
Final
Archaeological Inventory Survey for the
Island School Project
Nāwiliwili Ahupua‘a, Līhu‘e District, Kaua‘i Island
TMK: (4) 3-8-002:016

Prepared for
Wilson Okamoto Corporation

Prepared by
Nifae Hunkin, B.A.,
David Shideler, M.A.
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai‘i, Inc.
Kailua, Hawai‘i
(Job Code: NAWILIWILI 13)

March 2014

O‘ahu Office
P.O. Box 1114
Kailua, Hawai‘i 96734
Ph.: (808) 262-9972
Fax: (808) 262-4950

www.culturalsurveys.com

Maui Office
1860 Main St.
Wailuku, Hawai‘i 96793
Ph: (808) 242-9882
Fax: (808) 244-1994

Management Summary

Reference	Archaeological Inventory Survey (AIS) for the Island School State Land Use District Boundary Amendment Project, Nāwiliwili Ahupua'a, Līhu'e District, Kaua'i Island, TMK: (4) 3-8-002:016 (Hunkin et al. 2014)
Date	March 2014
Project Number	Cultural Surveys Hawai'i, Inc. (CSH) Job Code: NAWILIWILI 13
Investigation Permit Number	The fieldwork for the current AIS investigation was carried out under Hawai'i State Historic Preservation Division/Department of Land and Natural Resources (SHPD) permit no. 13-06, issued per Hawai'i Administrative Rules (HAR) Chapter 13-282.
Project Location	The project area consists of the 38.448-acre (ac) (15.559 hectares [ha]) Island School campus as shown on the U.S. Geological Survey 7.5-Minute Series Topographic Map, Līhu'e (1996) Quadrangle.
Project Funding and Land Jurisdiction	The proposed project is privately funded.
Agencies	SHPD
Project Description	The Island School is an existing Pre-K through Grade 12 private school located on a 38.448-ac (15.559 ha) site in Puhi, Island of Kaua'i. The Island School site, identified as Tax Map Key: (4) 3-8-002:016, is located adjacent to the northeast boundary of the University of Hawai'i's Kaua'i Community College campus. To meet increased enrollment projections, Island School has prepared a development master plan for the 38.448-ac campus that includes new classrooms and other school facilities.
Project Acreage	38.448 ac (15.559 ha)
Area of Potential Effect (APE) and survey acreage	The approximately 38.448-ac (15.559 ha) project area is defined in this study as the Area of Potential Effect (APE).
Historic Preservation Regulatory Context	At the request of Wilson Okamoto Corporation, CSH undertook this AIS to fulfill the requirements of the Hawai'i Administrative Rules (HAR) Chapter 13-13-276, and was conducted to identify, document, and make Hawaii Register of Historic Places (Hawaii Register) eligibility recommendations for the subject parcel's historic properties. The investigation includes a project-specific effect recommendation and treatment/mitigation recommendations for the parcel's historic properties that are recommended Hawai'i Register eligible. This document is intended to support the proposed project's historic preservation review under Hawai'i Revised Statutes (HRS) Chapter 6E-42 and HAR Chapter 13-13-284. It is also intended to support any project-related historic preservation consultation with stakeholders, such as state and county agencies and interested Native

	<p>Hawaiian and community groups.</p> <p>A Literature Review and Field Inspection (LRFI) was submitted by Groza and Hammatt in January 2013, and was reviewed and accepted on February 11, 2013; Log No. 2013.0401, Doc. No. 1302SL09. As part of that Chapter 6E-42 Historic Preservation Review, the SHPD recommended that an AIS be completed to provide additional documentation of historic properties that will be adversely affected as part of the proposed project. It was also requested that a subsurface component be part of the AIS scope of work to further assess the potential for historic properties.</p>
Fieldwork Effort	<p>The fieldwork component of this AIS was completed between April 3 and 5, 2013, by CSH archaeologists Nifae Hunkin, B.A., Frederick LaChance, B.A., Gerald K. Ida, B.A., Michael Rivera, B.A., and David Doig, B.A., under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator). The fieldwork required 15 person-days to complete.</p>
Number of Historic Properties Identified	<p>One historic property was identified during earlier LRFI work (Groza and Hammatt 2013) for the project area, SIHP (State Inventory of Historic Properties) # 50-30-11-2179:</p> <ul style="list-style-type: none"> • SIHP # 50-30-11-2179, Features A through D; A is a reservoir, Feature B is in an earthen ditch; Feature C is an earthen ditch with running water, and Feature D is an earthen ditch. Features A, C, and D are likely part of the Upper Lihue Ditch system. <p>Although the south side of the project area curves around the reservoir (Feature A, part of the Upper Lihue Ditch system), the reservoir is not part of Island School and is located on another parcel.</p> <p>A second historic property was designated in the course of the present study: SIHP # 50-30-11-2220, a Hawaii Territory Survey Marker and transit station, also has been assessed as significant under Criterion D.</p>
Historic Properties Recommended Eligible to the Hawai'i Register of Historic Places	<p>SIHP # 50-30-11-2179, Features A-D, plantation-era infrastructure features (Features A, B, C, and D are likely part of the Upper Lihue Ditch System), recommended eligible under Criterion D.</p> <p>SIHP # 50-30-11-2220, a Hawaii Territory Survey Marker and transit station, also has been assessed as eligible under Criterion D.</p>
Historic Properties Recommended Ineligible to the Hawai'i Register of Historic Places	<p>No historic properties recommended ineligible to the Hawai'i Register of Historic Places were identified during the current AIS investigation.</p>

<p>Effect Recommendation</p>	<p>CSH's project specific effect recommendation is "effect, with proposed mitigation commitments." The proposed development will adversely affect two feature components (Features C and D) of the single significant historic property, SIHP # 50-30-11-2179, identified within the project area and APE. Both feature components are part of the Upper Lihue Ditch system. Because this historic property consists only of surface features, the recommended archaeological monitoring should adequately address the project's effect on Features C and D of SIHP # 50-30-11-2179. An archaeological monitoring program with on-site monitoring is recommended for any future work that may adversely affect Features A and B of SIHP # -2179.</p>
<p>Recommendation</p>	<p>In order to alleviate the proposed project's adverse effect on properties recommended eligible to the Hawai'i Register, CSH offers the following mitigation recommendations:</p> <p>SIHP # 50-30-11-2179 (historic agricultural infrastructure) is likely part of Lihue Plantation, which was once in operation throughout much of Nāwiliwili. Some areas formerly part of the plantation are still farmed today. Within the current project area, most of the agricultural infrastructure has lost its integrity through repeated modification, disuse and extensive ground disturbance and cannot convey its historical significance as part of this larger district. The archaeological remnants of this agricultural infrastructure still may contribute important information, however. Accordingly, in order to mitigate further destruction of portions of SIHP # 50-30-11-2179 during the proposed campus facility expansion project, an archaeological monitoring program (per the language of HAR Chapter 13-275-8¹), is recommended. This monitoring program will comply with HAR Chapter 13-279 and focus on the remnants of the old agricultural field system within the project area.</p> <p>The following significant historic properties will be adversely affected by the proposed project. The recommended mitigation measures listed below are intended to alleviate this adverse effect. The scope and methods for these mitigation measures were developed in consultation with SHPD.</p> <ul style="list-style-type: none"> • SIHP # 50-30-11-2179, Feature C, Archaeological Monitoring • SIHP # 50-30-11-2179, Feature D, Archaeological Monitoring • In addition, an archaeological monitoring program with on-site monitoring is recommended for any future work that may adversely affect Features A and B of SIHP # -2179.

Under Hawai'i State historic preservation review legislation, historic preservation mitigation must take one of five forms: A) Preservation; B) Architectural Recordation; C) Archaeological Data Recovery; D) Historical Data Recovery; and E) Ethnographic Documentation (HAR Chapter 13-275-8 [or 13-13-284-8]). Under this legislation, an archaeological monitoring program is considered a form of archaeological data recovery.

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Section 1 Introduction

1.1 Project Background

At the request of Wilson Okamoto Corporation, Cultural Surveys Hawai'i, Inc. (CSH) completed an Archaeological Inventory Survey (AIS) for the Island School State Land Use District Boundary Amendment Project, Nāwiliwili Ahupua'a, Līhu'e District, Kaua'i Island (Figure 1 and Figure 2). The Island School is an existing Pre-K through Grade 12 private school located on a 38.448-acre (ac) (15.559 hectare [ha]) parcel in Puhi, Island of Kaua'i. The Island School campus, identified as Tax Map Key: (4) 3-8-002:016 (Figure 3), is located adjacent to the northeast boundary of the University of Hawai'i's Kaua'i Community College campus. To meet increased enrollment projections, Island School has prepared a development master plan for the campus that includes new classrooms and other school facilities (Figure 4).

1.2 Historic Preservation Regulatory Context

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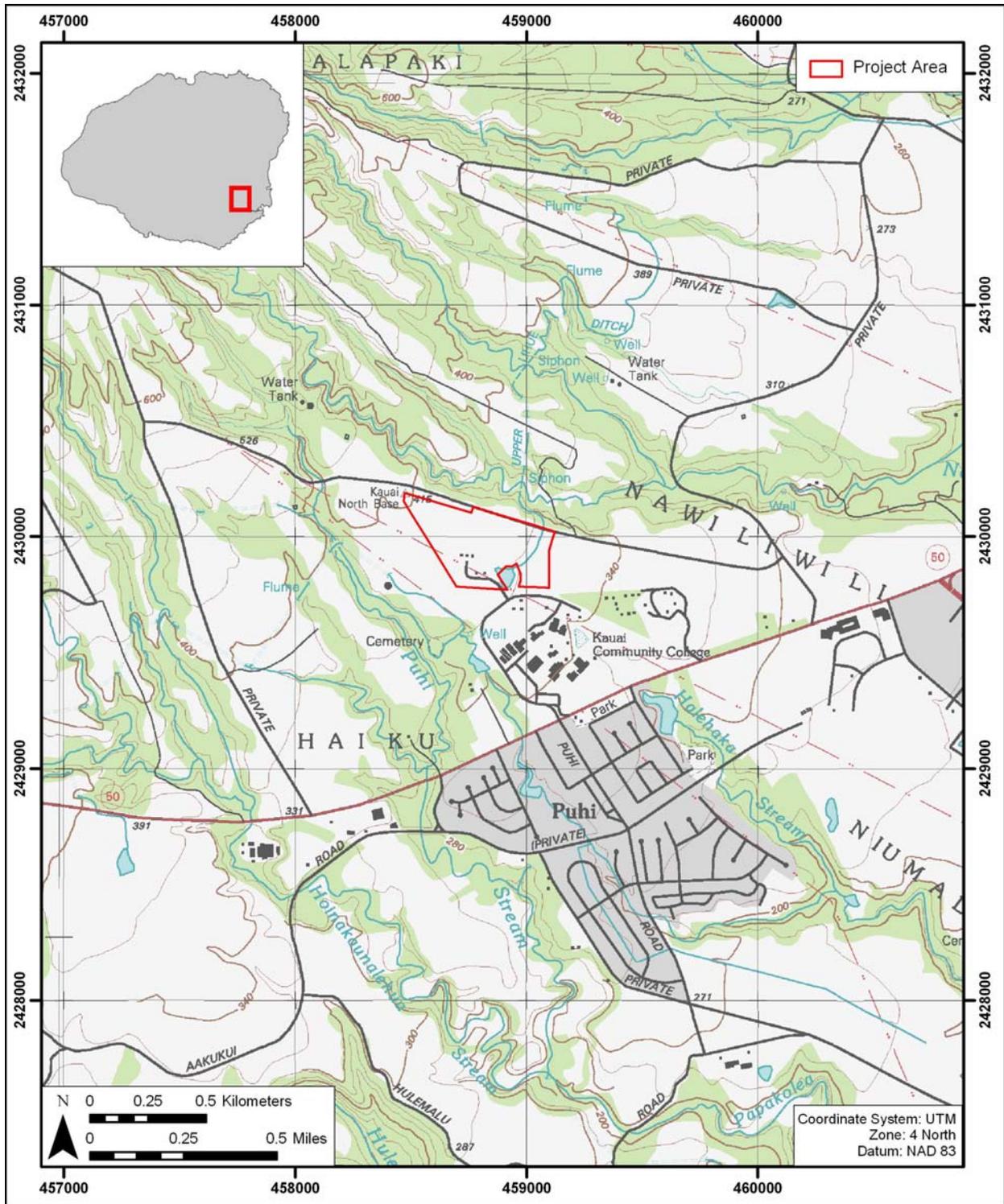


Figure 1. Portion of 1996 U.S. Geological Survey 7.5-Minute Series Topographic Map, Līhu‘e quadrangle, showing the project area



Figure 2. Aerial photograph (source: U.S. Geological Survey Orthoimagery 2005), showing the location of the project area

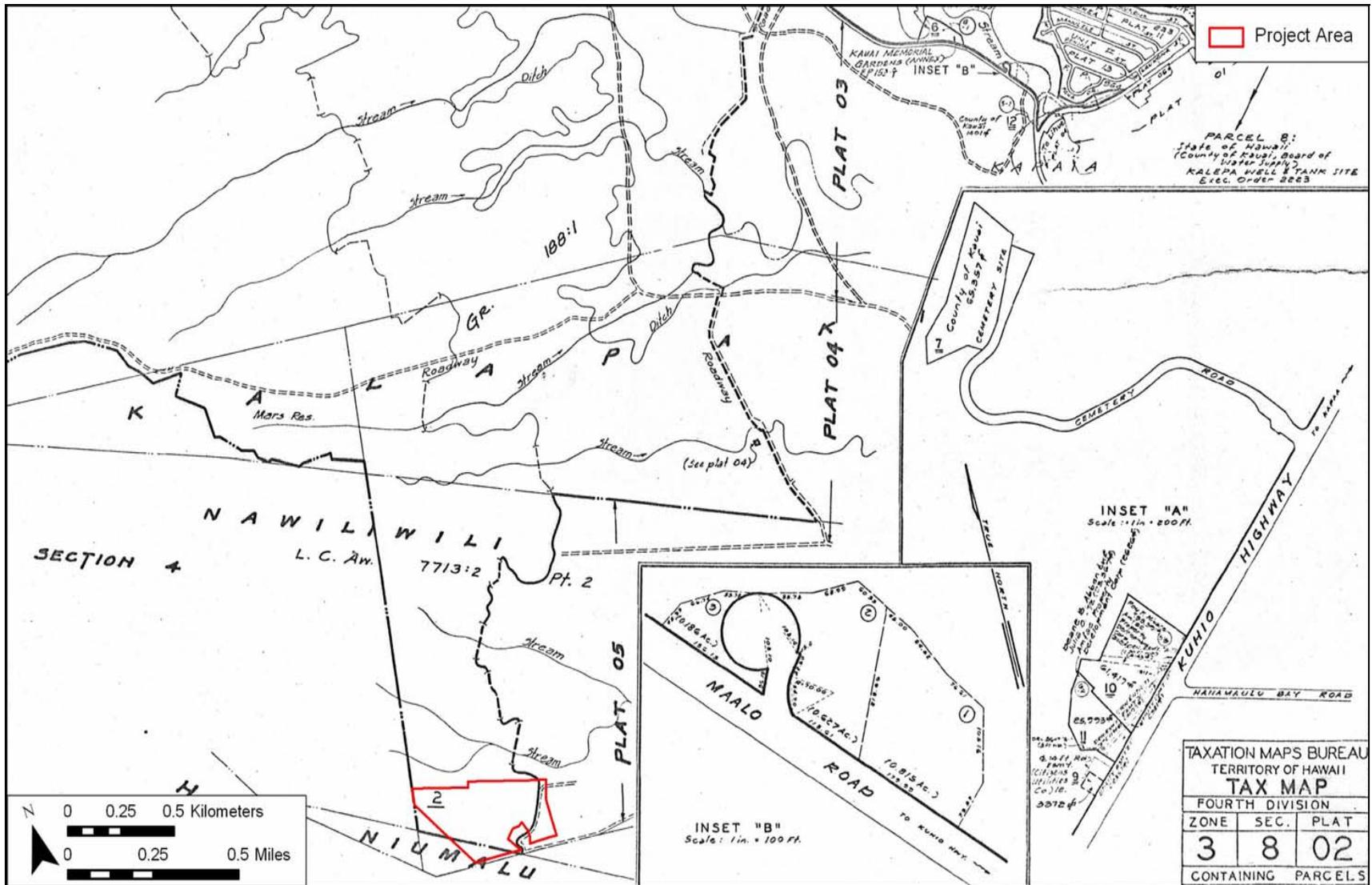


Figure 3. 2013 Hawai'i Tax Map Key 3-8-002, showing the project area

1.3 Scope of Work

The following AIS scope of work is designed to satisfy the Hawai'i state requirements for archaeological inventory surveys (HAR Chapter 13-276):

1. Historic and archaeological background research, including a search of historic maps, written records, Land Commission Award (LCA) documents, and the reports from prior archaeological investigations. This research focused on the specific project area's past land use, with general background on the pre-Contact and historic settlement patterns of the *ahupua'a* and district. This background information was used to compile a predictive model for the types and locations of historic properties that could be expected within the project area.
2. A ground survey of the entire project area for the purpose of historic property identification and documentation. All historic properties were located, described, and mapped with evaluation of function, interrelationships, and significance. Documentation will include photographs and scale drawings of selected historic properties. All historic properties will be assigned Inventory of Historic Properties numbers by the State and located with a Trimble Global Positioning System (GPS). This GPS data will be in the report in ArcGIS format and be sufficient for planning purposes.
3. Based on the project area's environment and the results of the background research, subsurface testing with a combination of hand and backhoe excavation was conducted. Subsurface testing focused on locating and evaluating subsurface deposits, such as buried cultural layers and/or deposits with significant paleoenvironmental data, which could not be located by the ground survey. Testing in sensitive areas was conducted by hand after the initial backhoe work. If appropriate samples from these excavations are found, they will be analyzed for chronological and paleoenvironmental information. All subsurface historic properties identified will be documented to the extent possible, including geographic extent, content, function/derivation, age, interrelationships, and significance.
4. Preparation of a survey report which included the following:
 - a. A topographic map of the survey area showing all historic properties;
 - b. Results of consultation with knowledgeable community members about the property's past land use and historic properties.
 - c. Description of all historic properties with selected photographs, scale drawings, and discussions of function;
 - d. Historical and archaeological background sections summarizing prehistoric and historic land use as they relate to the project area's historic properties;
 - e. A summary of historic property categories and their significance in an archaeological and historic context;

- f. Recommendations based on all information generated that will specify what steps should be taken to mitigate impact of development on the project area's significant historic properties - such as data recovery (excavation) and preservation of specific areas. These recommendations will be developed in consultation with the client and the State agencies.

This scope of work also includes full coordination with SHPD and Kaua'i County relating to archaeological matters.

1.4 Environmental Setting

1.4.1 Natural Environment

The project area is located approximately 3.2 kilometers (km; 2 miles [mi]) west of Līhu'e, *mauka* (inland) of Kaumuali'i Highway in Nāwiliwili Ahupua'a, Līhu'e District, in the southeastern quadrant of the island of Kaua'i. The parcel is fairly far inland, about 4.8 km (3 mi) from the southeastern coast. The project area is exposed to the prevailing northeast trade winds, and receives approximately 1700 millimeters (mm) (67 inches [in]) of rainfall annually (Giambelluca et al. 1986). The project area lies on level to gently sloping lands that range from approximately 360 feet (ft) to 400 ft above mean annual sea level (AMSL) with a tributary of Nāwiliwili Stream to the northeast. A tributary of Puhi Stream is approximately 250 meters (m) to the west.

Project area soils predominately consist of Puhi silty clay loam, 3 to 8 percent slopes (PnB) with a ribbon of Puhi silty clay loam, 8 to 15 percent slopes (PnC), running along its southwestern boundary. Rough broken land (rRR) abuts the north boundary and extends into the northeastern portion of the project area (Figure 5).

Puhi silty clay loam consists of well-drained soils on uplands. These soils developed in material derived from igneous rock. Slope ranges primarily from 3-15 percent. The run-off of the Puhi silty clay loam is slow, creating an only slight erosion hazard. Puhi silty clay loam is used for sugar cane, pasture, pineapple, orchards, wildlife habitat, and woodland.

Rough broken land (rRR) consists of very steep land broken by frequent intermittent drainage channels. Slope is 40-70 percent, runoff and geologic erosion are both rapid. (Foote et al. 1972:62, 75, 118:Sheet 22).

1.4.2 Built Environment

Development within the project area consists of existing school and administrative buildings (Figure 6, Figure 7, Figure 8, and Figure 9). The University of Hawai'i's Kaua'i Community College campus is adjacent to the south. The residential community of Puhi lies just south across Kaumuali'i Highway. The lands to the west, north and east are relatively undeveloped (see Figure 2).

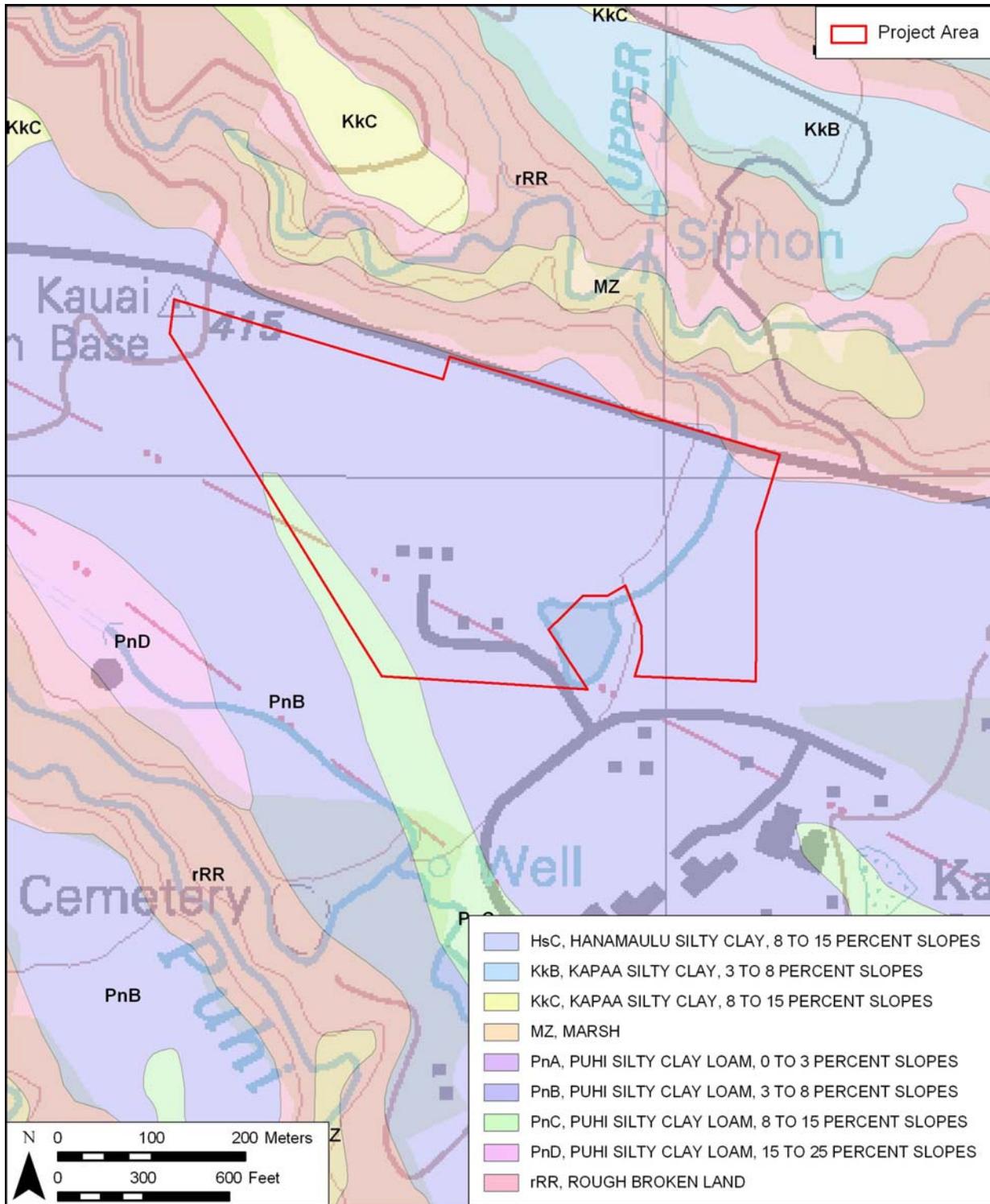


Figure 5. Portion of 1996 U.S. Geological Survey 7.5-Minute Series Topographic Map, Lihue quadrangle, with overlay of the U.S. Department of Agriculture (USDA) Soil Survey of the State of Hawai'i (Foote et al. 1972), indicating sediment types within the project area



Figure 6. Entrance to Island School, school buildings in background, view to north



Figure 7. Island School grounds, Wilcox Gym to left, Frear Hawaiian Studies Building to right, open space in foreground, view to north



Figure 8. General View: central portion of the project area, view to south



Figure 9. General View: central portion of the project area, view to north

Section 2 Methods

2.1 Field Methods

Gerald K. Ida, B.A., Nifae Hunkin, B.A., Frederick LaChance, B.A., Michael Rivera, B.A., and David Doig, B.A. completed the fieldwork portion of the current AIS, which required 15 person-days to complete. Fieldwork took place between April 3 and 5, 2013, under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator). Fieldwork consisted of a 100 percent pedestrian inspection of the project area. Following the pedestrian inspection, the historic property identification effort focused on a subsurface testing program within areas of the project area proposed for development. Twenty-five (25) test excavations (TE) were completed and documented.

2.1.1 Pedestrian Inspection

A complete ground survey of the project area was undertaken for the purpose of historic property identification and documentation. CSH archaeologists surveyed the entire project area in transects, spaced between 3 to 5 m apart with an overlapping field of vision and examined surface characteristics for extant historic properties.

2.1.2 Subsurface Testing

The subsurface testing program consisted of 25 test excavations. In consultation with the landowner and the project developer, trenches were placed in areas anticipated to be impacted by project construction (i.e. subsurface disturbance) (see Figure 4).

Trenches were excavated to assess the stratigraphy and potential for subsurface historic properties (e.g., cultural deposits) and to gather data for comparative analysis with historic research and archaeological data from project areas in the vicinity.

A standard backhoe with a 2-ft wide bucket was used to excavate each test excavation. Generally, excavated trenches were either (1) approximately 6 m long, 1 m wide and between 1 to 2 m deep; or (2) approximately 2 m long, 1 m wide and 1 to 2 m deep. All trenches were excavated to culturally sterile sediment indicating no further potential for encountering historic properties.

CSH personnel closely monitored all backhoe excavation activity. Two archaeologists monitored the backhoe excavation; one positioned at either end of the trench to monitor both the removal of sediment from the trench and the emptying of the backhoe bucket on the adjacent backdirt pile.

The location of each of test excavation was recorded using a Trimble Pro GPS unit. GPS location information was converted into GIS shape files ESRI's ArcGIS 9.1.

2.2 Document Review

Historic and archival research included information obtained from the University of Hawai'i at Mānoa's Hamilton Library, the SHPD Library, the Hawai'i State Archives, the State Land

Survey Division, and the Bernice Pauahi Bishop Museum (BPBM) archives. Previous archaeological reports for the area were reviewed, as were historic maps and primary and secondary historical sources. Information on Land Claim Awards (LCAs) was accessed through Waihona 'Āina Corporation's Māhele Data Base (www.waihona.com) and Ulukau: The Hawaiian Electronic Library's Māhele Data Base (<http://ulukau.org/cgi-bin/vicki?l=en>).

This research provided the environmental, cultural, historic, and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected types and locations of historic properties in the project area.

Section 3 Background Research

3.1 Traditional and Historical Background

Nāwiliwili Ahupua'a is located in the ancient *moku*, or district of Puna and is probably best known in a traditional sense for its *heiau* at Kuhiau, reportedly at least four acres in size, and its associated *pōhaku* (rock) called Paukini, located in the bay.

3.1.1 Mythological and Traditional Accounts

Many sources suggest Nāwiliwili takes its name from the *wiliwili* tree (*nā* is the plural article, as in “the *wiliwili* trees” or “place of the *wiliwili* trees”). According to Pukui and Elbert (1986), the *wiliwili* (*Erythrina sandwicensis*) is a native leguminous tree whose flowers and pods are used for *lei*, and whose light wood was once used for surfboards, outriggers, and net floats. Handy (1940:67) suggests a *kaona* (hidden meaning) for the name Nāwiliwili based on a duplication of the word *wili*, which means “twisted,” as in the meandering Nāwiliwili Stream.

According to Hammatt and Creed (1993:22), Land Commission documents indicate the shoreline location of several house lots in Nāwiliwili Ahupua'a was known as Papalinahoa. Kikuchi (1973) states this was the name of “an early chief (*mo'o*),” but Hammatt and Creed (1993) suggest it may also have been the name of an *'ili* (land division) or of the *konohiki* (headman of an *ahupua'a* land division). Papalinahoa was also the name of an *'auwai* (irrigation ditch) on the south side of Nāwiliwili Stream, associated with LCA 3566 (Hammatt and Creed 1993).

The *menehune* (legendary race of small people) were known to live in the Nāwiliwili area:

It was one of the favorite playgrounds of the tribe of *Menehune*, the little brown work-people who played as hard as they worked. And again it is William Hyde Rice, who, more than any other teller of stories, has kept for us old tales of this happy playground...(Damon 1931:395-396)

Handy (1940:67) describes Nāwiliwili Valley in his chapter on the main *kalo* (taro) growing locations in Puna, Kaua'i:

[Nāwiliwili] For 3 mi inland from the sea the Nāwiliwili River twists (*wiliwili*) through a flat valley bottom which was formerly all in terraces. Inland, just above the bay, three Hawaiian taro planters cultivate wet taro in a few small terraces. Most of the land is [now] in pasture.

The *lo'i* terraces are south of the project area. Due to the concentration of *lo'i* within the vicinity of the coast, as well as the availability of aquatic resources, the coastal area contained a majority of the population of the *ahupua'a* of Nāwiliwili.

3.1.2 Early Historic Period

Western homesteading and commerce were established on the lands above Nāwiliwili Bay that would evolve into Līhu'e Town within a few years after the establishment of the missionary and business activities at Kōloa in the mid-1830s. Accounts of nineteenth century travelers on

the trail between Kōloa and Līhu'e present the first record of the lands surrounding Līhu'e and therefore also Nāwiliwili. William DeWitt Alexander, son of the former Waioli missionary William P. Alexander, described a return visit to Kaua'i in 1849, six years after his family had left the island. Traveling on horseback from Kōloa to Wailua, Alexander noted in his diary:

We then rode through a gap in the hills, leading out from Kōloa. The scenery was very fine, and worthy of Kaua'i. Mauna Kāhili was close on the left, and on the right a beautiful range of hills extending towards the northeast, and terminating in an abrupt peak which goes by the name of "Hoary Head" [Hā'upu]. We rode on over a beautiful undulating table land, dotted with groves of *lauhala* and *kukui*. After riding about five mi, we crossed a stream fitly called Stoney Brook. We afterwards crossed many other streams on our way. Five mi further we passed Dr. Lafon's former residence. Here we began to descend towards the sea. (Alexander 1991:122)

Apparently, Alexander observed no conspicuous Hawaiian settlements between the Gap and Dr. Lafon's residence in the Līhu'e area. It may be, however, that substantial settlement down in the Hulē'ia Stream valley was largely obscured from his view.

In the 1830s, the Governor of Kaua'i (Kaikio'ewa) founded a village at Nāwiliwili that eventually developed into Līhu'e. According to Hammatt and Creed (1993), the name Līhu'e was not consistently used until the establishment of commercial sugar cane agriculture in the middle nineteenth century. From the 1830s to the *Māhele*, the names Nāwiliwili and Līhu'e were used interchangeably to some extent to refer to a settlement along Nāwiliwili Bay. Some sources attribute the decision to call this area Līhu'e (literally translated as "cold chill") to the ruling chief Kaikio'ewa, who apparently named it after his nearby upcountry home (see below). Waimea and Kōloa were preferred anchorages compared with Nāwiliwili, which opens directly east to the trade winds. Gales were known to blow ships onto the rocks. During the whaling era, Kōloa, which was home to some of the earliest major commercial operations in the Hawaiian Islands, was the preferred anchorage because of the ready supply of nearby food stuffs for resupply of the ships. Forty to sixty whaling ships would call at Kōloa in one season (Smith 1991:77).

By 1830, the sandalwood trade had waned and the whaling industry was growing. At the same time, commercial agriculture was being established on Kaua'i. When the first crop of sugar cane was harvested at Kōloa, the king himself commanded that portions of his private land be planted in cane. In 1839, Governor Kaikio'ewa began farming the slopes of Nāwiliwili Bay where there was more rain than at Kōloa (Dorrance and Morgan 2000). He also built a house and church in Nāwiliwili Ahupua'a.

Donohugh (2001:94) describes Kaikio'ewa's attempt to establish the first commercial sugar mill and plantation in Līhu'e in 1839:

During the early decades of Kōloa Plantation, other sugar plantations had started up on the island. One was to result in the ascendancy of Līhu'e to the principal town and seat of government on Kaua'i, replacing Wailua. When Kaikio'ewa was appointed governor, he located his home in what is now the Līhu'e District. He planned to grow sugar cane but died in 1839 before his plans could be realized.

Kaikio'ewa was responsible for the name [Līhu'e], which means "cold chill," the name of his previous home at a higher and chillier altitude on O'ahu.

Donohugh (2001:94) describes observations by James Jarves, who passed through Līhu'e in 1838:

... [He] found only a church built by Kaikio'ewa and a few grass houses. He commented the governor had selected Hanamā'ulu Bay as the harbor, "entirely overlooking the fact that it opened directly to the windward."

Following Kaikio'ewa's death in 1839 shortly after the establishment of the sugar plantation, the plantation closed down in 1840 (Dorrance and Morgan 2000).

Around this time, perhaps as late as 1842, the first missionaries settled in the Līhu'e area led by Dr. and Mrs. Thomas Lafon, and assisted by Rev. and Mrs. Peter Gulick from Kōloa. Schools were established, and some missionaries attempted to grow cotton as the first intensive cash crop, but were unsuccessful (Damon 1931).

An account of the United States Exploring Expedition that passed through Līhu'e in 1840, described the area.

At noon they reached Lihui [sic], a settlement lately undertaken by the Rev. Mr. Lafon, for the purpose of inducing the natives to remove from the sea-coast, thus abandoning their poor lands to cultivate the rich plains above. Mr. Lafon has the charge of the mission district lying between those of Koloa and Waioli. This district [Līhu'e] was a short time ago formed out of the other two.

The principal village is Nawiliwili, ten mi east of Koloa. This district contains about forty square mi, being 20 mi long by two broad. The soil is rich: it produces sugar-cane, taro, sweet-potatoes, beans, etc. The only market is that of Koloa. The cane suffers somewhat from the high winds on the plains.

The temperature of Lihui [sic] has much the same range as that of Koloa, and the climate is pleasant: the trade-winds sweep over it uninterruptedly, and sufficient rain falls to keep the vegetation green throughout the year....

On the fertile places, although the pasturage was good, yet no cattle were to be seen. (Wilkes 1845:67-68)

With the death of Kaikio'ewa, governorship of Kaua'i was transferred for a brief period to his widow Keaweamahi. Then followed the brief tenure of Chiefess Kekauonohi and her husband Keali'iahonui (son of King Kaumuali'i) after which the governorship passed to Paulo Kanoa in 1848. Kanoa had two houses overlooking Nāwiliwili Bay: one on the bluff south of Nāwiliwili Stream (the present location of Kaua'i High School) and another at Papalinaloa, north of the bay (Damon 1931).

During the second half of the nineteenth century, western settlers and entrepreneurs set their sights on southeast Kaua'i. Ethel Damon's history *Koamalu* gives an account of the pre-cash crop landscape as observed at the time of the Rice family's arrival on Kaua'i in 1854. Damon describes the Līhu'e landscape at the time of the family's arrival at Nāwiliwili Bay:

From the deck of their river craft in 1854 Mrs. Rice and the children could plainly see above the rocky shore and ruins of Kuhiau, the old heiau, or temple, and nearby on the bluff the flaming blossoms of a great *wili-wili* tree among *koa* trees which then grew almost down to the water's edge. (Damon 1931:17-18)

3.1.3 The Māhele (Land Divisions)

In 1845, the Board of Commissioners to Quiet Land Titles, also called the Land Commission, was established “for the investigation and final ascertainment or rejection of all claims of private individuals, whether natives or foreigners, to any landed property” (Chinen 1958:8). This led to the Māhele, the division of lands between the king of Hawaii, the *Ali'i* (chiefs), and the common people, which introduced the concept of private property into the Hawaiian society. In 1848, Kamehameha III divided the land into four categories: certain lands to be reserved for himself and the royal house were known as Crown Lands; lands set aside to generate revenue for the government were known as Government Lands; lands claimed by *ali'i* and their *konohiki* (land manager for the *ali'i*) were called Konohiki Lands; and habitation and agricultural plots claimed by the common people were called *kuleana* (Chinen 1958:8-15).

Victoria Kamāmalu was awarded LCA 7713, which included over two thousand acres of Nāwiliwili Ahupua'a. She was the daughter of Kīna'u, and thus the granddaughter of Kamehameha I; her brothers were Kamehameha IV and Kamehameha V.

In addition to Kamāmalu's large award at Nāwiliwili, there were many smaller *kuleana* awards. According to Hammatt and Creed (1993:20):

Within the valley floor and adjacent to the alluvial plain [in Nāwiliwili] ... are 14 LCAs for which there are testimonies available in the Land Commission records. The awards vary in size between one to two ac and are generally around one acre. The majority of land recorded is for *lo'i* (wetland agriculture) but *kula* (dryland plots) are present as are a few houselots.

Fifty-four *lo'i* recorded, awards generally two to three *lo'i* plots; largest award comprised eight *lo'i*; a single award consisted of one *lo'i*. All awards contained *lo'i* and nine of the 15 total awards had *kula* lots. Without exception, the nine awards containing *kula* mention only one *kula* per award. This is of interest because it shows that the alluvial plain was not entirely dedicated to wetland planting and that a small *kula* lot was essential for subsistence agriculture.

Some awards at Nāwiliwili mention houselots along the shoreline.

According to Kikuchi (1973), Nāwiliwili was home to at least five fishponds in addition to Alekoko (*Menehune*) Loko. The names of two of these were unknown, but the others are Kalalalehua (near a *mo'o* of the same name), Lokoponu, and Papalinaloa (near a *mo'o* of the same name). Land Commission documents identify the *konohiki* for Nāwiliwili at the time of the *Māhele* as Daniela Oleloa; in testimony and register documents, claimants and their witnesses trace the right to live and work the lands from the *konohiki*.

No *kuleana* LCAs were awarded within the project area or its vicinity. There were a few scattered houselots sites in the higher portions of the valley floor and along the lower slopes bordering the *lo'i* and *kula*. However, most of the habitation sites appear to be along the

shoreline with a pattern of clustering in villages, a typical settlement pattern for Hawaiian valleys.

3.1.4 Mid- to Late-1800s

Māhele records indicate that taro continued to be cultivated in Nāwiliwili Valley through the middle nineteenth century. However, later in that century, much of the taro lands in Nāwiliwili, as in other wetland regions of the Hawaiian Islands, were converted to rice cultivation. This shift was dictated by changes in the ethnic make-up of the islands' population and economic demands. Little is known of the rice industry in Nāwiliwili.

As a direct result of the availability of large tracts of land for sale during the *Māhele*, in 1849, Lihue Plantation “was established on the site Kaikio‘ewa had chosen, and the cluster of homes and stores around it was the start of the town of Līhu‘e” (Donohugh 2001:94). The plantation began as a partnership between Henry A. Pierce, Judge William Little Lee, chairman of the Land Commission, and Charles Reed Bishop, doing business as Henry A. Pierce and Company (Damon 1931).

The first 3,000 acres were purchased in Nāwiliwili and an additional 300 acres were purchased in Ahukini in 1866. The Lihue Plantation became the most modern plantation at that time in all Hawai‘i. It featured a steam-powered mill built in 1853, the first use of steam power on a Hawaiian sugar plantation, and the ten-mile-long Hanamā‘ulu Ditch built in 1856 by plantation manager William H. Rice. The ditch was the first large-scale irrigation project utilized by the sugar plantations (Moffatt and Fitzpatrick 1995:103). Dorrance and Morgan (2000:28) provide a slightly different list of achievements for Lihue Plantation: “The first irrigation ditch in Hawai‘i was dug in 1857 [at Līhu‘e], and in 1859 the first steam engine in a Hawai‘i mill was installed at Lihue Plantation.”

The residential and administrative heart of Lihue Plantation was located east of the subject project area, now downtown Līhu‘e, Kaua‘i’s political center and most developed area.

The success of the Lihue Plantation allowed it to continue to expand. When the owner of Hanamā‘ulu Ahupua‘a, Victoria Kamāmalu, died in 1870, all 9,177 acres in the *ahupua‘a* were purchased by Paul Isenberg, the manager of Lihue Plantation from 1862-1878 (Damon 1931:742-747). By 1870, the plantation owned 17,000 acres in Hanamā‘ulu. A total of 30,000 leased acres in Wailua were later added in 1878. Lihue Plantation built a second mill in 1877, north and west of the present airport. This mill operated until 1920, when it was converted into housing for laborers.

An 1878 Government Survey map (Figure 10) shows little development within the project area vicinity and that sugar plantations had not expanded to their later extent; Lihue Plantation fields are to the east, and Grove Farm fields are to the southeast. Kaumuali‘i Highway appears to be an unimproved or dirt road.



Figure 10. 1878 Government Survey map by W.D. Alexander, showing location of project area (Alexander 1878)

3.1.5 1900s

Lihue Plantation remained a vibrant and successful commercial operation throughout most of the twentieth century, in part, because of a continued interest in technological innovation. By 1910 little development had occurred within the project area and its vicinity as shown on the 1910 U.S. Geological Survey map (Figure 11). An unpaved road or trail extends more or less southeast to northwest and is adjacent to the western boundary of the project area.

Lihue Plantation's technological innovations include the 1912 installation of two 240-kilowatt generators above the cane fields on the slopes of Kilohana Crater. The plantation became one of the first hydroelectric power producers (along with Kekaha, Kaua'i) in the Hawaiian Islands with the generator installation (Dorrance and Morgan 2000). In 1919 Lihue Plantation began the development of an extensive irrigation water system that eventually "spanned and connected several watersheds from Hanalei to Koloa" (Wilcox 1998:70).

Lihue Plantation Co.'s irrigation ditches rivaled those of the East Kauai Irrigation Company, which was established in 1924. The two entities oversaw 51 miles of ditches. Wilcox (1998:68) relates that "Lihue Plantation had more ditches than ditch records, so only a rough chronology of its water development can be pieced together." The first irrigation ditch, originally constructed in 1856 by William Hyde Rice, eventually "metamorphosed into the Lower Lihue Ditch" (Wilcox 1998:70).

A 1941 map of Lihue Plantation Co. shows the project area primarily within field 39B and extending into 39A (Figure 12). Grove Farm abuts these fields to the southwest. The 1963 U.S. Geological Survey map (Figure 13) shows a portion of the "Upper Lihue Ditch" extending into the project area. The location of the ditch corresponds with the separation between field 39A and 39B (Figure 12). Unfortunately, Wilcox's (1998:764-65) account does not include a construction date for Upper Lihue Ditch. The ditch does not appear to be visible on the 1910 U.S. Geological Survey (Figure 11) but is evident in a map provided in a letter report prepared by David Pratt (Appendix B) and in the Lihue Plantation map from 1941.

3.1.6 Modern Land Use

A 1965 aerial photograph (from Foote et al. 1972) (Figure 14) and a 1977-1978 aerial (Figure 15) both show sugar cane cultivation within the project area and its immediate vicinity prior to the construction of Island School.

Lihue Plantation continued commercial sugar cane cultivation in Līhu'e until 2000, when it finally shut down (Dorrance and Morgan 2000).

Island School's (2009) website details the history of the school. The concept of the school originated in 1975 and was implemented on January 27th, 1977 in Keālia. In 1989 American Factors, Inc., (AMFAC) donated 10 acres in Puhi, in an area described as "behind Kaua'i Community College," for the present location of Island School. Pre-kindergarten through fourth-grade classrooms were constructed in 1990. Two large buildings donated by Hawaiian Dredging were reconfigured into the current Administration Building and Main Hall. Three portable classrooms from Keālia completed the new campus that opened in September 1991. On September 11th, 1992, Hurricane Iniki demolished the three portable buildings, and other buildings lost their roofs or were severely damaged. However, Island School reopened within 11 days of the hurricane. Some classrooms were housed in other facilities until the Fall of 1993,

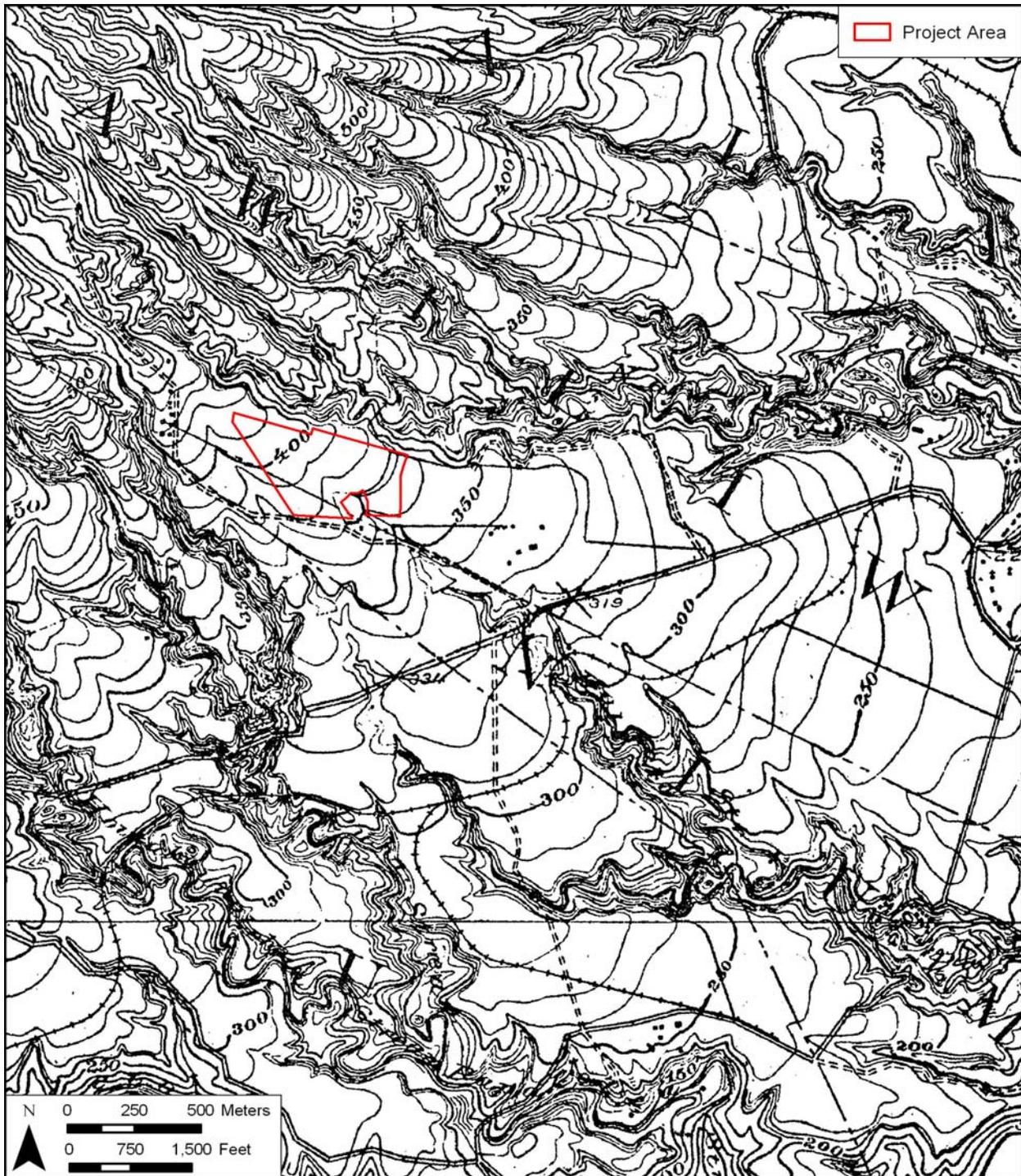


Figure 11. Portion of 1910 U.S. Geological Survey Map, Līhu'e quadrangle, showing the project area

“when all was again in order, with old facilities repaired and new facilities finished” (Island School 2009).

New construction on the campus since the early 1990s includes: the Weinberg Enrichment Center, constructed in 1995-96; Purdy Hall, constructed in 1998; and new soccer fields and a grass track on half of a 20-acre parcel purchased in 2000; Carter Hall modular building in 2001-2002; the Wilcox Gym the Frear Hawaiian Studies Buildings in 2005; and the Palena'ole modular building in 2010-2011 (Island School 2013).

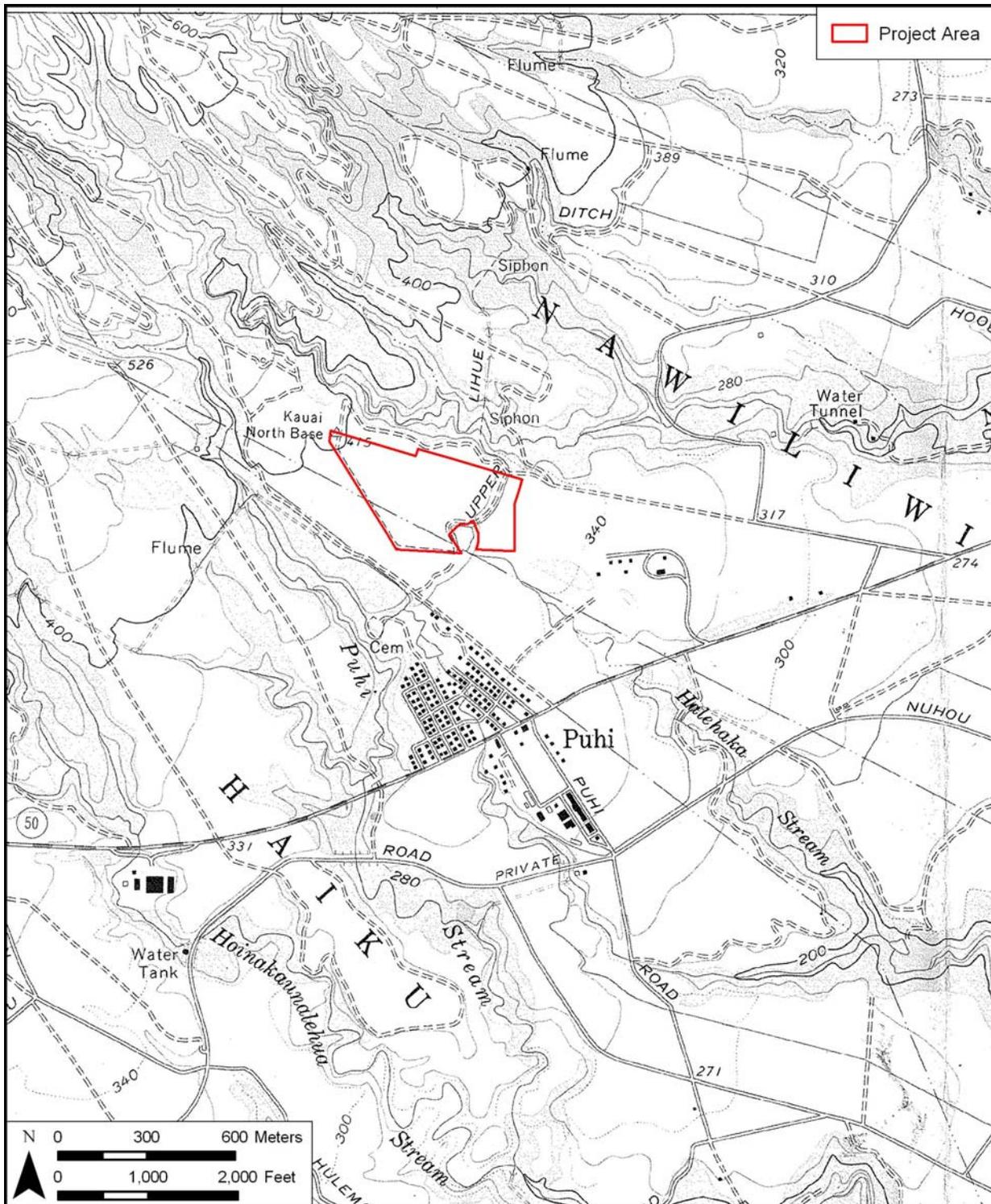


Figure 13. Portion of 1963 U.S. Geological Survey 7.5-Minute Series Topographic Map, Lihue quadrangle, showing the project area. Note that Upper Lihue Ditch extends northeast/southwest through the project area



Figure 15. 1977-1978 U.S. Geological Survey aerial of Līhu'e showing the project area and its vicinity

Section 4 Previous Archaeological Research

4.1 Early Archaeological Studies

An overview of archaeological studies conducted in the vicinity of the current project area is summarized in Table 1 and shown on Figure 16 except for island-wide or archipelago-wide studies. A discussion of the archaeological findings that are relevant to the current project area follows.

Table 1. Previous Archaeological Studies Conducted within the Vicinity of the Project Area

Study	Location	Type	Findings
Bennett 1931	Island Wide Survey	Recordation of Major pre-Contact Sites	The study identified one site in the area (Bennett Site 98).
Palama 1973	Kaua'i Community College area	Reconnaissance Survey	The study noted portions of <i>'auwai</i> , possible <i>lo'i</i> , and an historic military complex. No SIHP #s were assigned.
Neller and Palama 1973	Lower portion of the Hulē'ia River	Reconnaissance Survey	Thirty-one sites were identified including one historic human burial (reported as "Feature(s)" 98, 3000-3013, and 3022-3034).
Ching et al. 1973	Kanoa Estate Lands	Archaeological Surface Survey of Puna, Niumalu Ahupua'a	Nine archaeological "features" and "feature complexes" were identified and documented, including three fishpond features (<i>loko kuapā</i> and two <i>loko wai</i>) (Features 98, 3027, and 3028), two <i>'auwai</i> (Features 3029 and 3030), and four <i>lo'i</i> complexes (Features 3031-3034). No SIHP #s are cited.
Kido 1986	Alekoko Fishpond and Hulē'ia Estuary	Preliminary Survey	A mangrove encroachment on pond wall, breaks in wall and rubbish used to fortify wall were observed; a more comprehensive survey was recommended. No SIHP #s were assigned.
Walker and Rosendahl 1988	Grove Farm Lihue/Puhi Project	Surface and Subsurface Survey	The study identified two historic properties, a Japanese cemetery (SIHP # -503) and a historic residence (SIHP # -9390).
Rosendahl 1989	Additional Areas of the Grove Farm Līhu'e/Puhi Project	Archaeological Inventory Survey	No cultural material was observed.
McMahon 1990	Līhu'e	Archaeological Fieldcheck	Three previously-identified historic residential sites (SIHP #s 50-30-9390, -9401, -9402) were observed.

Study	Location	Type	Findings
Walker et al. 1991	Līhu'e District	Archaeological Inventory Survey	The study identified ten historic properties; three pre-Contact, seven historic including a concrete bridge (SIHP # -1846), railroad bridge (SIHP # -1845), cultural deposits (SIHP # -1838 A and B), terraces and walls (SIHP # -1839 A and B), roads (SIHP # -1841), a possible agricultural area (SIHP # -1843), and a historic cemetery (SIHP # 1844).
Henry et al. 1993	590-ac Grove Farm Līhu'e/Puhi Project Site	Archaeological Inventory Survey w/ Subsurface Testing	Two historic properties were identified including a cemetery (Site 503) and residence (Site 9390) (revised report same as Walker and Rosendahl 1988).
O'Hare et al. 1993	100-ac Puakea Golf and Country Club	Archaeological Inventory Survey w/ Subsurface Testing	No cultural material was observed.
Hammatt and Chiogioji 1998	11.5 km portion of Kaumuali'i Highway corridor	Archaeological Inventory Survey	Four historic properties were identified: Grove Farm office building in Puhi, the Līhu'e Mill Bridge, the Ho'omana Overpass Bridge, and the Līhu'e Public Cemetery. No SIHP #s were assigned..
Hammatt and Shideler 2004	One-Stop Center at Kaua'i Community College	Archaeological and Cultural Impact Evaluation Study	No cultural material was observed and no cultural impacts anticipated.
Groza and Hammatt 2010	Kaua'i Community College Rezone Campus	Literature Review and Field Investigation	Ten historic surface features, including two previously identified historic features (CSH 9, CSH 10), were found during the field inspection. The Puhi Camp Cemetery (SIHP # 50-30-11-B006 / CSH 10) is outside of but surrounded by the project area. The nine features found within the project area consist of five irrigation ditches (CSH 1, CSH 2, CSH 4, CSH 6, CSH 9), one of which (CSH 1) is abandoned; three reservoirs (CSH 3, CSH 5, CSH 7), one of which (CSH 3) is abandoned; and an abandoned wooden flume (CSH 8). No SIHP #s were assigned other than the cemetery citation.
Groza and Hammatt 2013	Island School, Puhi, Kaua'i	Literature Review and Field Investigation	Four historic properties were identified during surface survey, SIHP # 50-30-11-2179, Features A through D, and plantation era agriculture infrastructure.

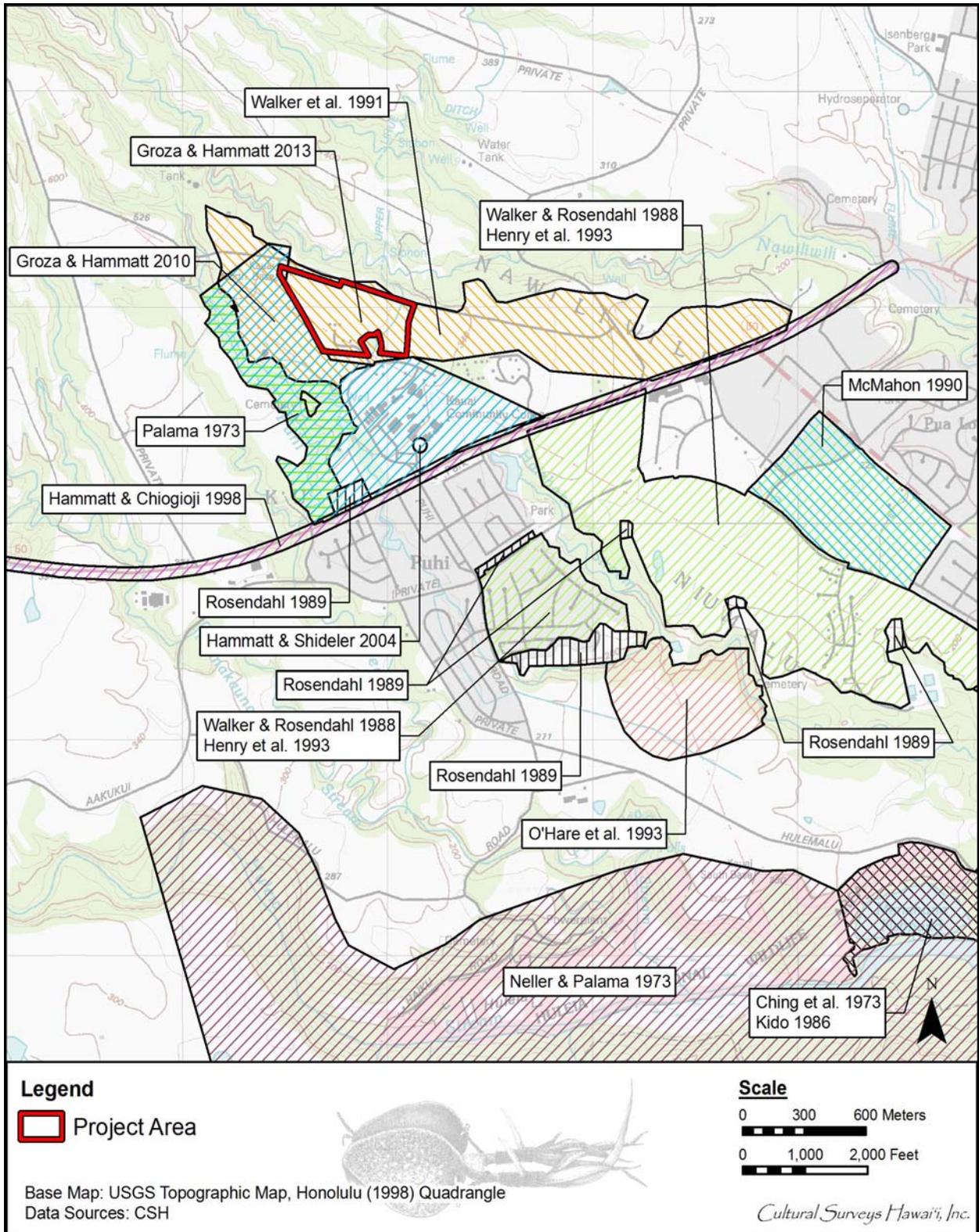


Figure 16. Portion of 1996 U.S. Geological Survey 7.5-Minute Series Topographic Map, Lihū'e quadrangle showing previous archaeological studies in the vicinity of the project area

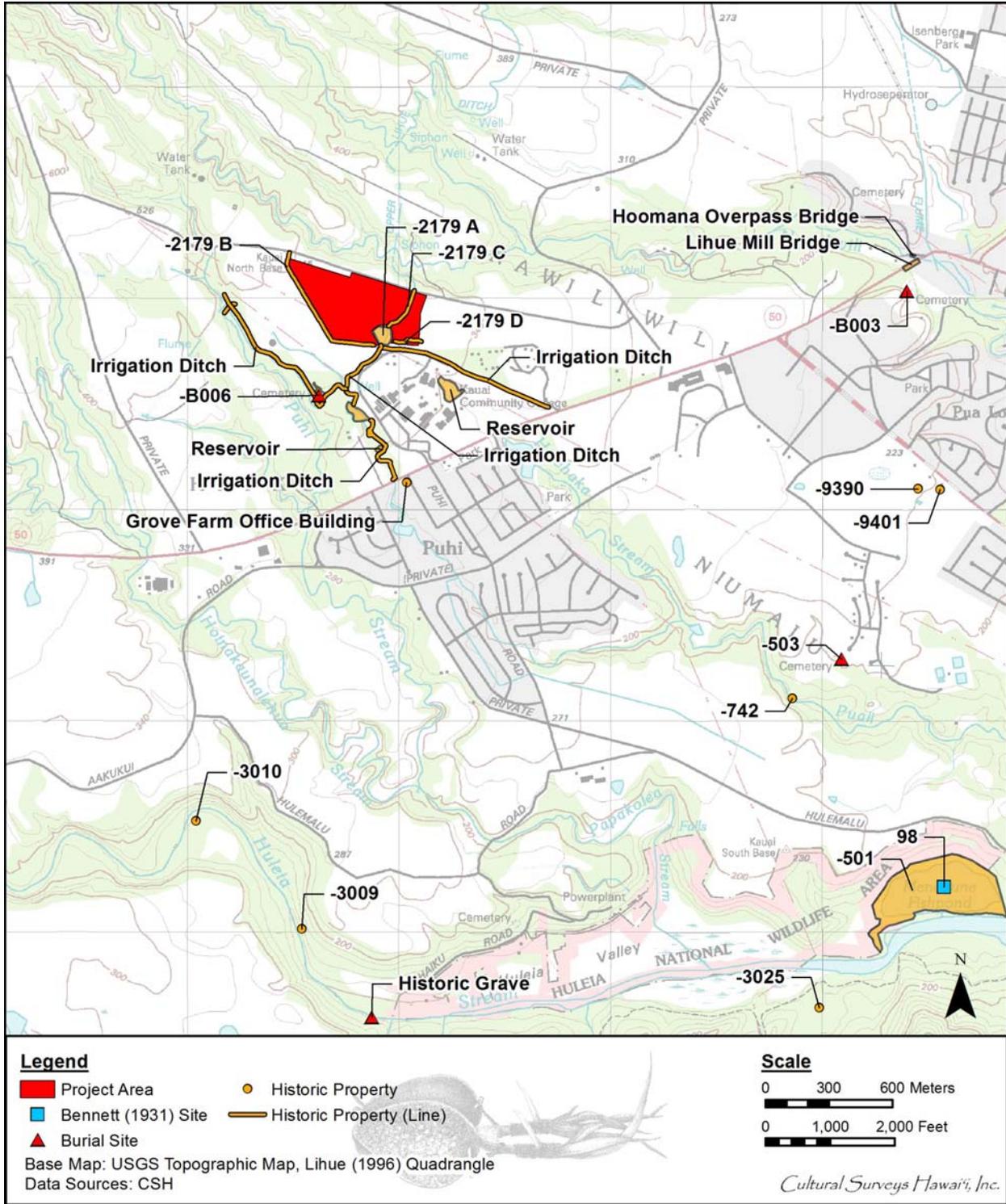


Figure 17. Previously identified SIHP #s in the vicinity of the project area

4.1.1 Bennett 1931

The first attempt at a comprehensive archaeological survey of Kaua'i was undertaken by Wendell Bennett (1931) of the Bishop Museum. Bennett's survey report identifies no archaeological sites within or in the vicinity of the present project area. The "Niumalu" or "*Menehune*" Fishpond (Bennett Site 98), approximately 3 km to the southwest is the closest.

4.1.2 Neller and Palama 1973

Neller and Palama (1973) carried out an archaeological reconnaissance of the lower portion of the Hulē'ia River and vicinity recording a number of historic properties. The archaeological richness of that area from the "*Menehune* Fishpond" downstream and near the crest of the trail to Kīpū Kai is clear. They did, however, also document four historic properties upstream of the *Menehune* Fishpond, the nearest of which (SIHP # -3010) consists of contiguous rock wall enclosures and several other features. This historic property is described as:

...a compound, probably belonging to a chief or other important person. Nearby there are stone-faced river terraces, irrigation ditch (*auwai*), and a stone bridge crossing the *auwai*. The area is worth restoring to its prehistoric condition. It is an impressive site. (Neller and Palama 1973:3)

SIHP # -3009, also identified by Neller and Palama, is approximately 2.4 km from the current project area, and consists of an "agricultural area along both sides of the river, including rock-walled terraces and irrigation ditches ('*auwai*). Also includes cement covered grave of G. Kalili, died Dec. 17, 1898" (Neller and Palama 1973:11).

4.1.3 Ching et al. 1973

Ching et al. (1973) conducted detailed research on Alekoko (*Menehune*) Fishpond and its vicinity. Nine archaeological features and feature complexes were identified and documented, including three fishpond features (*loko kuapā* and two *loko wai*), two '*auwai*, and four *lo'i* complexes. Although located well to the south of the present study area, the Alekoko (*Menehune*) Fishpond is an important historical property of the general vicinity and a testament to the organization and initiative of the Native Hawaiian population of the area.

4.1.4 Kido 1986

Michael Kido (1986) conducted a preliminary survey of Alekoko (*Menehune*) Fishpond and the Hulē'ia Estuary. The most prominent feature of the estuary and the pond was the mangrove. It was revealed that an extensive encroachment of mangrove into the estuary and on the pond wall existed. Small breaks in the wall along with cement bags, iron scrap, and other rubble were observed. Apparently this material was used to repair to damage to the wall. It was recommended that a comprehensive survey was needed before any activity that would impact the Alekoko Fishpond or the Hulē'ia Estuary.

4.1.5 Walker and Rosendahl 1988

Walker and Rosendahl (1988) conducted an archaeological surface and subsurface inventory survey of the 450-ac Grove Farm Līhu'e/Puhi area from Puhi Town, south of Kaumuali'i Highway nearly to Nāwiliwili Bay. A total of two historic properties were identified, a historic

Japanese cemetery (SIHP # -503), and a historic residence (SIHP # -9390). The following year, Paul Rosendahl (1989) produced an addendum report covering eight additional separate small adjacent areas. No historic properties or cultural material were identified. Henry et al. (1993) covered the same project area and his project represents the final archaeological inventory survey for this area.

4.1.6 O'Hare et al. 1993

O'Hare et al. (1993) carried out an archaeological inventory survey on a 100-ac Puakea Golf and Country Club project area located approximately one km southeast of Puhi Town. No historic properties or cultural materials were identified.

4.1.7 Hammatt and Chiogioji 1998

CSH (Hammatt and Chiogioji 1998) conducted an archaeological assessment of an approximately 11.5-kilometer long portion of the Kaumuali'i Highway corridor, a portion of which is 500 m south of the project area. During the reconnaissance survey no historic properties were found in the vicinity of the school campus. No surface traditional Hawaiian archaeological sites were observed during the entire survey although four historic sites (two bridges, a cemetery and an office building) were noted. No state site numbers were assigned.

4.2 Studies within or adjacent to the project area

4.2.1 Palama 1973

In 1973, the Archaeological Research Center Hawaii conducted an archaeological reconnaissance of approximately 57 ac of Kaua'i Community College (KCC) that also included the southwestern portion of the current project area (Palama 1973). Portions of an "old 'auwai" (conforming to Grove Farm's Mauka Ditch), an old military complex, a Japanese Cemetery, plantation camp remains, and possible *lo'i* were found but nothing was deemed to warrant further investigation (Palama 1973). Palama (1973:2) "recommended that no further work is warranted" for the historic features he identified and no state site numbers were assigned. The "old 'auwai" (plantation ditch) is approximately 100 m west of the northern portion of the project area.

4.2.2 McMahan 1990

SHPD staff, Nancy McMahan, conducted a pedestrian field inspection of three parcels in Līhu'e Judiciary District. The only sites identified were two historic residences (SIHP # -9390 and -9401), which were originally described by Rosendahl (1989).

4.2.3 Walker et al. 1991

The entire proposed project area was included in the 1,550-ac Lihue/Puhi/Hanamaulu Master Plan AIS (Walker et al. 1991). Designated as Section No. 1, it is described as:

...bounded on the north and east by the Nāwiliwili Stream gulch, on the south by Kauai Community College and Kaumuali'i Highway, and on the west by the Puhi Stream gulch. This entire parcel has been modified and is presently in sugar cane (*Saccharum officinarum* L. hybrid) cultivation. (Walker et al. 1991:2)

According to Walker et al. (1991:7) only areas in sugar cane were sampled ... [and] were not generally surveyed because areas altered by sugar cane cultivation are unlikely to contain archaeological features, and because sugar cane cultivation within the present project area does not occur in low swale or alluvial flat areas that may contain buried cultural deposits.

While Section No. 1 is listed as an area subjected to “inventory-level survey” in the Conclusion Section of the report, this statement is further explained that “only very limited surface survey was done in sugar cane fields [and] no subsurface testing was performed in sugar cane fields” (Walker et al. 1991:18). No historic properties were identified in or within the vicinity of the current project area during the Walker et al. (1991) inventory survey. Additionally, none of the ten historic properties (SIHP #s -1838 through -1847) identified during the Walker et al. (1991) study (including a concrete bridge, concrete wharf, cultural deposits, terraces, roads, walls, retaining walls, a possible agricultural area, and a historic cemetery), was identified in or within close proximity to the project area. The plantation infrastructure documented in the present study was not recorded in the Walker et al. (1991) study.

4.2.4 Hammatt and Shideler 2004

In 2004, CSH (Hammatt and Shideler 2004) conducted an archaeological and cultural impact evaluation study for the One-Stop Center at KCC approximately 600 m south of the project area. The proposed project involved construction of a two-story building of approximately 35-40,000 net square feet (about 55-60,000 gross square feet) in the southwest (Kaumuali'i Highway) side of the existing KCC campus. A field inspection of the vicinity of the proposed project was conducted and observed to be a graded, established lawn with no observed indicators of any archaeological concern. As the project area was under sugar cane cultivation for many decades and the location of the project area was observed to be graded with an established lawn, it was concluded that there were unlikely to be any cultural impact issues associated with the “one-stop” project.

A summary of the proposed project and findings was mailed to Dr. Pua Aiu (then) of the Office of Hawaiian Affairs and to Mr. Dennis Chun of the Hawaiian Studies program of Kaua'i Community College on December 23, 2003. Follow-up telephone consultation was held with Mr. Chun of February 19, 2004, and with Dr. Aiu on February 24, 2004. A brief telephone conversation on the subject was also held with Ms. LaFrance Kapaka-Arboleda of the Kaua'i Office of Hawaiian Affairs and the Kaua'i/Ni'ihau Islands Burial Council on February 20, 2004. None of these parties expressed any concerns for adverse impacts to cultural practices by the proposed project as described. SHPD concluded “No further archaeological work is needed for the project” (see Appendix A).

4.2.5 Groza and Hammatt 2010

In 2010, CSH conducted a Literature Review and Field Inspection (Groza and Hammatt 2010) for the KCC Rezone Campus project and campus expansion that would include the construction of new buildings, additions to buildings, and new parking lots within its existing 198.8-ac campus. A total of ten historic surface features, including two previously-identified historic features (CSH 9, CSH 10), were found during the field inspection. CSH 9, an “old *'auwai*” that conforms to a portion of Grove Farm's “Mauka Ditch” was previously found during an archaeological reconnaissance (Palama 1973) of the western portion of the (Groza and

Hammatt 2010) project area. Palama (1973) also recorded the location of a cemetery that was identified during the (Groza and Hammatt 2010) field inspection as CSH 10 (Puhi Camp Cemetery, SIHP # 50-30-11-B006).

The nine features found within the project area appeared to be related to Grove Farm and date to the plantation era. The historic surface features consist of five irrigation ditches (CSH 1, CSH 2, CSH 4, CSH 6, CSH 9), one of which (CSH 1) is abandoned; three reservoirs (CSH 3, CSH 5, CSH 7), one of which (CSH 3) is abandoned; and an abandoned wooden flume (CSH 8).

Palama's (1973) archaeological reconnaissance also identified former plantation camp remains associated with Puhi Camp, Puhi Camp, and an area containing possible *lo'i*. These features were not visible during this field inspection.

Based on the findings during the field inspection CSH recommended an AIS. This AIS has not been undertaken to our knowledge.

4.2.6 Groza and Hammatt 2013

During pedestrian inspection, several surface features were observed that are related to the Lihue Plantation. The surface features consist of a reservoir that is adjacent to and surrounded by the project area, and three irrigation ditches. All three of the irrigation ditches are associated with the adjacent reservoir. The four historic surface features related to the Lihue Plantation are designated as SIHP # 50-30-11-2179 Features A through D.

Section 5 Results of Fieldwork

5.1 Pedestrian Inspection Field Results

On Wednesday, April 3, 2013, CSH archaeologists Gerald K. Ida, B.A., Frederick LaChance, B.A. and Nifae Hunkin, B.A. completed a 100% surface survey for the current AIS investigation, under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator).

SIHP # 50-30-11-2179, Features A through D, was identified as part of a Literature Review and Field Inspection (Groza and Hammatt 2013), which was reviewed and accepted by SHPD on February 11, 2013 (Log No. 2013.0401, Doc. No. 1302SL09, Appendix A.3). A majority of the project area had been graded and modified since the early 1990s. In general, the areas of interest for the surface survey component of the current AIS were those less impacted by prior development, with primary focus on a heavily wooded area at the project area's eastern side, and the area to the north that was overgrown with tall grass (Figure 18 and Figure 19). No new historic property was added to the inventory of historic properties as a result of the current pedestrian inspection.

5.2 Subsurface Testing

Twenty-five test excavation trenches (TE) were completed for the subsurface testing component of this AIS investigation (Figure 20). Fourteen TE (TE-1 through TE-10, and TE-13 through TE-16) were short, approximately 2-m long and 70-cm wide. The fourteen shorter TE were spaced along the relatively undisturbed northeast edge of the project area adjacent to a tributary of Nāwiliwili Stream to the northeast where it was thought that the prospect of subsurface cultural resources was greater because of both the proximity to the stream and the relative absence of prior land disturbance in this area. Eleven longer, linear TE (TE-11, TE-12, and TE-17 through TE-25), each 6-m long and 70-cm wide, were placed to assess the potential for subsurface historic properties in areas where construction is planned for the proposed project (Figure 21).

The stratigraphy in each trench was drawn and photographed. The sediments were described using standard USDA soil description observations and terminology. Sediment descriptions include Munsell color, texture, consistency, structure, plasticity, cementation, origin of sediments, any inclusions such as cultural material and/or roots and rootlets, lower boundary distinctiveness and topography, and other general observations.

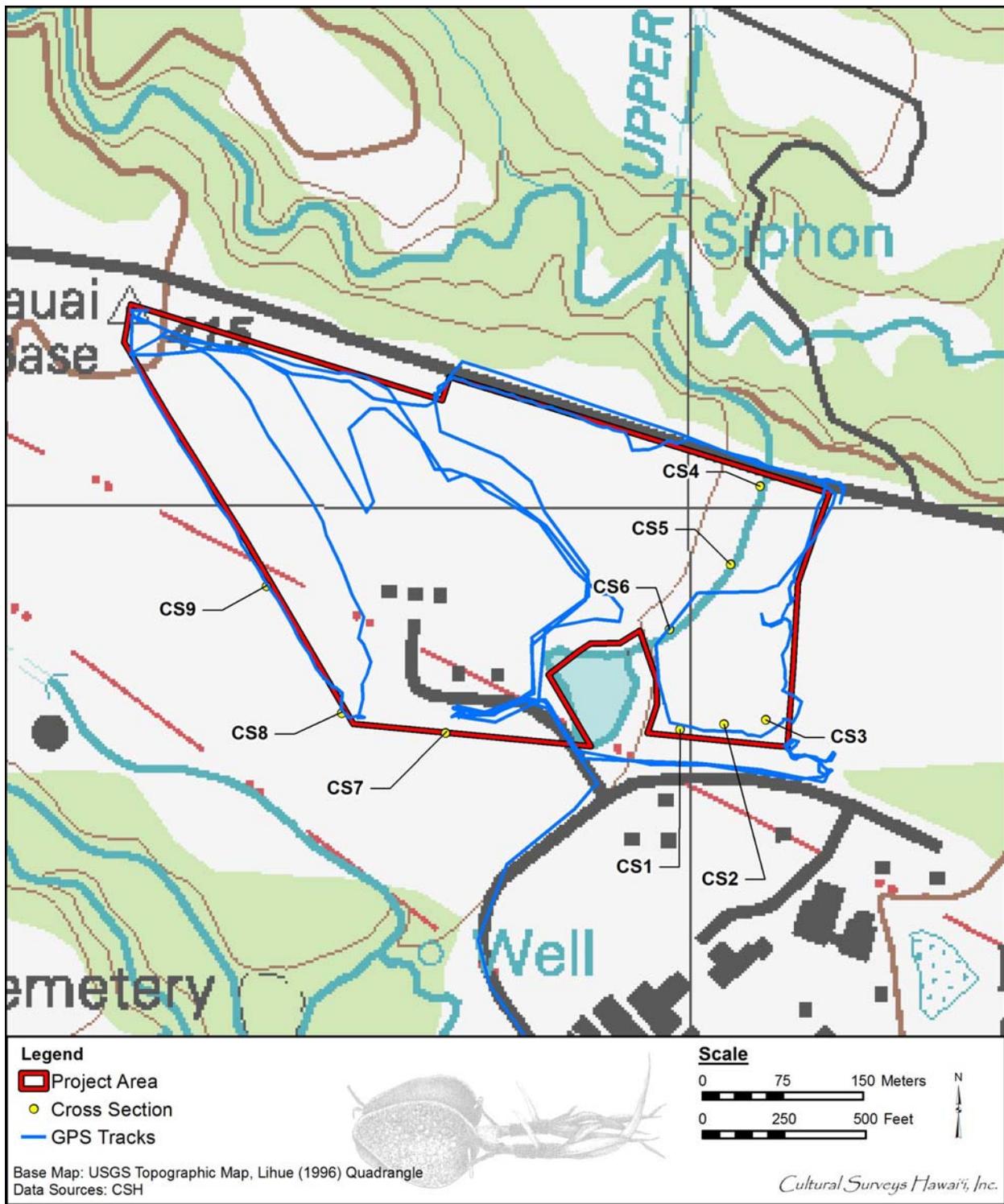


Figure 18. Portion of 1996 U.S. Geological Survey 7.5-Minute Series Topographic Map, Lihue quadrangle, showing the project area, pedestrian inspection transects, and cross section locations (CS1 through CS9)

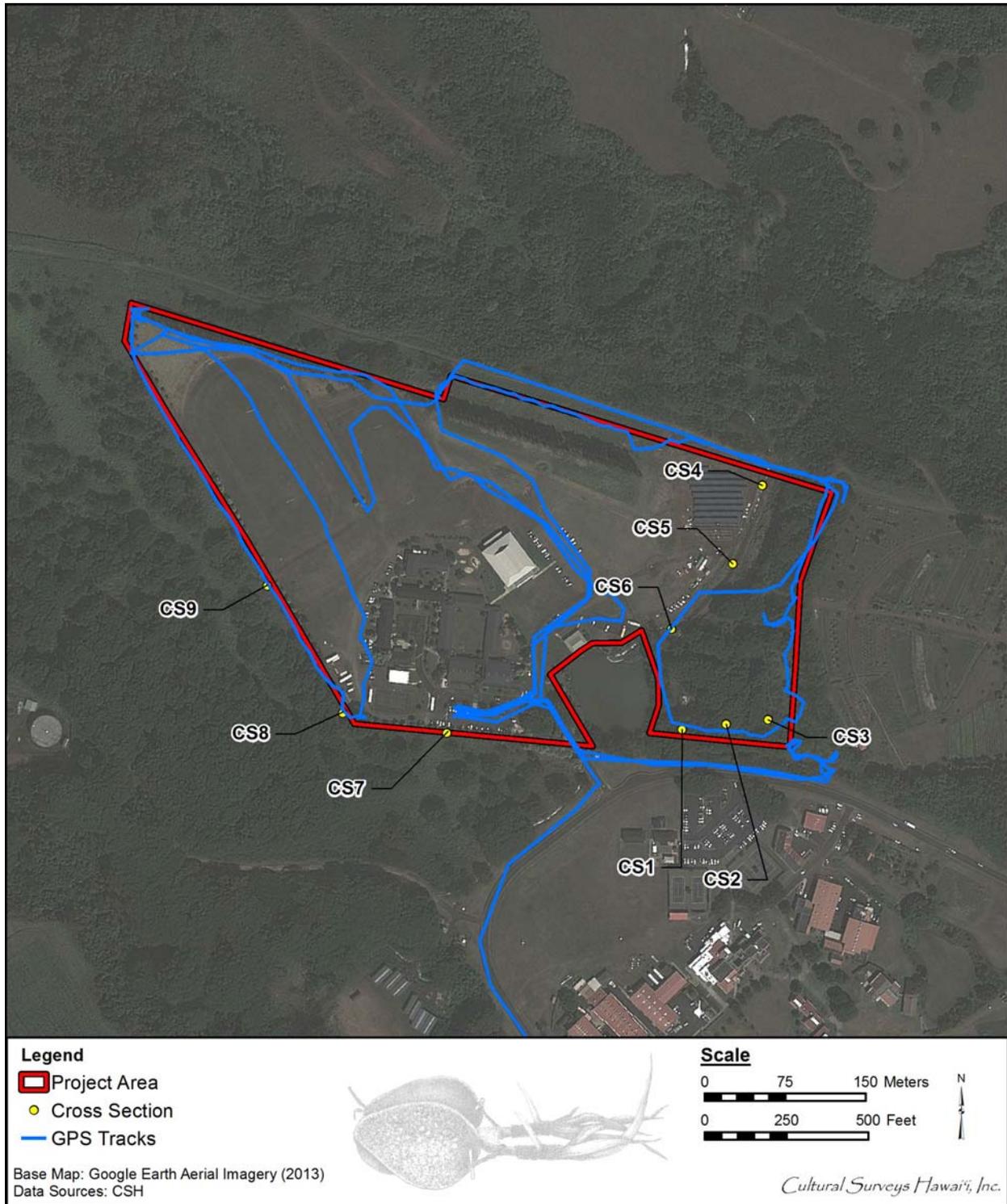


Figure 19. 2013 Google Earth Aerial Imagery aerial photograph showing the project area, pedestrian inspection transects (not all are shown) and cross section locations (CS1 through CS9)

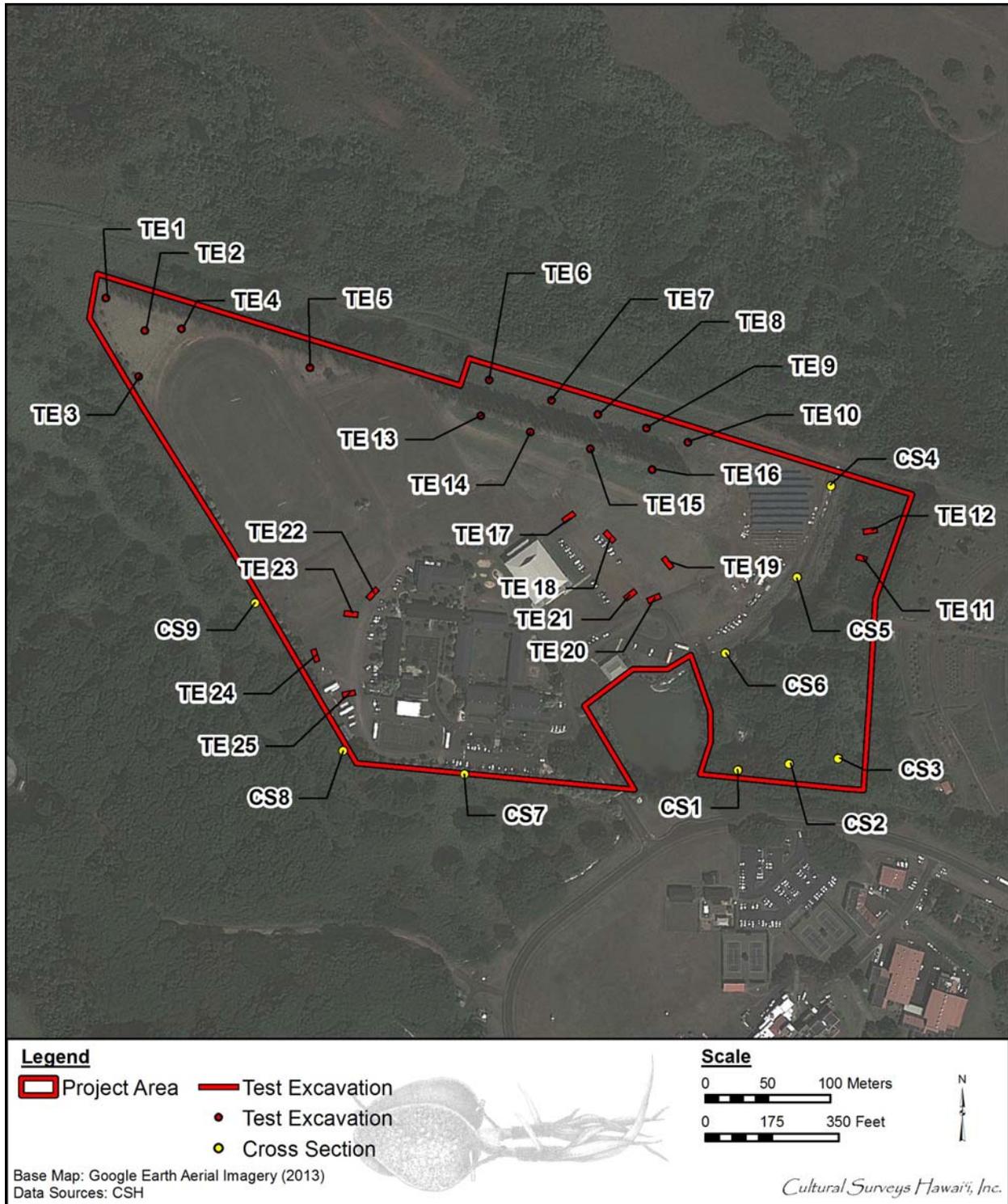


Figure 20. 2013 Google Earth Aerial Imagery aerial photograph showing project area boundary, test excavation (TE) locations and cross section (CS) locations

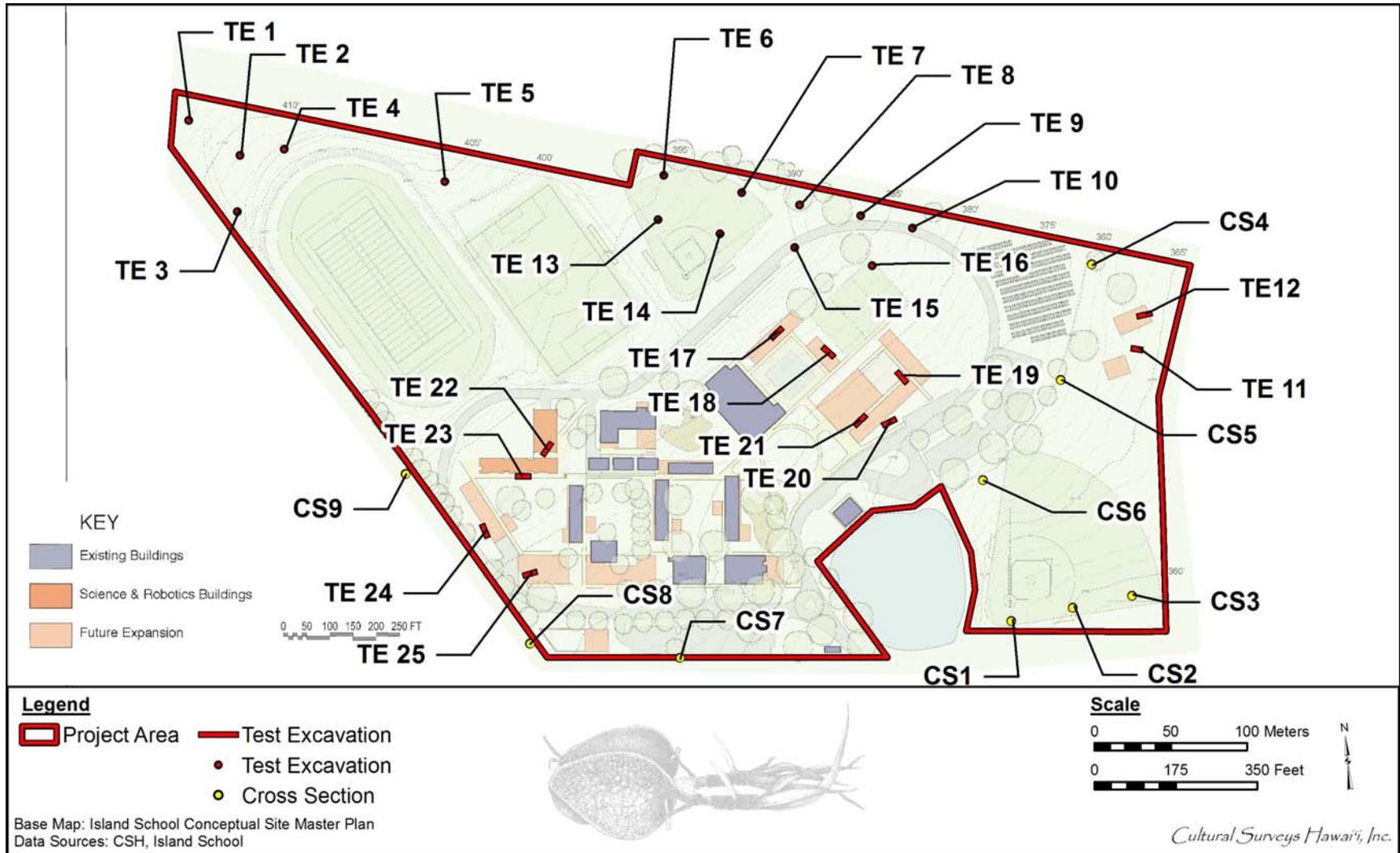


Figure 21. Island School Site Master Plan showing test excavation (TE) locations in relation to proposed development

5.2.1 Test Excavation 1 (TE-1)

TE-1 was located at the northwestern corner of the project area (see Figure 20 and Figure 21). The excavation site was selected to document general stratigraphy near a tributary of Nāwiliwili Stream in the northwestern portion of the project area. The dimensions of TE-1 were 1.9-m long, 0.7-m wide and 0.9-m deep. Stratigraphy at this location included a top layer of grass superposing successive layers of disturbed and undisturbed naturally-deposited clay sediments (Table 2, Figure 22 and Figure 23). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-1 was level, and its approximate elevation was 122 m above mean sea level (AMSL). No cultural material was observed during test excavation at this location.

Table 2. TE-1 Stratigraphy

Stratum	Depth (centimeters below surface [cmbs])	Description
I	0 – 20	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ia	20 – 75	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
Iib	75 – 90	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

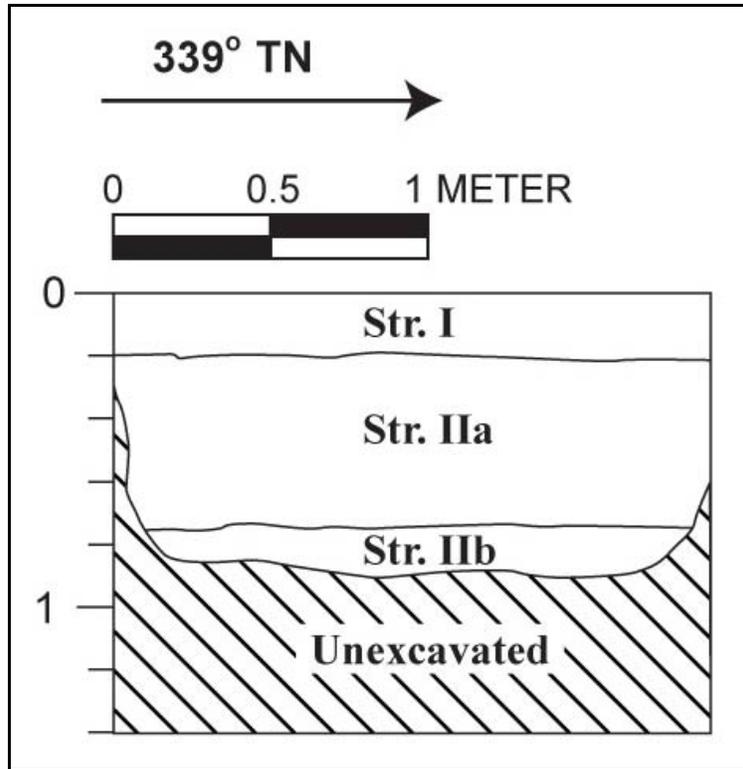


Figure 22. TE-1, view to west



Figure 23. TE-1, view to west

5.2.2 Test Excavation 2 (TE-2)

TE-2 was located at the northwestern corner of the project area (see Figure 20). The excavation site was selected to document stratigraphy near a tributary of Nāwiliwili Stream in the northwestern portion of the project area. The dimensions of TE-2 were 2.0-m long, 0.7-m wide and 0.9-m deep. Stratigraphy included a top layer of grass superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 3, Figure 24 and Figure 25). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-2 was level, and its approximate elevation was 122 m AMSL. No cultural material was observed during test excavation at this location.

Table 3. TE-2 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 20	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ia	20 – 80	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
Ib	80 – 90	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

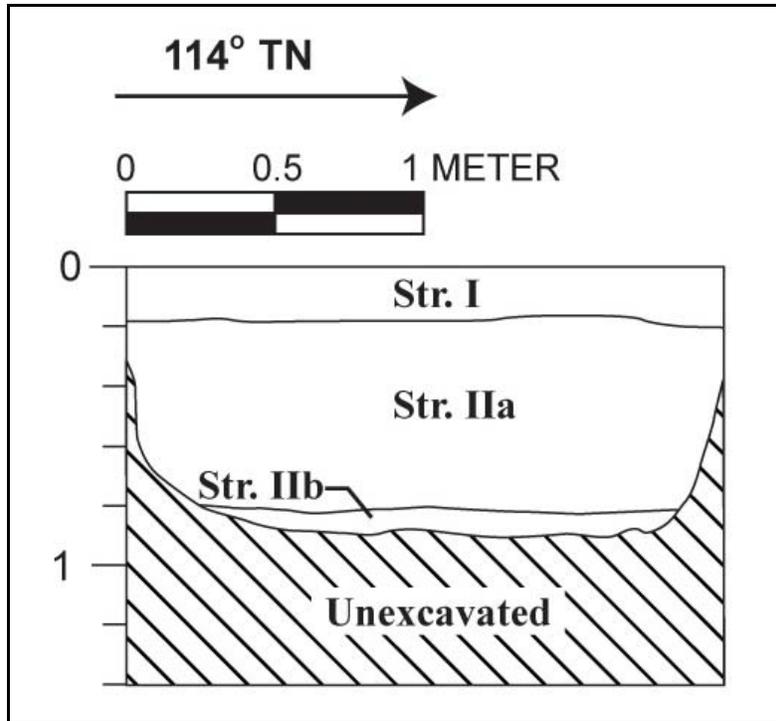


Figure 24. TE-2, view to north



Figure 25. TE-2, view to north

5.2.3 Test Excavation 3 (TE-3)

TE-3 was located at the northwestern corner of the project area (see Figure 20 and Figure 21). The excavation site was selected to document stratigraphy near a tributary of Nāwiliwili Stream in the northwestern portion of the project area. The dimensions of TE-3 were 2.0-m long, 0.7-m wide and 1.4-m deep. Stratigraphy included a top layer of grass superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 4, Figure 26, and Figure 27). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-3 was level, and its approximate elevation was 122 m AMSL. No cultural material was observed during test excavation at this location.

Table 4. TE-3, Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 30	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
IIa	25 – 120	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
IIb	120 – 140	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

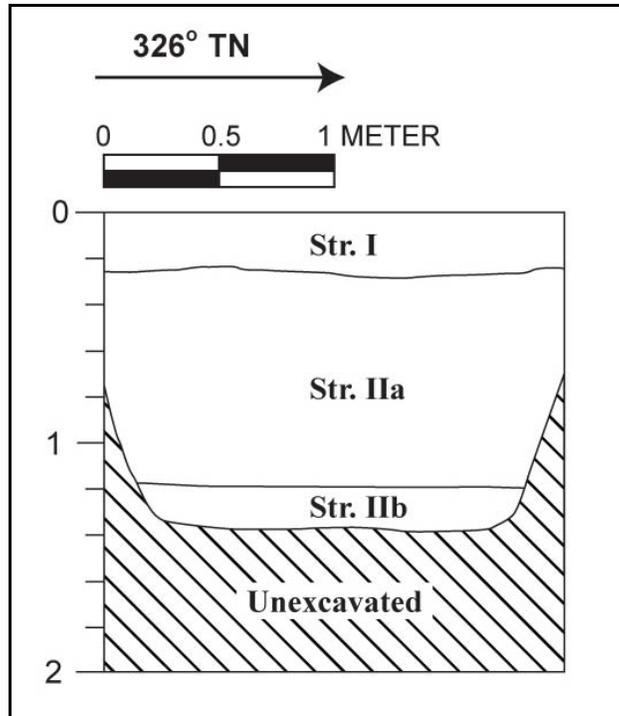


Figure 26. TE-3, view to southwest



Figure 27. TE-3, view to southwest

5.2.4 Test Excavation 4 (TE-4)

TE-4 was located at the northwestern corner of the project area (see Figure 20 and Figure 21). The excavation site was selected to document stratigraphy near a tributary of Nāwiliwili Stream in the northwestern portion of the project area. The dimensions of TE-4 were 2.0-m long, 0.7-m wide and 1.3-m deep. Stratigraphy included a top layer of grass superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 5, Figure 28, and Figure 29). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-4 was level, and its approximate elevation was 122 m AMSL. No cultural material was observed during test excavation at this location.

Table 5. TE-4 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 30	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
IIa	30 – 120	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
IIb	127 – 130	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

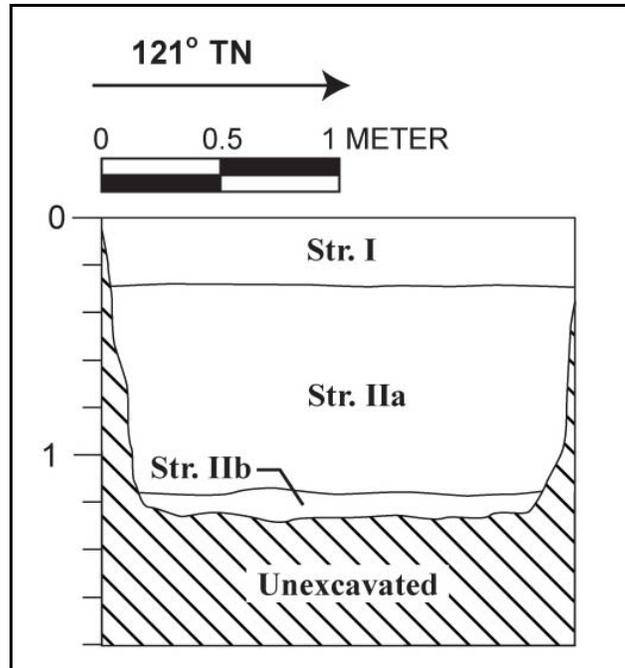


Figure 28. TE-4, view to northeast



Figure 29. TE-4, view to north

5.2.5 Test Excavation 5 (TE-5)

TE-5 was located at the north-northwestern side of the project area (see Figure 20 and Figure 21). The excavation site was selected to document stratigraphy near a tributary of Nāwiliwili Stream in the northwestern portion of the project area. The dimensions of TE-5 were 2.00-m long, 0.70-m wide and 1.32-m deep. Stratigraphy included a top layer of grass superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 6, Figure 30, and Figure 31). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-5 was level, and its approximate elevation was 121 m AMSL. No cultural material was observed during test excavation at this location.

Table 6. TE-5 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 22	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ila	20 – 121	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
Ilb	120 – 132	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

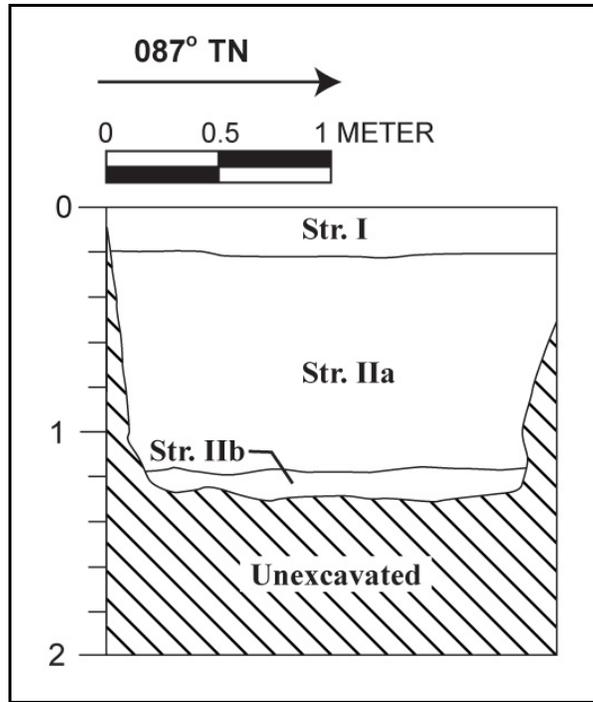


Figure 30. TE-5, view to north



Figure 31. TE-5, view to north

5.2.6 Test Excavation 6 (TE-6)

TE-6 was located at the north-central side of the project area (see Figure 20 and Figure 21). The excavation site was selected to document stratigraphy near a tributary of Nāwiliwili Stream in the northern portion of the project area. The dimensions of TE-6 were 2.0-m long, 0.7-m wide and 1.4-m deep. Stratigraphy location included a top layer of tall grass (approximately 1.5 to 2.0 m) and associated root action superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 7, Figure 32, and Figure 33). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-6 was level, and its approximate elevation was 114 m AMSL. No cultural material was observed during test excavation at this location.

Table 7. TE-6 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 45	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ila	40 – 80	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
Ilb	80 – 140	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

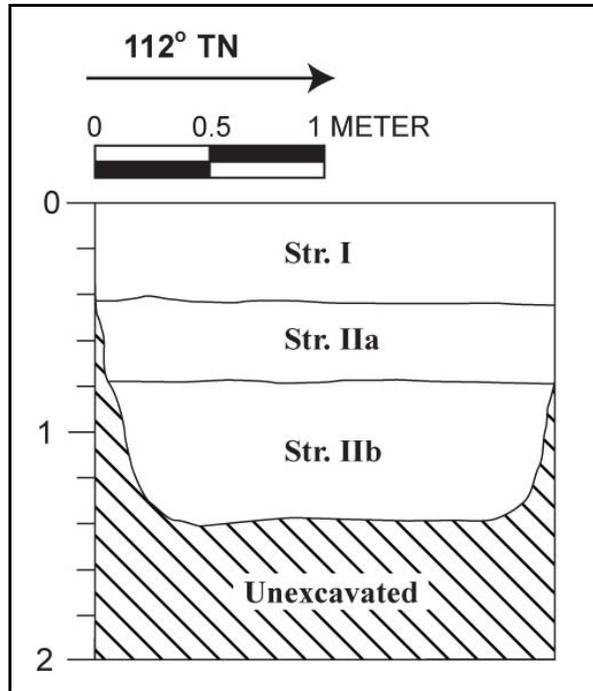


Figure 32. TE-6, view to north



Figure 33. TE-6, view to north

5.2.7 Test Excavation 7 (TE-7)

TE-7 was located at the north-central side of the project area (see Figure 20 and Figure 21). The excavation site was selected to document stratigraphy near a tributary of Nāwiliwili Stream in the northern portion of the project area. The dimensions of TE-7 were 2.0-m long, 0.7-m wide and 1.4-m deep. Stratigraphy included a top layer of tall grass (approximately 1.5 to 2.0 m) and associated root action superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 8, Figure 34, and Figure 35). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-7 was level, and its approximate elevation was 114 m AMSL. No cultural material was observed during test excavation at this location.

Table 8. TE-7 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 30	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ila	28 – 70	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
Ilb	65 – 140	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

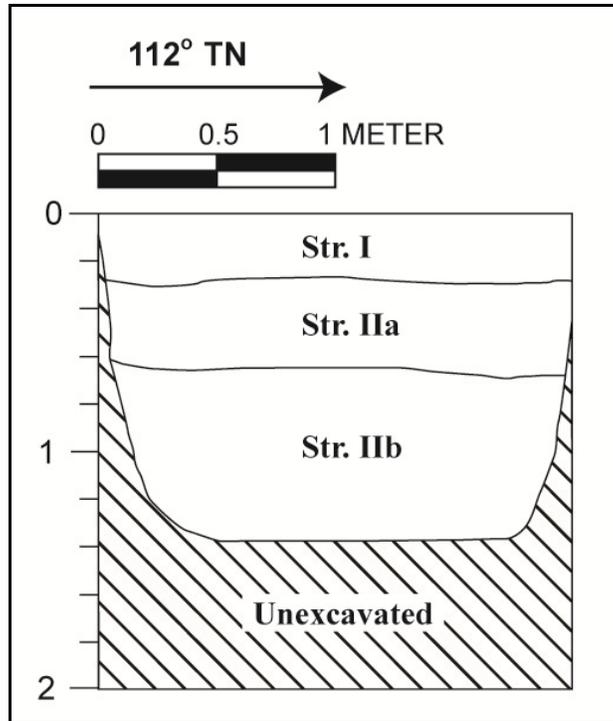


Figure 34. TE-7, view to north



Figure 35. TE-7, view to northeast

5.2.8 Test Excavation 8 (TE-8)

TE-8 was located at the north-central side of the project area (see Figure 20 and Figure 21). The excavation site was selected to document stratigraphy near a tributary of Nāwiliwili Stream in the northern portion of the project area. The dimensions of TE-8 were 2.0-m long, 0.7-m wide and 1.5-m deep. Stratigraphy at this location included a top layer of tall grass (approximately 1.5 to 2.0 m) and associated root action superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 9, Figure 36, and Figure 37). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-8 was level, and its approximate elevation was 112 m AMSL. No cultural material was observed during test excavation at this location.

Table 9. TE-8 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 33	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ila	28 – 68	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
Ilb	62 – 150	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

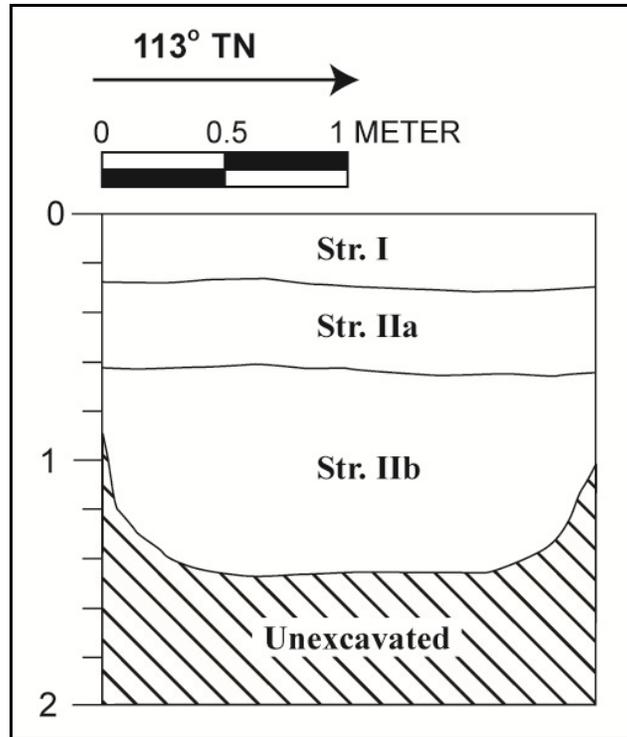


Figure 36. TE-8, view to north



Figure 37. TE-8, view to northeast

5.2.9 Test Excavation 9 (TE-9)

TE-9 was located at the north-central side of the project area (see Figure 20 and Figure 21). The excavation site was selected to document stratigraphy near a tributary of Nāwiliwili Stream in the northern portion of the project area. The dimensions of TE-9 were 2.00-m long, 0.7-m wide and 1.42-m deep. Stratigraphy included a top layer of tall grass (approximately 1.5 to 2.0 m) and associated root action superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 10, Figure 38, and Figure 39). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-9 was level, and its approximate elevation was 111 m AMSL. No cultural material was observed during test excavation at this location.

Table 10. TE-9 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 30	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ila	30 – 70	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
Ilb	67 – 142	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

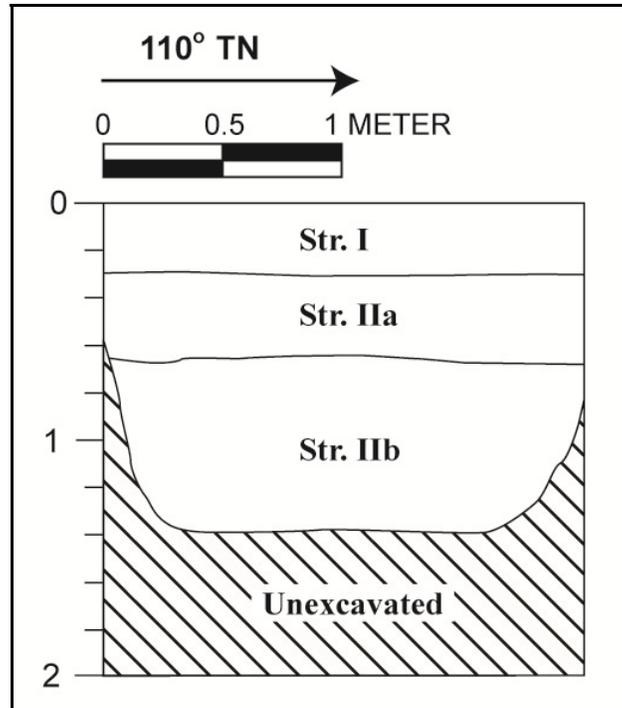


Figure 38. TE-9, view to north



Figure 39. TE-9, view to north

5.2.10 Test Excavation 10 (TE-10)

TE-10 was located at the north-central side of the project area (see Figure 20 and Figure 21). The excavation site was selected to document stratigraphy near a tributary of Nāwiliwili Stream in the northern portion of the project area. The dimensions of TE-10 were 2.00-m long, 0.70-m wide and 1.45-m deep. Stratigraphy at this location included a top layer of tall grass (approximately 1.5 to 2.0 m) and associated root action superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 11, Figure 40, and Figure 41). The stratigraphy at this location is consistent with USDA soil designations for the region, of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-10 was level, and its approximate elevation was 111 m AMSL. No cultural material was observed during test excavation at this location.

Table 11. TE-10 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 35	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
IIa	30 – 62	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
IIb	60 – 145	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

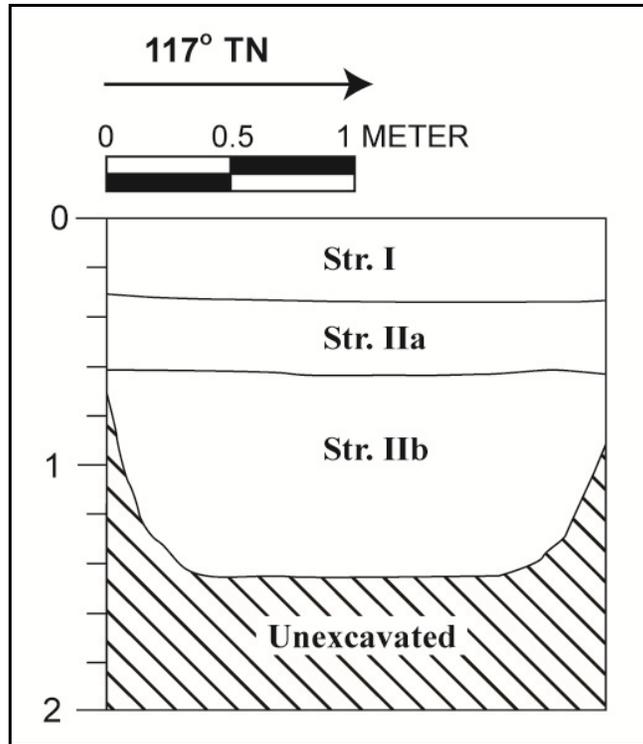


Figure 40. TE-10, view to north



Figure 41. TE-10, view to northwest

5.2.11 Test Excavation 11 (TE-11)

TE-11 was located at the northeastern corner of the project area (see Figure 20 and Figure 21). The excavation site was selected to document an area of proposed construction activity. The dimensions of TE-11 were 6.00-m long, 0.70-m wide and 2.15-m deep. Stratigraphy included a top layer of heavy root disturbance superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 12, Figure 42, and Figure 43). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-11 was level and heavily wooded. The approximate elevation at this location was 108 m AMSL. No cultural material was observed during test excavation at this location.

Table 12 TE-11 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 60	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
II	20 – 215	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

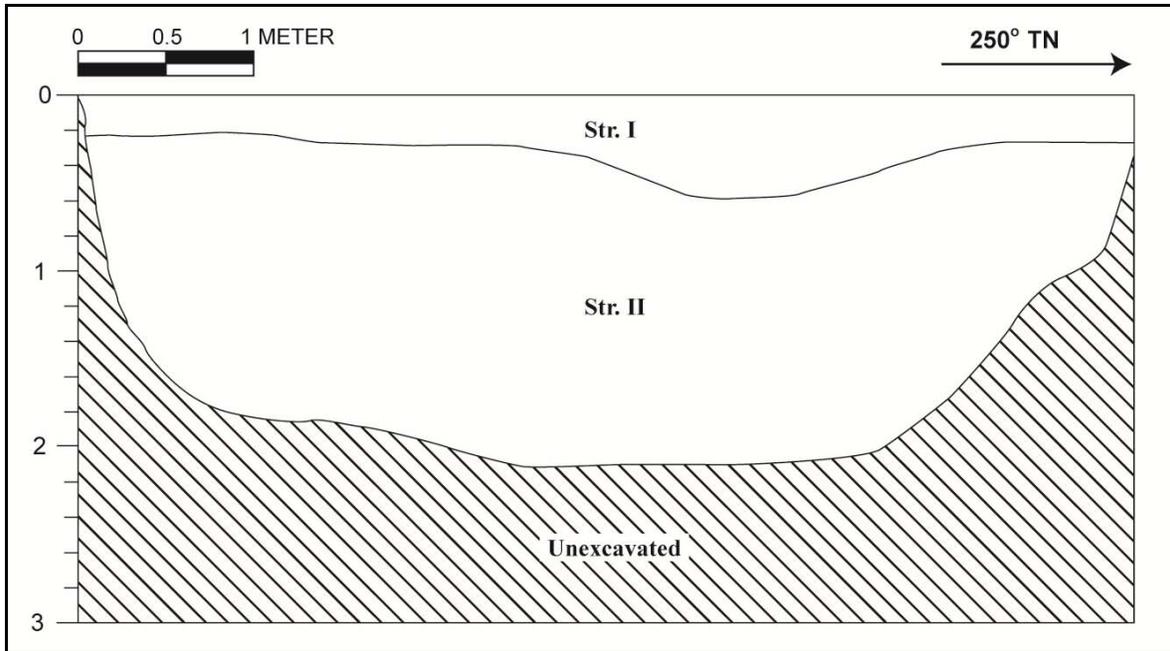


Figure 42. TE-11, view to south



Figure 43. TE-11, view to southeast

5.2.12 Test Excavation 12 (TE-12)

TE-12 was located at the northeastern corner of the project area (see Figure 20 and Figure 21). The excavation site was selected to document an area of proposed construction activity. The dimensions of TE-12 were 6.0-m long, 0.7-m wide and 2.0-m deep. Stratigraphy at this location included a top layer of heavy root disturbance superposing successive layers of disturbed and undisturbed naturally-deposited clay sediments (Table 13, Figure 44, and Figure 45). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-12 was level and heavily wooded. The approximate elevation at this location was 108 m AMSL. No cultural material was observed during test excavation at this location.

Table 13. TE-12 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 35	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
II	28 – 200	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

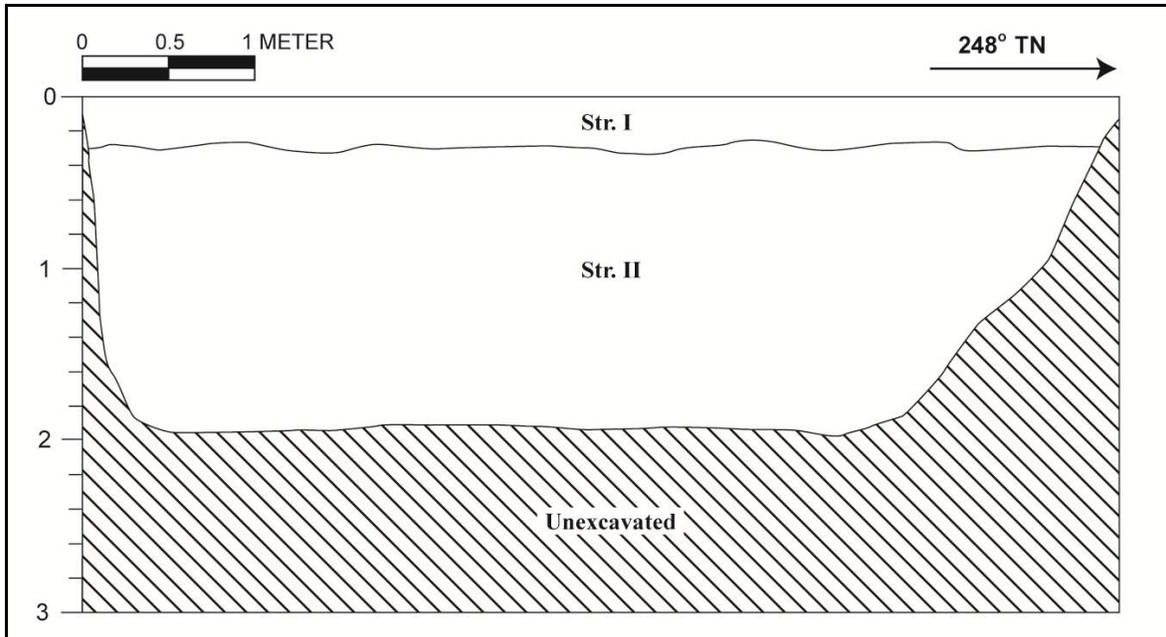


Figure 44. TE-12, view to south



Figure 45. TE-12, view to southeast

5.2.13 Test Excavation 13 (TE-13)

TE-13 was located at the north-central portion of the project area (see Figure 20 and Figure 21). The excavation site was selected to document stratigraphy near a tributary of Nāwiliwili Stream in the northern portion of the project area. The dimensions of TE-13 were 1.80-m long, 0.70-m wide and 1.28-m deep. Stratigraphy included a top layer of grass superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 14, Figure 46 and Figure 47). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-13 was level, and its approximate elevation was 114 m AMSL. No cultural material was observed during test excavation at this location.

Table 14. TE-13 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 18	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ila	15 – 72	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
Ilb	70 – 128	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

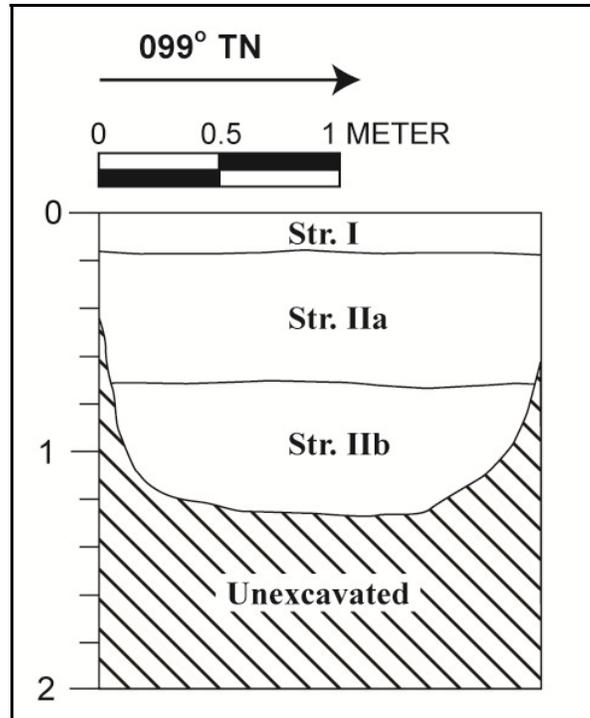


Figure 46. TE-13, view to north



Figure 47. TE-13, view to north

5.2.14 Test Excavation 14 (TE-14)

TE-14 was located at the north-central portion of the project area (see Figure 20 and Figure 21). The excavation site was selected to document stratigraphy near a tributary of Nāwiliwili Stream in the northern portion of the project area. The dimensions of TE-14 were 1.80-m long, 0.70-m wide and 1.45-m deep. Stratigraphy included a top layer of grass superposing successive layers of disturbed and undisturbed naturally-deposited clay sediments (Table 15, Figure 48, and Figure 49). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-14 was level, and its approximate elevation was 114 m AMSL. No cultural material was observed during test excavation at this location.

Table 15. TE-14 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 22	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ila	20 – 70	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
Ilb	70 – 145	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

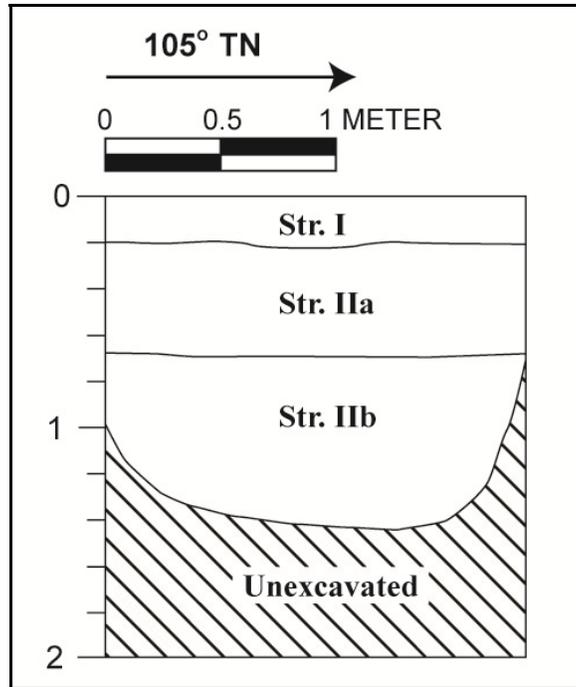


Figure 48. TE-14, view to north



Figure 49. TE-14, view to north

5.2.15 Test Excavation 15 (TE-15)

TE-15 was located at the north-central portion of the project area (see Figure 20 and Figure 21). The excavation site was selected to document stratigraphy near a tributary of Nāwiliwili Stream in the northern portion of the project area. The dimensions of TE-15 were 2.0-m long, 0.7-m wide and 1.4-m deep. Stratigraphy included a top layer of grass superposing successive layers of disturbed and undisturbed naturally-deposited clay sediments (Table 16, Figure 50, and Figure 51). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-15 was level, and its approximate elevation was 113 m AMSL. No cultural material was observed during test excavation at this location.

Table 16. TE-15 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 45	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ila	37 – 77	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
Ilb	72 – 140	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

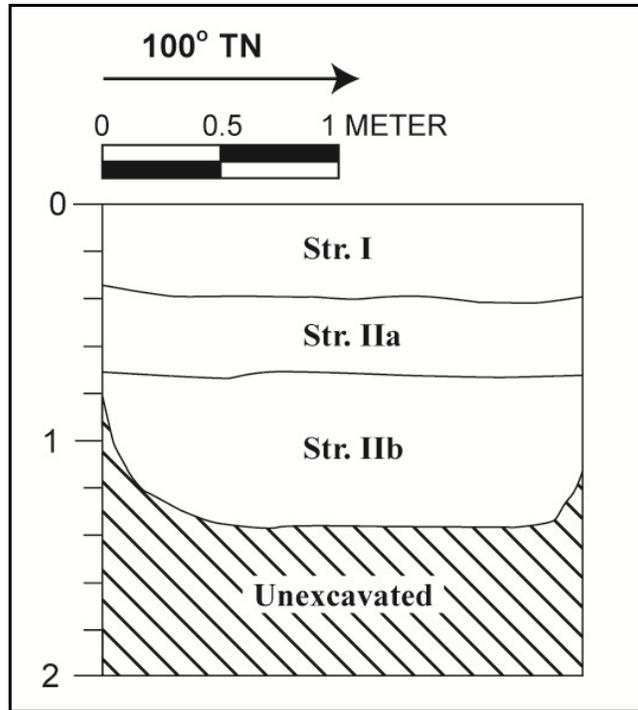


Figure 50. TE-15, view to north



Figure 51. TE-15, view to northeast

5.2.16 Test Excavation 16 (TE-16)

TE-16 was located at the north-central portion of the project area (see Figure 20 and Figure 21). The excavation site was selected to document stratigraphy near a tributary of Nāwiliwili Stream in the northern portion of the project area. The dimensions of TE-16 were 2.00-m long, 0.70-m wide and 1.65-m deep. Stratigraphy included a top layer of grass superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 16, Figure 52, and Figure 53). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-16 was level, and its approximate elevation was 111 m AMSL. No cultural material was observed during test excavation at this location.

Table 17. TE-16 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 40	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ila	30 – 82	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
Ilb	80 – 165	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

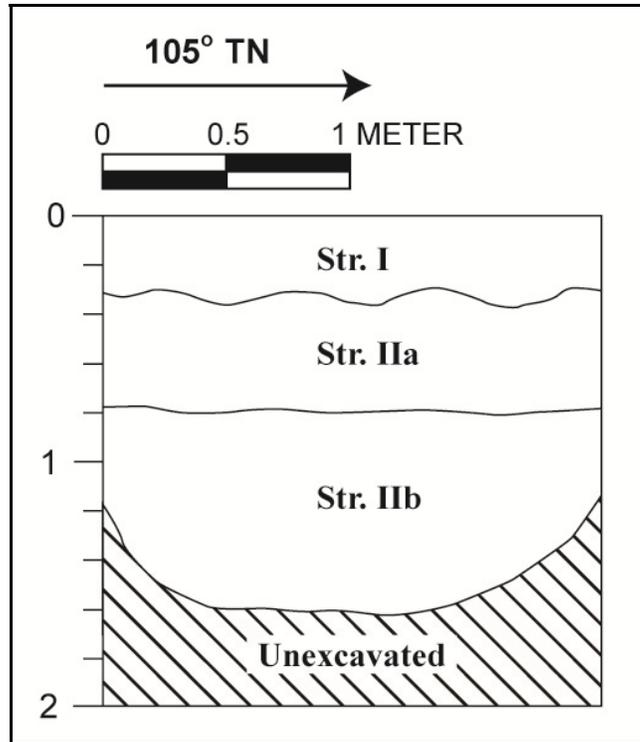


Figure 52. TE-16, view to north



Figure 53. TE-16, view to northeast

5.2.17 Test Excavation 17 (TE-17)

TE-17 was located at the central portion of the project area (see Figure 20 and Figure 21). The excavation site was selected to document an area of proposed construction activity. The dimensions of TE-17 were 6.00-m long, 0.70-m wide and 1.47-m deep. Stratigraphy included a top layer of landscaped grass with associated roots superposing successive layers of disturbed and undisturbed naturally-deposited clay sediments (Table 18, Figure 54, and Figure 55). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-17 was level with an approximate elevation of 112 m AMSL. No cultural material was observed during test excavation at this location.

Table 18. TE-17 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 23	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
IIa	18 – 53	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
IIb	40 – 147	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

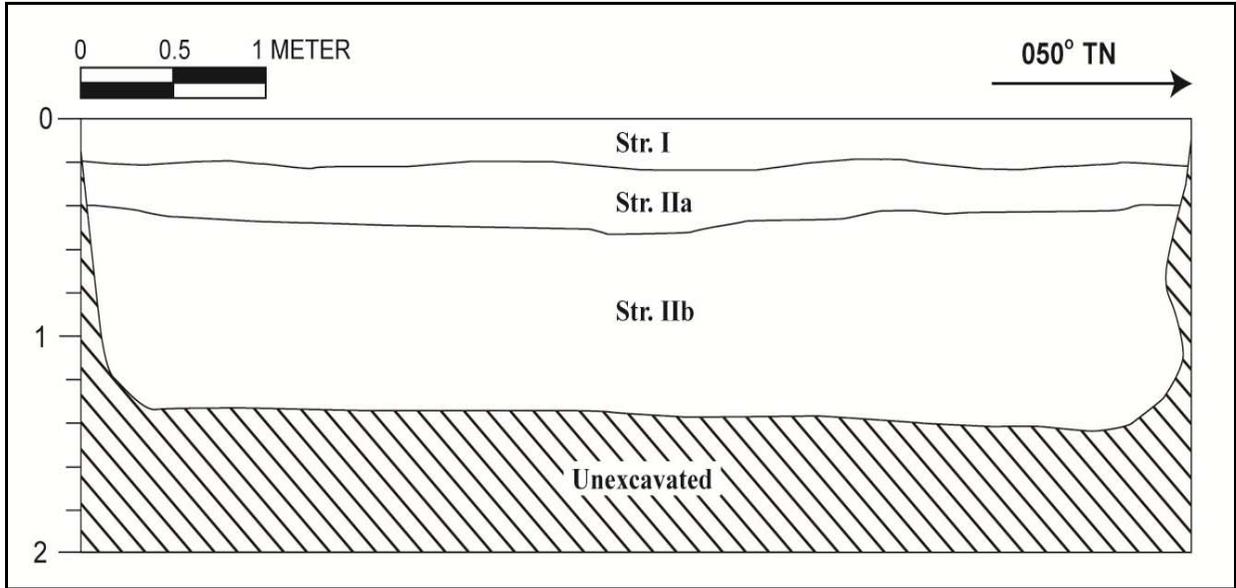


Figure 54. TE-17, view to northwest



Figure 55. TE-17, view to north

5.2.18 Test Excavation 18 (TE-18)

TE-18 was located at the central portion of the project area (see Figure 20 and Figure 21). The excavation site was selected to document an area of proposed construction activity. The dimensions of TE-18 were 6.0-m long, 0.7-m wide and 1.5-m deep. Stratigraphy included a top layer of landscaped grass with associated roots superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 19, Figure 56, and Figure 57). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-18 was level with an approximate elevation of 112 m AMSL. No cultural material was observed during test excavation at this location.

Table 19. TE-18 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 40	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ila	30 – 72	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
Iib	60 – 150	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally-deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

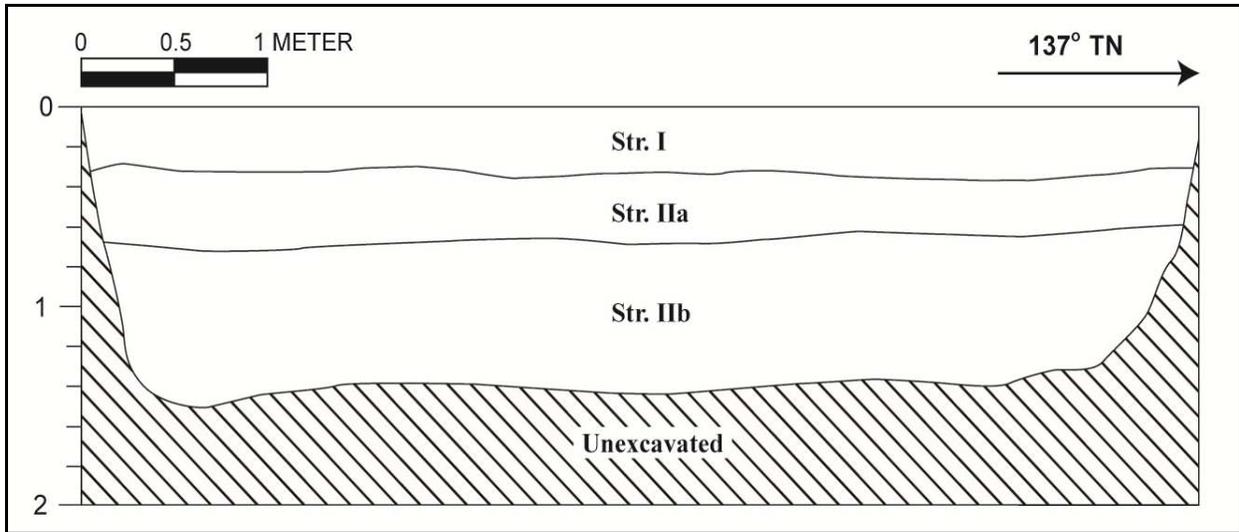


Figure 56. TE-18, view to northeast



Figure 57. TE-18, view to east

5.2.19 Test Excavation 19 (TE-19)

TE-19 was located at the central portion of the project area (see Figure 20 and Figure 21). The excavation site was selected to document an area of proposed construction activity. The dimensions of TE-19 were 6.0-m long, 0.7-m wide and 1.4-m deep. Stratigraphy included a top layer of landscaped grass with associated roots superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 20, Figure 58, and Figure 59). The stratigraphy is consistent with USDA soil designations for the region of Puhi silt loam, 3 to 8 percent slopes (PnB). The surface at TE-19 was level with an approximate elevation of 112 m AMSL. No cultural material was observed during test excavation at this location.

Table 20. TE-19 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 32	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ia	20 – 75	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally deposited Puhi silt loam, 3 to 8 percent slopes (PnB)
Ib	62 – 140	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally deposited Puhi silt loam, 3 to 8 percent slopes (PnB)

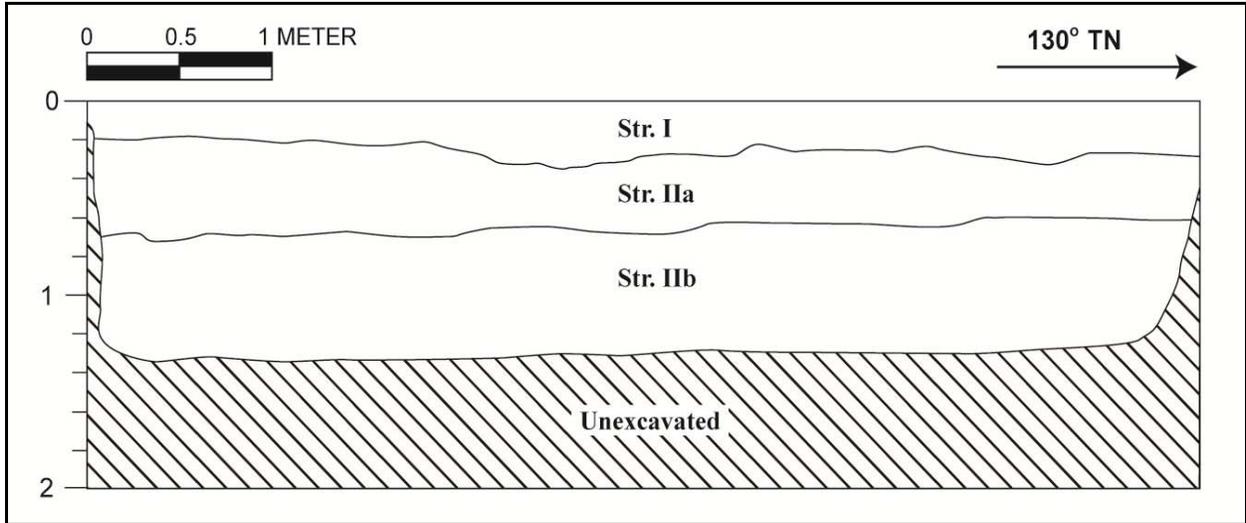


Figure 58. TE-19, view to northeast



Figure 59. TE-19, view to east

5.2.20 Test Excavation 20 (TE-20)

TE-20 was located at the central portion of the project area (see Figure 20 and Figure 21). The excavation site was selected to document proposed construction activity. The dimensions of TE-20 were 6.0-m long, 0.7-m wide and 1.4-m deep. Stratigraphy at this location included a top layer of landscaped grass with associated roots superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 21, Figure 60, and Figure 61). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-20 was level with an approximate elevation of 112 m AMSL. No cultural material was observed during test excavation at this location.

Table 21. TE-20 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 50	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ia	38 – 82	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
Ib	68 – 140	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

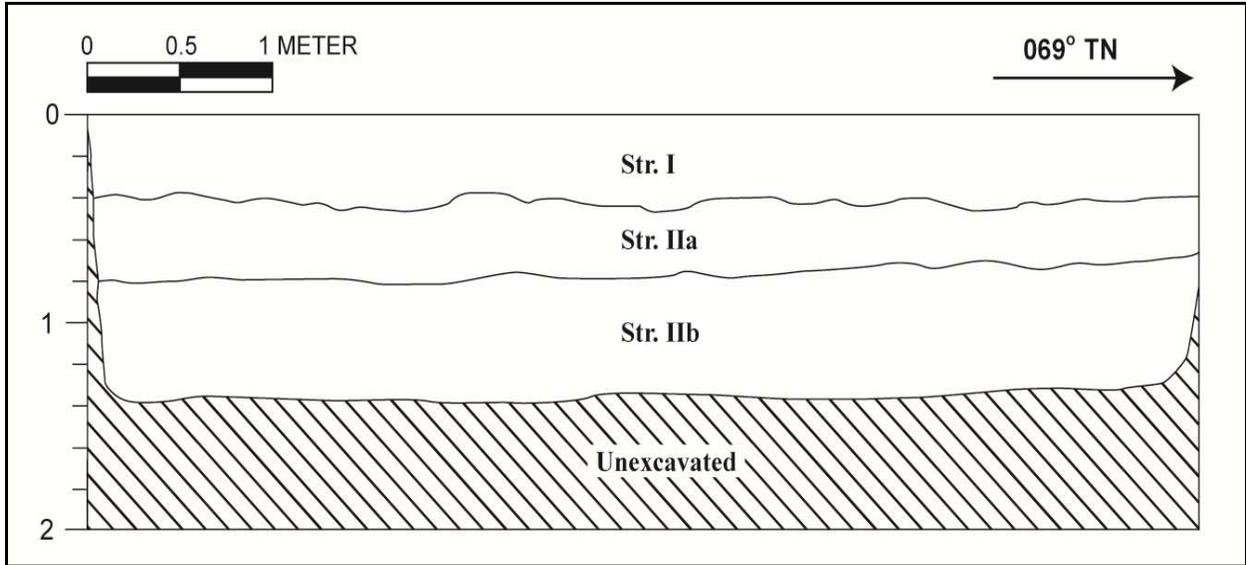


Figure 60. TE-20, view to north



Figure 61. TE-20, view to northeast

5.2.21 Test Excavation 21 (TE-21)

TE-21 was located at the central portion of the project area (see Figure 20 and Figure 21). The excavation site was selected to document an area of proposed construction activity. The dimensions of TE-21 were 6.0-m long, 0.7-m wide and 1.5-m deep. Stratigraphy included a top layer of landscaped grass with associated roots superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 22, Figure 62, and Figure 63). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-21 was level with an approximate elevation of 112 m AMSL. No cultural material was observed during test excavation at this location.

Table 22. TE-21 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 45	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
IIa	38 – 80	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
IIb	70 – 150	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

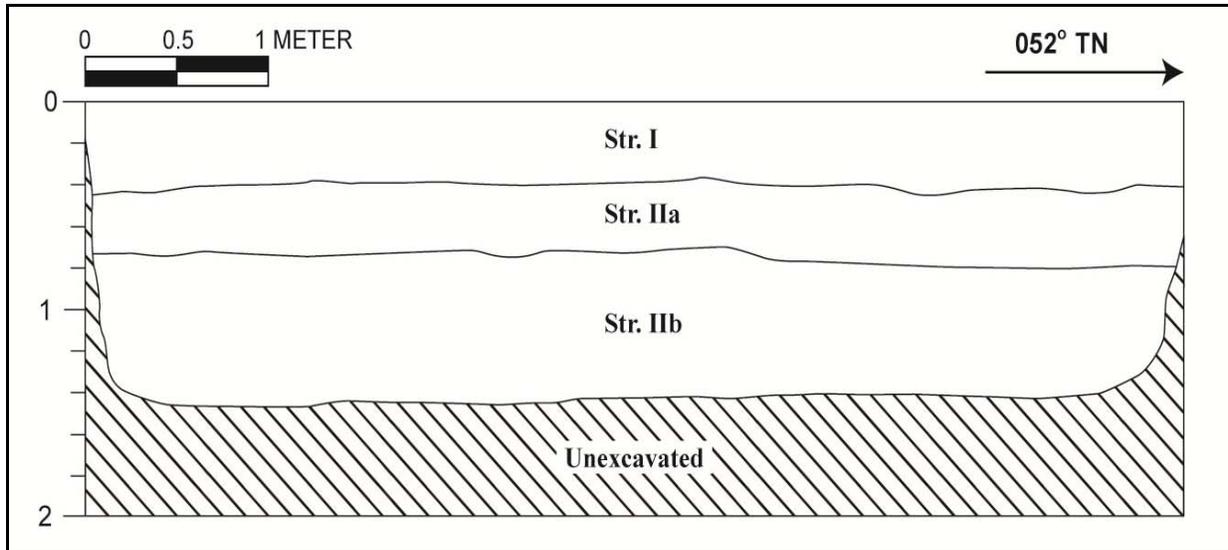


Figure 62. TE-21, view to northwest



Figure 63. TE-21, view to north

5.2.22 Test Excavation 22 (TE-22)

TE-22 was located at the southwestern corner of the project area (see Figure 20 and Figure 21). The excavation site was selected to document an area of proposed construction activity. The dimensions of TE-22 were 6.0-m long, 0.7-m wide and 1.5-m deep. Stratigraphy included a top layer of landscaped grass with associated roots superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 23, Figure 64, and Figure 65). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-22 was level with an approximate elevation of 116 m AMSL. No cultural material was observed during test excavation at this location.

Table 23. TE-22 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 20	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
IIa	10 – 52	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
IIb	45 – 150	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

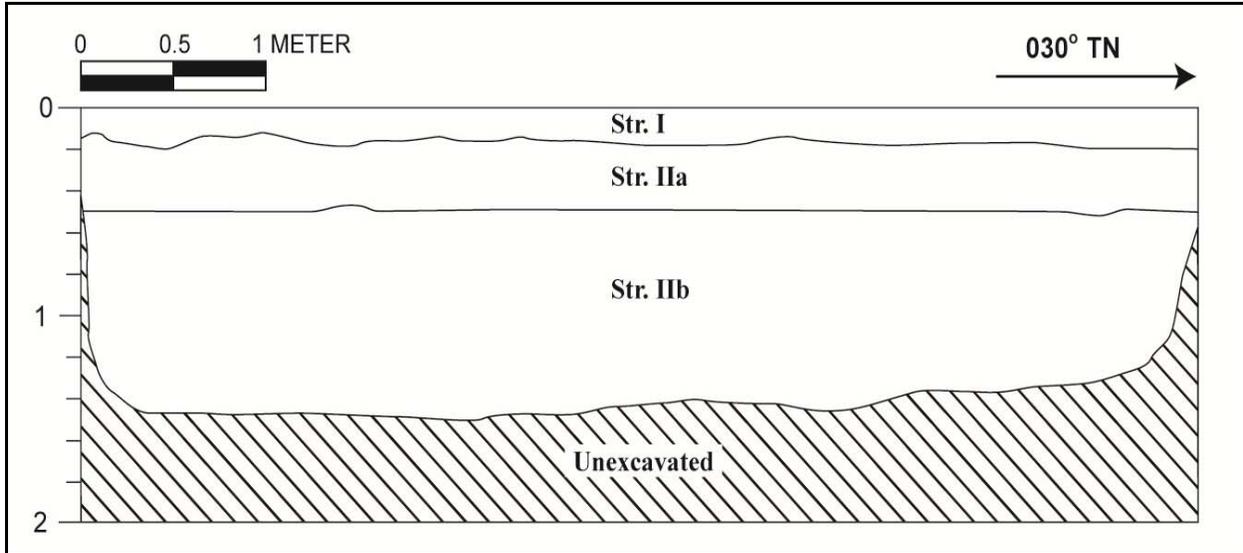


Figure 64. TE-22, view to northwest



Figure 65. TE-22, view to north

5.2.23 Test Excavation 23 (TE-23)

TE-23 was located at the southwestern corner of the project area (see Figure 20 and Figure 21). The excavation site was selected to document an area of proposed construction activity. The dimensions of TE-23 were 6.0-m long, 0.7-m wide and 1.5-m deep. Stratigraphy included a top layer of landscaped grass with associated roots superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 24, Figure 66, and Figure 67). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-23 was level with an approximate elevation of 116 m AMSL. No cultural material was observed during test excavation at this location.

Table 24. TE-23 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 40	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
Ila	35 – 65	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
Iib	62 – 150	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

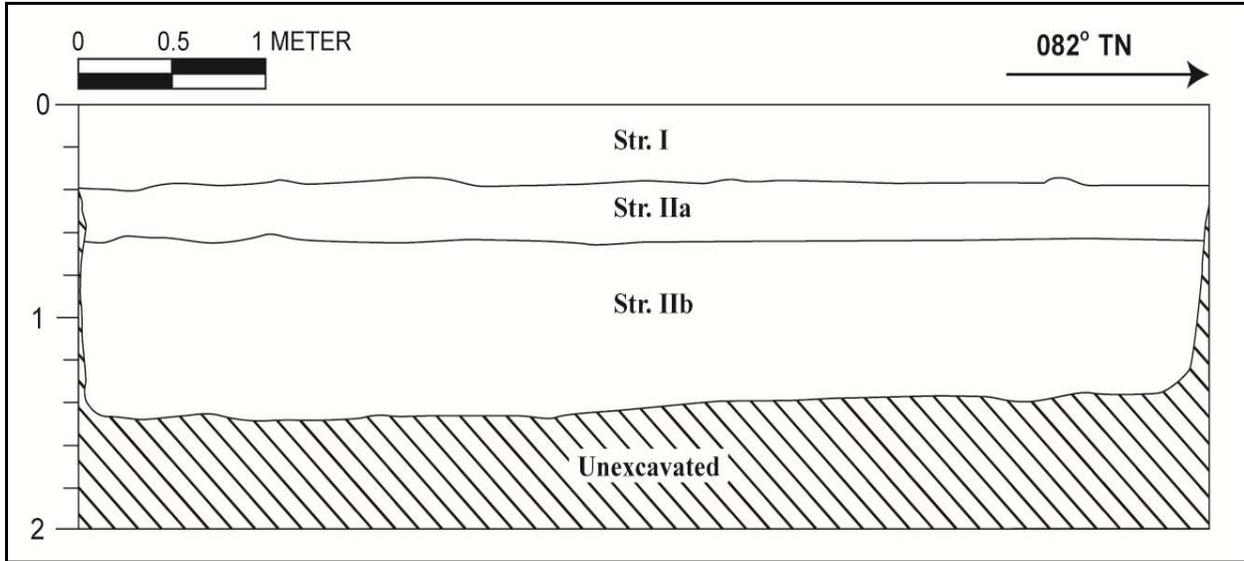


Figure 66. TE-23, view to north



Figure 67. TE-23, view to northwest

5.2.24 Test Excavation 24 (TE-24)

TE-24 was located at the southwestern corner of the project area (see Figure 20 and Figure 21). The excavation site was selected to document an area of proposed construction activity. The dimensions of TE-24 were 6.0-m long, 0.7-m wide and 1.5-m deep. Stratigraphy at this location included a top layer of landscaped grass with associated roots superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 25, Figure 68, and Figure 69). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-24 was level with an approximate elevation of 116 m AMSL. No cultural material was observed during test excavation at this location.

Table 25. TE-24 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 22	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
IIa	17 – 102	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
IIb	95 – 150	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

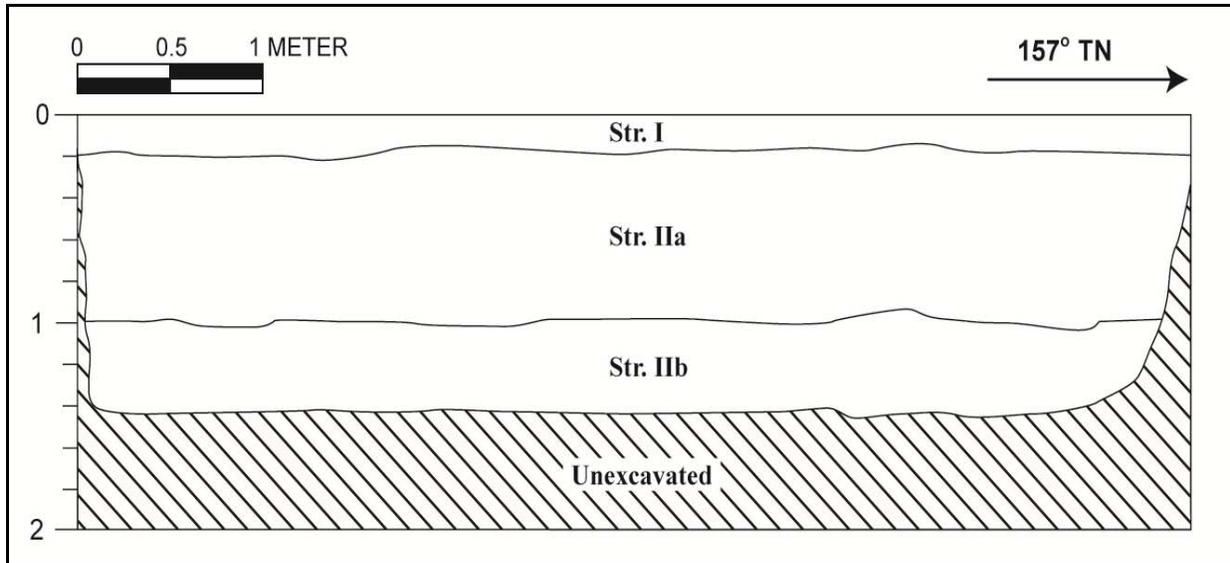


Figure 68. TE-24, view to northeast



Figure 69. TE-24, view to southeast

5.2.25 Test Excavation 25 (TE-25)

TE-25 was located at the southwestern corner of the project area (see Figure 20 and Figure 21). The excavation site was selected to document an area of proposed construction activity. The dimensions of TE-25 were 6.0-m long, 0.7-m wide and 1.5-m deep. Stratigraphy at this location included a top layer of landscaped grass with associated roots superposing successive layers of disturbed and undisturbed naturally deposited clay sediments (Table 26, Figure 70, and Figure 71). The stratigraphy is consistent with USDA soil designations for the region of Puhi silty clay loam, 3 to 8 percent slopes (PnB). The surface at TE-25 was level with an approximate elevation of 116 m AMSL. No cultural material was observed during test excavation at this location.

Table 26. TE-25 Stratigraphy

Stratum	Depth (cmbs)	Description
I	0 – 40	10YR 4/3, brown; silty clay loam; moderate, very fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped grass surface
IIa	30 – 60	5YR 4/4, reddish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; disturbed naturally deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)
IIb	55 – 150	5YR 4/8, yellowish red; silty clay; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; naturally deposited Puhi silty clay loam, 3 to 8 percent slopes (PnB)

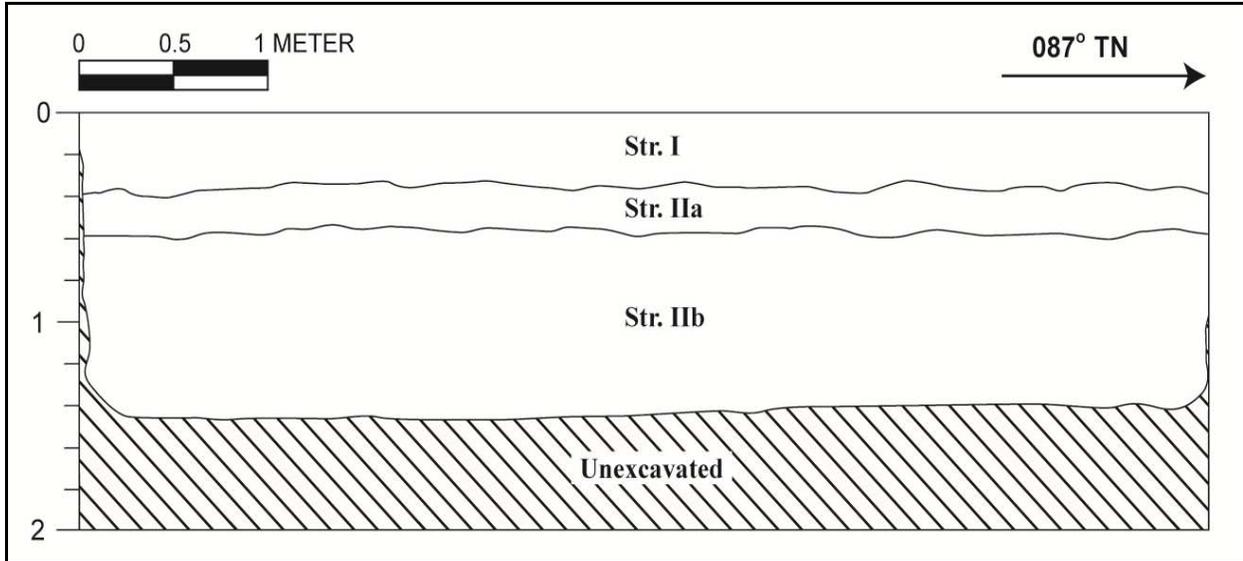


Figure 70. TE-25, view to north



Figure 71. TE-25, view to east

5.2.26 Summary and Interpretation of Subsurface Testing Results

Subsurface testing results for the current AIS was consistent with background information regarding its past land use as being completely used for sugar cane cultivation. Testing was intended to provide a comprehensive overview of the stratigraphy of the area, and to assess the potential for historic properties at TE locations. TE locations were selected to examine proposed building locations and to investigate areas that had undergone relatively minimal prior disturbance related to current school campus development.

TE-1 through TE-10 and TE-13 through TE-16 were undertaken to provide stratigraphic data and to indicate the presence or absence of historic properties at those relatively undisturbed locations near a tributary of Nāwiliwili Stream where the likelihood of historic properties was thought to be greater; TE-11, T-12 and TE-17 through TE-25 were completed to gather a larger representative sample at proposed building site locations.

Testing involved a total of 43.4 m² of area excavated to depths ranging from 90 to 200 cmbs to identify possible subsurface historic properties. Although the total area of the project area is approximately 38.45-ac (approximately 15.56 ha), the specific testing areas (i.e., areas that underwent minimal prior disturbance and/or modification, and where structures are planned) comprises approximately 9.14-ac (approximately 37,008 m²). Total tested area percentage for the entire project area would be approximately 0.028 percent; however, the testing density in areas of proposed project development was much higher (Figure 72). Common practice for regions where potential for historic properties is high a total area to area tested ratio is often one to two percent; however, for the purposes of this AIS investigation, the relatively low sampled area percentage is proportionate to the possibility of subsurface historic properties.

In general, the stratigraphy throughout the tested areas was consistent with naturally-deposited reddish brown clay varieties, all of which correlate with the USDA soil survey designation for the region of silty clay loam, 3 to 8 percent slopes (PnB) (Foote et al. 1972).

Root action and surface soil accumulation varied between tested areas based on surface vegetation. Areas where surface vegetation was short (TE-1 through TE-5, TE-13 through TE-25) exhibited finer roots, and associated root action was denser and more concentrated near the surface, and created a more stable surface. Areas where surface vegetation was higher, containing larger flora (TE-6 through TE-12), roots were coarser and associated disturbance to the top layer was sparser and created a looser surface. Stratum I, in all test excavations (TE-1 through TE-25), represents this surface vegetation to top layer dynamic. Also, Stratum I represents the vertical extent of mechanized grading and leveling events conducted to create the existing surface at the time of this AIS.

Stratum IIa in TE-1 through TE-10 and in TE-17 through TE-25 represents a combination of mechanized disturbance associated with successive plowing and grading events associated with sugar cane cultivation that occurred from historic times (pre-1963) into the 1980s, and then left fallow until 1991, when the development of existing Island School campus facilities occurred. The presence of modern cane-related plastic debris was observed in Stratum IIa during testing of TE-14, TE-21 and TE-23, further evidence that Stratum IIa at those locations was the plow zone between disturbed sediments used for cane cultivation that spanned from historic times as

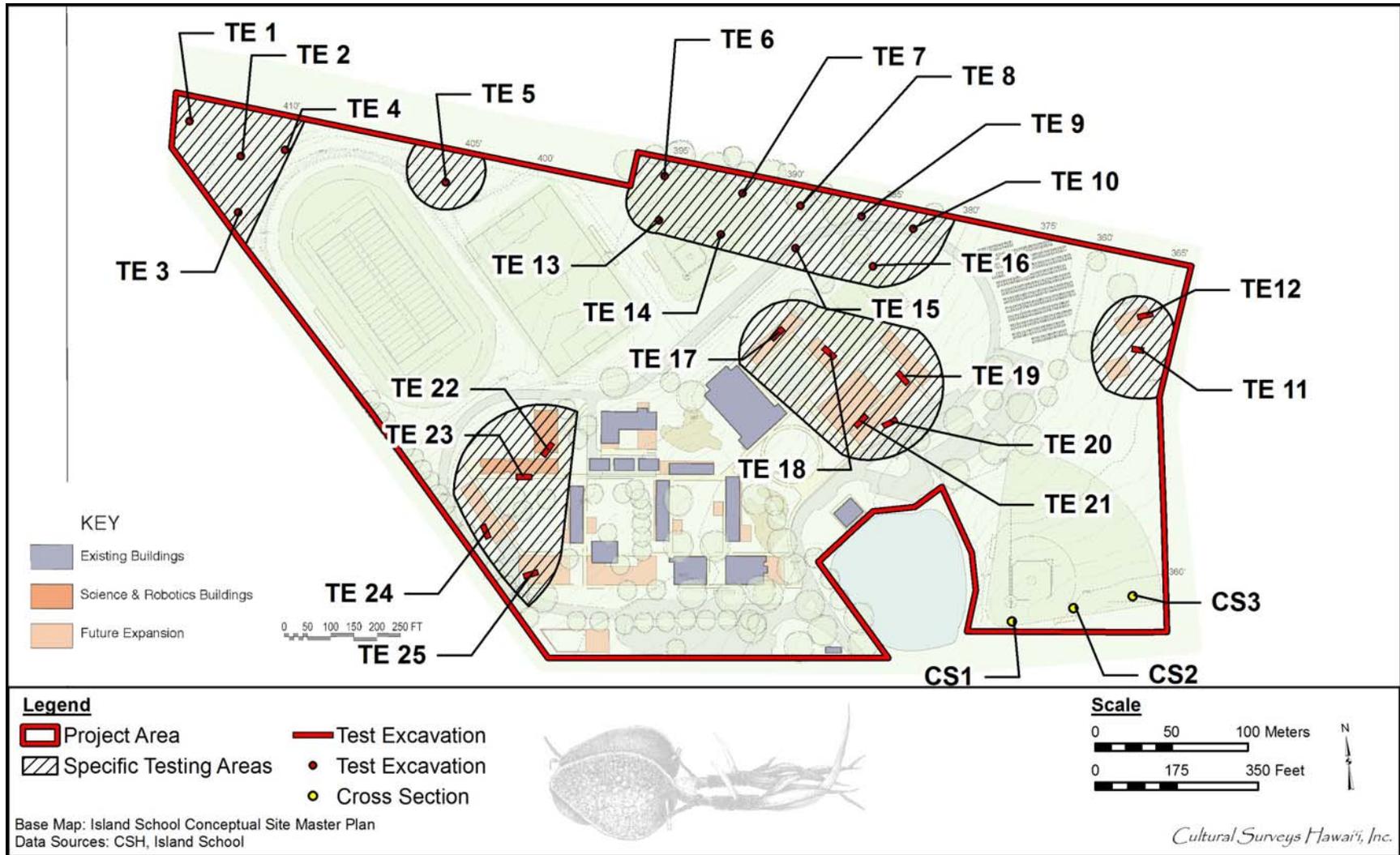


Figure 72. TE locations and specific testing areas overlay with Island School Conceptual Site Master Plan

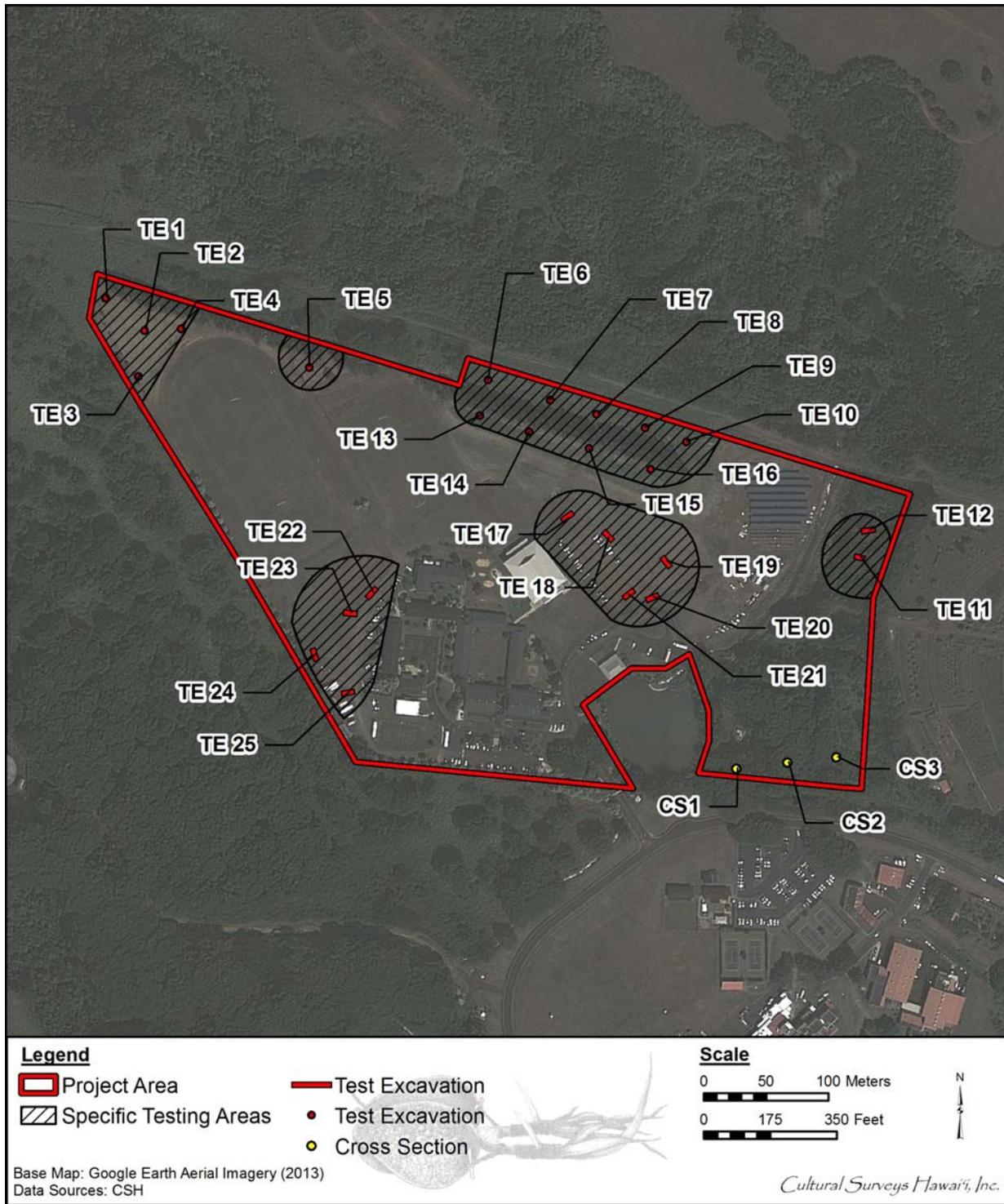


Figure 73. TE locations and specific testing areas overlay on an aerial photograph

documented in the Background Research section of the current document, and continued use into modern times prior to the establishment of the current Island School campus. TE 11 and TE 12 did not include a designated Stratum IIa and Stratum IIb distinction. This is attributable to the fact that no alteration was done to these locations during construction of the current Island School campus grounds and that the surrounding area had become densely forested since being used for cane cultivation.

No historic or traditional cultural material was observed during subsurface testing for this AIS. Areas tested revealed naturally-deposited clay sediments that had been graded and shaped over time for current use and application.

5.3 Historic Property Descriptions

Two historic properties were identified within the project area. SIHP # 50-30-11-2179 including four designated features (Feature A through Feature D) and ten designated sub-features (A1 through A4, B1, C1 through C4, and D1) is described in Section 5.3.1 below. A description of SIHP # 50-30-11-2220 with one feature follows in Section 5.3.2.

5.3.1 SIHP # 50-30-11-2179

FORMAL TYPE:	Reservoir/Ditches
MEASUREMENTS:	660 m long (E-W); 410 m wide (N-S)
FUNCTIONAL INTERPRETATION:	Water Control (Agriculture)
CONDITION:	Very Good
TEMPORAL INTERPRETATION:	Historic, plantation era

DESCRIPTION: SIHP # 50-30-11-2179 consists of a total of four water control features (designated Feature A through Feature D) related to Lihue Plantation. Feature A is a reservoir, Feature B is a drainage ditch, and Features C and D are irrigation ditches (Figure 74 and Figure 75). The 1963 U.S. Geological Survey map (see Figure 13) shows Upper Lihue Ditch, which dates to the early twentieth century, and includes Features A, C and D. Features A through C also have a total of ten sub-features (detailed below).

Features A, C, and D functioned together to transport water from a source north of the project area. Crossing Nāwiliwili Stream, via Feature C, they diverted the water into the Feature A Reservoir and then into the fields east of the project area via Feature D.

Nine cross section profiles (CS1–CS9) were drawn at select locations along Features B, C, and D, and photographs were taken to document current conditions of Features A through D (Figure 74 and Figure 75).

Development plans for the current project include installing an athletic field at the southeast portion of the project area (see Figure 4). Feature D will be filled in and graded for construction of the athletic field. Feature C will be filled and leveled, and the water flow of Feature C will be diverted using a pipe.

5.3.2 SIHP # 50-30-11-2179 Feature A (Reservoir with Associated Sluice Gates and Culvert)

Feature A is a reservoir located adjacent to and northeast of the gate at the Island School campus road entrance (Figure 76). The reservoir is not part of Island School property and is located outside of the project area, but is almost completely surrounded by the project area (Figure 74 and Figure 75). A 1941 map of Lihue Plantation Co. shows the Feature A reservoir between the boundaries of fields 39A and 39B (see Figure 12). The 1963 U.S. Geological Survey map (see Figure 13) shows a portion of the “Upper Lihue Ditch” that corresponds with the separation between field 39A and 39B; indicating that Feature A was likely associated with the Upper Lihue Ditch system. The reservoir also appears on the 1910 U.S. Geological Survey (see Figure 11) although its associated ditches are not evident. No modification to Feature A is planned as part of the proposed development project.

The reservoir measures 88.5 m by 82.3 m with a constructed berm on the east and south sides. A wooden catwalk extends from the east bank over the water for 2 m, at the end of which is a metal, mechanical device for opening and closing an underground drain pipe. Sub-features A1 through A4 are part of an overflow area at the southern end of the reservoir (Figure 77 and Figure 78). Descriptions of the sub-features follow.

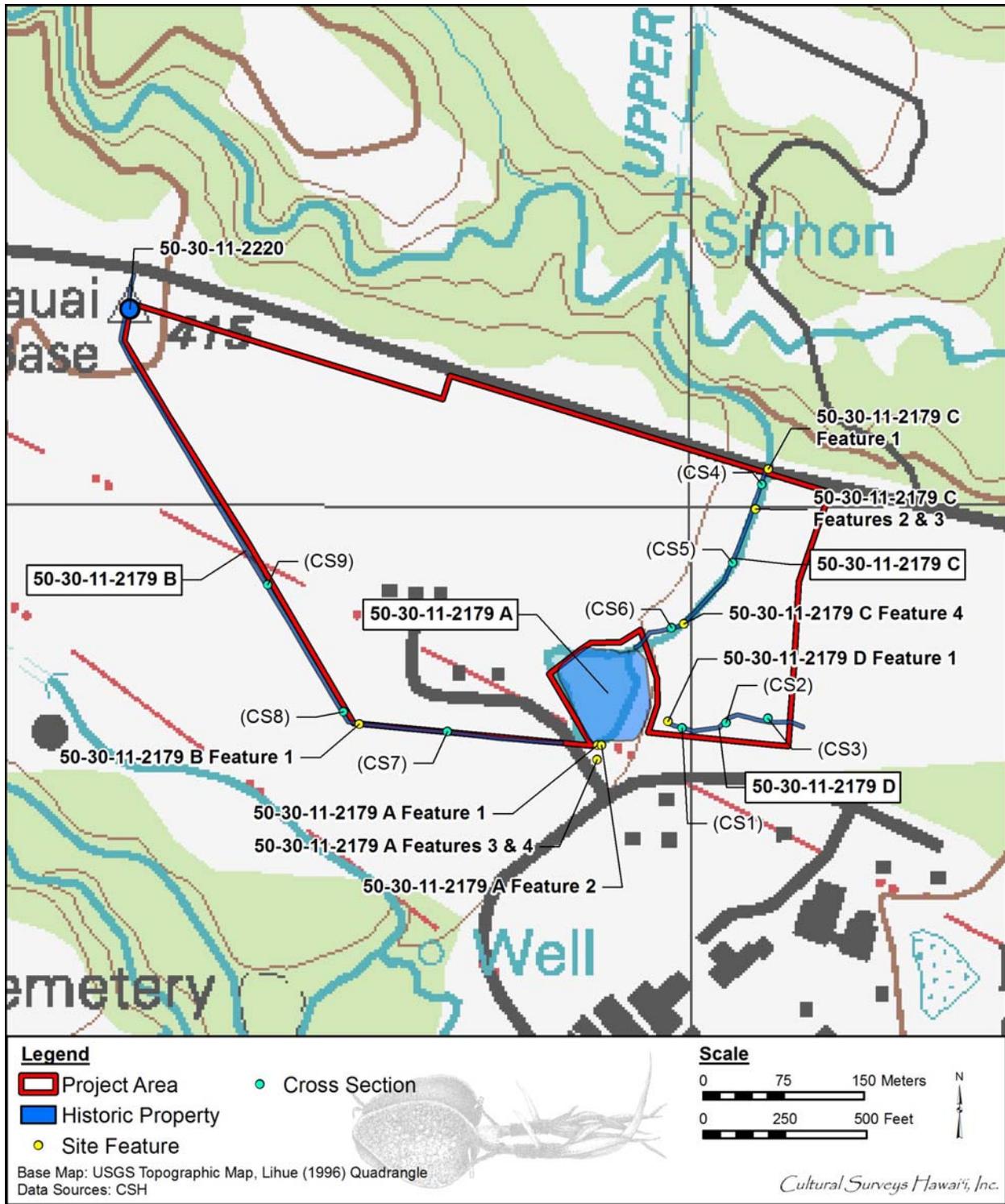


Figure 74. Portion of 1996 U.S. Geological Survey 7.5-Minute Series Topographic Map, Lihue quadrangle, showing the project area, SIHP # 50-30-11-2179, Features A through D locations, and cross section (CS1 through CS9) locations

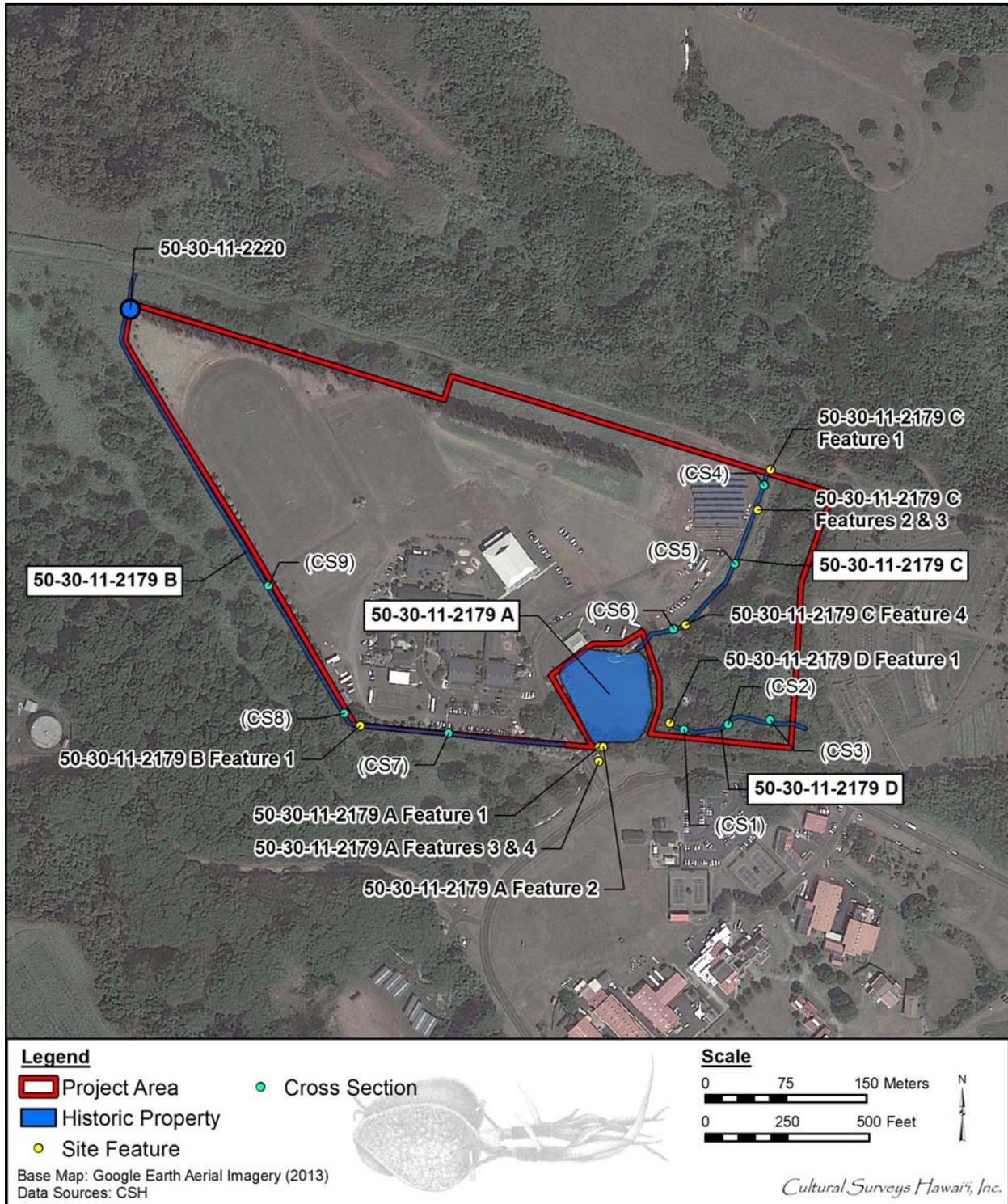


Figure 75. 2013 Google Earth Aerial Imagery satellite image, showing the project area, SIHP # 50-30-11-2179, Features A through D locations, and cross section (CS1 through CS9) locations



Figure 76. Photo of SIHP # -2179 Feature A, reservoir adjacent to (but outside of) the project area, view to south



Figure 77. Photo of the overflow area of SIHP # -2179 Feature A, including the four sub-features (Features A1–A4)

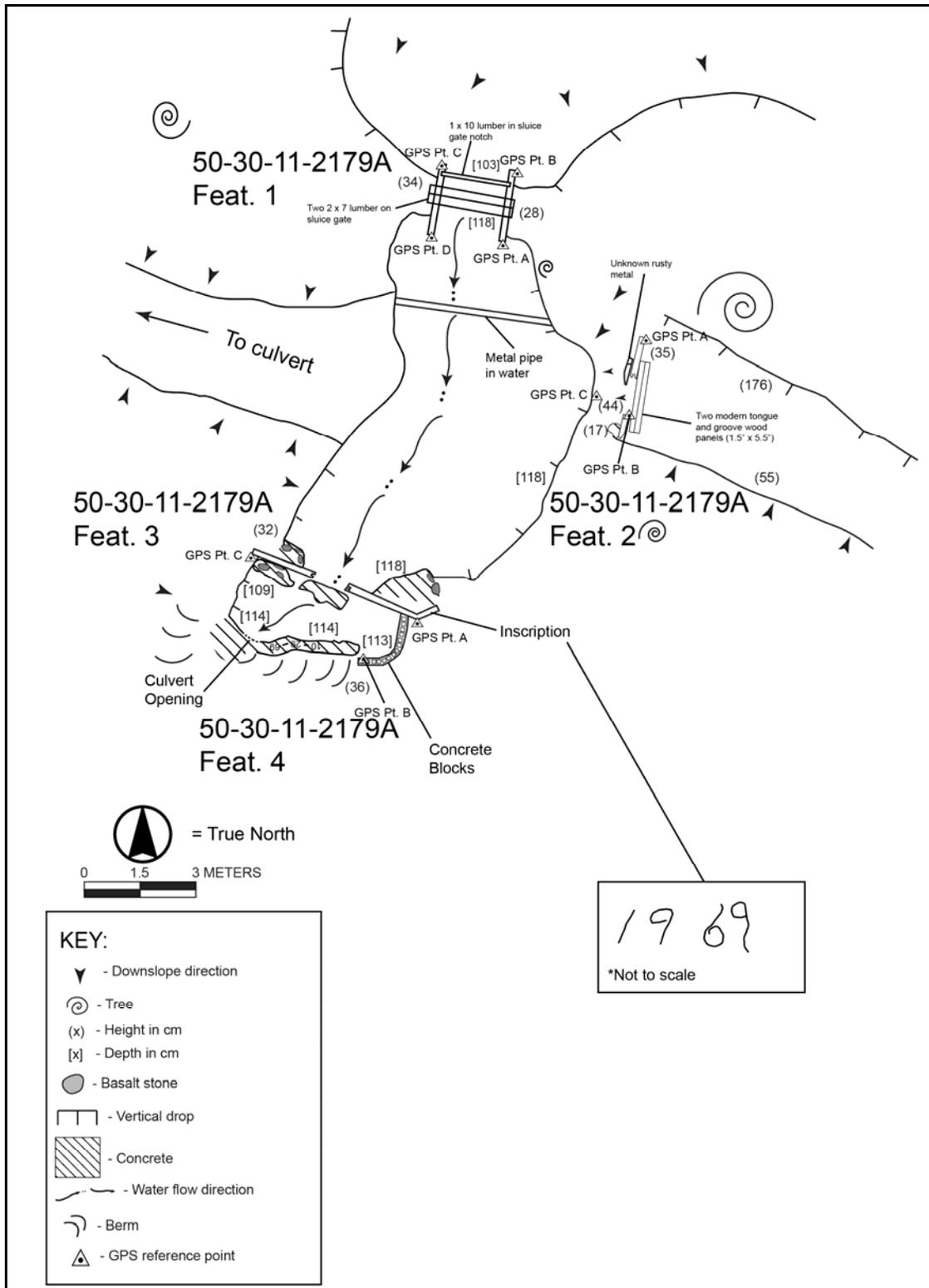


Figure 78. Plan view of SIHP # -2179 Feature A, including the four sub-features (Features A1–A4, labeled in this figure as Feat. 1–4)

Sub-feature A1: Sub-feature A1 (see Figure 74 and Figure 75 and Figure 78 for location) designates an active vertical rising sluice gate at the northern edge of the Feature A reservoir overflow area contains two pre-cast concrete wing walls and a gate composed of three wooden boards (Figure 79 and Figure 80). The sluice gate opening measures 1.8 m wide, with a maximum height of 1.18 m. Two 2 in x 7 in pieces of lumber straddle the sluice gate (Figure 79).



Figure 79. Photo of SIHP # -2179 Feature A1, sluice gate at the northern end of the overflow area, view to northwest



Figure 80. Photo of SIHP # -2179 Feature A1, sluice gate at the northern end of the overflow area, view to north

Feature A2: Feature A2 is an abandoned vertical rising sluice gate with two pre-cast concrete wing walls lies 0.70 m from the edge of the water on the easternmost edge of the Feature A overflow area (see Figure 74 and Figure 75 and Figure 78 for location) and is approximately 0.15 m higher than the water in elevation (Figure 81 and Figure 82). The opening of the sluice gate measures 0.90 m wide, with a maximum height of 0.44 m. Two tongue and groove wooden panels are on the east side of the gate.



Figure 81. Photo of SIHP # -2179 Feature A2, sluice gate at the easternmost edge of the Feature A overflow area, view to south



Figure 82. Photo of SIHP # -2179 Feature A2, sluice gate at the easternmost edge of the Feature A overflow area, view to east

Feature A3: Feature A3 is a formed, slotted concrete sluice gate frame constructed of two pre-cast concrete wing walls is at the southwest side of the Feature A overflow area (see Figure 74, Figure 75 and Figure 78 for location and Figure 83 and Figure 84). The wooden gate is missing. Water flows from the reservoir through the gate frame to the west to an area outside of the project area and within the Kaua'i Community College campus. This is the reservoir's only outlet.



Figure 83. Photo of SIHP # -2179 Feature A3, sluice gate at the southwest side of the Feature A overflow area, view to southwest



Figure 84. Photo of SIHP # -2179 Feature A3, sluice gate at the southwest side of the Feature A overflow area, view to south

Feature A4: Feature A4 is a modern culvert enters the reservoir at the south side of the Feature A overflow area (see Figure 74, Figure 75, and Figure 78 for location) running NE/SW and is composed of a large metal pipe with an opening approximately 0.65 m in diameter, and head and wing walls constructed of basalt boulders and cobbles with mortar fill, which have been partially capped with concrete (Figure 85). Feature A4 has a maximum height of 1.14 m. An inscription reading “10-29-69” was observed on the east wing wall (Figure 86).



Figure 85. Photo of SIHP # -2179 Feature A4, modern culvert at the south end of the Feature A overflow area, view to southwest



Figure 86. Photo of SIHP # -2179 Feature A4, modern culvert, showing the inscription reading “10-29-69,” view down

5.3.3 SIHP # 50-30-11-2179 Feature B (Irrigation Ditch with Associated Culverts)

Feature B is an irrigation ditch (Figure 87 and Figure 88) forming the west, southwest, and a portion of the south boundary of the project area (see Figure 74 and Figure 75 for location). The earthen ditch is 703 m long, 0.9 m deep with a maximum width of 2.0 m (Figure 89, Figure 91, and Figure 93). The ditch walls are sloped resulting in a bottom width of 1.0 m. The ditch is not currently used for irrigation but collects storm drainage and surface run-off from the Island School campus and its athletic fields.

A 1941 map of Lihue Plantation Co. (see Figure 12) shows Feature B forming the western boundary of field 39B, separating Lihue Plantation and Grove Farm. Although the ditch does not currently extend to Feature A, the Lihue Plantation Co. map shows a connection. No modification to Feature B is planned as part of the proposed project.

Three cross section profiles of Feature B (CS7 through CS9) were recorded (see Figure 74 and Figure 75 for cross section locations). CS7 was documented to show existing conditions of Feature B in its southernmost section (Figure 89 and Figure 90). CS8 was documented in the southwest corner of Feature B (Figure 91 and Figure 92). CS9 was documented along the western alignment of Feature B (Figure 93 and Figure 94).

Feature B1. Feature B1 is comprised of two abandoned culverts, both of which contain a large corrugated metal pipe with a diameter of 0.70 m and are oriented east/west (see Figure 74 and Figure 75 for location and Figure 97).

The eastern culvert has only a head wall constructed of stacked small to large sub-angular and angular basalt boulders and cobbles filled with mortar. The head wall is capped with concrete. The eastern culvert is approximately 3.10 m long and 0.70 m wide, with a total height of 1.84 m (Figure 95 and Figure 98).

The western culvert was not visible due to tree branch pilings in the ditch. A small strip of a concrete cap was visible through the branches (Figure 96).



Figure 87. Photo of SIHP # -2179 Feature B, earthen irrigation ditch, view to east



Figure 88. Photo of SIHP # -2179 Feature B, earthen irrigation ditch, view to west

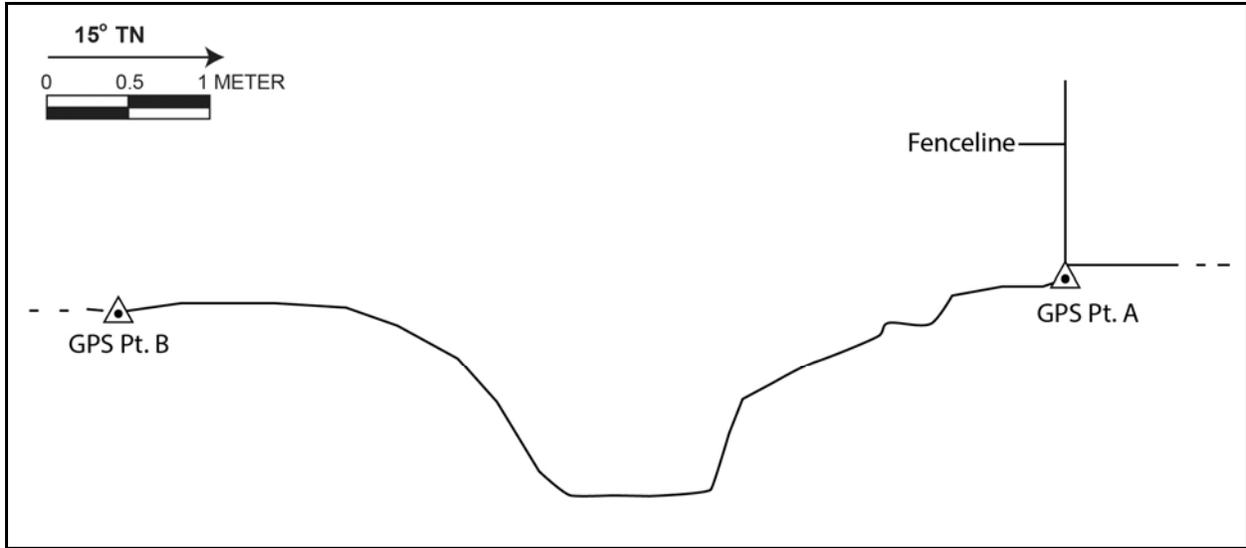


Figure 89. SIHP # -2179 Feature B, Cross Section 7



Figure 90. Photo of SIHP # -2179 Feature B, Cross Section 7

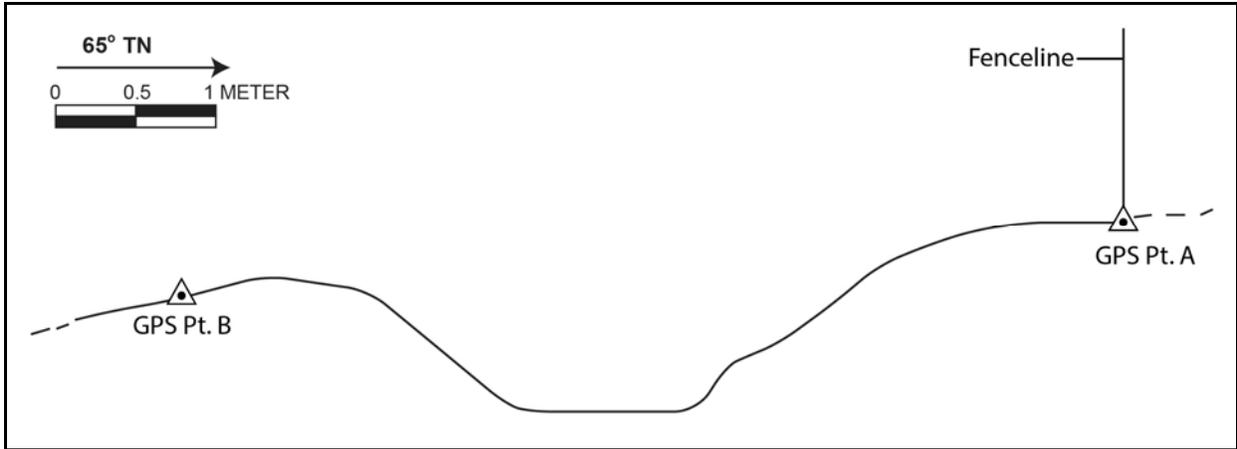


Figure 91. SIHP # -2179 Feature B, Cross Section 8



Figure 92. Photo of SIHP # -2179 Feature B, Cross Section 8

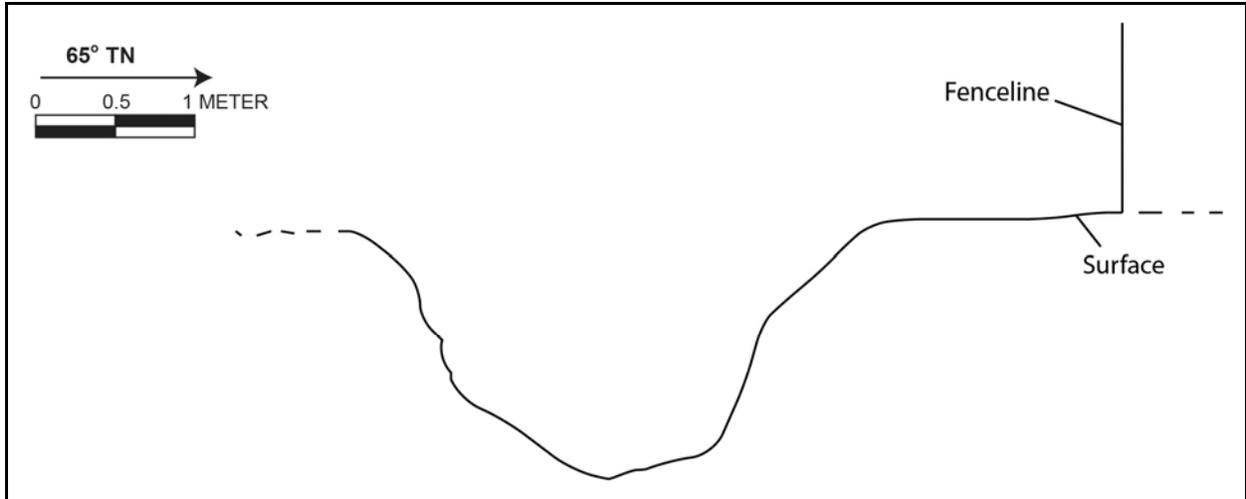


Figure 93. SIHP # -2179 Feature B, Cross Section 9



Figure 94. Photo of SIHP # -2179 Feature B, Cross Section 9



Figure 95. Photo of SIHP # -2179 Feature B1, eastern culvert, view to west



Figure 96. Photo of SIHP # -2179 Feature B1, western culvert, view to east

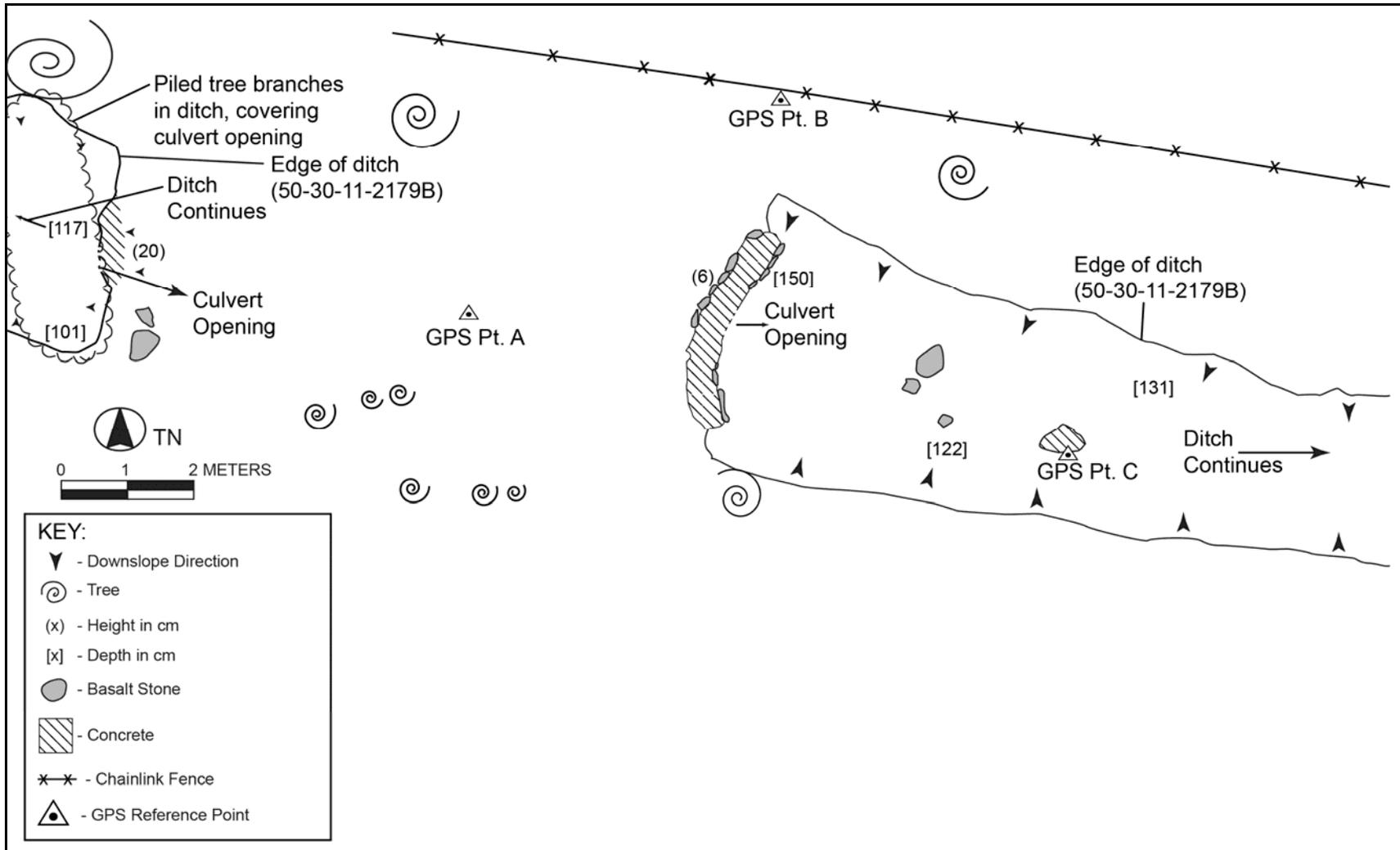


Figure 97. Plan view of SIHP # -2179 Feature B1, including east and west culverts

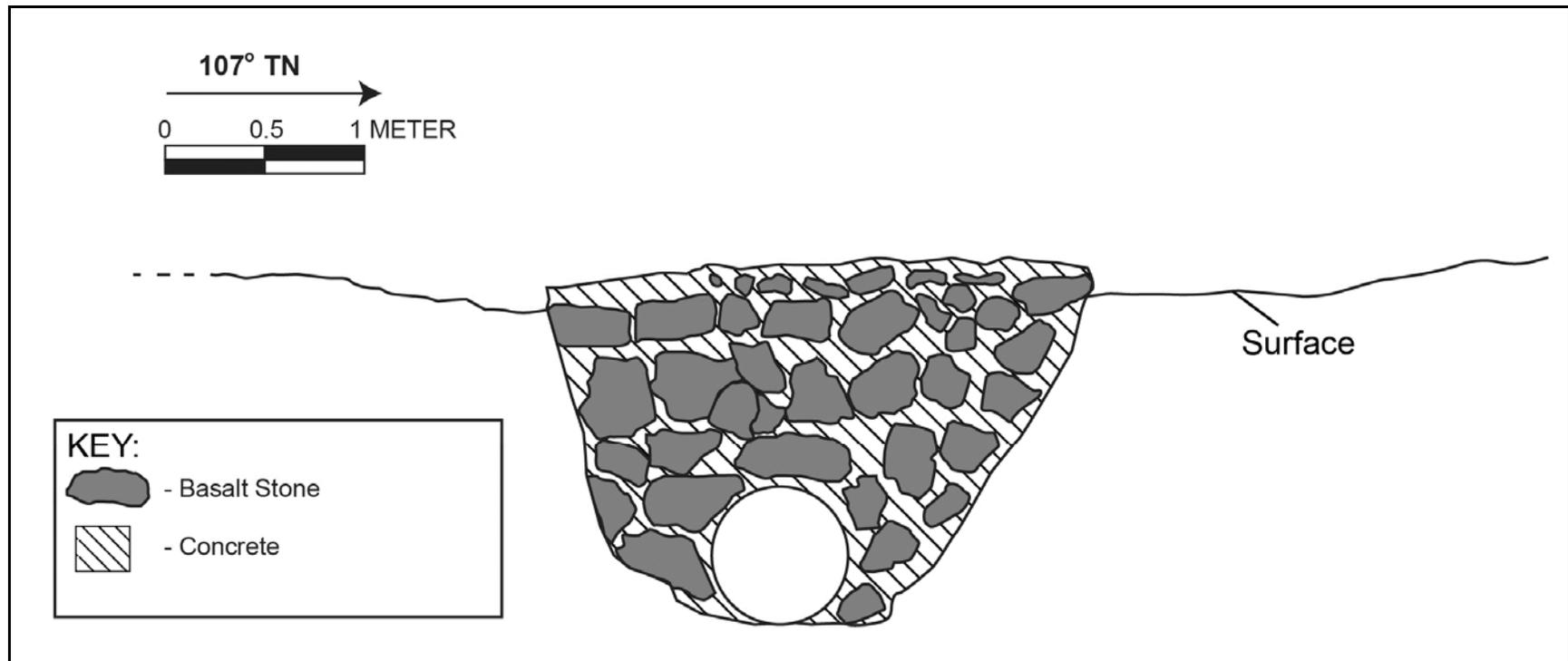


Figure 98. Elevation drawing of SIHP # 2179 Feature B1, eastern culvert

5.3.4 SIHP # 50-30-11-2179 Feature C (Irrigation Ditch and Associated Culverts and Sluice Gates)

Feature C is a section of an irrigation ditch (see Figure 74 and Figure 75 for location) that enters the project area from the north, near the parcel's northeast corner. The portion of the ditch within the project area is 209 m long. Water flowing through the ditch originating from a siphon north of the project area feeds SIHP # -2179 Feature A (reservoir adjacent to the project area). The irrigation ditch has mounded earthen berms on each side that measure 2.0 m wide and are from 0.5 to 0.7 m high. The water channel is 2.5 m wide and approximately 1.2 m deep. The current condition of Feature C is good.

Three cross section profiles (CS4 through CS6) were recorded to represent physical characteristics of Feature C. CS4 was documented to show Feature C at its northernmost section (Figure 99 and Figure 100). CS5 was documented at the central section of Feature C (Figure 101 and Figure 102). CS6 was documented in the southern portion of Feature C (Figure 103 and Figure 104).

A 1941 map of Lihue Plantation Co. (see Figure 12) shows that Feature C is the boundary between fields 39A and 39B. Irrigation ditches frequently formed the boundaries of fields. The 1963 U.S. Geological Survey map (see Figure 13) depicts a portion of the "Upper Lihue Ditch." Its location corresponds with the separation between field 39A and 39B (see Figure 12), indicating SIHP # -2179 Feature C is part of the Upper Lihue Ditch system. Feature C has four sub-features, as detailed below.

Feature C1. The northernmost end of SIHP # -2179 Feature C (see Figure 74 and Figure 75 for location) is a slightly curved culvert (Figure 105). At this end, its height averages approximately 0.90 m. The base of the culvert is constructed of concrete and small to medium angular and sub-angular basalt boulders. The culvert itself is a large deteriorating steel pipe approximately 0.60 m wide at the opening. The upper portion of the culvert is constructed of concrete-filled hollow blocks with an average height of 0.40 m on the south (ditch) side and 0.10 m on the north (surface) side (Figure 106 and Figure 107). No definite date of construction can be determined, but the difference in construction materials suggests that the culvert is historic but later modified, although the time span between original construction and later modification is indeterminate.

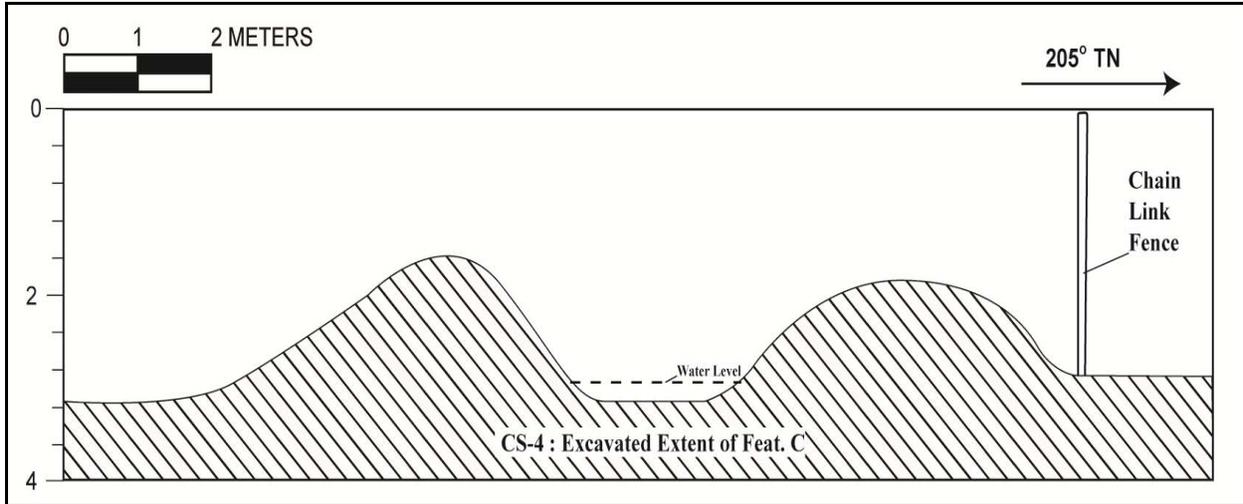


Figure 99. SIHP # -2179 Feature C, Cross Section 4



Figure 100. Photo of SIHP # -2179 Feature C, Cross Section 4, view to southeast

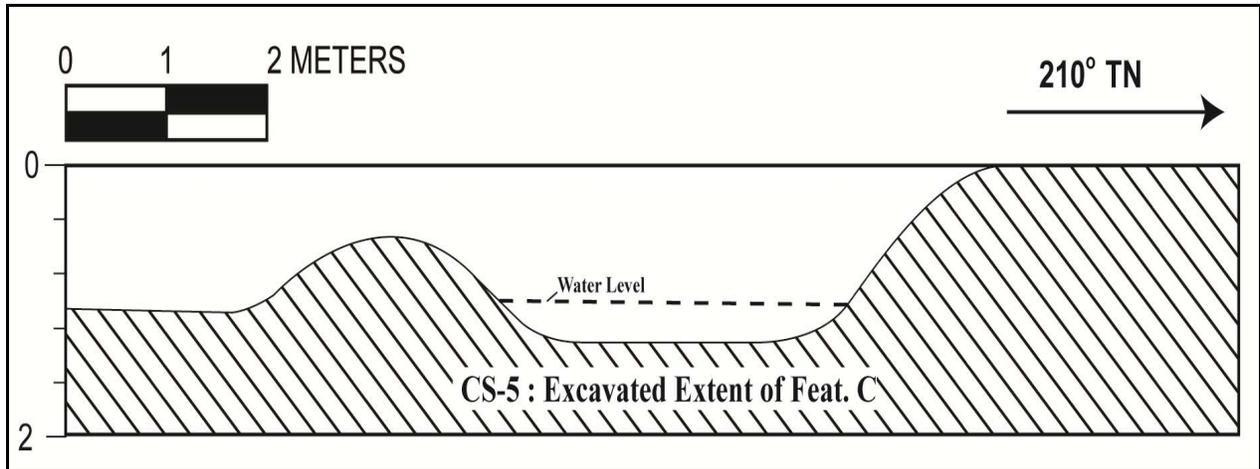


Figure 101. SIHP # -2179 Feature C, Cross Section 5



Figure 102. Photo of SIHP # -2179 Feature C, Cross Section 5, view to southeast

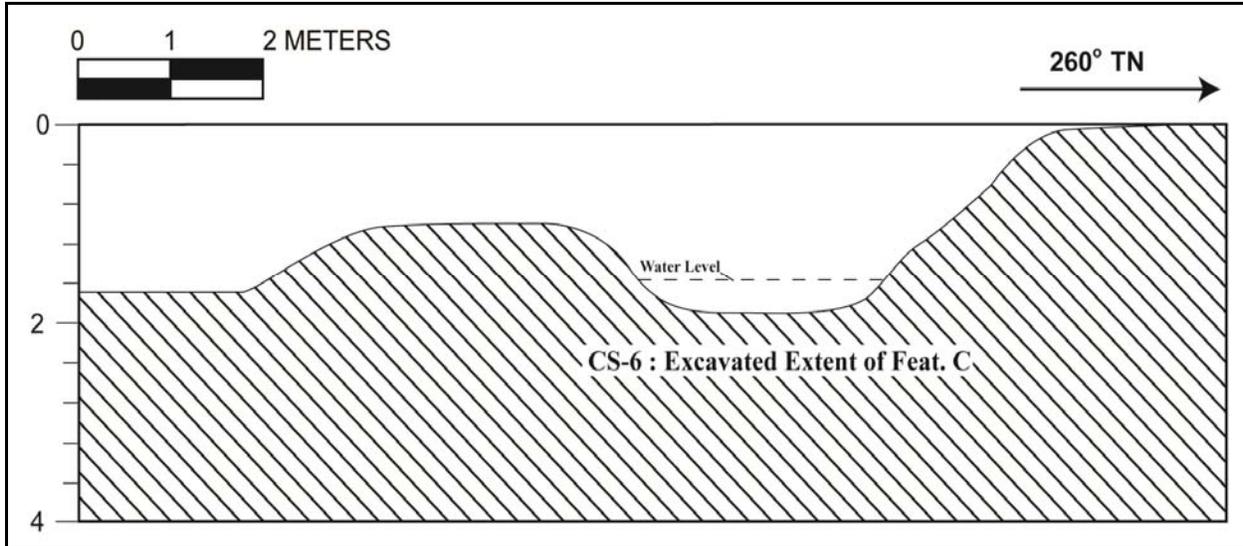


Figure 103. SIHP # -2179 Feature C, Cross Section 6



Figure 104. Photo of SIHP # -2179 Feature C, Cross Section 6, view to south



Figure 105. Photo of SIHP # -2179 Feature C1, culvert at northernmost section, view to north

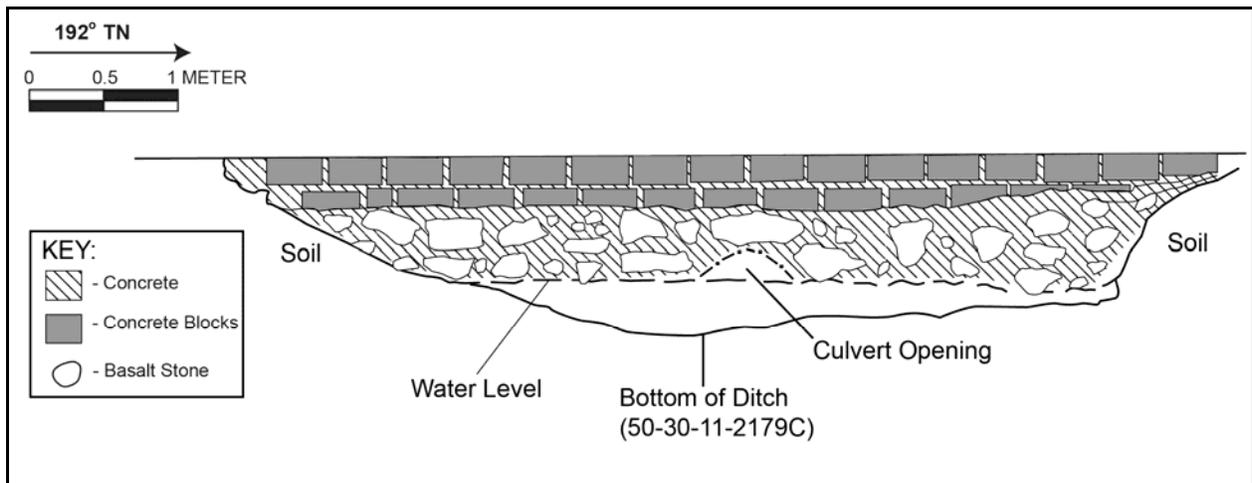


Figure 106. Elevation drawing of SIHP # -2179 Feature C1, culvert at northernmost section

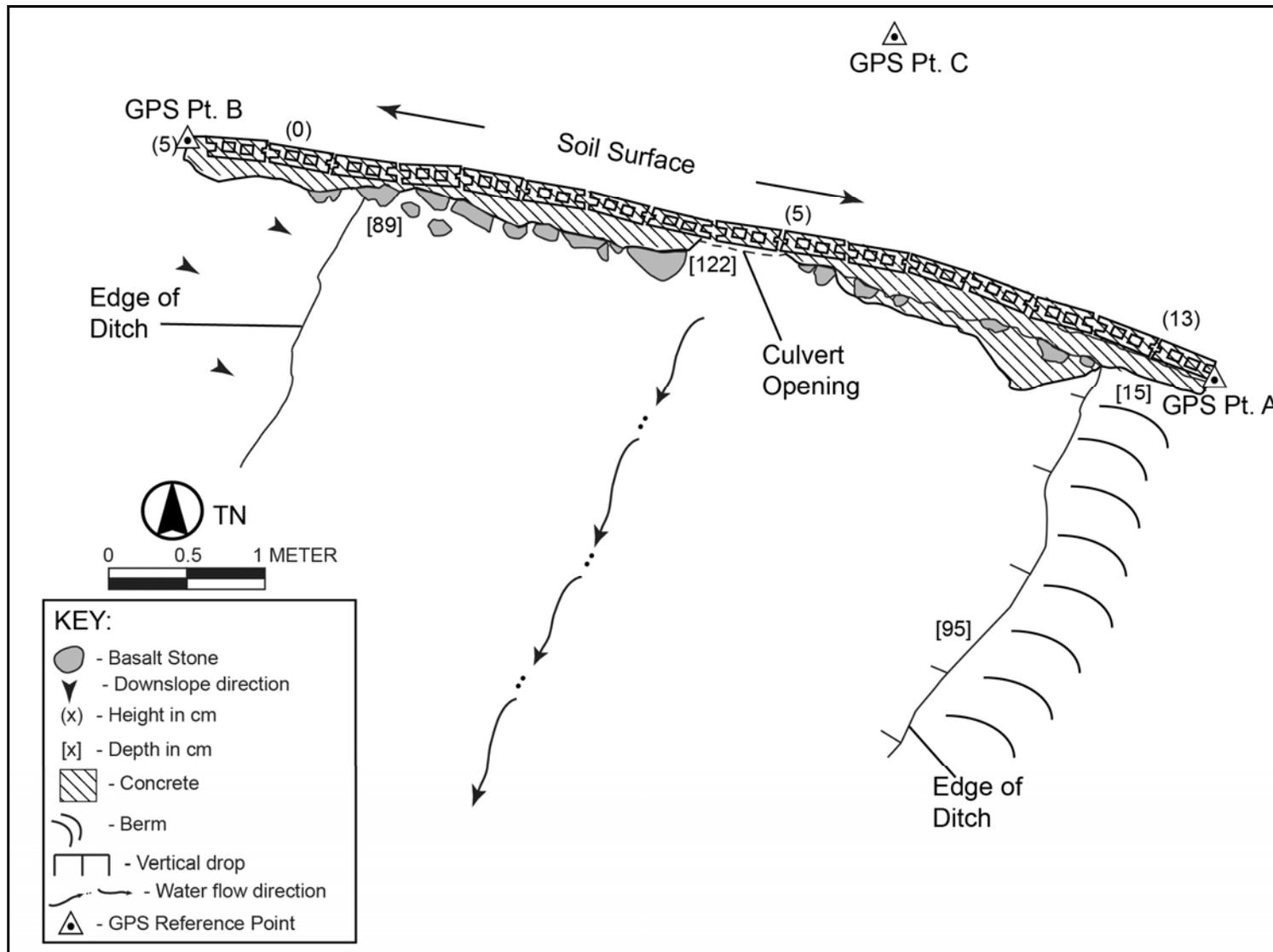


Figure 107. Plan view of SIHP # -2179 Feature C1, culvert at northernmost section

Feature C2. Feature C2 consists of one active and one abandoned vertical rising sluice gate, somewhat perpendicular to each other (see Figure 74 and Figure 75 for location and Figure 108, Figure 109, and Figure 110).

The active sluice gate lies across Site # -2179 Feature C (the ditch) in a roughly NW/SE direction. The wing walls are constructed of concrete. No rising gate was present. The gate opening measures 0.97 m wide and 1.05 m high. Adjacent to the northern side of the eastern half of the sluice gate is a small retaining wall about 0.70 m along the side of the ditch and constructed of stacked sub-angular basalt cobbles up to two courses high, with a height of approximately 0.30 m from the top of the water. Abutting the southern side of both halves of the gate are small basalt and mortar walls, likely constructed at a later date to stabilize the gate and prevent erosion. On the upper portion of the eastern half of the gate, an inscription of "6-22-76" was observed, which suggests a construction date of June 22, 1976.

The abandoned sluice gate is located on the eastern bank of Site # -2179 Feature C. The wing walls are of the same material as the active gate and appear to have been constructed at approximately the same time as those of the active gate, although the gate is cracked and broken in some places. No rising gate was present. The gate opening measures 0.70 m wide and 0.85 m high from the concrete base.

Feature C3. Feature C3 is an abandoned culvert located approximately 0.80 m north of Feature C2 (see Figure 74 and Figure 75 for location and Figure 110 and Figure 111). The culvert includes a large corrugated metal pipe measuring approximately 0.65 m wide at the opening. Around the sides and on top of the pipe are stacked angular and sub-angular basalt boulders and cobbles with concrete fill. The culvert is capped with concrete. The whole structure is approximately 0.67 m high and 1.59 m wide (Figure 112 and Figure 113).

The time of the Feature C3's construction could not be determined.

Feature C4. Two vertical rising sluice gates, one active and one abandoned, constitute Feature C4 (see Figure 74 and Figure 75 for location and Figure 114 and Figure 116).

The active sluice gate is aligned in a roughly NW/SE direction across SIHP # -2179 Feature C (the ditch). The gate has two pre-cast concrete wing walls and a vertical rising gate composed of two wooden boards. The gate opening measures approximately 0.80 wide and 1.20 m high. A large 4 in x 12 in board of treated wood straddles the ditch just southwest of (nearly atop) the active gate (Figure 115).

The abandoned sluice gate is located on the northeast bank of the ditch, perpendicular to the active sluice gate, abutting the eastern half. No vertical rising gate was present. The gate opening is approximately 0.80 m wide and 1.20 m high. The abandoned gate is made of the same pre-cast concrete as the active gate and appears to have been constructed at the same time.

Feature C4's construction could not be dated.



Figure 108. Photo of SIHP # -2179 Feature C2, consisting of one active and one abandoned vertical rising sluice gate, somewhat perpendicular to each other, view to east



Figure 109. Photo of SIHP # -2179 Feature C2, Photo of SIHP # -2179 Feature C2, view to southeast

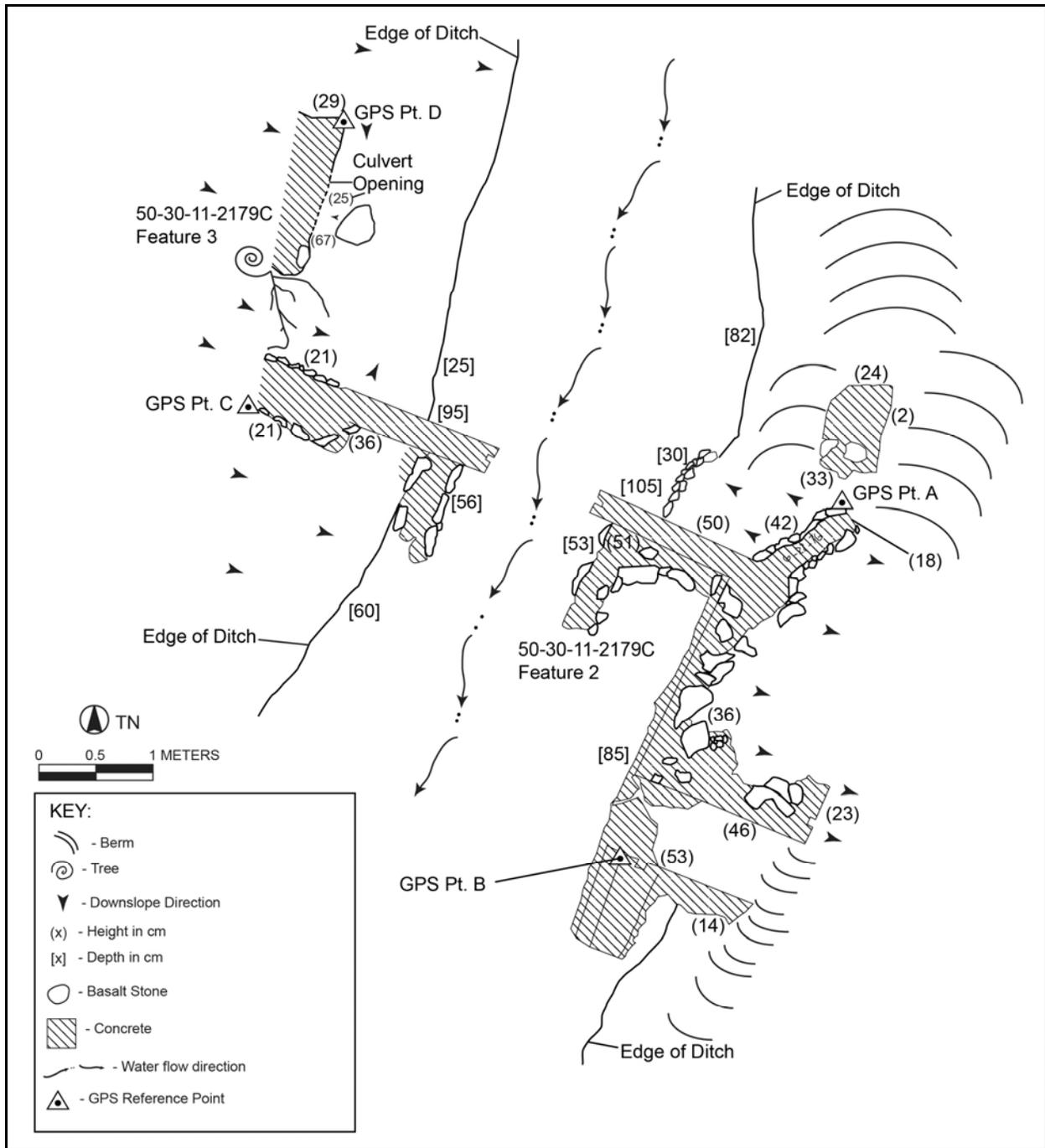


Figure 110. Plan view of SIHP # -2179 Feature C2 (two sluice gates) and Feature C3 (culvert)



Figure 111. Photo of SIHP # -2179 Feature C3, an abandoned culvert located approximately 0.80 m north of Feature C2, view to southwest



Figure 112. Photo of SIHP # -2179 Feature C3, an abandoned culvert, view to northwest

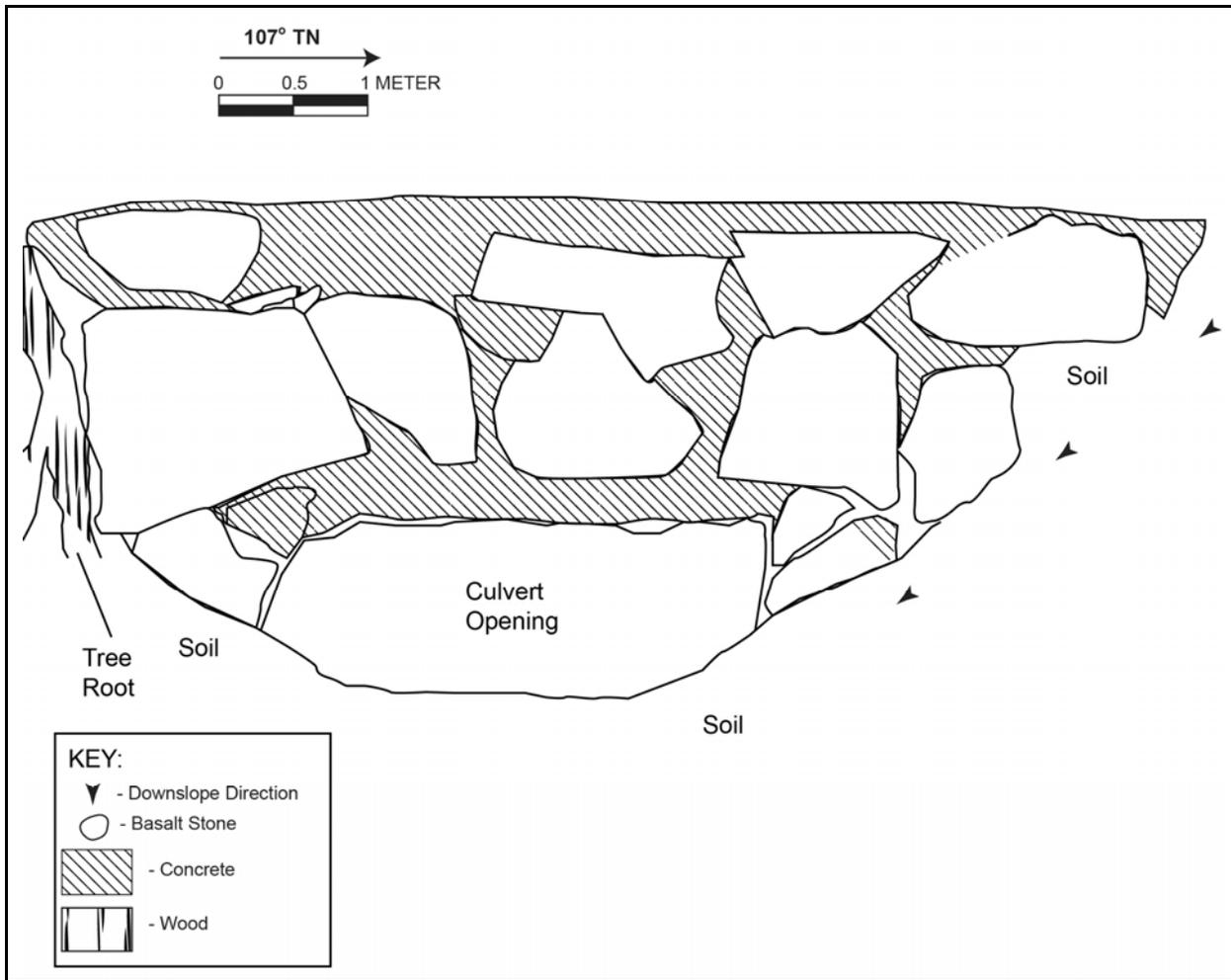


Figure 113. Elevation drawing of SIHP # -2179 Feature C3, an abandoned culvert



Figure 114. Photo of SIHP # -2179 Feature C4, one active and one abandoned vertical rising sluice gate, view to northwest



Figure 115. Photo of SIHP # -2179 Feature C4, showing the 4" x 12" board of treated wood just southwest of (nearly atop) the active gate, view to west

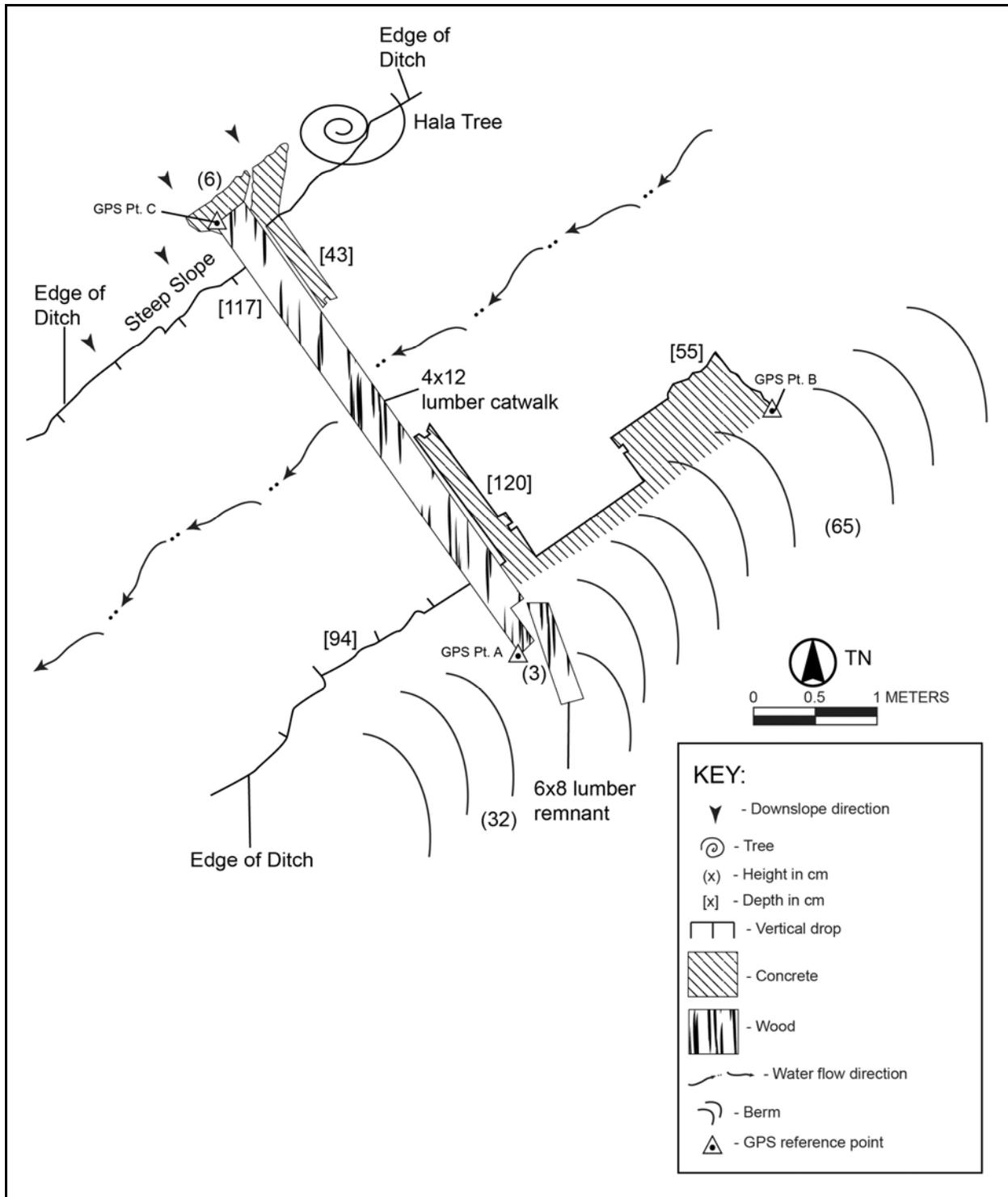


Figure 116. Plan view of SIHP # -2179 Feature C4, two vertical rising sluice gates

5.3.5 SIHP # 50-30-11-2179 Feature D (Irrigation Ditch)

Feature D is a portion of an irrigation ditch (see Figure 74 and Figure 75 for location) that bordered the southwest portion of field 39A, as shown on a 1941 map of Lihue Plantation Co map (see Figure 12). Feature D is also evident on the 1965 aerial from Foote et al. (1972) and 1977-1978 USGS aerial (see Figure 14 and Figure 15). Feature D, like Features B and C, was part of the Upper Lihue Ditch system, and also like those ditches, it fed into the Feature A reservoir. Three cross section profiles (CS1 through CS3) were recorded of Feature D prior to possible partial destruction during planned construction activities.

CS1 was documented at Feature D's westernmost portion (Figure 117 and Figure 118). CS2 was documented at the central portion of Feature D (Figure 119 and Figure 120). CS3 represents the easternmost portion of Feature D (Figure 121 and Figure 122).

A 1941 map of the Lihue Plantation Company's cane field system indicates that Feature D is located in what was once the upslope portion of Field 39A (see Figure 12). The function of Feature D was to distribute water originating from Feature A (reservoir) to flood cane fields to the east (down slope). The current condition of Feature D is poor, and is attributable to continuous modification due to subsequent agriculture-related land use and lack of maintenance.

An outlet at the westernmost end of Feature D, designated as Feature D1 allowed water to flow from the Feature A reservoir into the Feature D ditch channel (Figure 123, Figure 124, and Figure 125).

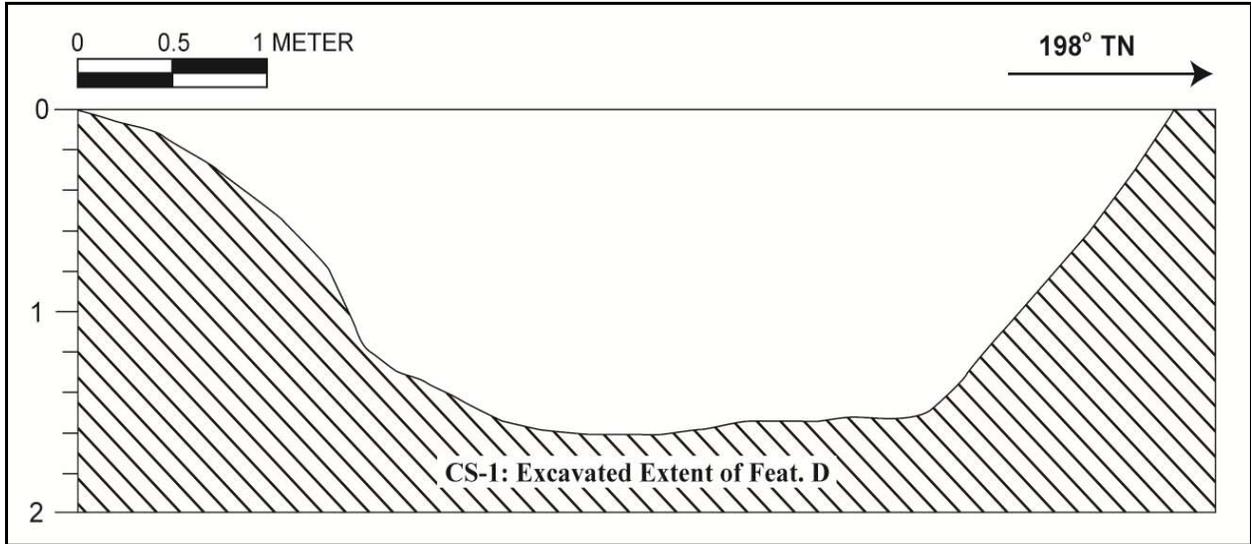


Figure 117. SIHP # -2179 Feature D, Cross Section 1



Figure 118. Photo of SIHP # -2179 Feature D, Cross Section 1, view to east

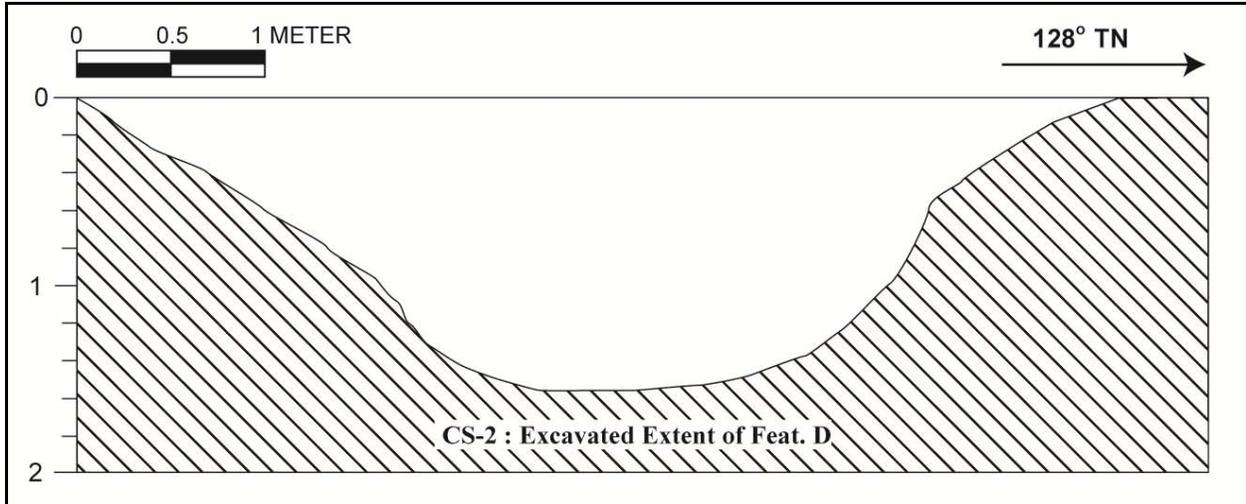


Figure 119. SIHP # -2179 Feature D, Cross Section 2



Figure 120. Photo of SIHP # -2179 Feature D, Cross Section 2, view to northeast

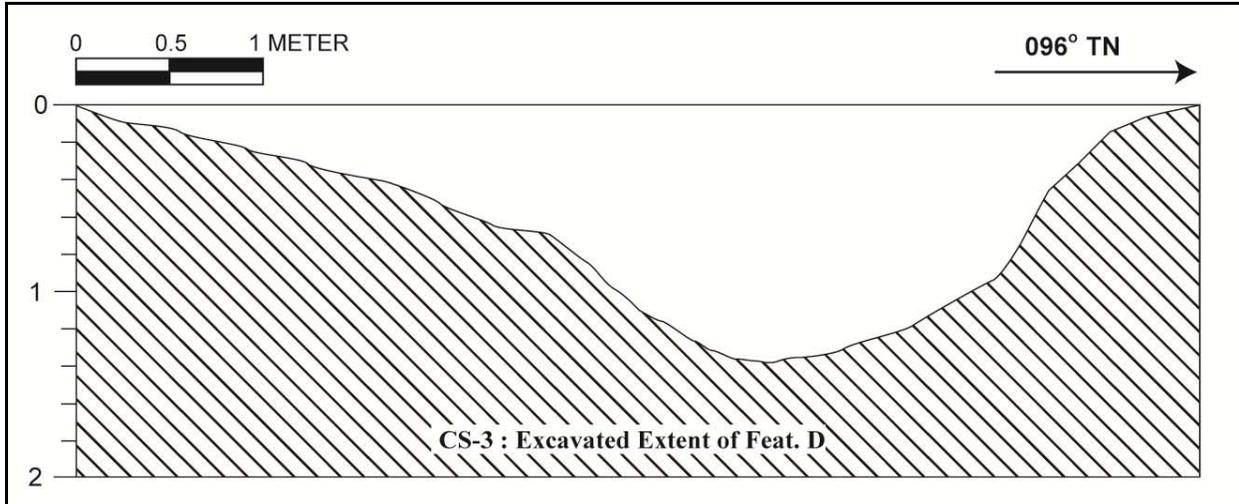


Figure 121. SIHP # -2179 Feature D, Cross Section 3



Figure 122. Photo of SIHP # -2179 Feature D, view to north



Figure 123. Photo of SIHP # -2179 Feature D1, outlet at the westernmost end of Feature D, which indicates that water from Feature A was diverted and fed into Feature D to be transported to feed cane fields to the east (slightly down slope from Feature C and Feature A), the original Lihue Plantation Company's cane field 39A, view to west

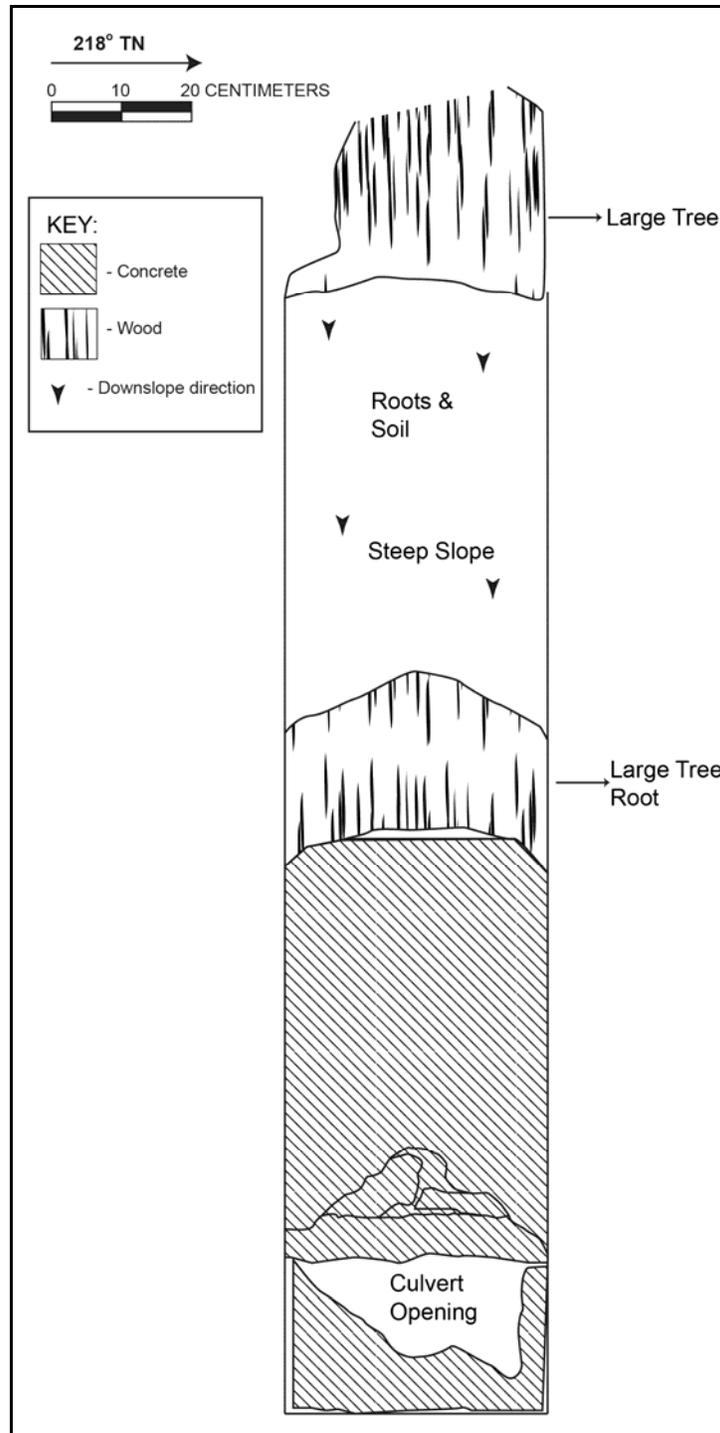


Figure 124. Elevation drawing of SIHP # -2179 Feature D1 at culvert opening in the northwest corner

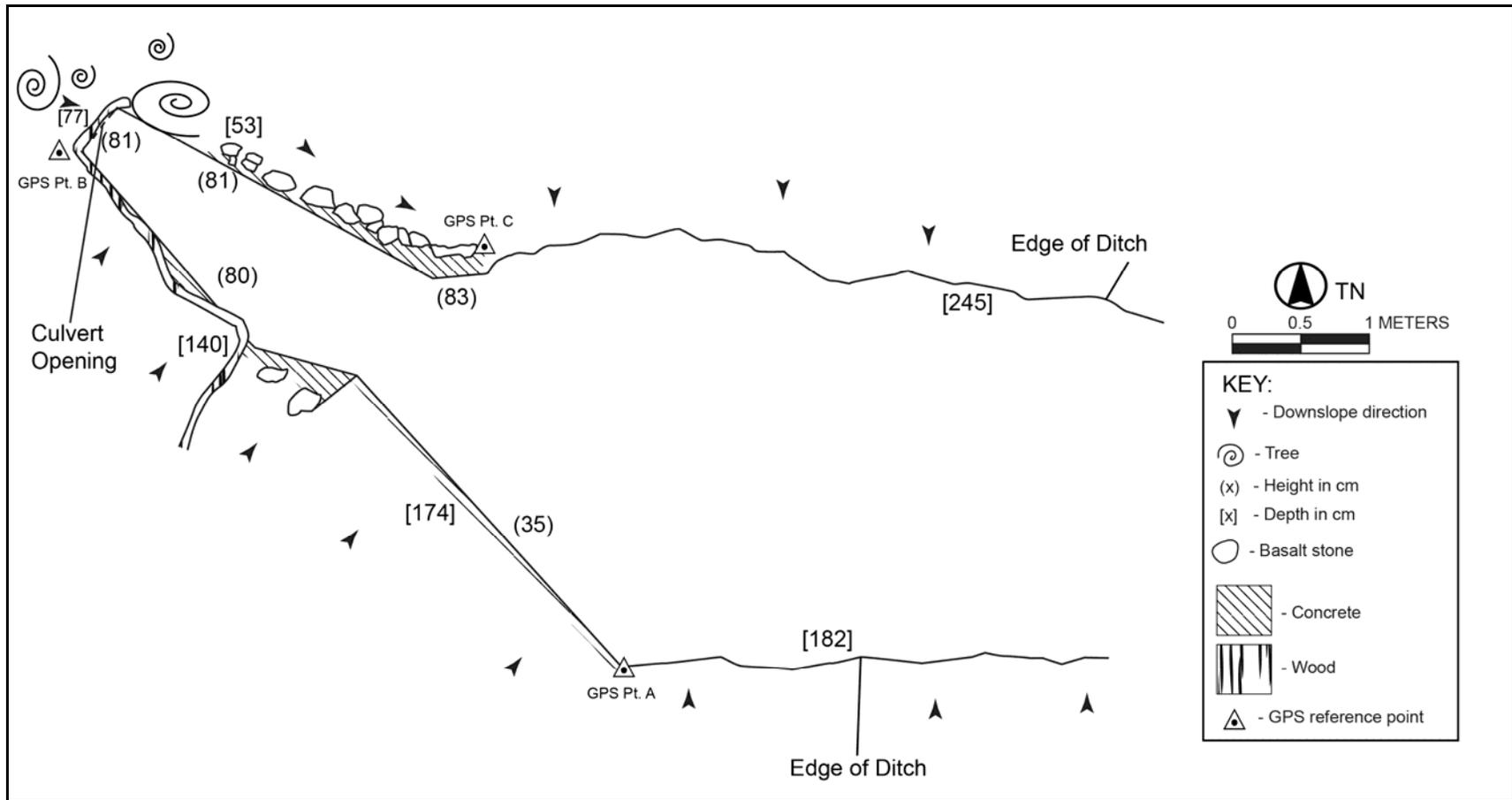


Figure 125. Plan view of SIHP # -2179 Feature D1, portion of an irrigation ditch SIHP # -2179 Feature D

5.3.6 SIHP # 50-30-11-2220

FORMAL TYPE: Hawaii Territory Survey Marker and Transit Station

MEASUREMENTS: 2.70 m long and 1.98 m wide, with a maximum height of 1.72 m

FUNCTIONAL INTERPRETATION: Survey marker

CONDITION: Very Good

TEMPORAL INTERPRETATION: Historic, territorial government survey

DESCRIPTION:

SIHP # 50-30-11-2220 is a basalt and concrete structure built over a Hawaii Territory Survey marker located on the east bank of Feature B (Figure 126 and Figure 127). The structure is approximately 2.70 m long and 1.98 m wide, with a maximum height of 1.72 m. The purpose of the structure is not completely clear (it is rather elaborate to have been intended to just protect the survey marker) but almost certainly served as a transit station as well as a survey marker (see Figure 130).

The walls are composed of stacked small to large sub-angular basalt boulders and mortar. The east and west walls are trapezoid shaped, and the south end of the east wall has two built-in steps. Part of the bank has eroded, exposing part of the west wall base.

The structure is topped with a square concrete slab with sides measuring approximately 1.85 m. At the center of the concrete slab is a “bump” with a hole and a metal pipe protruding upward from the hole. The top of the slab is also covered with hundreds of divots or small depressions (Figure 128). An inscription at the northern end of the slab reads, “KAUAI NORTH BASE 5-10-33-RTM.”

On the inside of the east and west walls, at the base, are short protruding walls made of basalt boulders and mortar, the same construction as the main outer walls. The two small walls support the metal base of a structure that includes the metal pipe that runs all the way to and through the concrete slab at the top of the larger structure (Figure 127). This metal base and pipe component is directly over the survey marker (Figure 129).

The structure appears to have functioned as a viewing or mapping platform. The metal pipe above the marker (Figure 126, Figure 127, and Figure 130) could have allowed a surveyor to set up a transit in such a way as to center a plumb bob above the marker.



Figure 126. Photo of SIHP # -2220, showing the overall structure, including the trapezoid-shaped walls, the steps on the east wall, the square concrete slab topping the structure, and the metal pipe protruding outward from the top



Figure 127. Photo of SIHP # -2220, showing the short protruding inner walls supporting the metal structure with a base and pipe that runs all the way to and through the concrete slab at the top



Figure 128. Photo of SIHP # -2220, showing the top of the cement slab with the words “KAUAI NORTH BASE” and many divots



Figure 129. Photo of SIHP # -2220, showing the Hawaii Territory Survey marker that the structure covers

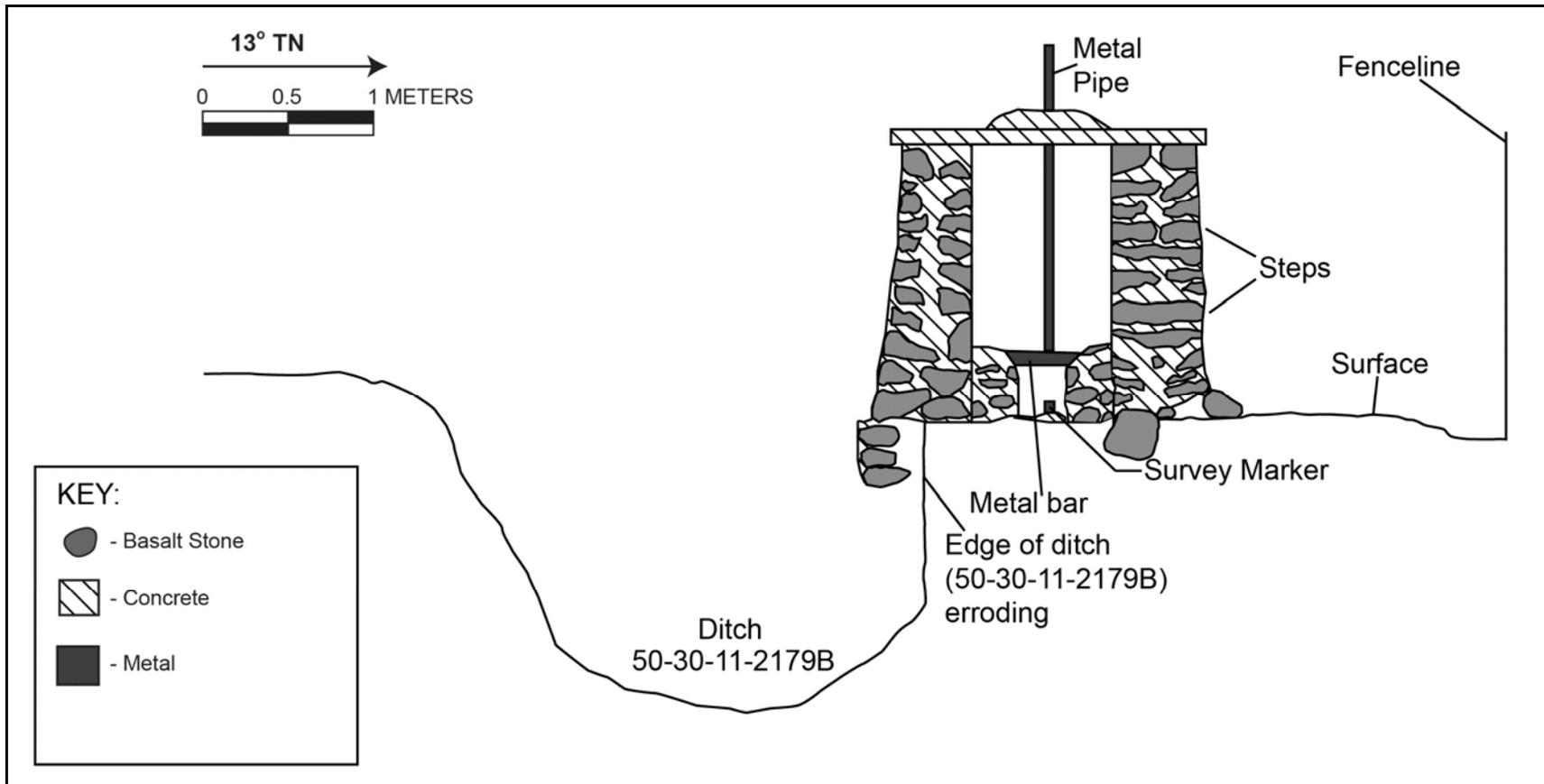


Figure 130. Elevation drawing of SIHP # -2220

Section 6 Significance Evaluations

SIHP # 50-30-11-2179, consisting of a total of four designated historic water control features related to the Lihue Plantation, was evaluated for significance according to the broad criteria established for the Hawai'i Register of Historic Places (see discussion below). The five criteria are:

- A Associated with events that have made an important contribution to the broad patterns of our history;
- B Associated with the lives of persons important in our past;
- C Embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, or possesses high artistic value;
- D Have yielded, or is likely to yield information important for research on prehistory or history;
- E Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property, or due to associations with traditional beliefs, events or oral history accounts – these associations being important to the group's history and cultural identity.

SIHP # 50-30-11-2179 has been assessed as significant under Criterion D, meaning that this historic property has “yielded, or is likely to yield, information important for research on prehistory or history.” This reflects its value to our understanding of Plantation-era infrastructure. Water control was essential to Lihue Plantation, as evidenced by the fact that water was transferred from as far away as Hanalei to the plantation (Wilcox 1996:70). SIHP # 50-30-11-2179 is part of the Upper Lihue Ditch, which dates to the early twentieth century, and extends more than 7 km (4 mi) inland. The ditch, which corresponds with SIHP # -2179 Feature C, empties into SIHP # -23179 Feature A (reservoir), and bordered Lihue Plantation fields 39A and 39B (see Figure 12). Features C and D also bordered portions of Lihue Plantation fields 39A and 39B. Features B, C, and D are all part of Upper Lihue Ditch.

The proposed project may have an adverse effect on these historic properties. In accordance with the SHPD review of the Groza and Hammatt (2013) study, an AIS was recommended to provide additional documentation of these features (October 26, 2012; Log No. 2011.0117, Doc. No. 1210SL44).

SIHP # 50-30-11-2220, a Hawaii Territory Survey Marker and transit station, also has been assessed as significant under Criterion D.

Section 7 Project Effect and Mitigation Recommendations

The following project effect discussion and cultural resource management recommendations are intended to facilitate project planning and support the proposed project's required historic preservation consultation. Table 27 summarizes project effects and recommended mitigation. This discussion is based on the results of this archaeological inventory survey investigation.

7.1 Project Effect

7.1.1 Project Description

The purpose of this project is to make additions to the Island Schools facilities into currently unused portions of the project area. These additions will include two new athletic fields at the northern and southeastern sections of the project area, and the construction of approximately eleven new buildings with associated utilities (see Figure 4). Plans to modify the existing conditions of the project area include extensive clearing and grading of its northern and eastern sides for two athletic fields and two buildings at the northeastern most section.

7.1.2 Project Effect

According to the latest design plans, Features C and D of SIHP # 50-30-11-2179, will be adversely affected by the proposed construction. Features C and D will be buried to create a usable surface for the proposed project. Feature C is an active earthen ditch through which water flows into Feature A (reservoir). This ditch will be buried and a pipe will be installed to control the flow of water currently running within Feature C. Feature D is an earthen ditch no longer in use. This ditch will be buried and the infilled area will be graded to create the surface of the south side of an athletic field. SIHP # -2179 Features A, C, and D are all components of the Upper Lihue Ditch system.

No work is planned for areas of Features A and B of SIHP # 50-30-11-2179. Feature A lies outside the project area, and will not be altered in any way for the current proposed project. Feature B will not be modified in any way for the proposed project. No work is planned for the immediate vicinity of the SIHP # 50-30-11-2220, a Hawaii Territory Survey Marker and transit station.

7.2 Mitigation Recommendations

Features C and D are the only components of historic property SIHP # 50-30-11-2179 within the project area that will be affected by the proposed project. AIS fieldwork results, site interpretation and background information on plantation-era land use of the project area indicates low potential for additional historic properties to be discovered during construction-related excavation.

In order to alleviate the proposed project's adverse effect on properties recommended eligible to the Hawai'i Register, CSH offers the following mitigation recommendations:

SIHP # 50-30-11-2179 (historic agricultural infrastructure) is likely part of Lihue Plantation, which was once in operation throughout much of Nāwiliwili. Some areas formerly part of the

plantation are still farmed today. Within the current project area, the agricultural infrastructure has lost its integrity through repeated modification, disuse and extensive ground disturbance and cannot convey its historical significance as part of this larger district. The archaeological remnants of this agricultural infrastructure still contain important information, however. Accordingly, in order to mitigate the destruction of portions SIHP # 50-30-11-2179 during the proposed campus facility expansion project, a program of archaeological data recovery, in the form of an archaeological monitoring program (per the language of HAR Chapter 13-275-8¹), is recommended. This monitoring program should comply with HAR Chapter 13-279 and focus on impacts to plantation-historic era features within the project area and to any yet unidentified subsurface historic properties that may be encountered during construction-related activities.

Because SIHP # 50-30-11-2179 consists only of surface features, the recommended archaeological monitoring should adequately address the project's effect on Features C and D of SIHP # 50-30-11-2179. An archaeological monitoring program with on-site monitoring is recommended for any future work that may adversely affect Features A and B of SIHP # -2179.

Table 27. Project Effect and Mitigation Recommendations for Identified Historic Properties

SIHP #	Site Type	Significance Criteria ¹	Specific Project Effect	Mitigation Recommendation
50-30-11-2179 Feature A	Reservoir	D	No effect	An archaeological monitoring program with on-site monitoring is recommended for any future work that may adversely affect this component of SIHP # -2179.
50-30-11-2179 Feature B	Ditch	D	No effect	An archaeological monitoring program with on-site monitoring is recommended for any future work that may adversely affect this component of SIHP # -2179.
50-30-11-2179 Feature C	Ditch	D	Partial to complete destruction	Archaeological Monitoring
50-30-11-2179 Feature D	Ditch	D	Complete destruction	Archaeological Monitoring
50-30-11-2220	Hawaii Territory Survey Marker and transit station	D	No effect	No further work is recommended as no effect is planned.

¹ See above (Section 5) for explanation of significance criteria

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