Final

Archaeological Monitoring Plan for the Replacement of Mākaha Bridges 3 and 3A, Farrington Highway, Mākaha Ahupua‘a, Wai‘anae District, Island of O‘ahu

Portions of TMK: [1] 8-4-001:012, 8-4-002:045, 47, 8-4-018:014, 122, 123, 8-4-08:018, 019, and 020

Prepared for
R.M. Towill Corporation

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Management Summary

Reference	Archaeological Monitoring Plan for the Replacement of Mākaha Bridges 3 and 3A, Farrington Highway, Mākaha Ahupua‘a, Wai‘anae District, Island of O‘ahu (Altizer et al. 2010).
Date	March 2010
Project Number (s)	Federal Highway Administration (FHWA) Aid Project No.: BR-093-1(20) Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: MAKAHA 4
Investigation Permit Number	Monitoring will likely be performed under Hawai‘i State Historic Preservation Division (SHPD) permit No.10-10, issued per Hawai‘i Administrative Rules (HAR) Chapter 13-282.
Project Location	The project area comprises portions of TMK (1) 8-4-001:012, 8-4-2:047, 45, 8-4-018:014, 122, 123, 8-4-08:018, 019, 020, and is located along the Farrington Highway corridor, approximately 500 feet (150 m) *mauka* of the shoreline at Mākaha Beach Park, at the intersection of Kili Drive and Farrington Highway, Mākaha Ahupua‘a, Wai‘anae District, Island of O‘ahu. Bridge 3 is located just south of Kili Drive and Bridge 3A is located just north of Kili Drive. This area is depicted on the 1998 Wai‘anae U.S. Geological Survey 7.5-minute topographic quadrangle.
Land Jurisdiction	State of Hawai‘i, Private, City and County of Honolulu
Project Funding	FHWA and State of Hawai‘i Department of Transportation (HDOT)
Agencies	FHWA, State Historic Preservation Division (SHPD), HDOT
Project Description and Related Ground Disturbance	HDOT proposes to demolish and replace the two existing bridge structures with new bridge structures that meet current standards. The project will require construction of a temporary detour road and temporary bridge structures on the seaward (southwestern) side of Farrington Highway. Additionally, drainage improvements along both bridges will be made, including construction of erosion control measures to reduce discharges of sediment in storm water runoff.
Project Acreage	Approximately 3.7 acres
Area of Potential Effect (APE)	The proposed bridge replacement project’s APE extends no further than the project area’s approximately 3.7-acre footprint.
Historic Preservation Regulatory Context and Document Purpose	This project’s historic preservation review includes compliance with Hawai‘i Revised Statutes (HRS) Chapter 6E-8 and HAR Chapter 13-13-275. Additionally, with FHWA funding, the project is a federal undertaking requiring compliance with Section 106 of the National Historic Preservation Act (NHPA), the National Environmental Policy Act (NEPA), and the Department of Transportation Act (DTA). As part of this historic preservation review compliance, CSH conducted an archaeological inventory survey (McDermott and Tulchin 2006), which was reviewed and

	approved by SHPD (SHPD correspondence, LOG NO: 2006.0731 DOC NO: 0603CM59). FHWA's Section 106 review determined that the project will have an adverse effect on historic properties. SHPD concurred with this determination. This archaeological monitoring plan is a mitigation component of the project's Memorandum of Agreement (MOA) developed between HDOT, FHWA, and SHPD. This archaeological monitoring program was prepared in consideration of the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation, and is to be implemented to mitigate the project's effect on known historic properties, facilitate the identification and treatment of any burials that might be discovered during subsurface disturbance, and to mitigate the project's effect on any non-burial archaeological deposits that might be uncovered during project construction. In consultation with SHPD, this monitoring plan is designed to fulfill the state requirements for monitoring plans [HAR Chapter 13-279-4].
Historic Properties Potentially Affected	Based on CSH's archaeological inventory survey report (McDermott and Tulchin 2006), all five historic properties identified within the project area were determined eligible to the National/Hawai‘i Register: State Inventory of Historic Properties (SIHP) # 50-80-7-6822, Mākaha Bridge 3, constructed in 1937, determined eligible under Criteria A and D. SIHP # 50-80-7-6823, Mākaha Bridge 3A, constructed in 1937, determined eligible under Criteria A and D. SIHP # 50-80-7-6824, Farrington Highway, constructed in the 1930s as part of the Territorial Highway System, determined eligible under Criterion D. SIHP # 50-80-7-6825, buried A-horizon enriched with cultural material from prehistoric and historic land use, contains previously disturbed human skeletal remains that SHPD has determined are most likely Native Hawaiian, determined eligible under Criteria D and E (Hawai‘i Register only). SIHP # 50-80-12-9714, remnants of the O‘ahu Railway and Land Company (OR&L) Railroad, a portion of which, located outside the current project area, is already listed on the National Register. The railroad remnants within the current project area have lost their integrity and can no longer convey the railroad's significance under Criteria A, B, and C. The remnants were determined eligible for their information (Criterion D).
Recommended Monitoring	On-site archaeological monitoring is recommended for all ground disturbing activities Any departure from this full-time, on-site monitoring, would require consultation with, and the written approval of, SHPD.

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Section 1 Introduction

1.1 Project Background

At the request of R.M. Towill Corporation, Cultural Surveys Hawai‘i, Inc. (CSH) has prepared this archaeological monitoring plan for the Mākaha Bridges 3 and 3A replacement project, located within Mākaha Ahupua‘a, Wai‘anae District, Island of O‘ahu. The approximately 3.7-acre project area comprises portions of tax map key (TMK) (1) 8-4-001:012, 8-4-2:047, 45, 8-4-018:014, 122, 123, 8-4-08:018, 019, 020, and is located along the Farrington Highway corridor, approximately 500 feet (150 m) *mauka* of the shoreline at Mākaha Beach Park, at the intersection of Kili Drive and Farrington Highway. This area is depicted on the 1998 Wai‘anae U.S. Geological Survey topographic 7.5-minute quadrangle map, a TMK map, and an aerial photograph (Figure 1, Figure 2, and Figure 3).

Within this area, the Hawai‘i Department Of Transportation (HDOT) proposes to demolish and replace the two existing Farrington Highway bridge structures with new bridge structures that meet current standards. Bridge 3 is located just south of Kili Drive and Bridge 3A is located just north of Kili Drive. The approximately 3.7-acre project area is comprised of private, City and County of Honolulu, and State of Hawai‘i lands.

This HDOT and Federal Highways Administration (FHWA) funded bridge replacement project [FHWA Aid Project No.: BR-093-1(20)] will require construction of a temporary detour road and temporary bridge structures on the *makai* (southwestern) side of Farrington Highway. Additionally, drainage improvements along both bridges will be made, including construction of erosion control measures to reduce discharges of sediment in storm water runoff.

This project’s historic preservation review includes compliance with Hawai‘i Revised Statutes (HRS) Chapter 6E-8 and HAR Chapter 13-13-275. Additionally, with FHWA funding, the project is a federal undertaking requiring compliance with Section 106 of the National Historic Preservation Act (NHPA), National Environmental Protection Act (NEPA), and the Department of Transportation Act (DTA). As part of this historic preservation review compliance, CSH conducted an archaeological inventory survey of the project area (McDermott and Tulchin 2006), which was reviewed and approved by SHPD (SHPD correspondence, LOG NO: 2006.0731 DOC NO: 0603CM59—refer to Appendix B).

The FHWA Section 106 review of the Mākaha Bridges Replacement Project determined that the project will have an adverse effect on historic properties. The State Historic Preservation Division (SHPD) concurred with this determination and, per their HAR 6E-8 review, determined that a project effect determination of “effect with proposed mitigation commitments” was warranted for this project. This archaeological monitoring plan is a mitigation component of the project’s Memorandum of Agreement (MOA) between HDOT, FHWA, and SHPD.

This archaeological monitoring program was prepared in consideration of the Secretary of the Interior’s Standards and Guidelines for Archaeology and Historic Preservation, and should be implemented to mitigate the effect on known historic properties, facilitate the identification and treatment of any burials that may be discovered during subsurface disturbance, and to mitigate the project’s effect on any non-burial archaeological deposits that may be uncovered during

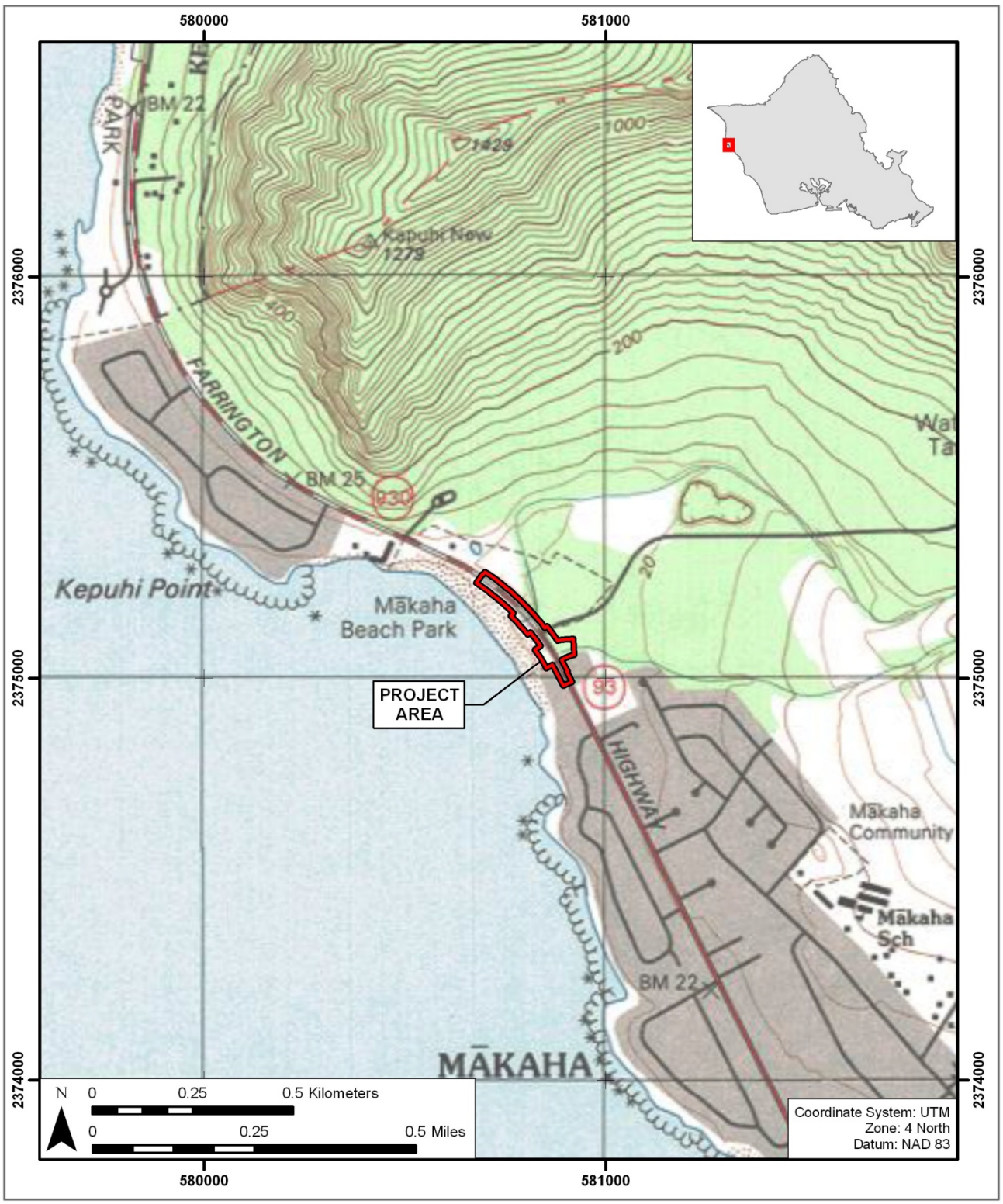

Figure 1. Portion of the 1998 U.S. Geological Survey 7.5-minute series Wai‘anae quadrangle topographic map showing the project area

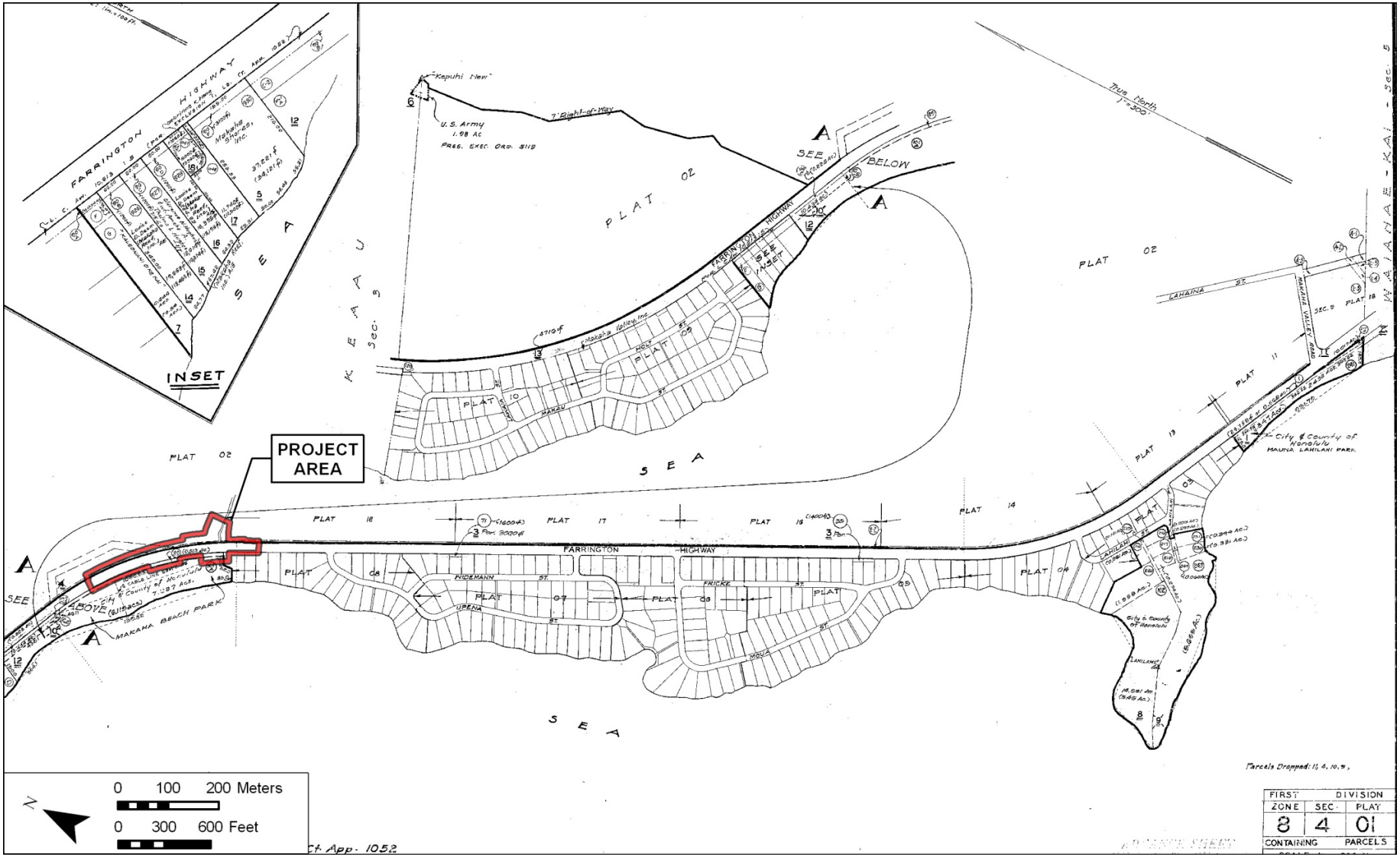

Figure 2. Portion of TMK 8-4-01 showing the location of the current project area

Figure 3. Aerial photograph showing location of current project area (U.S. Geological Survey Orthoimagery 2005)

project construction. In consultation with SHPD, this monitoring plan is designed to fulfill state requirements for monitoring plans [HAR Chapter 13-279-4].

The project's earlier archaeological inventory survey conducted by CSH in 2005 (McDermott and Tulchin 2006) identified and documented five historic properties. State Inventory of Historic Properties (SIHP) # 50-80-7-6825 is a buried A-horizon with cultural material from pre-contact and historic land use, and previously disturbed human skeletal remains determined to be most likely Native Hawaiian. Following the provisions of the project's MOA, this historic property is the focus of a data recovery program, the plan for which was written by CSH (Groza et al. 2010) and approved by SHPD (SHPD Correspondence LOG NO: 2010.0313, DOC NO: 1002NM39; see Appendix B).

The four other historic properties are all currently in-use or remnant historic transportation infrastructure. They include SIHP # 50-80-7-6824, Farrington Highway; SIHP # 50-80-7-6822, Mākaha Bridge 3; SIHP # 50-80-7-6823, Mākaha Bridge 3A; and SIHP # 50-80-12-9714, the remnants of the OR&L Railroad. Based on the inventory survey results, it was determined that no project related mitigation was required for SIHP # 50-80-7-6824, Farrington Highway, because the project consists of routine maintenance to an in-use historic property that is consistent with the Secretary of the Interior's standards for the treatment of historic properties (36 CFR part 68). Pursuant to the project's MOA, the three remaining historic properties (the two bridges and the OR&L remnants) will be documented in architectural studies as a form of mitigation. This architectural Historic American Engineering Record (HAER) documentation is currently underway by Mason Architects.

In compliance with Hawaii State Burial Law (HRS Chapter 6E-43 and HAR Chapter 13-300) a burial treatment plan was prepared by CSH (Tulchin and McDermott 2006) to address the treatment of the project's previously identified human skeletal remains. These remains, which consist of a human hand phalanx and a rib fragment, are a component of SIHP # 50-80-7-6825. These human remains were previously disturbed (prior to the current project) by past land use. The O‘ahu Island Burial Council (OIBC) was asked to approve the relocation of the human remains to an acceptable reinterment site because preservation in place was not possible under the current construction design. At its October 11th, 2006 meeting, the OIBC voted to relocate the human remains associated with SIHP No. 50-80-07-6825 and SHPD subsequently approved the project's final burial treatment plan (SHPD correspondence LOG NO: 2006.3522 DOC NO: 0610PC04 and LOG NO: 2007.2400 DOC NO: 0707MC07, respectively, see Appendix B). Disinterment of the human remains and implementation of the project's burial treatment plan will take place prior to any project-related construction activity and will occur during the project's data recovery when SIHP # 50-80-7-6825 will be further investigated (refer to Groza et al. 2010: 52).

1.2 Environmental Setting

1.2.1 Natural Environment

Based on U. S. Department of Agriculture soils survey data, soils within the project area consist of Halei‘wa Silty Clay, 0 to 2 Percent Slopes (HeA). Hale‘iwa Silty Clay is described by Foote (et al. 1972) as a moderate to poorly drained clay occurring in alluvial fans and drainage ways (Figure 4). Based on subsurface testing results, the seaward-most portions of the project

area, near the active beach, have marine Jaucas sands beneath terrigenous silty sediments. Also based on subsurface testing results, underlying the fine grain sediments in the inland portion of the project area are Pleistocene coral reef remnants. Elevation in the project area is approximately 20 feet (6 m) above mean sea level (AMSL).

Rainfall is less than 20 inches (500 mm) annually along the Wai‘anae Coast and winter storms are the major source of precipitation. December through February are relatively wet months for the region (Armstrong 1973). The project area is generally without relief, with the exception of minor topography associated with the two drainages that pass through the project area, Mākaha Stream’s north and south branches. These are intermittent drainages that are usually blocked from the sea by the active sand beach berm. During the archaeological inventory survey, the only water in these drainages consisted of a small, shallow, somewhat stagnant pond located immediately upstream of Bridge 3A.

Vegetation along the Wai‘anae Coast is sparse. With 20 inches (500 mm) or less of rain annually, only the hardiest plants adapted to coastal environments can thrive. The vegetation is typical of dry seashore environments in Hawai‘i and is dominated by alien species. Indigenous species include *hau* (*Hibiscus tiliaceus*), *kou* (*Cordia subcordata*), *kamani* (*Calophyllum inophyllum*), *naupaka* or *naupaka kahakai* (*Scaevola sericea*), *pa‘u o Hi‘iaka* (*Jacquemontia ovalifolia sandwicensis*), the native beach morning glory or *pohuehue* (*Ipomea pes-caprae*) and the coconut or *niu* (*Cocos nucifera*). Introduced species found bordering Farrington Highway include sea grape (*Coccoloba uvifera*), *kiawe* trees (*Prosopis pallida*), Madagascar Olive trees (*Noronhia emarginata*), and *koa haole* (*Leucaena leucocephala). Kiawe*, *koa haole*, and various grasses were dominant within the project area.

1.2.2 Built Environment

The built environment within and in the immediate vicinity of the project area consists of paved roads, graded, unpaved road-shoulder pull-off/parking areas, residential development, historic bridges, and remnants of the OR&L Railroad.

Paved roads are located both within and in the immediate vicinity of the project area. Farrington Highway is present through the project area, running roughly north-south, and continues in both directions. As part of this investigation, this portion of Farrington Highway has been designated SIHP # 50-80-07-6824 because the highway alignment is clearly older than 50 years. Kili Drive intersects Farrington Highway in the middle of the project area.

Graded parking areas are located within the northwestern and southwestern borders of the project area. The northwestern parking area consists of a level unpaved area on the makai (west) side of Farrington Highway and is utilized by patrons of Mākaha Beach Park. The parking area in the southwestern portion of the project area is also located on the makai (west) side of Farrington Highway and is similar in construction to the northwestern parking area. The parking area is utilized by the City and County as a bus stop. A small bench and shelter has been constructed in this area for bus patrons. Residential development, in the form of residential housing and access roads, is located immediately south of the project area. Mākaha Bridge 3 (designated SIHP # 50-80-07-6822) and Bridge 3A (designated SIHP # 50-80-07-6823), are present in this portion of Farrington Highway within the project area. Both bridges are

constructed over streams leading into the ocean, and serve as a means of keeping this portion of Farrington Highway level and protected from stream overflow.

Remnants of the OR&L Railroad (previously designated SIHP # 50-80-12-9714) are located within the western boundary of the project area, *makai* of Farrington Highway. The remains consist of rectangular concrete slabs, and stone and mortar railroad berm, which were utilized to minimize slope and maintain a level railroad track.

Figure 4. Aerial photo with a soil overlay showing soils present in the project area (Foote et al. 1972; U.S. Department of Agriculture 2001)

Section 2 Background Research

2.1 Traditional and Historical Background

2.1.1 Mythological and Traditional Accounts

The project area is located within the *ahupua‘a* of Mākaha, which extends from the leeward Wai‘anae Range to the coastline. Wai‘anae Ahupua‘a is present to the southeast and Kea‘au Ahupua‘a is present to the northwest.

Although there are many traditional accounts detailing the pre-contact period of other portions of the Wai‘anae District, few exist for Mākaha. Mary Kawena Pukui (1974) gives the meaning of Mākaha as “fierce” and Roger C. Green (1980) suggests that this translation refers to “fierce or savage people” once inhabiting the valley. Green (1980:5) also refers to “…the ‘Ōlohe people, skilled wrestlers and bone-breakers, by various accounts [who] lived in Mākaha, Mākua, and Kea‘au, where they often engaged in robbery of passing travelers.”

Legend: How Mākaha Got Its Name

The shores fronting the beautiful Mākaha Valley were known for their abundant marine resources. Edward Iopa Kealanahele’s (1975) legend of how Mākaha got its name gives light to the great ocean resources:

> Long ago, there lived in this valley a handsome young chief named Makaha. His skill as a fisherman gained island-wide attention, which eventually reached the ears of Ke Anuenue [the rainbow], the goddess of rain, who lived in upper Manoa Valley.
>
> She was so intrigued that she sent her trusted winged friend, Elepaio, to investigate Makaha. Elepaio returned with exciting stories of Mākaha’s daring and skills.
>
> The next morning, Ke Anuenue created an awe-inspiring double rainbow which arched from Manoa Valley to this valley, from where she and her retinue could watch Makaha perform his daring feats at the ocean.
>
> The people of the Wai‘anae Valley were petrified by that magnificent rainbow that ended in this unnamed valley where Makaha lived.
>
> Knowing that Ke Anuenue was watching, they prayed that she would bring them the much needed gentle rains and not the harsh storms she could create when displeased.
>
> Makaha, aware of her presence, scaled Mauna Lahilahi and called loudly to his aumakua [his ancestral spirit] Mano ai Kanaka, the most vicious of man-eating sharks. As Mano ai Kanaka glided in from the ocean, Makaha dived from the rocky pinnacle, emerged on Mano ai Kanaka’s back and rode with regal grandeur.
>
> As the two disappeared into the depths, the sea became calm. Suddenly Makaha seemed to be everywhere along the rocky coast gracefully tempting death. Then, just

> as suddenly, Makaha seemed to skim the ocean as Mano ai Kanaka carried him to shore.
>
> Makaha then carried his entire catch to the rainbows end deep in the valley and offered it to Ke Anuenue. Deeply touched, she sent gentle rains to the parched earth of the great Wai‘anae Valley. She was impressed by the selection of seafood that was offered her but was disappointed by the quality of the poi, mai‘a [banana] and uala [sweet potato] which were dry and stringy. She demanded to know why since she was so accustomed to good quality fruits. She was told that it was because of the lack of rainfall in the valley.
>
> Ke Anuenue became enamored with Makaha and from then on her double rainbow would appear in Mākaha's kuleana [land area] and gentle rains would fall on Wai‘anae so the people could enjoy lush bananas and an abundance of taro.
>
> The people built a heiau in honor of Ke Anuenue and Makaha but Ke Anuenue refused the honor and named the entire valley, Makaha, by which it is now known.

Stories of Malolokai

In the *ahupua‘a* of Mākaha there are accounts of a talking stone on the hill of Malolokai, and two small pits on the *makai* side of the road at Kepuhi Point:

> We rode to the plain of Kumanomano,… and it is said of the place, the teeth of the sun is sharp at Kumanomano. Mākaha rose above like a rain cloud. We passed in front of a famous hill Malolokai. We saw the talking stone standing there [Kuokoa, August 11, 1899 In Sterling and Summers 1978:79].

A brief account of the location of Malolokai cave is given by Kuokoa, July 12, 1923 in Sterling and Summers (1978:79): "…Malolokai lies below [beyond] the hill of Maunalahilahi close to a cliff. Below, in the level land of Waihokaea are the bones of the travelers who were killed by skilled *lua* fighters."

Lua literally means hand-to-hand fighting that includes bone-breaking (Pukui and Elbert 1986). It is often referred to as the *art of lua*, or the Hawaiian martial art. Starting in the 1750s, the art of *lua* was only taught to the *ali‘i* and their guards. It was a long time familial secret and could only be passed down through family. Later, in the early1920s, the *kapu* was broken and the Hawaiian martial art of *lua* was taught to other people outside of the bloodline.

Lua had an array of weapons that were used in combat made of different types of hardwood found throughout the Hawaiian islands such as *kauwila* and *kawa‘u*. Marine resources were also used to make weapons, such as shark teeth, used to make the *leiomano*, a shark tooth weapon used as a knife and the marlin (swordfish) bill.

Some legends say that they were cannibals and not *lua* fighters:

> The late Harry George Poe, born in Makua Valley in 1882, wrote in his diary that the robbers threw their victims into a pit that went underground to the ocean. Poe explained, 'the reason is, they wants a man's legs without no hair on to make [an] aku

> [tuna] fishhook. They believe in those days that the human leg is best, lucky hook for aku.' One legend says a group of hairless men from Kauai finally wiped out the entire colony of robbers. Since that time, Malolokai has been safe for travelers (McGrath et al. 1973:11).

The following is a story told by an unknown Hawaiian. Kepuhi Point is at the base of the ridge that divides Mākaha and Kea‘au Valleys. McAllister recorded it in 1933 (SIHP # -175):

> Long ago there lived here a group of people who are said to have been very fond of human flesh. At a high altitude on each side of the ridge, guards were stationed to watch for people crossing this narrow stretch of land between the mountains and the sea. On the Mākaha side, they watched from a prominent stone known as Pohaku o Kane; on the Kea‘au side, from a stone known as Pohaku o Kaneloa. The individual who passed here was in constant danger of death, for on each side of the trail men lay in wait for the signal of the watcher. If a group of persons approached, too many to be overcome by these cannibalistic peoples, the guards called out to the men hidden below, "Moanakai" [high tide]; but if, as frequently happened, only two or three people were approaching, the watchers called, "Mololokai" [low tide]. The individuals were then attacked and the bodies taken to two small caves on the sea side of the road. Here the flesh is said to have been removed and the bones, skin and blood left in the holes, which, at high tide, were washed clean by the sea.
>
> For many years these people prayed upon the traveler until at one time men from Kauai, hairless men [Olohe] came to this beach. They were attacked by these cannibals but defeated them, killing the entire colony. Since then the region has been safe for traveling (McAllister 1933:121-122).

In Hi‘iaka's "Address to Cape Kaena," she mentioned Mākaha as she travelled along the sunny coast. As she stood at the top of the Pōhākea Pass looking back, she sang the following song (Emerson 1965:157):

Kaena's profile fleets through the calm,	Kunihi Kaena, Holo i ka Malie;
With flanks ablaze in the sunlight-	Wela i ka La ke alo o ka pali;
A furnace-heat like Kilauea;	Auamo mai i ka La o Kilauea;
Ke-awa-ula swelters in heat;	Ikiiki i ka La na Ke-awa-ula
Kohola‘-lele revives in the breeze	Ola i ka makani Kai-a-ula Kohola‘ lele-
That breath from the sea, Kai-a-ulu.	He makani ia no lalo.
Fierce glows the sun of Makua;	Haoa ka Loa i na Makua;
How it quivers at Ohiki-lele-	Lili ka La i Ohiki-lolo
'Tis the Sun-god's dance o‘er the plain,	Ha‘a-hula le‘a ke La i ke kula,
A roit of dance at Makaha.	Ka Ha‘a ana o ka La i Makaha;
The sun-tooth is sharp at Kumano;	Oi ka niho o ka La i Ku-manomano;

Life comes again to Maile ridge,	Ola Ka-maile i ka huna na niho
When the Sun-god ensheaths his fang.	Mo‘a wela ke kula o Walio;
The Plain Walio‘ is sunburned and scorched;	Ola Kua-iwa i ka malama po
Kua-iwa revives with the nightfall;	Ola Waianae i ka makani Kai-a-ulu
Waianae is consoled by the breeze	Ke hoa aku la i ka lau o ka niu
Kai-a-ulu and waves its coco fronds;	Uwe’ o Kane-pu-niu i ka wela o ka La;
Kane-pu-niu’s fearful of sunstroke’(*e)*	Alaila ku‘u ka luhi, ka malo‘elo‘e,
A truce, now, to toil and fatigue:	Auau aku i ka wai i Lua-lua-lei
We plunge in the Lua-lei water	Aheahe Kona, Aheahe Koolau wahine,
And feel the kind breeze of Kona,	Ahe no i ka lau o ka ilima.
The cooling breath of the goddess,	Wela, wela i ka La ka pili i ka umauma,
As it stirs the leaves of ilima.	I Pu‘u-li‘ili‘i, i Kalawalawa, i Pahe-lona,
The radiant heat scorches the breast	A ka pi‘i‘na i Wai-ko-ne-ne’-ne;
While I sidle and slip and climb	Hoomaha aku i Ka-moa-ula;
Up one steep hill then another;	A ka luna i Poha-kea
Thus gain I at last Moa-ula,	Ku au, nana i kai o Hilo:
The summit of Poha-kea.	
There stand I and gaze oversea	
To Hilo, where lie my dewy-cold	
Forest preserves of lehua	
That reach to the sea in Puna-	
My lehuas that enroof Kuki‘i.	

Menehune in Mākaha are mentioned in Hawaiian Folk Tales by Thomas G. Thrum (1907) in the story of Kekupua’s Canoe. The *menehune* constructed a canoe for Chief Kakae, who lived in Wahiawa, for his wife to travel to Tahiti. Kekupua was the Chief’s main man who went to Mākaha to pull the canoe down to the ocean.

2.1.2 Early Historic Period

Wai‘anae District

The origin of the name Wai‘anae is thought to be connected to the richness of the waters off Wai‘anae’s coast: *wai* - water and *‘anae* - large mullet (Sterling and Summers 1978). Several accounts attest to the abundance of fish from Wai‘anae waters (Wilkes 1845; Pukui et al. 1974). In 1840, Wilkes makes the following comment: “The natives are much occupied in catching and drying fish, which is made a profitable business, by taking them to Oahu, where they command a ready sale” (Wilkes 1845:81-82).

Traditional accounts of Wai‘anae portray a land of dual personality: a refuge for the dispossessed and an area inhabited by the rebellious and outlaws. Certain landmarks in Wai‘anae attest to this dichotomy. Kawiwi, a mountain between Wai‘anae and Mākaha Ahupua‘a, was dedicated as a refuge by priests during times of war (McAllister 1933; Kamakau 1961). Pōka‘ī Bay was used as a school administered by the exiled high-class priests and *kahuna* who took refuge in Wai‘anae after Kamehameha Nui gained control of O‘ahu (Sterling and Summers 1978:68). It was also near Pōka‘ī Bay, at a place named Pu‘u Kāhea, that the eighteenth century prophet and *kahuna nui* of O‘ahu, Ka‘opulupulu, made his last famous prophecy before he was killed in Po‘olua (Sterling and Summers 1978:71). In contrast, other places in Wai‘anae were famed for their inhospitality.

Certainly, the environmental conditions along the Wai‘anae Coast played a part in shaping Wai‘anae people. Vancouver, the first explorer to describe this coast in 1793, describes the Wai‘anae Coast as "…composed of one barren rocky waste, nearly destitute of verdure, cultivation or inhabitants..." (Vancouver 1798:217).

The *‘ōku‘u* epidemic of 1804 (thought to be cholera) undoubtedly had a major effect on the native population, not only in Wai‘anae, but throughout the rest of the islands as well. John Papa ‘Ī‘ī relates that the *‘ōku‘u* "broke out, decimating the armies of Kamehameha I" [on O‘ahu] (1959:16). Other diseases also took their toll. The combined census for the Wai‘anae and ‘Ewa Districts in 1831-1832 was 5,883 (Schmitt 1977:12). Twenty years later, the combined census for the two districts was 2,451.

Another early historic period foreign influence, which greatly impacted Hawaiian culture and the traditional lifestyle, was the sandalwood trade. In an effort to acquire western goods including ships, guns, and ammunition, the chiefs acquired massive debts to the American merchants (‘Ī‘ī 1959:155). These debts were paid off in shiploads of sandalwood. When Kamehameha found out how valuable the sandalwood trees were, he ordered the people not to let the felled trees fall on the young saplings, to ensure their protection for future trade (Kamakau 1992:209-210).

Mākaha Ahupua‘a

Earliest accounts specific to Mākaha describe a good sized inland settlement and a smaller coastal settlement (Green 1980). These accounts correlate well with a sketch drawn by Bingham in 1826, which depicts only six houses along the Mākaha coastline (Figure 5). Green (1980:20-21) describes Mākaha's coastal settlement as, "…restricted to a hamlet in a small grove of coconut trees on the Kea‘au side of the valley, some other scattered houses, a few coconut trees along the beach, and a brackish water pool that served as a fish pond, at the mouth of the Mākaha Stream." This stream supported traditional wetland agriculture, including taro, in pre-contact and early historic periods, and sugarcane in the more recent past. Mākaha Stream, although it has likely changed course in its lower reaches, favors the northwest side of the valley leaving most of the flat, or gently sloping, alluvial plain on the southeast side of the valley. Rainfall is less than 20 inches annually along the Wai‘anae Coast and increases to approximately 60 inches along the 4000-foot high cliffs at the back and sides of the valley (Hammatt et al. 1985). Seasonal dry land cultivation in early times would have been possible, and remnants of dry land fields (*kula*) have been found in the valley in previous surveys (Green 1980).

The ancient, small (130-square meter) stepped stone *heiau* called Laukīnui, is so old that tradition claims it was built by the *menehune*. In areas watered by the stream there were *lo‘i* lands, but along

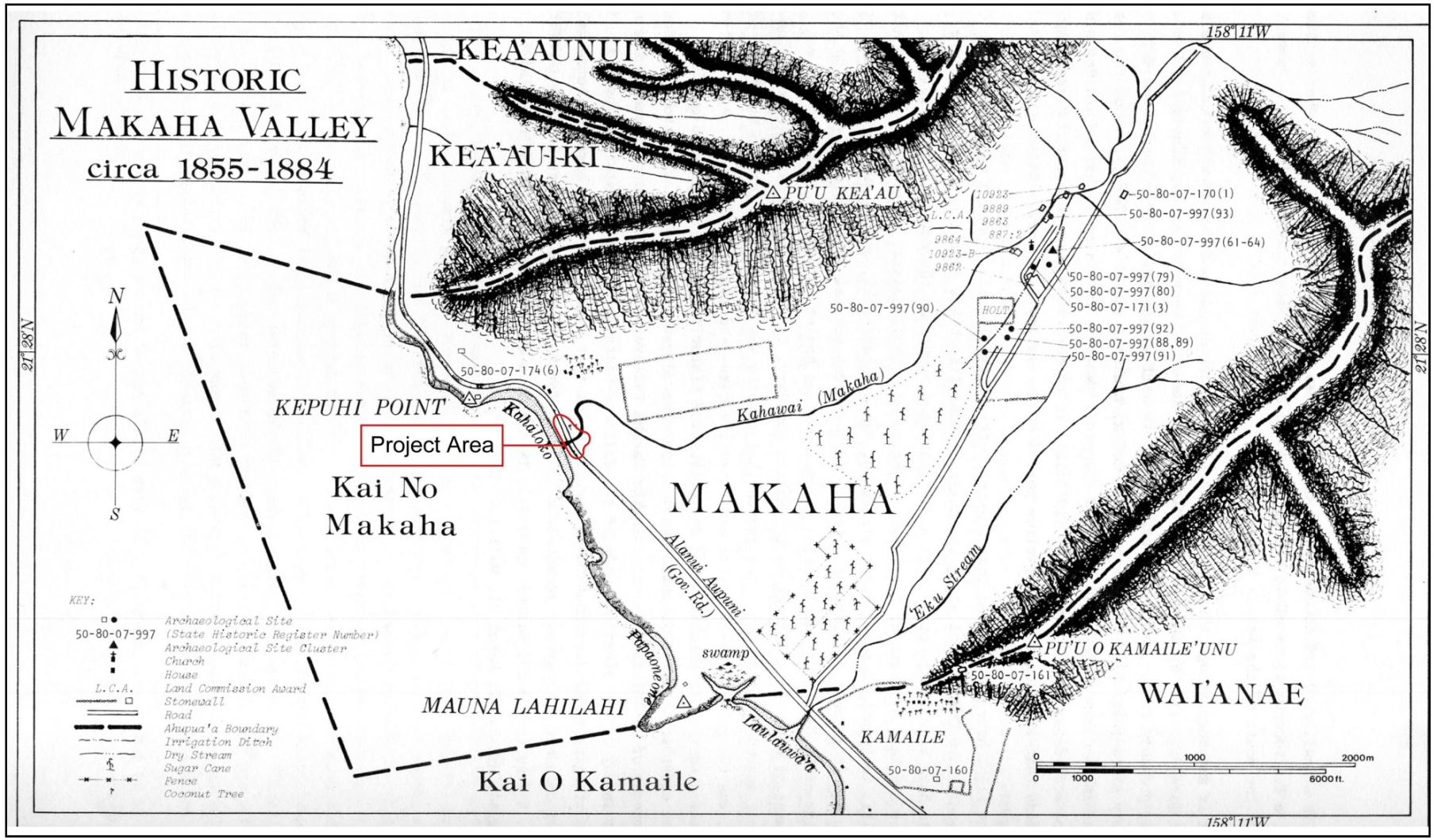

Figure 5. 1855-1884 Map (Green 1980) of Mākaha Valley showing location of project area and surrounding LCAs

this arid coast there was plenty of land where there was not enough water for taro, and typically here sweet potatoes and other dry land crops would have flourished. The Bishop Museum study undertaken by Green (1980) identified several field shelters with firepits associated with this dry land field system. Their settlement model indicates, during this early period, the field shelters were used as rest and overnight habitations by people living permanently on the coast who temporarily moved inland to plant, tend, and harvest their crops during the wet season (Green 1980: 74).

At the boundary between Mākaha and Wai‘anae Ahupua‘a lies Mauna Lahilahi, a striking pinnacle jutting out of the water. Vancouver describes Mauna Lahilahi as “a high rock, remarkable for its projecting from a sandy beach.” He also describes a village located south of Mauna Lahilahi situated in a grove of coconuts (Vancouver 1798:219). This village is Kamaile, which Green (1980:8) likens to a miniature *ahupua‘a* “with the beach and fishery in front and the well watered taro lands just behind.” A fresh water spring, Keko‘o, gave life to this land and supported one of the largest populations on the Wai‘anae Coast. The present project area is north of this coastal settlement, within a relatively low site density shoreline environment.

2.1.3 Māhele and LCA Documentation

The Organic Acts of 1845 and 1846 initiated the process of the *Māhele* - the division of Hawaiian lands, which introduced private property into Hawaiian society. In 1848, the crown and the *ali‘i* (royalty) received their land titles. *Kuleana* awards for individual parcels within the *ahupua‘a* were subsequently granted in 1850. Mākaha Ahupua‘a had 13 claims of which seven were awarded (Table 1). Of these seven, six Mākaha LCAs were located inland attesting to the importance of the inland settlement (see Figure 5). The seventh Mākaha LCA claims a *muliwai* as its western boundary. According to Pukui and Elbert (1986: 236) a *muliwai* refers to a “river, river mouth; pool near mouth of a stream, as behind a sand bar, enlarged by ocean water left there by high tide; estuary.” The reference to it as a boundary indicates this LCA was likely situated near the coast. There were two unawarded claims which also mention the *muliwai* as their boundary. Based on this information, it is possible that these claims were for Mākaha lands within the current project area, or at least in the immediate vicinity.

Land use information for the Mākaha LCAs is sparse. *Lo‘i* lands and *kula* lands were an important part of sustenance. In addition to these general land specifications, there is also mention of *noni*, ponds, and land for raising *mao*. The *noni* ponds are recorded in association with the *‘ili* of Kamaile indicating the claimant was claiming land in neighboring Wai‘anae Ahupua‘a in addition to the Mākaha claim. *Mao* refers to an introduced species of “cotton” (*Gossypium barbadense* or *Gossypium hirsutum*), which was commercially grown in Hawai‘i beginning in the early part of the nineteenth century, although it never became an important industry (Wagner et al. 1990: 876). *Ma‘o* generally does well in hot, arid environments and Mākaha would have been a suitable climate for such an industry.

Kuho‘oheihei (Abner) Pākī, father of Bernice Pauahi, was given the entire *ahupua’a* of Mākaha by Liliha after her husband, Boki, disappeared in 1829 (Green 1980). Although several individuals are recorded as having charge over Mākaha including Aua, Kanepaiki “chief of the Pearl River”, and the present “King”, Pākī felt entitled to the entire *ahupua‘a* of Mākaha. It is uncertain how much of his claim was granted. Whatever the case, it is suggested Chief Pākī was able to wield a certain amount of control over the residents of Mākaha during the *Māhele*

resulting in the limited number of LCA applications. Taxpaying adult males in 1855 numbered 39, indicating there were more families living and working the Mākaha lands (Barrere 1970: 7) than was reflected in *Māhele* awards.

Based on the *Māhele* documents, Mākaha's primary settlement was inland where waters from Mākaha Stream could support *lo‘i* and *kula* cultivation. Although there is evidence for settlement along the shore, for the most part, this was limited to scattered, isolated residents. The only "cluster" of habitation structures was concentrated near Mākaha Beach, near the Kea‘au side of Mākaha where there is also reference to a fishpond. There is tentative, but inconclusive evidence for land claims within the vicinity of the current project area.

Table 1.LCAs in Mākaha Ahupua‘a

Land Claim #	Claimant	‘Ili	Land Use	Landscape Feature	Awarded
877	Kaana/Kuaana for Poomano, wife	Kapuaa		Surrounded by lands of Alapai	1 ap.; 1.587 Acs (also Hotel St. & Waianae awards)
8228	Inaole (no name)	Laukini	House	stream on 2 sides	No
8763	Kanakaa	Hoaole	‘ili		No
9689	Nahina	Kekio	16 *lo‘i,* house lot	kahawai, muliwai on west	1 ap. .957 Ac.
9859	Napoe	Aheakai/ Laukini Mooiki	17 *lo‘i* (*mo‘o*) & kula house	*pali* on N. Kalua ma on N., kula & stream on E, stream on S. *muliwai* on west.	No
9860	Kalua	Luulauwaa (Laulauwaa)	House	in *kahawai* (stream valley) of Mākaha, hau, *muliwai* on west	No
9861	Nahina, see above	Kekio			No
9862	Kanehaku	Kekio Mooiki			
9863	Kala	Waikani Kahueiki Kapuaa		stream on S. *pali*(s) & stream land of Alapai	1 ap.; (Kalihi) 1.346 Acs
9864	Kapea	Laukini	19 lo‘i kula	pali	1 ap.; 1.217 Acs
10613	Pākī, Abner	Ahupua‘a			Apana 5: 4,933 Acres
10923	Uniu	Mākaha		stream on E.land of Kalua on S, *pali on W.*	1 ap.; .522 Ac. 1 ap.; .576 Ac.

Land Claim #	Claimant	‘Ili	Land Use	Landscape Feature	Awarded
10923B	Alapai	Kapuaa	2 lo‘i & kula	pali on E. kahawai on W.	1 ap.; .52 Ac.

2.1.4 1850 to 1900

By ancient custom the sea, for a mile off the shores, belonged to the *ahupua‘a* as part of its resources. The ruling chief could prohibit the taking of a certain fish or he could prohibit all fishing at specific times. Chief Pākī filed two such prohibitions, one in 1852, for the taking of *he‘e* or octopus (*Polypus* sp.) and the other in 1854 for the taking of *‘ōpelu* (*Decaqpterus pinnulatus*) (Barrere in Green 1980:7)

In 1855, Chief Pākī died, and the administrators of his estate sold his Mākaha lands to James Robinson and Co. In 1862, one of the partners, Owen Jones Holt, bought out the shares of the others (Ladd and Yen 1972). The Holt family dominated the economic, land-use, and social scene in Mākaha from this time until the end of the nineteenth century. During the height of the Holt family dynasty, from about 1887 to 1899, the Holt Ranch raised horses, cattle, pigs, goats and peacocks (Ladd and Yen 1972:4). Mākaha Coffee Company also made its way into the valley, buying up land for coffee cultivation, although they never became a prosperous industry. Upon Holt’s death in 1862, the lands went into trust for his children.

2.1.5 1900 to Present

The Holt Ranch began selling off its land in the early 1900s (Ladd and Yen 1972). In 1907, the Wai‘anae Sugar Company moved into Mākaha and, by 1923, virtually all of lower Mākaha Valley was under sugar cane cultivation. The plantation utilized large tracks of Lualualei, Wai‘anae, and Mākaha Valleys. The manager’s report for 1900 describes the plantation as having some 400 acres of newly cleared land fenced and planted, two miles of railroad, and nearly three miles of flumes laid to said lands (Condé and Best 1973:357). For a half century, Mākaha was predominantly sugarcane fields; however, by 1946 the manager’s report announced plans to liquidate the property because an additional increase in wage rates made operations no longer profitable (Condé and Best 1973:358).

The lack of water resources played a role in Wai‘anae Sugar Company’s low profitability. In the 1930s, Wai‘anae Plantation sold out to American Factors Ltd. (Amfac, Inc.). American Factors Ltd. initiated a geologic study of the ground water in the mountain ridges in the back of Mākaha and Wai‘anae Valleys. The study indicated that tunneling for water would be successful, but before tunneling could commence, World War II came about and plans were put on hold (Green 1980). In 1945, American Factors Ltd. contracted the firm of James W. Glover, Ltd. to tunnel into a ridge in the back of Mākaha Valley. The completed tunnel (Glover Tunnel) was 4200 feet long and, upon completion, had a daily water capacity of 700,000 gallons. The water made available was predominantly used for sugarcane irrigation. In 1946, Wai‘anae Plantation announced in the *Honolulu Advertiser* (Friday, Oct 18, 1946 cited in McGrath et al. 1973:145) that it planned to liquidate its nearly 10,000 acres of land. The day before, news of the impending sale was circulated among the investors at the Honolulu Stock Exchange. One of the investors was Chinn Ho.

> The unorthodox Ho had started his Capital Investment Company only the year before with a bankroll of less than $200,000, much of it the life savings of plantation workers. He was known as a friend of the little man, an eager disciple of economic growth, and an upstart (McGrath et al. 1973:145).

Chinn Ho managed to broker the deal the following day by 2 pm, when the Wai‘anae Plantation sold the Mākaha lands to the Capital Investment Corporation, which still maintains ownership of much of Mākaha Valley. There was an attempt to convert sugar lands back to ranching, but the perennial problem of water continued. Parts of the property were sold off as beach lots, shopping centers, and house lots, and many of the former plantation workers bought house lots. Chinn Ho also put his personal investment into Mākaha and initiated resort development including a luxury hotel. In 1969, the Mākaha Valley Golf Club, an 18-hole course with tennis courts, restaurant and other golf facilities opened for local and tourist use (McGrath et al. 1973:146-163). Numerous other small-scale agricultural interests were pursued during this time period including coffee, rice, and watermelons (Ladd and Yen 1972). Water from Glover Tunnel was then used to water Mākaha Valley farms, the lush grounds of the Mākaha Inn and Country Club, and its associated golf course.

2.1.6 Alterations to the Wai‘anae Coastline (1880 –1930)

Prior to the 1880s, the Wai‘anae coastline may not have undergone much alteration. The old coastal trail likely followed the natural contours of the local topography. With the introduction of horses, cattle, and wagons in the nineteenth century, many of the coastal trails were widened and graded to accommodate these new introductions. However, the changes probably consisted of superficial alterations to existing trails and did not entail major realignments. Kuykendall (1953:26) describes mid-nineteenth century road work: “Road making as practiced in Hawai‘i in the middle of the nineteenth century was a very superficial operation, in most places consisting of little more than clearing a right of way, doing a little rough grading, and supplying bridges of a sort where they could not be dispensed with.”

The first real alteration to the Wai‘anae coastline likely resulted from growth of the Wai‘anae Sugar Company. The company cultivated sugarcane in Mākaha, Wai‘anae, and Lualualei Valleys,and to more easily transport their cane to the dock and to the mill at Wai‘anae Kai, a railroad was constructed in 1880. Additional alteration to the Wai‘anae coastline occurred in the late nineteenth century with the extension of Dillingham’s OR&L rail line into the Leeward Coast. Construction of the railroad would have had an impact on the natural landscape, such as the sand dunes, as well as human-made features, particularly the fishponds and saltponds maintained in the coastal zone. One reporter writes a glowing story of the railroad trip to Wai‘anae at its opening on July 4, 1895:

> For nine miles the road runs within a stone’s throw of the ocean and under the shadow of the Wai‘anae Range. With the surf breaking now on the sand beach and now dashing high on the rocks on one side, and with the sharp craigs and the mountains interspersed with valleys on the other, patrons of the road are treated to some of the most magnificent scenery the country affords (McGrath et al. 1973:56).

This report indicates the railroad hugged the ocean during a good portion of the trip. The railway's grade requirements demanded considerable alteration to natural landscapes in order to make them feasible for transport, including curve and slope reduction. An 1884 map illustrates the alignment of the old Government Road (Jackson 1884; Figure 6 and Figure 7), which was likely a modified version of the original coastal trail. After the Belt Road was completed, further roadwork was carried out in the 1930s on what was called the "Wai‘anae Road", later named Farrington Highway. Kili Drive was built ca. 1970s to provide additional access into Mākaha Valley. Additional access was necessary due to increased population related to residential, golf resort, and condominium development in the valley.

Mākaha Bridges 3 and 3A and Improvements to Farrington Highway

The Mākaha bridges were built in 1937. Hawai‘i was still a territory, and W. D. Bartel was the Chief Engineer for the Territorial Highway Department. At the time, the bridges, along with associated improvements to the existing "Wai‘anae Road," later renamed Farrington Highway, were important components of the Territorial Highway System. Based on photographs, (McGrath et al. 1973:138-139, 144, 149; Figure 7, Figure 8, and Figure 9), Farrington Highway was first paved as a result of 1930s Territorial Highway System construction. The expansion of the belt road system was an important improvement that further facilitated transportation to and from the more remote portions of Wai‘anae, beyond Mākaha.

2.2 Previous Archaeological Research

2.2.1 Previous Archaeological Studies in Mākaha Ahupua‘a

A number of archaeological studies have been carried out in Mākaha Ahupua‘a (Table 2, Figure 10), beginning with McAllister's (1933) island-wide survey in which he describes seven sites in Mākaha Ahupua‘a:

SIHP # 50-80-07-169 is a complex of rock-faced terraces for irrigated taro cultivation located "two-thirds the way up the valley." It is shown on McAllister's O‘ahu site map, on the northwest side of the valley, approximately 800 m northwest of Kāne‘ākī Heiau.

SIHP # 50-80-07-170 is Kāne‘ākī Heiau which has been preserved and reconstructed.

SIHP # 50-80-07-171 is another set of extensive, once irrigated taro terraces with some rock facings, approximately 6 ft. in height, and is reported as, "half-way up Mākaha Valley and on the Honolulu side of the stream" and is shown on McAllister's O‘ahu site map as approximately 400 m south of Kāne‘ākī Heiau. Green (1980) reported that this site was not relocated and had been destroyed; however Neller (1984) relocated and described the site as damaged.

SIHP # 50-80-07-172 is described as a stone platform, interpreted as a possible shrine, and is shown on McAllister's O‘ahu site map as approximately 600 m south of Kāne‘ākī Heiau. Green (1980) reported that this site was not relocated and had been destroyed; however, Neller (1984) relocated and described the site as damaged.

SIHP# 50-80-07-173 is described as the "probable location" of a large rock reported in 1839 by E. O. Hall as "two or three miles distance" past the settlement at Pukahea (Pu‘u Kahea) that was once an object of worship. This sacrificial stone was reported by Hall as "in no peculiar sense striking" and "as undignified as any other hump or inanimate matter along the road."

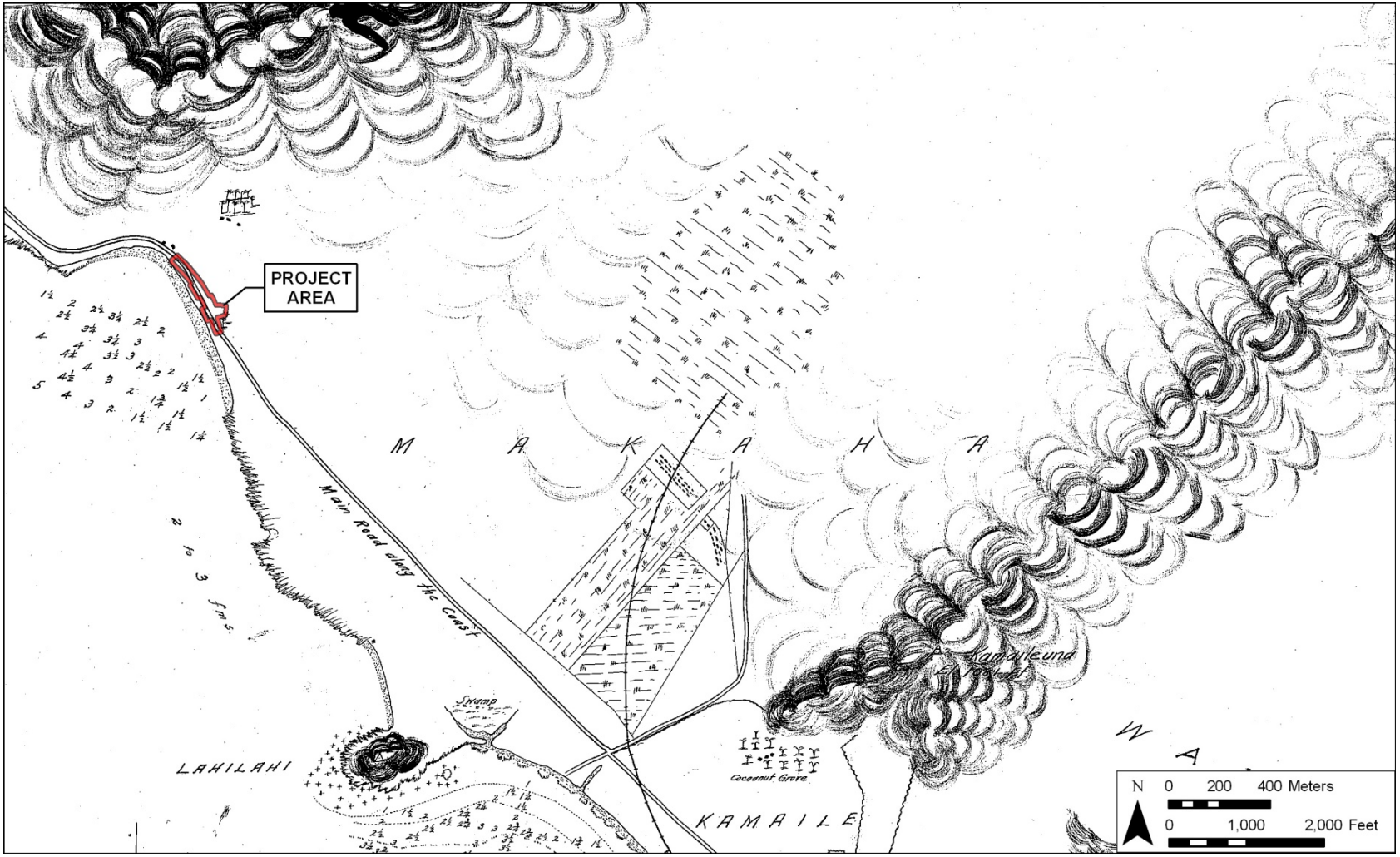

Figure 6. An 1884 Government Survey map showing the alignment of the Old Government Road along the Wai‘anae Coast and through the current project area (Jackson 1884).

Figure 7. Photograph of the old Waianae Road (McGrath et al. 1973:51)

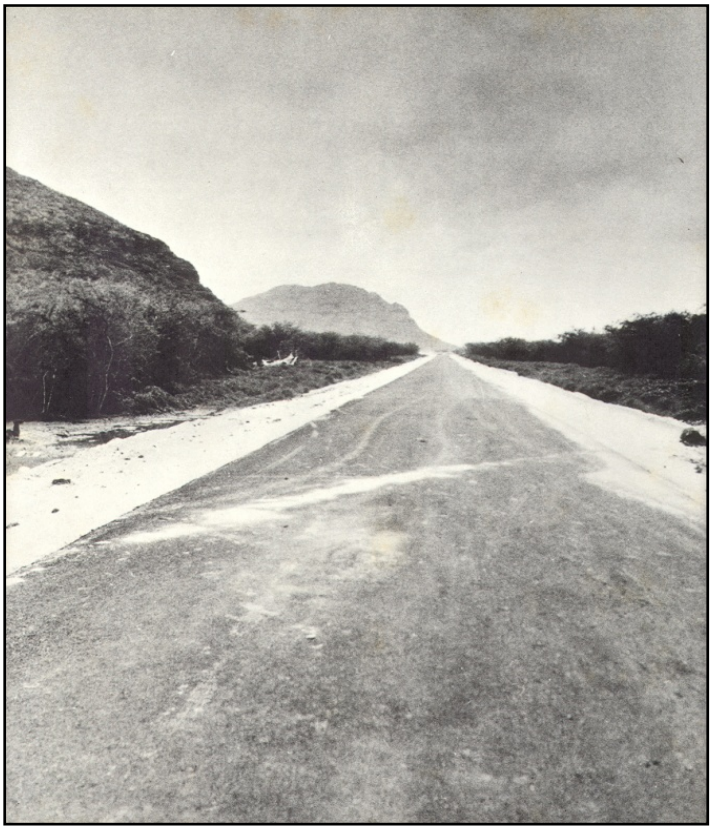

Figure 8. Photograph of Farrington Highway, late 1940s (McGrath et al. 1973:144)

Figure 9. Photograph of Farrington Highway, 1947 (McGrath et al. 1973:149), the current project area is in the distance, near the beach at the base of the ridgeline, on the far side of the shallow peninsula

Table 2. Previous Archaeological Studies in Mākaha Ahupua‘a

Study	Location	Type of Study	Findings
McAllister 1933	Island-wide	Island-wide survey	Describes seven sites within Mākaha Ahupua‘a
Green 1969	Large expanse of the central valley	Mākaha Valley Historical Project Report 1	Presents historical documentation and analysis of remains
Green 1970	Large expanse of central Mākaha Valley	Mākaha Valley Historical Project Report 2	Presents results of excavations including 16 carbon dates going back to circa AD 1200.
Ladd andYen 1972	Large expanse of central Mākaha Valley	Mākaha Valley Historical Project Report 3	Presents results of excavations
Ladd 1973	Large expanse of central Mākaha Valley	Mākaha Valley Historical Project Report 4	Presents results of excavations
Green 1980	Large expanse of central Mākaha Valley	Mākaha Valley Historical Project Report 5 - Summary	Summary of archaeological data and cultural history
Bordner 1981	Corridor in Mākaha Valley floor *mauka* of Kāne‘ākī Heiau	Surface Survey	Notes numerous agricultural sites
Bordner 1983	Corridor in Mākaha Valley floor *mauka* of Kāne‘ākī Heiau	Surface Survey	Notes numerous agricultural sites
Kennedy 1983	Elevation of 1072 feet in the Mākaha Valley floor, 2 km *mauka* of Kāne‘ākī Heiau	Well Monitoring Report	No historic properties observed
Neller 1984	Central Mākaha Valley (SIHP # -997)	Archaeological Reconnaissance Survey	Identifies unreported sites, and re-analysis of several sites
Hammatt et al. 1985	West side of Mākaha Valley (SIHP # -776)	Archaeological Reconnaissance Survey	Identifies numerous modified natural terraces associated with dry land agriculture
Barrera Jr. 1986	West-central side of Mākaha Valley	Archaeological Survey	Identified four sites including four stone platforms, a U-shape habitation enclosure, a

Study	Location	Type of Study	Findings
			terrace, and a wall. Approximately 17 test pits were excavated
Kennedy 1986	Mauna Lahilahi	Archaeological Investigations	Identifies five archaeological sites
Ahlo et al. 1986	Mauna Lahilahi	Affidavits of brief oral histories	Accounts note the general sacredness of Mauna Lahilahi and the good fishing
Komori 1987	Mauna Lahilahi	Archaeological Survey and Testing	Relocates Kennedy's five sites and describes eleven more. Reports eight carbon dates
Bordner and Cox 1988	Upper Mākaha Valley floor	Mapping Project	Relocates previously identified sites with focus on sites -764 and -77; emphasis on dry land agriculture.
Donham 1990	Two areas on southeast side of Mākaha Valley	Archaeological Inventory Survey	Identified a terrace associated with dry land agriculture and/or habitation
Kawachi 1990	Mauna Lahilahi	Burial report	Describes remains of at least two individuals, artifacts and sites
Hammatt and Robins 1991	Water Street/ Kili Drive Area	Archaeological Inventory Survey	Identified a linear earthen berm understood as associated with commercial sugar cane cultivation
Kawachi 1992	84-325 Makau St., Kepuhi Point	Burial Report	Documentation of burial eroded by waves associated with Hurricane ‘Iniki
Moore and Kennedy 1994	Northwest side of Mākaha Valley, 242-foot elevation	Archaeological Investigations	No historic properties were observed
Cleghorn 1997	*Mauka* of Farrington Hwy and north of Kili Drive	Archaeological Inventory Survey	A cultural layer, a pond/wetland area ,remains of structures associated with the OR&L Railroad, and a bridge foundation were documented
Pagliaro 1999	Kāne‘ākī Heiau	*Heiau* Restoration Report	Presents background, a restoration plan and an

Study	Location	Type of Study	Findings
			account of restoration work
Magnuson 1997	Upper Mākaha Valley	Archaeological Review	Presents an overview and summary of previous studies
Maly 1999	Central Mākaha Valley	Limited Consultation Study	Presents historical background and consultation with knowledgeable parties
Elmore et al. 2000	South side of Kili Drive (Site area - 776)	Archaeological Inventory Survey	Identified three features poss. assoc. with dry-land ag. and/or habitation
Moore and Kennedy 2000	North side of Kili Drive (SIHP # - 776)	Archaeological Inventory Survey	Identified two features possibly associated with dry land agriculture
Kailihiwa and Cleghorn 2003	Lower Mākaha	Archaeological Monitoring Report	Identified three sites
Tulchin and Hammatt 2003	Kili Drive and Farrington Hyw.	Archaeological Inventory Survey	No historic properties observed
Perzinski and Hammatt 2004	Mauna Lahilahi Beach Park	Archaeological Inventory Survey	A multi-component cultural layer, 2 burials, the OR&L Railroad, and a historic wall alignment were identified and documented.
Hazlett and Hammatt 2007	Mākaha Bridge 3, Farrington Highway, Mākaha	Archaeological Monitoring Report for emergency repairs	No cultural resources identified
Hammatt and Yucha 2008	An approximately 61-Acre Parcel Mākaha Ahupua‘a, TMK: [1] 8-4-002: 043, 044, 048 and 063	Archaeological Literature Review and Field Inspection	Identified seven sites, recommended AIS
McDermott and Tulchin 2006	Mākaha Bridges 3 and 3A	Archaeological Inventory Survey	Identified five sites
Jones and Hammatt 2009	Mauna Lahilahi Beach Park	Archaeological Monitoring Report	Identified two burials

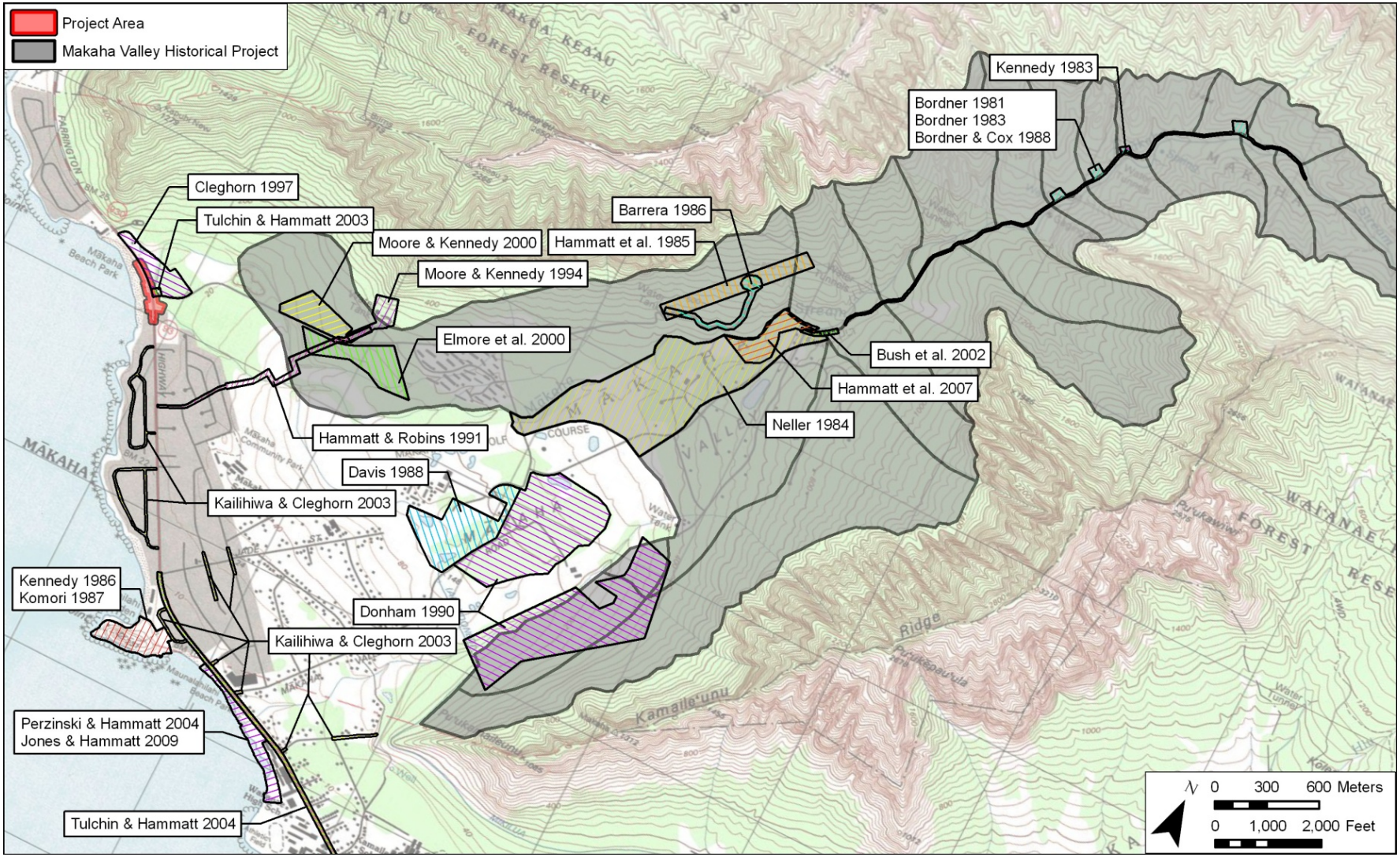

Figure 10. 1998 Wai‘anae U.S. Geological Survey topographic quadrangle showing previous archaeological investigations in Mākaha Ahupua‘a

It is unclear whether McAllister actually saw this stone, which Hall describes as “lying at the foot of a frightful precipice several hundred feet in height” but McAllister’s map appears to locate it in the flats of the central-seaward portion of the valley.

SIHP# 50-80-07-174, Laukinui Heiau, was described as “the important one [*heiau*] in Mākaha Valley”, and said to be so old as to have been built by the *menehune*. McAllister places this site in the vicinity of Kepuhi Point and his description of the *heiau* incorporating a “coral outcrop” and “an amazing amount of coral” fits that locale.

SIHP # 50-80-07-175, known as Mololokai, is located at the base of the ridge between Kea‘au and Mākaha on the *makai* side of the road. This site was described as two pits where early cannibals had come to wash the de-fleshed bodies of their victims at high tide. Associated with this site were said to be two prominent stones, a Pōhaku O Kāne on the Mākaha side and a Pōhaku O Kanaloa on the Kea‘au side.

The Mākaha Valley Historical Project (Green 1969, 1970, 1980; Ladd and Yen 1972; and Ladd 1973), involving fieldwork conducted between 1968 and 1970, studied most all of Mākaha Valley. However, as Neller (1984:1) noted, sites were lumped into large geographical districts and most of the valley was only surveyed at the reconnaissance level. The Mākaha Valley Historical Project research was unique in that it was funded by private enterprise without legal compulsion and the investigations covered parts of the valley beyond those due for development. More than 600 archaeological features were recorded in the upper valley and 1,131 features were recorded in the lower valley.

The coastal strip and the central lower valley were not included because of previous development. Excavations were conducted at 30 separate structural features including 10 field shelters, four stone mounds, three stepped-stone platforms, three house enclosures, two storage pits, a clearing, a site thought to be a shrine, a *heiau*, a pond field terrace system, a habitation feature, two historic house platforms, and a modern curbed foundation. Carbon dating indicated settlement as early as the 13th century. Settlement was focused on the primary water source, Mākaha Stream. Subsequently, with increased population, expansion into *kula* lands occurred. By the 16th century, expansion occurred in the upper valley with changes in subsistence to irrigated taro system (i.e. *lo‘i*) (Green 1980:75).

Green’s (1980) archival research, as part of the Mākaha Valley Historical Project, identifies a number of small residences, thought to correspond to late pre-contact and early historic habitation, in the vicinity of the current project area. This area, and presumably the associated settlement, is termed Kahaloko, based on information provided by Clark (1977:91). This Kahaloko area (see Figure 5) few houses and coconut trees, is depicted on Green’s reconstructed map of Mākaha Valley settlement and land use for the period between 1855 and 1884 (Green 1980:22-23). This settlement was, at least generally, geographically associated with a fishpond:

> It is highly probable that there was a brackish-water fishpond in the low area behind the beach where Mākaha Stream would have constantly been imponded… A pond appears in this position on the preliminary field map for the O‘ahu Railway and Land Company (Dillingham Files, n.d.). The use of the name Kahaloko (place of the fishpond) for Mākaha Beach strongly suggests its

> presence, and Clark (1977:92) gives Mākāhā [sluice gate of a traditional Hawaiian fishpond] as the name of a large fishpond here (Green 1980:20).

Richard Bordner (1981) carried out a survey of a linear project area in the middle of the valley floor, inland of Kāne‘ākī Heiau, in support of road widening and well placement projects. This corridor ran through several site areas documented during the Mākaha Valley Historical Project. Descriptions of sites are by proximity to site mapping points. Bordner (1981: D-22) concluded, “the entire Mākaha Valley was utilized for agricultural production in the most intensive way, such that all areas capable of it were undoubtedly utilized for crop production.” This study accessioned two reviews by Roger C. Green and Matthew Spriggs resulting in Bordner's preparing “Mākaha Valley Well III - V Re-Survey” (1983) and writing “Appendix B: Response to M. Spriggs Review of Mākaha Wells” (n. d.).

Kennedy (1983) produced an archaeological monitoring report on work at a 100 m long strip near “Well IV” at an elevation of 1,072 feet in the valley floor, approximately 2 km inland from Kāne‘ākī Heiau. He saw no evidence of buried features or artifacts.

Earl Neller (1984) of SHPD went back into the area designated as Site Area 997 “to clear up various deficiencies in the published reports and unpublished site data” and to re-examine various “puzzling inconsistencies.” He relocated sites previously reported as destroyed (McAllister sites 171 and 172), identified unreported sites, and re-analyzed several sites studied during the Mākaha Valley Historical Project.

Hammatt, Shideler and Borthwick (1985) carried out an archaeological reconnaissance survey of a 3,000-ft long corridor on the west side of central Mākaha Valley in the -776 site area, documenting numerous modifications of natural terraces for dry land agriculture. A total of 10 archeological sites including 1 wall, 2 habitation sites, and 7 agricultural sites were recorded.

Barrera, Jr. (1986) carried out an archaeological survey of a mid-valley well site on the west-central side of the valley. The project area included a corridor approximately 600 m long and 30 m wide, and a proposed reservoir site 90 m in diameter. He identified four sites, including four stone platforms (Site -1465), a U-shape habitation enclosure (Site -1466), a terrace (Site -1467) and a wall (Site -1468). At least 17 test pits were excavated, however no artifacts were recovered.

Kennedy (1986) carried out archaeological investigations focused on the north (Mākaha) side of Mauna Lahilahi, and identified five sites including a possible shrine, a *koa*, a linear pile, and an enclosure.

Komori (1987) carried out archaeological survey and testing at Mauna Lahilahi, relocating Kennedy's (1986) five sites. An additional 11 sites, including petroglyphs, enclosures, terraces, rock shelters, midden, and lithic scatters were identified. He reports eight radiocarbon dates within the AD 1300-1650 period.

Bordner and Cox (1988) carried out a mapping project on the upper valley floor, inland of Kāne‘ākī Heiau. While much of the focus of this study was more accurately locating sites previously identified during the Mākaha Valley Historical Project, their findings indicate that the relative importance of dry land, non-irrigated agriculture had previously been underestimated.

Donham (1990) carried out an archaeological inventory survey of two discrete but adjacent parcels encompassing approximately 130 acres in the south-central portion of the valley. Donham identified a terrace associated with dry land agriculture and/or habitation.

Hammatt and Robins (1991) carried out an archaeological inventory survey of an approximately 4,600-ft long route of a proposed 20-in water main extending northeast from Farrington Highway, up Water Street, and then continuing northeast across Kili Drive. They documented a single historic property SIHP # 50–80-07-4363. Site -4363 was described as "a linear earthen berm ... buttressed along its stream side with cobbles and boulders" (Hammatt and Robins 1991). The berm was interpreted as, "associated with the historic sugarcane cultivation" (Hammatt and Robins 1991). Based on historic maps, the berm likely represents an old ditch alignment, which was likely altered during construction of the adjacent golf courses. It presently functions as a flood control structure, protecting housing down-slope. Subsurface testing within the corridor encountered nothing of archaeological significance.

Carol Kawachi (1992) documented a burial(s) eroding out of the sand at 84-325 Makau Street. This was a pit burial, approximately 50 cm below the surface, extending 1.5 m long, in a sand bank exposed by Hurricane ‘Iniki. The burial included staghorn coral at major joints and a possible shell, *niho palaoa*.

Moore and Kennedy (1994) carried out archaeological investigations on the northwest side of Mākaha Valley for a proposed reservoir at 242-foot elevation. The access corridor and reservoir site covered approximately eleven acres. No historic properties were observed.

Fields Masonry documented stabilization and restoration of Kāne‘ākī Heiau carried out in 1996 (Pagliaro 1999). Prior restoration efforts had been carried out in 1970.

Magnuson (1997) conducted a preliminary archaeological review of upper Mākaha Valley for a proposed water line replacement project. This was primarily an archaeological literature review providing an overview of sites.

In 1997, Cleghorn conducted test excavations associated with an archaeological inventory survey conducted for the new Mākaha Beach Park comfort station and parking area, located *mauka* of Farrington Highway. Cleghorn identified a cultural layer present in an area approximately 80 m *mauka* of Farrington Highway near its intersection with Kili Drive. Radiocarbon analysis indicated an age range of AD 1440-1690. The deposit contained, "evidence of a small encampment near the coast" (Cleghorn 1997:32). Clegorn also indicates the possible importance of a pond/wetland area just *mauka* of the Highway at Mākaha Beach Park: "This pond and wetland may have offered rich resources for the Hawaiians of the area, and the pond may have been used as an inland fishpond during the prehistoric and early historic eras" (Cleghorn 1997:33). This pond/wetland area is likely the area Green (1980) identified as "Kahaloko." Also present in the area are remains of infrastructure associated with the OR&L Railroad (SIHP # 50-80-12-9714). Cleghorn indicates the presence of a bridge foundation located in an unnamed stream just north of Kili Drive, *makai* of the highway, and within the current Mākaha Bridges project area (Cleghorn 1997:11).

Maly (1999) conducted a "Limited Consultation Study with Members of the Hawaiian Community in Wai‘anae" in support of the Mauna ‘Olu Water System. Several interviewees deferred to Mr. Landis Ornellas (a co-founder of the organization *Hui Mālama o Kāne‘ākī*

Heiau) as a cultural expert for mid-valley Mākaha. Concerns for continuing community consultation were expressed.

Elmore (et al. 2000) conducted an archaeological inventory survey of an approximately 19.6 acre parcel located on the south side of Kili Drive, and just west of the condominiums in a portion of previously identified SIHP # 50-80-07-776. A total of eight features were identified. Of these, five were determined modern disturbances while the other three were thought to be possible traditional Hawaiian dry land agricultural and/or habitation features.

Moore and Kennedy (2000) conducted an archaeological inventory survey of an approximately 20-acre parcel located on the north side of Kili Drive in a portion of previously identified SIHP # 50-80-07-776. A total of 12 features were identified; 10 of these were determined modern disturbances while the other two were thought to be possible traditional Hawaiian dry land agricultural features.

Kailihiwa and Cleghorn (2003) monitored Mākaha Water System Improvements Phase II for 10 streets in the *ahupua‘a* of Mākaha and Wai‘anae. A total of three sites were documented, which consisted of five features including a pit, a concrete flume, two thermal features, and a charcoal deposit. No cultural material was found in any of the deposits.

Tulchin and Hammatt (2003) conducted an archaeological inventory survey, located at the corner of Kili Drive and Farrington Highway, associated with a proposed fiber optic cable facility. No historic properties were observed.

Perzinski and Hammatt (2004) conducted an archaeological inventory survey of Mauna Lahilahi Beach Park. A total of 3 sites were identified as a result of pedestrian survey and subsurface testing. These include the remnants of the OR&L Railroad (SIHP # 50-80-12-9714), the remnants of a historic wall alignment (SIHP # 50-80-07-6635), two burials (SIHP # 50-80-07-4064), and a multi-component subsurface cultural layer containing concentrations of midden charcoal, and artifacts. Radio carbon dating results indicate initial settlement of the shoreline in the 1400s with 400 to 500 years of continuous use, into the 20th century.

In 2007, CSH conducted a literature review and field inspection for a 61-Acre parcel *mauka* of the Mākaha Town Center and *makai* of Mākaha Golf Course (Hammatt and Yucha 2008). Evidence of historic agriculture had been previously found within the project area (see Hammatt and Robins 1991 above). During the field check, additional evidence of agriculture was observed including rock mounds (CSH 1, CSH 5 and CSH 6); retaining walls associated with berms CSH 2 and CSH 3); and a rock alignment that may have been used as a water control dam (CSH 4). CSH 3 and CSH 6 appear to be associated with SIHP # 50-80-07-4363, a linear earthen berm associated with historic sugarcane cultivation attributable to the Wai‘anae Sugar Plantation. An inventory survey was recommended because of evidence of historic and possible pre-contact agriculture.

Recently CSH monitored improvements to Mauna Lahilahi Beach Park. As a result, two additional burials were documented (Jones and Hammatt 2009).

2.2.2 Previously Recorded Sites in the Vicinity of the Project Area

Table 3 summarizes previously recorded archaeological sites in the vicinity of the project area; Figure 11 shows the locations of these sites.

Table 3. Previously Identified Archaeological Sites in Coastal Mākaha Ahupua‘a

State Site #	Description
50-80-07-173	Probable location of rock discussed by Hall and documented by McAllister (1933:121): “called ...Pukahea...an object of worship, and to which sacrifices were offered in former times. (3 miles from Pukahea) a large rock...in no particular sense striking”
50-80-07-174	Laukīnui Heiau (McAlllister 1933:121) “Low walls inclose, on three sides, what appear to be two low stone-paved platforms...Just to the south of the inclosure a coral outcrop forms a natural platform which was undoubtedly part of the heiau...The heiau is so old as to be accredited to the *menehunes* and said to have been the important one in Mākaha Valley, though not nearly so pretentious or well-preserved as that of Kaneaki.”
50-80-07-175	Mololokai (McAllister 1933:121) Two small pits on the *makai* side of the old road that were said to have been used by a group of cannibals who would place the de-fleshed bodies of their victims in the pits for cleaning by the high tide. Located at the foot of the ridge between Keaau and Mākaha Valleys. Now buried/destroyed.
50-80-07-776	Mākaha Valley Historic Project Site Area -776 Various pre-contact and historic sites including field shelters, stone mounds, stone platforms, habitation enclosures, storage pits, habitation features, and dry land agricultural features.
50-80-07-3704	Mauna Lahilahi (Kennedy 1986; Komori 1987; Kawachi 1990) A natural promontory at the southern end of Mākaha Valley. Subsurface cultural deposits, evidence of marine and religious activities, stone tool production, petroglyphs, and crevice burials; all included under one site designation.
50-80-07-4363	Historic sugarcane-related berm (Hammatt and Robins 1991)
50-80-07-4527	Burial at 84-325 Makau St.(Kawachi 1992) Pit burial, approximately 50 cm below the surface, extending 1.5 m long. Exposed from sand bank by Hurricane 'Iniki. Included staghorn coral at major joints and a possible shell, *niho palaoa*.
50-80-12-9714	Remnants of the OR&L Railroad, present along the *makai* side of Farrington Highway. A portion of the railroad is listed on the National Register of Historic Places**.**
50-80-07-6634	Multi-component cultural layer in Mauna Lahilahi Beach Park containing midden, charcoal, and artifacts (Perzinski and Hammatt 2004).
50-80-07-6635	Rectangular wall alignment constructed of basalt cobbles and boulders. Located in Mauna Lahilahi Beach Park (Perzinski and Hammatt 2004).
50-80-07-4064	Two burials at Mauna Lahilahi Beach Park (Perzinski and Hammatt 2004).
50-80-07-6704	Burial at Mauna Lahilahi Beach Park (Jones and Hammatt 2009).
50-80-07-6705	Burial at Mauna Lahilahi Beach Park (Jones and Hammatt 2009).

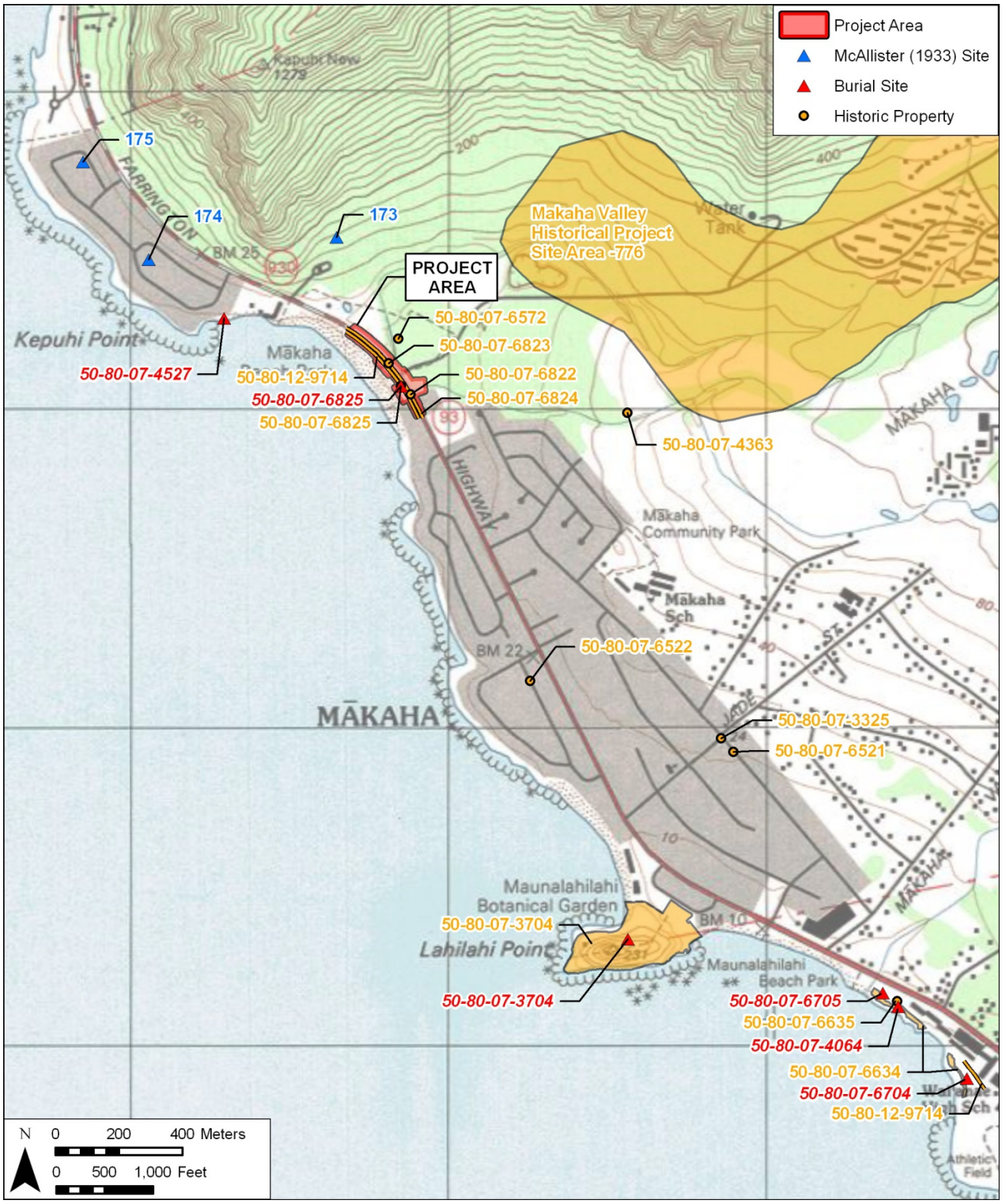

Figure 11. Previously recorded sites in the vicinity of the project area.

2.3 Inventory Survey Summary

In compliance with, and to fulfill applicable Hawai‘i state and federal historic preservation legislation, CSH completed an archaeological inventory survey investigation for the proposed Mākaha Bridges project (McDermott and Tulchin 2006).

As part of its inventory survey field effort, carried out on August 30 and 31, 2005, CSH conducted a systematic pedestrian inspection of the project area. CSH also excavated eight trenches to prospect for subsurface cultural deposits. Approximately half of the roughly 3.7-acre project area consists of paved roadways and active stream drainages that were not suitable for subsurface testing.

Based on fieldwork results, five cultural resources were documented within the project area (Figure 12; Appendix A):

- SIHP # 50-80-7-6822, Makaha Bridge 3, constructed in 1937
- SIHP # 50-80-7-6823, Makaha Bridge 3a, constructed in 1937
- SIHP # 50-80-7-6824, Farrington Highway, originally constructed in the 1930s as part of the Territorial Highway System
- SIHP # 50-80-7-6825, buried, culturally enriched A-horizon, activity area dating to the pre-contact and historic period, contains a probable Native Hawaiian burial (disarticulated human remains—previously [prior to the current project] disturbed).
- SIHP # 50-80-12-9714, the former OR&L Railroad alignment--constructed in the 1890s

These findings are largely in keeping with expectations, based on background research. During the pre-contact and historic periods, and continuing today, the project area was/is an important transportation and/or communications corridor. Prehistorically, the project area likely included the primary coastal trail that circled the island of O‘ahu. In the 1800s this trail was improved to convey horse and wagon traffic, eventually becoming the “Old Waianae Road,” Farrington Highway’s predecessor (McGrath et al. 1973). By the turn of the 20th century, the OR&L Railroad passed through the project area, likely with associated electric and/or telegraph lines. In the first part of the 20th century, in response to demands of advancing automotive technology, a portion of the Territorial Highway System was constructed through the project area. With its associated Bridges 3 and 3A within the project area, this roadway became known as Farrington Highway. Throughout the 20th century, Farrington Highway has developed as an important communications corridor; most recently, at the turn of the 21st century, with the installation of fiber optic communication lines within the roadway’s right-of-way. Of the five cultural resources documented within the project area, four are components of this long established transportation and communication corridor.

The fifth cultural resource (SIHP # 50-80-7-6825) documented within the project area is a relatively rare remnant of a pre-contact and historic activity area. Based on available information, this subsurface cultural deposit may yield additional important archaeological

Figure 12. Locations of the five cultural resources identified and documented within the project area

information regarding prehistoric and historic coastal land use along the Mākaha Coast. This archaeological record may extend from the historic period, prior to the construction of the OR&L Railroad, back into Mākaha's prehistory, to as early as the fourteenth century (AD 1300-1430 based on radiocarbon dating results). This type of specific archaeological information regarding coastal habitation and land use within Māhaka is currently lacking.

Additionally, this subsurface cultural layer contains probable Native Hawaiian skeletal remains. These skeletal remains are important cultural resources in their own right, and their treatment and protection is clearly outlined in Hawai‘i state burial law (HRS Chapter 6E-43 and HAR Chapter 13-300). As a previously identified, most likely Native Hawaiian burial site, the treatment of these human remains falls under the jurisdiction of the O‘ahu Island Burial Council.

All of these recorded cultural resources were documented within the *makai* portions of the project area. *Mauka* of Farrington Highway, the project area appears to have been disturbed by grading or other land alteration, likely associated with commercial agriculture. Evidence for this past land disturbance includes a large amount of rusted metal, PVC pipe, and plastic, which was observed in trench profiles between one and two meters below the current land surface. In Trench 4, approximately 3 m below the current land surface, a sedimentary layer interpreted as the remnants of a former "*muliwai*," or backshore marshy pond, was documented. This deposit is perhaps of paleoenvironmental interest, but, based on radiocarbon dating results, it was deposited well before human colonization of the Hawaiian Islands (2890–2570 BC) (refer to Appendix A for complete historic property descriptions).

2.4 Background Summary and Anticipated Finds

2.4.1 Background Summary

Cordy (1998) provides a synthesis of the settlement patterns and prehistory of the Wai‘anae District. This study places the settlement of Wai`anae into the wider context of O‘ahu settlement as a whole. The proximity of expansive forest resources and well-watered agricultural lands to abundant marine resources made the Windward side of O‘ahu most appealing to early O‘ahu settlers and their descendants. Foraging trips to the dryer areas of the island would have occurred and were most likely associated with recurrent, temporary habitation during resource procurement. The rich marine resources of the Wai‘anae District, and particularly the fishing grounds off shore, were likely a strong draw for early O‘ahu inhabitants. As population in the Windward areas increased, permanent settlement began to spill over into the well-watered regions of O‘ahu's leeward side. Eventually, with further population expansion, permanent settlement spread to the less watered regions of the leeward side, which included much of the Wai‘anae District and all of the current project area (Cordy 1998:1-6). Settlement most likely began as temporary habitation along the coast in association with marine resource procurement. Later, permanent settlement would have developed in response to expanding populations in previously settled, better watered areas.

Available radiocarbon dates indicate that, by A.D. 600-800, there was at least temporary coastal habitation on the Wai‘anae coast. This dated sample comes from the area fronting Pōka‘i Bay, one of the only areas along the Wai‘anae Coast to have a perennial stream reach the coast, and undoubtedly one of the more attractive areas for early temporary and, later, permanent settlement (Cordy 1998:6). The current project area is more arid than the area of Pōka‘i Bay;

however marine resources were likely equally abundant in the both areas. Accordingly, it is likely that the first temporary habitation of the current project area was later than the A. D. 600-800 time frame for Pōka‘i Bay, but perhaps not significantly so because, after Wai‘anae Ahupua‘a, Mākaha has the next most abundant fresh water resources of the Wai‘anae District (Cordy 1998:39).

Archaeological data indicate that a significant and rather substantial pre-contact population once occupied Mākaha Valley. Green, in his summary Report No. 5, of the Mākaha Valley Historical Project (1980), proposed that the earliest Hawaiian settlement (before A.D. 1100) was likely focused along the coast at the mouth of Mākaha Stream, in the immediate vicinity of the current project area. Following this initial settlement, sometime after A.D. 1100, exploitation of the surrounding *kula* lands prompted an expansion into the surrounding lower valley. Subsequently, as the population increased in Mākaha Valley, expansion into other *kula* regions occurred. Green argues that the *kula* expansion was a rational exploitation of “More than sufficient kula land in Mākaha for the coastal population” in an area with presumably little pressure on resources (Green 1980:74).

According to Green, various events during the 15th and early 16th centuries led to population expansion into the upper valley regions. Green attributes this movement to “changes in the subsistence (irrigated wet taro system), emigration of a part of the population to an area of low population density, and development of a different means of social organization (in the form of social stratification and segmentation)” (Green 1980:75).

In 1997, Cleghorn conducted an archaeological inventory survey, which abuts the eastern boundary of the current project area. Test excavations identified a cultural layer present in an area approximately 80 meters *mauka* of Farrington Highway, near the intersection of Kili Drive. Radiocarbon analysis indicated an age range of A.D. 1440-1690. This subsurface cultural deposit may be a remnant of the Kahaloko pre-contact and early historic coastal settlement that Roger Green (1980) reported for this portion of coastal Mākaha, based on archival research.

By the mid-1800s the traditional Native Hawaiian lifestyle in Mākaha Valley was in decline. The sandalwood trade, which ended circa 1829, undoubtedly had a negative effect on the Native Hawaiian population. During this time Mākaha Valley entered its cattle ranching period. The construction of the OR&L Railroad more directly linked Honolulu to Wai‘anae in 1895. Based on the paucity of LCAs claimed within the *ahupua`a* and early population figures, it appears that the Native Hawaiian population was quite low in the latter half of the 19th century.

In 1907, the Wai‘anae Plantation moved into Mākaha and placed large portions of the valley under sugarcane production. With plantation activity, Mākaha’s population numbers slowly increased in the early 1900s. The construction of Farrington Highway in the 1930s, tied the Wai‘anae Coast, and Mākaha, more closely with the rest of O‘ahu, including Honolulu. World War II greatly affected the landscape of the Leeward Coast as the military placed bunkers, gun emplacements, and barbed wire along the waterfront. The sale of Wai‘anae Sugar Plantation in the late 1960s brought large scale resort development to the area, and spurred local population growth as parts of the plantation were sold off as beach lots, shopping centers, and house lots. Subsequent infrastructure improvements, including utilities and an improved transportation corridor, have brought further population growth to the area in recent years.

Sediments observed during the archaeological inventory survey of the current project area, conducted by CSH in 2005, were consistent with the U.S. Department of Agriculture soil survey (Foote et al. 1972, McDermott and Tulchin 2009). Observed soils include those similar to Hale‘iwa Silty Clay, 0 to 2 percent slopes through the majority of the project area. Pockets of Jaucas sand were observed in *makai* test trenches, while remnants of coral reef were observed in the inland portion of the project area, underlying fine grain sediments.

2.4.2 Anticipated Finds

Based on previous historic document and archaeological research, and the previous inventory survey in the project area, two types of cultural deposits are known in the project area. These include transportation infrastructure consisting of Mākaha Bridge 3 (SIHP# 50-80-07-6822), Mākaha Bridge 3A (SIHP# 50-80-07-6823), a portion of Farrington Highway (SIHP# 50-80-07-6824), and remnants of the OR&L Railroad (SIHP# 50-80-12-9714). Also present is a multi-component, subsurface cultural layer containing pre-contact and historic cultural material as well as the remnants of a human burial (SIHP# 50-80-07-6825). All documented historic properties will likely be impacted by the current project. Other types of cultural material that may be encountered during construction activities include additional subsurface transportation infrastructure and historic trash deposits, pre-contact shell midden, artifacts, and additional human burials.

2.4.3 Research Objectives

2.4.3.1 SIHP # 50-80-07-6825

The SIHP # 50-80-07-6825 subsurface cultural layer is the subject of a dedicated archaeological data recovery program, the plan for which (Groza et al. 2010) has been approved by SHPD. This archaeological data recovery fieldwork will be completed prior to project construction and prior to the archaeological monitoring activities outlined in this plan.

Background research indicates that SIHP # 50-80-07-6825, a buried A-horizon with cultural material from pre-contact and historic land use, and previously disturbed human skeletal remains determined to be most likely Native Hawaiian, may yield additional important archaeological information regarding coastal land use along the Mākaha Coast. The project's archaeological inventory survey has indicated that SIHP # 50-80-07-6825 may have originated as early as the fourteenth century (AD 1300–1430), based on preliminary radiocarbon dating results, and continued as a stable, culturally modified land surface through the historic period. This type of specific archaeological information regarding coastal habitation and land use within Māhaka is currently lacking.

The significance of the SIHP # 50-80-07-6825 cultural deposit is best discussed in terms of its potential to provide important archaeological information. Previous archaeological research along O‘ahu’s Wai‘anae Coast indicates a traditional-Hawaiian settlement pattern characterized by relatively early coastal occupation associated with marine resources procurement. There is fairly abundant archaeological information regarding inland settlement for Mākaha Valley, but very little information about coastal settlement (Cordy 1998). With this rarity of coastal habitation deposits, SIHP # 50-80-07-6825 has potential to provide important information that is lacking regarding Mākaha’s pre-contact and early historic archaeological record.

The SIHP # 50-80-07-6825 subsurface deposit may be comparable and homologous to the coastal subsurface cultural deposits (SIHP # 50-80-07-6634) recently documented at near-by Mauna Lahilahi Beach Park in the Ahupua‘a of Wai‘anae, immediately to the south of Mākaha (Perzinski and Hammatt 2004). SIHP # 50-80-07-6634, an intact cultural layer, was documented during subsurface testing. The cultural layer contained four distinct layers (Stratum II, IIA, IIB, and IIC) all containing varying concentrations of midden, artifacts, and charcoal. Based on laboratory analysis, radiocarbon dating, and historical research, it was determined that the upper two layers (Stratum II and IIA) represented an early post-contact to historic cultural deposit. These sub-layers were distinguished by a very dark gray color and, in most instances, historic trash was present, as well as invertebrate midden, cut bone, and a few fish hooks. Within the lower two layers (Stratum IIB and IIC) of SIHP # 50-80-07-6634 no historic midden or artifacts (modern bottle glass, rusted metal) were encountered. These layers were generally distinguishable by a slightly lighter color of a gray, a lack of historic midden and artifacts, and a higher concentration of marine and vertebrate midden. Radiocarbon analysis of charcoal collected from the cultural layer indicated that Stratum IIB was deposited no earlier than A.D. 1430. Thus it was suggested that Stratum IIB and IIC represented the pre-contact component of the site (Perzinski and Hammatt 2004).

Other potentially comparable and homologous subsurface cultural layers along the Wai‘anae Coastline include SIHP # 50-80-07-5762 and 50-80-07-5763. Both of these buried calcareous sand A-horizons were documented during archaeological inventory survey of ‘Ulehawa Beach Park in Nānākuli and Lualualei Ahupua`a, south of the current Mākaha Bridges project area. These layers contained charcoal, fishhook fragments, volcanic glass and basalt flakes, marine shell and fishbone midden deposits, and small, distinct pit features. Based on radiocarbon dating analysis, these deposits date to the late pre-contact/early historic period (McDermott and Hammatt 2000:147-148).

There are clear similarities between SIHP # 50-80-07-6825, within the current Mākaha Bridges project area, and SIHP # 50-80-07-6634, within Mauna Lahilahi Beach Park, and SIHP # 50-80-07-5762 and 50-80-07-5763, within ‘Ulehawa Beach Park. These similarities in geographic setting, stratigraphy, midden, and artifact deposits indicate that these subsurface cultural layers are the result of comparable formation processes. These subsurface deposits represent the remains of traditional Hawaiian coastal land use and likely habitation. Due to their apparent rarity, the archaeological information they contain is particularly significant.

Additional data collected from SIHP # 50-80-07-6825 may also identify relationships between this site and other sites in the near vicinity. The settlement of Kahaloko, shown on Figure 5 just *makai* of SIHP # 50-80-07-6825, consisted of a few houses and coconut trees between 1855 and 1884. This settlement was at least generally geographically associated with a fishpond and the literal translation of Kahaloko is “pond place” (Clark 1977:134). Kahaloko was “filled in when the railroad bed for the” OR&L Railroad was constructed in the late nineteenth century (Clark 1977:134).

Two Māhele land claims (9859, 9860) that were not awarded mention a *muliwai* as their boundary. It is possible that these claims were for Mākaha lands within the current project area, and may be in the immediate vicinity of SIHP # 50-80-07-6825.

Modern disturbance has truncated SIHP # 50-80-07-6825, which may run more or less north/south just *makai* of Farrington Highway, and may be discontiguous as another cultural layer has been documented within the vicinity of the project area (Cleghorn 1997). Our research objectives should provide specific archaeological information regarding coastal habitation and land use within Māhaka.

The monitoring activities described in this plan may provide the opportunity to further the research objectives for SIHP # 50-80-07-6825. These objectives include:

1. To better define the age and function of SIHP # 50-80-07-6825; and
2. To define and delimit the boundaries of SIHP # 50-80-07-6825.

Should the pre-contact cultural layer be impacted by construction activities related to the current project, it may be possible to obtain additional carbon samples for dating purposes to better quantify the date range of the cultural layer. Additional artifacts and midden recovered from the site may also help to solidify this date range and provide additional information on site function. Stratigraphic profiles of excavations that cut through this subsurface cultural layer may provide additional information regarding the layers accumulation and subsequent burial beneath more recent sedimentary layers.

2.4.3.2 SIHP # 50-80-07-6822, 6823, and -9714 (Historic Transportation Infrastructure)

Historic American Engineering Record-type recordation of the various transportation related historic properties in the project area (SIHP # 50-80-12-9714, remnants of the O. R. & L. Railroad; SIHP # 50-80-7-6822, Mākaha Bridge 3; and SIHP # 50-80-7-6823, Mākaha Bridge 3A) has already been completed by Mason Architects, and will be documented in reports that are currently under review by the National Park Service. This documentation was based on the structural elements that were visible above the current land surface at the time of inspection. During the upcoming archaeological monitoring work, it is likely that additional subsurface portions of these features will be exposed during their demolition. The on-site archaeological monitor will further document these features, as allowable by the construction environment and schedule, with sketch drawings, scale elevations and/or profiles, and photographs. This information may provide additional information regarding the techniques used in these feature’s construction.

Section 3 Archaeological Monitoring Provisions

In consultation with SHPD, it was determined that a monitoring program was warranted as a historic preservation mitigation measure for the proposed Mākaha Bridges replacement project. The following discussion outlines the provisions and procedures that will govern the project's archaeological monitoring program.

Under Hawai‘i State historic preservation legislation, "Archaeological monitoring may be an identification, mitigation, or post-mitigation contingency measure. Monitoring shall entail the archaeological observation of, and possible intervention with, on-going activities which may adversely affect historic properties" (HAR Chapter 13-279-3). For this project, the proposed monitoring program will serve as a mitigation measure that insures proper documentation should historic properties be encountered during construction activities.

Hawai‘i State historic preservation legislation governing archaeological monitoring programs requires that each monitoring plan discuss eight specific items (HAR Chapter 13-279-4). The monitoring provisions below address those eight requirements in terms of the archaeological monitoring for the construction within the project area.

1. Anticipated Historic Properties:

   There are known historic properties in the project area including Mākaha Bridge 3 (SIHP# 50-80-07-6822), Mākaha Bridge 3A (SIHP# 50-80-07-6823), a portion of Farrington Highway (SIHP# 50-80-07-6824), remnants of the OR&L Railroad (SIHP# 50-80-07-5825), and a subsurface cultural layer containing the remnants of a human burial (SIHP# 50-80-12-9714). There is also a possibility of encountering additional human skeletal remains or burials.

2. Locations of Historic Properties and/or Archaeological Remains:

   It is possible that historic properties may be encountered anywhere within the project area; however, based on the prior archaeological inventory survey results (McDermott and Tulchin 2006), there are specific portions of the project area that are more likely than others where cultural deposits are likely to be found. Figure 12, above, clearly shows these locations within the project area.

3. Fieldwork:

   On-site monitoring is recommended for all ground disturbing activities. A qualified archaeologist will monitor all ground disturbance associated with the project's construction. Any departure from this will only follow consultation with, and written concurrence from, SHPD/DLNR.

   The monitoring fieldwork will likely encompass the documentation of subsurface archaeological deposits (e.g, subsurface cultural layers or subsurface historic structural remnants) and will employ current standard archaeological recording techniques. This will include drawing and recording the stratigraphy of excavation profiles where cultural features or artifacts are exposed as well as representative profiles. These exposures will be photographed, located on project area maps, and sampled. Photographs and representative profiles of excavations will be taken even if no

historically-significant sites are documented. As appropriate, sampling will include the collection of representative artifacts, bulk sediment samples, and/or the on-site screening of measured volumes of feature fill to determine feature contents.

If human remains are identified, no further work will take place, including no screening of back dirt, no cleaning and/or excavation of the burial area, and no exploratory work of any kind unless specifically requested by the SHPD. All human skeletal remains that are encountered during construction will be handled in compliance with HRS Chapter 6E-43 and HAR Chapter 13-300 and in consultation with SHPD/DLNR.

4. Archaeologist's Role:

   The on-site archaeologist will have the authority to stop work immediately in the area of any findings so that documentation can proceed and appropriate treatment can be determined. In addition, the archaeologist will have the authority to slow and/or suspend construction activities in order to insure that the necessary archaeological sampling and recording can take place.

5. Coordination Meeting:

   Before work commences on the project, the on-site archaeologist shall hold a coordination meeting to orient the construction crew to the requirements of the archaeological monitoring program. At this meeting the monitor will emphasize his or her authority to temporarily halt construction and that all historic finds, including objects such as bottles, are the property of the landowner and may not be removed from the construction site. At this time it will be made clear that the archaeologist must be on site during all subsurface excavations.

6. Laboratory work:

   Laboratory analysis of non-burial related finds will include standard artifact and midden recording, as follows: Artifacts will be documented as to provenience, weight, length, width, type of material, and presumed function. Bone and shell midden materials will be sorted down to species, when possible, then tabulated by provenience, and presented in table form.

7. Report Preparation:

   One of the primary objectives of the report will be to present a stratigraphic overview of the project area which will allow for predictive assessments of adjacent properties, which may be the subject of future development. The report will contain a section on stratigraphy, description of archaeological findings, monitoring methods, and results of laboratory analyses. The report will address the requirements of a monitoring report (HAR section 13-279-5). Photographs of excavations will be included in the monitoring report even if no historically significant sites are documented. Should burial treatment be completed as part of the monitoring effort, a summary of this treatment will be included in the monitoring report. Should burials and/or human remains be identified, then other letters, memos, and/or reports may be requested by SHPD's Burial Sites Program.

8. Archiving Materials:

   All burial materials will be addressed as per SHPD/DLNR instructions. Materials not associated with burials will be temporarily stored at the contracted archaeologist's facilities until an appropriate curation facility is selected, in consultation with the landowner and SHPD.

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Appendix A Historic Property Descriptions

A total of five cultural resources were documented within the current Mākaha Bridges project area. Figure 12 shows their locations.

SIHP #: 50-80-07-6822

FORMAL TYPE:	Bridge
FUNCTION:	Transportation
# OF FEATURES:	1
AGE:	Historic, constructed in 1937
DIMENSION:	20 m NW/SE x 15 m NE/SW
LOCATION:	On Farrington Highway, South of Kili Drive
TAX MAP KEY:	N/A, within State Highway Right-of-Way
LAND JURISDICTION:	State of Hawaii

DESCRIPTION:

SIHP # 50-80-07-6822 (Bridge 3) is a historic bridge, built in 1937 (Figure 13-Figure 21). It is located along the Mākaha Coast and is incorporated into Farrington Highway. The intersection of Farrington Highway and Kili Drive is present immediately northwest of the bridge. Remnants of the OR&L railroad berm (SIHP # 50-80-12-9714) are present just southwest of the bridge. These railroad remnants consist of abutments for a former bridge that conveyed the railroad over West Mākaha Stream.

During fieldwork, the streambed beneath Bridge 3 was sandy and dry. West Mākaha Stream is an intermittent stream and Bridge 3 functions to maintain Farrington Highway's level road surface and provide protection against road flooding. The bridge measures 65 ft (20 m) long (SE/S-NW/N) by 50 ft (15 m) wide (E/NE-SW/W) and is 12 ft (3.5 m) high. The bridge is constructed primarily of massive, creosote-treated wooden columns, beams, and planks of varying length and width (Figure 14 and Figure 15), blue rock (basalt) and mortar abutments, and wing walls (Figure 16 and Figure 17). The wooden columns, beams, and planks are held together by large steel nuts and bolts. Concrete reinforcements are visible at each of the bridge's four corners (Figure 18 and Figure 19).

The bridge is a three-span-beam structure supported by wooden columns that are reinforced with wooden plank X-bracing. Although buried by stream sediments at the time of the current investigation, based on past photographs of Bridge 3 (Thompson 1983:VI-5), the bridge's columns are supported by two piers, likely comprised of concrete, and possible blue rock and

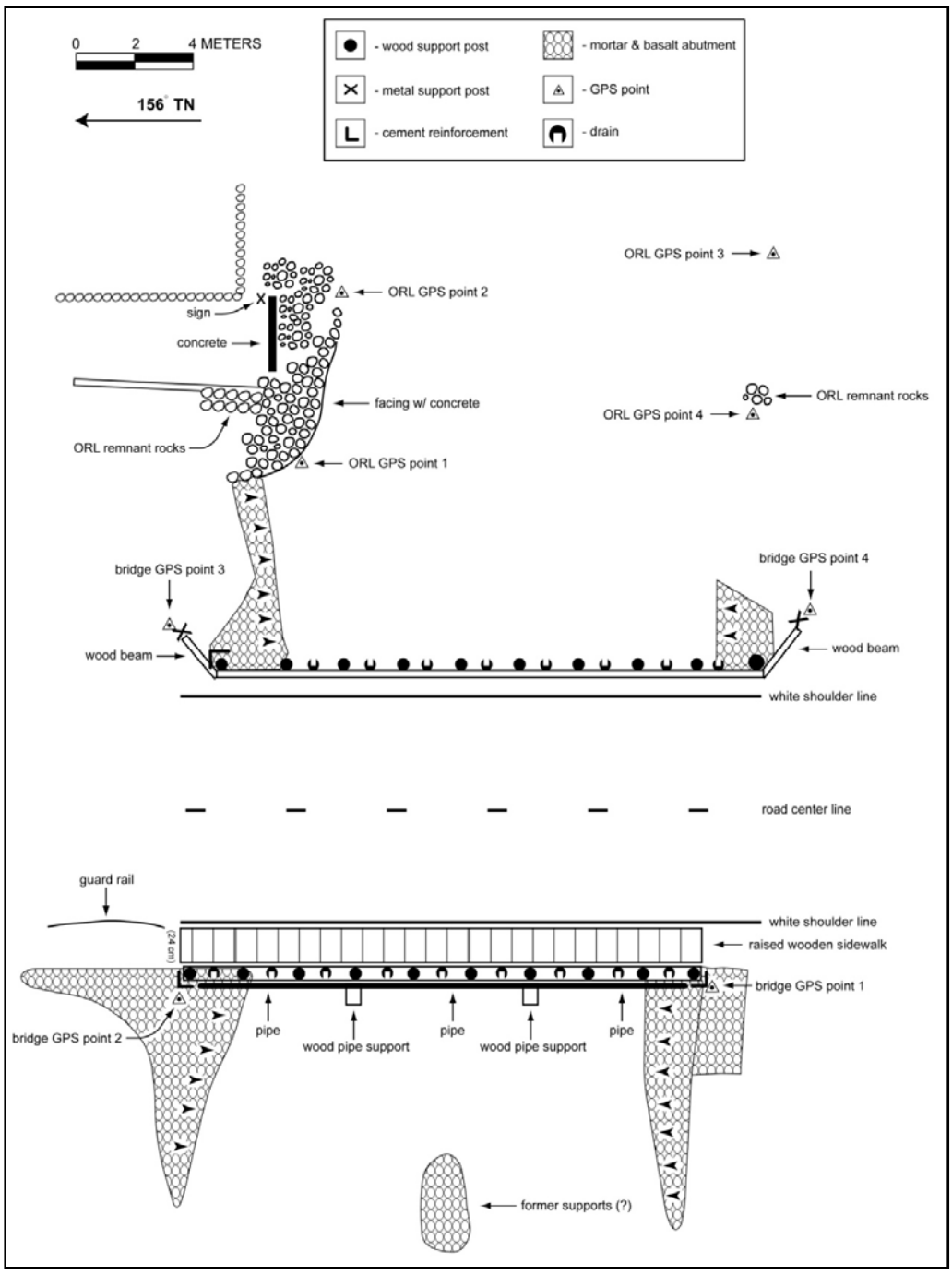

Figure 13. Plan view of SIHP # 50-80-07-6822 (Bridge 3) and Feature B of SIHP # 50-80-12-9714, a remnant of the OR&L Railroad trestle

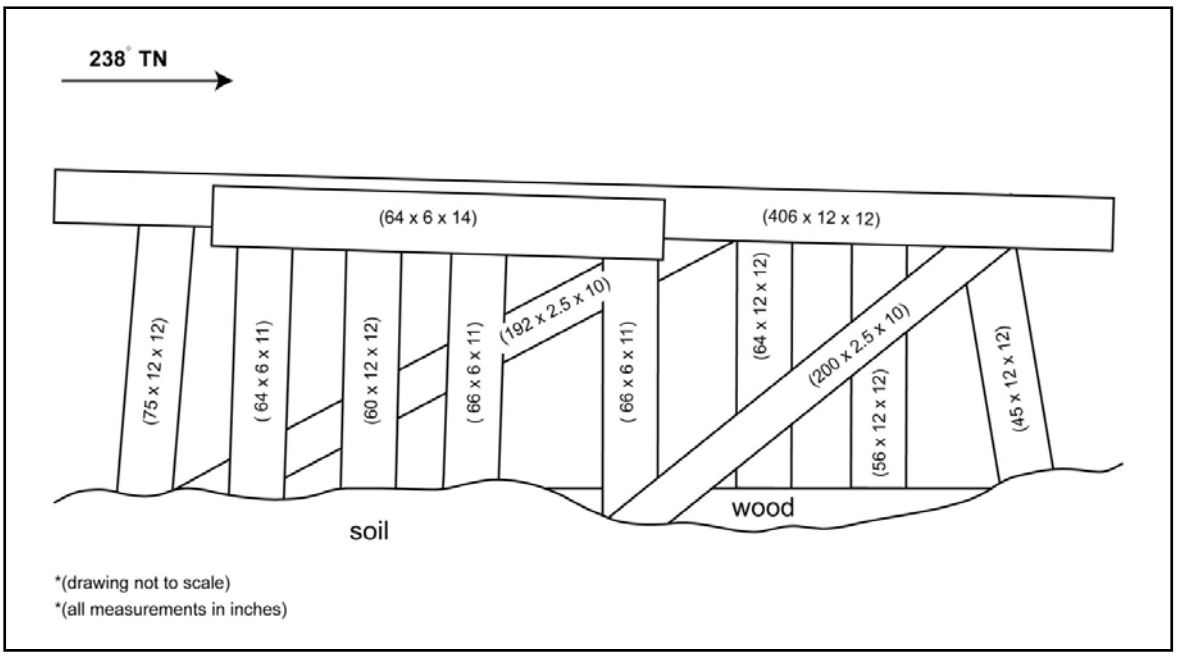

Figure 14. Schematic profile of SIHP # 50-80-07-6822 (Bridge 3), showing wooden bridge columns and bents with dimensions; plank X-bracing is not depicted but plank dimensions are shown

Figure 15. Photograph of SIHP # 50-80-07-6822, showing massive wooden beams, bents, and columns, and plank X-bracing, view to northwest/north

Figure 16. Photograph of SIHP # 50-80-07-6822, blue rock and mortar abutments, wooden beams and concrete end bent; view north

Figure 17. Photograph of SIHP # 50-80-07-6822, blue rock and mortar abutments with concrete reinforcement at corners; view north

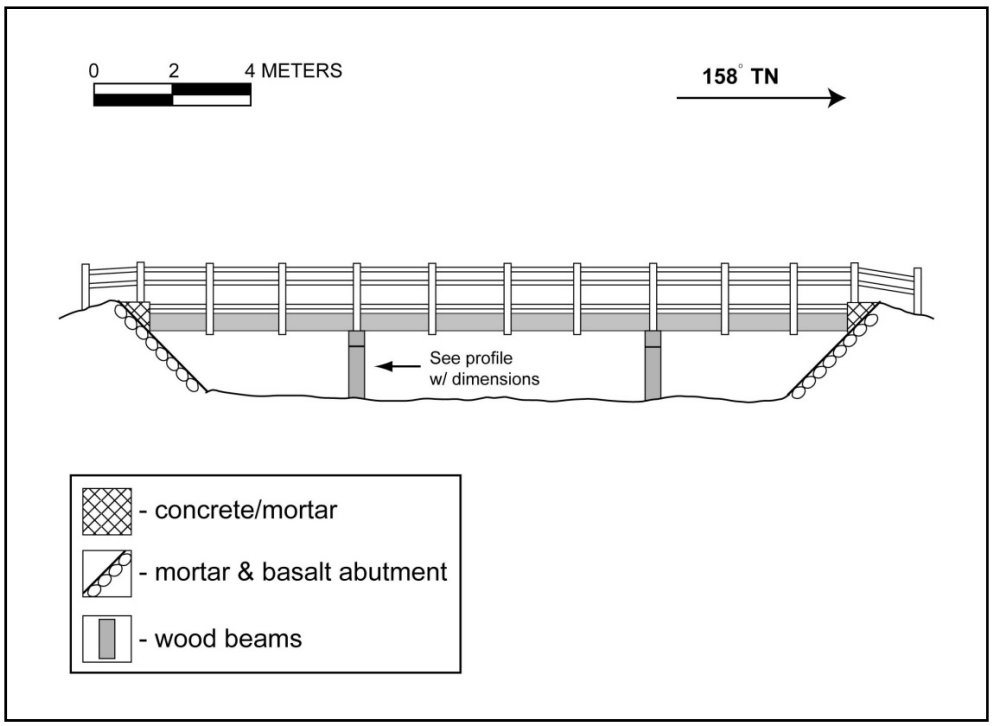

Figure 18. Elevation of SIHP # 50-80-07-6822 (Bridge 3)

Figure 19. Overview of SIHP # 50-80-07-6822; view southeast

mortar (see description of Bridge 3A that follows). Over each of its two piers, the bridge's bents are wooden beams, while the bridge's end bents are concrete. The bridge deck is wooden planking set perpendicular to the bridge's alignment. The bridge is level with no significant elevation difference.

Wooden guardrails, which are painted white and constructed along the *mauka* (east-northeast) and *makai* (west-southwest) sides of the bridge, run parallel with the road and are present along the entire length of the bridge (Figure 18, Figure 19, Figure 20). A metal pipe is also present parallel to the *mauka* side of the bridge (Figure 20). It is supported by wooden beams behind the wooden guardrail, and is suspended above the dry streambed, which leads to the ocean.

A raised wooden sidewalk, located along the *mauka* (east-northeast) side of the bridge, is also incorporated into the bridge construction (Figure 21). The sidewalk runs the entire length of the bridge, is raised 10 inches (25 cm) from the road surface, and is 4 ft (120 cm) wide.

The bridge construction is similar in design and construction materials to the wooden bridges/trestles of the adjacent OR&L Railroad. It may be that the abundance of railroad related construction materials and left over railroad trestles was a determining factor in the selection of Farrington Highway's bridge type and materials in the 1930s (Thompson 1983:VI-1).

Constructed as part of the Territorial Highway System in 1937, Bridge 3 is a component of Farrington Highway. Farrington Highway, described below, is an important transportation and communication corridor, which connects the Wai‘anae District with Honolulu and the rest of the island. Prior to construction of Farrington Highway, overland transport with vehicles was confined to "Old Wai‘anae Road," which was not paved and did not have bridges across Mākaha Stream. Because of transport limitations over the "Old Wai‘anae Road," prior to construction of Farrington Highway, most transport and travel between Wai‘anae and Honolulu was made using the OR&L Railroad or steamer ship.

The construction of Farrington Highway and Bridge 3 across Mākaha Stream, as part of the Territorial Highway System, were part of a significant historical trend that greatly facilitated intra-island travel and communication. It was only after 1925 that Territorial officials availed themselves of available federal funding for road and bridge construction; this lead to abundant bridge and road construction in Hawaii. Further federal assistance was available in the 1930s as part of the Works Progress Administration and National Reclamation Association programs (Thompson 1983: III-15). These Territorial Highway System improvements are components of a broad historic pattern of travel and communication improvement in the State of Hawai‘i during the first half of the 20th century. These improvements lead to increased development of previously rural areas.

Based on National Register Bulletin #15 discussion of integrity, Bridge 3 maintains integrity of location. The bridge is in the same location, on the southern branch of Mākaha Drainage, where it was originally constructed in 1937. Although Farrington Highway at this location cannot be described as rural, at least not as it once was at the time of original construction, within the immediate vicinity of Bridge 3, the roadway still appears rural in character. Nearby residences are somewhat removed from the bridge and these residences are restricted to the south side of the bridge because of Mākaha Beach Park.

Figure 20. Photograph of SIHP # 50-80-07-6822, wooden guardrail and metal pipe; view southeast/east

Figure 21. Photograph of SIHP # 50-80-07-6822, raised wooden sidewalk; view southeast/east

Viewed today, the bridge's integrity of feeling and association are still evident.

As the drawings, measurements, and photographs above demonstrate, the bridge also retains integrity of design, materials, and workmanship. The massive wooden supports, the cross beams supporting the roadway itself, and the finer boards used to create the pedestrian walkway and wooden guardrails, still convey the intended bridge construction style and appearance. These building materials, if they are not original, are weathered and at least appear to be original constuction. If there has been significant reconstruction or refurbishment of the bridge, this apparently was done with similar material types and construction techniques that were used during original bridge construction. The addition of modern steel guardrails in the vicinity of the bridge do not necessarily detract from the its integrity of design, materials, and workmanship.

The bridge's integrity of setting has been diminished over the years with the encroachment of housing on its southern side. The increased population in the vicinity of the bridge, and associated increase in traffic volume, has diminished the bridge's former rural setting.

As part of a historic bridge inventory of the Island of O‘ahu, prepared for the State of Hawai‘i Department of Transportation, Bethany Thompson prepared the following assessment of Bridge 3, based on observations and research undertaken in 1980:

> The Mākaha #3 bridge across Mākaha stream located on Farrington Highway .124 miles west of the intersection with Upena St. is a timber girder floor beam structure built in 1937. W. D. Bartel was the Chief Engineer for the Territorial Highway Department.
>
> The structure is 60' in total length, with three spans. It is 29.2' wide and 12'in height. The load capacity is H-15. There is a 4' sidewalk on the right side. The abutments are constructed of cement rubble masonry with two wooden rails on each side. The design integrity is intact.
>
> The painted white railings with their creosoted sub-structure and cement rubble masonry abutments blend aesthetically with the rural ranch scenes of the Wai‘anae coast. The bridge is an important transportation link between the Wai‘anae coast and Honolulu.
>
> The only vantage point for viewing this bridge is from the beach. The view is good.
>
> Aesthetically, the scene is rated average. (Thompson 1983:VI-4)

Despite the intervening quarter century, Thompson's bridge description and integrity assessment are still applicable today. Based on available information, Bridge 3 (SIHP # 50-80-07-6822) has the integrity to convey its historic significance under Criteria A, broad patterns of history (transportation improvements in the Territory of Hawai‘i in the first half of the 20th century), and D, information regarding Territory of Hawai‘i bridge construction. Based on available background information, the bridge is not recommended as eligible under Criterion B, for association with important historical figures. Additionally, the bridge does not appear to be significant under Criterion C, as embodying the distinctive characteristics of a type, period, or method of construction, the work of a master, or displaying high artistic value.

SIHP #: 50-80-07-6823

FORMAL TYPE:	Bridge
FUNCTION:	Transportation
# OF FEATURES:	1
AGE:	Historic, constructed in 1937
DIMENSION:	30 m NW/SE x 15 m NE/SW
LOCATION:	On Farrington Highway, North of Kili Drive
TAX MAP KEY:	N/A, within State Highway Right-of-Way
LAND JURISDICTION:	State of Hawaii

DESCRIPTION:

SHIP # 50-80-07-6823 (Bridge 3A) is a historic bridge, built in 1937 (Figure 22-Figure 29). It is located along the Mākaha Coast and is incorporated into Farrington Highway. The intersection of Farrington Highway and Kili Drive is present immediately southeast of the bridge. Remnants of the OR&L railroad berm (Site 50-80-12-9714) are just southwest of the bridge (Figure 22). These railroad remnants consist of abutments and piers for a former bridge that conveyed the railroad over Mākaha Stream.

During fieldwork, the streambed beneath Bridge 3 had no flowing water, only a shallow, tidally fluctuating, small pond. Mākaha Stream is an intermittent stream and Bridge 3A functions to maintain Farrington Highway's level road surface and provide protection against road flooding. The bridge measures 100 ft (30 m) long (SE-NW) by 50 ft (15 m) wide (NE-SW) and is 15 ft (4.5 m) high. The bridge is constructed primarily of massive, creosote treated wooden columns, beams, and planks of varying length and width (Figure 23 and Figure 24), blue rock and mortar abutments, and wing walls (Figure 25). The wooden columns, beams, and planks are held together by large steel nuts and bolts. Concrete reinforcements are visible at each of the bridges four corners (Figure 26).

The bridge is a four-span-beam structure supported by wooden columns that are reinforced with wooden plank X-bracing. The bridge's columns are supported by three piers, comprised of a layer of concrete overlying a layer of blue rock and mortar. Over each of its three piers, the bridge's bents are wooden beams, while the bridge's end bents are concrete. The bridge deck is wooden planking set perpendicular to the bridge's alignment. The bridge is level with no significant elevation difference.

Wooden guardrails, which are painted white and constructed along the *mauka* (northeast) and *makai* (southwest) sides of the bridge, are parallel with the road and present along the entire length of the bridge (Figure 26 and Figure 27). A metal pipe is also present parallel to the *mauka* side of the bridge

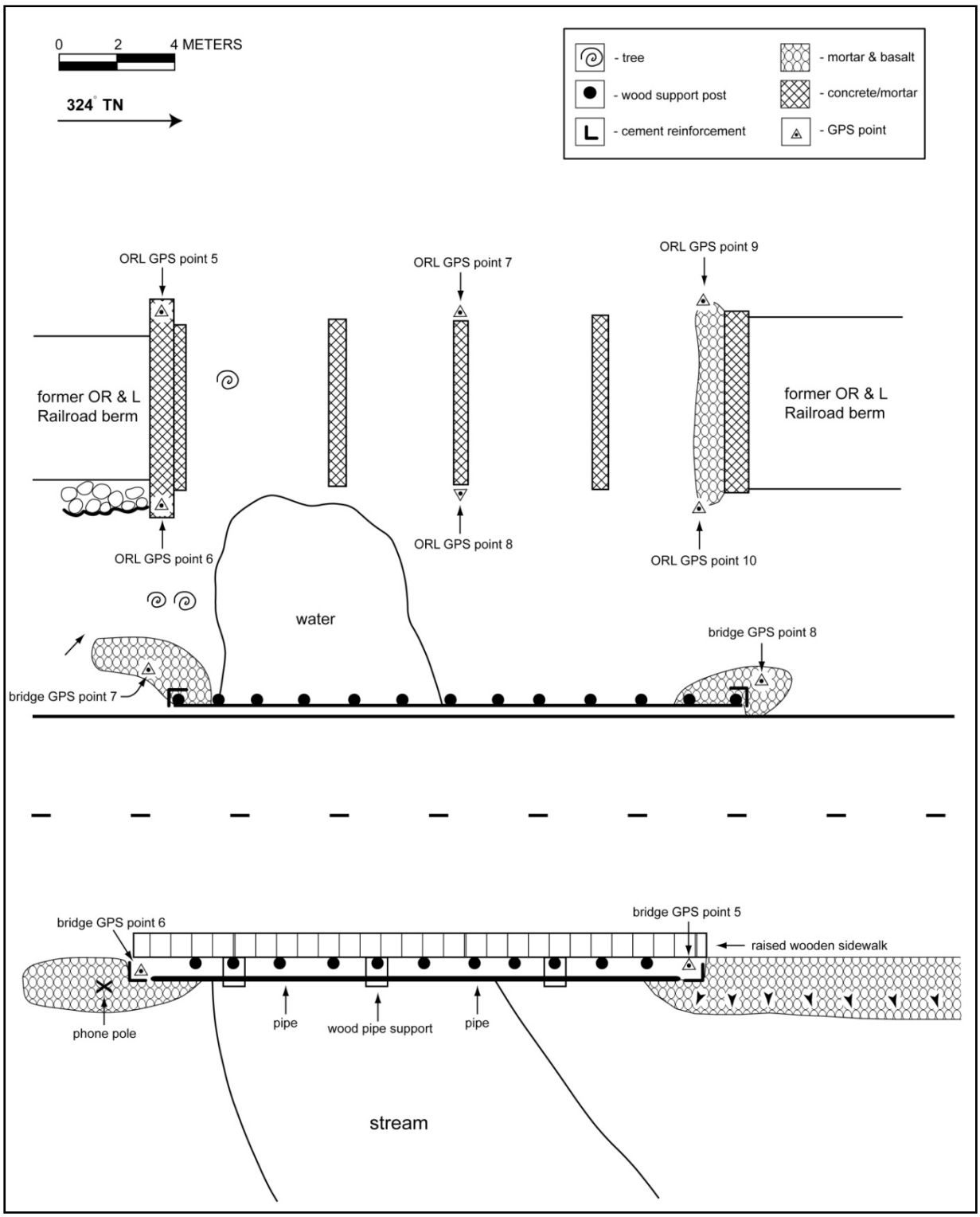

Figure 22. Plan view of SHIP # 50-80-07-6823 (Bridge 3A) and Feature C of SIHP # 50-80-12-9714, remnant of an OR&L Railroad trestle.

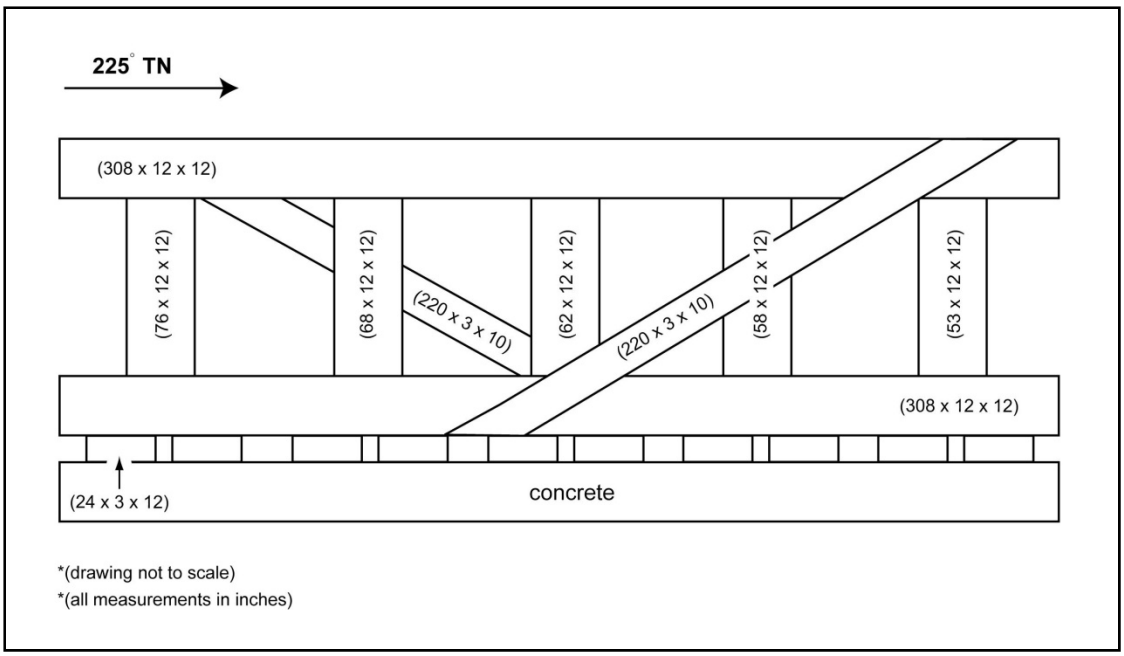

Figure 23. Schematic profile of SHIP # 50-80-07-6823, showing wooden column and bent supports, with wooden diagonal bracing, and the visible portion (concrete) of the bridge pier

Figure 24. Photograph of SHIP # 50-80-07-6823 substructure, showing wooden columns, beams, planks, X-bracing, and the concrete and blue rock and mortar piers; view south

Figure 25. Photograph of SHIP # 50-80-07-6823, blue rock and mortar abutment; view west

Figure 26. Photograph of SHIP # 50-80-07-6823, concrete corner reinforcement, wooden sidewalk and guardrail; view northwest

Figure 27. Photograph of SHIP # 50-80-07-6823, wooden guardrail and metal pipe; view northwest

A raised wooden sidewalk, located along the *mauka* (northeast) side of the bridge, is also incorporated into the bridge construction (see Figure 26). The sidewalk is present along the entire length of the bridge, is raised 10 inches (25 cm) from the road surface, and is four ft (120 cm) wide.

The bridge construction is similar in design and construction materials to the wooden bridges/trestles of the adjacent OR&L Railroad (Figure 22, Figure 28, and Figure 29). It may be that the abundance of railroad related construction materials and left over railroad trestles was a determining factor in the selection of Farrington Highway's bridge type and materials in the 1930s (Thompson 1983:VI-1).

Constructed as part of the Territorial Highway System in 1937, Bridge 3A is a component of Farrington Highway. Farrington Highway, described below, is an important transportation and communication corridor that connected Oahu's Wai‘anae District with Honolulu and the rest of the island. Prior to Farrington Highway's construction, overland transport with vehicles was confined to "Old Wai‘anae Road," which was not paved and did not have bridges across Mākaha Stream. Because of the transport limitations over the "Old Wai‘anae Road," prior to the construction of Farrington Highway, most transport and travel between Wai‘anae and Honolulu was made using the OR&L Railroad or streamer ship.

The construction of Farrington Highway and Bridge 3A across West Mākaha Stream, as part of the Territorial Highway System, were part of a historic trend that greatly facilitated intra-island travel and communication. It was only after 1925 that Territorial officials availed themselves of

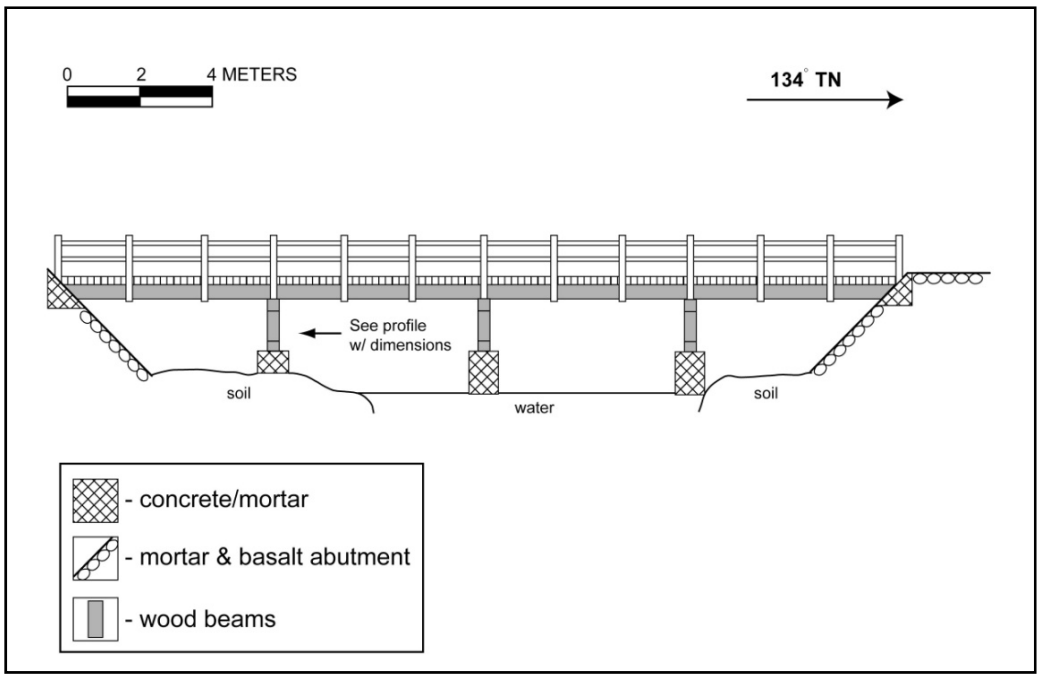

Figure 28. Elevation of SHIP # 50-80-07-6823 (Bridge 3A)

Figure 29. Photograph of SHIP # 50-80-07-6823, view to the northeast

the available federal funding assistance for road and bridge construction; this lead to abundant bridge and road construction after 1925 in Hawaii. Further federal assistance became available in the 1930s as part of the Works Progress Administration and National Reclamation Association programs (Thompson 1983:III-15).

These Territorial Highway System improvements are components of a broad historic pattern of travel and communication improvement in the State of Hawai‘i during the first half of the 20th century. These improvements lead to increased development of previously rural areas.

Based on National Register Bulletin #15 discussion of integrity, Bridge 3A retains integrity of location. The bridge is today on the same northern branch of Mākaha Drainage where it was originally constructed in 1937. Although Farrington Highway at this location cannot be describe as rural, as it was at the time of original construction, within the immediate vicinity of Bridge 3A, the roadway still appears rural in character. Viewed today, the integrity of feeling and association of the bridge is still evident.

As the drawings, measurements, and photographs above should demonstrate, the bridge also retains integrity of design, materials, and workmanship. The massive wooden supports, the cross beams supporting the roadway itself, and the finer boards used to create the pedestrian walkway and wooden guardrails, still convey the intended bridge construction style and appearance. These building materials, if they are not original, are weathered and at least appear to be original. If there has been significant reconstruction or refurbishment of the bridge, this work apparently was done with the same material types and construction techniques that were used during the bridges original construction. The addition of modern guardrails in the vicinity of the bridge does not necessarily detract from its integrity of design, materials, and workmanship.

Unlike Bridge 3, Bridge 3A retains integrity of setting has not diminished over the years as development has not encroached. The increased population in the vicinity of the bridge, with its associated increase in traffic volume, is less noticeable with Bridge 3A, and there is much more of a sense of the original rural setting (Figure 29).

As part of a historic bridge inventory of the Island of O‘ahu, prepared for the State of Hawai‘i Department of Transportation, Bethany Thompson prepared the following assessment of Bridge 3A, based on observations and research undertaken in 1980:

> The Mākaha #3A bridge located on Farrington Highway .200 of a mile west of the intersection with Upena Street is a timber girder floor beam structure built in 1937. W. D. Bartel was the Chief Engineer for the Territorial Highway Department.
>
> The bridge is a 4 span structure with a total length of 78’ with a width of 20.3’ and a length of 11’. It has a load capacity of H-15. The abutments are constructed of cement rubble masonry. There are two wooden railings on both sides of the structure. The design integrity is intact.
>
> The painted white railings with their creosoted sub-structure and cement rubble masonry abutments blend aesthetically with the rural ranch scenes of the Wai‘anae coast. The bridge is an important transportation link between the Wai‘anae coast and Honolulu.

> There are vantage points for public viewing of the bridge. The view is good. Aesthetically, the scene is rated average. (Thompson 1983:VI-6)

Despite the intervening quarter century, Thompson's description and integrity assessment are still applicable today. Based on available information, CSH recommends that Bridge 3A (SIHP # 50-80-07-6823) has the integrity to convey its historic significance under Criteria A, broad patterns of history (transportation improvements in the first half of the 20th century), and D, information regarding Territory of Hawai‘i bridge construction. Based on available background information, the bridge is not recommended as eligible under Criterion B, for association with important historical figures. Additionally, the bridge does not appear to be significant under Criterion C, as embodying the distinctive characteristics of a type, period, or method of construction, the work of a master, or displaying high artistic value.

SIHP #: 50-80-07-6824

FORMAL TYPE:	Road
FUNCTION:	Transportation
# OF FEATURES:	1
AGE:	Historic, constructed in the 1930s
DIMENSION:	Linear, 10 m wide including shoulders, approximately 340 m through the project area
LOCATION:	Parallel to the coast through Wai‘anae District, Oahu
TAX MAP KEY:	N/A, within State Highway Right-of-Way
LAND JURISDICTION:	State of Hawaii

DESCRIPTION:

SIHP #50-80-07-6824 consists of Farrington Highway, is present through the length of the project area, oriented roughly northwest by southeast, and continues outside the project area along the Wai‘anae Coast in both directions (

Figure 30 and Figure 31). The portion of Farrington Highway within the project area measures approximately 340 m long (NW/SE) by 10 m wide, including shoulders (NE/SW). Construction of this portion of road included grading with subsequent asphalt paving. Painted on the road surface are two solid white lines marking the the boundaries, while double-solid yellow lines divide the road into two lanes of opposing traffic. The road is asphalt paved. Mākaha Bridges 3 and 3A (SIHP #50-80-07-6822 and SIHP # 50-80-07-6823) are also present in this portion of Farrington Highway (see site descriptions above).

A large asphalt paved shoulder is present along the *makai* side of the highway between Bridges 3 and 3A (

Figure 30). This functions as a bus pull over for the City and County bus stop. There is a small bus stop shelter at the edge of this pull out area. Modern steel guardrails and steel safety signs have been installed along portions of the roadway adjacent to the approaches to

Figure 30. Photograph of SIHP #50-80-07-6824 (Farrington Highway), view northwest

Figure 31. Photograph of SIHP #50-80-07-6824 (Farrington Highway), view southeast

Mākaha Bridges 3 and 3A. Overhead utility lines are strung between creosote-treated wooden utility poles. Based on background research, Farrington Highway is an important subsurface utilities corridor, with water, sewer, and fiber optic lines in the highway right-of-way. The defunct electric or communication cable observed in Trenches 5 and during the inventory survey is likely another of the utility lines associated with the Farrington Highway utility and communication corridor.

Farrington Highway was originally constructed in the 1930s. Its predecessor along the Wai‘anae Coast was variously termed the “Government Road” or “Old Wai‘anae Road” and provided less than ideal travel and transport conditions for the Wai‘anae District. The predecessor of Farrington Highway was described as a “mud hole in the winter and billowed dust in the summer” (McGrath et al. 1973:51). Figure 7 is a photograph of the “Old Wai‘anae Road” in Mākaha, south of the current project area, facing south towards Wai‘anae. The Old Wai‘anae Road was not paved and did not have bridges across Mākaha Stream. Because of the transport limitations over the Old Wai‘anae Road, prior to the construction of Farrington Highway, most transport and travel between Wai‘anae and Honolulu was made using the OR&L Railroad or steamer ship (McGrath et al. 1973).

Farrington Highway was one component of the overall Territorial Highway System. It was only after 1925 that Territorial officials availed themselves of the available federal funding assistance for road and bridge construction; this lead to abundant bridge and road construction in Hawai‘i. Further federal assistance became available in the 1930s as part of the Works Progress Administration and National Reclamation Association programs. This funding lead to additional standardization and improvement of the Territorial Highway System (Thompson 1983: III-15). These improvements were significant events that greatly facilitated intra-island travel, transportation, and communication. Farrington Highway was eventually named after Wallace Rider Farrington (1871-1933), a former Honolulu Newspaper man, Mayor of Honolulu, and Territorial Governor of Hawai‘i (1921-1929), who was influential in expanding Hawai‘i roadways.

Once constructed, Farrington Highway, became an important transportation and communication corridor that connected Oahu’s Wai‘anae District with Honolulu and the rest of the island. Figure 8 and Figure 9 show the rural nature of Farrington Highway in the 1940s. These Territorial Highway System improvements are components of a broad historic pattern of travel and communication improvement in the State of Hawai‘i during the first half of the 20th century. These improvements lead to increased development of previously rural areas.

Based on National Register Bulletin #15 discussion of integrity, Farrington Highway retains integrity of location. Through the current project area, the road follows the same alignment where it was originally constructed in the 1930s. In terms of design, setting, materials, workmanship, feeling and association, this small stretch of Farrington Highway has lost its integrity. This loss is due to the installation of additional road features, such as signage, guardrails, and a paved bus stop pull out, and the encroachment of residences, which has reduced the rural feeling of this portion of the highway. It is quite possible that other portions of Farrington Highway, particularly farther northwest of the current project area, still retain some integrity of the original Territorial Highway System.

The small portion of Farrington Highway (SIHP # 50-80-07-6824) within the current project area is recommended National and Hawai‘i Register eligible for its information content (Criterion D) regarding territorial road placement, grading, and construction techniques. The roadway does not retain enough integrity to convey its significance under any other criteria.

SIHP #: 50-80-07-6825

FORMAL TYPE:	Subsurface cultural layer
FUNCTION:	Activity Area
# OF FEATURES:	2
AGE:	Pre-contact and historic
DIMENSION:	30 m NW/SE by 15 m NE/SW
LOCATION:	*Makai* side of Farrington Highway, between Bridges 3 and 3A
TAX MAP KEY:	N/A, within State Highway Right-of-Way
LAND JURISDICTION:	State of Hawaii

DESCRIPTION:

SIHP # 50-80-07-6825 is a subsurface cultural layer observed during the documentation of Trench 8, located in the southwestern portion of the project area (see Figure 11, Figure 32-Figure 35). The tentative boundaries established for SIHP # 50-80-07-6825 are Trench 7 to the northwest, a point between test Trench 6 and Trench 8 to the southeast, the *makai* edge of Farrington Highway to the northeast, and the *makai* boundary observed in Trench 8 (Figure 32). These boundaries were established through the combination of test trench observations and an evaluation of previous subsurface disturbance in the immediate area (e.g. construction of Farrington Highway). A more precise boundary could be established through further investigation; however, the current boundary is sufficient for management decisions. Based on current information, SIHP # 50-80-07-6825 measures approximately 30 m (NE-SW) by 15 m (NW-SE) for a total area of approximately 450 square meters.

SIHP #50-80-07-6825 consists of two features: Feature A is a subsurface cultural layer initially observed as Stratum II of Trench 8, but later determined to encompass a larger area (refer to discussion in the Trench 7 description, above); and Feature B consists of a human rib fragment and hand phalange. These human remains were observed within the Stratum II cultural layer and were clearly previously disturbed and disarticulated prior to the excavation of Trench 8 (Figure 20).

Feature A consists of a culturally enriched sand A-horizon and is likely the former land surface during the pre-contact and early historic period, before construction of the OR&L Railroad. The cultural layer is present approximately 30 cm below the current land surface and has an average thickness of 80 cm. The overlying sediment (Stratum I) is a terrigenous fill sediment that contains fairly abundant historic/modern refuse.

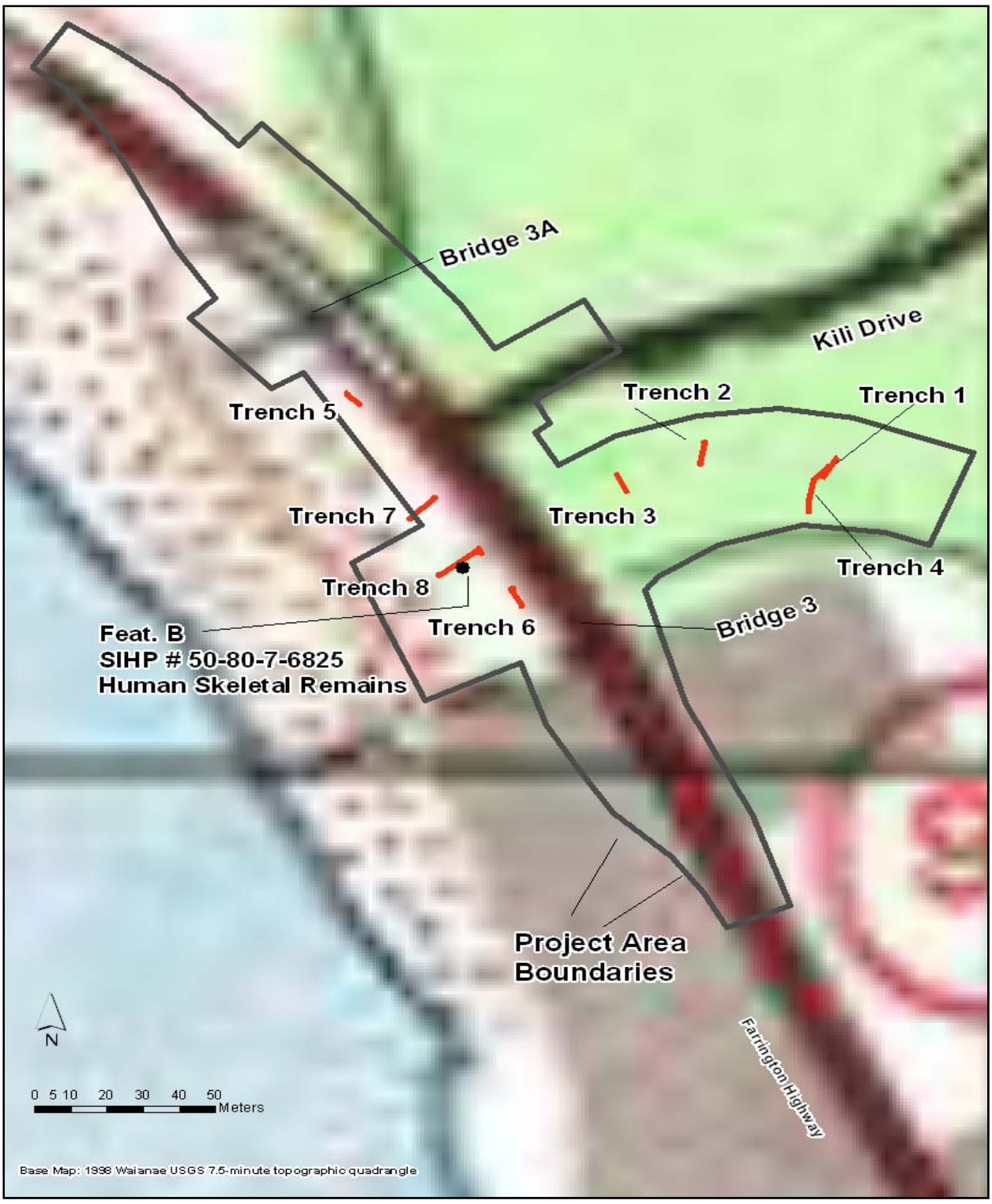

Figure 32. Location of test trenches excavated during archaeological inventory survey

The Stratum II cultural layer is distinctive mottled gray and dark gray calcareous sand, with charcoal flecking, that is typical of culturally enriched A horizons in coastal Hawai‘i. The lower boundary of the cultural layer is wavy and abrupt, almost scalloped in appearance, indicating repeated small pit excavations within and down through the layer, into underlying natural calcareous sand deposits. The cultural layer is visible only as a light gray area in the Trench 8 photographs (Figure 33 and Figure 34).

The cultural layer contains varying concentrations of midden and artifacts of both pre-contact traditional Hawaiian and historic origin. Three distinct collection areas, designated A, B, and C, were sampled from the cultural layer (Figure 35). From collection area B, 30 liters were screened though 1/8th inch mesh and the resulting cultural material was collected, identified, and tabulated. From collection areas A and C, 45 liters of sediment were screened and the resulting material was collected, identified, and tabulated. Table 4 shows the results of this sampling. Table 4 does not include the approximately 200 grams of butchered cow bone observed, but not collected, within collection areas A, B, and C.

The few historic artifacts, and the clearly historically butchered cow bone, observed within the deposit, were not particularly temporally diagnostic. The nail fragment was highly corroded, and although clearly not modern, was not diagnostic. The clear and green bottle glass fragments are small and without diagnostic markings. They are highly weathered with a flaky, opalescent patina covering all surfaces that have not been freshly broken. Based on this patina, these glass fragments are clearly not modern. In all, these few historic artifacts do not contradict the impression that the cultural deposit predates, and was capped by, the installation of the OR&L Railroad in the 1890s.

In order to establish the date range of the cultural layer, 5.0 g of wood charcoal from collection area C were sent to Beta Analytic, Inc. for radiocarbon dating analysis. The AMS method was required for this small sample. Unfortunately, the charcoal sample consisted of diffuse charcoal particles collected from throughout collection area C, not from a distinct cultural sub-feature, such as a hearth. Accordingly, the resulting age determination is less than ideal for dating a specific event. Also, the individual charcoal particles that made up the sample were too small for wood charcoal species identification. This sample was, however, the best that was available from documentation of the cultural layer. Dating results are shown in Table 5, below. The resulting calendar age, at 2-sigma, is between A.D. 1300 and 1430.

Based on the limited “window” on the SIHP # 50-80-07-6825 cultural deposit available from the documentation of Trench 8, it is difficult to determine the deposit’s full archaeological potential. As no postholes or other structural remnants were identified in Trench 8, it is best to classify the deposit as an “activity area,” rather than a more specific functional term, such as “habitation area.” Further analysis of the deposit may more conclusively determine the types of activities, including possible habitation, that were conducted in this area.

Feature B, the human hand phalange and rib fragment located in collection areas A, B, and C, comprises a previously identified burial site based on the definitions of Hawai‘i state burial law (HAR Chapter 13-300-2), and was treated as such during the documentation of Trench 8. CSH personnel carefully cleaned the exposed sidewalls to determine if any burial pit cut was

Figure 33. Photograph of Trench 8; view southwest

Figure 34. Photograph of Trench 8; view south

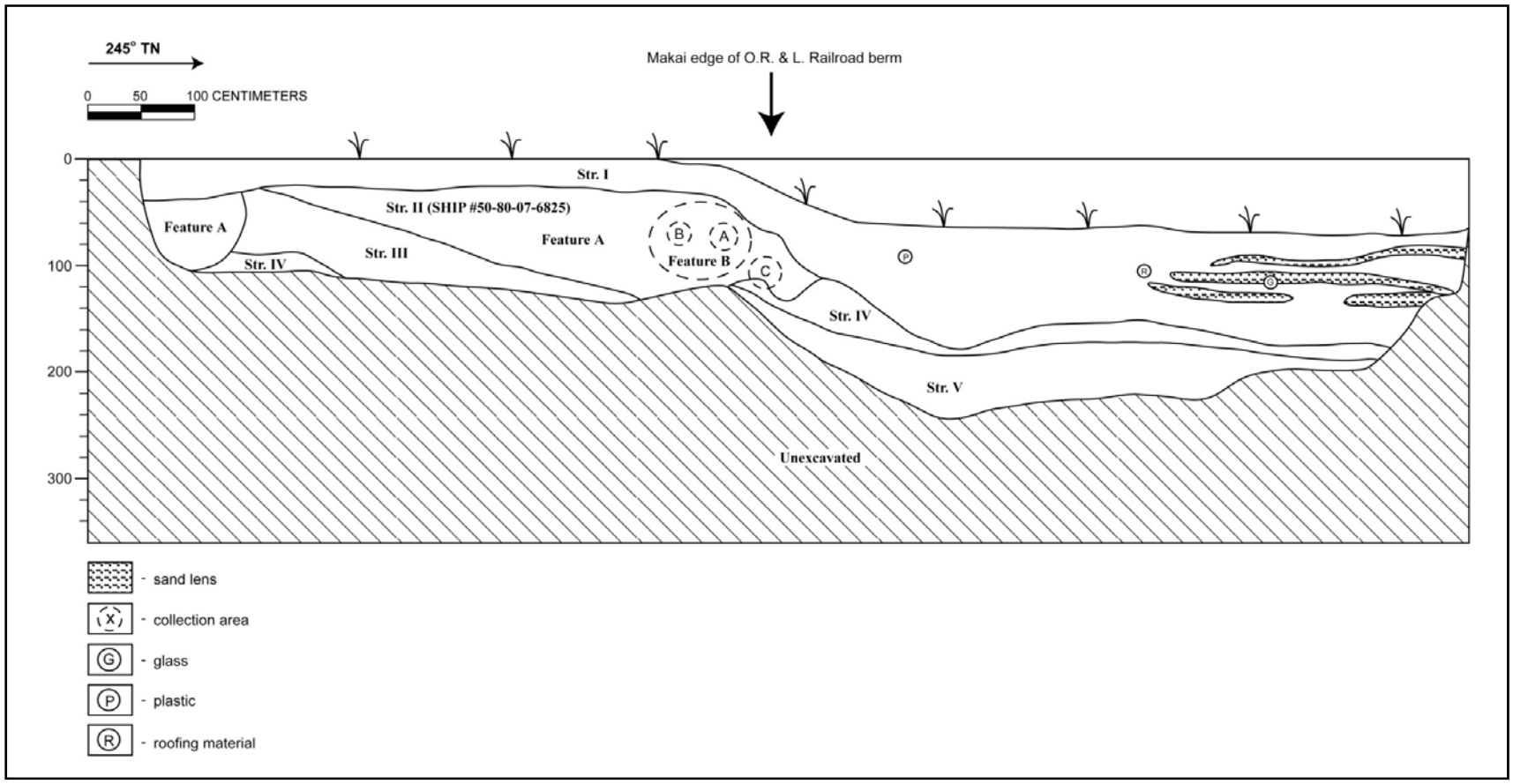

Figure 35. Trench 8, profile of south wall (Note: Stratum II is SIHP # 50-80-07-6825.)

Table 4. Catalogue of Recovered Materials from SIHP # 50-80-07-6825, Collection Areas A-C

Collection Area	Stratum	Depth	# of Pieces	Total Weight	Material Type	Function/ Formal Type
A	II	60-100cmbs	-	17.4g	Marine Shell	Midden
A	II	60-100cmbs	-	4.1g	Charcoal	-
A	II	60-100cmbs	2	0.5g	Volcanic Glass	Lithic Reduction Debitage
A	II	60-100cmbs	8	13.6g	Basalt	Lithic Reduction Debitage
A	II	60-100cmbs	1	0.4g	Bottle Glass	Shards
B	II	60-100cmbs	-	8.3g	Marine Shell	Midden
B	II	60-100cmbs	-	1.4g	Charcoal	-
B	II	60-100cmbs	6	2.4g	Basalt	Lithic Reduction Debitage
B	II	60-100cmbs	4	22.7g	Bottle Glass	Shards
B	II	60-100cmbs	3	0.2g	Fish Bone	Midden
C	II	70-110cmbs	-	19.2g	Marine Shell	Midden
C	II	70-110cmbs	-	5.0g	Charcoal*	-
C	II	70-110cmbs	1	3.1g	Nail	Building Material
C	II	70-110cmbs	5	1.7g	Basalt	Lithic Reduction Debitage
C	II	70-110cmbs	4	0.3g	Animal Bone	Midden

*Wood Charcoal sent to Beta Analytic, Inc. for AMS radiocarbon dating analysis (Sample Beta-208481)

Table 5. Results of Radiocarbon Analysis from SIHP # 50-80-07-6825

Beta Analytic ID #	Sample Material/Analytic Technique	Provenience	Conventional Radiocarbon Age	C13/C12 Ratio	Oxcal Calibrated Calender Age (2 sigma)
Beta-208481	Wood Charcoal/ AMS	Sample Area C, Stratum II, 70-110 cmbs, Trench 8	570 +/- 40 BP	-25.5 o/oo	1300AD-1430AD (95.4%)

discernable; there was no evidence of a pit. Because the human remains were clearly disarticulated and previously disturbed, CSH personnel carefully excavated into the trench sidewalls, and screened the resulting sediment, to locate additional human skeletal remains, or portions of an undisturbed skeleton. Excavations 30 cm into either trench sidewall did not reveal additional skeletal material, although additional butchered cow bone was observed, but not collected.

SHPD was immediately notified of the burial find, per HAR 13-300-31(b)(3). Because it would be unsafe to leave an open, unattended trench within the project area, SHPD agreed that CSH should not keep the trench open for a SHPD site visit. Following trench documentation, the human remains were returned to the original discovery location in the trench sidewall and the trench was backfilled. SHPD agreed to notify the Koa Mana organization, which had expressed prior concern that the project would affect Native Hawaiian burial deposits, of the burial discovery. CSH agreed to notify additional Native Hawaiian organizations and community members as part of the inventory survey's cultural consultation effort, see discussion below [8-31-05 personal communication, Melanie Chinen (SHPD), with Matt McDermott (CSH)].

Regarding the burial's ethnicity, CSH provided SHPD with the following summary of available evidence in an email [9-2-05 email communication, Matt McDermott (CSH) to Melanie Chinen (SHPD)]:

> Here is my response to your enquiry regarding burial ethnicity. Typical archaeological evidence for determining ethnicity of a burial includes associated burial goods, burial position/evidence of mortuary practices, and association with a dated stratigraphic layer. The human rib fragment and finger bone were previously disturbed and were found within a stratigraphic layer that clearly has both prehistoric, traditional Hawaiian cultural remains, as well as historic metal and bottle glass. Because this is a naturally deposited stratigraphic layer, not a fill deposit, it appears this layer accumulated during both the prehistoric as well as the historic period. Accordingly, for this burial, based on the evidence of associated burial goods, burial position/mortuary practices, and association with a dated stratigraphic layer, we cannot say whether the burial is Native Hawaiian or not.
>
> That being said, archaeology also weighs the evidence of demographics and overall cultural context. In the at least 800 year human habitation of the Waianae

> coastline, there have been thousands, more likely tens of thousands of Native Hawaiians buried in unmarked graves within Waianae beach sands. During the last 200 years along the Waianae coastline, there have most likely been perhaps a hundred, maybe a few hundred, unmarked non-Native Hawaiian burials in Waianae beach sands. This is largely due to the early establishment of cemeteries for non-Native Hawaiians. Based on these reasonable estimates, there is a distinctly higher probability that the previously disturbed rib and finger bones discovered in sand deposits during the Makaha Bridges inventory survey are from a Native Hawaiian burial. This likelihood cannot be definitively confirmed with the available archaeological evidence, nor could it be confirmed with osteology, unless more of the skeleton, preferably the skull, was located. If possible, DNA analysis would offer your best option to more conclusively determine ethnicity. DNA, however, is a destructive analysis. Based on available evidence, including demographics and cultural context, I believe this burial is more likely Native Hawaiian.

In response to CSH's request, SHPD made an ethnicity determination for the burial site of "probable Native Hawaiian," per requirements of HAR Chapter 13-300-31(g) [9-21-05 email communication, Melanie Chinen (SHPD) to Matt McDermott (CSH)]. As a previously identified, most likely Native Hawaiian, burial site, the decision regarding burial treatment, either preservation in place or relocation, falls under the jurisdiction of the O‘ahu Island Burial Council (HAR Chapter 13-300-33).

Undoubtedly, construction activities associated with the OR&L Railroad and Farrington Highway have affected at least the upper portions of the SIHP # 50-80-07-6825 cultural layer. It is also likely that the installation of the OR&L Railroad line over a portion of the cultural layer has served to insulate and preserve portions of the deposit (see Figure 35).

The overall integrity of SIHP # 50-80-07-6825 is difficult to assess based on the small "window" of the subsurface cultural layer documented in Trench 8. The subsurface layer clearly has integrity of location. Arguably it has integrity of design (the haphazard accumulation of cultural material as part of a pre-contact and historic coastal activity area) and materials (the cultural material that makes up the deposit). Integrity of setting, workmanship, feeling, and association are not particularly relevant to this type of archaeological, subsurface cultural resource.

The significance of the cultural deposit is best discussed in terms of its potential to provide important archaeological information. Previous archaeological research along O‘ahu's Wai‘anae Coast indicates a traditional-Hawaiian settlement pattern characterized by relatively early coastal occupation associated with marine resources procurement. From early coastal settlements, with time and expanded populations, habitation spread inland into agricultural areas. There is fairly abundant archaeological information regarding inland settlement for Mākaha Valley, but very little information about coastal settlement (Cordy 1998). With this rarity of coastal habitation deposits, SIHP # 50-80-07-6825 has potential to provide important information that is currently lacking in the Mākaha pre-contact and early historic archaeological record.

The SIHP # 50-80-07-6825 subsurface deposit may be comparable and homologous to the coastal subsurface cultural deposits (SIHP # 50-80-07-6634) recently documented at near-by Mauna Lahilahi Beach Park in the Ahupua‘a of Wai‘anae, immediately to the south of Mākaha (Perzinski & Hammatt 2004). SIHP #50-80-07-6634, an intact cultural layer, was documented during subsurface testing. The cultural layer consisted of four distinct cultural layers (Stratum II, IIA, IIB, and IIC) all containing varying concentrations of midden, artifacts and charcoal. Based on laboratory analysis, radiocarbon dating, and historical research, it was determined that the upper two layers (Stratum II & IIA) represented an early post-contact to historic cultural deposit. These sub-layers were distinguished by a very dark gray color and the presence of historic trash, as well as invertebrate midden, cut bone, and few fish hooks.

Within the lower two layers (Stratum IIB and IIC) of SIHP #50-80-07-6634 no historic midden or artifacts (modern bottle glass, rusted metal) were encountered. These layers were generally distinguishable by a lighter gray color, a lack of historic midden and artifacts and a higher concentration of marine and vertebrate midden. Radiocarbon analysis of the charcoal collected from the cultural layer indicated that Stratum IIB was deposited no earlier than A.D. 1430. Thus it was suggested that Stratum IIB and IIC represented the pre-contact component of the site (Perzinski and Hammatt 2004).

Other potentially comparable and homologous subsurface cultural layers along the Wai‘anae Coastline include SIHP #s 50-80-07-5762 and 50-80-07-5763. Both of these buried calcareous sand A horizons were documented during archaeological inventory survey of ‘Ulehawa Beach Park in Nānākuli and Lualualei Ahupua`a, south of the current Mākaha Bridges project area. These layers contained charcoal, fishhook fragments, volcanic glass and basalt flakes, marine shell and fishbone midden deposits, and small, distinct pit features. Based on radiocarbon dating analysis, these deposits date to the late pre-contact/early historic period (McDermott and Hammatt 2000:147-148).

There are clear similarities between SIHP # 50-80-07-6825, within the current Mākaha Bridges project area, and SIHP # 50-80-07-6634, within Mauna Lahilahi Beach Park, and SIHP #s 50-80-07-5762 and 50-80-07-5763, within ‘Ulehawa Beach Park. These similarities in geographic setting, stratigraphy, and midden and artifact deposits indicate that these subsurface cultural layers are the result of comparable formation processes. These subsurface deposits represent the remains of traditional Hawaiian coastal land use and likely habitation. Due to their apparent rarity, the archaeological information they contain is particularly significant.

Based on available information, SIHP # 50-80-07-6825 is recommended eligible to both the Hawai‘i and National Registers for the archaeological information (Criterion D) it has yielded and will potentially yield regarding traditional Hawaiian coastal land use along the Mākaha and Wai‘anae Coast. Additionally, based on the probable Native Hawaiian burial, the cultural resource is recommended significant under Hawai‘i Register Criterion E, for its traditional cultural significance to Native Hawaiians.

SIHP #: 50-80-12-9714

FORMAL TYPE:	Railroad remnants
FUNCTION:	Transportation
# OF FEATURES:	3
AGE:	Historic, constructed in the 1890s
DIMENSION:	Linear, 5 m wide NE/SW by approximately 270 m long NW/SE within the project area
LOCATION:	10 m *makai* and parallel to Farrington Highway,
TAX MAP KEY:	N/A, within State Highway Right-of-Way
LAND JURISDICTION:	State of Hawaii

DESCRIPTION:

SIHP # 50-80-12-9714 is the historic OR&L Railroad alignment. A portion of this alignment is present NW/SE through the entire project area, parallel and *makai* of Farrington Highway (Figure 36-Figure 39). The former narrow gauge railroad was constructed through the project area between 1895, when the OR&L tracks reached Wai‘anae, and 1898, when the OR&L tracks rounded Ka‘ena Point (McGrath et al. 1973). The only remnants visible during documentation of this site were the prepared surface of the former railroad berm/bed (Feature A), and two railroad trestle remnants (Features B and C). No tracks, ties, or spikes were observed during documentation of the site.

Feature A, the former railroad bed, is discernable as a slightly raised (20-40 cm high) approximately 2 m wide, low berm is present NW/SE near the exposed sands of the active beach. This berm is not visible across the entire project area; in places it blends in with the surrounding topography. The alignment is overgrown with *kiawe* tress and tall grasses. Based on results of subsurface testing, where Trenches 7 and 8 sectioned a portion of the former railroad alignment, the berm is made of locally available sediments, with no indication of imported gravels or other material to prepare the railroad bed surface. As noted above, there was no indication of railroad ties, rail spikes, or tracks within the project area. The berm is most easily discernable adjacent to the remnants of the two railroad trestles that formerly crossed Mākaha Stream’s outlets, immediately *makai* of Bridges 3 and 3A.

Feature B (Figure 36 and Figure 37) is the railroad trestle remnant immediately *makai* of Mākaha Bridge 3. Based on the visible remnants, this former railroad bridge over Mākaha Stream’s southern drainage would have been a single span beam structure supported by crudely constructed basalt rock and mortar abutments. The remnants are shown on Figure 13, the plan view of Bridge 3, and Figure 38. Figure 39 is a photograph of the former railroad bridge southern abutment, showing the crude basalt boulder and mortar construction. The southern abutment measures 8 m E/W, by 4 m N/S, by 1.5 m high.

Figure 36. Photograph of the southern abutment of Feature B, SIHP # 50-80-12-9714, view south, showing crude basalt boulder and mortar construction

Figure 37. Photograph of the northern abutment of Feature B, SIHP # 50-80-12-9714; view north

Figure 38. Photograph of the northern abutment and piers of Feature C, SIHP # 50-80-12-9714; view northwest

Figure 39. Photograph of the southern abutment of Feature C, SIHP # 50-80-12-9714; view west

There is a narrow horizontal concrete form on the southern side of the abutment that is oriented perpendicular to the bridge alignment. This likely served as an end bent for the railroad bridge. No concrete end bent was observed at the northern abutment (Figure 37).

The northern abutment of the railroad bridge is in poor condition, or was never formally constructed. Only a few basalt boulders were observed along what may have been the northern abutment. Unlike Feature C, describe below, there are no indications of bridge support piers between the bridge abutments. It is possible there never were bridge piers, or they were removed or buried by stream erosion. It is also possible that the bridge was supported by piles driven directly into the drainage sediments that have since been removed or eroded away.

Feature C, immediately *makai* of Mākaha Bridge 3A (Figure 38), was either more formally constructed, or better preserved than Feature B. Feature C consists of the remains of a four-span railroad trestle that once crossed the northern drainage of West Mākaha Stream. Between the bridge abutments are three piers that would have supported the bridge's substructure. These piers measure 6 m long, 0.8 m wide, and are 0.2 to 0.6 m above the current drainage floor. They are constructed of formed concrete, with visible seam scars from the wooden forms that were used when they were poured (Figure 38). These piers were likely footings for bridge support columns.

The Feature C remnant abutments are tiered (Figure 38 and Figure 39). The northern abutment (Figure 38) consists of three tiers; the lower tier is basalt rock and mortar, and the upper tiers are made of formed concrete. The northern abutment measures 7.5 m long, by 2.0 m wide, by 2.0 m high. The southern abutment is two-tiered and constructed of formed concrete (Figure 39). Basalt boulders are piled along the northeastern (*mauka*) side of the abumtent. The southern abutment measures 8.0 m long, by 1.2 m wide, by 1.4 m high.

These railroad trestle features were likely constructed between the late 1890s, when the railroad was first constructed through this portion of Mākaha, and 1947, when the OR&L Railroad ceased operation. No construction dates were observed on any of the structural remnants. Without additional information, such as records, historic maps, or photographs for this portion of the railroad, it is difficult to determine exactly when these railroad features were constructed.

A 13-mile section of the OR&L Railroad track, located south of the current project area, extending from Auyong Homestead Road in Nānākuli, around Kahe Point, and into Kapolei, was listed on the National Register in 1975. Based on information included on a 1982 update to the OR&L National Register nomination form, this 13-mile segment of track was determined significant under Criteria A, B, and C. This segment of the OR&L Railroad still has track and railroad ties and retains integrity to convey its historic significance under these criteria.

The portion of the OR&L railroad present in the current Mākaha Bridges project area has not been previously documented, nor has it been previously evaluated for eligibility to either the Hawai‘i or National Registers. The remnants of the railroad in the current project area retain integrity of location, but without the component tracks, railroad ties, and spikes, they lack integrity of design, materials, workmanship, feeling and association. The setting has also been compromised by modern development of nearby private residences, Mākaha Beach Park, and Farrington Highway. Therefore, the railroad remnant lacks integrity convey its historic significance under Criteria A, B, and C.

Accordingly, the section of the OR&L Railroad within the current project area is recommended as a "non-contributing component" of a cultural resource that is currently listed on the National Register. Although deemed a non-contributing component, CSH does recommend the section of railroad remnant within the current project area as Hawai‘i and National Register eligible for its information potential (Criterion D). The remnant railroad features have yielded, and may still yield, important information regarding late 19th and early 20th century railroad grade and trestle construction techniques.

Appendix B SHPD Correspondence

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
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ROBERT K. MASUDA
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DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

March 6, 2006

Dr. H.H. Hammatt
Cultural Surveys Hawaii, Inc.
P.O. Box 1114
Kailua, Hawai‘i 96734

LOG NO: 2006.0456
DOC NO: 0602CM74
Archaeology
Architecture

Dear Dr. Hammatt:

SUBJECT: **Chapter 6E-8 Historic Preservation Review –**
Archaeological Inventory Survey for the Proposed Replacement of Mākaha Bridges 3 and 3A, Farrington Highway
Mākaha Ahupua‘a, Waianae District, Island of O‘ahu
TMK: (1) 8-4-various plats and parcels

Thank you for the opportunity to review the aforementioned report by McDermott and Tulchin (2005), which we received on January 26, 2006. Pedestrian survey and representative subsurface testing documented a total of five (5) historically-significant sites that were deemed eligible for the National and State Register: (1) SIHP No. 50-80-07-6822 (Mākaha Bridge 3), constructed in 1937; (2) SIHP No. 50-80-07-6823 (Mākaha Bridge 3A), constructed in 1937; (3) SIHP No. 50-80-07-6824 (Farrington Highway), constructed in the 1930s; (4) SIHP No. 50-80-07-6825 (subsurface, pre-Contact and historic cultural layer, including two isolated, disarticulated human bones in a previously-disturbed/non-burial context); and, (5) SIHP No. 50-80-07-9714 (remnants of the O.R. & L. Railroad), constructed in the 1890s. The latter site is already listed on the National and State Register of Historic Places.

Cultural Surveys of Hawai‘i (CSH) has determined that the proposed undertaking (demolition and replacement of the two existing bridges) will have an “adverse effect” on these sites. Land ownership of the 3.9-acre project area is a mixture of State of Hawai‘i, City and County of Honolulu, and private. The Federal Highway Administration (FHWA) and the State of Hawai‘i Department of Transportation (HDOT) are funding the proposed undertaking. In accordance with the Federal Secretary of the Interior’s standards, a Memorandum of Agreement (MOA) between the SHPD, FHWA, HDOT and other relevant parties will need to be developed before this undertaking can proceed.

CSH has recommended the following mitigation measures for these sites: (1) Site -6822 (Bridge 3), -6823 (Bridge 3A), and -9714 (railroad remnants) should be documented, in addition to the excellent documentation provided by CSH, according to Historic American Engineering Records (HAER); (2) Site -6824 (Farrington Highway), no further work required; (3) Site -6825 (subsurface cultural layer with two isolated, disarticulated human bones in a previously-disturbed/non-burial context), data recovery and monitoring.

Dr. H.H. Hammatt
Page 2

CSH has recommended that a Burial Treatment Plan (BTP) for the isolated human remains recovered at Site -6825 be submitted to the SHPD for consideration before the O'ahu Island Burial Council (OIBC). According to your report, we understand the human remains have been temporarily preserved in place, pending OIBC review. CSH has also suggested that, with the exception of the BTP, the additional work, including the architectural documentation (HAERs), data recovery, and monitoring, can be combined into a single mitigation plan.

We agree with CSH's identification of historic properties, assessment of adverse effects, and mitigation measures to resolve the adverse effects. The inventory survey report fulfills all of the major requirements outlined in the Hawai'i Administrative Rules Chapter 276. We would like to commend CSH on the overall high quality of the report. Before we can accept the inventory survey report as final, however, please make the following minor changes:

(1) Check and correct all references, making sure the text is consistent with the references cited section.

(2) Some trench photographs (*e.g.,* Figure 10, 13, 16) do not contain a scale and/or a view (cardinal direction) perspective. If you do not have other photographs with scale and view to replace these, please include the information in the figure captions.

(3) The reference to "Table 5" (p.78) should read "Table 6."

(4) Please indicate on the photographs of Site -6835 (Figures 44 and 45) the location of the subsurface cultural layer (*e.g.,* use Photoshop to insert arrows on the image).

Upon receipt of the revised inventory survey report, which we will accept as final, we can begin consultation regarding the BTP and mitigation plan.

Aloha,

Melanie Chinen, Administrator
State Historic Preservation Division

CM

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
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March 17, 2006

Dr. H.H. Hammatt
Cultural Surveys Hawaii, Inc.
P.O. Box 1114
Kailua, Hawai'i 96734

LOG NO: 2006.0731
DOC NO: 0603CM59
Archaeology
Architecture

Dear Dr. Hammatt:

SUBJECT: **Chapter 6E-8 Historic Preservation Review –**
Revised Archaeological Inventory Survey for the Proposed Replacement of Mākaha Bridges 3 and 3A, Farrington Highway
Mākaha Ahupua'a, Waianae District, Island of O'ahu
TMK: (1) 8-4-various plats and parcels

Thank you for submitting the aforementioned report by McDermott and Tulchin (2006), which we received on March 16, 2006. The report summarizes the findings of an archaeological inventory survey. We requested several minor editorial changes in a letter (LOG NO: 2006.0456, DOC NO: 0602CM74) dated March 6, 2006. You have addressed all of these changes to our satisfaction.

The report is accepted as fulfilling the requirements of Hawai'i Administrative Rules (HAR) Chapter 13-276.

Please contact Dr. Chris Monahan at 808-692-8015 if you have questions, concerns, or disagreements.

Aloha,

For

Melanie Chinen, Administrator
State Historic Preservation Division

CM

LINDA LINGLE
OVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
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October 24, 2006

Mr. David Shideler
Cultural Surveys Hawaii, Inc.
P. O. Box 1114
Kailua, HI 96734

LOG NO: 2006.3522
DOC NO: 0610PC04

Dear Mr. Shideler:

SUBJECT: **Notice of Council Determination - Burial Treatment Plan for the State Department of Transportation's Makaha Bridges 3 and 3A Project**
Makaha Ahupuaa, Waianae District, Island of Oahu
TMK: (1) 8-4-001:012, 8-4-002:045, 047, 8-4-018:014, 122, 123, 8-4-008:018, 019, 020

On October 11, 2006, at a duly noticed meeting of the Oahu Island Burial Council (OIBC) with a quorum of members present, the OIBC concurred with your client's proposal and voted to relocate the human skeletal remains identified during the subject project.

Should your client disagree with the OIBC's determination, §13-300-38(c) of the Hawaii Administrative Rules (HAR) provides an option to request reconsideration of the OIBC's determination upon submittal to the Department of Land and Natural Resources (DLNR) of a written request for reconsideration within ten (10) business days following receipt of this notice. Furthermore, §6E-43(c) of the Hawaii Revised Statutes (HRS) provides that OIBC determinations may be administratively appealed as a contested case. Any appeal pursuant to §6E-43(c) must be submitted in writing to the DLNR within forty-five (45) days following receipt of this notice.

Should your client accept the OIBC's decision as final, the DLNR would like to proceed with final approval of a burial treatment plan for the subject burial site. Pursuant to §6E-43(d), HRS, the DLNR has ninety (90) days from the date of the OIBC's determination to approve a final burial treatment plan.

The plan is currently being reviewed and the department will contact you once the review is completed. Should you have any questions, please contact Ms. Piilani Chang of our History and Culture Branch at 692-8015.

Sincerely,

Melanie A. Chinen, Adminstrator
State Historic Preservation Division

c: Members, Oahu Island Burial Council
Piilani Chang, Cultural Historian

LINDA LINGLE
GOVERNOR OF HAWAII

ALLAN A. SMITH
INTERIM CHAIRPERSON
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POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 9, 2007

David W. Shideler
Cultural Surveys Hawai'I, Inc.
P.O. Box 1114
Kailua, Hawaii 96734

Log No. 2007.2400
Doc No. 0707MC07

Dear Dr. Hammatt:

SUBJECT: Burial Treatment Plan for the Proposed Replacement of Makaha Bridges 3 and 3A
Makaha Ahupua'a, Wai'anae District, Island of O'ahu
TMK: (1) 8-4-001:002; 8-4-002:045, 047; 8-4-018:014, 122, 123; 8-4-008:018, 019, 020

Thank you for your letter of July 5, 2007 requesting final approval of the burial treatment plan for the above cited project. As stated in my February 27, 2007 correspondence, you have adequately addressed our recommendations and incorporated those comments into your revised burial treatment plan. However, my previous correspondence incorrectly stated that Mr. Alika Silva was recognized as a cultural descendant for the skeletal remains located at SIHP No. 50-80-7-6825, Feature B and I asked that you reflect this in the BTP. We have reviewed the Oahu Island Burial Council meeting minutes regarding this matter and I agree that Mr. Silva has not been recognized as a cultural descendant. To the contrary, as of this date Mr. Silva has not submitted an application for such claim to this office. Therefore, we are able to accept the previously submitted revised burial treatment plan as final. I apologize for any inconvenience this may have caused to you and your client, and we look forward to proceeding with the implementation of the plan.

Again, we request that you notify the Waianae district representatives, Mr. Analu Josephides, and Ms. Alice Greenwood, as well as my office, of your plans to disinter the remains at least one week in advance of the scheduled disinterment. This will allow the Waianae regional representatives of the Oahu Island Burial Council the opportunity to oversee the cultural protocols during the disinterment activities.

Aloha,

Melanie A. Chinen, Administrator
State Historic Preservation Division

LINDA LINGLE
GOVERNOR OF HAWAII

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CHAIRPERSON
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February 17, 2010

David Shideler
Cultural Surveys Hawai`i, Inc.
P.O. Box 1114
Kailua Hawai`i 96734

LOG NO: 2010.0313
DOC NO: 1002NM39
Archaeology

Dear Mr. Shideler:

SUBJECT: Chapter 6E-42 Historic Preservation Review –
Archaeological Data Recovery Plan for Makaha Bridges 3 and 3A
Makaha, Wai`anae, O`ahu
TMK: (1) 8-4-001: 012

Thank you for the opportunity to review the aforementioned plan (*Archaeological Data Recovery Plan for Makaha Bridges 3 and 3A Replacement Project Farrington Highway, Makaha Ahupuaa, Waianane District, Oahu TMK 8-4-001: 012 [Groza, Shideler and Hammatt. PhD. CSH January 2010*, which we received on January 14, 2010. The plan and the strategies you propose to address the research questions are adequate. The data recovery will establish the age of the sites, the boundaries and determine the function of the site and type and variety of activities. One site 6825 is the site to be data recovered.

This plan satisfies the requirements of Hawai`i Administrative Rules (HAR) Chapter 13-278 and Section 106 and is accepted. A final hard copy and a searchable pdf version on a CD of this report should also been submitted for our library with a copy of this letter.

Please contact me at (808) 692-8015 if you have any questions or concerns regarding this letter.

Aloha,

Nancy A. McMahon

Nancy McMahon, Archaeology Branch
State Historic Preservation Division