are many large trees on the property, some of which are on the Hawai'i "Exceptional Tree List."

Kualoa Regional Park lies in transition between Kaneohe Bay and the windward open coast. The site has been extensively altered during human habitation and park development leaving little native flora. Although the park's open space limits the species diversity of terrestrial animals, it has added protection for several rare or endangered waterbirds that frequent this site (Bruner, 1993).

The park supports a typical array of exotic (introduced) birds including the Common Waxbill, Cattle Egret, Red-vented Bulbul, Common Myna bird, House sparrow, Zebra Dove, and House Finch.

Endangered native waterbird species observed included the Common Moorhen and Hawai'ian stilt. The nonendangered Black-crowned Night Heron, a native waterbird, was seen flying above the park.

Migratory native birds frequent the site depending on the season. Shorebirds seen along the shoreline included Pacific Golden Plover, Ruddy Turnstones, Sanderlings, and Wandering Tattlers. The Plover prefer open areas such as intertidal reefs, rocky shorelines, mud flats, lawns and pastures. The Turnstone, Sanderline, and Tattler often utilize mudlfats and shallow ponds.

Sea birds, including the White-tailed Tropicbird, Wedge-tailed Shearwaters, Great Frigate Birds, and others are commonly seen at this coastal site. Sea bird nesting has not been observed in the park proper (probably due to abundant predators), but nesting of several species is common on Mokoli'i Island.

Mammals which may be encountered in the area include mongoose, mice, rats, domestic and feral dogs and cats, and possibly the endangered Hawai'ian Hoary Bat.

Anticipated Impacts and Mitigative Measures
No rare, endangered, or threatened plant or animal species are presently known to exist on the project site. No adverse impacts are anticipated, and the only mitigative measures that are proposed is the re-vegetation of lawn areas disturbed by the wastewater system repair and improvements.

3.7 ARCHAEOLOGICAL AND CULTURAL RESOURCES

An archeological assessment of the proposed emergency repair and improved reliability of wastewater systems at Kualoa Regional Park was conducted by Cultural Survey Hawaii (October 1999). The study included subsurface analysis from 16 percolation test pits of 12 inch diameter, three feet deep, the data from which was used in the system routing. The following discussion includes references from this study and other sources compiled for the area.

Existing Conditions
Kualoa is one of O'ahu's most important archaeological sites. Its significance extends over 500 years in Hawaiian history from the early Polynesians who inhabited the Hawaiian Islands to the height of the monarchy of the late 1800's. Abundant references to Kualoa in mythology and legendary stories underscore Kualoa's importance in Hawaiian social and political history. Kualoa was said to have been a very sacred place and its land was closely protected by O'ahu chiefs and priests since it was considered the symbol of sovereignty and independence for O'ahu. It was reported that all canoes lowered their sails when passing Kualoa in acknowledgment of the area as a sacred residence of the chiefs. Kualoa was also a sacred refuge in ancient times when people sought sanctuary if they violated a Kapu or institutional prohibition (Gunness, 1986).

Archaeological excavations of Kualoa Park within the last 100 years revealed culturally significant artifacts that aid in the study of early Hawaiian culture. Artifacts uncovered at Kualoa indicates that the area had various uses from a human burial ground to a training area for royalty (ali'i) (Gunness, 1986).

Archaeological evidence indicates that early Hawaiians constructed fishponds at the site and used the eastern beach area as a burial ground. The ruling ali'i also used the area as a training ground and recreational site. Games and festivities common to makahiki ceremonies were conducted here after an island circling procession concluded.

Archaeological excavations around Kualoa Point clearly show that the site is of significant archaeological importance in the study of ancient Hawaiian civilization. Research within the last fifty years has provided valuable information about early Hawaiian cultural practices as well as insights on day-to-day activities of the ali'i.

Archaeological research has occurred at Kualoa only within the last fifty years. Past use of the site, notably as a World War II military landing strip may have destroyed many valuable archaeological sites in the area. Beach front erosion has also been responsible for the loss of archaeological resources uncovered along the eastern shoreline.

The City and County of Honolulu, Department of Parks and Recreation contracted Cultural Surveys Hawaii, Inc. to prepare an ethnographic study of the *ahupua'a* of Kualoa. This study was not completed at the time of this assessment, however, an executive summary of the study is included in Appendix C. The study was commissioned to gather and synthesize available cultural, historical and archaeological documentation on Kualoa- - long recognized by native Hawaiian as a special, spiritual place in Hawaiian culture. A special focus of the study was to provide a documentary foundation for developing relevant cultural and interpretive themes to be integrated into a Master Plan for the future development of Kualoa Regional Park.

The ethnographic study investigated Kualoa from traditional Hawaiian times, into the mid-nineteeth century and the Mahele, which introduced private land ownership to the Hawaiian kingdom, through the history of the Judd family at Kualoa which led to the modern Kualoa Ranch, and into the Twentieth century with the establishment of Kualoa Regional Park. Fifteen individuals whose family ties, cultural interests, spiritual concerns, or professional lives have drawn them to Kualoa were interviewed for the present study.

Anticipated Impacts and Mitigative Measures

Proposed ground disturbing activities in the east beach area are focused in an area believed to have been massively affected by runway construction and later road and parking lot development. There is a high probability of encountering burials or other significant archaeological resources particularly in the areas nearest the three comfort stations. Archaeological monitoring of all subsurface excavation extending deeper that 18 in. is recommended.

Proposed ground disturbing activities in the central study area are focused in an area that was extensively tested and found to be generally lacking in archaeological resources. Archaeological monitoring of all subsurface excavations extending deeper that 18 in. is recommended within a distance of 200 ft of the main paved north/south access road and within a distance of 200 ft. of the gravel road. Monitoring of subsurface excavations deeper that 18 in. is recommended on the north side of the gravel access road.

The most archaeologically sensitive area is the southwest study area. Archaeological monitoring of ground disturbance in this area is indicated. The existing imu feature located mauka of the access road near the proposed septic tank area will be protected by field markings

and warning pylons. Figure 3 shows the approximate location of two archaeological sites that will be avoided in the construction.

There are numerous known archaeological and cultural resources on the project site. In the event that any previously unidentified sites or remains are encountered during site work and construction, work in the immediate area will cease. An archaeologist from the State Historic Preservation Division will be notified and work in the area will be suspended until further recommendations are made for appropriate treatment of cultural materials. Excavations deeper than 18 inches will be monitored by an archaeologist.

The project has undergone Chapter 6E-8 Historic Preservation Review by the State Historic Preservation Division (SHPD)(Refer to Letter from Don Hibbard, SHPD dated February 22, 2000). The SHPD made recommendations which, if followed appropriately, the proposed centralized wastewater system improvements for Kualoa Regional Park will have "no adverse effect" on significant historic sites. Based on previous archaeological findings of burials and historical resources at Kualoa, and in order to counter any adverse effect to significant historic sites, the SHPD requires the production of an archaeological monitoring plan, archaeological monitoring of the project area, and the production of an archaeological monitoring report.

An updated monitoring plan has been specified in the contract documents, prepared by Cultural Surveys Hawaii (April 2000), and is included as an appendix to this document. Refer to this document for the specific procedures for response to particular finds and events associated with the project activities. The purpose of the monitoring plan is to respond to the possibility that inadvertent finds, especially human burials, but additionally, other cultural deposits, may occur within the project area and also to protect known cultural resources. Findings related to burials, artifacts, or habitation deposits will affect the timing of construction activities. Findings that must remain in place, may require the design engineer to modify the plan to avoid damage to the cultural remains. The monitoring plan specifies that relocation of the two-inch PVC collection lines is possible as to leave remains *in situ*. The contractor is responsible for implementing the monitoring plan during construction.

The Deputy Administrator Colin C. Kippen, Jr. of the Office of Hawaiian Affairs issued a letter on April 26, 2000 in review of the Archaeological Monitoring Plan.

> *Based on an initial review of your proposal by members of our Hawaiian Rights Division with expertise in environmental assessments, cultural affairs and inter-agency consultations, your draft was found to be an acceptable approach incorporating reasonably conservative protective assumptions in light of the cultural sensitivity of the site. For this reason, we have no comments or suggestions for further improvement at this juncture.*

Potential effects to the cultural resources of Kualoa *ahupua'a* will be mitigated by the sensitivity taken in the construction process, following the approved monitoring and mitigation plan. Further, the completed ethnographic study will ensure the integration of cultural values and themes into the long-range plan for Kualoa Regional Park.

3.8 LAND USE DESIGNATIONS

Existing Conditions
The project area is bounded by the entire shoreline of Kualoa Regional Park on its east and south sides. Directly south of the site is Kane'ohe Bay, with its coral reefs and Hakipu'u Sandbar. Directly east is the vast expanse of the Pacific Ocean. Sitting west of the project site adjacent to the park is the 120-acre Moli'i Fishpond, which is actively used for aquaculture. Just beyond is Johnson Road which provides access to ten single family dwellings. This area is also used for the commercial production of taro, ornamental plants and horse grazing. Across Kamehameha Highway from the park, is the Kualoa Ranch and Activity Club, which provides visitors with activities such as horseback riding, mountain biking, helicopter rides and jet skiing in the Bay. Further north of the park, single family dwellings occupy the coastline.

Development patterns on Oahu are set by State land use designations, the City & County of Honolulu General Plan, regional Development Plans and zoning regulations. The principal function of these regulations are to specify where land uses such as agricultural, commercial, residential, industrial, open and public areas are permitted. A more detailed discussion of existing land use designations and required permits and approvals for the proposed project is provided in Section 5.0.

Kualoa Regional Park is located within the State Land Use Agricultural District. The proposed project does not require a change in State Land Use designation and is a permitted use within the Agricultural District.

On the City and County of Honolulu's Ko'olau Poko Development Plan Land Use Map, the subject property is designated as Park. The proposed project is consistent with the Development Plan designation. The project is also consistent with the Ko'olau Poko Sustainable Communities Plan, the soon to be adopted update of the Development Plan.

The site is designated as P-2 Park/Preservation on the City and County of Honolulu's Zoning Map. The proposed project is consistent with the Zoning Map designation.

Anticipated Impacts and Mitigative Measures
The proposed project is consistent with existing land use designations, therefore there is no need for any change in the existing land use classifications or in the amount of land designated for development. Land use patterns in the area will not change as a result of the proposed action. No mitigative measures are required.

3.9 ROADWAYS AND TRAFFIC

Existing Conditions
Kamehameha Highway serves as the park's entrance and exit. The highway is two lane, generally flat and runs parallel to the windward coastline. The posted speed limit is 45 miles per hour. The project site is accessed by vehicle through the park's two lane paved road. The shoreline is accessed

via pedestrian walkways and lawns. Several parking areas have been developed to serve the park use areas along the shoreline.

Anticipated Impacts and Mitigative Measures

Construction Period. Construction activities will be appropriately scheduled to avoid unnecessary impacts on traffic. Contractors will be responsible for providing necessary traffic controls and precautions to maintain traffic safety at the park entrance and along the internal roadway. However, the construction work and interior roadway improvements will take place within the boundaries of the project site.

Future Traffic Flow. The proposed project is primarily reconstruction of the existing wastewater collection, treatment and disposal systems. Given the limited impacts, no mitigative measures are proposed. Proposed improvements are intended to support present attendance levels. Expansion of facilities is not included, therefore, no mitigation measures are required at this stage.

3.10 AIR QUALITY AND NOISE

Existing Conditions

Air quality on Oahu is generally good and relatively low in pollution, except where there are large numbers of vehicles or when weather patterns create stationary air conditions. The project site is adjacent to Kamehameha Highway and vehicles traveling on this road contribute to the air pollution levels in that area. However, the area mauka of the development is mountainous and undeveloped and the predominance of northeast trade winds generally create relatively clean air conditions in this area.

The existing noise environment at the project site is characteristic of a park setting. Noise sources include traffic from Kamehameha Highway and surf along the shoreline. Noise impacts will be short-term and limited to the construction phase only.

Anticipated Impacts and Mitigative Measures

Construction activities are expected to generate short-term impacts to air quality primarily from fugitive dust emissions. The impact of construction activities on air quality will be mitigated by conforming to strict dust control measures, particularly those specified in the State Department of Health's (DOH) Air Quality Standards, Chapter 37-A, Public Health Regulations, 1968; and the U.S. Soil Conservation Service's Erosion and Sediment Control Guide for Hawaii, 1968. Short term increases in vehicular emissions due to disruption of traffic by construction equipment mobilization may occur. Long-term air quality conditions in the area are not anticipated to decline once construction is completed. No mitigative measures are required.

Construction work at the project site will involve activities that may generate an increase in noise levels. However, such exposures are only a short-term condition, occurring during normal working hours. Construction-period noise will be mitigated in accordance with Title

11, Administrative Rules, Chapter 46, Community Noise Control of the State Department of Health.

3.11 SOCIO-ECONOMIC CHARACTERISTICS

Existing Conditions

Recreational Use. O'ahu's park system consists of a hierarchy of four levels: neighborhood, community, district, and regional. The first three levels are intended to serve a population base of less than a three-mile radius. The last level, regional parks (includes Kualoa), are larger in area and serve the recreational needs of the entire island.

Kualoa Regional Park is a 150-acre beach park administrated by the Department of Parks and Recreation (DPR) of the City and County of Honolulu. The estimated attendance at Kualoa Regional Park for 1995 was 215,628 persons. The park has facilities for daytime picnic use and overnight camping. Other characteristics of the park include programs for student groups, conservation areas and a wildlife refuge. The southern section of the park is reserved for organized camping by children's groups. Coastal facilities consist of restrooms, water and sewer utilities, a road, and parking areas.

The white sandy beach at Kualoa is particularly valuable since the beach has good facilities and water conditions in the Kane'ohe Bay area. Other than Kualoa Regional Park, public shoreline access opportunities in the Kane'ohe Bay area are limited to two small city parks and one state park.

Area Trends. Windward O'ahu is economically dependent upon the resources of leeward O'ahu, which is the financial, industrial, and commercial center of the State. Agriculture production remains an important land use of windward O'ahu.

Agricultural activities in the area are comprised of small plots of land used for the production of ornamental plants, fruits, vegetables, taro, and cut flowers. Beef, pork, milk, and eggs are also produced, although these activities are generally small-scale operations employing family members or a hired staff of five or less.

Kualoa Ranch, Inc., located across the highway from the park, is the primary employer in the area of the project site. Cattle, taro, papaya, and vegetables are the main commodities produced, but the ranch also receives significant income from on-site tourist-related activities.

Population. The Kualoa area encompasses the Ko'olau Poko census tract (ct 103.03). Census data for 1990 were used to describe population and housing characteristics for the Kualoa area. Residents of the Kualoa area are predominantly of Caucasian and Hawai'ian descent, making up 32.6 percent and 27.9 percent of the census tract population, respectively. Smaller portions of the area's population are of Japanese (17. 1 %), Filipino (9.2 %), and Chinese (6.6%) descent.

The population of the Kualoa area is small, representing only about 0.5 percent of O'ahu's population. The Kualoa region still retains its rural/agricultural character.

Kualoa has been identified as an area of strong cultural continuity. The preservation of Hawai'ian communities is important for the regeneration and subsistence of the Island's native culture. These communities are reliant upon natural resources remaining intact to maintain their values and ways of life.

In addition to Kualoa Regional Park's attractiveness as a recreational area, the existence of prehistoric burial sites enhances the cultural importance of the park. The Kualoa community has expressed their desire to preserve the artifacts and archaeological sites of this sacred and historical land. Listing on the National Register indicates a broad interest in these resources.

Housing and Families. The Kualoa area has slightly larger household sizes than the O'ahu population, with 3.5 persons per unit compared to 3.0 persons per unit island-wide. In 1990, there were 1,390 housing units in Kualoa, about 0.4 percent of O'ahu's housing stock of 281,683 units. Almost 90% of Kualoa's units are single-family detached structures, indicative of an agricultural region. More than half of all housing units are owner occupied (53.2%), with the remainder being renter occupied and a small percentage of units being vacant (0.3%).

Public Utilities. Kualoa Regional Park is served by Kamehameha Highway. Other utilities include electric power, telecommunications, and potable water supplies. Kamehameha Highway, adjacent to Kualoa Regional Park, is a soft-shouldered two-lane rural highway that directly accesses the park. No other public roadway provides access to the park. Inside the park an undivided paved roadway provides access to the southeastern and southwestern portions of the park. No improvements are required for telecommunications, or potable water supplies as a result of the project.

Anticipated Impacts and Mitigative Measures

The short-term construction period will generate some temporary disturbance to users of the park near work areas. There will be public notice made of any partial closure of the park required during the construction period. No construction will take place during weekend periods.

There will be no adverse long-term effects to the recreational resources. There will be no effect upon population, housing and public utilities. The project will create short-term benefits as a result of design and construction employment. The project will create jobs for local construction personnel. Local material suppliers and retail businesses can also be expected to benefit through a multiplier effect from the increased construction activities. State General Excise Tax revenues will be generated by the project's construction and related expenditures.

3.12 VISUAL RESOURCES

Existing Conditions

The project site is located within a picturesque setting with beautiful ocean, shoreline and mountain vistas. There are unique views of the windward shoreline, Chinaman's Hat and mountain to ocean views available from Kualoa Regional Park.

Anticipated Impacts and Mitigative Measures
The proposed project will have a short-term effect on visual resources during the construction period. There will be no effect on the visual setting following completion of construction.

3.13 UTILITIES

Existing Conditions
Water. The Board of Water Supply's system supplies potable water to Kualoa Regional Park.

Wastewater. The proposed project is for the emergency repair and to improve reliability of the wastewater facilities serving Kualoa Regional Park.

Electrical Power. The electrical needs of the project site are serviced by Hawaiian Electric Company. The project will require power supply to lift stations/grinder pumps as required at the individual comfort stations.

Telephone. Telephone service to the project site is provided by GTE Hawaiian Tel. The project will require telephone service to send SCADA alarm signals from the pump stations to the SCADA headquarters.

Anticipated Impacts and Mitigative Measures
There will be no adverse impact to utilities serving the park. The proposed project will provide for emergency repair and improve the reliability of the wastewater facilities serving the park.

Section 4.0
Alternatives to the Proposed Action

4.0 ALTERNATIVES TO THE PROPOSED ACTION

This Environmental Assessment evaluates several alternatives to the proposed project described in Section 2.0. The alternatives include:

- No Action Alternative
- Wastewater System Configuration Options
- Treatment Options
- Disposal Options
- Feasible Alternatives and Recommended System

4.1 ALTERNATIVE 1: NO ACTION

The No Action alternative would maintain the wastewater systems at Kualoa Regional Park in its present run-down condition. This is considered unacceptable because of the inadequacy of the wastewater treatment and disposal function at the park facilities. Without corrective action, the State Department of Health would likely issue a Notice of Violation to the City for the facilities.

Without improvements, the inadequacy of the park's wastewater management facilities could cause the closure of some park facilities or require a continuation and expanded use of portable toilets. This alternative would result in a continuation of the periodic sewer overflows, public health risk and environmental risk.

4.2 SYSTEM CONFIGURATIONS

Three general configurations were considered for replacing the existing wastewater system at Kualoa Regional Park. The options include individual systems, a dual system and a centralized system. Each of these system configurations were analyzed in the preliminary planning, including treatment effectiveness, capital construction costs, operation and maintenance issues, and disposal issues.

Individual. Individual wastewater systems could be installed throughout the park to serve each source. This would create duplicative systems in terms of treatment and disposal at each location, with no efficiency of combined treatment and disposal systems. There would be no installation of force mains and gravity collection lines leading between the comfort stations, which would minimize ground disturbance. There would be multiple disposal locations, including one system at Comfort Station #3 that would be close to the shoreline.

Dual System. The dual system would handle wastewater through two duplicate systems serving the east and west sides of the park. The wastewater sources found on the west side of the park include Comfort Stations #1-#3, which would be served by one system. The east side of the park, including Comfort Station #4, Food Service Building, Recreation/Adminstration

Building, Caretaker's Cottage, would be served by the second system. There would be collection and force main lines serving each of the dual systems. The dual system would establish two disposal systems.

Central System. The central system would serve all of the park facilities except the maintenance building. The wastewater would be conveyed through a system of newly installed force mains and gravity collection lines. A single treatment and disposal system would be installed.

4.3 WASTEWATER TREATMENT SYSTEM ALTERNATIVES

There are several options for wastewater treatment systems that could be utilized at Kualoa Regional Park, including separate and centralized facilities. Five different systems were considered, including composting toilets, separate septic tanks, separate aerobic systems, centralized septic tanks and a centralized aerobic system. It is not feasible to connect with a municipal sewer system since there is no service in this region of Oahu.

The installation of composting toilets would not require the development of new facilities such as a wastewater collection system, effluent treatment system or a disposal system. As a result, there would be no site disturbance for trenching and excavation, and would therefore pose little potential to affect archaeological remains. However, the design of composting toilets includes a waste collection and processing unit in the bottom portion of each toilet. The composting toilets would need to be raised above the existing floor level to allow for maintenance access to the lower portion of the composting toilet. To enable this function and make the toilets ADA accessible, it would require significant structural modification of each comfort station.

The separate septic tank system would improve the existing condition of the failing systems but would not improve the disposal conditions found at some of the current treatment/disposal locations. This is an interim solution for a centralized septic system with absorption beds located away from the shoreline. Septic tanks provide a slower treatment rate than an aerobic system due to the absence of oxygen to aid the breakdown of organic wastes.

Separate aerobic systems would provide a higher level of treatment at each of these locations, yet would continue the disposal of effluent at multiple locations. The aerobic system actively introduces oxygen through aeration to accelerate treatment and are typically used to provide a higher level of treatment or to treat higher flows. This is a costly solution to the current problem since it involves duplication of system elements. As compared to the proposed action, there would be significantly greater excavation requirements at each comfort station, with the potential of uncovering archaeological remains, particularly at Comfort Stations #1-3.

Consolidation to a centralized septic or aerobic system would eliminate the existing effluent disposal locations adjacent to the shoreline. The centralized septic tank installation is located in an area where it is anticipated that archaeological resources will not be affected. The interim system can be incorporated into an ultimate centralized aerobic system. The interim solution is designed to accommodate flows from existing facilities, with its components being a gravity

sewer, force main, low pressure pumps, septic tanks and SCADA. The ultimate solution is a centralized aerobic treatment facility that may be located mauka of the access road. However, there is limited archaeological information available for the potential site of the centralized aerobic facility, and significant additional research and investigation will be required. The additional time required to complete the field studies and documentation would jeopardize funding and further delay the emergency repair and corrective action. Expansion of facilities at the park would require expansion of the wastewater system, with additional archaeological and environmental research to be completed at that time.

Above-grade placement of wastewater collection lines and force mains connecting to a centralized treatment and disposal facility was also considered. This option involves laying new pipe at existing grade and mounding suitable cover on top. This construction technique would avoid potential excavation disturbance of buried cultural remains along the piping route. However, this method would significantly alter the surface features of the park, plus it would make the piping more susceptible to vandalism.

4.4 DISPOSAL SYSTEMS ALTERNATIVES

With a centralized treatment facility, several alternatives for disposal were considered. These alternatives include discharge to a variety of subsurface disposal options, surface water discharge, and water reuse options.

A leach field or absorption bed disposal system was evaluated for this project. This is one form of subsurface disposal of treated effluent, which is proven and cost-effective. Areas located away from the shoreline would be most suitable for this type of disposal. A centralized disposal would be more efficient than creating individual disposal systems.

Trenching and seepage pits were also considered, however, they would concentrate the treated effluent and pose a greater potential to have an adverse effect to groundwater and near shore water quality. Absorption beds and leaching fields would distribute the treated effluent over a broader area, allowing for greater potential dissipation and leaching, which dilutes the concentration of residual constituents in the treated effluent which adversely affect surface water and groundwater quality.

Discharge to a created treatment wetlands system before discharging into nearby surface waters such as Apua Pond was also considered. However, Apua Pond is an historic fishpond that is listed on the National Register of Historic Places. This disposal method would not be suitable due to potential cultural resource issues. Although this method may be technically feasible, the acquisition of necessary permits would be a difficult and lengthy process.

Water reuse for irrigation of park grounds was also considered, through either subsurface or surface irrigation. The park grounds are currently irrigated using potable water. By using the treated effluent for irrigation, wastewater disposal may be used in a manner that will decrease potable water use. Based on pan evaporation data for the area, area requirements for irrigation will vary from month to month, with the likely requirement for a back-up subsurface disposal

option during most of the year. Subsurface disposal backup would likely be required during the months of October through May. The construction cost for the underground irrigation system was estimated at $300,000 versus $7,000 cost savings annually for the reduced potable water use.

4.5 FEASIBLE ALTERNATIVES AND RECOMMENDED WASTEWATER SYSTEM

The feasible alternatives identified in the preliminary engineering report included three separate septic tank/leach field systems, two packages aerobic plant/leach field systems and one centralized system. The capital costs are compared below.

Alternative	Capital cost estimates
Three septic tank/leach fields	$620,000
Two aerobic plant/leach field	$750,000
Centralized system	$645,000

The capital costs are comparable between the feasible alternatives. Operation costs for all alternatives are also comparable. Aerobic systems require greater operator attention. Septic systems require more frequent pumping and are spread throughout the park.

The recommended wastewater system is a centralized wastewater system with an absorption bed. This is intended to be an interim treatment system that is flexible to accommodate the park master plan that will be adopted in the future. Potential impacts and proposed mitigative measures relating to the proposed action are discussed in Section 4.

Section 5.0
Required Permits and Approvals

5.0 CONFORMANCE WITH PLANS, REQUIRED PERMITS AND APPROVALS

5.1 STATE LAND USE DESIGNATIONS AND CONTROLS

The subject property is located within the State Land Use Agricultural District. The State of Hawaii Land Use Law regulates the classification and uses of lands in the State to accommodate continuing agricultural activities, and to retain the natural resources of the area. All State lands are classified by the State Land Use Commission, with consideration given to the General Plan of the County, as either Urban, Rural, Agricultural, or Conservation. The proposed project does not require a change in State Land Use designation; it is a permitted use.

5.2 CITY AND COUNTY OF HONOLULU LAND USE CONTROLS

5.2.1 Ko'olau Poko Development Plan and Sustainable Communities Plan

The subject property is designated Park on the City and County of Honolulu's Ko'olau Poko Development Plan Land Use Map. The project proposes to make emergency repairs and improve reliability of the wastewater facilities serving the existing park. The City and County of Honolulu's Development Plans provide detailed plans for administrative purposes and assists the Department of Planning and Permitting in implementing the County's General Plan. It serves as a guideline for specific improvements and provides orderly direction for this region's future growth within the framework of the General Plan. The Ko'olau Poko Development Plan Land Use Designation for the entire site is designated as Park. The proposed project is consistent with the Development Plan designation. The recently completed Ko'olau Poko Sustainable Communities Plan (1999) also designates the area as Park, and the proposed use is consistent.

5.2.2 Zoning Districts

The subject property is designated P-2 General Preservation on the City and County of Honolulu's Zoning Map. Most City Parks have this same zoning designation. The purpose of the Comprehensive Zoning Ordinance for the City and County of Honolulu is to implement the General Plan and Regional Development Plans' policies for growth and development. The proposed project is consistent with the Zoning Map designation.

5.2.3 Special Management Area

Kualoa Regional Park lies within the County's Special Management Area (SMA) which encompasses the shoreline area surrounding the island and other sensitive coastal resources. The project is exempt from obtaining a Special Management Area Use Permit because it is an emergency repair of an existing facility and does not increase or expand capacity.

5.3 APPROVALS AND PERMITS REQUIRED

The proposed project is consistent with and supports the State and City and County land use designations of the subject property. The following is list of the approvals and permits required for the renovation and construction work for the site. Ministerial permits will be obtained as required such as demolition, building, grading, etc.

- Completion of the Chapter 343, HRS environmental review process.
- Ministerial permits as required, as shown in the Permit Register, Department of Land Utilization (October 1996).
- Approval of the wastewater system from the State of Hawaii, Department of Health.

Section 6.0

Findings and Reasons Supporting Anticipated Determination

6.0 FINDINGS AND REASONS SUPPORTING ANTICIPATED DETERMINATION

6.1 ANTICIPATED DETERMINATION

In accordance with the Department of Health Rules Section 11-200-12, an applicant or agency must determine whether an action may have a significant impact on the environment. The Rules establish "significant criteria" to be used as a basis in making the determination and 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) Involve an irrevocable loss or destruction of any natural or cultural resources;

The proposed project is for the emergency repair and to improve reliability of existing wastewater facilities. There is no significant destruction of existing natural or cultural resources. As previously noted, there are significant archaeological or historical sites are known to exist within the project site, which are avoided in the project design. There will be extensive monitoring of construction to avoid potential impacts to cultural sites. If during the course of construction any cultural or archaeological remnants are unearthed, their treatment will be conducted in strict compliance with the requirements of the Department of Land and Natural Resources.

(2) Curtail the range of beneficial uses of the environment;

The site has been developed as a County regional park since the 1950's. The proposed action will not curtail the range of potential beneficial uses of the environment. The planned improvements are intended to improve the quality of the environment at this park by improving the reliability of the system, quality of treated effluent and manner of disposal.

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

The proposed project is consistent with the environmental policies established in Chapter 344, Hawaii Revised Statutes.

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

The proposed project is an investment in the emergency repair and improved reliability of an existing County park asset and will improve the economic and social welfare of the community and State. The improvements will not negatively or significantly alter the existing area, nor

will it contribute to population growth. The improvements will provide the park users with properly functioning comfort stations and wastewater systems.

(5) Substantially affects public health;

Insignificant or undetectable impacts to public health may be affected by air and noise impacts during construction, but will be mitigated by appropriate control measures. The long-term benefits to positive social and quality of life implications associated with the project outweigh the temporary negative impacts. Overall, impacts will be significantly positive in terms of public health through the provision of improved wastewater management facilities as compared to the "no action" alternative. The proposed project will reduce the public exposure to sewage spills.

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

As this is an existing project, the proposed improvements will not create significant secondary impacts such as population changes or effects on public facilities. Design and construction work will generate indirect and induced employment opportunities and multiplier effects, but not at a level that would generate any significant expansion. The short-term employment impacts will be beneficial to the local economy.

(7) Involves a substantial degradation of environmental quality;

The proposed project will consist of emergency repair and improved reliability to the wastewater systems on an existing developed park. The wastewater improvements will improve the overall quality of the park by assuring proper function of the comfort stations and other park facilities.

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

Renovation of and improvement to the park wastewater facilities is consistent with the long term objectives of the City and County Department of Parks and Recreation.

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

There are no endangered plant or animal species located within the limits of the project site.

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

Short-term effects on air, water quality or ambient noise levels during construction will be mitigated by compliance with City and County of Honolulu and State Department of Health rules which regulate construction-related activities. After development, improvements to the site and related infrastructure should not create detrimental impacts to air, water quality or

ambient noise levels. The project will improve water quality in the near shore environment through a reduction in sewer overflows.

(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, fresh water, or coastal waters;

The existing project site is generally compatible with the criteria stated above. The project is partially located in a Zone AE flood hazard area and tsunami inundation zone, as discussed in Section 3. The improvements are designed with consideration of these natural factors.

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

The planned improvements will not substantially affect scenic vistas or view-planes.

(13) Require substantial energy consumption.

Construction of the project will not require substantial energy consumption relative to other similar projects.

6.2 REASONS SUPPORTING THE ANTICIPATED DETERMINATION

As stated above, there are no significant environmental impacts expected to result from the proposed action as the project site already developed. A Finding of No Significant Impact (FONSI) is anticipated. The emergency repair of wastewater systems at Kualoa Regional Park will be beneficial to the State and residents of Oahu.

Section 7.0

Responses to Comments on the Draft Environmental Assessment

Distribution List
Kualoa Regional Park
Centralized Wastewater System
Draft EA

State Agencies

Mr. Thomas E. Arizumi, Chief
Environmental Management Division
Department of Health
State of Hawaii
919 Ala Moana Boulevard, Room 300
Honolulu, Hawaii 96814

Mr. Timothy Johns, Chair
Department of Land and Natural Resources
State of Hawaii
1151 Punchbowl Street
Honolulu, Hawaii 96813

Mr. Don Hibbard, Ph.D.
Deputy State Historic Preservation Officer
Historic Preservation Division
Department of Land and Natural Resources
State of Hawaii
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

Office of Planning
Department of Buisness Economic Development and Tourism
State of Hawaii
State Office Tower
235 South Beretania Street, 6th Floor
Honolulu, Hawaii 96813

Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

City Agencies

Mr. Clifford Jamile
Manager and Chief Engineer
City and County of Honolulu
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96813

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

Koolauloa Neighborhood Board No. 28
P.O. Box 418
Hauula, Hawaii 96717
Maryanne Long, Chair

Kahalu'u Neighborhood Board No. 29
c/o KEY Project
47-200 Waihee Road
Kaneohe, Hawaii 96744
Amy Luersen, Chair

Kaneohe Neighborhood Board No. 30
c/o Kaneohe Satellite City Hall
46-024 Kamehameha Highway
Kaneohe, Hawaii 96744
Roy Yanagihara, Chair

Kualoa Advisory Council
47-200 Waihee Road
Kaneohe, Hawaii 96744
Attention: Gloria Fraiola

Kaneohe Public Library
45-829 Kamehameha Highway
Kaneohe, HI 96744

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

March 9, 2000

Mr. Robert Miyasaki
City and County of Honolulu
Department of Design and Construction
650 South King Street
Honolulu, Hawai'i 96813

EIS #00-359

Re: Draft Environmental Assessment (EA) for the Centralized Wastewater System at Kualoa Regional Park: TMK: 1-4-9-04:01 and 11

Dear Mr. Miyasaki:

Thank you for the opportunity to review the Draft EA for a centralized wastewater system at Kualoa Regional Park. The EA proposes to connect the four current comfort stations at Kualoa Park to a new septic tank system and leach field to be built mauka of Apua pond. The DEA anticipates a finding of no significant impact (FONSI).

We have two basic concerns. The archaeological and cultural information in the EA is incomplete and the FONSI is inappropriate.

Kualoa is perhaps the most historically, culturally and archaeologically important site on the island of O'ahu. The archaeological assessment attached to the EA summarizes the importance of the area, but fails to comport the sensitivity of this place. A full and complete cultural analysis must be completed before decisions on a wastewater treatment center can be made.

The anticipation of a FONSI is based on an approach that identifies impacts, proposes mitigation and concludes that the impacts have been addressed by the mitigation measures. Although this approach is often used it is insufficient in this situation. The EA both the archaeological richness of this area and the likelihood that subsurface remains will be impacted. The proposed mitigation consists of two measures. First, it is suggested that an archaeological monitor will be present during construction activities. Second, the EA offers that construction will be halted if cultural resources are found. In an area as culturally rich as Kualoa, it is likely that many archaeological resources will be found and that this will require halting the project continuously. In this extreme circumstance, monitoring is not sufficient mitigation to achieve a finding of no significant impact (FONSI).

For these reasons, we strongly urge the City and County to do a complete EIS that (1) includes a cultural assessment and (2) fully assesses the costs of this project in light of the delays that may occur from archaeological findings.

OHA considers this project extremely sensitive. We would like to meet with the department to discuss our concerns.

If you have any questions concerning our comments, please contact Lynn J. Lee, Policy Analyst, at 594-1936.

Sincerely,

Colin Kippen, Jr.
Deputy Administrator

cc: Board of Trustees
OEQC
Group 70 International, Inc.

DEPARTMENT OF DESIGN AND CONSTRUCTION

CITY AND COUNTY OF HONOLULU

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JEREMY HARRIS
MAYOR

GARY G. L. YEE, AIA
DIRECTOR

ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

DCP 2000-328

May 11, 2000

Mr. Colin Kippen, Jr.
Deputy Administrator
Office of Hawaiian Affairs
State of Hawai'i
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

Dear Mr. Kippen:

Subject: **Centralized Wastewater System for Kualoa Regional Park**
Responses to Comments on the Draft Environmental Assessment

Thank you for providing your comments on the Draft EA for the Centralized Wastewater System at Kualoa Regional Park. We have prepared the following responses to issues raised in your letter of March 9, 2000.

The rich history, archaeology and culture of Kualoa is recognized in the Draft EA. The adequacy of the archaeological investigations conducted for this subject project in terms of depth and substance has been confirmed by the DLNR Historic Preservation Division. There have also been numerous previous investigations at Kualoa from which a wealth of archaeological and cultural information is referenced in the subject studies.

The areas selected for the installation of the collection system and centralized wastewater treatment and disposal system are the least sensitive areas in terms of known archaeological and cultural resources. Due to past agricultural and military activities at Kualoa, the proposed project area is the least sensitive location for this type of work to be conducted.

Please recognize that this is an existing park that provides a valuable resource for cultural and recreational activities in the windward Oahu region. A new cultural assessment would document many interesting perspectives of the past and present; however, there is an urgent need to conduct emergency repairs to the wastewater system at Kualoa Regional Park. This was evidenced recently by people attending the ceremonies associated with the arrival of Hokulea on the weekend of March 11-12, 2000. The situation will only get worse as we enter the summer camping season.

Appropriate measures will be taken to ensure that construction will not have a significant effect on archaeological resources. Based on the surveys of the project area, the shallow trenching that is proposed for the collection system is not anticipated to encounter significant resources. Monitoring of construction activities will be conducted following the DLNR-approved monitoring plan. At this time we do not intend to conduct an additional cultural assessment for the emergency repair of an existing wastewater system at this existing park, nor do we believe the preparation of an EIS is warranted. Under a separate contract for the Kualoa Regional Park Master Plan project, the City and County of Honolulu, Department of Parks and Recreation contracted Cultural Surveys Hawaii, Inc. to prepare an ethnographic study of the ahupua'a of Kualoa. This study was not completed at the time of this assessment; however, an executive summary of the study is included in Appendix C of the Final EA.

Following our meeting with Lynn Lee of your staff, we have prepared a monitoring and mitigation plan for the construction activities following the guidance from OHA. This plan has been reviewed by both your office and the SHPD, and we appreciate your concurrence with the steps proposed to minimize impacts to archaeological and cultural resources. The new plan and your correspondence is included in the Final EA.

Thank you again for providing your comments on the Draft EA. We appreciate your concerns and the sensitivity of the setting at Kualoa, and we would be glad to discuss these issues with the department. If you have further questions or comments, please call Robert Miyasaki of the Division of Planning and Programming at 527-5159.

Sincerely,

FOR GARY Q. L. YEE, AIA
Director

BENJAMIN J. CAYETANO
GOVERNOR

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

February 3, 2000

Gary Yee, Acting Director
Department of Design & Construction
650 South King Street, 14th floor
Honolulu, Hawaii 96813

Attention: Robert Miyasaki

Dear Mr. Yee:

Subject: Draft Environmental Assessment (EA) for **Kualoa Park Centralized Wastewater System**

We have the following comments to offer:

1. Contacts: Notify the Hakipu'u Ohana, longtime residents of this area, of the proposed project, allowing them sufficient time to review the draft EA and submit comments. Document all contacts in the final EA and include copies of any correspondence.

2. Agency contacts: Document your contacts and include copies of any correspondence made during the pre-consultation phase of this draft EA. Given the wealth of archeological and historic features, documentation of contacts made with the State Historic Preservation Division of DLNR is vital. Has SHPD concurred with the archeological monitoring and preservation plan included in the draft EA?

3. Park closures: Only construction areas of the park will be closed during this phase. How long will this time period be?

4. Site map: Will any of the construction activities impinge on the Conservation District? In the final EA enclose a site map that shows the Conservation District boundaries in relation to the construction areas.

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

Sincerely,

GENEVIEVE SALMONSON
Director

c: Jeff Overton

DEPARTMENT OF DESIGN AND CONSTRUCTION

CITY AND COUNTY OF HONOLULU

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JEREMY HARRIS
MAYOR

GARY Q. L. YEE, AIA
DIRECTOR

ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

DCP 2000-329

May 11, 2000

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

Dear Ms. Salmonson:

Subject: Centralized Wastewater System for Kualoa Regional Park
Responses to Comments on the Draft Environmental Assessment

Thank you for providing your comments on the Draft EA for the Centralized Wastewater System at Kualoa Regional Park. We have prepared the following responses to issues raised in your letter of February 3, 2000.

Hakipu'u Ohana. We contacted Joyce Uyehara to notify her about the Draft EA availability and the scheduled Kahalu'u Neighborhood Board meeting of February 9, 2000. We have had no further contact with Joyce; however, we have discussed project issues further with Board Members Amy Luerson and Moana Lee, and also with Gloria Fraiola, a member of the Kualoa Regional Park Master Planning Committee. These local residents have had direct input to the project planning through their comments. Most of their issues have dealt with the sensitivity of the archaeological resources at the Park, and implications of the wastewater facilities as they relate to the unfinished Park Master Plan.

Agency Contacts. The pre-consultation was limited to meetings and/or telephone discussions with agencies including City Department of Planning and Permitting, City Department of Parks and Recreation, State Department of Health, State Office of Environmental Quality Control, and the State Historic Preservation Division. The interaction with the SHPD did include review of the Archaeological Assessment, and there is an approved archaeological monitoring and preservation plan. Please refer to the attached letters from the SHPD and OHA regarding consultation on archaeological and cultural resources.

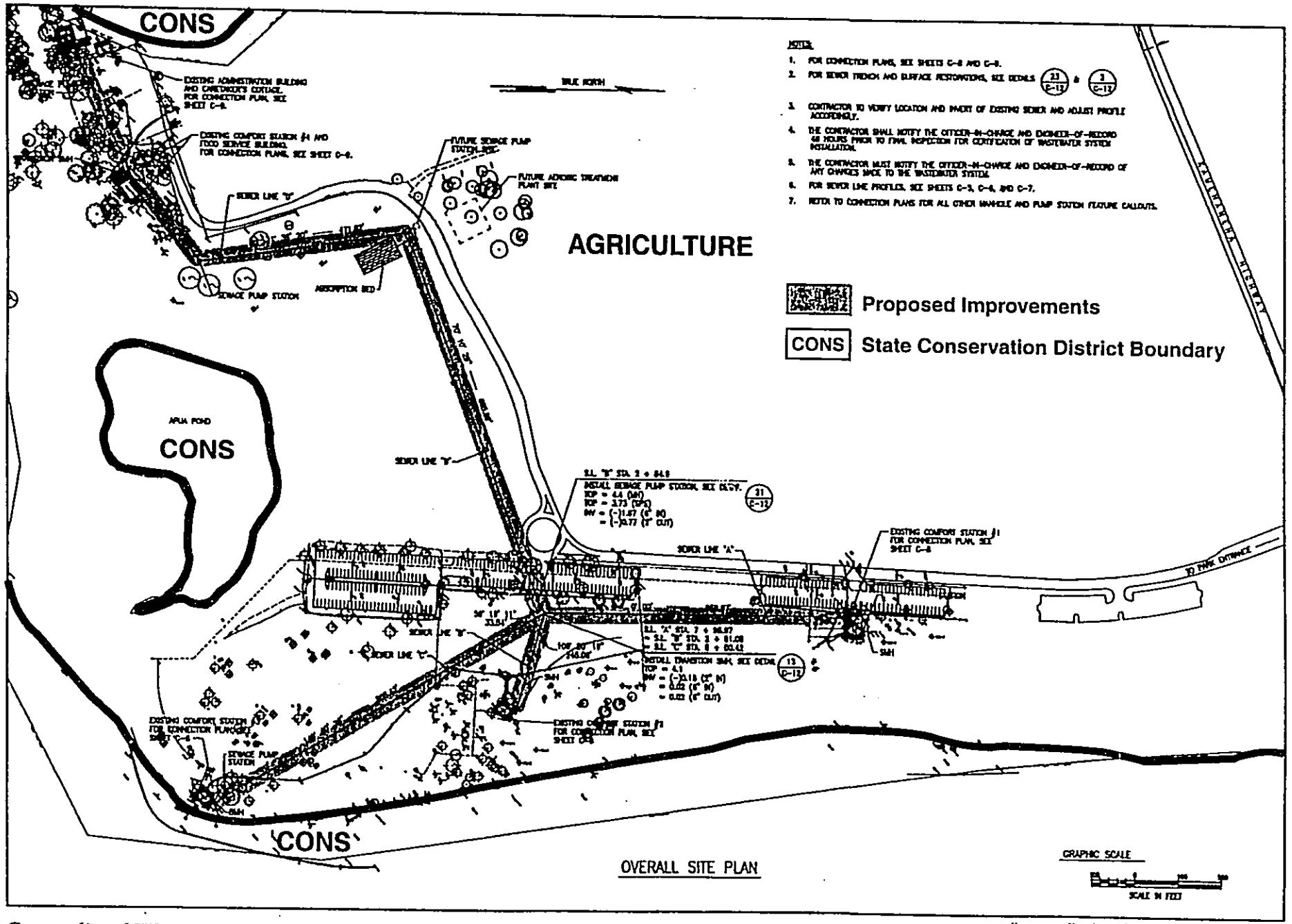
Park Closure. Portions of the park will be closed during the construction; however, at no time will the entire park be closed. The total construction time period is estimated at less than six months.

Conservation District. The Final EA will include a site map that identifies the Conservation District boundaries (P-1 zoning areas) in relation to the construction areas. No work will take place in the Conservation District.

Thank you again for providing your comments on the Draft EA. If you have further questions or comments, please call Robert Miyasaki of the Division of Planning and Programming at 527-5159.

Sincerely,

FOR GARY Q. L. YEE, AIA
Director



Centralized Wastewater System at Kualoa Regional Park

Relationship to Conservation District Boundary

Source: Engineering Solutions, Inc. (1999)

RECEIVED
'00 FEB 28 P2:34

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

DESIGN & CONSTRUCTION
DIVISION OF
PLANNING & PROGRAMMING

RECEIVED
'00 FEB 28 P1:
DESIGN & CONSTRUCTION
DIV. OF ENGINEERING

February 22, 2000

LOG NO: 24835
DOC NO: 0002SC02

Mr. Gary Q.L. Yee, Acting Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 2nd Floor
Honolulu, Hawaii 96813

Dear Mr. Yee:

SUBJECT: **Chapter 6E-8 Historic Preservation Review of a Draft Environmental Assessment (DEA) for the Centralized Wastewater System at Kualoa Regional Park**
Kualoa, Ko'olaupoko, O'ahu
TMK: 4-9-004: 001 & 011

Thank you for the opportunity to comment on the DEA prepared for the planned centralized wastewater system at Kualoa Regional Park in Kualoa, O'ahu. Our review is based on historic reports, maps, and aerial photographs maintained at the State Historic Preservation Division; no field inspection was made of the subject parcels.

Previously, as noted in the DEA (p. 3-6), we reviewed and approved for implementation an archaeological monitoring plan that called for on-site monitoring of all excavations that exceeded 18 inches in depth (Hibbard to Shideler, March 16, 1999, DOC NO: 9903SC10). Since our review of that document, further information regarding the location and likelihood of subsurface cultural deposits at Kualoa Regional Park has been provided to our office (*Archaeological Assessment for Reconstruction of Wastewater Systems at Kualoa Regional Park, Kualoa Ahupua'a, Ko'olaupoko, O'ahu [TMK: 4-9-04:01]*. 1999. Hammatt & Shideler). The subject assessment report subdivides the project area into the East Beach, Central, and Southwest study areas; these regions are shown in the document attached to the DEA. In view of the additional data supplied by the assessment, we would like to make the following, revised recommendations concerning the need for archaeological monitoring during the construction of a centralized wastewater system at Kualoa Regional Park:

East Beach: All subsurface excavations that exceed 18 inches in depth shall be monitored on-site by a qualified archaeologist.

Central: Since much of this region of the project site has been found to be extensively disturbed and devoid of archaeological resources, only limited archaeological monitoring is recommended. Specifically, a qualified archaeologist should conduct on-site monitoring of all subsurface excavations exceeding 18 inches in depth and within a distance of 62 meters (200 feet) of the main paved north/south access road, and within a distance of 62 meters (200 feet) of the southern dogleg of the gravel access road. On-site archaeological monitoring is NOT recommended in between these two areas on the south side of the access road. On the north side of the gravel access road, extending to the park headquarters, on-site archaeological monitoring of all excavations exceeding 18 inches in depth is required.

Southwest: All ground disturbance in this portion of the project area should be monitored on-site by a qualified archaeologist.

If these revised recommendations are followed, then we believe that the proposed centralized wastewater system improvements for Kualoa Regional Park will have "no adverse effect" on significant historic sites.

Should you have any questions, please feel free to call Sara Collins at 692-8026.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

SC:jk

DEPARTMENT OF DESIGN AND CONSTRUCTION

CITY AND COUNTY OF HONOLULU

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JEREMY HARRIS
MAYOR

GARY Q. L. YEE, AIA
DIRECTOR

ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

DCP 2000-330

May 11, 2000

Mr. Don Hibbard, Administrator
Historic Preservation Division
State of Hawai'i
Suite 555, Kakuhihewa Building
601 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Hibbard:

Subject: Centralized Wastewater System for Kualoa Regional Park
Responses to Comments on the Draft Environmental Assessment

Thank you for providing your comments on the Draft EA for the Centralized Wastewater System at Kualoa Regional Park. We have prepared the following responses to issues raised in your letter of February 22, 2000.

Archaeological monitoring will be conducted in accordance with the monitoring plan submitted in April 2000, included as an appendix to this Final EA. The Office of Hawaiian Affairs has concurred with the procedures specified in the monitoring plan, as evidenced in the attached letter of April 26, 2000 from Colin Kippen, Jr. Therefore, the proposed project will have no adverse effect on significant historic sites.

Under the approved monitoring plan, monitoring of excavations in the East Beach area will be limited to work exceeding 18 inches in depth. The Central Area is extensively disturbed and generally devoid of resources, therefore limited monitoring is required per the plan revisions. All ground disturbances in the Southwest Area of the park will be monitored.

Thank you again for providing your comments on the Draft EA. If you have further questions or comments, please call Robert Miyasaki of the Division of Planning and Programming at 527-5159.

Sincerely,

FOR GARY Q. L. YEE, AIA
Director

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
File:

February 17, 2000

96-061B/epo

Mr. Robert Miyasaki
Department of Design
and Construction
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Miyasaki:

Subject: Draft Environmental Assessment (DEA)
Centralized Wastewater System
Kualoa Regional Park
Kualoa, Oahu
TMK: 4-9-04: 1 & 11

Thank you for allowing us to review and comment on the subject project. We have the following comments to offer:

As there is no existing sewer service system in the area and none will be constructed in the near future, the Department of Health (DOH) concurs with the proposed project to repair and replace the existing individual wastewater systems with a centralized treatment and disposal system that will connect the four (4) existing comfort stations and support facilities. The Department of Health has received and reviewed these plans (a septic tank with bed/trench disposal) to service the existing comfort stations and support facilities. These plans were approved on November 30, 1999.

96-061B/epo

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems."

Should you have any questions, please contact the Planning/ Design Section of the Wastewater Branch at 586-4294.

Sincerely,

GARY GILL
Deputy Director for
Environmental Health

c: WWB
OEQC

DEPARTMENT OF DESIGN AND CONSTRUCTION

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
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JEREMY HARRIS
MAYOR

GARY Q. L. YEE, AIA
DIRECTOR

ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

DCP 2000-333

May 11, 2000

Mr. Gary Gill, Deputy Director
State of Hawai'i
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Gill:

Subject: Centralized Wastewater System for Kualoa Regional Park
Responses to Comments on the Draft Environmental Assessment

Thank you for providing your comments on the Draft EA for the Centralized Wastewater System at Kualoa Regional Park. We have prepared the following responses to issues raised in your letter of February 17, 2000.

The DOH Wastewater Branch has reviewed plans for the centralized wastewater treatment and disposal system, and granted approval in November 1999. Your letter concurs with the plan to repair and replace the existing individual systems and connect the wastewater sources to a single treatment and disposal location.

Plans for the system will conform to applicable portions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems."

Thank you again for providing your comments on the Draft EA. If you have further questions or comments, please call Robert Miyasaki of the Division of Planning and Programming at 527-5159.

Sincerely,

FOR GARY Q. L. YEE, AIA
Director

DC 2000-00161

DEPARTMENT OF PLANNING AND PERMITTING

CITY AND COUNTY OF HONOLULU

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RECEIVED
'00 FEB 23 A11:11
DESIGN & CONSTRUCTION
DIVISION OF
PLANNING & PROGRAMMING

JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
ACTING DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

February 22, 2000

2000/CLOG-282(ASK)

RECEIVED
'00 FEB 23 A9:54
DESIGN & CONSTRUCTION
DIV. OF PLANNING & PROGRAMMING

MEMORANDUM

TO: MR. GARY Q.L. YEE, AIA, ACTING DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

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

Barbara A Brown for

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR THE CENTRALIZED WASTEWATER SYSTEM AT KUALOA REGIONAL PARK; TMK 4-9-4: 1

We have reviewed the above document and offer the following comments:

1. Page 1-3, Section 1.4 of the Draft EA states that the Department of Planning and Permitting is the accepting authority for the "proposed action." This is contrary to the summary information on page 1-1, which identifies the Department of Design and construction as the accepting authority. This discrepancy should be corrected in the Final EA.

2. The property identified by Tax Map Key 4-9-1: 11 is Mokolii Island (Chinamans Hat). While it may be part of the Regional Park, it is not part of the project area. This clarification should be made in the Final EA.

3. Excavation depths should be described in the text of the Final EA.

Alternatives

Treatment

1. The Final EA should provide additional information for the considered alternatives to allow for a better comparison with the selected alternative (a centralized septic system).

2. Page 4-1 of the Draft EA states that connection with a municipal sewer system is not feasible as there is no service in this region. The Final EA should identify the location of the nearest municipal sewer line and discuss any future plans for extending the line closer to the project site.

3 Page 2-4 of the Draft EA states that centralized septic tanks are the selected alternative because of the "emergency repair need, cost, operation and maintenance issues, and need for significantly more archaeological investigation" if the "ultimate solution" , a centralized aerobic system (mauka of the access road) were implemented. Since the aerobic system would provide a higher level of treatment and better environmental protection than the selected septic system, the Final EA should include a specific comparison justifying the selected alternative.

4. The Final EA should consider construction of an aerobic treatment plant in the location of the proposed septic tanks and absorption bed as an alternative.

5. Page 2-3 of the Draft EA states that the 14,500 g.p.d. flows are within the "allowable flow range" that may be treated by septic tanks. The Final EA should identify what standard is being applied.

6. Page 4-1, section 4.2 of the Draft EA states that separate septic tank systems would improve the failing systems but would not improve the disposal conditions. The Final EA should clarify what is meant by "disposal conditions" and how the selected "centralized" septic system is preferable in that regard.

Disposal

7. It is not clear from the discussion on page 4-2, Section 4.3 that water reuse for irrigation will not be employed. The Final EA should clarify this.

Archaeology

1. Page 3-5 of the Draft EA states that the archeological assessment contains a subsurface analysis from 16 percolation test pits. The attached archaeological assessment does not discuss this subsurface work. The Final EA should clarify this.

Shoreline

1. The Final EA should disclose the location of the proposed improvements relative to the shoreline. If any of the proposed improvements are within 55 feet of the shoreline a shoreline survey will be required at the time of construction. Work within 40 feet of the shoreline will require a shoreline setback variance.

Should you have questions regarding the above, you may contact Ardis Shaw-Kim of our staff at 527-5349.

kuaiosea.esk

DEPARTMENT OF DESIGN AND CONSTRUCTION

CITY AND COUNTY OF HONOLULU

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JEREMY HARRIS
MAYOR

GARY Q. L. YEE, AIA
DIRECTOR

ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

DCP 2000-332

May 11, 2000

MEMORANDUM

TO: MR. RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

FROM: FOR GARY Q. L. YEE, AIA, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: CENTRALIZED WASTEWATER SYSTEM FOR KUALOA REGIONAL PARK RESPONSES TO COMMENTS ON THE DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for providing your comments on the Draft EA for the Centralized Wastewater System at Kualoa Regional Park. We have prepared the following responses to issues raised in your letter of February 22, 2000.

Text Revisions. We have corrected the errors in the Draft EA regarding the accepting authority and TMK designation.

Excavation Depths. Excavation depths are listed in the final EA. These depths will range from a minimum of 24 inches for the majority of the collection system piping (3,900 linear ft.), to two feet below grade for the disposal system (5,700 sq. ft. area), and up to 10 feet below grade for the septic tanks (1,260 sq. ft. area).

Individual Wastewater System. Up to 15,000 gpd or more may be treated cost effectively using septic tanks, according to the "Manual of Septic Tank Practice" published by the U.S. Dept. of Health, Education and Welfare (Public Health Service). Plans for the system will conform to applicable portions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems."

Alternatives. There is an expanded evaluation of alternatives to the proposed action of the centralized treatment system. The evaluation of an aerobic system at the proposed location of the septic tank system was considered, and it was deemed to be less feasible due to its higher near-term costs. The aerobic system will not become necessary until the park usage is increased significantly beyond the current levels, therefore, it is relevant to the long-term plans for park improvements but not emergency repairs. Effluent treatment levels expected to result from the septic tank system will be adequate to meet individual wastewater system standards, and far better than the current condition. The proposed location could be used for an aerobic system at some point in the future with replacement of the septic tanks.

Municipal Sewer Line. The closest municipal sewer line is near Kaneohe, and there are no plans to extend the sewer line in the direction of Kualoa.

Disposal Conditions. The use of separate septic tank systems would not improve the disposal system locations that are very close to the shoreline. The centralized system is over 700 feet away from the shoreline, as compared to the multiple existing disposal locations, some as close as 100 feet from the shore.

Water Reuse for Irrigation. The reuse of effluent was considered but could not be a reliable single solution during rainy periods. A reuse system at this Oahu location would require back-up subsurface disposal or effluent storage during rainy periods.

Subsurface Analysis. There was a DLNR-approved archaeological monitoring plan which was required for the 16 percolation test pits completed to site the disposal system. We can forward a copy of the plan for your review. There were no significant findings resulting from this testing.

Improvements near the Shoreline. The pump station and collection force main line at Comfort Station #3 will be the closest to the ocean, at a distance of nearly 40 feet. We do not anticipate the need for a shoreline setback variance since all improvements near Comfort Station #3 will be placed below grade.

Thank you again for providing your comments on the Draft EA. If you have further questions or comments, please call Robert Miyasaki of the Division of Planning and Programming at 527-5159.

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843

February 4, 2000

TO: MR. GARY Q.L. YEE, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

FROM: CLIFFORD S. JAMILE

SUBJECT: YOUR MEMORANDUM OF JANUARY 14, 2000 REGARDING THE DRAFT ENVIRONMENTAL ASSESSMENT FOR THE CENTRALIZED WASTEWATER SYSTEM AT KUALOA REGIONAL PARK, KUALOA, OAHU, TMK: 4-9-04: 01 AND 11

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the proposed wastewater system at Kualoa Regional Park.

We have the following comments to offer:

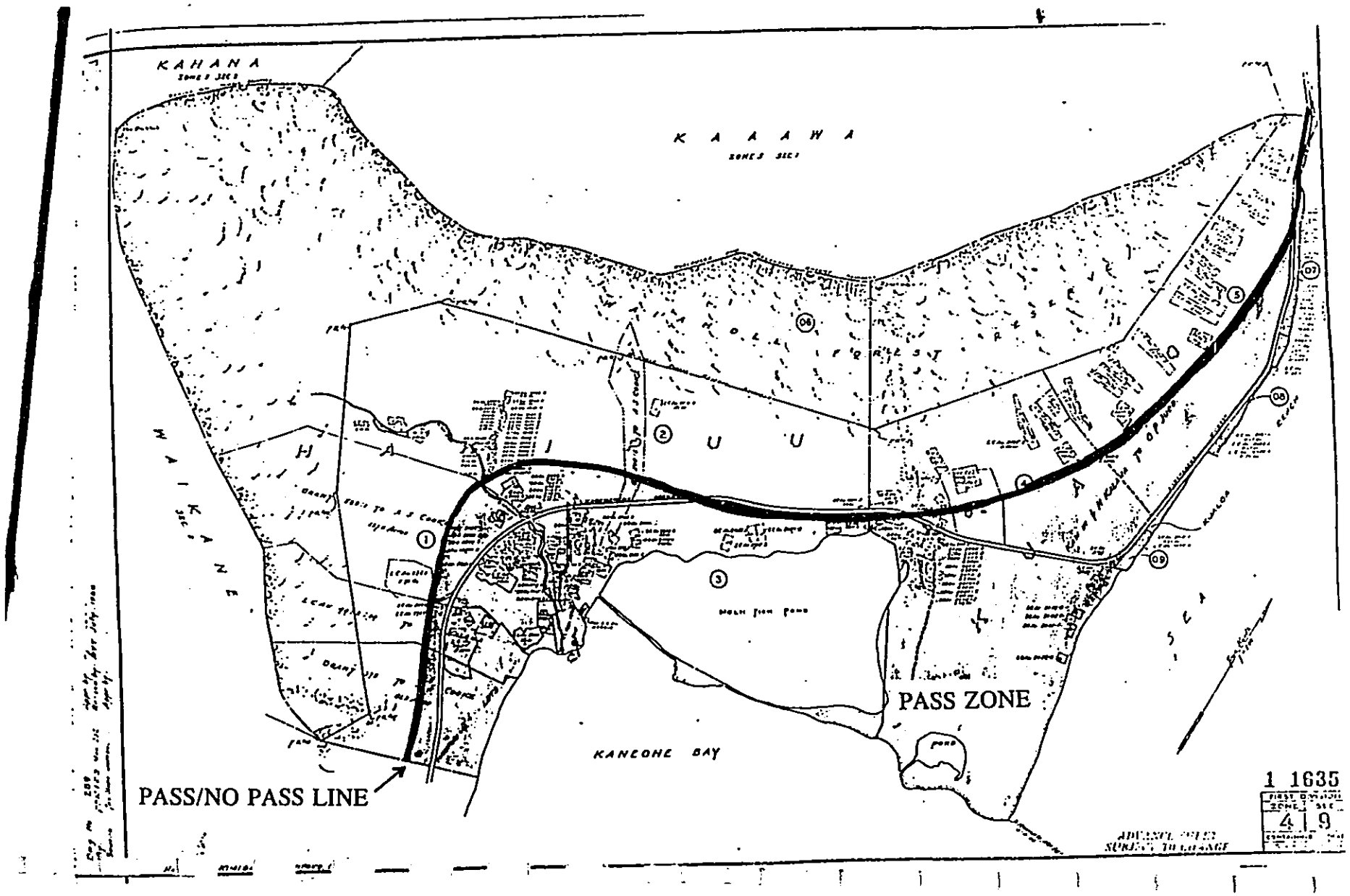
1. We have no objections to the proposed project. The proposed wastewater facility will be constructed within the Pass Zone. The enclosed map indicates the Pass/No-Pass boundary line.

2. Board of Water Supply approved reduced pressure principle backflow prevention assemblies will be required to be installed after all domestic water meters serving the project site.

If you have any questions, please contact Kathryn Kami at 527-5221.

Enclosure

cc: Office of Environmental Control
Group 70 International, Inc.


KAHANA
KAAAWA
KANEOHE BAY
PASS/NO PASS LINE
PASS ZONE
1 1635

DEPARTMENT OF DESIGN AND CONSTRUCTION

CITY AND COUNTY OF HONOLULU

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JEREMY HARRIS
MAYOR

GARY Q. L. YEE, AIA
DIRECTOR

ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

DCP 2000-334

May 11, 2000

MEMORANDUM

TO: MR. CLIFFORD S. JAMILE, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: FOR GARY Q. L. YEE, AIA, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: CENTRALIZED WASTEWATER SYSTEM FOR KUALOA REGIONAL PARK RESPONSES TO COMMENTS ON THE DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for providing your comments on the Draft EA for the Centralized Wastewater System at Kualoa Regional Park. We have prepared the following responses to issues raised in your letter of February 4, 2000.

We appreciate you providing the information regarding the Pass/No-Pass Boundary line and the map. The project will be constructed in the Pass Zone.

No new domestic water meters will be installed as a result of this project. Connections to the BWS system, if required, will be designed with BWS-approved reduced pressure principle backflow prevention assemblies.

Thank you again for providing your comments on the Draft EA. If you have further questions or comments, please call Robert Miyasaki of the Division of Planning and Programming at 527-5159.

KUALOA PARK ADVISORY COUNCIL
c/o 47-200 Waihee Road
Kaneohe, Hawaii 96744
Attention: Gloria Fraiola

February 23, 2000

City and County of Honolulu
Department of Design and Construction
650 South King Street
Honolulu, Hawaii 96813

Attention: *Robert Miyasaki*

RE: Draft Environmental Assessment For the Centralized Wastewater system at Kualoa Regional Park; TMK: 1-4-9-04:01 and 11

Members of the Advisory Council are aware that something has to be done to correct the wastewater problems for all of the current facilities at Kualoa. Many of us are regular park users and have seen the overflowing cesspools and backed up toilets. But we must remind you that Kualoa cannot be treated as just "another park" – it's cultural significance is too great. You must understand that we have to look at any proposal for improvement with a critical eye and weigh it's value against the potential disturbance or destruction of cultural material.

It is obvious from this report that there has been a decision made not just to look at emergency work to the existing waste water system, but to design it in such a way as to tie into a certain type of centralized wastewater system. In doing so a pre-determined location had to be selected and it is in an area that has not had extensive archaeological work done. Through out the years we have been continuously surprised by where significant archaeological finds have been discovered. Such was the case of the burials found in the tree farm area. In proceeding with any park improvement work at Kualoa we should investigate thoroughly all alternatives. Always choosing the least invasive path. In your report it is not clear what alternatives you investigated and what if any the rationale for rejecting them.

In your report you note that a centralized septic system is only an interim solution and that a centralized aerobic system is eventually needed. Also that the centralized aerobic system would need another EA/EIS because there is a need for significantly more archaeological investigation in the desired site for a centralized aerobic treatment plant. Our vision for the park is to keep it natural, with large areas unobstructed and to minimize, whenever possible, invasive measures needing to be taken. The area you identified for the future treatment plant in the draft Master Plan is designated as Multi-Purpose Open Space – intended as a transition area leading into interpretive theme areas and an outdoor stage, which in our opinion is in keeping with the cultural significance of the area.

The Kualoa Master Plan was never finished. The committee stop work until a requested ethnography could be done of the area. When ethnography is completed it is the intent of the committee to re-convene to complete it's work. I would like to point out that during our planning meetings the option of a treatment facility was "deemed unfeasible . . . Further, the noxious odors and visual impact of such a facility would be a major detriment to the planning goals and objectives of Kualoa."

As pointed out at your presentation to the Kahalu'u Neighborhood Board on February 9, 2000, your report does not fully explain the wastewater disposal alternatives you explored and why you would recommend against them. Also, it was recommended that you include the draft master plan of the park with this system overlaid, so that it is clearer where the system would be placed in relation to our proposed plans. Your report also did not adequately explained (because it wasn't explored?) an alternate plan should the work of this project uncover sensitive cultural material forcing you to redesign and/or relocate the system. It is my understanding that you are to the address the above concerns in writing and that you would extend the deadline for comments until people have a chance to review this new material.

As of this date I have not received this material. Today was the original deadline for comments on your draft. Because the community has not had the opportunity to review the requested new information, I do not feel this draft EA should be accepted. Also the Kualoa Master Plan and Advisory Council strongly recommends that an archaeologist be on site at all time during the construction phase. Kualoa Park needs more than just monitoring services. As stated in our first paragraph, Kualoa cannot be treated as just "another park" – it's cultural significance is too great.

Sincerely,

Gloria Fraiola
Kualoa Park Advisory Council/
Master Plan Committee

cc: Ms. Genevieve Salmonson – Office of environmental Quality Control
Jeffrey Overton – Group 70 International
Linda Fujihara, Kualoa Regional Park
Wilfred Ho, District IV

DEPARTMENT OF DESIGN AND CONSTRUCTION

CITY AND COUNTY OF HONOLULU

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JEREMY HARRIS
MAYOR

GARY Q. L. YEE, AIA
DIRECTOR

ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

DCP 2000-331

May 11, 2000

Ms. Gloria Fraiola
Kualoa Park Advisory Council
c/o 47-200 Waihee Road
Kaneohe, HI 96744

Dear Ms. Fraiola:

Subject: Centralized Wastewater System for Kualoa Regional Park
Responses to Comments on the Draft Environmental Assessment

Thank you for providing your comments on the Draft EA for the Centralized Wastewater System at Kualoa Regional Park. We have prepared the following responses to issues raised in your letter of February 23, 2000.

The decision to connect the comfort stations to a centralized wastewater system was based on many factors, including environmental suitability and archaeological resource conditions. The area selected for the centralized system was determined based on extensive archaeological investigations. It is recognized that there will always be the potential to uncover unknown remains in any significant excavation work in Kualoa, however, the selected location represents an area with some of the least potential for encountering significant subsurface remains.

Future requirements for an aerobic treatment system will require its own environmental documentation prior to construction. Thank you for alerting us about the potential conflict with the preliminary location for the aerobic facility. With future master planning work ahead, the location of the aerobic facility can be sited in a compatible location in the general area of the disposal field.

As requested, the additional discussion of alternative plans is included in the Final EA. We have also prepared an overlay of the draft master plan for the park with the wastewater facilities layout.

Archaeological monitoring will be conducted in accordance with the monitoring plan approved in March 1999, and subsequent revisions offered in your most recent letter. Therefore, the proposed project will have no adverse effect on significant historic sites.

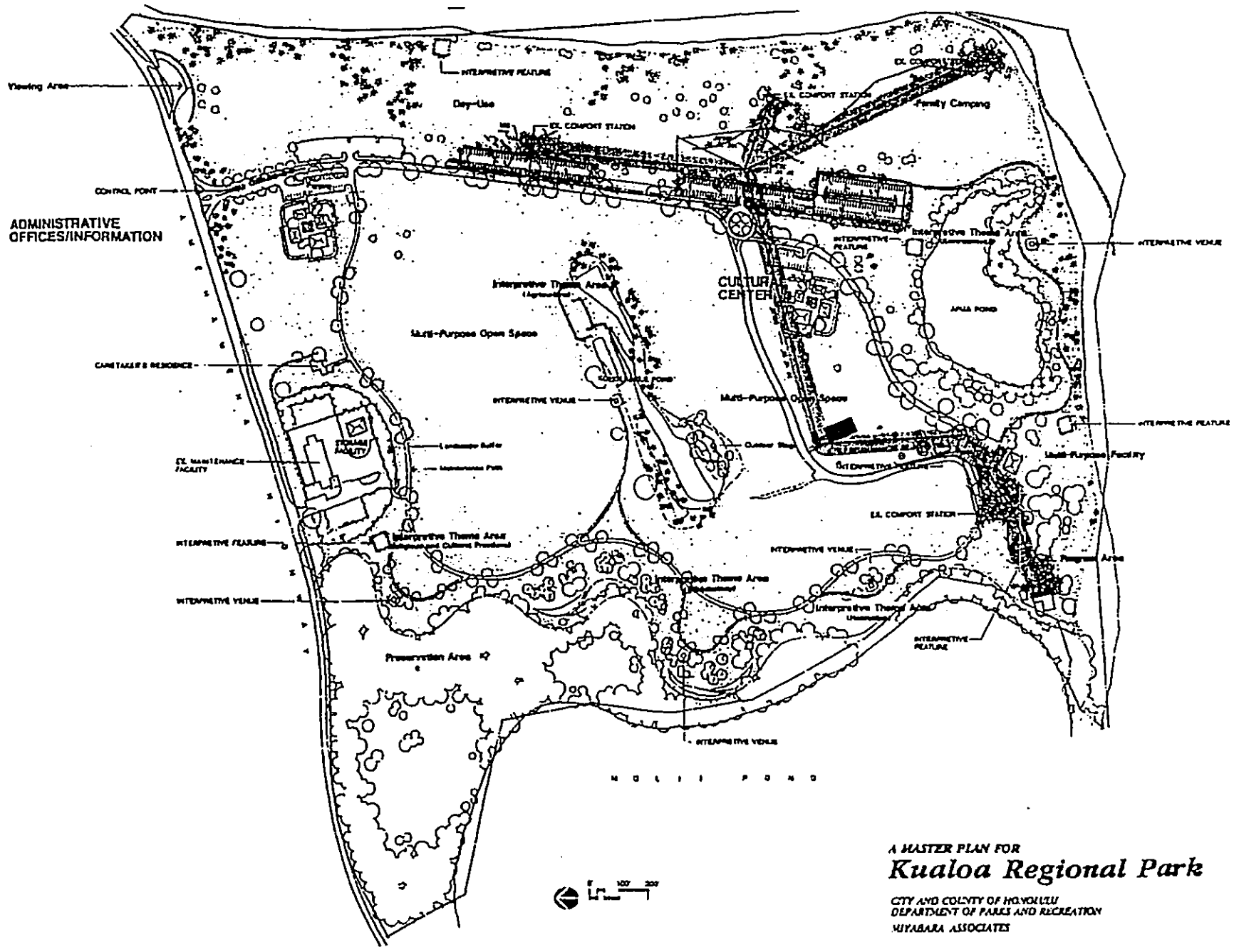
Under the approved monitoring plan, monitoring of excavations in the East Beach area will be limited to work exceeding 18 inches in depth. The Central Area is extensively disturbed and generally devoid of resources, therefore limited monitoring is required per the plan revisions. All ground disturbance in the Southwest Area of the park will be monitored. Please refer to the

updated monitoring and mitigation plan attached as an appendix to the Final EA. and the letters from the SHPD and Office of Hawaiian Affairs stating their concurrence with the proposed monitoring and mitigation procedures.

Thank you again for providing your comments on the Draft EA. If you have further questions or comments, please call Robert Miyasaki of the Division of Planning and Programming at 527-5159.

Sincerely,

FOR GARY Q. L. YEE, AIA
Director



Centralized Wastewater System at Kualoa Regional Park

Preliminary Master Plan Overlay

Figure 7

University of Hawai'i at Mānoa

Environmental Center
A Unit of Water Resources Research Center
2550 Campus Road • Crawford 317 • Honolulu, Hawai'i 96822
Telephone: (808) 956-7361 • Facsimile: (808) 956-3980

February 18, 2000
EA: 00195

City and County of Honolulu
Department of Design and Construction
650 South King Street, 14th Floor
Honolulu, Hawaii 96813
Attn: Robert Miyasaki

Dear Mr. Miyasaki:

Draft Environmental Assessment
Kauloa Regional Park Centralized Wastewater System
Ko'olau Poko District, Oahu

The City and County of Honolulu Department of Design and Construction is proposing to conduct emergency repair and upgrade of the existing wastewater systems which frequently clog and overflow, sometimes necessitating closure of park areas. The purpose of this project is to protect public and environmental health while maintaining continued park usage until proper planning, archaeological studies and monies can be appropriated to implement a preferred central aerobic system.

This review was completed with the assistance of James Bayman, Anthropology; and Sherri Hiraoka, Environmental Center.

Archaeological and Cultural Resources

Our reviewers appreciated the Draft EA's recognition of the high cultural and archaeological sensitivity of the Kualoa area and approve of the measures that are proposed to protect any previously unidentified sites that may be uncovered. We suggest that in addition to the measures mentioned in the document on page 3-6, that all subsurface excavations be archaeologically monitored, regardless of depth. This is based on the reasonable possibility that burials (albeit potentially disturbed or secondarily deposited) could be encountered during subsurface excavations associated with this project. By increasing monitoring, human remains may be properly identified and evaluated within the framework of historic preservation regulations and cultural protocol.

Geology and Hydrology

The Draft EA states on page 3-2 that there is "no potential for leached effluent to reach [a] potable drinking water aquifer." Is there a possibility that the effluent may reach nearshore waters and ponds? If this were to happen, how will it affect water recreation and wildlife in the area, such as the birds seen along the shoreline?

Disposal System Alternatives

Our reviewers felt that the water reuse for irrigation alternative was a good idea, especially to conserve potable water which is currently used. It was not clear why this alternative was not adopted. At the very least, the irrigation alternative could be used in conjunction with the leaching fields to reduce the levels of effluent dispersed through the leaching and to reduce potable water use for irrigation.

Thank you for the opportunity to comment on this permit application.

Sincerely,

Peter Rappa
Assistant Environmental Coordinator

cc: Group 70 International, Inc.
OEQC
James Moncur
James Bayman
Sherri Hiraoka

DEPARTMENT OF DESIGN AND CONSTRUCTION

CITY AND COUNTY OF HONOLULU

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ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

DCP 2000-327

May 11, 2000

Mr. Peter Rappa
Assistant Environmental Coordinator
University of Hawai'i at Mānoa
Environmental Center
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

Dear Mr. Rappa:

Subject: Centralized Wastewater System for Kualoa Regional Park
Responses to Comments on the Draft Environmental Assessment

Thank you for providing your comments on the Draft EA for the Centralized Wastewater System at Kualoa Regional Park. We have prepared the following responses to issues raised in your letter of February 18, 2000.

Archaeological and Cultural Resources. Construction activities will be conducted following the DLNR- approved archaeological monitoring plan, which does not require monitoring of shallow (18 in.) excavations except in the most sensitive southwest area of the park. Procedures are established for proper identification and evaluation of remains if encountered at any point in the construction process. The new facilities are located where there is documentation of disturbed ground from previous agriculture and military activities, and few artifacts are expected to be found. Please refer to the updated monitoring and mitigation plan attached as an appendix to the Final EA, and the letters from the SHPD and Office of Hawaiian Affairs stating their concurrence with the proposed monitoring and mitigation procedures.

Geology and Hydrology. Treated effluent disposed in the absorption bed system at the new centralized wastewater treatment and disposal facility will leach into the shallow groundwater. There is no connection with the potable drinking water aquifer at this location. The individual wastewater system is approved by the State of Hawaii Department of Health, and is not anticipated to cause adverse effects to the quality of the shallow groundwater, potable aquifer, nearby ponds or nearshore ocean waters. There is no likelihood of untreated or inadequately treated effluent reaching these waters, and it will not adversely affect recreation and wildlife in the area. Effluent treatment levels expected to result from the septic tank system will be adequate to meet individual wastewater system standards, and far better than the current condition.

Disposal System Alternatives. There is an expanded evaluation of alternatives to the proposed action of the centralized treatment system provided in the Final EA. The evaluation of an aerobic system at the proposed location of the septic tank system was considered, and it was deemed to be less feasible due to its higher near-term costs. The aerobic system will not become necessary until the park usage is increased significantly beyond the current levels, therefore, it is relevant to the long-term plans for park improvements but not emergency repairs.

The reuse of effluent was considered but could not be a reliable single solution during rainy periods. A reuse system at this Oahu location would require back-up subsurface disposal or effluent storage during rainy periods. The creation of a dual system for disposal (reuse and subsurface systems) would be cost prohibitive for this emergency repair project. It was found that there would be extensive and costly retrofit requirements for this solution, and it would also require additional staff. Reuse may, however, be a possibility as part of the long-term disposal plan at this location.

Thank you again for providing your comments on the Draft EA. If you have further questions or comments, please call Robert Miyasaki of the Division of Planning and Programming at 527-5159.

Sincerely,

FOR GARY G. L. YEE, AIA
Director

References

APPENDIX A - REFERENCES

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Kualoa Regional Park Beach Erosion Control, Environmental Impact Statement Preparation Notice, Prepared by Oceanit Laboratories, Inc.

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Archaeological Assessment for Reconstruction of Wastewater Systems at Kualoa Regional Park, Kualoa ahupua'a, Ko'olau Poko O'ahu, Hawai'i. Prepared for Engineering Solutions, Inc.

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Reconstruction of Wastewater Systems at Kualoa Regional Park, Preliminary Engineering Report, Prepared for the Department of Design and Construction, City and County of Honolulu.

Federal Emergency Management Agency. September 4, 1987
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University of Hawaii, Department of Geography. 1983.
Atlas of Hawaii, Second Edition.

Appendix A

Letters from the State Historic Preservation Division and State Office of Hawaiian Affairs

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

April 26, 2000

David W. Shideler, M.A.
Cultural Surveys Hawai`i
733 N. Kalaheo Avenue
Kailua, Hawai`i 96734

EIS# 359

Subject: Draft Kualoa Regional Park Archaeological Monitoring Plan

Dear Mr. Shideler:

This is in response to your request for preliminary comments on your proposed draft *Archaeological Monitoring Plan for Reconstruction of Wastewater Systems at Kualoa* Regional Park, Kualoa Ahupua`a, Ko`olaupoko, O`ahu, Hawai`i.

Based on an initial review of your proposal by members of our Hawaiian Rights Division with expertise in environmental assessments, cultural affairs and inter-agency consultations, your draft was found to be an acceptable approach incorporating reasonably conservative protective assumptions in light of the cultural sensitivity of the site. For this reason, we have no comments or suggestions for further improvement at this juncture. If you have any questions, please contact Sebastian Aloot at 594-1850.

Sincerely,

Colin C. Kippen, Jr.
Deputy Administrator

cc: Board of Trustees
OEQC
SHPD

From: Sebastian Aloot <saloot@oha.org>
To: csh@dps.net <csh@dps.net>
Date: Wednesday, April 26, 2000 12:10 PM
Subject: Re: Kualoa Monitoring Plan

Mr. Shideler:

After reviewing your plan and consulting with both our Cultural Officer and Lynn Lee, I am preparing a written response officially advising you that OHA has no comments at this time regarding your proposed cultural monitoring plan. I found the plan straightforward, understandable and, given the sensitivity of the site, acceptably conservative in its protective approach.

Given your short time frame, I though you would appreciate an early response.

C. Sebastian Aloot

>>> "Administration" <csh@dps.net> 04/25/00 11:50AM >>>
Aloha Sebastian Aloot,

Enclosed please find a copy of the Kualoa monitoring plan for your review.

Mahalo,

David Shideler

4/27/00

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

February 22, 2000

Mr. Gary Q.L. Yee, Acting Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 2nd Floor
Honolulu, Hawaii 96813

LOG NO: 24835
DOC NO: 0002SC02

Dear Mr. Yee:

SUBJECT: **Chapter 6E-8 Historic Preservation Review of a Draft Environmental Assessment (DEA) for the Centralized Wastewater System at Kualoa Regional Park**
Kualoa, Ko'olaupoko, O'ahu
TMK: 4-9-004: 001 & 011

Thank you for the opportunity to comment on the DEA prepared for the planned centralized wastewater system at Kualoa Regional Park in Kualoa, O'ahu. Our review is based on historic reports, maps, and aerial photographs maintained at the State Historic Preservation Division; no field inspection was made of the subject parcels.

Previously, as noted in the DEA (p. 3-6), we reviewed and approved for implementation an archaeological monitoring plan that called for on-site monitoring of all excavations that exceeded 18 inches in depth (Hibbard to Shideler, March 16, 1999, DOC NO: 9903SC10). Since our review of that document, further information regarding the location and likelihood of subsurface cultural deposits at Kualoa Regional Park has been provided to our office (*Archaeological Assessment for Reconstruction of Wastewater Systems at Kualoa Regional Park, Kualoa Ahupua'a, Ko'olaupoko, O'ahu [TMK: 4-9-04:01]*. 1999. Hammatt & Shideler). The subject assessment report subdivides the project area into the East Beach, Central, and Southwest study areas; these regions are shown in the document attached to the DEA. In view of the additional data supplied by the assessment, we would like to make the following, revised recommendations concerning the need for archaeological monitoring during the construction of a centralized wastewater system at Kualoa Regional Park:

East Beach: All subsurface excavations that exceed 18 inches in depth shall be monitored on-site by a qualified archaeologist.

Central: Since much of this region of the project site has been found to be extensively disturbed and devoid of archaeological resources, only limited archaeological monitoring is recommended. Specifically, a qualified archaeologist should conduct on-site monitoring of all subsurface excavations exceeding 18 inches in depth and within a distance of 62 meters (200 feet) of the main paved north/south access road, and within a distance of 62 meters (200 feet) of the southern dogleg of the gravel access road. On-site archaeological monitoring is NOT recommended in between these two areas on the south side of the access road. On the north side of the gravel access road, extending to the park headquarters, on-site archaeological monitoring of all excavations exceeding 18 inches in depth is required.

Southwest: All ground disturbance in this portion of the project area should be monitored on-site by a qualified archaeologist.

If these revised recommendations are followed, then we believe that the proposed centralized wastewater system improvements for Kualoa Regional Park will have "no adverse effect" on significant historic sites.

Should you have any questions, please feel free to call Sara Collins at 692-8026.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

SC:jk

Appendix B
Archaeological Assessment

ARCHAEOLOGICAL ASSESSMENT FOR RECONSTRUCTION OF WASTEWATER SYSTEMS AT KUALOA REGIONAL PARK, KUALOA *AHUPUA`A*, KO`OLAUPOKO, O`AHU, HAWAI`I (TMK 4-9-04:1)

PREPARED FOR

ENGINEERING SOLUTIONS INC.

BY

HALLETT H. HAMMATT, PH. D.

AND

DAVID W. SHIDELER, M. A.

CULTURAL SURVEYS HAWAI`I

OCTOBER, 1999

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I. INTRODUCTION

A. Scope of Work

Cultural Surveys Hawai`i was contracted by Engineering Solutions Inc. to prepare an archaeological assessment for the reconstruction of wastewater systems at Kualoa Regional Park (under the jurisdiction of City and County of Honolulu, Department of Parks and Recreation), located in the seaward portion of Kualoa *Ahupua`a*, Ko`olaupoko District, O`ahu (Figures 1-4). The proposed lay-out of wastewater infrastructure was worked out in consideration of known archaeological resources. The agreed upon scope of work was restricted to a literature search and was performed in order to:

(1) identify previously identified archaeological resources in the literature and maps

(2) determine their exact location compared to the present project areas

(3) assess the sensitivity of each of the project areas for containing unidentified archaeological sites

(4) determine the impact that the proposed activities would have on existing or potential archaeological resources in each area

(5) prepare a report on the results of this literature research which would be in the form of an archaeological assessment including a map of each of the project areas showing previously identified archaeological resources and identifying sensitive areas. The report was also to include recommendations for mitigation in each of the areas.

This scope does not include field work at this time. It was pointed out in the agreed upon scope of work that field work, possibly including subsurface testing for one or more of the areas, may be required at a later date depending on the evaluation of the State Historic Preservation Division which will comment on the project since Kualoa is on the National Register of Historic Places.

B. Overview of the Significance of Kualoa

The entire *ahupua`a* of Kualoa was placed on the State and National Registers of Historic Places in 1973 (bearing state site number 50-80-06-528). The register forms assert that Kualoa was considered one of the two most sacred places on the island of O`ahu (along with Kukaniloko). The register forms focus on Kualoa's import as a symbol of sovereignty and independence for O`ahu, its role as a place of refuge, its role as a place where sacrificial victims for religious rituals were drowned, and its history as a sacred residence of chiefs. Kualoa is also significant in Hawaiian folklore and mythology including traditions of Papa and Wākea, Hāloa, Pele, Hi`iaka, Kamapua`a and *mo`o* (lizard dragons). Kualoa is also significant in its association with historic personages in the Judd and Wilder families and for its role in the early history of sugar production on O`ahu.

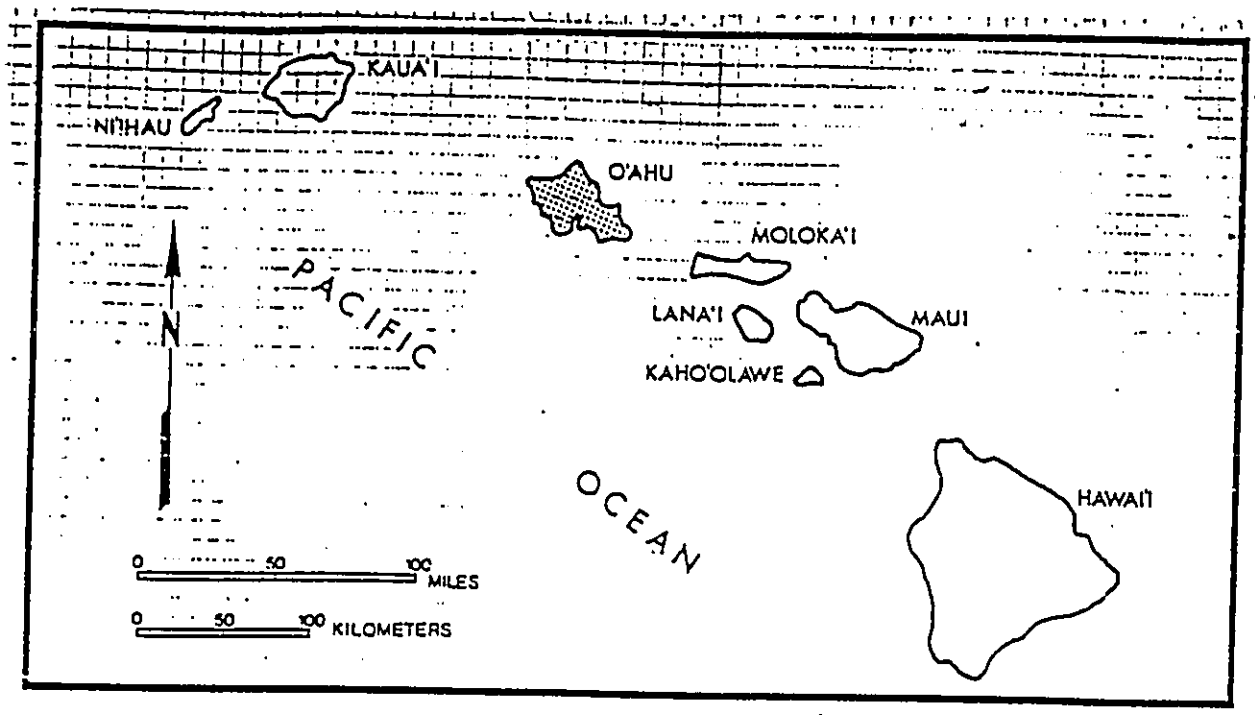


Fig. 1 State of Hawai'i

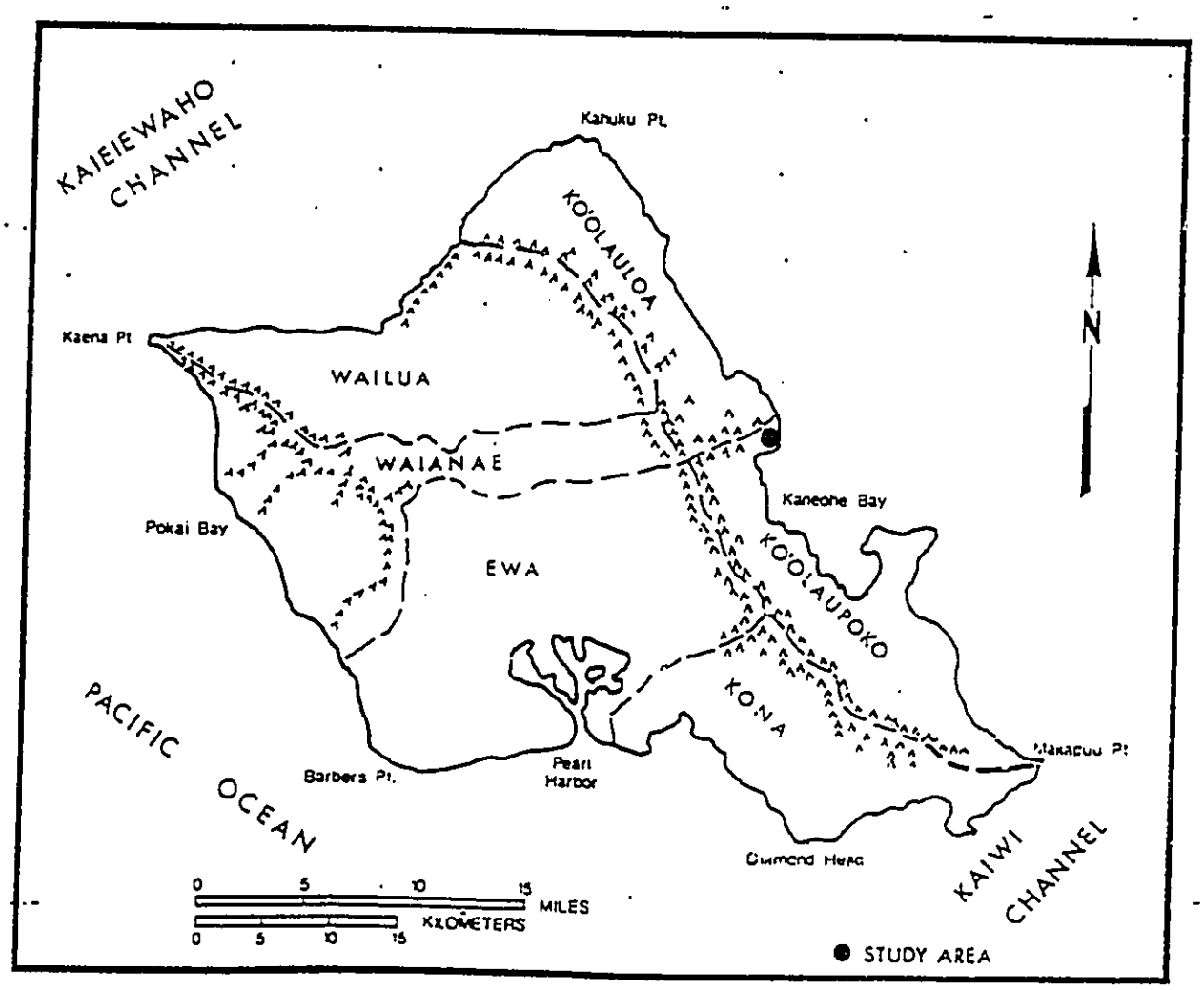


Fig. 2 O'ahu Island Location Map

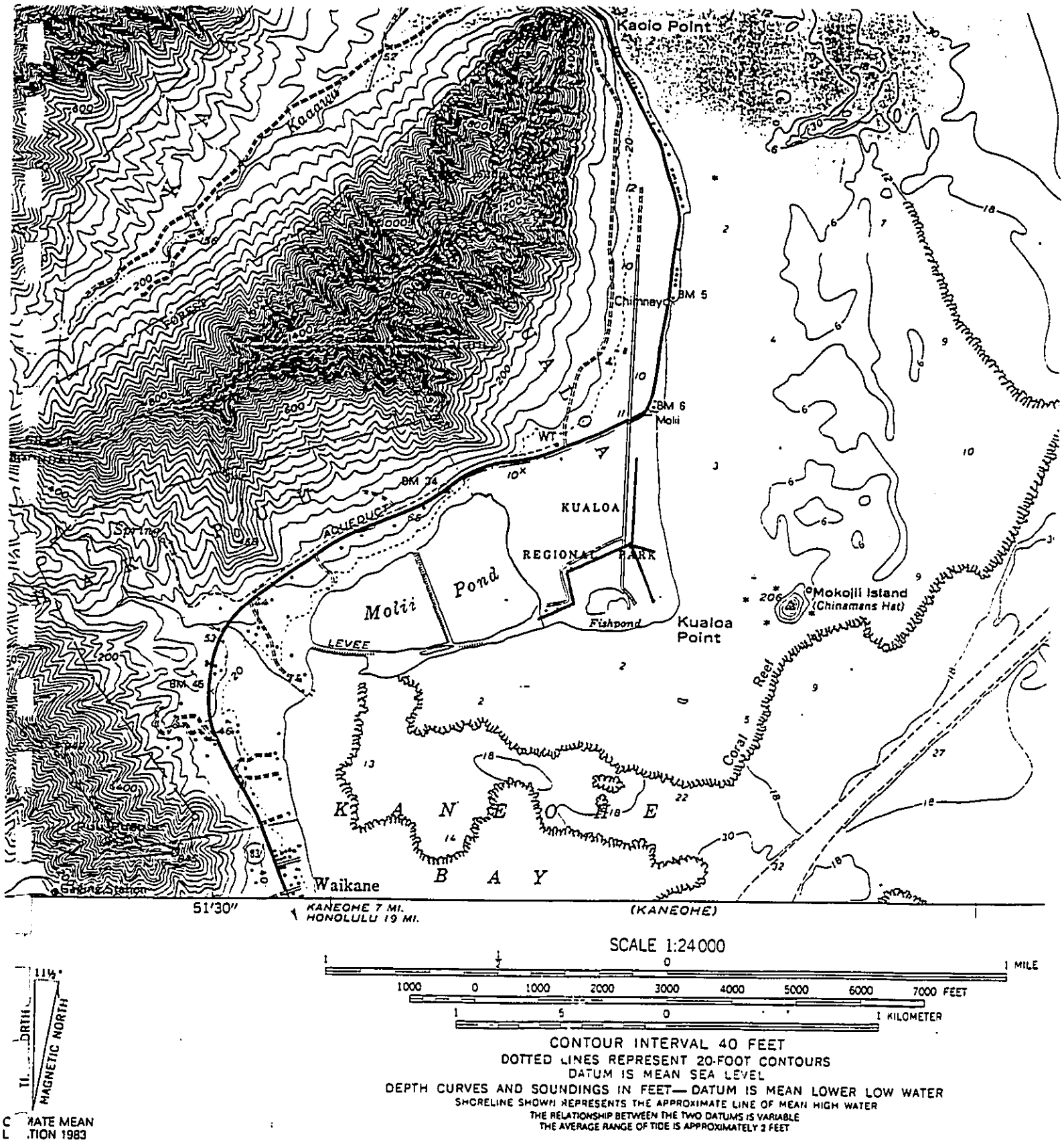


Figure 3 Portion of the USGS 7.5 Minute Series, Kahana Quad Map Showing Location of Project Area

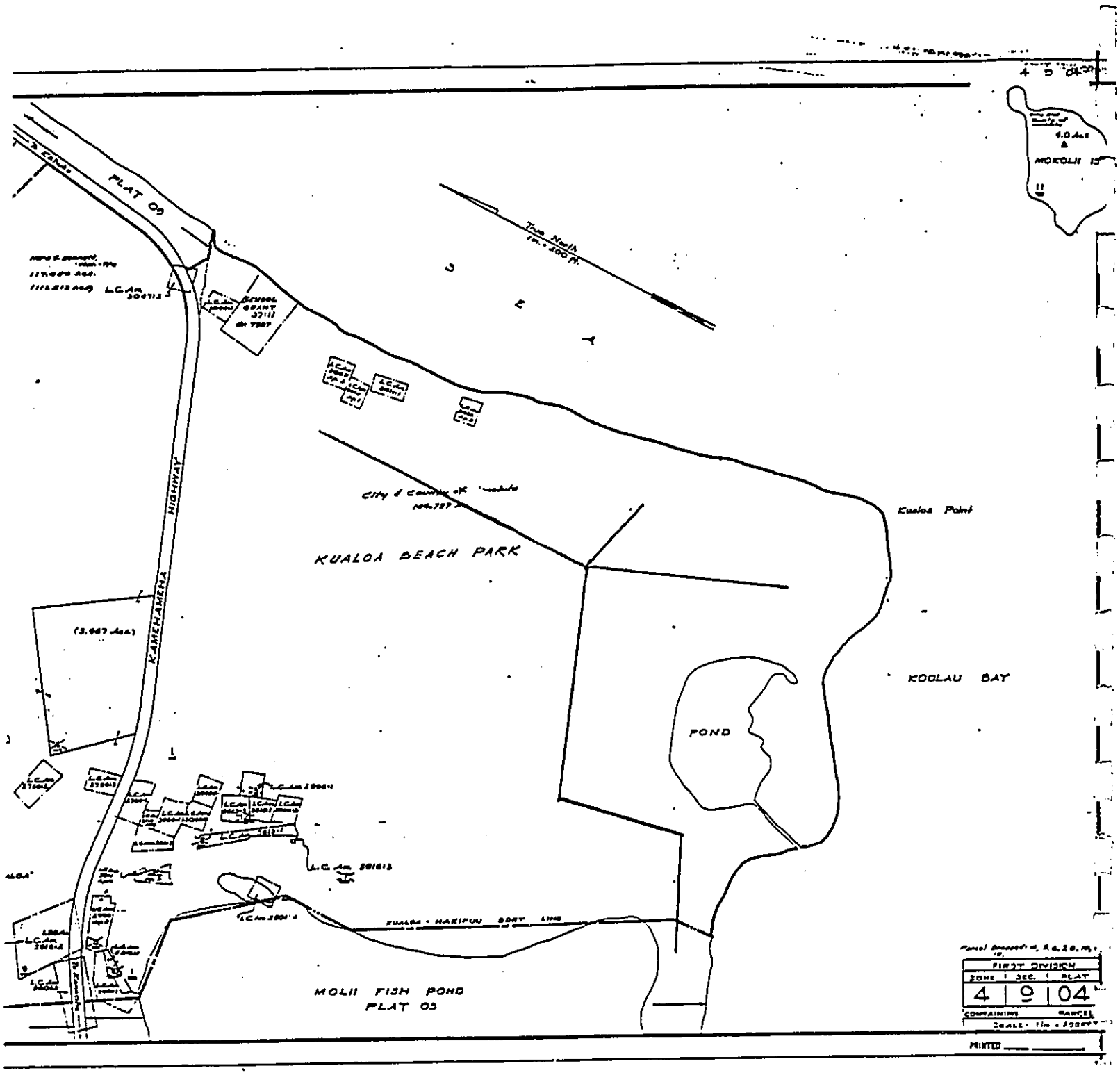


Figure 4 Tax Map Key (TMK) 4-9-04 showing location of project area

Nearly a hundred burials have been reported from Kualoa and thus it must also be considered to be a significant Hawaiian burial ground. Many of these burials have been reported from close to the present study areas. Kualoa has received over fifty archaeological studies.

C. Overview of Study Areas Covered in the Present Assessment

Engineering Solutions Inc. asked CSH to prepare an archaeological assessment for a specific site plan. This specific site plan was developed in consultation with CSH and Park staff in order to minimize adverse impact to archaeological resources. The plan includes sewer lines connecting all four of the existing comfort stations, the existing administration building, the caretaker's cottage and the food service building to a centralized treatment plant and absorption field lay-out. In the present plan, a straight sewer line connects each of the three comfort stations along East Beach with a collector sewer line at a point just east of the roundabout. The collector line then runs straight in a southwesterly direction to the treatment plant and absorption field located near the northern dogleg of the access road to south beach and the administration building. Another collector sewer line roughly parallels the south and east sides of the access road connecting the administration building to the centralized treatment plant and absorption field lay-out with very short spur lines connecting the caretaker's cottage, the park offices comfort station, and the food service building to this southwestern collector line. Approximately five pump stations are placed along the route but these are understood as quite small in area. Because this project traverses so much of the park it seemed appropriate to evaluate the archaeological concerns for different portions of the infrastructure alignment. To minimize confusion, these areas will be referred to in this document as "study areas" in order to keep them separate from previously designated "archaeological survey areas".

Different and conflicting numbering systems have been used to designate the extant bathhouse/comfort stations (with the same structure being assigned different numbers). To minimize confusion, the four modern comfort station structures in question will be referred to by geographic designations as: "northernmost comfort station" (conforming to ESI designated "bathhouse/comfort station #1"), "central east beach comfort station"(conforming to ESI designated "bathhouse /comfort station #2"), "`Āpua Point comfort station" (conforming to ESI designated "bathhouse /comfort station #3") and "park offices comfort station" (conforming to ESI designated "bathhouse /comfort station #4"). The "historic bathhouse" built of lava rock in 1916 (presently in a ruined state) and located in the park offices area will be referred to as the "historic bathhouse".

Specific portions of the route will be discussed in terms of the following study areas:

A. The east beach study area including the sewer lines connecting the northernmost comfort station, the central east beach comfort station, and the `Āpua Point comfort station to the collector sewer line,

B. The central study area including the collector sewer line from the three east beach comfort stations to the treatment plant and absorption field, the area of the treatment plant and absorption field and the collector line from the administration building to the treatment plant and absorption field, and

C. The southwestern study area in the vicinity of the kitchen and administration building.

II. REVIEW OF THE STUDY AREAS

A. East Beach Study Area (Figure 5)

Introduction

The presently proposed plans connect the sewer line from the three east beach comfort stations to a main collector line (Figure 5). The northern leg begins at the northern side of the northernmost comfort station, runs a very short distance (a few meters) north, swings around the west side of the comfort station, and then runs south for approximately 229 m to the collector sewer line junction. The eastern leg connects with the northern side of the central east beach comfort station and then runs west for approximately 80 m to the collector sewer line junction. The southern leg exits the north side of the Āpua Point comfort station and then runs north west for approximately 275 m to the collector sewer line junction.

The study area for these sewer line segments falls in three previously designated (Gunness 1987a, b) archaeological survey areas ""2A" "2B" and "2E" (see appendix). A brief summary of the archaeological data pertaining to the east beach segments of the proposed sewer line is presented below with the location of excavations in the vicinity of the proposed sewer alignment shown in Figure 5.

Overview of Previous Archaeological Studies in the Vicinity

Area 2 A

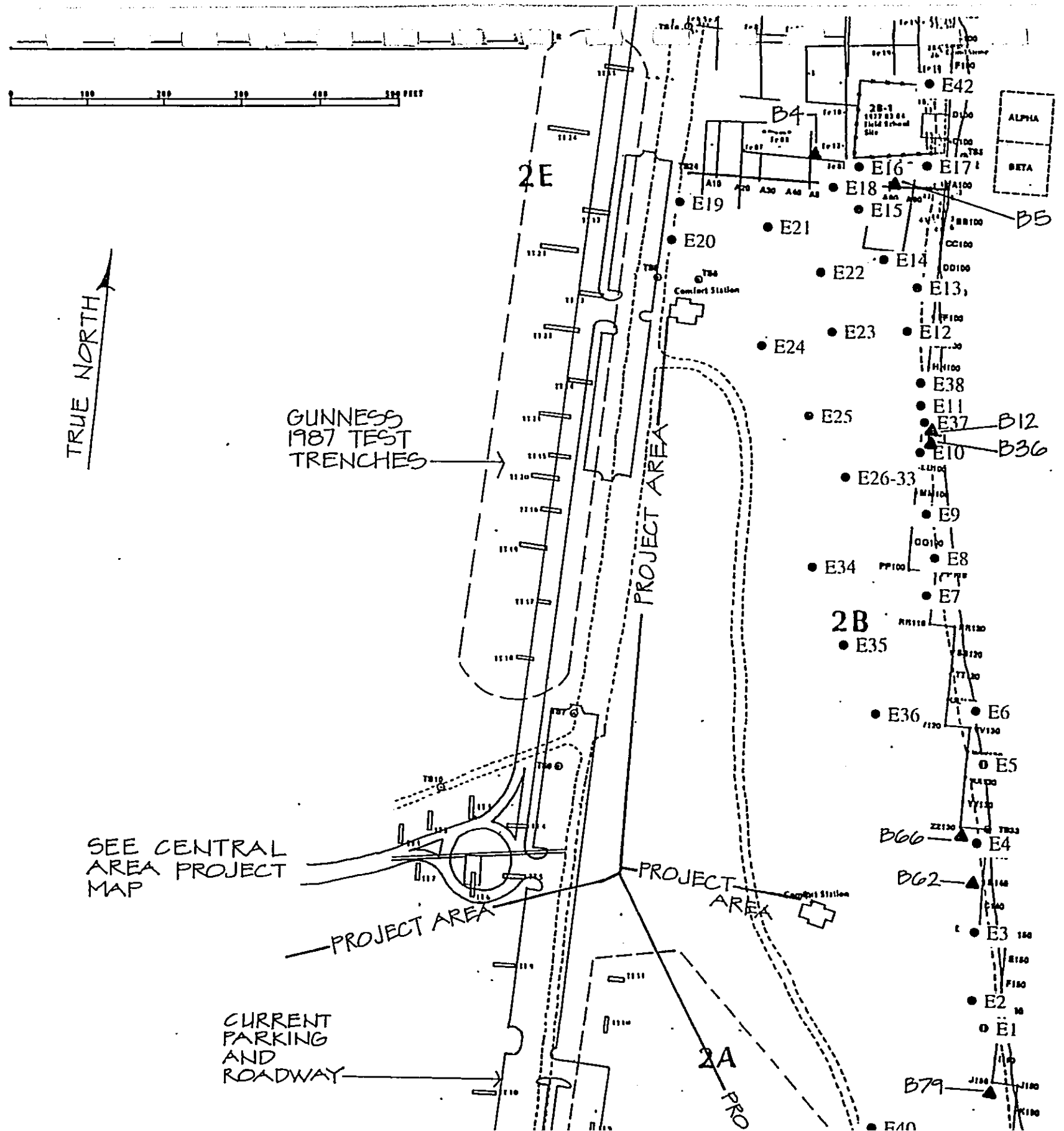
Gunness (1986:10) discusses the area located just west of an imaginary line connecting the Central East Beach and `Āpua Point Comfort Stations (presently known as archaeological survey area 2A, but which Gunness in 1986 called "Area 3") as follows:

> In 1978 one test pit and ten test trenches were excavated in and around Area 3 [Archaeological Survey Area 2A], in preparation for a later abandoned beach erosion control project. It was found that historic activities in this area had completely destroyed any archaeological remains that may have once been present. This area has since been completely bulldozed and modified on two separate occasions, first in the construction of settling basins for the abandoned erosion control project [circa 1978]; and again in early 1985 by extensive grubbing and grading during park improvement activities.

For Area 2A, Gunness (1987b:5, map) concluded that: "No further archaeological work is necessary here."

Area 2B (Figure 5)

Survey area 2B runs along the coastal portion of east beach. The eastern-most portion of the east beach sewer lines lie in this survey area. Archaeological studies in survey area 2B have largely focused on the vicinity of the "field school site (2B-1)" just to the northwest of the


TRUE NORTH
GUNNESS
1987 TEST
TRENCHES
2E
PROJECT AREA
B4
B5
E42
E16
E17
E18
E19
E15
E21
E20
E14
E22
E13
E23
E12
E24
E38
E11
E25
E37
B12
B36
E10
E26-33
E9
E34
E8
E7
2B
E35
E36
E6
E5
B66
E4
B62
E3
E2
E1
B79
E40
2A
SEE CENTRAL
AREA PROJECT
MAP
PROJECT AREA
CURRENT
PARKING
AND
ROADWAY
ALPHA
BETA
Comfort Station

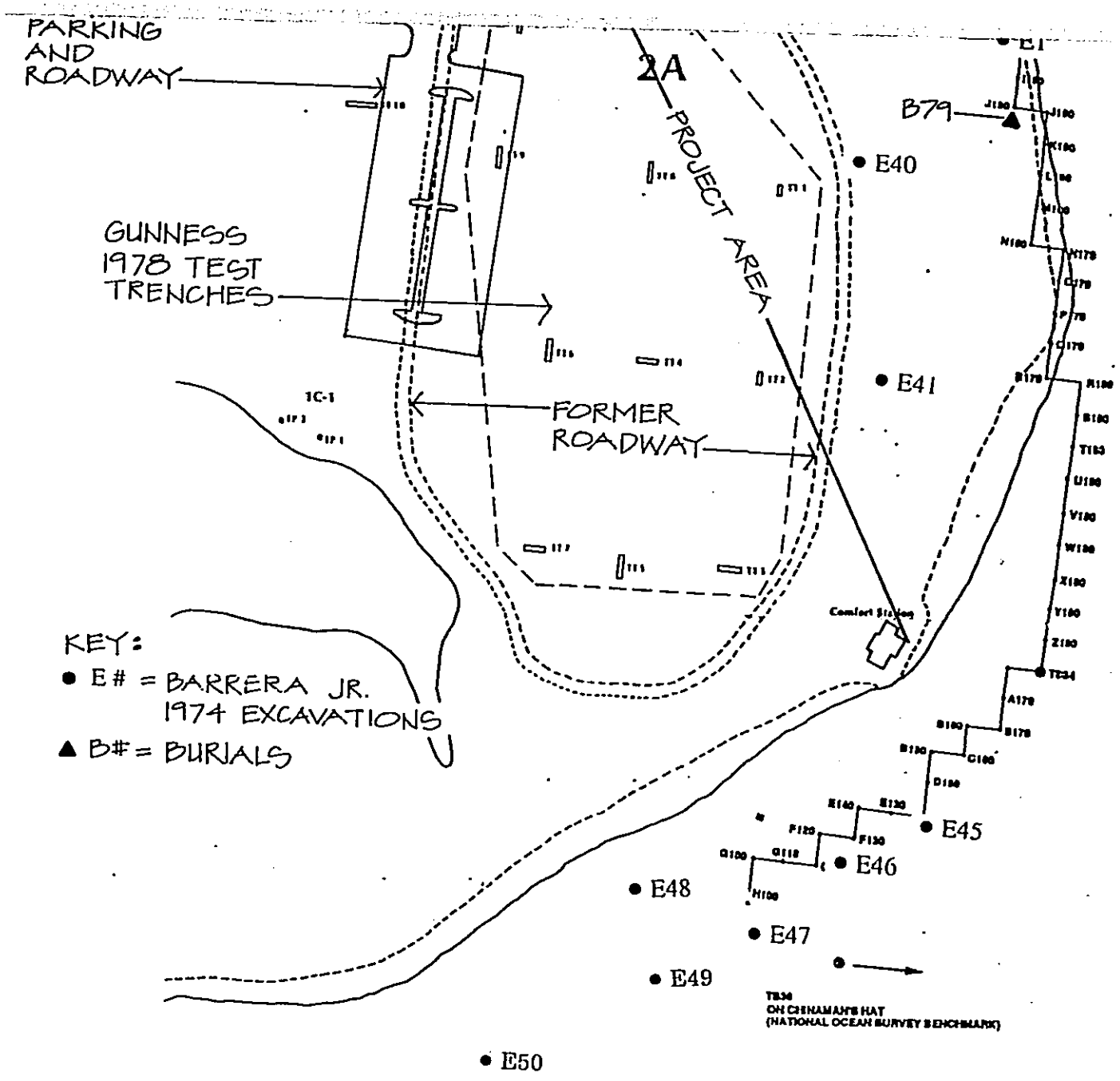


Figure 5 Map of East Beach Showing Location of Proposed Wastewater Infrastructure and Locations of Previous Archaeological Studies

northernmost comfort station and along the coast where erosion has brought to light numerous burials and other finds. This summary will focus on the studies nearest the proposed sewer alignments.

Barrerra (1974) carried out excavations just to the north and east of the proposed east beach sewer lines. His closest trenches to the north leg (trenches 19, 20, 21, 24, 25 and 34) encountered no cultural deposits. None of Barrera's 1974 excavations were excavated within 50 m of the east leg of the proposed sewer line. None of his closest units to the east leg (1-5, 36, 40) appear to have produced anything notable at all (detailed stratigraphy is not reported). Only units 40 and 41 were near the southern leg and they appear to have produced nothing notable.

The vast majority of burials documented at Kualoa have been recovered from just north of the northernmost comfort station along the coast. Only five burials (burial numbers 12, 36, 62, 66 and 79) have been recovered from due east of the proposed east beach sewer lines.

Relatively little subsurface work has been carried out in area 2B back from the beach. Barrera's excavation units 26-33 (80 m east of the north leg sewer alignment) did locate "an *extremely high density of pits and post holes*" (Barrera 1974:5) which were interpreted as the foundation of an oval or round house. A basalt rock and coral alignment associated with four post molds (Feature 88, located 80 m north east of the northernmost bathhouse) was identified during monitoring by the Kualoa Archaeological Research Program staff (Gunness 1987:144, 147) and may well represent another house foundation.

Gunness (1987:5, map) concluded regarding area 2B that "even fairly shallow subsurface disturbance back from the beach, such as excavation for irrigation lines, or holes to plant trees, may disturb burials; therefore archaeological monitoring of all such activities is recommended."

Cleghorn carried out archaeological monitoring at parking lot 3 by the central east beach comfort station in 1996. While no cultural material was observed, excavations were very modest and only to a depth of 33 cm or so. Cleghorn (1996:22) recommended that any excavations deeper than ca. 18 inches should be archaeologically monitored

Area 2 E

Gunness (1986:23-30; 1987a:166) excavated 28 backhoe test trenches (Test trenches TT 1 -TT 28) to the west of the north leg of the proposed east beach sewer line (in an area she called "Area 2" but which is now known as archaeological survey area "2E") prior to the commencement of road construction in 1986. This testing showed that the eastern portion of this series of trenches cut through the west edge of the airstrip construction of 1942. As much as a meter of soil was graded away during construction of the airstrip, removing virtually all archaeological material that may have been present in the area under the airstrip. Typically the eastern portion of these trenches showed culturally sterile sand immediately overlain by coral fill. Any cultural deposits that may have been extant were understood as having been scraped away during airstrip construction. In three of these more eastern trenches, excavation

revealed "the very base of truncated features...underlying the coral fill" but the features were thought to be historic (Gunness, 1986: 23). The remainder of the (eastern) test trenches were culturally sterile.

The Gunness test trenches of most interest are those closest to the proposed north leg of the east beach sewer line numbered TT 13 and TT14 (just west of the northernmost comfort station). Gunness (1986:23) relates that test trenches 13 and 14 cut across the embankment at the west edge of the airstrip. In theory then, the massive grading for the airstrip should extend approximately 150 feet (the width of the strip) east of the middle of these trenches to just about the north leg alignment. Gunness (1987b:5, map) concluded that "no further archaeological work is necessary" in Survey Area 2E.

However, Paul Cleghorn (1996:6) monitored approximately 11.1 square meters of excavation for a drinking fountain and dry well between the parking lot (Lot 2) and the northernmost comfort station and identified a layer (II) from 60-70 cm. depth with cultural material "probably prehistoric in age." Cleghorn (1996:22) concluded that:

> the *in situ* sandy loam soil does in fact have the potential of containing intact subsurface cultural features — *post holes, midden, and volcanic glass were* found in the drinking fountain/ dry well excavations. It appears that the area adjacent to the east beach, extending from the shore to the park road, continues to have a high potential of containing intact subsurface features...any excavations deeper than ca. 18 inches should be archaeologically monitored.

Summary Evaluation of East Beach Study Area

Recommendations by previous archaeologists are sometimes contradictory. Gunness' recommendations often change over time. In Survey area 2A, Gunness (1987b:5, map) recommended: "No further archaeological work is necessary here." Gunness (1986:55-56) did not, however, write this area off the previous year when she asserted:

> Area 3 [Archaeological Survey area 2A] has been completely disturbed on several occasions in the historic past, apparently leaving no intact archaeological deposits. It is unlikely that development in this area will have an impact on archaeological materials; however, there is still the possibility that unexpected human burials could be discovered during trenching activities here. Archaeological monitoring is therefore recommended during that phase of development.

For Survey area 2B, Gunness (1987b:5, map) recommended that:

> This whole area was used prehistorically as a burial ground...even fairly shallow subsurface disturbance back from the beach, such as excavation for irrigation lines, or holes to plant trees, may disturb burials; therefore archaeological monitoring of all such activities is recommended.

Certainly Gunness is correct in pointing out the abundance of burials in the vicinity as 17 or so burials have been encountered within a radius of 100 m to the east of the northernmost comfort station. Most of these burials have been exposed by sea erosion along a narrow coastal strip but the location of burials numbered 4 & 5 (see figure 5) show that the burials extend back from the coast as well.

Gunness (1987b:5, map) recommended that "No further archaeological work is necessary" for Survey area 2E. The Gunness trenches indicate that the width of the WWII airstrip (150' wide) ran basically from the northernmost comfort station to the west side of the main access road and that any archaeological resources extant here were scraped away in 1942. Gunness (1986:54-55) did not, however, write this area off the previous year. She asserts:

> The area was graded to such an extent during construction of the airstrip that even human remains, that may have been buried at some depth, are probably no longer present here. However, a possibility still remains that scattered features and artifacts could turn up during construction activities...For this reason, it is recommended that archaeological monitoring be done during any subsurface disturbing activities.

The findings of Cleghorn (1996) suggest that a thin (10 cm thick) prehistoric layer may be at least intermittently present in the area immediately west of the northernmost comfort station. Paul Cleghorn (1996:6) disagreed somewhat with Gunness' (1987) conclusions recommending that...any excavations deeper than ca. 18 inches should be archaeologically monitored.

Noting that relatively little archaeological work has been carried out in the immediate vicinity of the north and east legs of the east beach sewer lines we are inclined to follow Cleghorn's and Gunness' (1986) recommendations that all excavations in the east beach study area below 18 inches be monitored. There does not however appear to be cause for prior testing in this area.

B. <u>Central Study Area</u> (Figure 6)

Introduction

The presently proposed plans run the collector sewer line from the junction with the lines from the east beach comfort station approximately 295 m along the south side of the existing gravel road to a centralized treatment plant and absorption field (Figure 6). Another collector line runs northeast from the park headquarters area up the south and east sides of the existing gravel road extending approximately 165 m from the southern elbow of the park head quarters access road to the centralized treatment plant and absorption field.

The study area for this stretch of the line falls mostly in previously designated (Gunness 1987a, b) archaeological survey area ""1C". Present plans call for the placement of a portion of the treatment plant across the gravel road in archaeological survey area ""4C".

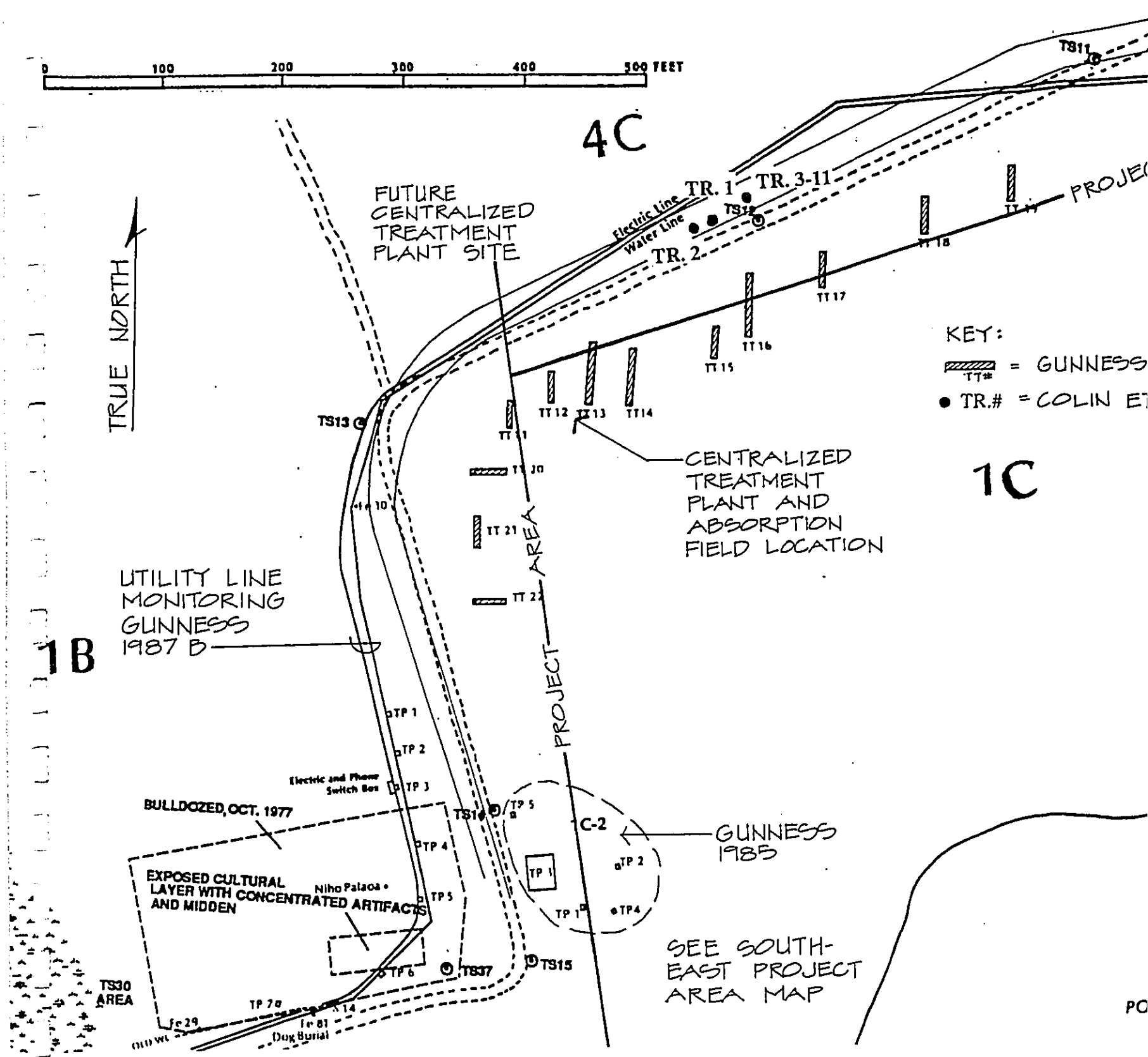
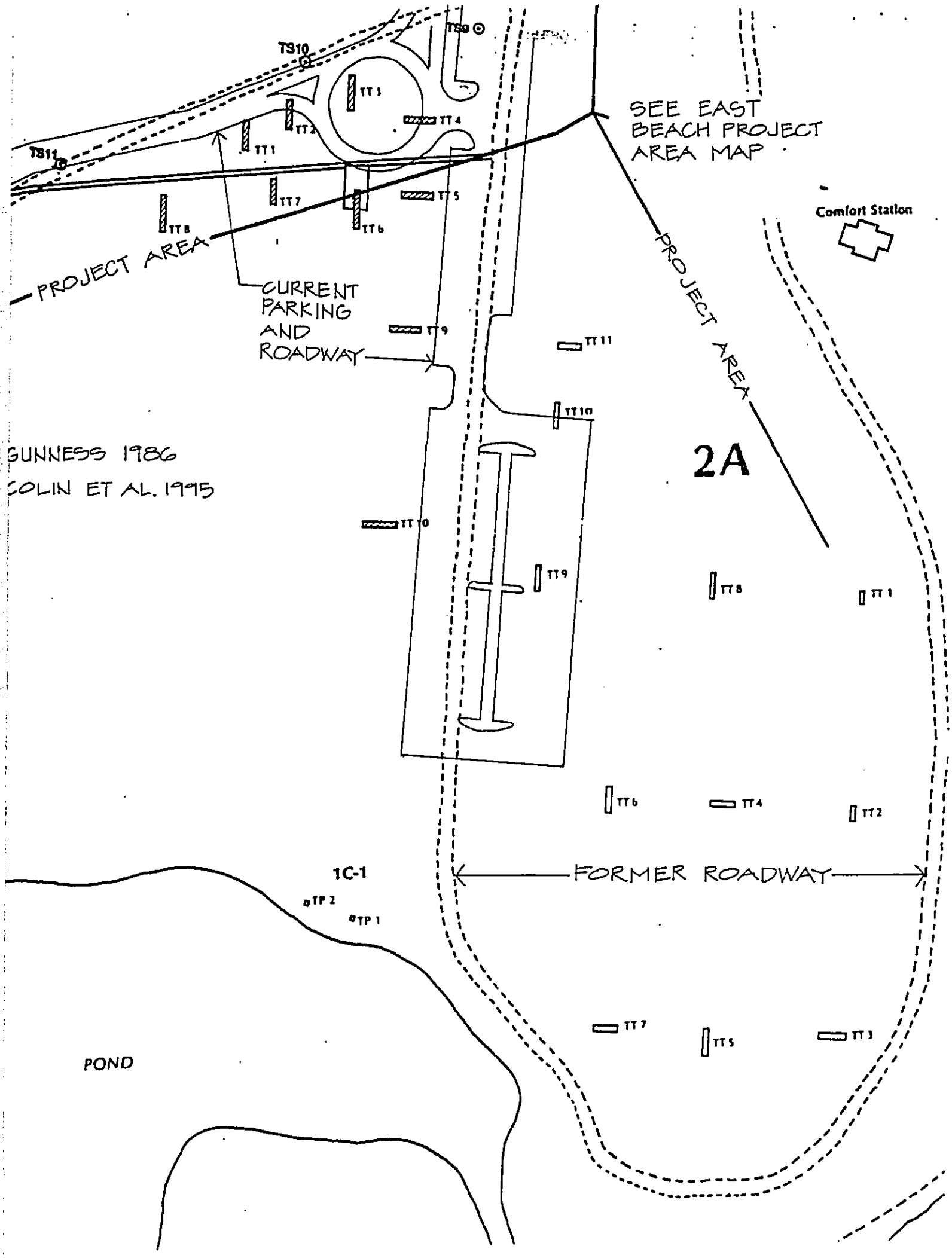


Figure 6 Map of Central Portion of the Project Area Showing Location of Proposed Centralized Treatment Plant and Absorption Field and Location of Archaeological Excavations


TS10
TS9
TS11
TT1
TT2
TT3
TT4
TT5
TT6
TT7
TT8
TT9
TT10
TT11
SEE EAST BEACH PROJECT AREA MAP
PROJECT AREA
CURRENT PARKING AND ROADWAY
PROJECT AREA
Comfort Station
GUNNESS 1986
COLIN ET AL. 1995
2A
TT10
TT9
TT8
TT1
TT6
TT4
TT2
FORMER ROADWAY
1C-1
TP 2
TP 1
TT7
TT5
TT3
POND

Overview of Previous Archaeological Studies in the Vicinity

Area 1C

Archaeological survey area 1C (called "Area 5" at that time) was extensively tested by Gunness in 1985 (Gunness 1986:34-41). This area was found to have been extensively disturbed by historic activities including sand mining and filling with clay dirt. Gunness (1986:57) recommended archaeological monitoring in the vicinity of the rotary turn area (near trenches 6 and 7) where intact or partially intact archaeological deposits may exist but asserted that no further archaeological work appears to be necessary from the rotary turn area west to the corner. The following year, Gunness (1987:5 and map) appears to have changed her recommendation somewhat asserting that except for site areas 1C-1 and 1C-2 (discussed further below) no further archaeological work is necessary here [Area 1C].

Gunness (1987B: 111) relates that relatively little of cultural significance was observed during monitoring of the east end of the water and electric lines which roughly parallels the gravel access road and proposed collector sewer line. A possible *imu* was noted in this trench 20 m from the main road (near test trenches 5 and 6).

The southern leg of the collector sewer system roughly parallels the south and east sides of the existing gravel road to the administration area and passes near the site area designated 1C-2 (Gunness initially called this "Area 6"). Gunness (1986:42) relates that no subsurface testing was conducted in the 65 m stretch south of backhoe test trench 22 ""because extensive historic disturbance to the area was obvious." In 1985, Gunness excavated 28 m^2 in five test areas near the southern bend in the road. Four of the five initial test pits excavated near the bend in the road revealed a "completely churned" 5 to 30 cm thick layer containing large numbers of basalt flakes overlying sterile sand but test pit 3 , which was eventually expanded to 24 square meters, revealed a large *imu* surrounded by at least 13 post molds. This feature was left intact and is now demarcated by cement pylons around the perimeter.

Gunness concluded (1986:57) that "with the exception of the *imu* and associated post molds excavated near the corner, archaeological deposits on the eastern side of the road are for the most part completely disturbed by historic plowing and bulldozing" but nevertheless she concluded that "archaeological monitoring is recommended for all surface disturbing activities in this area. This will ensure that any additional features which might be discovered during construction are adequately recorded, and that artifacts left in the area are collected." She noted that the area on the west side of the road was archaeologically sensitive.

Area 4C

Future plans call for the placement of a portion of the sewer treatment plant on the north side of the access road in archaeological area 4C. Gunness (1987B:111) relates that relatively little of cultural significance was observed during monitoring of the water and electric lines which roughly parallels the gravel access road and proposed collector sewer line. No archaeological remains were observed on the northern side of the secondary road in area 4C. No artifacts were even surface collected from this area.

Gunness (1987:6) relates that "Grubbing in this area is presently being monitored by the archaeologist. To date, no significant archaeological remains have been discovered." As far as we know there is no further documentation of this 1987 monitoring. Gunness' sensitivity map (1987:map) indicates her assessment that no further archaeological work or monitoring is necessary in this area.

In 1995, however, Cultural Surveys Hawai`i (Colin *et al.* 1995) examined features exposed during road widening on the north side of the gravel access road, just south of the utility lines. Eleven trenches were excavated revealing five features. While noting that this area had been heavily impacted by historic activities, this study recommended that any ground altering work in the area be monitored as remnants of prehistoric features still exist.

Summary Evaluation of the Central Study Area

Gunness' recommended monitoring in the northeast and southwest portions of area 1C, but asserted there was no need for monitoring in the heavily disturbed and extensively tested area in-between. Cultural Surveys Hawai`i recommended monitoring on the area to the north of the main access road where a future treatment plant site is proposed(Colin *et al.* 1995:25). We recommend that these recommendations be followed in the future.

From the point of view of safe guarding archaeological resources it would be preferable if subsurface activities could be focused in the area to the east of the old roadway which extends northwest from the northern dogleg of the gravel access road.

C. <u>South West Study Area</u> (Figure 7)

Introduction

This study area includes the short segments of sewer lines connecting the park headquarters, comfort station and kitchen infrastructure to the main collector line which runs up to just southeast of the southern dogleg of the gravel access road to the park headquarters area (Figure 7). This area has been the focus of a great deal of archaeological research. This study area lies in archaeological survey area 1A

Overview of Previous Archaeological Studies in the Vicinity

In 1975, Stephan D. Clark and Robert D. Connolly III (1975: III, 4; 1978:5) excavated 36 1-m2 test pits at the `Āpua Pond wall (designated site 1A-1). By 1978, 72 m had been exposed (Clark and Connolly III 1978:5).

In 1976, Stephan D. Clark and Robert D. Connolly III (1978:6-7, Gunness, 1987a:57-59) excavated 17 1-m2 test pits near the Historic Bathhouse identifying the well-known "pig burial site".

In 1978, the KARP Staff (Clark and Connolly III 1978:5-6) provided additional description and discussion of the `Āpua Pond wall.

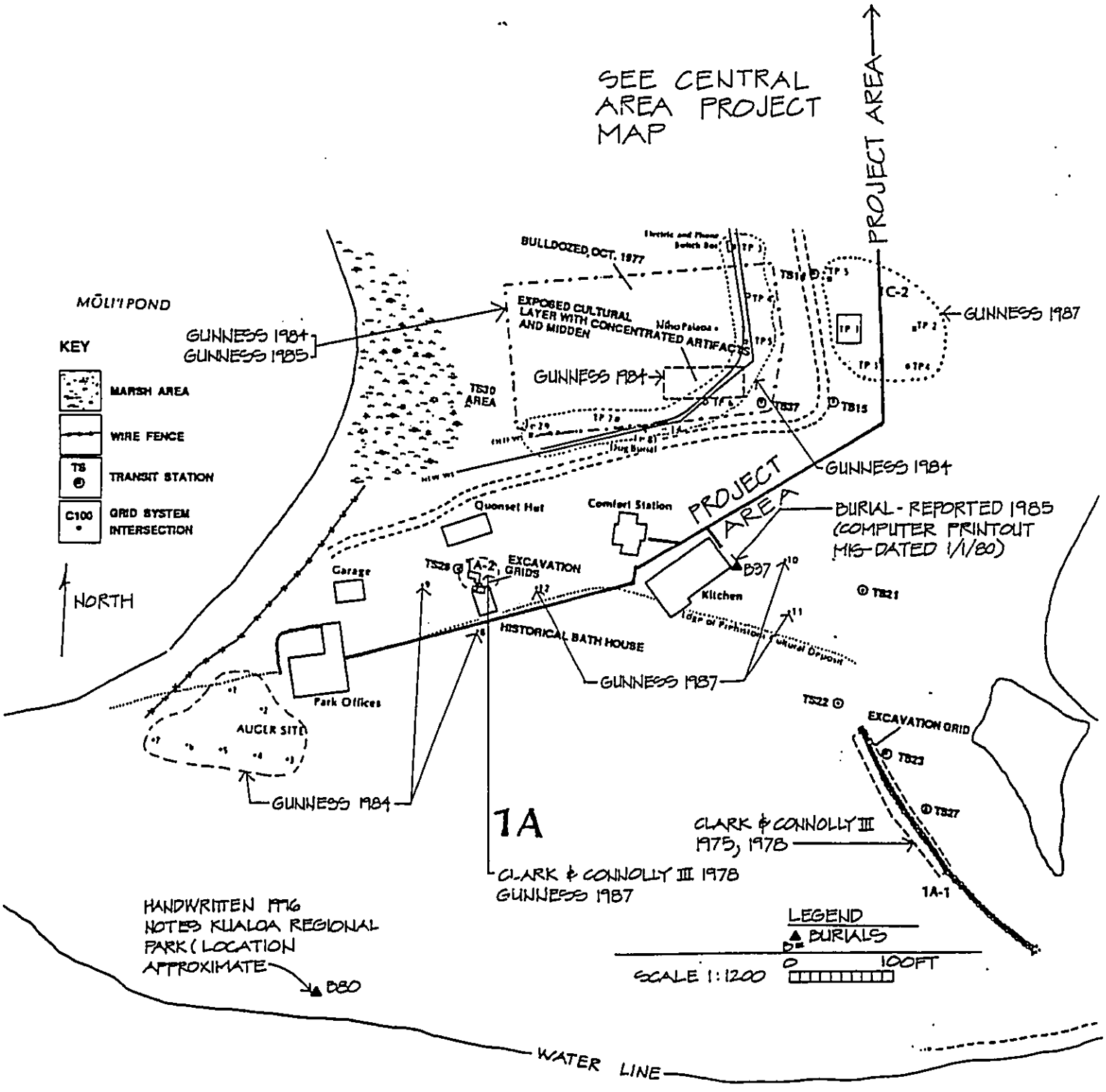


Figure 7 Map of Southwest Portion of the Project Area

In 1983, Jo Lynn Gunness, (1984:16-18, 1987a:64-67) excavated nine auger holes (numbered 1-9) and three shovel pits (numbered 10-12) for the kitchen facility site location. These excavations were located around the park offices, Historic Bathhouse and Kitchen facility within the present study area. Gunness recommended construction of the kitchen facility to the south west of the Park Offices (in the area of auger holes 1-7). Instead, the facility was built just to the south east of the Park Offices Comfort Station.

Jo Lynn Gunness (1984:18) concluded the area of the present kitchen facility "would have been the bay prehistorically, [and thus] there should be no direct impact on archaeological remains." She adds (1984:19), "Activities related to the construction of the [Park Offices] comfort station and its leaching-field have essentially eliminated whatever remains existed in the area extending from approximately 8 meters west of the comfort station, to the eastern boundary of the study area". In 1984, (Gunness 1984:18) she estimated that the seaward edge of prehistoric cultural deposits was "approximately 40 m north of the known north end of the ʻĀpua Pond wall." In 1987, however, Gunness (1987a:67) placed the seaward edge of prehistoric cultural deposits "approximately 5 to 10 meters north of the presently mapped northern end of the ʻĀpua Pond wall" (this is where the maps place the "edge"). The reason for pushing the boundary seaward may relate to the discovery of a burial (# 37) at the site of the Kitchen facility cess pool # 2 in 1985 (computer print-out of Kualoa Burial lots). If this was indeed an *in situ* burial then it indeed seems that Gunness' reassessment was appropriate.

In 1995 Paul Cleghorn (1996:15) performed archaeological monitoring of a small excavation (3.4 by 1.7 by 0.3 m deep) at the administration building. Nothing of significance was encountered.

Summary Evaluation of the Southwest Study Area

Although Gunness (1984:19) concluded that, "Activities related to the construction of the [existing Park Offices] comfort station and its leaching field have essentially eliminated whatever remains existed in the area", she later (1987:4) wrote:

> Extensive archaeological remains are known to be present here amid areas of general disturbance caused by past development...Even tree planting, trenching for water, electric, or sewer lines, or digging footings for cement slabs should be monitored by the archaeologist; and the developer should expect delays while archaeological mitigation measures are taken.

The park offices comfort station study area is clearly the most archaeologically sensitive of the three study areas evaluated in this report. Any areas of ground disturbance lying *mauka* (north) of the line annotated "Edge of Prehistoric Cultural Deposit" on Figure 7 should be archaeologically monitored.

On the other hand, excavations on the south side of that annotated line should, in theory, be in recently deposited beach sand in what was open bay until late historic times. Given the unique nature of some of the finds within archaeological study area 1A, the problematic reported discovery of burial 80 (see Figure 7), and the previous movement of this line of

cultural deposit (between Gunness 1984:18 & Gunness 1987:4) we do not feel comfortable recommending unmonitored excavation in this area. From the point of view of preserving the unique archaeological resources of this area it would be desirable that subsurface impacts be focused south of the annotated line.

III. SUMMARY AND RECOMMENDATIONS

Proposed ground disturbing activities in the east beach study area are focused in an area believed to have been massively impacted by runway construction and later road and parking lot development. Nevertheless there is a high probability of encountering burials or other significant archaeological resources particularly in the areas nearest the three comfort stations. Archaeological monitoring of all subsurface excavations extending deeper than 18" is recommended.

Proposed ground disturbing activities in the central study area are focused in an area that was extensively tested and found to be generally lacking in archaeological resources. Archaeological monitoring of all subsurface excavations extending deeper than 18" is recommended within a distance of 62 m (200 feet) of the main paved north/south access road and within a distance of 62 m (200 feet) of the southern dogleg of the gravel access road to the park headquarters. Continuous archaeological monitoring in-between on the south side of the gravel road is not indicated. However, monitoring results may revise this conclusion. Monitoring of all subsurface excavations extending deeper than 18" is recommended on the north side of the gravel access road to the park headquarters. Care should be taken to ensure that the *imu* feature in area C-2,currently protected by concrete pylons, is not impacted.

The southwest study area is the most archaeologically sensitive and archaeological monitoring of all ground disturbance in this area is indicated. It is highly desirable that the ground disturbance be focused seaward of the line annotated "Edge of Prehistoric Cultural Deposit" as present plans show.

No archaeological mitigation work in advance of ground disturbing activities in the project area is recommended.

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APPENDIX: OVERVIEW OF ARCHAEOLOGICAL SURVEY AREAS

Archaeological Survey Area 1A (South West Kualoa Regional Park Adjacent to Mōli`i Pond or Simply "South Beach")

Survey Area 1A lies east of Mōli`i Fishpond and west of `Āpua Fishpond and *makai* (south) of the roughly east-west trending end-portion of the access road to the present Kualoa Park offices (see Figure 2.) Survey Area 1A includes the present wood frame park offices (built by the Morgan family as a beach house in the 1950s), a care taker residence, quonset hut, the stone bath house (built circa 1916), a comfort station (built circa 1970) and a kitchen facility (built circa 1984.) Transit Stations TS 21, TS 23, TS27, and TS 28 are located in Survey Area 1A.

This area has been the focus of Polynesian Voyaging Society endeavors at Kualoa and on May 23, 1987 the beach ("South Beach") fronting Survey Area 1A was renamed "Hōkūle`a Beach" in honor of the return of the voyaging canoe of that name (*Star-Bulletin & Advertiser*, 5/24/87.) Survey Area 1A is presently the focus of park administration and group camping activities.

Archaeological research in this area began with the research on the `Āpua Pond wall (sometimes designated "1A-1") involving the excavation of thirty-six one-meter-square test pits in April 1975 previously discussed. The next major finding (sometimes designated "1A-2") is popularly referred to as the "Pig Burial."

Pig Burial (Stone House Area Deposit)

In 1916, the Morgan family built a stone bathhouse on the beach (Gunness 1987:57) which they knew as "*Hale Makani*" or "House of Winds". The beach has accreted substantially in the area and by 1987 was some 122 m. (400 feet) to the south of the bathhouse (Gunness 1987:57). Before the clearing of *koa haole* from the inland side of the bathhouse could take place in late 1976, the KARP staff was asked to conduct archaeological testing of the area at which time "17 square meters were excavated in four closely adjacent areas in the 'back yard' of the bathhouse" (*Ibid.*). Beginning 5 to 10 cm. beneath a mixed historic and prehistoric layer, the excavations uncovered a prehistoric cultural layer that went to depths of 40 to 50 cm. in some places (*Ibid.*). Gunness reports that:

> The soil contained charcoal; fish, bird and mammal bones; sea urchin remains; and quantities of shell representing numerous species of edible mollusks and bivalves. In addition, a number of prehistoric types of artifacts were uncovered. These included sling-stones, a hammer-stone, polished adze flakes, whetstone fragments, numerous coral abraders, bone fishhook manufacturing debris, a pearlshell fishhook blank, a double *leho* sinker (for octopus fishing), and a dog tooth pendant. Additionally, eleven volcanic glass flakes were recovered... (1987:57-9).

In addition to the above artifacts, numerous features were also uncovered including an *imu* or earth oven which measured approximately 90 cm. across (Gunness, 1987a:59).

Interestingly, an intact pig skeleton was uncovered just 45 cms. to the west of the *imu*, in a narrow pit:

> The skeleton is that of a boar with limbs tightly flexed (suggesting that they may have been bound), lying on its right side, with its head pointed in the *mauka* direction. A dog femur was found just above the forelimbs. A pattern of post molds appear to be associated with the pig burial feature (and possibly the *imu* feature) suggesting that some kind of structure marked the location (*Ibid.*).

The relationship of these features has remained speculative as Gunness concludes that "it is unclear if the *imu* and pig burial are associated; or what their relationship may be to other post molds in the test pits just to the north -- which indicate additional structural features."(*Op.cit.*: 59-62).

Due to the orientation and location of the pig burial along a direct line running down from the mountain ridge to the eastern side of Mōliʻi Fishpond, the burial might have acted as an *ahupuaʻa* boundary offering separating the *ahupuaʻa* of Kualoa from that of neighboring Hakipu'u *Ahupuaʻa* (*Op.cit.*: 62).

Connolly (1978:3) associated the pig burial with the date 1422 A.D. presumably on the basis of a date derived from rind hydration analysis of volcanic glass. This dating system is highly suspect at this time and no archaeologist today would regard this as a valid date.

Testing, Monitoring, and General Observations in Survey Area 1A

In 1983, plans were made to construct a new park kitchen facility in the South Beach area directly adjacent to the pig burial (*Ibid.*). However, due to the archaeological significance of this area, coupled with the fact that there was mounting evidence of a larger prehistoric cultural layer(s), made it essential that the kitchen facility be relocated (*Ibid.*). Furthermore, prior to the genesis of the Kualoa Archaeological Research Project (1975), a comfort station was constructed in the south beach area. Construction of the comfort station and its leaching field was believed to have disturbed the archaeological deposits in the surrounding area (*Op.cit.*:65). Therefore, archaeological investigations were conducted to determine just how much of the cultural layer had been disturbed, and how far the cultural deposits extended (*Ibid.*).

Gunness (1984:16-18) conducted augering tests digging seven holes (numbered 1-7) just south west of the present park offices (sometimes known as "auger site"). No cultural deposits were observed. An eighth auger hole (number 8) located five meters south of the stone bath house similarly yielded no notable cultural deposits while a ninth auger hole (number 9) located west of the pig burial site indicated a 40 cm. thick cultural deposit. Based on these archaeological investigations, it was possible to define the seaward extent of prehistoric cultural deposits in the 1A survey area as:

> The *mauka* side of a curving line drawn from the eastern end of the Mōliʻi Fishpond wall through the *makai* portion of the park offices, past the front of the historic stone bathhouse and comfort station, and ending approximately 40

meters north of the presently mapped north end of the ʻĀpua Pond wall (Gunness 1984:19).

Three additional shovel pits (consecutively numbered with the nine auger holes as excavations numbered 10, 11, and 12) were excavated by Gunness (extending into January of 1984) in the immediate vicinity of the present kitchen facility (Gunness 1987: 66). It had been believed that construction of the South Beach Comfort Station and grubbing of the general area had heavily disturbed or destroyed archaeological deposits in the vicinity (Gunness 1987:65). As a result of these excavations, Gunness concluded that the archaeological resources in an area extending from 8 meters west of the comfort station to 65 meters east of the comfort station were heavily damaged but were present. These shovel pits also allowed Gunness to fine tune her earlier delineation of the *makai* edge of the prehistoric cultural deposit drawing the seaward edge "ending approximately 5 to 10 meters north of the presently mapped northern end of the ʻĀpua Pond wall." (Gunness 1987:67). Gunness comments:

> Over the years following the excavations in the stone bathhouse area, evidence had accumulated suggesting that the prehistoric cultural materials found behind the stone bathhouse did not represent a small, isolated site. Artifacts were occasionally surface collected in the parking areas on either side of the bathhouse and quonset hut...others were found in the parking area behind the park offices. The soil in these areas is dark gray in color and contains the same kind of midden remains that were found during the bathhouse test excavations. (Gunness, 1987a:64)

It appears that the present kitchen facility was situated with little concern for archaeological resources. It is unclear whether there was any archaeological monitoring of its construction. Gunness (1987:67-68) relates that there was no archaeological monitoring of an associated leaching field but mentions her observation of basalt flakes and scattered small pit features in the excavations. In 1985, Gunness (1987:68) monitored the excavations for 2 of 3 cesspool tanks associated with the kitchen facility noting the presence of several large pit features, a number of artifacts, and human remains (designated burial # 37) near the east corner of the Kitchen facility (cess pool # 2).

Additional archaeological monitoring was conducted in association with separate trenches for water and electric line hook-ups to the kitchen facility extending from the north west corner of that facility to connect with the main water and electric lines (in Survey Area 1B - a distance of approximately 40 m). Midden, artifacts and numerous pit and post mold features are reported but little characterization of these deposits was possible (Gunness 1987:68-70).

From May to September of 1990, Goodman monitored tree removal along East Beach and South Beach. She describes stratigraphy and four mundane artifacts recovered from the southeastern portion of survey area 1A. Goodman's reporting (1991:16) of "a thin, discontinuous, unconsolidated...[layer that] contains indigenous artifact forms" somewhat calls into question Gunness' belief that the area Goodman was working in was seaward of any significant archaeological deposits. Possibly the two basalt flakes Goodman recovered were only secondarily deposited. Goodman (1991:30) considers this question of whether the artifacts are redeposited or are from a thin *in situ* cultural deposit but offers no conclusion.

Cleghorn (1996:15) conducted archaeological monitoring associated with the construction of new handicap access runways including an area adjacent to the park offices in area 1A. No evidence of prehistoric occupation were observed.

In general terms, it may be said that significant archaeological deposits are generally thought to be absent within 80 meters of the sea between Mōliʻi Pond and ʻĀpua Pond and highly important archaeological resources are extant in the *mauka* portion of survey area 1A. Gunness (1987b, 4, map) indicates no further archaeological work is necessary *makai* of the line marked "edge of prehistoric cultural deposit" (located approx. 80+ m back from the coast.) It may be noted in passing, however, that burial designated #80 was reported as from "South Beach near office" and Goodman (1991:16) reports a layer with indigenous artifact forms which would both seem to have had to have been redeposited (or erroneously reported) if Gunness is correct.

Survey Area 1C

Area 1C is bounded on the south by ʻĀpua Pond, on the east by the main park road, and on the north and west by the south beach access road (see figure 2). Transit Stations TS 9, TS 14, and TS 15 are located in Survey Area 1C.

As a result of observations made during the monitoring of grubbing along the northern edge of ʻĀpua Pond, Area 1C was further broken down into two sub-areas, 1C-1 and 1C-2. In 1985, "Test pits were excavated in Site Areas 1C-1 (north east of ʻĀpua Pond) and 1C-2 (WNW of ʻĀpua Pond); and an additional 22 backhoe trenches, varying in length from 6 to 20 meters, were excavated and recorded around the eastern, northern, and northwestern perimeters of Survey Area 1C" (*Ibid.*).

Area 1C-2

Area 1 C-2 "is an irregularly-shaped area of roughly 4,900 square meters between the southern half of the north-south portion of the access road, and the northwestern edge of ʻĀpua Pond" and "is directly across the access road from the densest concentration of features and artifacts in Survey Area 1 B, and is almost certainly an extension of that site" (Gunness 1987:94). A total of five test pits were excavated in this area (numbered TP1 - TP5; TP3 was eventually expanded to 24 square meters), producing shell midden, and a high concentration of prehistoric artifacts (3,920 artifacts in all). In four of the five test pits (all but TP 3) the entire cultural deposit was "completely churned" (Gunness 1986:42).

Test pit 3 uncovered "a large *imu* surrounded by at least 13 post molds. The overlying loamy sand, and the fill in the *imu* contained literally thousands of basalt flakes" (Gunness, 1986:45). In all, 3,530 artifacts were recovered from test pit 3 (Gunness, 1987a:99). A sample of charcoal taken from the bottom of the *imu* was radiocarbon tested and calibrated to a date between A.D. 1670 and 1730 (*Ibid.*).

Of the 22 backhoe trenches excavated (numbered TT 1 - TT 22) around much of the northern perimeter of survey area 1C, most revealed highly disturbed cultural layers (that are no longer intact) containing little to no prehistoric artifacts (Gunness 1987:100-12). Test Trench 6, however, uncovered a "concentration of large basalt rocks near the north end of the trench"

(Gunness 1986:34). After opening an additional 15 square meters at the north end of the trench, 214 prehistoric artifacts were recovered; no historic-era artifacts were found. It was concluded however that even though no historic materials were recovered during the expanded excavations around the north end of Test Trench 6, that "this is an historically excavated and filled ditch or trench" (Gunness 1986:37). Gunness suggests it may have served as a livestock barrier (Gunness 1986:39).

Gunness (1987b:4) recommended that "except for site areas 1C-1 and 1C-2...no further archaeological work is necessary here."

Survey Area 2 (East Coast of Kualoa Regional Park)

Survey Area 2 is a long narrow strip bounded on the north by Kamehameha Highway, on the east by the Pacific Ocean, on the south by Kāne`ohe bay, and on the west by a line running 20 to 30 meters west of and parallel to the main park road (Gunness, 1987a:113). This area was then broken down into five sub-areas (2A to 2E) by Gunness for easier recording and describing of artifacts and features.

It is a well recorded fact that the eastern coastline of Kualoa Park is eroding away at a high rate. This erosion has exposed a cultural layer between 15 and 50 cm. thick. Due to the wave action on the shoreline, the erosion has exposed midden materials, firepits, stone artifacts. As of 1984, approximately 2,000 stone artifacts had been surface collected from the beach and adjacent reef and human burials in otherwise sterile deposits.

The artifacts "represent a range of activities including adze and other stone tool manufacture, wood working, fishing, food preparation, and game playing" (*Op.cit.*:114; see also Clark and Connally 1978:3-4).

Survey Area 2A (SouthEast Coast of Kualoa Regional Park)

Archaeological Survey Area 2A conforms to an area lying within a loop of road (formed by the southern end of the main access road and a dirt maintenance road) previously extant at the southern end of the main Kualoa Access Road. In general terms this survey area lies east of the main access road and is roughly bounded by the three East Beach comfort stations. No transit station points lie in survey area 2A.

This area was the focus of archaeological studies in 1977 and 1978 (Gunness 1978) associated with a proposed location for storage and settling basins as part of a proposed U.S. Army Corps of Engineers Kualoa Beach Sand Replenishment Project. In September of 1977 the area was extensively bulldozed by a volunteer group from the National Guard and "it was discovered at that time that much of the surface had been scraped to sterile sand, and that the entire surface layer had been extensively disturbed" Gunness 1978:6). Only ten mundane artifacts were recovered at that time.

A total of eleven test trenches were excavated in the Summer of 1978 scattered over the southern portion of the survey area, including one 1-meter square unit (called test trench 1 or test pit 1) and ten 2.5 meter x 70 cm. shovel test trenches (test trenches 2 - 11). After excavations were complete, it was determined that: "If, at one time, there were any

archaeological remains in this area, they have been eliminated by historic modification of the landscape" (Gunness 1978:11).

Gunness (1987a:119) would later write that:

> It was determined that no intact prehistoric cultural deposits remained in Survey Area 2A; and following the above described testing, this area was completely altered during the construction of the settling basins for the later-abandoned erosion control project. In 1985, it was again bulldozed flat and the southern portion was developed as a camping ground.

She concluded (1987b:5) that "no further archaeological work is necessary here." Nevertheless, Cleghorn (1996:15) conducted archaeological monitoring associated with the construction of new handicap access runways including 4 ramps at parking lot 3 in area 2A. No cultural materials were observed.

Archaeological Survey Area 2B (South Central East Coast of Kualoa Regional Park)

Survey Area 2B, encompasses the south and central portions of the eastern beach extending from the southeast portion of ʻĀpua Pond on the South to include the field school site (1977, 1983 and 1984 field schools) located approximately 70 m north east of the survey area for bath house # 1. Transit Stations TS 4, TS 5, TS 24, TS 33 and TS 34 are located in Survey Area 2B (Duckworth-Williams and Clark, 1992:42). A grid system with a base line running the length of survey area 2B (presently the base line is believed to be entirely off-shore as a result of erosion) is offered by Duckworth-Williams and Clark (1992:Figure 2).

This has been the most studied portion of the park. Two sub-areas have been designated including the field school site which has been called 2B-1 and the "waterlogged site" or "Kualoa Depression" site known as 2B-2. Survey area 2B has been heavily tested by archaeologists since Barrera's work in the Summer of 1974.

All of Barrera's 51 one-meter square excavations are understood as lying within what would become known as archaeological survey area 2B. Barrera discovered an extensive cultural layer complete with post molds, pits, fire pits, what he believed was an oval or round house site (in test pits 26-33; Barrera 1974:19-20) and an assortment of stone tools, fishing equipment and a human burial (test pits 11, 37-38; Barrera 1974:20-21). From his research in what became survey area 2B, Barrera (1974: 39, 41) noted that "Kualoa Regional Park has considerable potential for significantly contributing to our understanding of the prehistoric Hawaiian way of life" and that "the importance of Kualoa's scientific potential should not be underestimated."

While none of Barrerra's 1974 excavations are believed to have been undertaken within the present "Northernmost Comfort Station" study area, several are close and test pits numbered 19-25 appear to lie within 100' to the north, east and south east. None of these units appear to have produced anything notable at all. However, in Barrera's units 26-66, located approximately 180' south east of the "Northernmost Comfort Station" study area, he thought he identified the remains of an oval or round house (Barrerra 1974:19-20) which must be regarded as highly significant.

In August 1975, Clark and Connolly excavated seven one-meter-square test pits approximately 150 meters north of Barrera's house site (Barrera's test pits 26-33) and encountered an abundance of artifacts , midden and features (KARP, 1976:1). The three northernmost test pits would eventually be the locus of a series of University of Hawaii Field Schools while the southern four were just to the south in the immediate vicinity of what Clark would call "the Kualoa Depression" (Clark, 1979:Figure 5) At the same time large numbers of artifacts started to be recovered from just off shore of the same general area (KARP, 1976:1).

In 1980, Hamilton M. Ahlo Jr. tested the north portion of survey area 2B (as well as much of the length of 2C and 2D) to evaluate the effects of erosion control projects on the archaeological deposit. Excavation units were small (25 cm) shallow (60 cm) holes dug at ten meter intervals along the beach edge. He (1980:4) documents that from 35 m north of the field school site to 35 m south "still retains a physically intact cultural deposit."

Archaeological Survey Area 2E (Inland Central East Coast of Kualoa Regional Park)

Survey Area 2E is a 30 to 60 meter wide strip extending along the western side of the main park road, from Kamehameha Highway, south, to the park secondary road. Gunness (1987:166) has chosen to include it within Survey Area 2 (rather than survey area 4) as it has a direct bearing on the archaeological findings in that area. Transit stations TS 6, TS 7, TS 8, TS 16, TS 17, TS 18 and TS 19 are located in survey area 2E (Duckworth-Williams and Clark, 1992:42).

Gunness (1987:166) excavated 28 backhoe test trenches (Test trenches TT 1 -TT 28) in this area prior to the commencement of road construction in 1986. This testing showed that as much as a meter of soil was graded away during construction of the airstrip, removing virtually all archaeological material that may have been present in the area under the airstrip. This left a 50 to 100 cm high embankment along the airstrip's western side" (*Ibid*). Gunness' (1987:166-167) 1986 research served to delimit the western edge of the airstrip as eight test trenches were opened below the embankment and sixteen above the embankment, with ten of the trenches cutting across the embankment. The western margin of the airstrip grading runs parallel to the present main access road (which was built over the graded airstrip) and lies approximately 15 m west of the west side of the road.

East of (below) the embankment under the former airstrip, typically the trenches showed culturally sterile sand immediately overlain by coral fill. Any cultural deposits that may have been extant were scraped away during airstrip construction in 1942. In three of these more eastern trenches excavation below the embankment reveled "the very base of truncated features were recorded underlying the coral fill" but the features were thought to be historic (Gunness, 1987a:167). The remainder of the "below" (eastern) test trenches were culturally sterile.

Gunness writes that thirty-four features were recorded in the trenches above the embankment or to the west of the airstrip grading (*Ibid.*). The features included a dog burial, and probable post molds; an *imu*, numerous pits (most appear to be historic), and an historically filled

trench in which thin copper wires had been laid along its length. The last-mentioned feature is probably related to the airfield installation. While extant prehistoric deposits were observed in this area, the prehistoric deposits were typically "completely churned"(*Ibid.*). In addition, in Test Trench 23, a large mammal bone (believed to be whale) was found in the underlying sterile sand (Gunness, 1987a:167, 171). It is believed that this bone was deposited here naturally. Some 124 indigenous artifacts were recovered after bulldozing. The artifacts are similar to those found in other areas of the park (Gunness, 1987a:171). Gunness (1987b: 5, map) concluded that no further archaeological work is necessary here."

The Gunness test trenches of particular interest are those numbered TT23 (just north of the study area for the "Northernmost Comfort Station"), TT 13 and 22 (located within the study area for the "Northernmost Comfort Station") and TT14 (just south of the study area for the "Northernmost Comfort Station")

Appendix C
Archaeological Monitoring Plan

ARCHAEOLOGICAL MONITORING PLAN FOR RECONSTRUCTION OF WASTEWATER SYSTEMS AT KUALOA REGIONAL PARK, KUALOA *AHUPUA`A*, KO`OLAUPOKO, O`AHU, HAWAI`I (TMK 4-9-04:1)

by

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and
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Prepared for

City and County of Honolulu,
Department of Design and Construction

by

Cultural Surveys Hawai`i
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I. Introduction

A. Background of Project

At the request of the City and County Department of Design and Construction, the present document provides an archaeological monitoring plan for the monitoring of the reconstruction of wastewater systems at Kualoa Regional Park (under the jurisdiction of City and County of Honolulu, Department of Parks and Recreation), located in the seaward portion of Kualoa *Ahupua`a*, Ko`olaupoko District, O`ahu (TMK: 4-0-04:-01)(Figures 1-2). The specific site plan for this centralized wastewater system was developed in consultation with Cultural Surveys Hawai`i (CSH) and Park staff and was worked out in consideration of known archaeological resources as examined in two archaeological assessments (Hammatt and Shideler, February 1999 and Hammatt and Shideler, October 1999) in order to minimize adverse impact to archaeological resources.

The reconstruction of wastewater systems design plan includes sewer lines connecting all four of the existing comfort stations, the existing administration building, the caretaker's cottage and the food service building to a centralized treatment plant and absorption field lay-out. In the present plan, a straight sewer line connects each of the three comfort stations along East Beach with a collector sewer line at a point just east of the roundabout. The collector line then runs straight in a southwesterly direction to the treatment plant and absorption field located near the northern dogleg of the access road to south beach and the administration building. Another collector sewer line roughly parallels the south and east sides of the access road connecting the administration building to the centralized treatment plant and absorption field lay-out with very short spur lines connecting the caretaker's cottage, the park offices comfort station, and the food service building to this southwestern collector line. Approximately five pump stations are placed along the route but these are understood as quite small in area.

This project has already undergone Chapter 6E-8 Historic Preservation Review by the State Historic Preservation Division (SHPD) (Letter from Don Hibbard, SHPD Administrator to Mr. Gary Q. L. Yee, Department of Design and Construction dated February 22, 2000). The SHPD review makes specific recommendations for archaeological monitoring, generally following recommendations of an archaeological assessment (Hammatt and Shideler, October 1999). The SHPD Chapter 6E-8 Historic Preservation Review letter goes on to assert that: "If these revised recommendations are followed, then we believe that the proposed centralized wastewater system improvements for Kualoa Regional Park will have `no adverse effect' on significant historic sites."

Based on previous archaeological findings of burials and historical resources at Kualoa, and in order to counter any adverse effect to significant historic sites, the SHPD requires the production of an archaeological monitoring plan, archaeological monitoring of the project area, and the production of an archaeological monitoring report.

The purpose of the present archaeological monitoring plan is to respond to the possibility that inadvertent finds, especially human burials, but additionally, other cultural deposits,

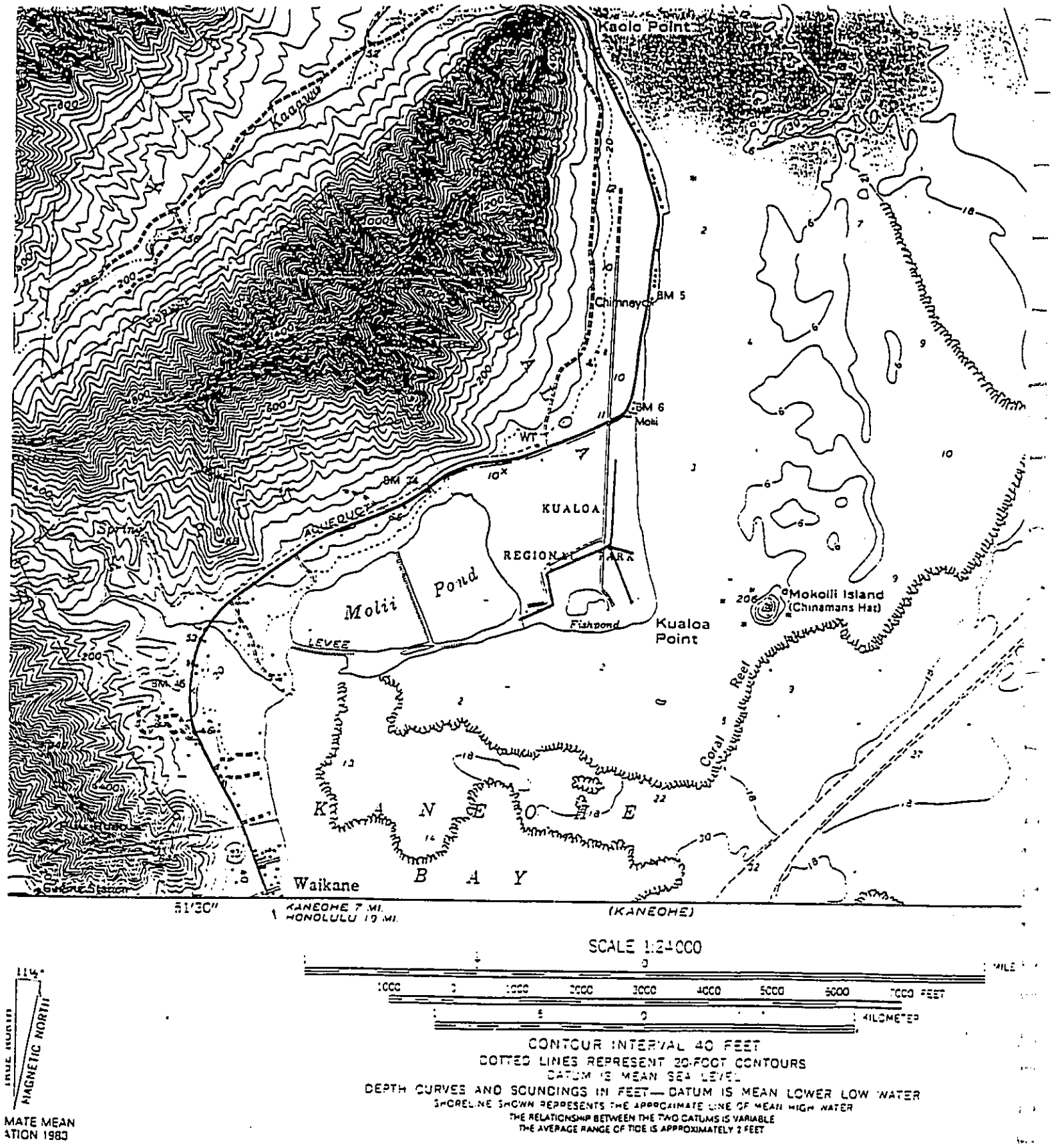


Figure 1 Portion of the USGS 7.5 Minute Series, Kahana Quad Map Showing Location of the Planned Wastewater System

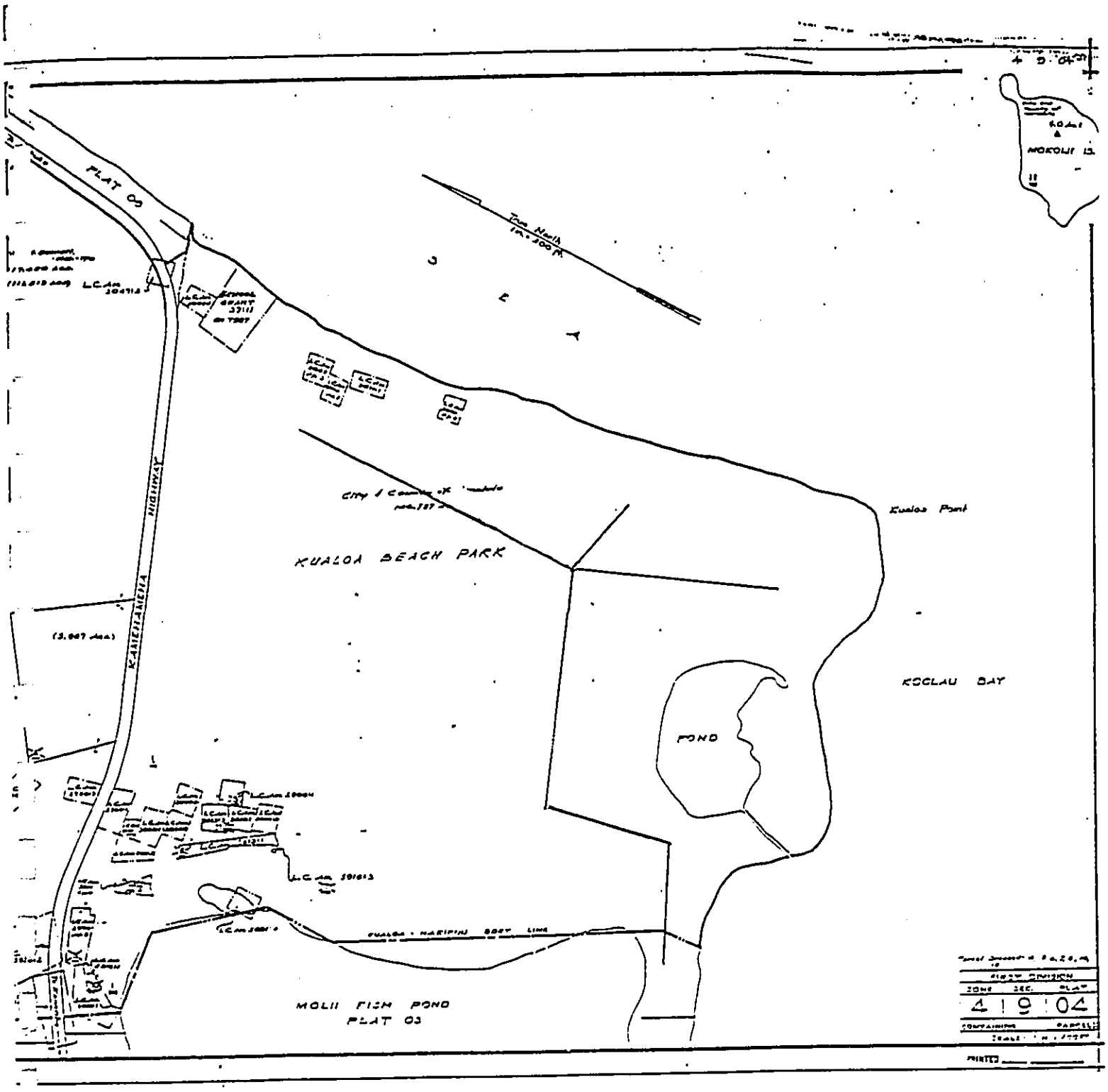


Figure 2 Tax Map Key (TMK) 4-9-04 Showing Location of the Planned Wastewater System

may occur within the project area and also to protect known cultural resources. This plan will serve to insure the protection of any finds, within the guidelines set forth by the DLNR/SHPD. This archaeological monitoring plan incorporates the recommendations of the SHPD.

B. Overview of the Significance of Kualoa

The entire *ahupua`a* of Kualoa was placed on the State and National Registers of Historic Places in 1973 (bearing state site number 50-80-06-528). The register forms assert that Kualoa was considered one of the two most sacred places on the island of O`ahu (along with Kukaniloko). The register forms focus on Kualoa's import as a symbol of sovereignty and independence for O`ahu, its role as a place of refuge, its role as a place where sacrificial victims for religious rituals were drowned, and its history as a sacred residence of chiefs. Kualoa is also significant in Hawaiian folklore and mythology including traditions of Papa and Wākea, Hāloa, Pele, Hi`iaka, Kamapua`a and *mo`o* (lizard dragons). Kualoa is also significant in its association with historic personages in the Judd and Wilder families and for its role in the early history of sugar production on O`ahu.

Nearly a hundred burials have been reported from Kualoa and thus it must also be considered to be a significant Hawaiian burial ground. Kualoa has been the subject of over fifty archaeological studies.

C. Overview of Archaeological Data Pertaining to the Area of Construction Impact

Because this project traverses so much of the park it seemed appropriate to evaluate the archaeological concerns for different portions of the infrastructure alignment. Specific portions of the route will be discussed in terms of the following areas:

A. The east beach study area including the sewer lines connecting the northernmost comfort station, the central east beach comfort station, and the `Āpua Point comfort station to the collector sewer line;

B. The central study area including the collector sewer line from the three east beach comfort stations to the treatment plant and absorption field, the area of the treatment plant and absorption field and the collector line from the administration building to the treatment plant and absorption field; and

C. The southwestern study area in the vicinity of the kitchen and administration building.

II. REVIEW OF ARCHAEOLOGICAL DATA

A. East Beach Study Area (Figure 3)

Introduction

The presently proposed plans connect the sewer line from the three east beach comfort stations to a main collector line (Figure 3). The northern leg begins at the northern side of the northernmost comfort station, runs a very short distance (a few meters) north, swings around the west side of the comfort station, and then runs south for approximately 229 m to the collector sewer line junction. The eastern leg connects with the northern side of the central east beach comfort station and then runs west for approximately 80 m to the collector sewer line junction. The southern leg exits the north side of the Āpua Point comfort station and then runs northwest for approximately 275 m to the collector sewer line junction.

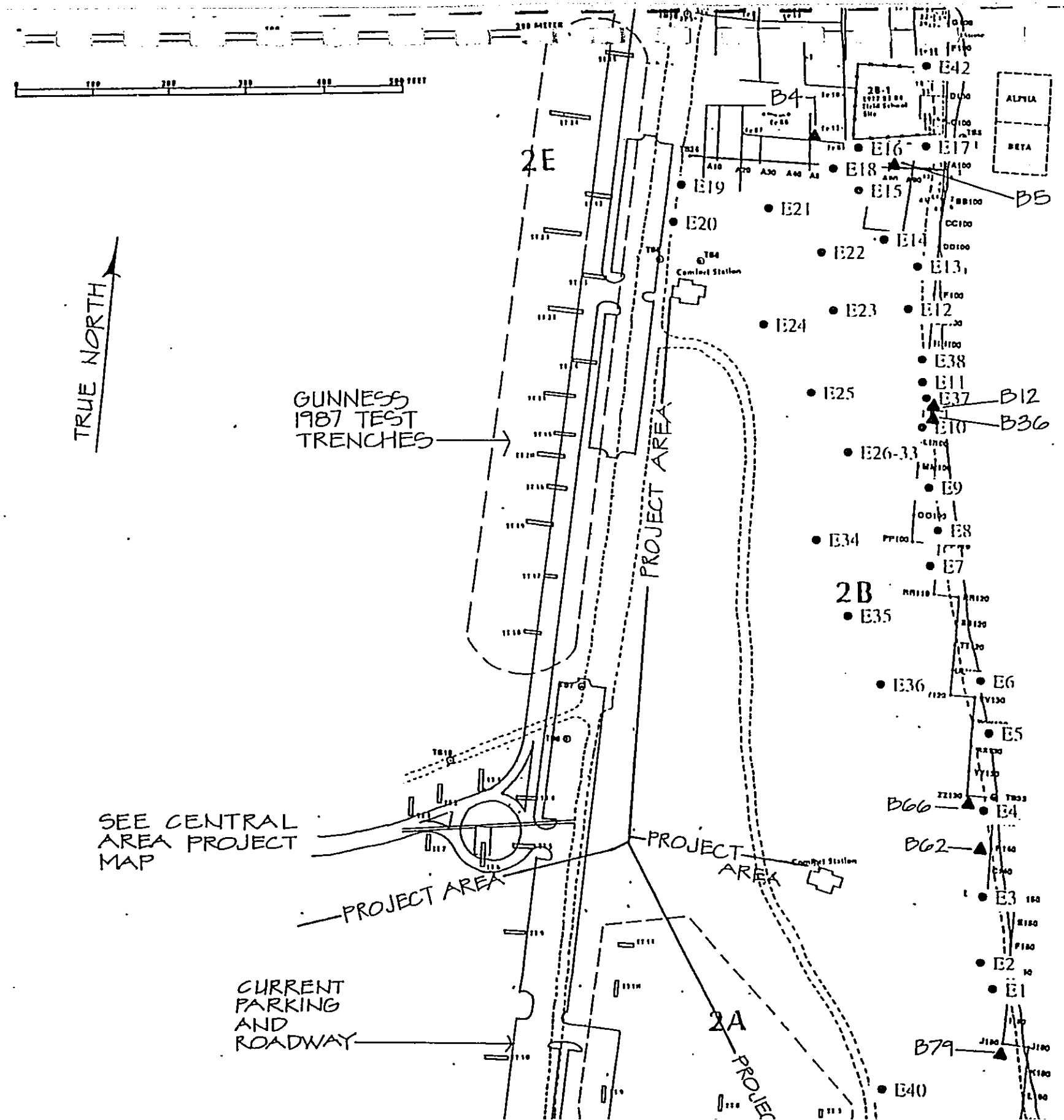
Overview of Previous Archaeological Studies in the Vicinity

The East Beach portion of the sewerage system lies overwhelmingly in an area heavily disturbed by construction of a WWII runway (Figure 4). The United States Army took over Kualoa Ranch and bulldozed the strip 6000' long and 150' wide by April of 1942. Gunness's 1987 test trenches in Area "2E" encountered the western edge of this airstrip bulldozing. As much as a meter of soil was graded away during construction of the airstrip, removing virtually all archaeological material that may have been present in the area under the airstrip. Typically the eastern portion of these trenches showed culturally sterile sand immediately overlain by coral fill. Any cultural deposits that may have been extant were understood as having been scraped away during airstrip construction.

The Gunness test trenches of most interest are those closest to the proposed north leg of the east beach sewer line numbered TT 13 and TT14 (just west of the northernmost comfort station). Gunness (1986:23) relates that test trenches 13 and 14 cut across the embankment at the west edge of the airstrip. In theory then, the massive grading for the airstrip should extend approximately 150 feet (the width of the strip) east of the middle of these trenches to include the north leg alignment. Gunness (1987b:5, map) concluded that "no further archaeological work is necessary" in Survey Area 2E.

However, Paul Cleghorn (1996:6) monitored approximately 11.1 square meters of excavation for a drinking fountain and dry well between the parking lot (Lot 2) and the northernmost comfort station and identified a layer (II) from 60-70 cm. depth with cultural material "probably prehistoric in age." Cleghorn (1996:22) concluded that:

> the *in situ* sandy loam soil does in fact have the potential of containing intact subsurface cultural features — post holes, midden, and volcanic glass were found in the drinking fountain/ dry well excavations. It appears that the area adjacent to the east beach, extending from the shore to the park road, continues to have a high potential of containing intact subsurface features...any excavations deeper than ca. 18 inches should be archaeologically monitored.


TRUE NORTH
GUNNESS
1987 TEST
TRENCHES
2E
2B
2A
PROJECT AREA
PROJECT AREA
SEE CENTRAL
AREA PROJECT
MAP
CURRENT
PARKING
AND
ROADWAY
ALPHA
BETA
B42
B4
B16
B17
B18
B19
B15
B5
B21
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B14
B22
B13
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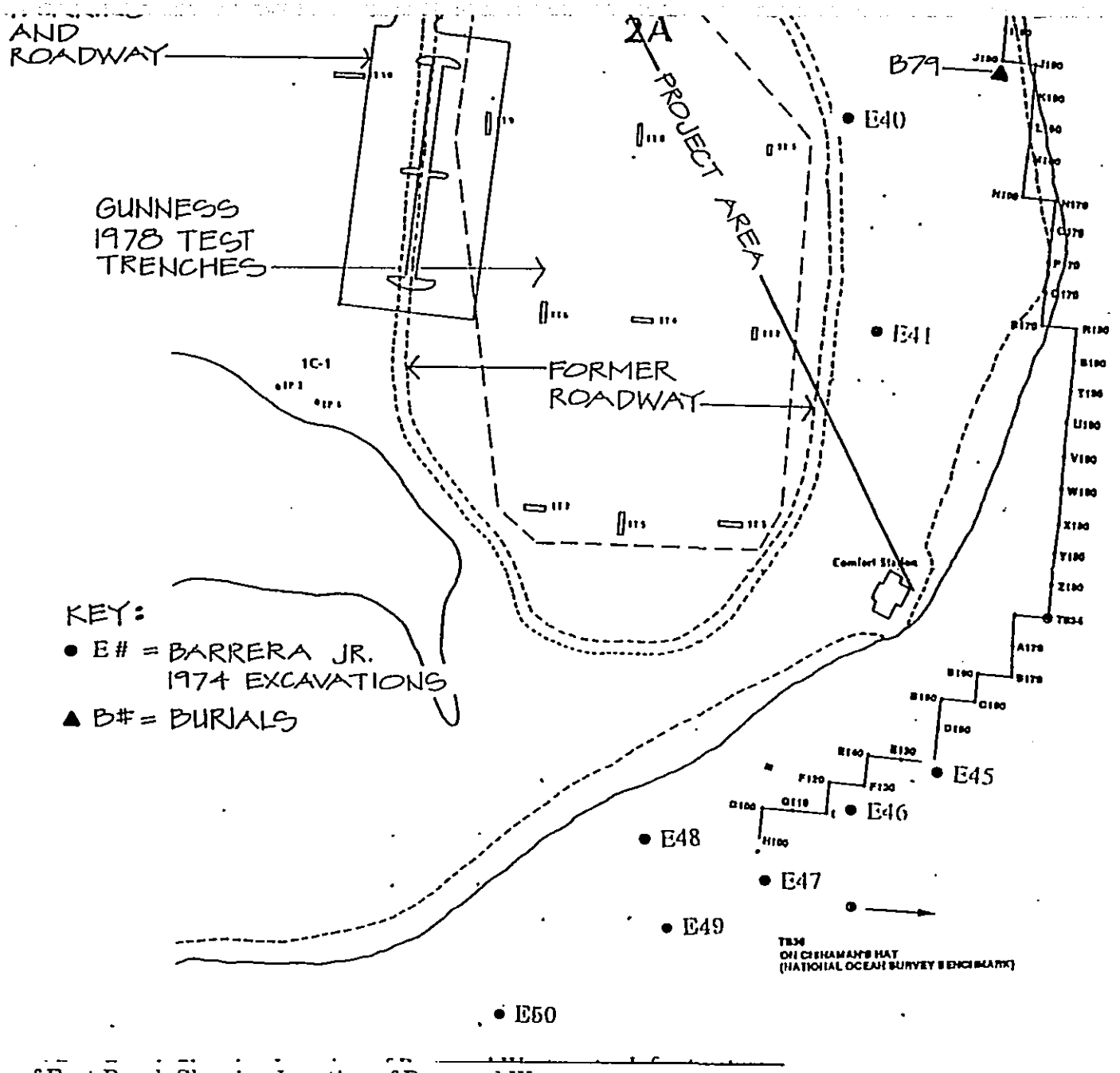


Figure 3 Map of East Beach Showing Location of Proposed Wastewater Infrastructure and Locations of Previous Archaeological Studies

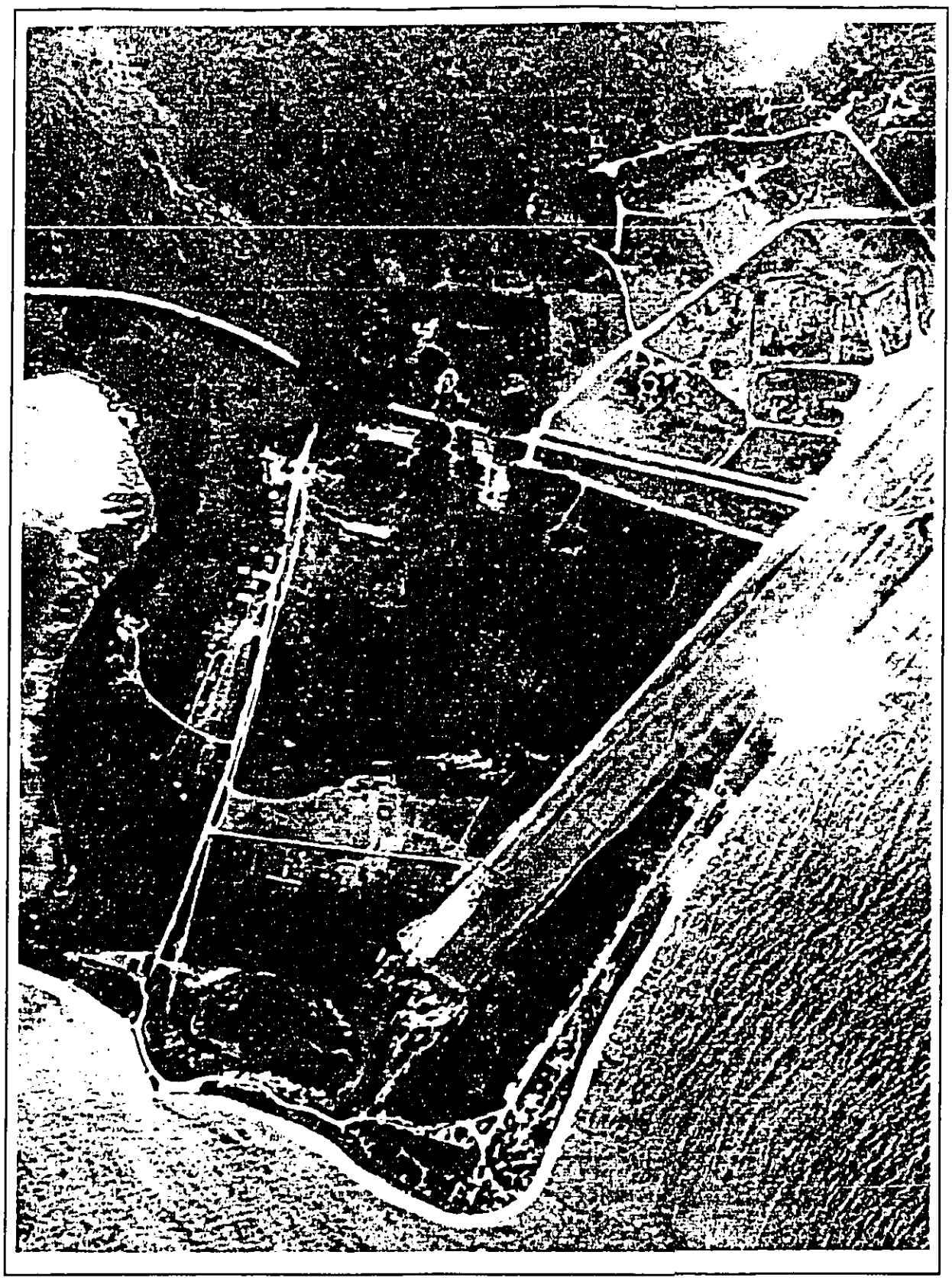


Figure 4 Aerial Photograph showing 1942 Runway Along Kualoa's East Beach.

Gunness (1986:10) discusses the area located just west of an imaginary line connecting the Central East Beach and `Āpua Point Comfort Stations (presently known as archaeological survey area 2A, but which Gunness in 1986 called "Area 3") as follows:

> In 1978 one test pit and ten test trenches were excavated in and around Area 3 [Archaeological Survey Area 2A], in preparation for a later abandoned beach erosion control project. It was found that historic activities in this area had completely destroyed any archaeological remains that may have once been present. This area has since been completely bulldozed and modified on two separate occasions, first in the construction of settling basins for the abandoned erosion control project [circa 1978]; and again in early 1985 by extensive grubbing and grading during park improvement activities.

For Area 2A, Gunness (1987b:5, map) concluded that: "No further archaeological work is necessary here."

Barrerra (1974) carried out excavations just to the north and east of the proposed east beach sewer lines. His closest trenches to the north leg (trenches 19, 20, 21, 24, 25 and 34) encountered no cultural deposits. None of Barrera's 1974 excavations were excavated within 50 m of the east leg of the proposed sewer line. None of his closest units to the east leg (1-5, 36, 40) appear to have produced anything notable at all (detailed stratigraphy is not reported). Only units 40 and 41 were near the southern leg and they appear to have produced nothing notable.

The vast majority of burials documented at Kualoa have been recovered from just north of the northernmost comfort station along the coast. Only five burials (burial numbers 12, 36, 62, 66 and 79) have been recovered from due east of the proposed east beach sewer lines.

The SHPD follows the recommendations of Gunness (1986), Cleghorn (1996), and Hammatt and Shideler (October 1999) in recommending that all excavations in the east beach study area below 18 inches be monitored. There does not however appear to be cause for prior testing in this area owing to the extensive subsurface impact from the runway,; the abandoned erosion control project settling basins [circa 1978]; and, again in early 1985, by extensive grubbing and grading during park improvement activities.

B. <u>Central Study Area</u> (Figure 5)

Introduction

The presently proposed plans run the collector sewer line from the junction with the lines from the east beach comfort station approximately 295 m along the south side of the existing gravel road to a centralized treatment plant and absorption field (Figure 5). Another collector line runs northeast from the park headquarters area up the south and east sides of the existing gravel road extending approximately 165 m from the southern elbow of the park headquarters access road to the centralized treatment plant and absorption field.

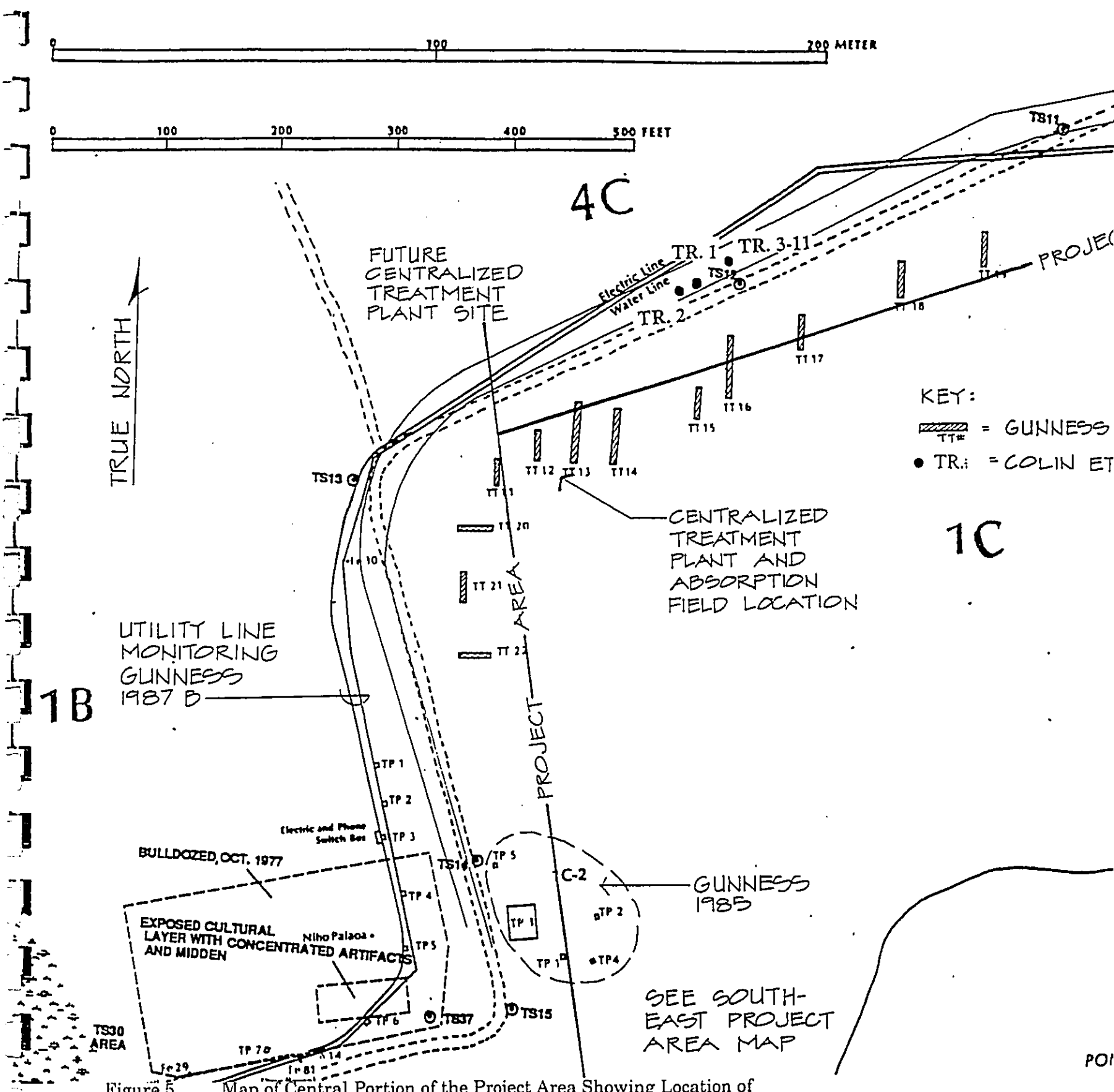
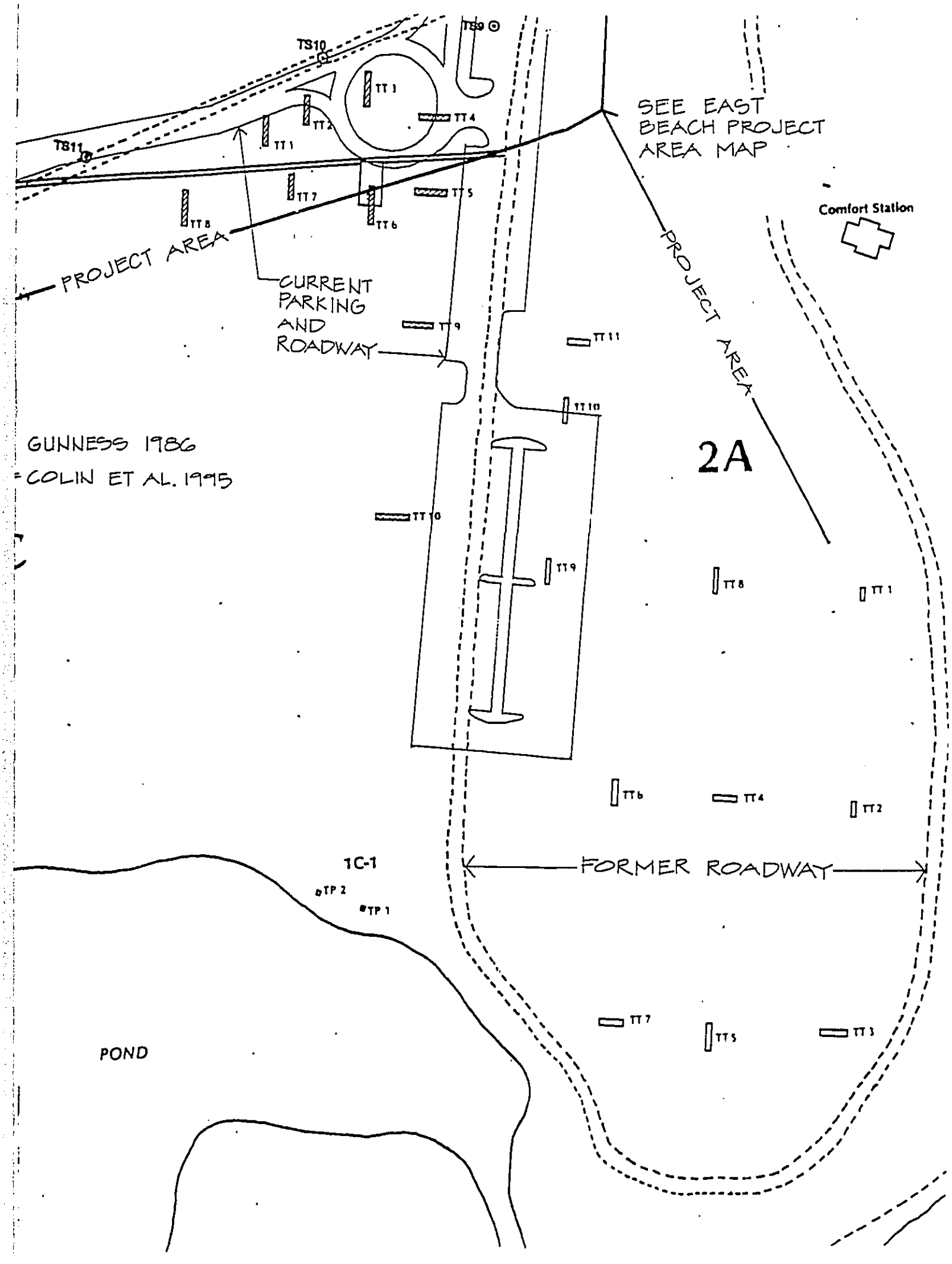


Figure 5 Map of Central Portion of the Project Area Showing Location of Proposed Centralized Treatment Plant and Absorption Field and Location of Archaeological Excavations


TS9
TS10
TS11
TT 1
TT 2
TT 3
TT 4
TT 5
TT 6
TT 7
TT 8
SEE EAST BEACH PROJECT AREA MAP
Comfort Station
PROJECT AREA
CURRENT PARKING AND ROADWAY
PROJECT AREA
GUNNESS 1986
= COLIN ET AL. 1995
TT 9
TT 11
TT 10
TT 10
2A
TT 9
TT 8
TT 1
TT 6
TT 4
TT 2
1C-1
TP 2
TP 1
FORMER ROADWAY
TT 7
TT 5
TT 3
POND

Overview of Previous Archaeological Studies in the Vicinity

Archaeological survey area 1C was extensively tested by Gunness in 1985 (Gunness 1986:34-41). This area was found to have been extensively disturbed by historic activities including sand mining and filling with clay dirt. Gunness (1986:57) recommended archaeological monitoring in the vicinity of the rotary turn area (near trenches 6 and 7) where intact or partially intact archaeological deposits may exist but asserted that no further archaeological work appears to be necessary from the rotary turn area west to the corner. The following year, Gunness (1987:5 and map) appears to have changed her recommendation somewhat asserting that except for site areas 1C-1 and 1C-2 (discussed further below) no further archaeological work is necessary here [Area 1C].

Gunness (1987B: 111) relates that relatively little of cultural significance was observed during monitoring of the east end of the water and electric lines which roughly parallels the gravel access road and proposed collector sewer line. A possible *imu* was noted in this trench 20 m from the main road (near test trenches 5 and 6).

The southern leg of the collector sewer system roughly parallels the south and east sides of the existing gravel road to the administration area and passes near the site area designated 1C-2 (Gunness initially called this "Area 6"). Gunness (1986:42) relates that no subsurface testing was conducted in the 65 m stretch south of backhoe test trench 22 ""because extensive historic disturbance to the area was obvious." In 1985, Gunness excavated 28 m^2 in five test areas near the southern bend in the road. Four of the five initial test pits excavated near the bend in the road revealed a "completely churned" 5 to 30 cm thick layer containing large numbers of basalt flakes overlying sterile sand but test pit 3 , which was eventually expanded to 24 square meters, revealed a large *imu* surrounded by at least 13 post molds. This feature was left intact and is now demarcated by cement pylons around the perimeter.

Gunness concluded (1986:57) that "with the exception of the *imu* and associated post molds excavated near the corner, archaeological deposits on the eastern side of the road are for the most part completely disturbed by historic plowing and bulldozing" but nevertheless she concluded that "archaeological monitoring is recommended for all surface disturbing activities in this area. This will ensure that any additional features which might be discovered during construction are adequately recorded, and that artifacts left in the area are collected." She noted that the area on the west side of the road was archaeologically sensitive.

Gunness (1987B:111) relates that relatively little of cultural significance was observed during monitoring of the water and electric lines which roughly parallel the gravel access road and proposed collector sewer line. No archaeological remains were observed on the northern side of the secondary road in area 4C. No artifacts were even surface collected from this area.

Gunness (1987:6) relates: "Grubbing in this area is presently being monitored by the archaeologist. To date, no significant archaeological remains have been discovered." As far as we know there is no further documentation of this 1987 monitoring. Gunness'

sensitivity map (1987:map) indicates her assessment that no further archaeological work or monitoring is necessary in this area.

C. <u>South West Study Area</u> (Figure 6)

Introduction

This study area includes the short segments of sewer lines connecting the park headquarters, comfort station and kitchen infrastructure to the main collector line which runs up to just southeast of the southern dogleg of the gravel access road to the park headquarters area (Figure 6). This area has been the focus of a great deal of archaeological research. This study area lies in archaeological survey area 1A.

Overview of Previous Archaeological Studies in the Vicinity

In 1975, Stephan D. Clark and Robert D. Connolly III (1975: III, 4; 1978:5) excavated 36 one-meter^2 test pits at the `Āpua Pond wall (designated site 1A-1). By 1978, 72 m had been exposed (Clark and Connolly III 1978:5).

In 1976, Stephan D. Clark and Robert D. Connolly III (1978:6-7; Gunness, 1987a:57-59) excavated 17 1-m2 test pits near the Historic Bathhouse identifying the well-known "pig burial site".

In 1978, the KARP Staff (Clark and Connolly III 1978:5-6) provided additional description and discussion of the `Āpua Pond wall.

In 1983, Jo Lynn Gunness (1984:16-18; 1987a:64-67) excavated nine auger holes (numbered 1-9) and three shovel pits (numbered 10-12) for the kitchen facility site location. These excavations were located around the park offices, Historic Bathhouse and Kitchen facility within the present study area. Gunness recommended construction of the kitchen facility to the south west of the Park Offices (in the area of auger holes 1-7). Instead, the facility was built just to the south east of the Park Offices Comfort Station.

Jo Lynn Gunness (1984:18) concluded the area of the present kitchen facility "would have been the bay prehistorically, [and thus] there should be no direct impact on archaeological remains." She adds (1984:19): "Activities related to the construction of the [Park Offices] comfort station and its leaching-field have essentially eliminated whatever remains existed in the area extending from approximately 8 meters west of the comfort station, to the eastern boundary of the study area". In 1984, (Gunness 1984:18) she estimated that the seaward edge of prehistoric cultural deposits was "approximately 40 m north of the known north end of the `Āpua Pond wall." In 1987, however, Gunness (1987a:67) placed the seaward edge of prehistoric cultural deposits "approximately 5 to 10 meters north of the presently mapped northern end of the `Āpua Pond wall" (this is where the maps place the "edge"). The reason for pushing the boundary seaward may relate to the discovery of a burial (# 37) at the site of the Kitchen facility cess pool # 2 in 1985 (computer print-out of Kualoa Burial lots). If this was indeed an *in situ* burial then it indeed seems that Gunness' reassessment was appropriate.

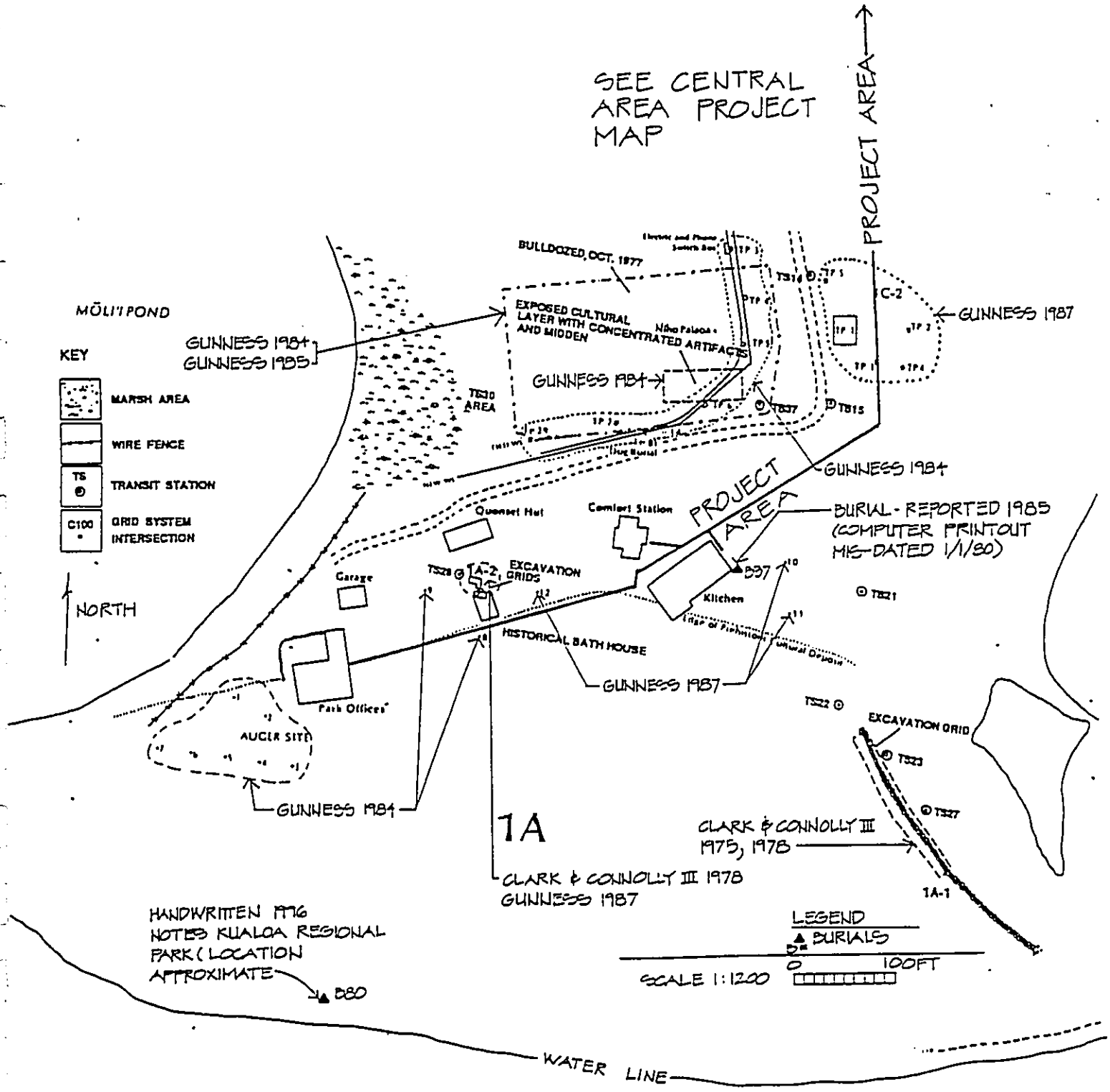


Figure 6 Map of Southwest Portion of the Project Area

In 1995 Paul Cleghorn (1996:15) performed archaeological monitoring of a small excavation (3.4 by 1.7 by 0.3 m deep) at the administration building. Nothing of significance was encountered.

Although Gunness (1984:19) concluded that, "Activities related to the construction of the [existing Park Offices] comfort station and its leaching field have essentially eliminated whatever remains existed in the area", she later (1987:4) wrote:

> Extensive archaeological remains are known to be present here amid areas of general disturbance caused by past development...Even tree planting, trenching for water, electric, or sewer lines, or digging footings for cement slabs should be monitored by the archaeologist; and the developer should expect delays while archaeological mitigation measures are taken.

The park offices comfort station study area is clearly the most archaeologically sensitive of the three study areas evaluated in this report. Any areas of ground disturbance lying *mauka* (north) of the line annotated "Edge of Prehistoric Cultural Deposit" on Figure 6 should be archaeologically monitored.

On the other hand, excavations on the south side of that annotated line should, in theory, be in recently deposited beach sand in what was open bay until late historic times. Given the unique nature of some of the finds within archaeological study area 1A, the problematic reported discovery of burial 80 (see Figure 6), and the previous movement of this line of cultural deposit (between Gunness 1984:18 & Gunness 1987:4) we do not feel comfortable recommending unmonitored excavation in this area. From the point of view of preserving the unique archaeological resources of this area it would be desirable that subsurface impacts be focused south of the annotated line.

III. MONITORING

Given the possibility that human burials and traditional Hawaiian cultural deposits may be encountered in the project area, an archaeological monitor will be on site during all ground disturbance activities at the project area. The following list presents the expected finds, and procedures for response to particular finds and events associated with the project activities.

1. Anticipated finds: There is a likelihood that the following historic properties may be encountered: habitation deposits (pre-contact and 1800s) and burials (pre-contact and 1800s). Additionally, there is the possibility of encountering scattered artifacts not directly associated with habitation deposits.

2. Treatment of remains encountered: If habitation deposits or human skeletal remains are encountered during excavation activities, work will be stopped immediately in the area, and the archaeologist will notify the SHPD/DLNR of the nature of the discovery. Burial finds will be treated according to HRS6E Burial Law and Administrative Rules Chapter 13-300. SHPD/DLNR will determine the appropriate treatment of the remains and any associated cultural material. If human remains are encountered, effort will be made to relocate the sewerage infrastructure where feasible. Much of this infrastructure is to consist of 2" diameter PVC lines and relocation of these lines to leave remains in situ should be possible. The consulting parties (SHPD/DLNR, the O`ahu Burial Council, and previously identified known lineal descendants) will decide if it is appropriate to remove the human skeletal remains. No remains will be removed without an SHPD determination. If any associated materials are encountered with an inadvertent human burial, all material will be treated according to SHPD's determination.

If any isolated feature (e.g. hearths, postholes, pits, etc.) or scattered habitation deposits, not associated with burials, are encountered, they will be documented according to SHPD standards, with an emphasis on profile documentation. If rich cultural deposits, with multiple features are encountered, work will be stopped, and SHPD will be consulted to determine appropriate measures. This may include preparation and implementation of a data recovery plan but this seems unlikely in the present case given the limited nature of the proposed ground-intrusive activities.. Substantial charcoal finds within likely pre-contact features will be collected, however no radiocarbon dating is envisioned at this time unless major findings are encountered. Any traditional Hawaiian artifacts encountered will be collected along with basalt and volcanic glass flakes and debitage, and food remains. Historic period artifacts will be collected for their diagnostic value in establishing temporal relationships within the stratigraphy.

3. The monitoring archaeologist has the authority to halt consturction in the immediate area of the find in order to carry out the plan. The field archaeologist will make it clear to project personnel that the archaeologist has the authority to halt work when it is appropriate.

4. Pre-excavation conference between the archaeologist and the project personnel. Before work begins on the project the on-site archaeologist will explain to the entire crew what materials may be encountered, the resulting procedures to follow, and the role of the archaeologist. At this time it will be made clear that the archaeologist must be on site for all ground disturbance activities.

5. Extent of monitoring. All ground disturbance should be monitored on-site by a qualified archaeologist.

6. Laboratory work to be done on collected materials.

   A. Burials.
   If removal is appropriate the remains will be stored temporarily at the SHPD Honolulu office until reburial plans are made in coordination with the O`ahu Burial Council, and previously identified known lineal descendants. Artifacts or other materials associated with any exumed human remains will be described and catalogued and then stored and reinterred with the human remains.

   B. Habitation layers
   Artifactual material from habitation layers will be catalogued and analyzed (measured, weighed, etc.) along with midden material. Diagnostic types of post-contact period artifacts will also be collected, catalogued, and analyzed.

7. Report. A draft archaeological monitoring report will be submitted to DLNR/SHPD within 30 days after the completion of Monitoring fieldwork for review and approval. This report will discuss the findings made during monitoring. The archaeological firm will submit the final report within 30 days after any review comments have been received.

   In the report the results of the laboratory analysis of the habitation deposits will be used to interpret their nature and function. For example, density of artifactual material and midden per volume (concentration index) can form the basis for the interpretation of the kind of habitation represented (i.e. permanent and temporary, domestic versus workshop, trash or other special feature).

In the case of post-contact habitation deposits, the location of these deposits will be plotted on a map for the purpose of assigning an identity to the habitation deposits.

8. Archiving of Collections. All exhumed human remains and associated artifacts will be given to DLNR/SHPD for temporary storage. After a brief period for analysis, materials not associated with burials will be stored at the Kualoa Regional Park facilities.

IV. SUMMARY AND RECOMMENDATIONS

The following summary of recommendations are in accord with recommendations in a Chapter 6E-8 Historic Preservation Review by the State Historic Preservation Division (SHPD) (Letter from Don Hibbard, SHPD Administrator toMr. Gary Q. L. Yee, Department of Design and Construction dated February 22, 2000).

Proposed ground disturbing activities in the east beach study area are focused in an area believed to have been massively impacted by runway construction and later road and parking lot development. Nevertheless there is a high probability of encountering burials or other significant archaeological resources particularly in the areas nearest the three comfort stations. Archaeological monitoring of all subsurface excavations extending deeper than 18" is recommended.

Proposed ground disturbing activities in the central study area are focused in an area that was extensively tested and found to be generally lacking in archaeological resources. Archaeological monitoring of all subsurface excavations extending deeper than 18" is recommended within a distance of 62 m (200 feet) of the main paved north/south access road and within a distance of 62 m (200 feet) of the southern dogleg of the gravel access road to the park headquarters. Continuous archaeological monitoring in-between on the south side of the gravel road is not indicated. However, monitoring results may revise this conclusion. Monitoring of all subsurface excavations extending deeper than 18" is recommended on the north side of the gravel access road to the park headquarters. Care should be taken to ensure that the *imu* feature in area C-2, currently protected by concrete pylons, is not impacted.

The southwest study area is the most archaeologically sensitive and archaeological monitoring of all ground disturbance in this area is indicated. It is highly desirable that the ground disturbance be focused seaward of the line annotated "Edge of Prehistoric Cultural Deposit" as present plans show.

No archaeological mitigation work in advance of ground disturbing activities in the project area is recommended.

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Star-Bulletin and Advertiser
1987 5/24/87

Appendix D

Ethnographic Study: Executive Summary

EXECUTIVE SUMMARY

Cultural Surveys Hawai`i was contracted by the Department of Parks and Recreation, City and County of Honolulu, to prepare an ethnographic study of the *ahupua`a* of Kualoa, Ko`olau Poko District, on the island of O`ahu. The study was commissioned to gather and synthesize available cultural, historical, and archaeological documentation on Kualoa — long recognized by native Hawaiians as a special, spiritual place in Hawaiian culture. A specific focus of the study was to provide a documentary foundation for developing relevant cultural and interpretive themes for the future development of Kualoa Regional Park.

A multilayered approach was adopted. Following a chronological sequence of themes, the study investigated Kualoa from traditional Hawaiian times, into the mid-nineteenth century and the *Māhele* which introduced private land ownership to the Hawaiian kingdom, through the history of the Judd family at Kualoa which led to the modern Kualoa Ranch, and into the twentieth century with the establishment of Kualoa Regional Park.

Specific thematic areas researched and reported in the study include:

Kualoa place names; and names of the Kualoa winds and seas; and proverbial sayings (*`ōlelo no`eau*): These names and sayings often capture the Hawaiian poetic and imaginative response to an area. For example, one of the Kualoa names collected for the study is *Holopali* — a wind at Ka`a`awa and Kualoa which means "running along the cliff", evoking visual images of a strong, gusty wind racing across the top of the *pali*. Thirty Hawaiian names and sayings associated with Kualoa were collected in the present study.

Myths and Symbolic Tales (*mo`olelo*) of Kualoa: Legends of seventeen Hawaiian gods and demi-gods that relate to Kualoa were collected in the present study. The legends, of varied complexity and detail, suggest the significance of Kualoa in the Hawaiian consciousness.

Cultural Traditions at Kualoa: Nine major traditions associated with Kualoa were collected and analyzed. These traditions include: the *menehune*, the night marchers, the *pu`uhonua* concept, the lowering of sails off Kualoa, human sacrifice, the *makahiki*, the introduction of *`ulu* (breadfruit), and the "template of the Earth." Specific details within each tradition are discussed and conflicting interpretations are noted.

Kualoa at the *Māhele*: At the mid-nineteenth century *Māhele*, Kualoa *ahupua`a* was among the Crown Lands retained by Kamehameha III. Subsequently in the *Māhele*, thirty-seven Land Commission Awards (LCAs) were registered in Kualoa to commoners and others who could prove residency on and use of the parcels they had claimed. These awards, whose records were collected for the present study, indicate that Hawaiians continuing to reside in Kualoa at the mid-nineteenth century were predominantly farming wet-land taro and sweet potatoes. Other plants gathered or cultivated included *wauke*, melons, and beans.

The Judd Family at Kualoa: G.P. Judd, who had come to the islands with the missionaries and later served in the Hawaiian government, purchased Kualoa from Kamehameha III in 1850. The Judd family's subsequent activities in Kualoa are documented in the study. After abandoning commercial sugar production, the family focused on the development of Kualoa Ranch which continues in operation to the present.

Kualoa in the Twentieth Century: Modern events, activities and concerns that have involved Kualoa are documented in the study; these include: World War II, the 1946 tsunami, the Kualoa-He`eia Ecumenical Youth (KEY) project, erosion control issues, the Temple of Lono, the voyaging canoe Hōkūle`a, and Hawaiian sovereignty. These events and issues suggest that Kualoa continues to resonate in the cultural, political, and social consciousness of Hawai`i.

Park History and Land Acquisition: The chronology of the acquisition of the future park lands and the subsequent history of Kualoa Regional Park are outlined in the study. It is apparent that development of the park has been the most significant opening of Kualoa *ahupua`a* to the general public since its purchase by G.P. Judd in 1850.

**Archaeological Investigations in Kualoa *Ahupua`a***: The first five recorded archaeological sites at Kualoa were located by J.G. McAllister in the 1930s. Since that time other archaeological investigations have recorded other major sites in Kualoa *ahupua`a* and in Kualoa Regional Park. These sites and the investigations that recorded them are detailed in the present study.

***Kama`aina* Interviews**: Fifteen individuals whose family ties, cultural interests, spiritual concerns, or professional lives have drawn them to Kualoa were interviewed for the present study. Full transcripts — which have been edited and approved by the interviewees — are presented in a volume of the study. Passages from the interviews have been excerpted and incorporated in appropriate sections throughout the study. These passages present the interviewees recollections and perceptions on specific aspects of life, culture and history at Kualoa. A common theme is the affection engendered by Kualoa and the profound sense of its significance that affected all the interviewees.

Hawaiian Language Newspaper Articles on Kualoa: A separate volume of the study presents articles on Kualoa — printed from 1862 to 1929 — that were copied from microfilm collections at Hamilton Library of the University of Hawai`i-Manoa, the Bishop Museum, and the Hawai`i State Library. Transcriptions and English translations prepared by Cultural Surveys Hawai`i are included in the volume. Also in the volume is an annotated bibliography of archaeological studies in Kualoa and a table listing articles on Kualoa in English language newspapers.

Study Summary and Recommendations for Kualoa Regional Park: The materials collected for this ethnographic study document that the Hawaiian traditions connected to Kualoa have not been lost in the present-day consciousness of both Hawaiians and non-Hawaiians. The most compelling evidences of this cultural continuity through time are the words of the fifteen *kama`aina* interviewees. The results of this ethnographic study suggest that traditional Hawaiian cultural themes and education in those themes should be the major focus of future park development.