SMA APPLICATION
DRAFT
ENVIRONMENTAL ASSESSMENT

PARKING LOT IMPROVEMENTS

Waianae Beach Park

Departments of Parks and Recreation ● Design and Construction
City and County of Honolulu

March 2008

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General Information & Summary Sheet

Project: This Environmental Assessment addresses proposed parking lot improvements at Waianae Beach Park. The proposed improvements would add 31 standard stalls and two ADA stalls to the existing 24 standard stalls and one ADA stall. The improvements are within a 0.5 acre area surrounding the existing parking lot. New parking lot lighting which is compatible with marine life and sea birds will be installed. One monkeypod tree will be relocated and four monkeypod trees will be added for a net increase of four monkeypod trees. Native white hibiscus will be planted as a border on one side of the parking lot. Drainage will be via an existing drywell. There are no known historic or prehistoric sites affected and subsurface sampling was performed at the proposed for verification.

Location	Waianae District, O‘ahu, Hawai‘I , City and County of Honolulu
Tax Map Key	8-5-02:49.
Project Site	0.5 Acres.
State Land Use District & Zoning	Urban Land Use District; P-2 Zoning.
Ownership	City and County of Honolulu; State of Hawaii.
Neighborhood Board/Council Dist.	Neighborhood Board 24 (Waianae Coast); Council District 1.
Approving Agency	Department of Design and Construction, 650 South King Street, Honolulu, Hawai‘I 96813.
Proposing Agency	Department of Design and Construction, 650 South King Street, Honolulu, Hawai‘I 96813.
Consultant	Austin Tsutsumi & Assoc., Kent Morimoto (Project Manager), 501 Sumner St., Suite 521, Honolulu, Hawai‘I 96817-5031; Telephone: (808) 533-3646; E-mail, KMorimoto@atahawaii.com.
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Required Permits and Approvals	Special Management Area Permit (Major), Department of Planning and Permitting.

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A. Archaeological Assessment

B. Cultural Impact Assessment

1 Description of the Proposed Action

1.1 **Technical characteristics.** This section describes the location and purpose of the project and how it would be accomplished.

1.1.1 **Project background.** The City and County of Honolulu, Department of Parks and Recreation, proposes to construct parking lot improvements at Waianae Beach Park, located on O‘ahu’s western shore. Additional parking is desired by the community because of heavy use of the multi-purpose facilities in this park.

1.1.2 **Location and purpose of the project**. The project site is located along the west shore of O‘ahu, adjacent to Pokai Bay. (Figure 1). The project provides additional on-site parking because of the heavy use of the Park and its multi-purpose facilities.

1.1.4 **How the project will be accomplished**. The proposed improvements would add a total of 31 standard stalls and two ADA stalls to the existing 24 standard stalls and one ADA stall. Two double and four single light standards will be installed to support high pressure sodium lamps at a height above ground of approximately 26 feet. This type of fixture directs the light towards the ground to not adversely impact night birds. The improvements are within a 0.5 acre area surrounding the existing parking lot. One monkeypod tree will be relocated and four monkeypod trees will be added for a net increase of four monkeypod trees. Native white hibiscus will be planted as a border on one side of the parking lot. There are no known historic or prehistoric sites affected and subsurface sampling was performed at the proposed for verification. The paved surface area will increase from 10,000 square feet (existing) to 20,000 square feet (total after project) and drainage will be via an existing drywell.

Schedule. The proposed improvements are scheduled for construction in 2008.

1.2. **Socio-economic characteristics**. This section discusses the impacts of the proposed project on the community in terms of both social and economic effects.

1.2.1 **Economic impacts on the community at large**. This project will have a beneficial economic impact on the community at large because it will improve access to the facilities of this beach park which will facilitate and enable the use of the multi-purpose facilities by more members of the community which will be a positive and beneficial impact.

1.2.2 **Provision of income for the county or state and creation of employment opportunities in areas with high unemployment rates**. The project provides benefits through jobs related to its implementation.

1.2.3 **Targeted segment of the population**. No specific segment of the population is targeted because this project has general public benefit.

1.2.4 **Population density**. The project has no effect on population density because the park’s capacity is not being increased.

1.2.5 **Recreational facilities**. The project benefits park-users by improving the facilities such as the parking lot. There are added benefits because more members of the community will have access to the park facilities.

1.2.6 **Child care provisions**. There are no child care provisions in relation to the proposed project.

1.2.7 **Relocations of residences**. No relocation of residences would occur.

1.2.8 **Costs of the proposed project and economic analysis**. The estimated total cost of construction for the proposed improvement is approximately $500,000.

1.3 **Environmental characteristics**. This section discusses the potential effects of the proposed project on the physical environment.

1.3.1 **Aesthetics and viewplanes.** The project will not adversely affect aesthetics or viewplanes. Four monkeypod trees will be added, and one will be relocated. Native white hibiscus will be planted along one edge of the parking lot. Border areas presently consisting of bare earth will be grassed and an irrigation system will be installed to maintain the vegetation. The aesthetics of the area will be improved as a result of these project components.

1.3.2 **Air pollution**. There would be some minor effects during construction and these would be mitigated per county and state rules. There would be no long term effects because the proposed project includes no air pollution sources and would not generate significant differences in traffic from the existing conditions.

1.3.3 **Traffic congestion**. The proposed project does not add capacity to the park, rather, it provides legitimate spaces which are intended to replace the use of illegitimate parking at the park which now occurs during times of intense use. Some community members can and do walk to the park, but their numbers will not change significantly after the project. There will be little effect on traffic except during periods when construction materials are delivered to the site. Such traffic will consist of heavy trucks and trailers. They will operate during normal working hours and will follow existing regulations regarding road clean-up (if necessary) resulting from this traffic.

1.3.4 **Noise levels**. There will be some increase in noise levels during construction of the project. This will occur during normal working hours. Contractor's equipment is required to meet Department of Health noise regulations.

1.3.5. **Effects on water quality and the marine environment.** Impacts on water quality and the marine environment are not anticipated. The parking lot is more than 400 feet from any water body and drainage from the parking lot is via an existing drywell.

1.3.6 **Other environmental effects**. The site is located in a coastal flood hazard area. No residential uses of this site are proposed. The existing parking lot and the proposed additional parking spaces are in flood zones AE and D.

1.3.7 **Parking lot lights.** Parking lot light standards are acceptable for near coastal installations where sea birds or other marine live could potentially be impacted. Four new poles with single light fixtures and two new poles with double light fixtures will be installed. The lights are of the shoebox type which is typically used in beach park situations now. There will be no light above the horizontal plane at the bottom of the fixture. The lamps are high pressure sodium. The height of the light fixtures above ground will be approximately 26 feet.

1.3.8. **Drainage.** Drainage is accomplished to the surrounding park lands via an existing drywell at the end of the parking lot.

2 Description of the Affected Environment

2.1 **Location**. The proposed project is located at Waianae Beach Park, on O‘ahu’s western shore. Tax Map Key: 8-5-02:49. Total land area is 0.5 acres.

2.2 **Land ownership and tenancy**. The parcel is owned by the State of Hawaii and managed by the City and County of Honolulu as a County beach park.

2.3 **County Zoning, State Land Use District**. The proposed project is in a State Urban Land Use District and is zoned P-2 by the County.

2.4 **Special Management Area, Coastal Zone Management Consistency, Shoreline Setback Area**. The proposed project is within the boundary of the SMA (Special Management Area) and is subject to regulatory authority of the City and County of Honolulu, Department of Planning and Permitting. Because no federal permits are involved, the project will not be subject to review and approval by the Hawai‘I Coastal Zone Management (CZM) Program for consistency with CZM objectives as part of the federal requirements imposed by the U.S. Army Corps of Engineers for issuance of their permits. The parking lot is more than 400 feet from the shoreline and out of the shoreline setback area.

2.5 **Land, beach and water use**. Beach use was observed during two separate site visits, and park use was discussed with Parks Department staff. On a daily basis the park is used for sight-seeing, picnicking, beachgoing and some swimming. On weekends and holidays, the park is often used by large organized groups of people for various events. In such cases there may be 100 or more people using the park. The multi-purpose facilities at the park include a gym and various activity areas and meeting rooms. These facilities are intensely used by the community as a community center with activities day and night and every day of the week.

2.6 **Land and related water use plans**. Following is a discussion of land and water use plans which are related to the proposed plan.

2.6.1 **City and County of Honolulu.** Improvements to this park are in conformance with planning for development of Waianae District, and as part of the Department of Parks and Recreation long-range plan for improvements to beach parks on O‘ahu.

2.6.2 **State of Hawai‘I.** Improvements to this park are in conformance with the general state objectives to improve parks for residents and visitors

2.6.3 **Federal.** There are no federal plans for the area, but the Park is adjacent to the Pokai Bay Military Reservation which is used for rest and recreation by U.S. Department of Defense personnel and families.

2.7 **Flora and Fauna**. The flora at this site consists of ground cover of mixed grass species and monkeypod trees. No listed, rare, threatened or endangered species are at this location. The value of the monkeypod trees in this park is high because of their maturity,

beauty and shade. Common birds appear to use the park. No listed species of fauna have been identified at this park.

2.8 **Coastal Setting and Beach Stability**. The beach fronting this park appears relatively stable, but is exposed to high surf and storm waves on occasion. Evidence of minor shoreline erosion, typical of much of O‘ahu’s leeward coast can be seen. However, rapid erosion or severe instability of this site does not seem apparent. The proposed project is more than 400 feet from the shoreline.

2.9 **Water Quality**. Ocean water quality is Class A in this area as determined by the State Department of Health. Thick and dense vegetation occupy the area (a distance of more than 400 feet) between the active portions of the park and the seashore.

2.10 **Historical, archeological, traditional and cultural sites**. There are no known traditional or cultural practices or historic or prehistoric sites or burials which would be affected by the proposed project. Archaeological and cultural reports is included as Appendices A & B, respectively.

2.11 **Sensitive habitats or bodies of water adjacent to the proposed project**. The Pacific Ocean is adjacent to the shoreline but is more than 400 feet from the proposed project and no effect is foreseen.

2.12 **Flooding and Tsunami.** According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map, the proposed project site is in the flood hazard zones AE and D. A parking lot is an acceptable use in such areas.

2.13 **Soils.** The park is primarily composed of fill material comprised of dirt and rocks. The proposed project site has been previously filled and graded when the park was first constructed and the existing parking lot was paved.

2.14 **Drainage.** Storm water runoff in the parking lot flows to the lower elevations of the topography into an existing drywell. The added impermeable surface area (10,000 square feet) of the additional parking stalls is not anticipated to adversely impact drainage at the park. The volume of runoff will increase from an approximate 1.2 CFS (cubic feet per second) to 2.4 CFS.

2.15 **Highway and Parking Lot Lighting.** There are highway lights on the utility poles lining Farrington highway. There are two existing “cobra” type lights at the existing parking lot. One will be removed and one will remain. Four new poles with single light fixtures and two new poles with double light fixtures will be installed. The lights are of the shoebox type which is typically used in beach park situations now. There will be no light above the horizontal plane at the bottom of the fixture. The lamps are high pressure sodium. The height of the light fixtures above ground will be approximately 26 feet. If adverse effects to fauna are observed in the future after construction, one option would be to turn off the parking lot lights at night if the park is to be closed to minimize impact on night birds and mammals, or aquatic life.

3 Major Impacts and Alternatives Considered

3.1 **Positive impacts**. Positive and beneficial impacts of the proposed project include the increased accessibility to the park offered by additional parking spaces including ADA spaces.

3.2 **Negative impacts**. There are no negative significant impacts of the proposed project.

3.3 **Alternatives considered.** The following is a discussion of the alternatives which were considered during the formulation of the recommended project.

3.3.1 **No-Action Alternative**. If no improvements are made the existing problem of parking overflow into unauthorized areas within the park, including lawns, will continue. Also, some members of the community will be denied access to the multi-use facilities which serve many population segments including youth, the elderly and the disabled.

3.3.2 **Preferred Alternative – Proposed Parking Lot Improvements.** The preferred alternative is to add the proposed parking lot improvements to the park. The specified location of the proposed parking stalls was made per discussions with park personnel and members of the community for the least impact on the existing park areas which are heavily used. This alternative leaves the existing large grassed areas available for large group use which is frequent at this location.

3.4 **Impacts Relative to the CZM Objectives & Policies and the SMA Guidelines.**
The following table displays the review guidelines in relation to the characteristics of the proposed project.

Impacts Relative to CZM Objectives & Policies and the SMA Guidelines		
Sec.	**Review Guideline**	**Impact of Project**
25-3.2(a)(1)	Ensure adequate access.	The existing public access will be enhanced because of additional parking stalls.
25-3.2(a)(2)	Ensure public recreation & wildlife preserves.	Project improves access to an existing public park; no adverse effect on wildlife or habitat.
25-3.2(a)(3)	Provide for waste treatment.	Park has existing waste treatment facilities and procedures.
25-3.2(a)(4)	Minimize alterations to landforms & vegetation.	There is no change in topography and existing bare earth areas will be landscaped.
25-3.2(b)(1)	No substantial cumulative or adverse effect.	There is no significant cumulative or adverse effect.
25-3.2(b)(2)	Consistent with objectives and policies of Sec. 25-3.1 & guidelines in HRS Sec. 205A-26.	The project benefits public recreation and has no adverse effects.
25-3.2(b)(3)	Consistent with County Plans	No change in existing land use or plan as park.

Impacts Relative to CZM Objectives & Policies and the SMA Guidelines		
Sec.	**Review Guideline**	**Impact of Project**
25-3.2(c)(1)	Minimize dredging, filling, estuarine effects	No dredging, filling or estuarine actions.
25-3.2(c)(2)	No reduction of beach or public recreation area.	There is no effect on beaches or reduction of public recreation areas.
25-3.2(c)(3)	No restrictions on public access to tidal or riverine areas.	The project places no restrictions on public access.
25-3.2(c)(4)	No substantial interference with line of sight towards sea from state highway.	The sea is not visible from the state highway at this location due to the presence of existing park vegetation which is located between the proposed project and the sea. The project itself is flat and at existing ground elevations
25-3.2(c)(5)	No adverse effect on water quality, visibility, fishing, habitat or agricultural lands.	Project is more than 400 feet from the ocean, there are no adjacent streams, no habitat or agricultural land is being disturbed, storm runoff from the additional paving is routed to an existing dry well so that there is no storm water discharge to State waters or to the ocean.

4 Proposed Mitigation Measures

4.1 **Potential problems and appropriate mitigation including best management practices**. There are no potential problems which might require mitigation. As required by law, contractor will follow best management practices during construction to minimize noise, dust, and disruption to park use.

5 Expected Determination

5.1 **Finding of No Significant Impact (FONSI)**. The proposed improvements will not have a significant effect on the environment and therefore preparation of an environmental impact statement is not required. This document constitutes a Notice of Negative Declaration/Finding of No Significant Impact for the proposed project. This determination was based on review and analysis of the "Significance Criteria" in Section 11-200-12 of the Hawai'I Administrative Rules, as documented below.

5.2 **Findings and reasons supporting the determination including justifying evidence.**

5.2.1 *No irrevocable commitment to loss or destruction of any natural or cultural resource would result.* There are no such sites present within the park.

5.2.2 *The proposed project would not curtail the range of beneficial uses of the environment.* The proposed project will enhance the beneficial use of the environment by providing improved parking and accessibility to the park.

5.2.3 *The proposed project would not conflict with the state's long-term environmental policies or goals and guidelines.* The state's environmental policies and guidelines as set forth in Chapter 344, Hawai'I Revised Statutes, "State Environmental Policy", encompass two broad policies: conservation of natural resources, and enhancement of the quality of life. The proposed project will both conserve and enhance the natural resources of the park, and enhance the recreational experience for both visitors and the local populace.

5.2.4 *The proposed project will improve the economic and social welfare of the community and the state.* The proposed improvements add to the benefits available to visitors who may tour around the island. By enhancing the visitor benefits, the general welfare of the state is improved because tourism is a major component of the state's economy.

5.2.5 *The proposed project would not substantially affect public health*. The proposed improvements will not have substantial effects on public health. Impacts, if any, will be beneficial because of increased access to the park and its facilities.

5.2.6 *No substantial secondary impacts, such as population changes or effects on public facilities, are expected.* The project will not alter the present use of the park. Enhancement of the park will not cause population changes nor will there be any effects on existing public facilities.

5.2.7 *No substantial degradation of environmental quality is expected due to the proposed project.* Construction activities would have potential short-term impacts on ambient environmental quality, although these impacts are expected to be minor. In the long term, the completed project will improve the environmental quality by lessening the dust problem due to the illegal parking that damages the grass. No endangered species or valuable habitat will be affected by the proposed project.

5.2.8 *No cumulative effect on the environment or commitment to larger actions will be involved.* The proposed improvements affect only the park itself.

5.2.9 *No rare, threatened or endangered species or their habitats are affected.* No impacts are anticipated on any candidate, proposed or listed endangered species or their habitats. There are no known threatened/endangered species or their habitats within the project limits.

5.2.10 *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* Construction activities may cause short-term impacts to air, noise and water quality which will be mitigated to the extent practicable.

5.2.11 *The proposed project will not detrimentally affect environmentally sensitive areas such as flood plains, tsunami zones, beaches, erosion-prone areas, geologically hazardous lands, estuaries, fresh waters or coastal waters.* The proposed project is the improvement of an existing park, and the project site is not in an erosion-prone or geologically hazardous location.

5.2.12 *The proposed project will improve scenic vistas and view planes identified in county or state plans or studies.* The proposed improvements to the park would not obstruct seaward views which are not present now because of dense foliage which exists on lands between the parking lot and the sea shore.

5.2.13 *There will be no requirement for substantial energy consumption.* Construction of the project and use of the completed project will not require substantial energy consumption.

6 Identification of Agencies, Organizations and Individuals Consulted

The following narrative summarizes the coordination with key agencies and with the Neighborhood Board as of this date of writing, and also provides a list of the permits required for this project to proceed.

6.1 State of Hawai'I.

6.1.1 Department of Health. Coordination with the Office of Environmental Quality Control has occurred through use of their guidelines for preparation of this environmental assessment.

6.1.2 Office of Hawaiian Affairs. OHA was consulted during preparation of the cultural impact assessment (Appendix B).

6.1.3 Department of Land and Natural Resources, Division of State Parks. Consultation occurred during preparation of the cultural impact assessment (Appendix B).

6.2 City and County of Honolulu.

6.2.1 Office of the Mayor. The Mayor's office is appraised of this project via the planning process.

6.2.2 Department of Design and Construction. The Department is the facilitator and one of the proponents of the project. Several meetings have been held with representatives of the Department to formulate this project.

6.2.3 Department of Parks and Recreation Services. The Department is one of the major proponents of this project and has participated in the preparation of the master plan and assessment process

6.3.4 Department of Planning and Permitting. The Department is responsible for the Special Management Area permit process.

6.3 United States Government.

6.3.1 No contacts have been initiated because there is no U.S. government involvement in this project, nor are there jurisdictions by permitting agencies such as the U.S. Army Corps of Engineers. No listed species have been identified.

6.4 Organizations and Individuals.

6.4.1 Neighborhood Board. An informational presentations have been ongoing with the neighborhood board via the City's routine information processes.

6.5 Permits and approvals

6.5.1 Special Management Area Permit (SMAP). An SMAP is required for this project because the entire park and all proposed projects would take place in the Special Management Area which consists of lands seaward of Farrington Highway.

6.5.2 An approval of construction documents and permits for building and grading will also be required.

6.5.3 Prior to construction, final project plans must be reviewed by the Disability and Communication Access Board. Plans should conform to the current guidelines, best design practices and recommendations from the U.S. Architectural and Transportation Barriers Compliance Board's Regulatory Negotiation Committee Final Report, "Accessibility Guidelines for Outdoor Developed Areas" (September 1999), or more recent guidance if available.

References

City and County of Honolulu, *Land Use Ordinance*.

City and County of Honolulu, *Parks Standard Details*, May 1990.

City and County of Honolulu, *Waianae Sustainable Community Plan,* 2000.

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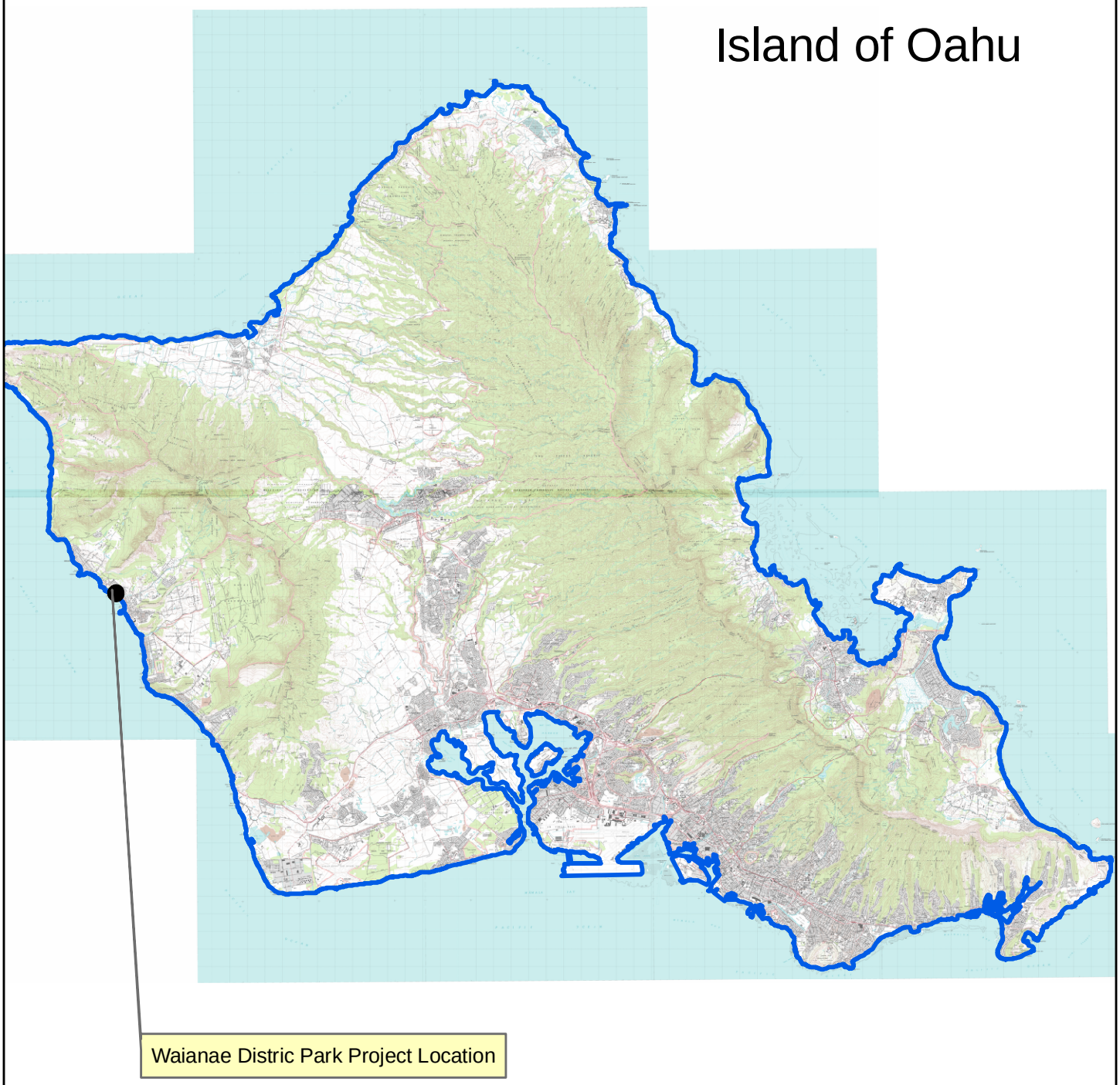


Figure 1. LOCATION
Waianae District Park
Parking Lot Improvements
Austin Tsutsumi & Associates

0 1 2 4 6 8 10 Miles

N

E. Dashiell, AICP
Environmental Planning Services
Honolulu - 9/20/07

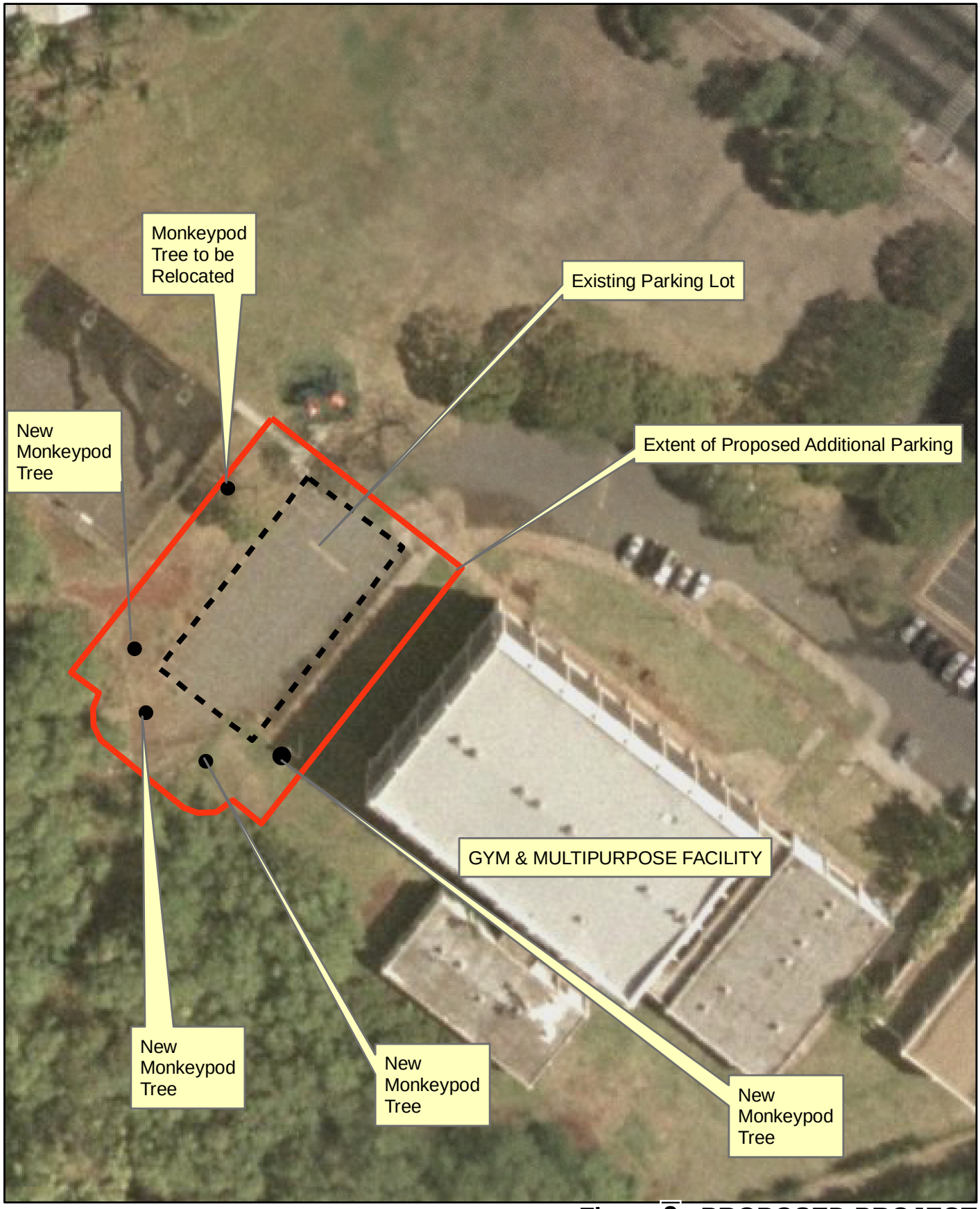
200 100 0 200 Feet

N

● Monkeypods

Figure 2 ENVIRONMENT
Waianae District Park
Parking Lot Improvements
Austin Tsutsumi & Associates

E. Dashiell, AICP
Environmental Planning Services
Honolulu - 9/20/07



50 25 0 50 Feet

N

● Monkeypods

Figure 3. PROPOSED PROJECT
Waianae District Park
Parking Lot Improvements
Austin Tsutsumi & Associates

E. Dashiell, AICP
Environmental Planning Services
Honolulu - 9/20/07

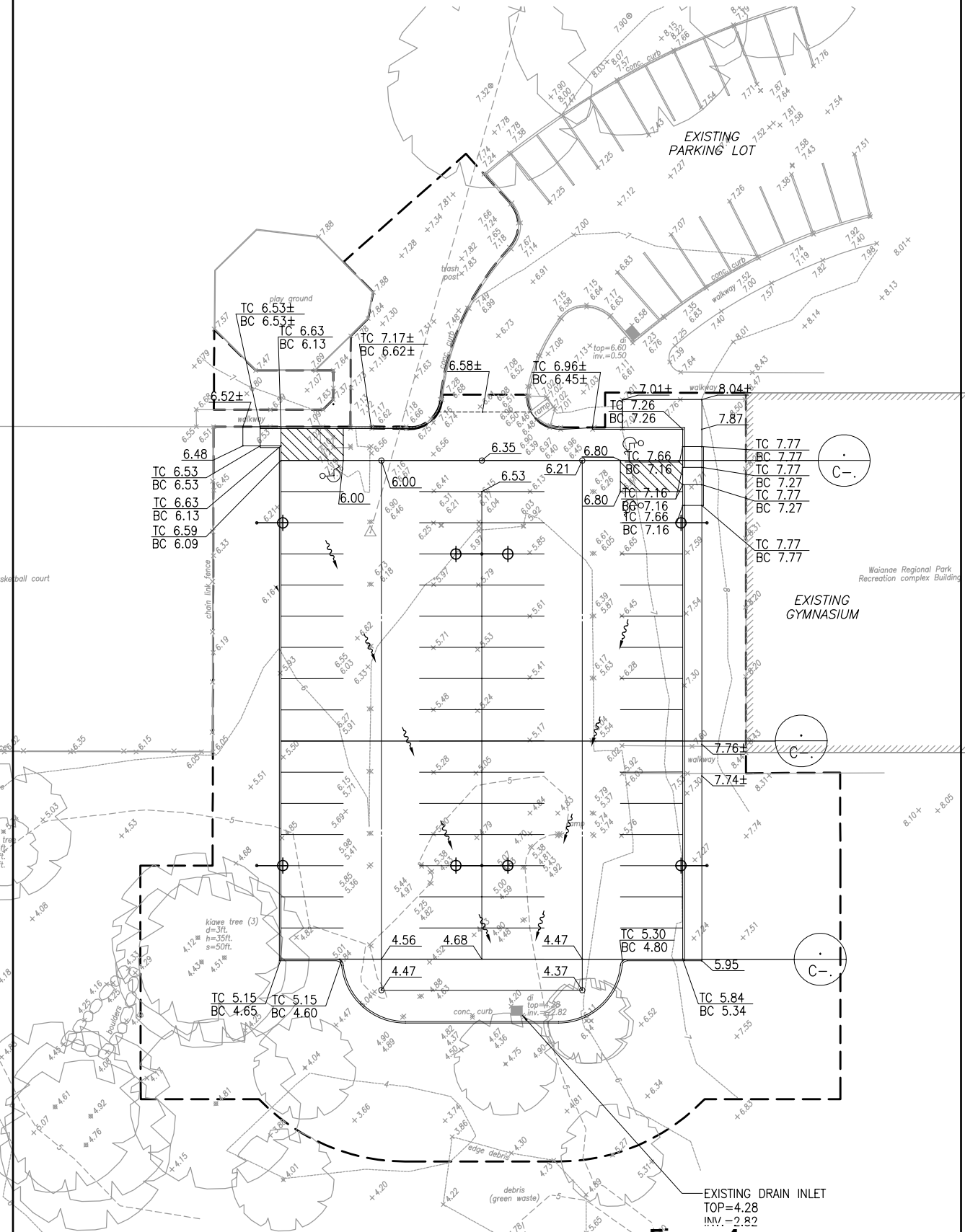


Figure 4
Layout & Drain Inlet

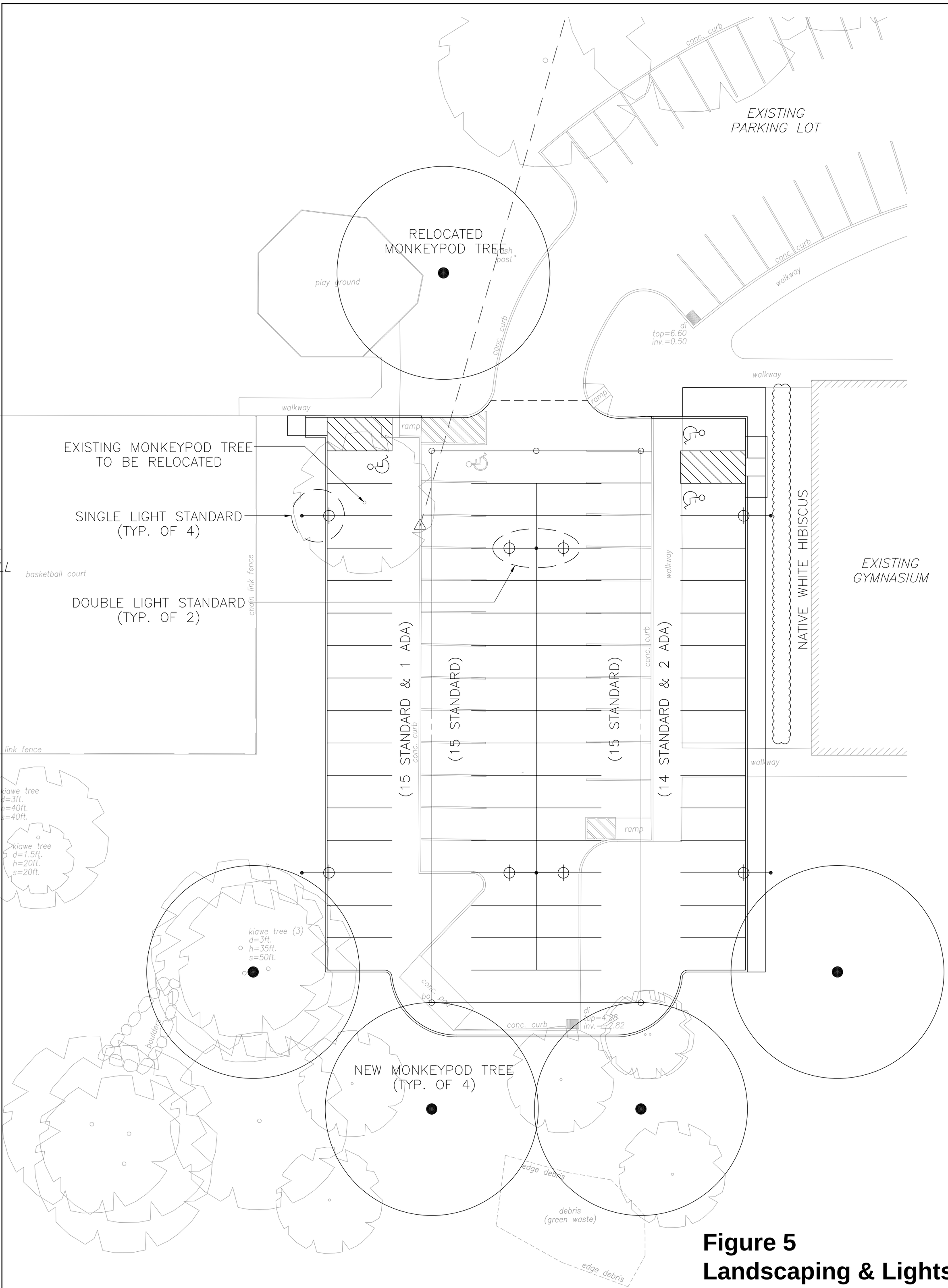


Figure 5
Landscaping & Lights

Figure 6. Existing monkeypod tree to be relocated.

Figure 7. Existing "cobra" light fixtures, one in background to remain, one in foreground to be replaced.

APPENDIX A
ARCHAEOLOGICAL ASSESSMENT

SCS Project Number 854-AA-2

AN ARCHAEOLOGICAL ASSESSMENT OF A PORTION OF THE WAI`ANAE REGIONAL PARK IN PREPARATION FOR PARKING IMPROVEMENTS IN WAI`ANAE AHUPUA`A, WAI`ANAE KAI, POKA`I `ILI, WAI`ANAE DISTRICT, ISLAND OF O`AHU, HAWAI`I [TMK: (1) 8-5-002:49]

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Figure 6: Profiles of Stratigraphic Trenches 4 through 6. 16

INTRODUCTION

Kent Morimoto of Austin, Tsutsumi, and Associates, Inc.contracted Scientific Consultant Services, Inc. (SCS) to conduct an Archaeological Inventory Survey of a portion of the Wai`anae Regional Park [TMK: (1) 8-5-2: 49] in Wai`anae Ahupua`a, Wai`anae Kai, Pōka`ī ‘Ili Wai`anae District, Island of O`ahu, Hawai`i (Figures 1 and 2). This work precedes planned parking lot improvements in the area situated between the existing Public Library and the basketball court. Archaeological testing in this area consisted of six mechanical trenches excavated on the perimeter of a planned asphalt parking lot. The area proved to yield negative cultural deposits, with mostly shallow soil deposits atop limestone bedrock identified throughout the excavated area. The results of this work are discussed in greater detail herein.

ENVIRONMENTAL SETTING

The project area is within the Wai`anae Regional Park, on the northwest flank of Pōka`ī Bay in the traditional Ahupua`a of Wai`anae Kai, Pōka`ī `Ili. While the Wai`anae Regional Park is a large area encompassing three TMK lots and over 75 acres, the specific area of examination was within TMK lot 49, which has been extensively graded and developed for community recreational use. The area of examination is along the perimeter of a pre-existing asphalt parking lot situated between the Public Library and a basketball court (see Figure 2). The parking lot is being expanded, and testing occurred only within the planned expansion zone (Figure 3).

While the project area lies in a dry coastal plain, Wai`anae Valley holds a diverse milieu of geographic features. First, the large and hospitable Pōka`ī Bay lies to the southeast of the project area. Kawiwi Stream, one of several mountain streams in Wai`anae Valley, enters Pōka`ī Bay’s western flank. This bay is demarcated on its east side by Kane`ilio Point, the location of Oahu’s only known *heiau* (shrine, temple) that is surrounded by water on three sides. Inland the steep slopes of Wai`anae Range begin their ascent far *mauka* of the project area. Pu`u Kamaile`unu and Pu`u Pahe`ehe`e demark the western and eastern flanks of this valley, respectively. Each *pu`u* (hill) is marked by a *heiau* bearing its namesake; however, Pahe`ehe`e Heiau has been destroyed. Pu`u Kahea, which stands at the back of the valley atop its central peak, once held the Kamohoali`i Heiau. These ceremonial features attest to the importance of Wai`anae Ahupua`a during the late pre-Contact Period.

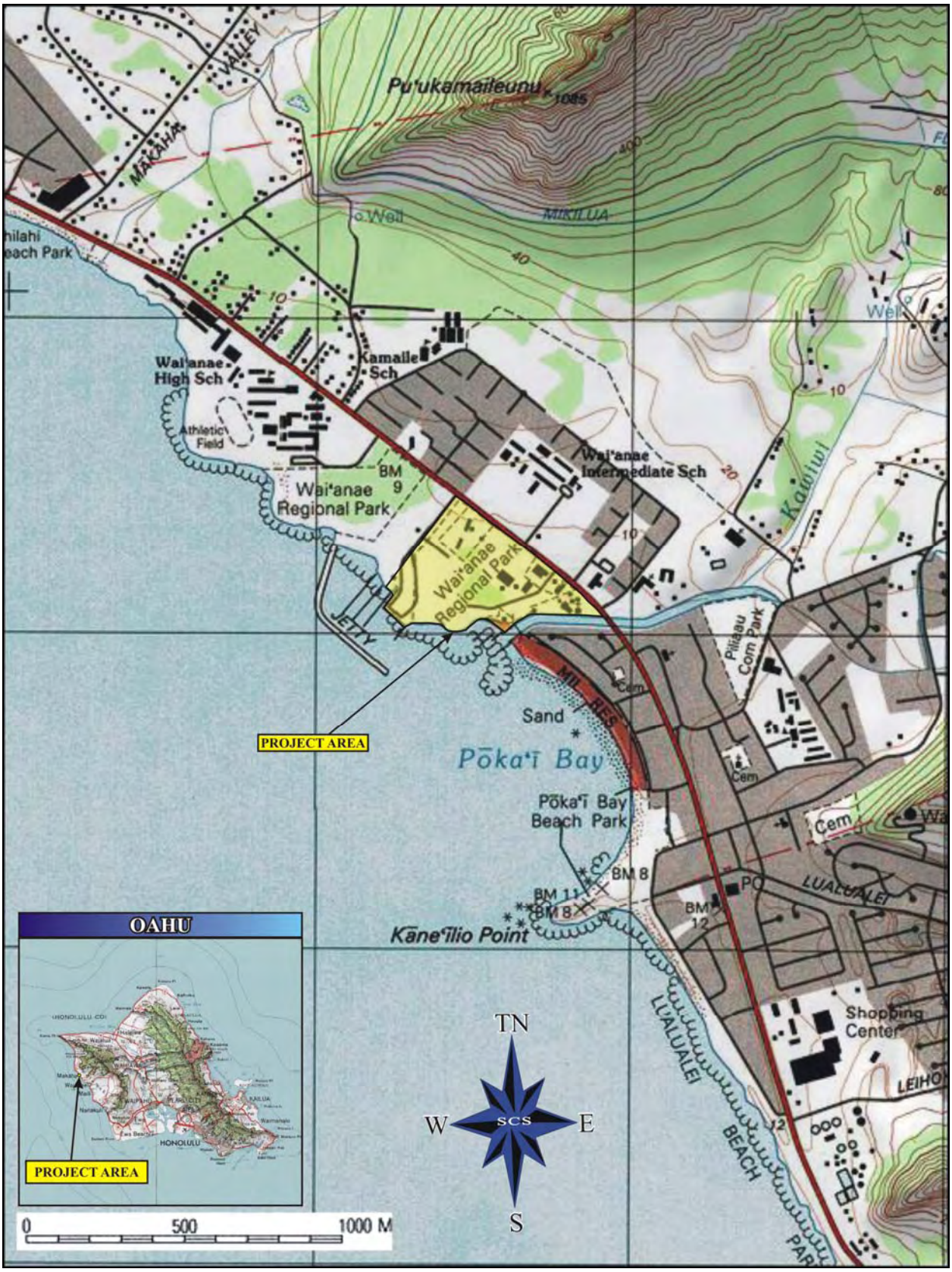

Figure 1: USGS Wai`anae Quadrangle Showing the Project Area.

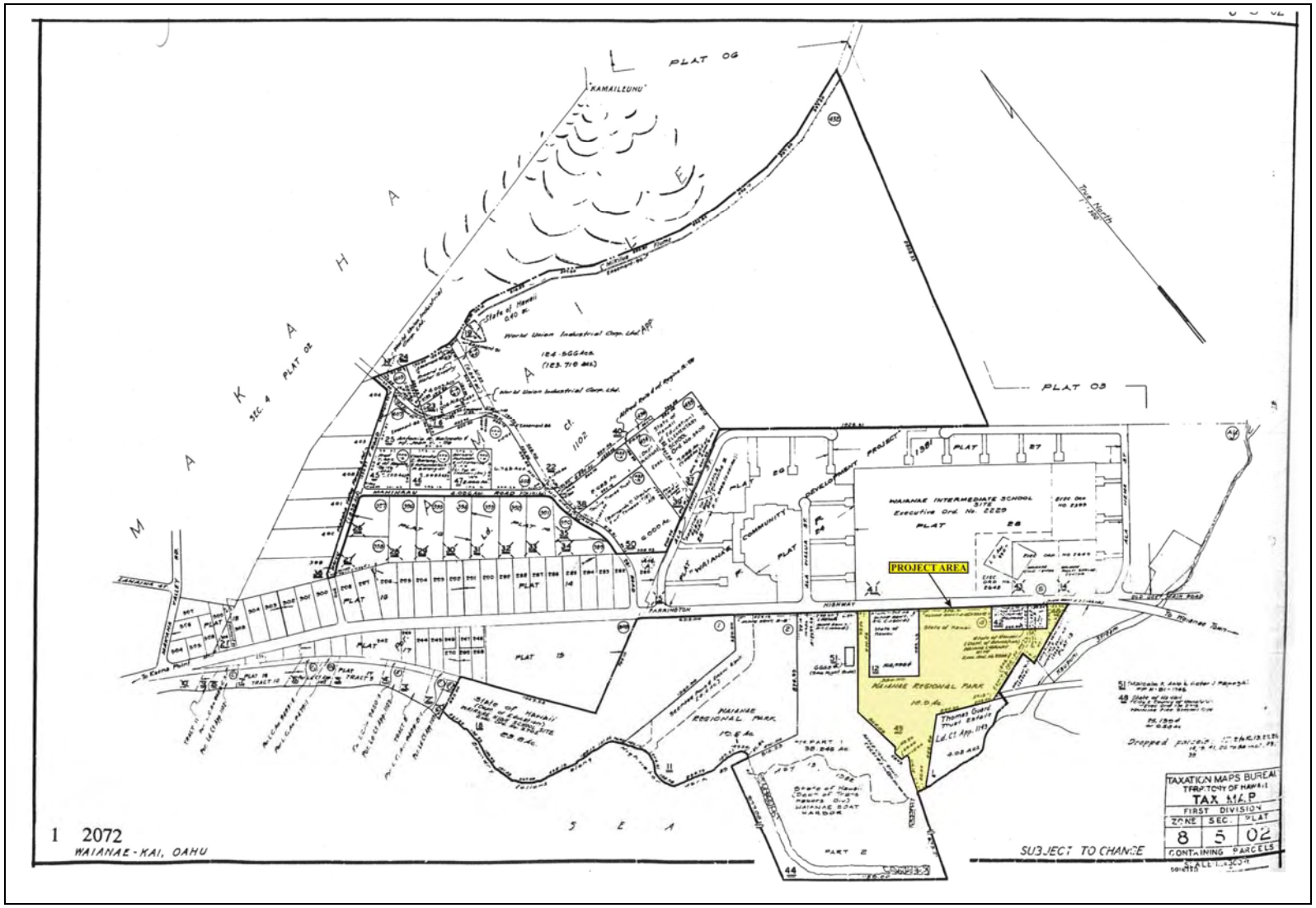

Figure 2: Tax Map Key [TMK] Showing the Project Area.

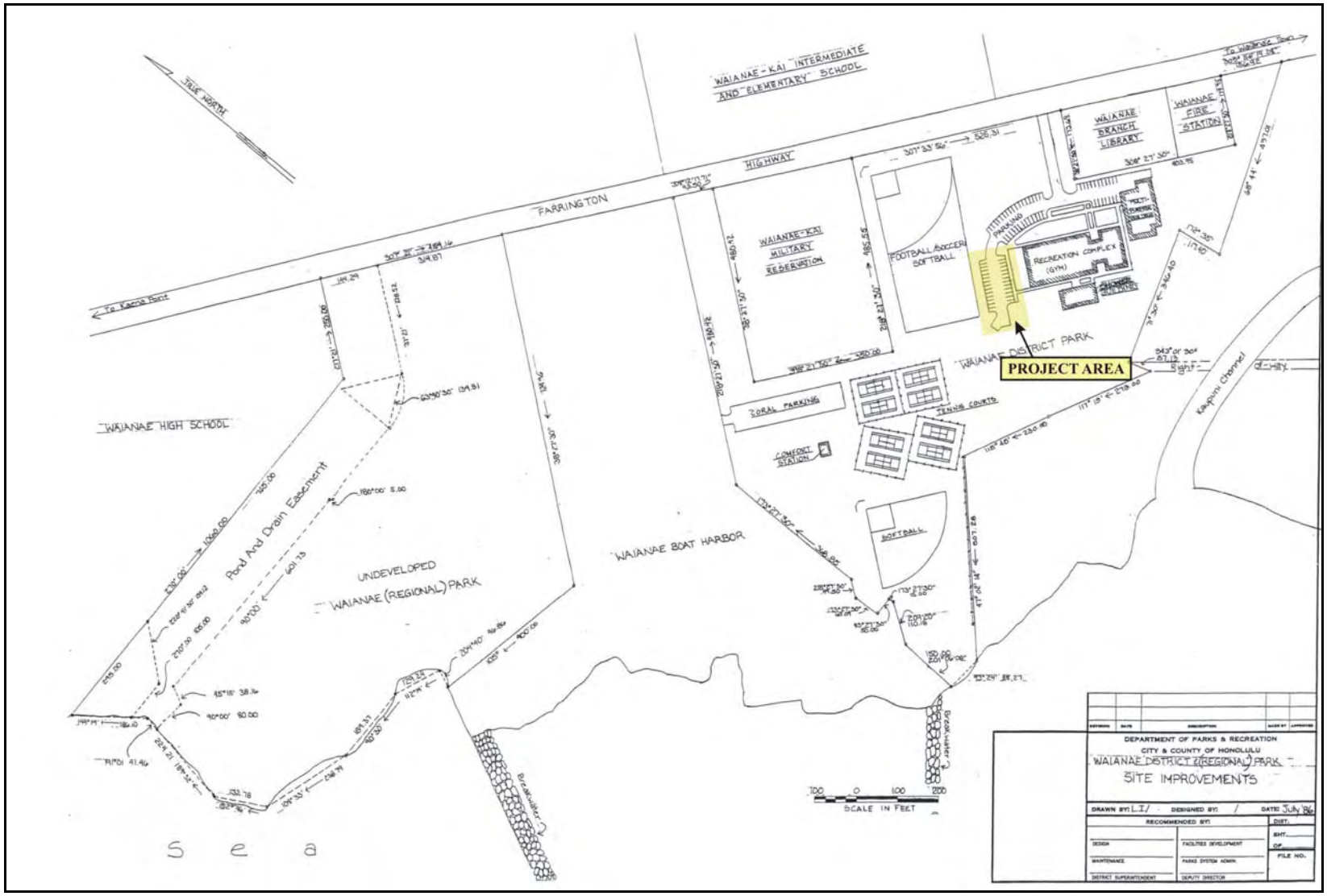

Figure 3: Detail of the Project Area, Showing the Project Area.

The project area lies on karst topography, a soil type defined as "An area of irregular limestone in which erosion has produced fissures, sinkholes, underground streams, and caverns" (Dictionary.com). Mean annual rainfall in the project area is approximately 40 inches per year (Armstrong 1983). Soils in the project area consist of Pulehu clay loam, an alluvium that developed from the erosion of igneous rock (Foote *et al.* 1972). This soil type ranges from sea level to 300 feet amsl(above mean sea level) and is associated with low annual rainfall. While Foote *et al.* defines the area's soil as such in his 1972 survey, the profiles from field work proved to be much more complex, and observations both on the surface and below revealed shallow and often bare coral limestone throughout the project area. Several sinkholes were also observed between the study area and the shoreline. These sinks have not been tested during this work, and are not believed to be associated with previous archaeological records for the area.

Vegetation on the project area is sparse. The majority of the ground is covered in low grass, with a few introduced species of trees on the lot including Monkey Pod trees (*Samanea sama)* and Keawe (*Prosopis pallida).*

BACKGROUND

TRADITIONAL SETTING

The generally accepted paradigm of Hawaiian settlement is that the earliest settlements were located in the wet, windward regions. As population pressure increased, populations began to branch out into leeward, less hospitable regions of Hawai`i, adapting their cultivation strategies as they moved into dryer climates. According to Kirch's (1985) Hawaiian Settlement Model, Wai`anae was settled during the Expansion Period (A.D. 1100–1650) during which time O`ahu's population was growing faster than any other period of Hawaiian prehistory. Prior to the Expansion Period, Wai`anae was likely visited by travelers and its rich offshore fisheries may have attracted seasonal fishermen (*ibid.).*

Wai`anae likely gets its name from a large freshwater fishpond west of Wai`anae Stream. Mullet were grown in this pond, thus the name *wai* (water) *`anae* (mullet) (Handy and Handy 1972). The region is renown for its fruitful deep sea fisheries, especially in the waters off Ka`ena Point. Wai`anae's fisheries are noted in Hawaiian legend. Chief Kawelo distinguished himself as an able fisherman in these waters (*ibid.;* Sterling and Summers 1978*).* Handy and Handy (1972) also explain that it is here, at Ka`ena Point that the demigod Maui is said to have cast his line and attempted to pull Kaua`i toward O`ahu, creating a single island of the two. When he felt he had hooked Kaua`i firmly, he gave a mighty tug and pulled up an enormous

boulder from the sea floor. This rock is known today as Pohaku o Kaua`i. The hook flew from its line and was lost in Pālolo Valley (Emerson in Sterling and Summers 1978).

Wai`anae's landscape is daunting, but its earliest settlements were prosperous. In an early Historic description of the area, Vancouver writes, "From the commencement of the high land to the westward of Opooroah (Puuloa) was...one barren rocky waste, nearly destitute of verdure, cultivation or inhabitants..." (in Sterling and Summers 1978). Vancouver's ship passed Wai`anae by, but if it had landed, these voyagers would have discovered that Wai`anae was not as desolate as it appeared from a distance. Upland crops, including taro (*kalo)*, gourds (*ipu manalo)* and sweet potato (*`uala)* were grown in the uplands of Wai`anae Valley (Handy and Handy 1972). Wet taro cultivation occurred extensively on the low valley slopes and the upper flatlands of Wai`anae Valley, where water was plentiful (Handy 1940). Today, evidence of terracing can still be seen in the upper reaches of the valley, but historic sugarcane cultivation obscured terrace remnants in the valley bottom. Fishing villages, particularly around Pōka`ī Bay produced the necessary dietary protein; however, the landscape in the lower valley was adverse to plant cultivation. Therefore, trade between the upper and lower valley was piqued in this inhospitable portion of western O`ahu.

Wai`anae society was punctuated by a distinct need to trade and share resources. This reliance on trade defined the culture in Wai`anae, perhaps to a greater extent than in other regions of O`ahu. The people of Nānākuli, for example, are said to have pretended to be deaf and dumb to passers-by, as they had no fresh water to offer travelers (McGrath *et al.* 1973: 10). This, according to Pukui *et al.* (1974) is why this place is called Nānākuli, "looking at the knees." Resource availability, or lack thereof, undoubtedly had a great impact on Wai`anae society.

Wai`anae has a special place in Hawaiian legend. Stories of kings and gods in this area abound. McGrath *et al.* describes the legend of Mt. Ka`ala, the highest mountain peak of O`ahu, and the most *mauka* point of Wai`anae Valley: "The most sacred spot on the coast was mount Kaala (*sic),* at the head of Makaha and Wai`anae (sic) Valleys….Ancient kahunas spoke of Mount Kaala as being clothed in the golden cloak of Kane, the first deity of the Hawaiian pantheon. Kaala was the guardian of the road to the west, the path of the sun, the resting place on the great road to death where spirits of the dead return to their homeland" (1973: 11). On the opposite end of the Wai`anae Range, Ka`ena Point is the legendary "Soul's Leap" where the souls of the dead departed the earth (Kamakau in Sterling and Summers 1978).

King Kamehameha I is said to have failed in his attempt to take over Kaua`i because he did not give homage to the Wai`anae gods. Kamakau states, "The fleet went (first) to Wai`anae and the war god (Kukailimoku) was carried ashore that evening" (in McGrath *et al.* 1973*).* McGrath continues, saying that Kamehameha rededicated two *heiaus* to his war god, giving no homage to the war god of Wai`anae. As a result, the Wai`anae gods sent a storm to stop Kamehameha's war canoes from reaching Kaua`i, preventing Kamehameha from taking Kaua`i by force (*ibid:* 14).

One legend describes the origins of *niu* (coconut palm) in the Hawaiian Islands as well as the naming of Pōka`ī Bay:

> "In very ancient times, when the great Hawaiian chiefs and navigators sailed across the vast Pacific between Hawai`i and Kahiki, a legend arose about a voyaging chief named Pōka`ī. It said that he brought and planted at Wai`anae the first coconut tree in Hawai`i, from which grew in time a famous grove, Ka Ulu Niu o Pōka`ī. The grove stretched from the site of the present police station to that of the Sacred Hearts Church...the bay *makai* of the grove, formerly known as Mā`alaea, eventually took the name of the legendary planter" (Clark 1977: 87).

Spirituality and cultural significance of the region is punctuated by the high number of *heiau* in Wai`anae Valley. McAllister (1933) names nine *heiau* in Wai`anae Valley alone: Pu`upahe`ehe`e (Site 152), Kuilioloa (Site 153), Keopuni (Site 155) Kahoali`i (Site 156), Malaihakoa (Site 157), Kikahi (Site 158), Kalamaluna (Site 159), Kane (Site 160), Kamaile (Site 161), and Punana`ula (Site 161). Some of these *heiau* have been destroyed, while some are partially or fully intact. Kuilioloa Heiau is particularly interesting, as this is the only known *heiau* on O`ahu to be surrounded by water on three sides. It rests on Kane`ilio Point at the southern extremity of Pōka`ī Bay.

POST-CONTACT HISTORY

By the time of Contact, Wai`anae Valley was the political and social center of the *moku* (district) of Wai`anae. With a very high population (as many as 1,500–2,000 people, according to Cordy 2002), settlements were concentrated in the lower slopes of Wai`anae Valley, where water was available for wet taro cultivation, and adjacent to Pōka`ī Bay, where access to the ocean and the rich marine resources famed in Wai`anae, was favorable. At the time of Contact, Wai`anae Valley was divided into two broad sections, and these sections were further divided into *`ili.* Wai`anae Kai encompassed the western half of the valley from the high mountain peak to the shore, while Wai`anae Uka, to the east, was the name of the second half. The project area is located on the north flank of Pōka`ī Bay.

Pōka`ī ‘Ili housed the Puehu Fishpond, a coastal trail and a coconut grove that is said in legend to have been planted by a chief from Kahiki for whom Pōka`ī is named (Cordy 2002). Within the coconut grove, Cordy notes houselots within and around the grove, including those of Ka`apuiki, the konohiki of Wai`anae in the early nineteenth century, and the house of High Chief Boki (51-52). Cordy further refers to archaeological evidence for agricultural plots in coral sinkholes and numerous human burials found in the Army Recreation Center area (*ibid.; s*ee also Previous Archaeology).

This region became the center for sweeping political changes in the late pre-Contact and early Historic Periods. Pu`u Kawiwi, at the rear of Wai`anae Valley, was the scene of the last stand of Maui Chief Kahekili against the O`ahu warriors. In this last battle of 1784, Kahekili overthrew the O`ahu chiefs, becoming ruling chief of the island. Ten years later, after Kahekili’s death, a power struggle ensued between his son and his brother (Kuykendall 1938). Wai`anae warriors sided with Kaeo, and they lost the deciding battle at `Aiea. A Wai`anae *kahuna* (priest) prophesied the coming of a “big fish” who “would eat all the little fish.” The following year, Kamehameha invaded O`ahu.

Following Kamehameha’s succession as ruling chief, “the despoiled people in large numbers fled to Wai`anae and settled there. This part of Oahu being hot, arid, isolated, with little water, was not coveted by the invaders” (Mouritz in Sterling and Summers 1978). The status Wai`anae once carried as a ruling center was now destroyed.

Kamehameha I monopolized the natural resources of his islands, often using them in great quantity for his own personal interests. Kuykendall tells the story in which Kamehameha learned the value of conservation during a deal with a Boston ship in 1817. He purchased the *Columbia* in exchange for two ship-loads of sandalwood. In an effort to pay for the deal, Kamehameha ordered the chiefs of several *moku,* including Wai`anae, to cut sandalwood. Soon the island chain was starving because the people were neglecting their taro patches. Kamehameha, seeing his mistake, then ordered his people to farm (Kamakau in Kuykendall 1938). Thereafter, Kamehameha managed the island’s resources more carefully.

Christian missionaries were quick to establish parishes throughout O`ahu following their arrival in 1820. However, it wasn’t until the 1840s that these missionaries began licensing natives to preach, and even longer before native ministers were ordained. David Malo and Blind Bartemeous (Pua`aiki) were the first ordained Hawaiian ministers. Ordained in 1850, Stephen Waimalu became the first Hawaiian minister of Wai`anae (Kuykendall 1938).

Sugar cultivation began in 1878 with a small operation owned by Hermann Widemann and Julius Richardson. Two years later, George and Albert Wilcox purchased and chartered the Wai`anae Sugar Company (Condè and Best 1973). Sugar in Wai`anae, like other operations throughout O`ahu, was limited by a lack of arable land and available water resources. This adversity was punctuated in the Wai`anae and Makaha Vallies, where water tunnels were eventually constructed (in 1915) to provide irrigation to the plantation. Despite this challenge, Wai`anae Sugar Company was among the most efficient sugar plantations in Hawai`i. At its peek, the plantation produced 13.79 tons of sugar per acre in 1935 (Dorrance and Morgan 2000). High yields did not make up for a lack of growing room. The plantation was closed in 1947.

During the Great Māhele, traditional land tenure was abrogated in favor of western ownership principals. The Hawaiian Monarchy gave portions of land to natives who could prove that they actively cultivated land segments. These land awards were given in the form of Land Commission Awards (LCAs). While LCAs and Land Grants (lands that were made available for purchase) abound in Wai`anae, none are present within or in the vicinity of the current study parcel. This finding is consistent with the understanding that lands within the *`ili* of Lehano Iki were not cultivated, as soils here were inappropriate for farming.

PREVIOUS ARCHAEOLOGY

A large body of archaeological work gives testament to the importance of the Wai`anae coastline. Work conducted within Wai`anae Regional Park, as well as in the neighboring Army Recreation Area and Pōka`ī Bay Beach Park collectively demonstrate the presence of habitations, ceremonial sites, agricultural features and numerous burials. Other archaeological investigations throughout coastal Wai`anae are cursorily mentioned during this discussion, but not extensively discussed.

McAllister (1933) was among the earliest researchers to conduct archaeological work on O`ahu. He documented numerous ceremonial sites and significant features including Wai`anae Village, Puehu Fishpond, and a number of *heiau* (see Post-Contact History). The closest of these known *heiau* sites is McAllister's Site 153, Kuilioloa Heiau at Kane`ilio Point, on the southern extremity of Pōka`ī Bay.

In 1975, Sinoto conducted archaeological survey of the current project area, documenting five previously unrecorded sites immediately within Wai`anae Regional Park. These sites are described in Clark, *et al.* (2004) as consisting of two enclosures, two L-shapes and a wall.

A human burial was exposed by a storm surge at Wai`anae Regional Park following Hurricane Iniki (Kawachi 1992). This burial was recorded under SIHP number 50-80-07-3967 and consisted of a single, adult human interred in the flexed position in the southwestern edge of the park. The interment was deposited in strata described as "uplifted coral bedrock with a layer of sand approximately 80 cm thick" (*ibid.).* The burial was left in place, covered and unmarked.

In a 2004 Inventory Survey of Wai`anae Regional Park, Clark, *et al.* report four previously undocumented features in Wai`anae Regional Park. The features identified are four coral limestone sinkholes, one of which was culturally modified with a low coral wall. These sinkholes were interpreted as planting areas, as evidenced by a well-developed, relatively rock free soil layer identified in each. During this survey, three of Sinoto's five previously documented sites were relocated and consolidated under a single SIHP number (50-80-07-3967), which is the same site number given to the burial reported for the area in Kawachi (1992) (Table 1). During this work, two of Sinoto's sites were not observed, indicating that they may have been destroyed during recent bulldozer activities.

Current Site-Feature Number	Previous Site Number	Feature Type	Author of Original Report
3967-1	3967	Burial	Kawichi 1992
3967-2	4822	Enclosure	Sinoto 1975
3967-3	4825	Enclosure remnant	Sinoto 1975
3967-4	4826	L-shape	Sinoto 1975
3967-5	3967-5	Modified Sinkhole	Clark *et al.* 2004
3967-6	3967-6	Sinkhole	Clark *et al.* 2004
3967-7	3967-7	Sinkhole	Clark *et al.* 2004
3967-8	3967-8	Sinkhole	Clark *et al.* 2004

Table 1:Sites and Feature Numbers Present on the Project Area.

In 1985 an extensive Inventory Survey and Monitoring Report was conducted in the Wai`anae Army Recreational Center (W.A.R.C) to the south of the current project area (Hammatt *et al.* 1985). This Inventory Survey consisted of 42 one-meter test units and 114 square meters of backhoe trenches were excavated. During this work, two continuous subsurface cultural layers were identified. These layers relate to the Traditional and Military periods, respectively. They are relatively intact, with the exception of places where previous military and recreational development activities have interrupted the otherwise continuous deposit. Despite

the stratigraphic disturbance, 96 features were recorded in total—40 pertaining the pre-Historic period, and the remainder relating to military activities. The majority of these sites are unlined midden pits, six *in situ* charcoal samples were collected, ranging in age from recent to 1340 ±70 radiocarbon years A.D. Most pre-Historic sites were found in the northern reach of the W.A.R.C. area. *In situ* cultural deposits were found in Stratum II, a light grey 10YR7/2 sand (~50-55 cmbs).

Among the artifacts, midden and lithics identified in the Hammatt *et al.* report, ten human burials were found. These ten are added to the five previously identified by Riford (1984), and two reported in Kam and Ota (1984). All burials and Traditional Period deposits identified in Hammatt *et al.* (1985) were catalogued under SIHP number 50-80-07-3998, a catalogue number originally issued for the two burial identified in Riford (*ibid.).*

At Pōka`ī Bay Beach Park, immediately south of the W.A.R.C., 34 test units were excavated throughout the park, identifying extensive Historic disturbance, most of which was positively correlated to prior military occupation of the area (Borthwick *et al.* 1999). However, a heavily fragmented pre-Historic cultural layer was identified in the northernmost reach of the project area, bordering the W.A.R.C. property. This heavily impacted layer was catalogued under the pre-Existing site number 50-80-07-3998.

Archaeological work conducted *mauka* of Farrington Highway include reports by Flood *et al.* (1994), Hammatt and Schideler (2006), Magnuson (2000) and Shefcheck and Spear (2007). These reports collectively reveal a thinning, but not insignificant occurrence of cultural deposits in the dryer inland portions of Wai`anae Valley.

Flood (1994) reports 24 historic features catalogued under SIHP number 50-80-07-2474. These features, found within the Wai`anae Intermediate School property, recovered very few artifacts. The thin soil atop raised coral led to the conclusion that the site "appears to have been somewhat peripheral to the impact of many of the broader historical events due to the relatively impermeable limestone reef deposits" (*ibid.).* A single fragment of human long bone fashioned into a lure point was the only piece of human bone recovered during this work. No burials were anticipated due to the relatively thin deposit of soil in the project area.

Directly adjacent to and south of the Flood *et al.* project area, Hammatt and Schideler (2006) reported an Inventory Survey on approximately 2.8 acres of land for the "Wai`anae Civic Center." In this survey, 22 trenches were mechanically excavated, exploring the entire parcel.

During this work, a human burial (site 50-80-07-6860) was identified in the northern corner of the parcel. A Burial Treatment Plan was recommended for this site. As the results of the remaining excavations yielded no results, no further work was recommended for the remainder of the project area.

As summarized in Hammatt and Schideler (2006), Magnuson (2000) reported an Archaeological Reconnaissance of a lot on the north side of the bend in Ala Akau Street, just northwest of the present study parcels. This study yielded negative results.

Finally, Archaeological Inventory Survey was conducted on two parcels immediately *mauka* of Wai`anae Intermediate School (Shefcheck and Spear 2007). This work also yielded negative results.

EXPECTED FINDINGS

Traditional knowledge and Historical record indicate that the area surrounding Pōka`ī Bay was extensively populated. Previous Archaeology around Poka`i Bay has shown that subsurface deposits are extensively disturbed in some areas, making it difficult to ascertain the extent of Traditional deposition. The preservation conditions in the immediate project area appear to have been extensively disturbed during modern development. Therefore the expected findings for this work, assuming that features are encountered, are midden deposits, charcoal lenses and burials. However, it is equally as likely to encounter zero cultural deposits due to the extent of modern disturbance in the area.

RESULTS

Six stratigraphic trenches were excavated around the perimeter of the planned parking area, in order to determine the soil conditions of the area and assess the presence of cultural deposits. Each trench measured 4.0 meters in length and approximately 0.4 m in width. Soils were proven to be shallow and poorly developed. Excavations at all trenches terminated at the limestone bedrock. These trenches are plotted in Figure 4. This work yielded zero cultural deposits. The details of each trench are specifically discussed below.

Stratigraphic Trench 1 (ST-1)

Located in the east corner of the planned parking lot, ST-1 yielded a single stratigraphic layer measuring 20 to 35 cm in thickness, and terminating on solid limestone bedrock (Figure 5).

This soil is described as 2.5YR2.5/3 dark reddish brown clay, with weak, friable and very fine structure. No cultural deposits were observed in this trench.

Stratigraphic Trench 2 (ST-2)

ST-2 was excavated just south of and parallel to ST-1 along the southeast border of the planned parking lot (see Figure 5). The unit consisted of two stratigraphic layers. Layer I (0-38 cmbs) is the same weak, friable clay found in ST-1. Layer II (28-61 cmbs) is located primarily within a *puka* (hole) in the limestone shelf, consisting of 10 YR 6/1 gray loamy sand, with a high proportion of crushed limestone. This layer is probably a remnant of trench backfill relating to previous construction in the area.

Stratigraphic Trench 3 (ST-3)

ST-3 is located adjacent to ST-1 in the north corner of the planned parking area (see Figure 5). This trench consisted of three stratigraphic layers. Layer I (0-10 cmbs) consisted of, 2.5 YR 3/3 dark reddish brown silty clay similar to that found in ST-1 and –2. Layer II (0-30 cmbs) is 2.5YR3/2 dusky red clay of the same composition of Layer I. Both Layers I and II are believed to be associated with graded fill and were found to be sterile of cultural deposits. Layer III (20-51 cmbs) is 2.5 YR 3/6 dark red silt with very few basalt pebble inclusions. Torn fragments of black plastic was found within this layer, indicating that it too is a fill deposit, associated with Modern landscaping.

Stratigraphic Trench 4 (ST-4)

ST-4 is located along the northwest side of the planned parking area, just *makai* and parallel to ST-3 (Figure 6). The most complex trench of this investigation, ST-4 consists of five, extremely fine soil strata. Layer I (0-20 cmbs) was 2.5 YR 4/4 reddish brown silt with very few basalt pebble inclusions and a smooth, abrupt boundary. Layer II (20-30 cmbs) is 7.5 YR 3/3 dark brown loam with a fine structure and a few coralline inclusions. Layer III (30-35 cmbs) consists of 10 YR6/1 gray loamy sand, similar to that found in ST-2/Layer II. Layer IV (35-45 cmbs) is 5 YR 3/2 reddish brown silty clay with a very hard consistency but very fine structure. Clear plastic sheeting was discovered within this stratum, indicating that all above layers are modern. Layer V (45-55 cmbs) is 7.5 YR 3/1 very dark gray weathered limestone. This deposit is the only stratum from this trench that is believed to be naturally deposited. Layer V contained no cultural material and terminated at solid limestone bedrock.

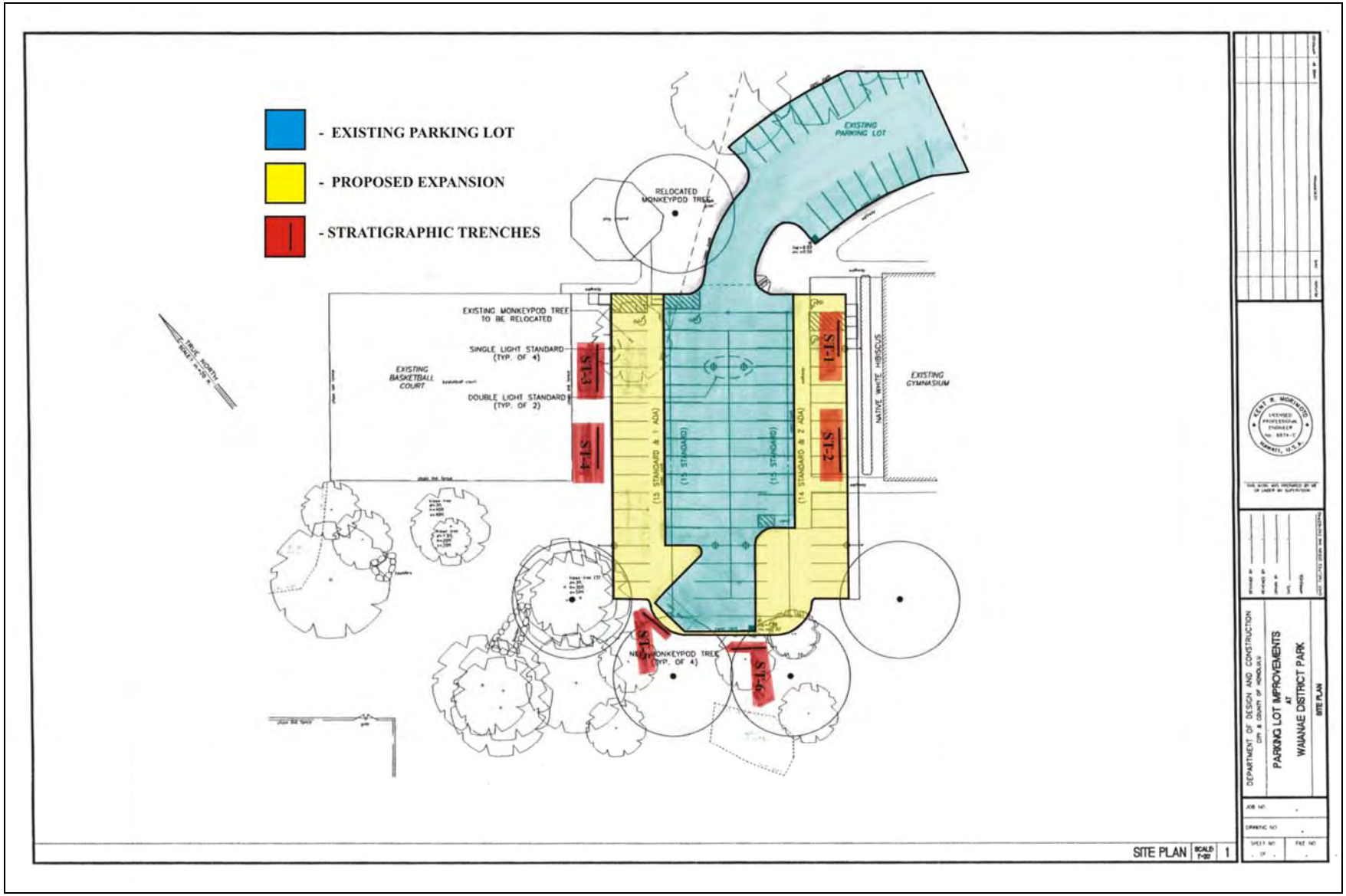

Figure 4: Detail of the Project Area, Showing the Existing Parking Lot, Planned Expansion, and Stratigraphic Trenches.

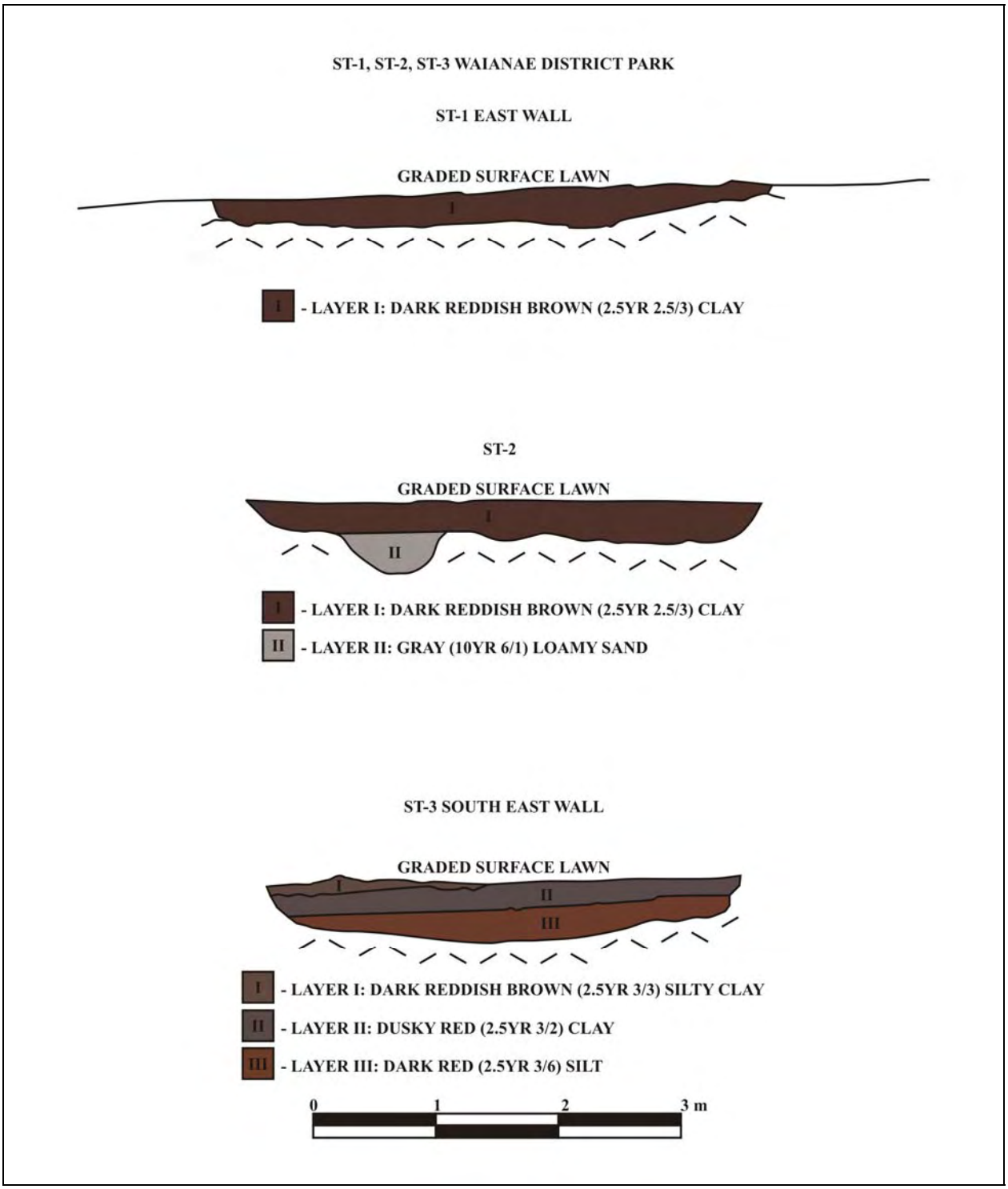

Figure 5: Profiles of Stratigraphic Trenches 1 through 3.

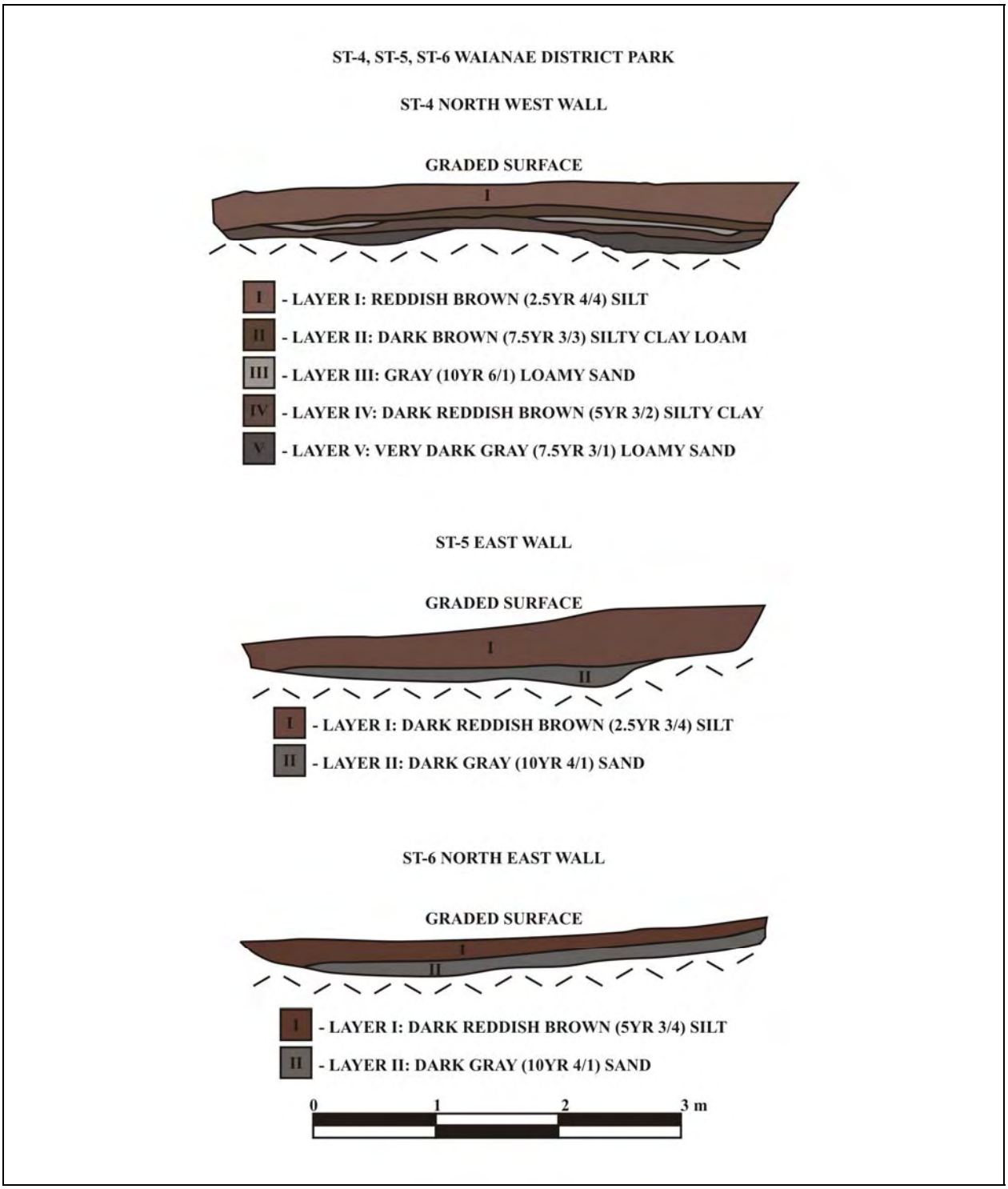

Figure 6: Profiles of Stratigraphic Trenches 4 through 6.

Stratigraphic Trench 5 (ST-5)

ST-5 bears nearly North-South, adjacent to the Southwest corner of the planned parking area (see Figure 6). This trench yielded only two stratigraphic layers. Layer I (0-40 cmbs) consists of 2.5 YR 3/4 silt, similar to that found in ST-1 through –4. Black plastic sheeting was found at the interface terminus of this layer, demarcating it from Layer II. Below the black plastic sheet, Layer II extends to the trench's terminus, at 60 cmbs. This layer consists of 10 YR 4/1 dark gray sand. The trench terminated abruptly at the limestone bedrock.

Stratigraphic Trench 6 (ST-6)

Centered on the south end of the parking area, ST-6 yielded two stratigraphic layers and no cultural deposits (See Figure 6). Layer I (0-20 cmbs) was composed of 5 YR 3/4 dark reddish brown silt containing sparse inclusions of modern trash debris. Layer II (20-28 cmbs) consisted of sand similar to that found in ST-5/Layer V. No cultural deposits were found in this trench.

CONCLUSIONS AND RECOMMENDATIONS

The limited testing that was conducted in this area yielded no indication of cultural remains. However, there were layers found in ST-4, -5 and -6 that may have been original sedimentation. These layers are similar in color to Hammatt *et al.* (1985) cultural layer, and may be a remnant of the cultural deposit documented at the W.A.R.C.

Due to the presence of sandy substrate and the occurrence burials in and around Wai`anae Regional Park, full time Archaeological Monitoring is strongly recommended for all subsurface excavations pertaining to the expansion of the present parking lot and throughout the surrounding environs.

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APPENDIX B
CULTURAL IMPACT ASSESSMENT

SCS Project Number 855-CIA-2

A CULTURAL IMPACT ASSESSMENT REPORT OF A PORTION OF THE WAI`ANAE REGIONAL PARK IN PREPARATION FOR PARKING IMPROVEMENTS, WAI`ANAE AHUPUA`A, WAI`ANAE DISTRICT, O`AHU ISLAND, HAWAI`I [TMK 8-5-002:49]

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March 2008

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INTRODUCTION

Scientific Consultant Services (SCS), Inc. has been contracted by Kent Morimoto, Project Manager for Austin, Tsutsumi, and Associates, Inc., to conduct a Cultural Impact Assessment of a portion of a land parcel in Wai`anae Ahupua`a, Wai`anae District, O`ahu Island, Hawai`i [TMK: 8-5-002:49] (Figure 1). According to documents received from Austin, Tsutsumi, and Associates, Inc., the proposed project includes the extension of a parking lot in Wai`anae District Park (Figure 2).

The Constitution of the State of Hawai`i clearly states the duty of the State and its agencies is to preserve, protect, and prevent interference with the traditional and customary rights of native Hawaiians. Article XII, Section 7 requires the State to "protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua`a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778" (2000). In spite of the establishment of the foreign concept of private ownership and western-style government, Kamehameha III (Kauikeaouli) preserved the peoples traditional right to subsistence. As a result in 1850, the Hawaiian Government confirmed the traditional access rights to native Hawaiian *ahupua`*a tenants to gather specific natural resources for customary uses from undeveloped private property and waterways under the Hawaii Revised Statutes (HRS) 7-1. In 1992, the State of Hawai`i Supreme Court, reaffirmed HRS 7-1 and expanded it to include, "native Hawaiian rights…may extend beyond the *ahupua`a* in which a native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner" (Pele Defense Fund v. Paty, 73 Haw.578, 1992).

Act 50, enacted by the Legislature of the State of Hawaii (2000) with House Bill 2895, relating to Environmental Impact Statements, proposes that:

> …there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawaii's culture, and traditional and customary rights…[H.B. No. 2895].

Act 50 requires state agencies and other developers to assess the effects of proposed land use or shoreline developments on the "cultural practices of the community and State" as part of the HRS Chapter 343 environmental review process (2001). Its purpose has broadened, "to promote and protect cultural beliefs, practices and resources of native Hawaiians [and] other

Figure 1: USGS Quadrangle Map Showing the Project Area.

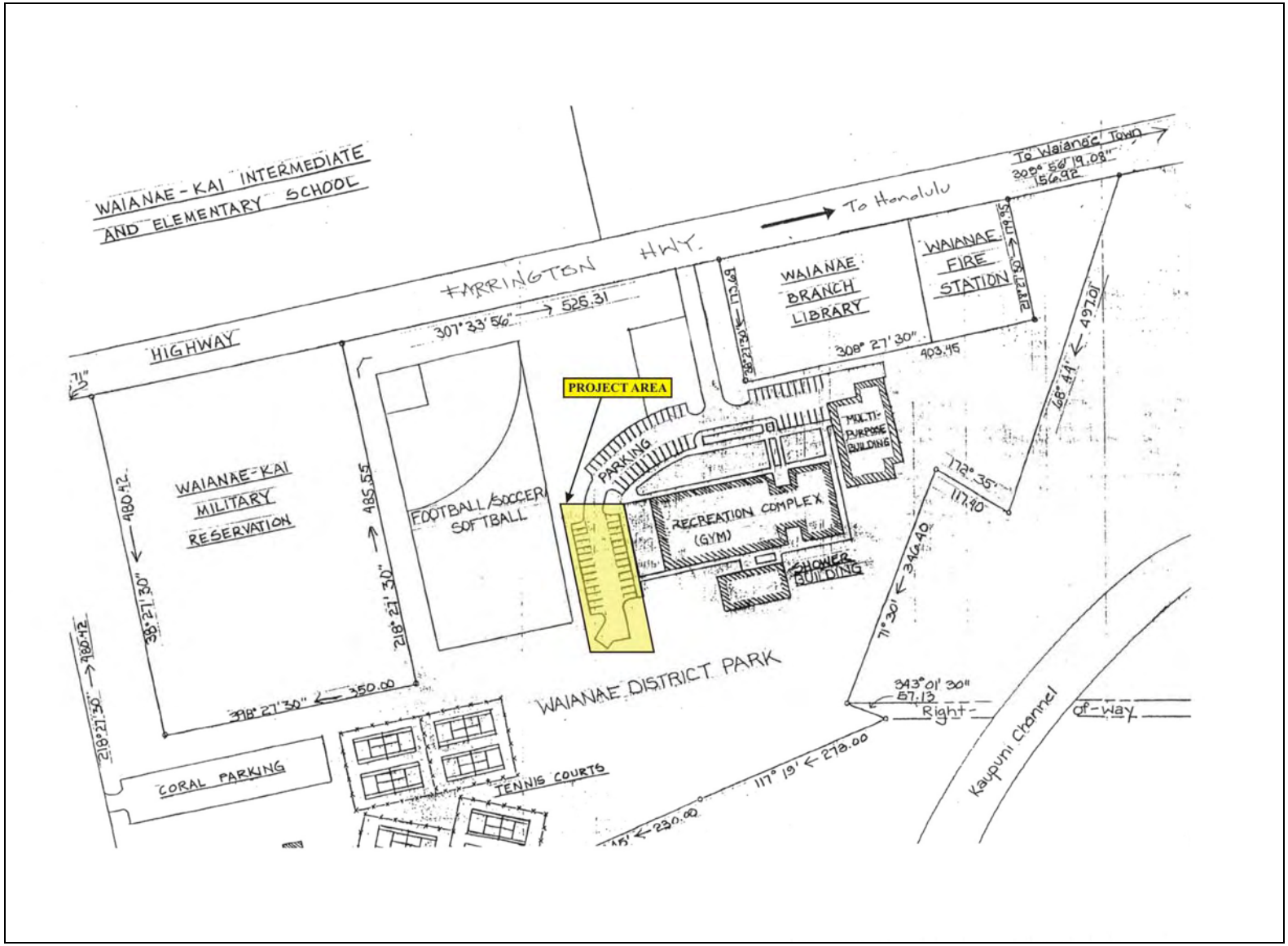

Figure 2: Plan View Map of Project Area.

ethnic groups, and it also amends the definition of 'significant effect' to be re-defined as "the sum of effects on the quality of the environment including actions that are…contrary to the State's environmental policies…or adversely affect the economic welfare, social welfare, or cultural practices of the community and State" (H.B. 2895, Act 50, 2000). Thus, not only are properties evaluated for impact to Native Hawaiians, but also for other ethnic groups as well.

Act 50 requires an assessment of cultural practices to be included in the Environmental Assessments and the Environmental Impact Statements, and to be taken into consideration during the planning process. The concept of geographical expansion is recognized by using, as an example, "the broad geographical area, e.g. district or *ahupua`a*" (OEQC 1997). It was decided that the process should identify 'anthropological' cultural practices, rather than 'social' cultural practices. For example, *limu* (edible seaweed) gathering would be considered an anthropological cultural practice, while a modern-day marathon would be considered a social cultural practice.

According to the Guidelines for Assessing Cultural Impacts established by the Hawaii State Office of Environmental Quality Control (OEQC 1997):

> The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religions and spiritual customs. The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both manmade and natural which support such cultural beliefs.

This Cultural Impact Assessment involves evaluating the probability of impacts on identified cultural resources, including values, rights, beliefs, objects, records, properties, and stories occurring within the project area and its vicinity (H.B. 2895, Act 50, 2000).

METHODOLOGY

This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). In outlining the "Cultural Impact Assessment Methodology", the OEQC states:

> …information may be obtained through scooping, community meetings, ethnographic interviews and oral histories…[1997].

This report contains archival and documentary research, as well as communication with organizations having knowledge of the project area, its cultural resources, and its practices and beliefs. Following the OEQC Guidelines for Assessing Cultural Impacts, the assessment should address, but not be limited to, the following matters:

(1) a discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints or limitations which might have affected the quality of the information obtained;

(2) a description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken;

(3) ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained;

(4) biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area;

(5) a discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken, as well as the particular perspective of the authors, if appropriate, any opposing views, and any other relevant constraints, limitations or biases;

(6) a discussion concerning the cultural resources, practices and beliefs identified, and for the resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site;

(7) a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project;

(8) an explanation of confidential information that has been withheld from public disclosure in the assessment;

(9) a discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs;

(10) an analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural

resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place, and;

(11) the inclusion of bibliography of references, and attached records of interviews which were allowed to be disclosed.

Based on the inclusion of the above information, assessments of the potential effects on cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

ARCHIVAL RESEARCH

Archival research focused on a historical documentary study involving both published and unpublished sources. These included legendary accounts of native and early foreign writers; early historical journals and narratives; historic maps and land records such as Land Commission Awards, Royal Patent Grants, and Boundary Commission records; historic accounts, and previous archaeological project reports.

INTERVIEW METHODOLOGY

Interviews are conducted in accordance with Federal and State laws and guidelines. Individuals and/or groups who have knowledge of traditional practices and beliefs associated with a project area or who know of historical properties within a project area are sought for consultation. Individuals who have particular knowledge of traditions passed down from preceding generations and a personal familiarity with the project area are invited to share their relevant information. Often people are recommended for their expertise or can be located by visiting the area. Organizations, such as Hawaiian Civic Clubs, the Island Branch of Office of Hawaiian Affairs, historical societies, Island Trail clubs, and Planning Commissions are invited to contribute their input and suggest further avenues of inquiry, as well as specific individuals to interview.

If knowledgeable individuals are identified, personal interviews are sometimes taped and then transcribed. These draft transcripts are returned to each of the participants for their review and comments. After corrections are made, each individual signs a release form, making the information available for this study. When telephone interviews occur, a summary of the information is often sent for correction and approval, or dictated by the informant and then incorporated into the document. Key topics discussed with the interviewees vary from project to project, but usually include: personal association to the *ahupua`a*, land use in the project's vicinity; knowledge of traditional trails, gathering areas, water sources, religious sites; place

names and their meanings; stories that were handed down concerning special places or events in the vicinity of the project area; and evidence of previous activities identified while in the project vicinity.

In this case initial letters, briefly outlining the development plans along with maps of the project area, were sent to organizations whose jurisdiction includes knowledge of the area with an invitation for consultation. Consultation was sought from the Office of Hawaiian Affairs, O`ahu and Martha Yent of Division of State Parks. Based on this research, an assessment of the potential effects on cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

PROJECT AREA AND VICINITY

The project area is located on the *makai* side of Farrington Highway across from the Wai`anae Kai Intermediate School. The portion to be developed into additional parking is abutted by the Recreation Complex to the east, open park to the south, a Football/Soccer/Softball field to the west, open field and Farrington Highway to the North (Figure 3).

CULTURAL HISTORICAL CONTEXT

The island of O`ahu ranks third in size of the eight main islands in the Hawaiian Archipelago. The Wai`anae and Ko`olau Mountain ranges were formed by two volcanoes. Through the millennia the constant force of water carved fertile amphitheater-headed valleys and rugged passes eroded at lower elevations providing access from one side of the island to another (Macdonald and Abbott 1970).

PAST POLITICAL BOUNDARIES

Traditionally, the division of Oahu's land into districts (*moku*) and sub-districts was said to be performed by a *Mā`ilikukahi* who was chosen by the chiefs to be the *mō`īho`oponopono o ke aupuni* (administrator of the government; Kamakau 1991:53–55). Cordy places Mā`ilikukahi at the beginning of the 16th century (2002). Mā`ilikukahi created six districts and six district chiefs (*Ali`i `ai moku*). Land was considered the property of the king or *Ali`i `ai moku* (the *Ali`i* who eats the island/district), which he held in trust for the gods. The title of *Ali`i `ai moku*

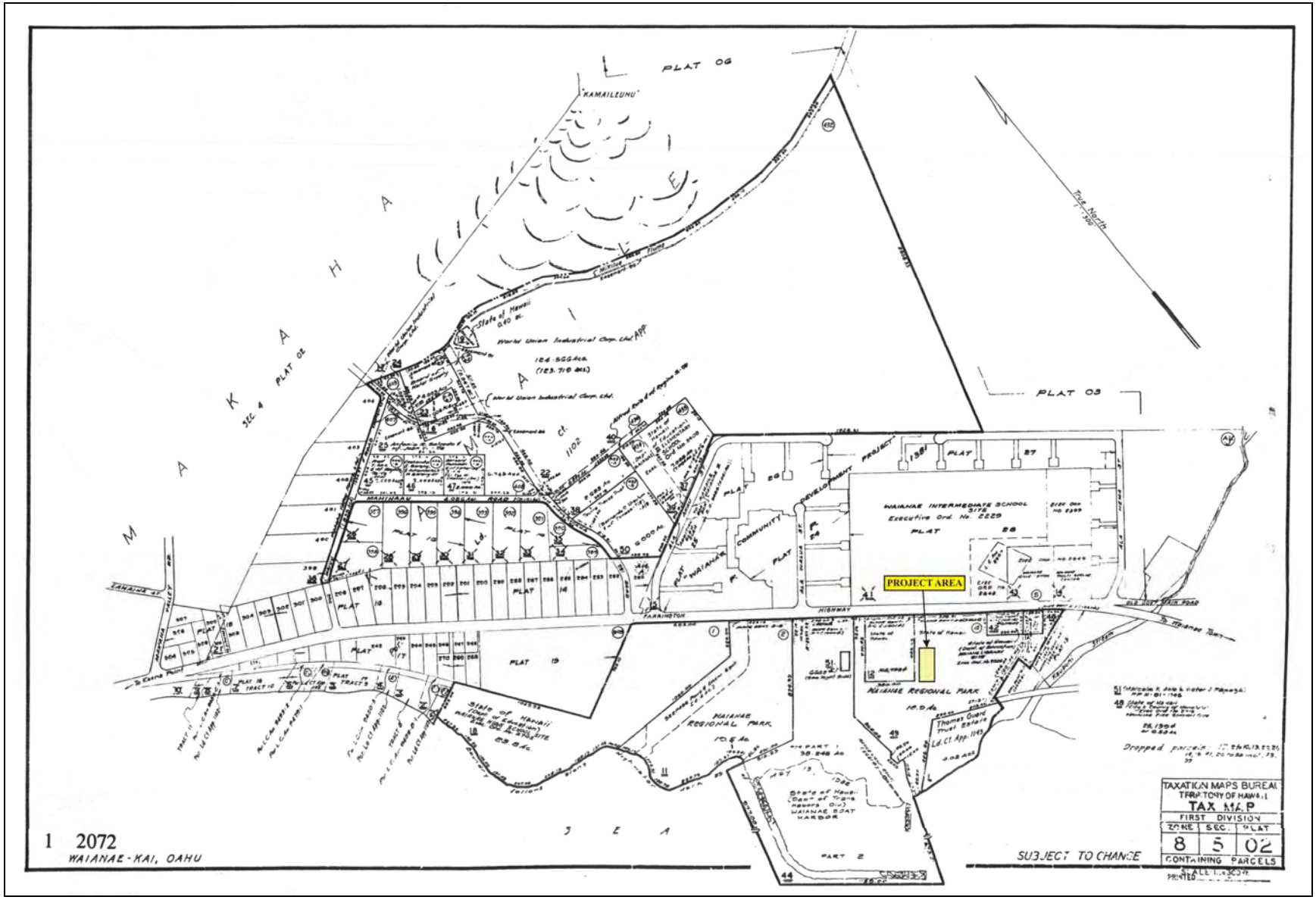

Figure 3: Tax Map Key [TMK] Showing Project Area Location.

ensured rights and responsibilities to the land, but did not confer absolute ownership. The king kept the parcels he wanted, his higher chiefs received large parcels from him and, in turn, distributed smaller parcels to lesser chiefs. The *maka`āinana* (commoners) worked the individual plots of land. It is said that Mā`ilikukahi gave land to *maka`āinana* (commoners) all over the island of O`ahu (*ibid*).

In general, several terms, such as *moku*, *ahupua`a*, *`ili* or *`ili`* ā*ina* were used to delineate various land sections. A district (*moku*) contained smaller land divisions (*ahupua`a*) that customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua`a* were therefore able to harvest from both the land and the sea. Ideally, this situation allowed each *ahupua`a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *`ili `āina* or *`ili* were smaller land divisions next in importance to the *ahupua`a* and were administered by the chief who controlled the *ahupua`a* in which it was located (Lyons 1875:33; Lucas 1995:40). The *mo`o`āina* were narrow strips of land within an *`ili*. The land holding of a tenant or *hoa `āina* residing in an *ahupua`a* was called a *kuleana* (Lucas 1995:61). The project area is located in Wai`anae Ahupua`a, meaning "mullet water" (Pukui *et al*.:220).

TRADITIONAL SETTLEMENT PATTERNS

The Hawaiian economy was based on agricultural production and marine exploitation, as well as raising livestock and collecting wild plants and birds. Extended household groups settled in various *ahupua`a*. During pre-Contact times, there were primarily two types of agriculture, wetland and dry land, both of which were dependent upon geography and physiography. River valleys provided ideal conditions for wetland *kalo* (*Colocasia esculenta*) agriculture, which included pond fields and irrigation canals. Other cultigens, such as *kō* (sugar cane, *Saccharum officinaruma*) and *mai`a* (banana, *Musa* sp.), were also grown and, where appropriate, such crops as *`uala* (sweet potato, *Ipomoea batatas*) were produced. This was the typical agricultural pattern seen during traditional times on all the Hawaiian Islands (Kirch and Sahlins 1992, Vol. 1:5, 119; Kirch 1985). Agricultural development on the leeward side of the main islands was likely to have begun early in what is known as the Expansion Period (A.D. 1200–1400 [Kirch 1985]).

Wai`anae Kai and Wai`anae Uka combined to create the largest valley in this district and, although the terrain is relatively poor, the valley contained a good deal of taro *lo`i* along its main stream and its tributaries.

***WAHI PANA* (LEGENDARY PLACES)**

Although Wai`anae has a dry coastal strip with poor soil, its fertile valley and deep-sea resources, made it rich, which was exemplified by the legendary chief, Kawelo, who was a proficient fisherman. Perhaps he had been inspired by the demi-god, Maui, who is associated with this region in many traditional *mo`olelo* (Handy and Handy 1972).

The importance of Wai`anae Ahupua`a in the Wai`anae District should be noted, as it was its political and religious center in the late 1600s to the 1700s (Cordy 2002). The *ahupua`a* housed numerous important *heiau* and had the largest population of the district at European contact. In *An Ancient History of Wai`anae*, Ross Cordy (2000) writes extensively concerning the entire district of Wai`anae. A brief summary is presented below incorporating his and others research.

Scattered amongst the agricultural and habitation sites were other places of cultural significance to the *kama`āina*, including an abundance of *heiau* and fishing *ko`a* (shrine) along the shore. At the *makai* end of Pu`upāhe`ehe`e, was a *luakini heiau* recorded by Thrum who also reported the slopes of the *pu`u* had been planted in grass in traditional times for the purpose of sledding contests (Thrum in Sterling and Summers 1978). Kū`īlioloa Heiau can still be partially seen on the tip of Kāne`ilio Point. This place was named after a legendary dog who was thought to be a protector of travelers in ancient times. To the west, on another small point, stood Keaupuni Heiau, now destroyed. The stones forming Kamohoali`i Heiau (a *luakini*) on Pu`u Kāhea were taken in 1870 for rock wall to enclose the house of the plantation manager. This *heiau* was said to be the residence of the chief Kahahana in the late 1700s and was associated with *mo`olelo* concerning the activities of the *kupua* (demi-god) Kamapua`a, as well as place of the famous prophecy pronounced by the *kahuna nui*, Kaopulupulu (see below). It was possibly used by Kamehameha I, who rededicated it to Kūka`ilimoku his war god, before his first attempt to conquer Kaua`i (Cordy 2000; McAllister 1930).

Two other *heiau* were located on Pu`u Kāhea: Kunaiwa and Haua (Cordy 2000). Other temples scattered across the landscape and on the valley ridges were listed by McAllister: Malaihakoa, Kikahi, Kalamaluna, Kamaile, and Punanaula (1930).

Above Kamile`unu ridge was Kawiwi, a fortress known to harbor spirits and where the unpopular O`ahu chief Haka was killed in the early 1500s (Cordy 2000). Here, also, was where the O`ahu warriors fled in their effort to escape from Kahekili's forces during their rebellious war with Maui (*ibid.*). It is also associated with the legend featuring the eel-man, Puhinalo, and

his beautiful wife (Sterling and Summers 1978). It was said Haumea dwelled here and helped the spirits steal a coconut whistle for the mute son of Kahelekulani (*ibid*.). Kainoa, the goddess who lived with other gods in the back of the valley on Ka`ala, sent *`iwa* birds to guide those who were lost in the forest (*ibid*.). In ancient times, a mysterious woman lived on the ridge. She never left, and when hungry, would cry out, summoning the birds to bring her food (*ibid*.). Thrum identified this fortress as the *pu`uhonua* (place of refuge) for the island of O`ahu (*ibid*.).

According to *Ka Nupepa Kuokoa* (Jan. 1, 1870), there was a long cliff road called Elou originating in Kalena and Hale`au`au Ahupua`a on the eastern side of the Wai`anae Mountains, then crossing at Kolekole pass and extending down into Wai`anae (Cordy 2000; Sterling and Summers 1978). Another trail named Kūmaipō, crossed the upper valley of Wai`anae, passed over the Kamaile `unu ridge at a low place, and went into Mākaha. A branch of this trail continued down into Waialua and Mokulē`ia (Cordy 2000). A coastal trail was situated inland of the fishponds, Puehu and Loko Lupoko, and *makai* of the coconut grove, Ka ulu niu o Pōka`ī (Cordy 2000).

The bay that fronts the Wai`anae Ahupua`a was named Pōka`ī, after a legendary voyaging chief from Kahiki who carried with him the coconut that became the grove of trees by the village.

> "In very ancient times, when the great Hawaiian chiefs and navigators sailed across the vast Pacific between Hawai`i and Kahiki, a legend arose about a voyaging chief named Pōka`ī. It said that he brought and planted at Wai`anae the first coconut tree in Hawai`i, from which grew in time a famous grove, Ka Ulu Niu o Pōka`ī. The grove stretched from the site of the present police station to that of the Sacred Hearts Church...the bay *makai* of the grove, formerly known as Mā`alaea, eventually took the name of the legendary planter" (Clark 1977: 87).

Behind the bay was a place named Puehu where the chief Kawelo, angry at his god for not consenting to his traveling to Kaua`i, struck the image and broke it into pieces.

Of significance was the prophecy given by Kaopulupulu, a great *kahuna*, before his death near Kamohoali`i Heiau, predicting the loss of the land to the foreigners. Kahahana, born on O`ahu and a descendent of Kuali`i, became the foster son of Kahekili on Maui. He returned from Maui and became the ruler of O`ahu in 1773 with the sanction of the O`ahu *kuhuna nui* and prophet, Kaopulupulu (Kamakau 1961). In 1782, Kahahana traveled around the island to consecrate and offer sacrifices at the *heiau* (Fornander 1919). When he arrived in Wai`anae at

Kamohoali`i Heiau, Kahahana sent for, Kaopulupulu, who lived in Waimea, before continuing the rituals. Kahahana was angry, as he had been told treacherous lies concerning Kaopulupulu offering O`ahu to Kahekili behind his back. Traveling to Anahulu, Mokulē`ia and Kawaihāpai, Kaopulupulu and his son, Kahulupue, proceeded to Wai`anae. When they reached Ka`ananiau at Ka`ena, they prayed to know if the journey was for good or evil and it was revealed that, indeed, they were to die. When they arrived at Pu`u Kāhea and Kamohoali`i Heiau, Kahahana immediately had Kahulupue killed (*ibid*). As Kahulupue was beaten, his father called out, "Take a deep breath, my son, and let the sea touch your skin, for the land shall belong to the sea (that is, to those coming over the sea)" (Sterling and Summers 1978: 71).

After Kamehameha's successful war with Kalanikupuli in 1795 and during the division of the *`aina pana la`au* (division of conquered lands) amongst his supporters, many destitute O`ahu chiefs and followers escaped to Wai`anae and settled there, as these lands were not in great demand.

POST EUROPEAN CONTACT

In 1793, Vancouver described Wai`anae as desolate and barren :

> From the commencement of the high land to the westward of Opooroah [Pu`uloa] was. . .one barren rocky waste, nearly destitute of verdure, cultivation or inhabitants, with little variation all to the west point of the island. . . Nearly in the middle of this side of the Island is the only village we had seen westward of Opooroah. . . .The shore here forms a small sandy bay. On its southern side, between the two high rocky precipices, in a grove of cocoanut and other trees, is situated the village. . . . The few inhabitants that visited us from the village, earnestly entreated out anchoring and told us, that if we would stay until morning, their chief would be on board with a number of hogs, and a great quantity of vegetables. . . The face of the country did not, however, promise an abundant supply. . . . [1984: 885-886]

He did observe in the mountains far from the coast, a narrow, winding valley that presented, ". . . a fertile cultivated aspect" (1984: 885).

In direct contrast was an inland description of Wai`anae recorded by Handy in 1940:

> In ancient times Waianae Valley had extensive systems of terraces along its various streams, in what is now forest and water reserve, and well down into the broad area not covered by sugar cane. Names were obtained for 14 district terrace sections, watered by Olahua Stream, extending as far down as the site of the present power house. The section named Honua, including the group of terraces farthest inland, belonged to the alii of the valley. [1940: 83]

In addition, *ipu manalo* (gourds) were thriving inland along with sweet potato plantations and coconut trees. The large fresh water Puehu fishpond was located west of the Wai`anae Stream near the coast and Loko Lupoko was constructed from a marsh in the *`ili* of Pāhoa (Cordy 2000). Handy and Handy suggest the name of the region Wai`anae, might be derived from the young mullet that would have been raised in the pond (1972: 468).

In the 1800s, the missionary Levi Chamberlain traveled to Wa`anae, describing it as

> ". . .a very beautiful place, opening an extensive valley . . . having a view of the sea from those points . . . on the left is a grove of coconuts on low ground through the midst of which runs a beautiful stream of clear water from the mountains. Houses are scattered here and there in the grove and clumps of sugar cane and rows of bananas are see interspersed. [Sterling and Summers 1978: 70]

THE GREAT MĀHELE

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on Western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian economy to that of a market economy (Kame`eleihiwa 1992:169–70, 176; Kelly 1983:45, 1998:4; Daws 1962:111; Kuykendall 1938 Vol. I:145). The Great Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were thus made available and private ownership was instituted, the *maka`āinana* (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. These claims did not include any previously cultivated but presently fallow land, *`okipū* (on O`ahu), stream fisheries, or many other resources necessary for traditional survival (Kelly 1983; Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent, after which they could take possession of the property (Chinen 1961:16). Wai`anae became Crown Lands and was owned by the King.

In the mid-1800s, Wai`anae Valley was held in lease from the Hawaiian Government by Paul Manini (son of Don Francisco de Paula Marin) who raised cattle on the land. By the late 1870s most of Wai`anae Ahupua`a was in ranching. J.M Dowsett had acquired Wai`anae Uka by 1870 and by 1880 was running a grazing ranch on 17, 200 acres of the Wai`anae Valley (McGrath *et al*. 1973).

However, sugar was to be the economic future of Hawai`i and with the passing of the treaty of reciprocity in 1876, allowing sugar into the United States duty free, the profits became enormous. In 1879 Judge Hermann A. Wideman, G.N. Wilcox and A.S. Wilcox started the Waianae Sugar Company consisting of the Makaha, Wai`anae and Lualualei valleys. With the addition of a railroad for hauling cane, Waianae Plantation carried the distinction of being the most modern and efficient in all of Hawai`i. As the success of sugar cultivation grew, so did Wai`anae Village. By the 1890s, there was a resident postmaster, two mail deliveries a week, a steamer arrival every Friday and the plantation manager's office boasted a telephone (McGrath *et al*. 1973). In addition, there was a Chinese storekeeper and a general store and saloon next to the project area where the Wai`anae Library is presently located. Eventually as the sugar lands increased, squabbles arose between the plantation and the taro farmers over the precious and limited water resources. Wells dug by the McCandless brothers solved the crises for the plantation for a while. Coffee was introduced on a 45 acre plantation in the lee of Mt. Ka`ala where there was abundant rain. At its peak, the plantation produced 13.79 tons of sugar per acre in 1935 (Dorrance and Morgan 2000).

In 1888, Benjamin F. Dillingham secured a franchise from King Kalākaua to build a railroad that eventually extended from Honolulu, along the Wai`anae coast, around Ka`ena Point, to Waialua and Kahuku (*ibid*.). With easy access to the Wai`anae coast by train came limited development. The Dowsett Hotel was built *makai* of the project area on Keaupuni Point and an additional store opened in 1896 serving a population that had grown to 1,281 souls (*ibid*.). With the arrival of WW II, the character and land use of Wai`anae was greatly changed. Some of the best sugar lands were taken over by the military, which was the beginning of the end for the Wai`anae Plantation, which closed in 1947. Military activities altered the entire coast and many valleys with the result of many moving away after the War. Real estate, initiated by Chinn Ho in the 1950s, was a lucrative enterprise, as old sugar cane lands were sold and subdivided into farm and house lots. Since then, Wai`anae had steadily grown with all the amenities of a modern community. The project area is located in the midst of this development.

SUMMARY AND CULTURAL ASSESSMEMNT

The "level of effort undertaken" to identify potential effect by a project to cultural resources, places or beliefs (OEQC 1997) has not been officially defined and is left up to the investigator. A good faith effort can mean contacting agencies by letter, interviewing people who may be affected by the project or who know its history, research identifying sensitive areas and previous land use, holding meetings in which the public is invited to testify, notifying the community through the media, and other appropriate strategies based on the type of project being proposed and its impact potential. Sending inquiring letters to organizations concerning development of a piece of property that has already been totally impacted by previous activity and is located in an already developed industrial area may be a "good faith effort". However, when many factors need to be considered, such as in coastal or mountain development, a good faith effort might mean an entirely different level of research activity.

In the case of the present parcels, letters of inquiry were sent to organizations whose expertise would include the project area. Consultation was sought from the Office of Hawaiian Affairs, O`ahu and Martha Yent of Division of State Parks. A letter was received from the Office of Hawaiian Affairs acknowledging receipt of our letter of inquiry.

Additionally, historical and cultural source materials were also consulted, extensively used, and can be found listed in the References Cited portion of the report. Such scholars as Kamakau (1961), Thrum (1908, 1916 1917), Fornander (1919, 1969), Walker (1930), Kuykendall (1938), Beckwith (1940), Chinen (1961), Handy and Handy (1972), Puku`i *et al*. (1974), Kelly (1983, 1998), and Kame`eleihiwa (1992) have contributed, and continue to contribute, to our knowledge and understanding of Hawai`i, past and present. The works of these and other authors were consulted and incorporated in the report where appropriate. Land use document research was supplied by the Waihona `Aina Data base (2005).

Analysis of the potential effect of the project on cultural resources, practices or beliefs, the potential to isolate cultural resources, maintain practices or beliefs in their original setting, and the potential of the project to introduce elements that may alter the setting in which cultural practices take place is a requirement of the OEQC (No. 10, 1997). The passing of Act 50 in April 2000 mandates the assessment of impacts on cultural practices by the proposed project. As stated earlier, this includes the cultural resources of the different groups comprising the multi-ethnic community of Hawai`i. Cultural resources can include sites, behaviors, values, beliefs, rights and stories, among other things. The project area has not been used for traditional cultural purposes within recent times.

Based on the lack of information concerning the project area from the Office of Hawaiian Affairs, O`ahu and the Division of State Parks, it is reasonable to conclude that, pursuant to Act 50, the exercise of native Hawaiian rights, or any ethnic group, related to gathering, access or other customary activities will not be affected by development activities on Parcel 49. Visual impact would appear to be minimal based on the location of the project area. Because there were no cultural activities identified on Parcel 49, there were no adverse effects.

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