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Annual Report----- July 1, 2007 thru June 30, 2008

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## **Cultural Resources Management Projects Performed at the Pōhakuloa Training Area, Island of Hawai'i, Hawai'i.**

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## **EXECUTIVE SUMMARY**

This report documents the results of the second year of a two year contract as outlined in the Scope of Work (SOW) dated March 24, 2006 for Cultural Resources Activities at the Pōhakuloa Training Area (PTA), Kīlauea Military Camp (KMC), Keaukaha Military Reservation Resource Center Building, and Kawaihae Military Reservation, Island of Hawai'i. The contract is between the US Army Garrison, Hawai'i (USAG-HI) and The Cooperative Ecosystem Studies Unit, University of Hawai'i. This report specifically addresses projects outlined in Section 5.b.(1-10), Cultural Resources Management.

The SOW was implemented to conserve, protect and enhance the natural and cultural resources in the State of Hawai'i as well as to comply with all applicable Federal and State laws and regulations while also improving the US Army's ability to conduct and maintain military readiness. Implementation of the SOW was achieved through close coordination with and guidance from the U.S. Army archaeologist at PTA. In order to obtain this goal and ensure that proper management measures/decisions are implemented, a better understanding of the natural and cultural resources of the State of Hawai'i must be achieved.

The period of work represented in this report is from July 1, 2007 thru June 30, 2008.

The project consists of inventory survey, site identification, site monitoring, database management, site relocation, maintenance of a curation facility, implementation of monitoring schedules and various other duties performed under the SOW in support of the Army's training mission.

All Cultural Resource Management Projects are designed to meet the following requirements:

- Section 106 of the National Historic Preservation Act and associated Codes of Federal Regulations
- Archaeological Resources Protection Act (ARPA)
- Native American Graves Protection and Repatriation Act (NAGPRA).
- Army Regulation AR-200-4

The accomplishments of the 2007-2008 year related to the SOW are summarized here. More detailed discussions of specific activities that document the steps taken toward accomplishing the goals set out in the SOW are contained in the series of reports that make up the remainder of this document. The reports are of variable form depending upon the nature of the activity and the reporting technique used. These include trip reports for shorter projects, usually a day or a few days in duration, and longer reports for more in-depth projects. These are discussed in the summary below. Many figures from the original reports have been removed in the interest of controlling the size of this report; additional figures are available upon request, as are complete reports. The topics discussed here, as indicated in the SOW, include the results of archaeological site monitoring, a summary of fieldwork carried out by the PTA CRM staff in areas controlled by the Army, a summary of public outreach work, a summary of improvements to and progress in the curation process, and construction and improvements made to the GIS database and the PTA CRM database.

## **ENVIRONMENTAL AND HISTORICAL BACKGROUND**

Most of the work reported herein was conducted at the Pōhakuloa Training Area in the center of Hawai'i Island (Figure 1). Elevations for PTA range between 1,238 m (4060 ft) and 2,707 m (8,880 ft) above sea level (Shapiro, Shapiro and Cleghorn 1998:4.) The climate is relatively cool and dry. Mean annual high temperatures range from 10-15.5°C (50-60° F) (Hommon and Ahlo 1983:10.) Although

rainfall is relatively low (between 100 mm and 400 mm [4 and 16 inches]), moisture, especially on the eastern range, is observed by the occurrence of fog and mist. During the winter months, PTA may experience an occasional frost (Hommon and Ahlo 1983). PTA is covered by lava flows of pāhoehoe and 'a'ā derived from Mauna Loa and Mauna Kea Volcanoes (Hommon and Ahlo 1983:7). A majority of the lava flows that cross through PTA are prehistoric lava flows derived from the Mauna Loa volcano and date from 200-400 yr B.P. up to 10,000 yr B.P. Mauna Kea lava flows represent a small portion of PTA lands limited to the northern portion of the training areas. These flows are more than 10,000 years old. There are several recent historic era flows that originated from the Mauna Loa volcano and cross through parts of the Training Area lands. The lava flows that date to 1843, 1899, and 1935 are located on the eastern portion of the Training Area. The 1859 lava flow is the only historic lava flow on the southwest section of PTA. Soils are generally shallow at PTA and are often comprised of loamy sand, silt loam, and fine sand derived from eluvial volcanic ash and cinder deposits.

Today, PTA vegetation is primarily classified as a sparse, open, or intermediate 'ohi'a (*Metrosideros polymorpha*) tree land with sparse to dense shrub understory and some isolated communities of naio-māmane scrub woodland vegetation. The naio-māmane community includes grasses (e.g., *Eragrostis* sp.), low shrubs (e.g., 'aweoweo [*Chenopodium oahuense*] and 'a'āli'i [*Dodonaea viscosa*]), and scattered trees (e.g., naio [*Myoporum sandwicense*] and māmane [*Sophora chrysophylla*]). The invasive fountain grass (*Pennisetum setaceum*) is becoming more prevalent across the area.

Wildlife in PTA is dominated by introduced feral species. The pig (*Sus scrofa*) and dog (*Canis familiaris*) were originally brought to the Hawaiian Islands by the prehistoric Polynesian settlers. However, the modern feral pigs and dogs are descended from animals that interbred with European introduced pigs and dogs. Other feral species that were introduced historically to Hawai'i from the Old World and now run free at PTA include sheep (*Ovis aries*), goat (*Capra hircus*), cat (*Felis catus*), mongoose (*Herpestes auropunctatus*), black rat (*Rattus rattus*), and the house mouse (*Mus musculus*). Birds at PTA include many native and introduced species. Non-native bird species observed at PTA include several taxa of introduced game birds such as chukar (*Alectoris chukar*), Erckel's francolin, (*Francolinus erckelii*), California quail (*Callipepla californica*), Kalij Pheasant (*Lophura leucomelana*), Ring-necked Pheasant (*Phasianus colchicus*), and turkey (*Meleagris* sp.). Other non-game introduced bird taxa include the skylark (*Alauda arvensis*), melodious laughing thrush (*Garrulax canorus*), red-billed leothrix (*Leothrix lutea*), Japanese white-eye (*Zosterope japonicus japonicus*), northern cardinal (*Cardinalis cardinalis*), and the house finch (*Carpodacus mexicanus*) (Welch 1993:16). Native birds include the migratory kōlea (American golden plover, *Pluvialis fulva*) as well as 'io (Hawaiian hawk, *Buteo solitarius*), pueo (Short-eared brown owl, *Asio flammeus sandwicensis*), palila (*Loxioides bailleui*), 'apapane (*Himatione sanguinea*), 'i'iwi (*Vestiaria coccinea*), 'elepaio (*Chasiempis sandwichensis*), and 'amakihi (*Hemignathus virens*). Although the Hawaiian Petrel ('ua'u, *Pterodroma sandwichensis*), 'alalā (Hawaiian crow, *Corvus hawaiiensis*), nēnē (Hawaiian Goose, *Branta sandwicensis*), and at least one species of rail (*Rallidae* spp.) once dominated the landscape, these taxa are no longer commonly seen in the area (Moniz-Nakamura 1999). Nēnē are becoming more common again at PTA (Lena Schnell, personal communication 2007).

*Map removed to protect rare resources. Available upon request*



lowland settlement, being some 43.4 km (27 miles) by air west of the coastal town of Hilo and 29 km (18 miles) east of Kailua-Kona. Since there was never a permanent Hawaiian settlement in the Interior Plateau region due to the inconducive sub alpine environment, traditional Hawaiian agricultural systems of dry land taro or sweet potato were not adapted to this area. However, archaeological studies in PTA and neighboring areas demonstrate that Hawaiians nevertheless utilized this upland plateau in prehistory for various types of resource acquisition. Radiocarbon dates indicate that Native Hawaiians used the Interior Plateau region for more than 1,000 years, from ca. A.D. 775 to the nineteenth century, with the most intense use of the Hawai'i Island uplands extending from A.D. 1200 to 1700 (see Roberts, Brown & Buffum 2004 for a recent summary).

Despite the remote location of the area from the foci of settlement on Hawai'i Island, PTA is surrounded by a number of highly significant sites. Located approximately 8 km (5 miles) west of the post on the slopes of Hualālai, Ahu a 'Umi Heiau is the closest known large *heiau* to PTA. Traditional accounts state that the *heiau* was constructed in commemoration of the unification of Hawai'i Island by chief 'Umi a Liloa around A.D. 1600 (Hommon and Ahlo 1983:23; Kirch 1985:179). The importance of this *heiau* site lies in its embodiment of the actions of the chiefly ruling class and their effects on regional land use patterns and resource exploitation. To the northeast of PTA on the upper slopes of Mauna Kea, at elevations ranging from approximately 2,621-3,962m (8,600-13,000 ft) is the Mauna Kea Adze Quarry Complex, covering an area in excess of 19.4km<sup>2</sup> (7.5 mi<sup>2</sup>). Within this extensive area are large site complexes as well as smaller clusters and isolated site locations. Located just northeast of the PTA Cantonment on the lower slopes of Mauna Kea below the main adze quarry are Hopukani, Waihu, and Liloe springs. Associated spring sites exhibit evidence basalt tool manufacturing activities and subsistence items specific to different elevations (McCoy 1986).

Following European contact, a number of changes took place in the land use associated with the Interior Plateau area and PTA more specifically. Adze and other stone tool manufacture appear to have ceased relatively quickly as metal became available through trade. Even during the first visit of James Cook, metal was noted among the Hawaiians. Cattle given to Kamehameha I by Vancouver were released into the uplands of Hawai'i Island and were placed under *kapu* restrictions so that the herd would grow. These cattle became feral and impeded use of the uplands. The cattle also changed the nature of the upland vegetation, trampling what plants they did not eat (Maly & Maly 2002: 150). Residents throughout the island in the 19<sup>th</sup> century had to build walls to protect cultivated plots from feral cattle, and some large walls were constructed to protect entire communities. The sandalwood trade changed the vegetation of the uplands as well. The sandalwood trade regularly required large groups of people to hike into the mountains to obtain the wood, which was then transported to ships for transport. By the late 19<sup>th</sup> century ranches managed the cattle, and sheep and goats were introduced. Walls and other features for animal control were constructed in the uplands and across the Interior Plateau, and supporting infrastructure (watering structures, shelters for animals and humans, etc.) was built across the area. The cantonment area of PTA itself was built in 1956.

The archaeological remains found across PTA illustrate the use of this area throughout human occupation of the island. Prehistoric archaeological sites found across PTA include chill glass quarries, excavated pits, trails, lava tube habitation and water collection sites, and shrines. These sites and the physical remains found in them demonstrate the variety of activities that took place in the Interior Plateau prior to European contact. The walls and other remains of the ranching era are the legacy of the historic era use of the area.

The scope of responsibility for the PTA Cultural Resources program has expanded spatially in recent years. The U.S. Army acquired a parcel of land to the north of the training area, referred to as the

Ke'āmuku parcel in the Waikōloa Ahupua'a of South Kōhala District. This 9,176 ha (22,675ac) parcel of land was formerly used as ranch land by the Parker Ranch. Elevation on this parcel ranges from 792 to 1,708 m (2,600-5,600 ft) above sea level. The parcel is made up of grasslands with deep soil and rock outcrops, from north to south: Pu'u Pa extremely stony very fine sandy loam (PVD), Waikoloa very fine sandy loam (WLC), Kilohana loamy fine sand, Waimea very fine sandy loam, in the central portion small areas of Kaimu extremely stony peat and Kamakoa very fine sandy loam surrounded by PVD and WLC. The southern portion of the parcel includes Kilohana loamy fine sand, Pu'u Pa extremely stony very fine sandy loam, Waikoloa very fine sandy loam, Very stony land, Waimea very fine sandy loam, Kaimu extremely stony peat, and lava flows with no soil development. All are well-drained soils. The Kaimu series are thin organic soils over 'a'ā lava; the remainder are formed in volcanic ash (Sato *et al* 1973). These are based primarily on Hāmākua and Laupāhoehoe Volcanics derived from Mauna Kea eruptions (Wolfe & Morris 1996). Cinder and scoria cones are found across the parcel. The area receives about 25 inches of rain each year. The Ke'āmuku parcel was grazed for many years by the cattle of the Parker Ranch, and the vegetation of much of the parcel, which largely consists of grasses, reflects this. Scattered trees and shrubs are found across the parcel.

Historic properties are distributed across the Ke'āmuku parcel. These properties include mounds, walls, remains of ranching activities such as fence lines and a sheep station, petroglyphs and pictographs, rock shelters and lava tubes, terraces, enclosures, cairns, C-shaped structures, an historic road, and apparent remains of public works project activities. The remains span the pre-Contact through the early 20<sup>th</sup> century time periods. The area does not appear to have seen dense settlement nor intensive agriculture during the pre-Contact period, although it is closer to areas that were densely populated and intensively cultivated than the rest of PTA. A succession of livestock related activities took place in the area probably starting with the introduction of cattle in 1793 (see Escott 2004; Maly & Maly 2002). Sheep farming was developed in the area in the 1850's, and cattle ranching was developed by the Parker Ranch by 1907. Government activities took place across the landscape, including surveying, road construction, and U.S. military training beginning in World War II.

Beyond the addition of the Ke'āmuku parcel, the PTA CRM staff is responsible for managing cultural resources at Kilauea Military Camp in Ka'u District, Keaukaha Military Reservation Resource Center Building in South Hilo District, and Kawaihae Military Reservation in South Kohala District. Keaukaha Military Reservation Resource Center Building is set on Papai extremely stony muck, and the area is generally landscaped and leveled. Most of the area is grassy and open. Kawaihae Military Reservation is located on the constructed dock, with no soils or vegetation. It has been used since World War II.

Kilauea Military Camp (KMC) is a 50 acre parcel on the north rim of the Kilauea crater in Hawai'i Volcanoes National Park in the 'ili'āina Keauhou of Ka'u District at 1219 m (4000 ft) above sea level. The camp is landscaped with grass and a number of trees. Most of the soil is Heake very rocky sandy loam, with a finger of Manu silt loam at the northeast corner of KMC. The landscape is dominated by the recent volcanics of Kilauea, and earthquake cracks are found across KMC. KMC lies at the edge of the montane rainforest environment; with most of the area around KMC consisting of open 'ōhi'a forest with tall grass and a creeping fern (*Gleichenia linearis*). Temperature varies little, with highs in the low 70° F and lows generally in the lower 60° F, though dropping to around 40° F in the winter. Prehistoric land use of the area was probably related to the forest resources found in the area, including bird catching and canoe making. Western visitors have been fascinated by the volcano since the early 1800's and have visited continuously since at least 1822. For a brief period of time (about 40 years), *pulu* was harvested from *hāpu'u* fern (*Cibotium glaucum*) in the vicinity of KMC for sale abroad. Ranching was

established to the north of KMC in the early 20<sup>th</sup> century, and probably affected vegetation in the area. The National Park was officially dedicated in 1921, although it had been created by Congressional act in August 1916 (Tomonari-Tuggle and Slocumb 2000:III-29). Military activity at KMC began ten years earlier, in 1911, although the idea of establishing a permanent camp was abandoned in 1915, only to be revived in 1916. A deed for the camp was drawn up in that year; the camp was to be for training National Guard troops and for Army and Navy recreation. The camp was closed when the U.S. declared war on Germany in 1917. In 1921 the Army took control of the camp in an agreement with the board of trustees, when it was used as a vacation locale for soldiers, and was staffed by the Army. By 1930 there were 42 Army buildings at KMC and a regular staff. The camp was self-sufficient except for fuel and food. In 1925 a 14-acre portion of the camp was set aside for the Navy, which officially opened its Naval Rest and Recreation Camp at Kilauea in 1926. During the 1930's, other buildings were constructed, including a hospital, bakery, barber shop, stone cabins, building improvements and improved water catchment systems. The lease with the National Park was renewed in 1936 for 20 years, but this resolution had been slow in coming after the lease expired in 1935 and resulted in the Navy camp closing. The Navy gradually withdrew and transferred sole control to the Army. After the attack on Pearl Harbor in December 1941, recreational activities at KMC were cancelled and it served for a time as the Army Headquarters on Hawaii Island. After June 1942, KMC was re-activated as a rest and relaxation camp. Japanese aliens from Hawaii Island were interned at KMC, until the summer of 1942 by which time all had been sent to Oahu or the U.S. mainland. In 1944 a prisoner of war function was added to KMC and as many as 140 prisoners of war from Korea and Okinawa remained at the end of the war. All returned to their home countries at the end of the war. Various improvements were made to existing buildings during this time. Following the completion of war damage repairs in 1946, the Army garrison force on Hawai'i Island was closed down, and U.S. Army presence on the island was concentrated at KMC, the Army Engineer office in Hilo, operations at the General Lyman Field and the Army Port. In 1949 KMC became a subpost of Fort Shafter on O'ahu. Some new cottages, a new paint shop and a small warehouse were built, and other existing buildings were refurbished or remodeled. In 1950, with the beginning of U.S. involvement in the Korean War, KMC was put on standby status. It was reactivated in 1951, again put on standby status in 1952, and reactivated ten weeks later. Several new buildings and a baseball field were completed by December 1952. Extensive renovation of camp facilities began in March 1956. In 1960 a portion of land on the north side of KMC was exchanged for land on the east side of the camp for the new by-pass highway. The highway covered the camp's garbage dump, which was a large earthquake crack. Renovations have continued over the years to maintain the buildings and compete with other hostels, but little new construction has taken place. A portion of KMC has been determined to be eligible for nomination to the National Register as a historic district.

## **CULTURAL RESOURCES PROGRAM**

The Cultural Resources Program at PTA continues to contribute data that increases understanding of the past uses of the region, as well as managing the resources at all installations so that they may be preserved for future generations. The remainder of this summary discusses the progress that has been made under the various sections of the SOW toward the established goals. The discussion here is a general summary of the work that was done; more specific information can be found in the reports included in the subsequent section under the corresponding heading.

The SOW specifies topics to be covered in the Annual Report, which reflect the focus of activities during the year by the PTA CRM staff. These topics include monitoring of archaeological sites; fieldwork related to compliance requirements carried out at PTA, Kilauea Military Camp, Keaukaha

Military Reserve, Kawaihae Military Reservation, and the West PTA Acquisition Area, also known as the Ke'āmuku Parcel; public outreach; improvements to and progress in the curation facility at PTA; and construction and improvements made to the GIS database and the PTA CRM database. Most of these areas were addressed during the period covered by this report. The remainder of this section of the report summarizes accomplishments in each area during the reporting period, and any recommendations made as a result of the work.

### **Quarterly Monitoring**

Archaeological site monitoring shifted during this year away from a focus on sensitivity areas and to establishing a program of regularly monitoring about 30 archaeological sites. Through conversations with Dr. Lucking and Mr. Godby this evolved into quarterly monitoring. This monitoring meets requirements for site monitoring established in the Stryker Brigade Combat Team Programmatic Agreement (SBCT PA) to evaluate any effects of troop training activities on archaeological sites in the vicinity. Thirty-five sites were chosen (see Table 1) based on proximity to roads and training areas as well as the sensitivity of the sites. Sites containing rare or perishable remains were chosen, as were sites that are susceptible to artifact movement. Troop proximity to sites was of concern, as was hunting activity permitted by the installation. An initial start was made of quarterly monitoring in October 2007 before the formal list of sites was established, which is reported below in a trip report. Quarterly monitoring for the first half of 2008 was reported in trip reports that are on file at PTA, and are summarized in the reports included below.

Basic information was available for most of the sites chosen for Quarterly Monitoring, but in many cases this was not sufficient for monitors to detect changes at the sites over time. Missing information included completed site and monitoring forms, plan maps of sufficient detail to note changes in the condition of the site, and photographs. Therefore, the primary goal of the Quarterly Monitoring program was to collect the baseline data, and ensure that it was available to the field crews. During the April-June quarter most of the quarterly monitoring field work consisted of drawing a plan map of site 50-10-30-19528. This map will be used for three purposes - to help determine which associated features should be considered part of this site and which should be given separate site numbers; to help decide how monitoring of such an extensive site will be conducted; and for the purposes of monitoring to be able to recognize if there are changes to the site.

During the first two quarters of the 2008 calendar year, eleven sites were visited and photographed. Seventeen plan maps were made of features at three sites: 50-10-31-14638, 50-10-31-21671, and 50-10-30-19528. Site and monitoring forms were filled out for the sites visited during the monitoring periods, and feature monitoring forms were developed and completed to allow assessment of individual features within extensive sites as well as the overall condition of the site itself. The monitoring raised some questions about the nature of some sites, such as 21671; further research into the nature of volcanic glass technology and function is recommended to allow better evaluation of volcanic glass quarries. More baseline data collection is necessary for the Quarterly Monitoring project. The goal of visiting each of the 36 sites identified for monitoring has not yet been reached. Given the amount of data collection needed to establish baseline data from which to monitor, it is not currently clear if this goal is obtainable with the current staffing levels.

**Table 1. Sites chosen for Quarterly Monitoring**

Trinomial Prefix	Site_ID	Site Description	Reason for monitoring
50-10-31	14638	Lithic workshop with associated lava tubes	Habitation sites and 2 distinct lithic work areas (material concentrations in hundreds). Basalt quarry location on western side of Pu'u Koli.
50-10-31	18675	Quarry	Platform shrine on Pu'u Koli.
50-10-31	18676	Shrine	Second shrine at Pu'u Koli
50-10-31	21290	Platform	Cairn at Pu'u Koli
	T-0419-1	Cairn	Cairn at Pu'u Koli
	T-0419-2	Cairn	On top of Pu'u Koli
	T-092204-1	Quarry	On top of Pu'u Koli
	T-092204-2	Quarry	Wooden poles, wood loop tied with sennit, bird feathers, rock pile, indications of modern use.
50-10-31	21291	Lava tube	Volcanic glass quarry immediately adjacent to Red Leg Trail on east side
50-10-31	21671	Quarry	
50-10-22		Rockshelter, petroglyph panel, activity areas	
50-10-31	23450		Pictograph in rock shelter, surface lithics in sink 3 rockshelters, 1 modified lava tube with lithics and bird bone, lithic scatter (no density) associated with mod lava tube, 1 other lava tube with lithic scatter and assoc cairns. Apparently soil in shelters/tubes, not discussed.
50-10-31	23568	Rock shelter	Rockshelter with lithics and bird bone, enclosure, 2 platforms, 2 terraces, wall segment. Lithics noted around platforms, no density.
50-10-31	23572	Rock shelter	gourd fragment, a few lithics, bird bone; near Pu'u Koli
50-10-31	24385	Lava tube	Well stratified deposits, rich midden assemblage. A.D. 1648-1886&1668-1955. 1.2mdeposits. 9x7.5 (approx) floor area, 2m sq total excavated (2-50x50, 1-100x100)
50-10-31	5003	Lava tube	Site complex of four lava tubes, two trails, ahu/cairns, surface volcanic glass scatter. Lava tubes have extensive cultural deposits. Repeated use.
	19490	Repeated use lava tubes and trail elements	
50-10-30	10221	Lava tube	Extensive cultural deposits, monitoring mostly for ungulate disturbance, poss. Hunting Hearths, charred wood, ash deposits, charcoal, ti leaves. Entrances visible from road; monitoring would be for ungulates and as a gauge for how well the message of no lava tube entrance is getting through.
50-10-30	10265	Lava tube	Burial site. Also organic material on the surface, hearths/ovens, deposits. Monitoring for disturbance, any access into the lava tube.
50-10-30	10268	Lava tube	
50-10-30	10270	Lava tube,	Burial site. Also pathway into sink, constructed

		water collection	terraces, organic material, historic material. Monitored for entrance to lava tube, disturbance. Coconut sennit and ti leaf, at least 8 pecked water holes; bird bone appears to be natural deposition. Dense charcoal deposits.
50-10-30			
	10271	Lava tube	Hearth, organic material including adzed wood, possibly an adze handle.
50-10-30	10272	Lava tube	Modified entryway, firebrands, rock-lined fire hearth.
	19503	Lava tube	Volcanic glass quarry E of Bobcat Trail.
50-10-30	19510	Quarry, volcanic glass	Small number of fire brands and charcoal pieces, charcoal concentration.
50-10-30		Lava tube,	
	19511	water collection	Bird bone, scattered charcoal, stash of stones.
50-10-30	19512	Lava tube	Trail, definitely historic era, possibly also prehistoric.
50-10-30		Paved trail with associated platforms	Burial site, hearth, cultural material. Archaeology section of cave report missing for this cave, no mention in cave report (Howarth & Stone draft) of human remains.
50-10-21			
	23694	C system lava tube ASA 34 cave 3A	Extensive cultural remains, mostly surface, organic remains; burial site at T-104
50-10-30	5004	Habitation Cave	Burial site
50-10-30	25004	Re-burial location	Platform, wall, organic materials, hearths, paving w/grass scattered, bird bone
50-10-30	21164	Lava tube	wall, poss gourd cradle, organic material, firepit.
50-10-30	21165	Lava tube	Lithic scatter (volcanic glass); Williams and Nees say should be expanded, other lithic scatters around
	21167	Quarry, volcanic glass	
50-10-21	23527	Pictograph	Pictograph site
50-10-21	23539	Keamuku sheep station	Keamuku sheep station

## Compliance Fieldwork

PTA CRM staff conducted archaeological survey and monitoring for a number of construction projects. Many of these field projects were in support of construction projects and were related to the Army's compliance responsibilities under Section 106 of the National Historic Preservation Act and its implementing regulations (36 CFR § 800), as amended. These activities included archaeological survey in areas of proposed projects, monitoring of construction activities, and gathering additional information to facilitate drafting site protection plans. All fieldwork required in addition to the actual time in the field background research preparation in the office, data downloading and presentation (GPS data, digital photographs), and report write-up.

Six months of construction monitoring, primarily conducted by Mr. James Head, was carried out at the Kilauea Military Camp (KMC) for the US-EPA required cesspool conversion project to convert existing cesspools to septic tank systems. Sixteen systems were installed. The archaeological monitoring plan (AMP) called for documentation of subsurface soils to provide information for future management decisions in addition to standard archaeological monitoring. Historic artifacts were found during the excavation activities dating to the period of time during which KMC has been a military installation.

None of the historic buildings encountered were affected by the project, and efforts were made to maintain the integrity of the entire proposed historic district.

Some field work continued into the 2007-2008 reporting period for the Fire Access Roads (FAR) construction in support of implementation of the Integrated Wildland Fire Management Plan (IWFMP). The projects all involved monitoring initial clearance of several proposed re-routes to meet firefighting and safety requirements as well as cultural resources concerns, and construction of staging and borrow areas along the firebreaks. Seven days were spent monitoring Fire Access Road construction. The work on these roads continues, and PTA Cultural Resource staff will continue to monitor the construction when new areas are worked.

The PTA Cultural Resources staff continued to work with the fencing program to ensure that historic properties are not affected by the fence construction. PTA Cultural Resources staff continued to spot monitor fence construction, which was done on four days during the reporting period. PTA CRM staff also conducted archaeological surveys of proposed fence lines (11.6 acres were surveyed) and worked with the fence line staff to re-route fences around historic properties. The fencing project is part of the efforts to protect endangered plants at PTA, and to control ungulates in accordance with the Programmatic Environmental Assessment (PEA).

Other projects for which PTA CRM staff conducted field work included 77 acres of archaeological survey and eight days monitoring construction projects. The survey projects included the Convoy Live Fire project for the Marines across the southern end of the impact area; survey at Range 1 for an addition to the trail system; survey of a proposed staging area for construction work on the Mamalahoa Highway; and survey of a proposed trail corridor in a portion of the Ke'amuku parcel. Construction projects that were monitored included installation of waterlines adjacent to the water tanks that serve PTA, installation of a propane line, construction of a sprung shelter, installation of elevation markers on the slopes of Mauna Kea, a fuel spill cleanup project, and one instance of post-training monitoring from Stryker vehicle training.

### **Cave Mapping**

Experienced cavers were brought on as temporary hires to continue the systematic mapping of the lava tube systems at PTA. Between January 9, 2008 and April 30, 2008 caving efforts focused on continuing data collection in the D System, located on the west side of the installation, as well as in the N system on the east side of the installation. A total of 3176.12m were surveyed during this reporting period, with 264.12m at Pu'u Koli (N system) and 2912m in the D system. The confined spaces SOP was implemented during this year including the use of air quality monitors. Archaeological site monitoring was integrated into the caving program, and an increased emphasis was placed on documenting cultural remains. Six archaeological sites were monitored, and five new archaeological sites were identified. Additional time was spent in the office producing summary reports on field work for several of the last cave seasons. A draft report for the caving completed last year on the Bobcat Habitation Cave was submitted. The report is still in draft form as the map is not complete, and the archaeological work will be summarized using this map. PTA CRM staff provided support for this work in various forms, including assisting in logistical arrangements, participating in field work, assisting with data input into the PTA Geodatabase, other computer assistance, and reviewing and assisting with reporting.

## **Public Outreach**

Public outreach included visits by the group Imi Pono no ka 'Āina (Excellence for the Land), Kea'au Elementary School students, Hilo Union Elementary School students, and Boy and Girl Scouts. Young people visiting PTA participated in exercises that not only introduced them to the archaeology at PTA and past uses of the area, but also methods employed by archaeologists to study and learn from the past. These included tours of the PTA DPW Environmental Office Interpretive Garden and exercises in mapping sites and identifying and interpreting artifacts.

PTA CRM staff also participated in Earth Day activities at the University of Hawai'i Hilo and the Keauhou Outrigger Hotel, an off-site meeting, and at Rotary Club and other community meetings. For all of these events, PTA CRM staff provided basic information about cultural resources at PTA and Army policy regarding resource management. Displays were developed that discussed cultural resource management at PTA and displayed some of the artifacts and site types characteristic of the area. These displays were transported to Earth Day activities in Hilo and Kona, as well as the other meetings around the island, by PTA CRM staff who were available to answer questions as well as help people practice identifying artifacts. PTA CRM staff also helped to host visitors to PTA for Earth Day, conducting tours of cultural resources and providing information in the Recreation Center. PTA CRM staff presented the Cultural Resources portion of the Range Control Safety Brief to the military detachments that trained at PTA eleven times, and represented the Cultural Resources program for five VIP visits.

PTA CRM staff attended the Society for Hawaiian Archaeology Conference at the Keauhou Outrigger Hotel in October 2008. Senior Cultural Resource Specialist Julie Taomia presented a paper at the conference on the distribution of cultural resources at PTA.

## **Curation Facility**

Ongoing curation activities include regular maintenance of the curation facility and monitoring of the controlled environment. The curation facility was regularly cleaned and the temperature and humidity monitored. Steps were taken to ensure that animals did not infest the curation facility, including placing rodent traps around the building, examining bird nests in the air conditioning units to determine the potential of insect introduction, and controlling ant infestations. Fourteen boxes of materials were processed this year as well as some additional bulk samples. Two additional boxes of material were obtained from Garcia and Associates and returned to PTA.

## **Database Development**

This year a number of steps were taken to unify the GIS conducted for the program to bring us closer to a simpler, consistent, and efficient process. These included creating a unified file structure on the computers to hold the GIS data, pulling existing data into the geodatabase format, and establishing ArcPad software for use in collecting GPS data. The feature classes in the PTA\_CR geodatabase were revised and restructured, and several new geodatabases were created to hold base background information.

The remainder of this report contains documents that provide the details of the work conducted during the 2007-2008 reporting period. The documents are arranged in the same order that they were summarized above.



## **CULTURAL RESOURCES PROGRAM AREAS**

### **QUARTERLY MONITORING**

APVG-GT-ENV

November 27, 2007

#### **MEMORANDUM FOR THE RECORD**

**SUBJECT:** Post-Training Monitoring in Training Area 15

**TMK:**(3) 4-4-016:001 in Ka'ohe Ahupua'a, Hāmākua District, Hawai'i Island.

1. On November 7, 2007, Julie Taomia, Senior Cultural Resource Specialist, and Cary Stine, Cultural Resource Specialist, travelled to Training Area (TA 15) to record site information in an area reported to have been used for military training activities within the past six months.
2. The most recent report by Garcia and Associates (GANDA) was not located prior to the field work. Information on site location information was drawn from the ArcGIS. The report was located after return to the office, and only one site in this area had been retained by GANDA as an historic property, 50-10-31-23450 (hereafter site numbers are given only by the final designation).
3. Only a single point was available for site 23450 from the GIS information (Figure 2), therefore, while several elements of the site that had been identified by GANDA as distinct features were noted, all of the features described in the report were not sought out. A follow-up visit will need to be made to record information about all features at this site.
4. Site 23450 consists of a complex of five features set in a sink. In general the sink appears to be in good condition, as do the features that were investigated. Several rusted tin cans were noted on the surface around the sink, likely an older variety of rations.
5. A rock shelter is present on the northern side of the sink, designated Feature 1 by GANDA. The southern side of the shelter is covered with grass (Plate 1). The interior appears to be relatively undisturbed, with new plants sprouting in this part of the rock shelter. Bird bone and an opihi shell were identified on the floor of the shelter. Goat tracks and scat were present on the soil surface of the rock shelter. The pictographs on the shelter wall appear to be in good condition (Plates 2-6). The photos were taken from the western end of the pictograph panel to the eastern end.
6. GANDA designated the base of the sink, with scattered stone artifacts, as Feature 5. Basalt flakes and a portion of a basalt stalactite artifact were located on the floor of the sink (Plates 7 and 8).
7. Feature 3, a small cave in the southern wall of the sink, was investigated, but no cultural material was noted. This feature was not photographed during this site visit.
8. A large number of features in this training area were originally given the site number 23934. In the Phase II report for the project area, GANDA determined that these features were not historic properties (most were either natural features or recent military features) and removed the site number from the list. For the most part, the results of this monitoring confirmed this assessment. However, some of the features that were discounted require further assessment before they can be completely discounted as historic properties. These latter will be discussed here.
9. At db point 4, a squarish pit was observed on a ridge in an undulating landscape (Plate 9). Fine-grained basalt was present in the vicinity, but none of it was clearly worked for tool production. No cultural material was present in the pit, though a void was evident on the northeast side under a lava shelf. To the southwest of this feature along the side of the ridge was a rectangular area

- that appeared to be terraced (Plate 10). Several additional areas along this ridge and an adjoining ridge also appeared to have been modified.
10. The site designated "15" by GANDA, consisting of 3 mounds, was located. The first mound encountered is a low linear mound with no evidence of disturbance (Plate 11). It is located in a low spot in the landscape. To the north/northeast of the first mound is a second one, very tall, located at a higher elevation on an eroding tumulus (Plate 12). The surface around is rubbly. An arrow tip was found embedded in a dead tree trunk. A mammal skeleton was found to the west of this feature. Ammunition shells were sparsely distributed on the ground surface in the area. The mound is in good condition and does not appear to be disturbed. A cobble exhibiting indications of modification was also found (Plate 13). At the northern end of the eroding tumulus was a third mound (Plate 14), lower than the middle mound at the southern end of the tumulus but larger overall than the southernmost mound. The base area was similar in size to the mound at the southern end of the tumulus. A GANDA site tag was found in this mound identifying it as site T-15 Fe. A.
  11. After this, one more temporary site location was sought out, which appeared to be natural. Thunder was heard on Mauna Kea, and the crew returned to the truck, ate lunch, and returned to the office. It was mid-afternoon at this point.
  12. Site 23450 needs to be revisited so that the remaining features identified by GANDA can be documented in their current condition. GANDA's assertion that all other features in this training area are either natural or military constructions may need to be re-assessed, as the additional features described above resemble other sites at PTA that have been identified as pre-Contact Native Hawaiian sites.

Julie M. E. Taomia  
Senior Cultural Resource Specialist  
Environmental Office, PTA

*Map removed to protect rare resources. Available upon request*



Plate 1. Site 23450 to the north



Plate 2. Pictograph panel at Site 23450



Plate 3. Site 23450 Pictograph Panel



Plate 4. Site 23450 Pictograph Panel





Plate 5. Site 23450 Pictograph Panel



Plate 6. Site 23450 Pictograph Panel



Plate 7. Site 23450 Basalt Stalactite Artifact Fragment.



Plate 8. Site 23450 Basalt Flakes.





Plate 9. DB4 pit



Plate 10. Terrace southwest of pit





Plate 11. GANDA site 15, southernmost mound



Plate 12. GANDA site 15 middle mound. Photo to the east/southeast.

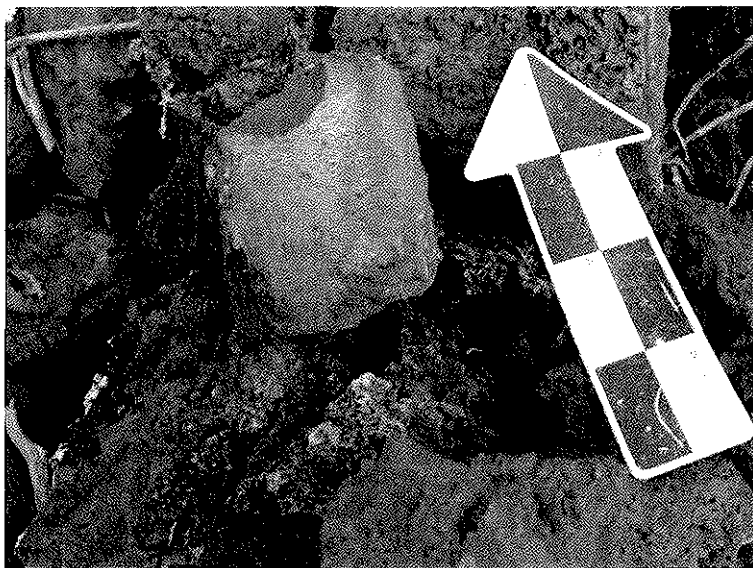


Plate 13. GANDA site 15, cobble found near central mound



Plate 14. GANDA site 15 northernmost mound, view to the east

*Prepared by*  
Julie M. E. Taomia, Ph.D.

## INTRODUCTION

Quarterly monitoring was initiated to satisfy the requirement for periodic monitoring of known archaeological sites that is called out in the Scope of Work (SOW) for Cultural Resources Activities at Pōhakuloa Training Area (PTA), Hawai'i Island as well as provisions for the SBCT Programmatic Agreement. The sites are to be monitored for human and animal damage as well as the effects of natural processes, and management recommendations made. The decision was made in consultation with Dr. Laurie Lucking, Cultural Resource Manager, and Mr. William Godby, PTA Archaeologist, that monitoring would be conducted quarterly so that any effects of training activities could be assessed.

Thirty-five sites were identified for quarterly monitoring. The sites are listed in Table 1, with a description of the type of site and justification for monitoring. Most of the sites have been assigned Hawaii State Site numbers; in these cases, only the final numerical designation is used. The formal site numbers include a trinomial prefix, which is indicated in the first column of Table 1. Sites that have not yet received a State site number are designated by the temporary site number, generally indicated by a T-DATE-#, although some other numbering systems have been used by previous researchers. Sites were chosen because of their sensitivity, the nature of the sites (unusual sites or cultural materials, particularly rich deposits), accessibility, and proximity to active training areas. An effort was made to choose sites across PTA, including two in the Keamuku parcel. Figure 1 provides a general overview of the locations of the sites identified for quarterly monitoring. The Pōhakuloa Training Area extends across several districts and ahupua'a. These include Ka'ōhe Ahupua'a, Hāmākua District (TMK (3) 4-4-016:001); Pu'u Anahulu Ahupua'a, North Kona District (TMK (3) 7-1-004:007); and Waikoloa Ahupua'a, South Kohala District (TMK (3) 6-7-001:003).

The results of quarterly monitoring during the first two quarters of calendar year 2008 are presented below. It will probably take several quarters to work out issues with the monitoring and to become familiar with the site locations. During the first quarter, only 11 sites were visited by the Cultural Resources staff (see Figure 3 for site locations; label locations are approximate). During the second quarter one site was monitored, one site was not found, and monitoring began at a third site. At many of these sites, baseline data such as site plan maps and initial site descriptions must be established as they have not been previously produced. The first task in initiating the quarterly monitoring was to collect all available documentation about the sites to be monitored and copies made for folders dedicated to the quarterly monitoring. This activity will not be necessary in the future, as baseline information for all sites will already be in the folders. Sites in the eastern portion of PTA were prioritized for monitoring during the first quarter as an intensive training episode was planned for March. In the second quarter, the emphasis shifted to sites on the western side of PTA.

Challenges that limited the time dedicated to this project during the first two quarters of the calendar year included jury duty for the Senior Cultural Resource Specialist, compliance driven survey needs, holidays, administrative duties and other staff leave time. In addition, once the intense training began the eastern portion of PTA was largely off-limits to Cultural Resource staff.

*Map removed to protect rare resources. Available upon request*

## QUARTERLY MONITORING 2008 QUARTER 1

21671 This site was originally identified by Williams 2002 as one of nine volcanic glass quarries on the east side of Redleg Trail. Approximately 300 quarry areas were observed during this project, but time constraints limited the level of recording that was possible. Site 21671 was not noted as one of the better examples of volcanic glass quarry, but was chosen for quarterly monitoring because it is adjacent to Redleg Trail and is easily accessible both on foot and by vehicle. Roberts et al 2004 conducted an eligibility evaluation of the volcanic glass quarries including 21671. The site was recommended as eligible for nomination to the National Register of Historic Places under criterion D, but no site plan map or detailed site description was made. Thirteen quarry locations were noted as features of the site.

The site encompasses a 2049 m<sup>2</sup> area and is located on a recent Mauna Loa rolling pāhoehoe flow that dates to between 200 and 750 B.P. The pāhoehoe is somewhat weathered, and lichen grows on all faces of the rock in scattered locations. 'Ōhi'a trees (*Metrosideros polymorpha*) grow across the site, puki'ave (*Styphelia tameiameia*), naio (*Myoporum sandwicense*), a'ali'i (*Dodonaea viscosa*), and various grasses are also present. A modern structure is present on the south side of the site, west/southwest of Feature 12. Between features 12 and 11 several apparent craters were encountered in an area with a large amount of shrapnel present. Pieces of PVC pipe were set in cracks across the site.

Monitoring at this site began at Feature 12, the feature most distant from Redleg Trail (see Figure 4). Features 11 (see Figure 5) and 12 were mapped, photographed and described before it became apparent that it was very difficult to discern activities related to stone material extraction for tools from other processes at the site. No hammerstones were encountered at the features visited, though the field forms from the Roberts et. al 2004 (Garcia and Associates, GANDA) project indicated that some were present. Most of the other features were visited after this to look for unquestionable artifacts, but it was not possible to find physical remains that were beyond question in the minds of the field crew. Additional research on the topic is needed to sort out this issue, and to determine if an archaeological site is being monitored here.

Feature 12 measured 11 m at 0° by 10 m at 90°. The GANDA site tag was relocated, as was a very weathered site tag that may have been placed by the Ogden crew (Williams 2002). Apparent flakes were found beyond the extent indicated by the Roberts et. al 2004 data. Large 'ohi'a trees were present at the feature, as were small naio, pukiawe, a'ali'i, grass, lichen and moss. Three areas were noted where rock appears to have been removed from the pāhoehoe. Flakes of varying quality were found across the feature. The extent of the feature was based on the distribution of the flakes. The feature basically appears to be in good condition. Goat scat was present across the feature, and 3 pieces of shrapnel were found on the feature.

Feature 11 measured 27 m at 0° by 14.5 m at 90°. The pāhoehoe at this feature was very glassy, and in many places it was observed overlying and adjacent to duller pāhoehoe. At about 26 m north of the mapping datum the pāhoehoe was ropy, though still glassy. The GANDA site tag was relocated. Some pieces with flake characteristics were noted, but there were also a number that appeared to have resulted from natural weathering processes. Loose pieces of rock were found that remained in place, but when lifted out bore characteristics of a feather termination. These pieces, though clearly natural, could easily be mistaken for the distal fragment of a broken flake. A piece of PVC pipe was set into a crack close to 27 m north of the datum established for mapping during this monitoring event, and a metal bar on the

west side of the site at about 12 m north of the mapping datum. A glassy lobe was observed that appeared to exhibit the result of a hit from ammunition. This lobe overlay a non-glassy basaltic flow. An apparent point of impact at the edge of the break on the glassy lobe was blueish black with a more glassy appearance than the surrounding rock, as if it had been heated and cooled very quickly. Feature 11 appeared to be in good condition, although the area has clearly been used. Ungulate scat was observed across the feature, a tobacco canister and a used key can opener were found, as well as the PVC pipe and metal bar. Shrapnel, shell casings and garbage from MRE packs were also noted across the feature.

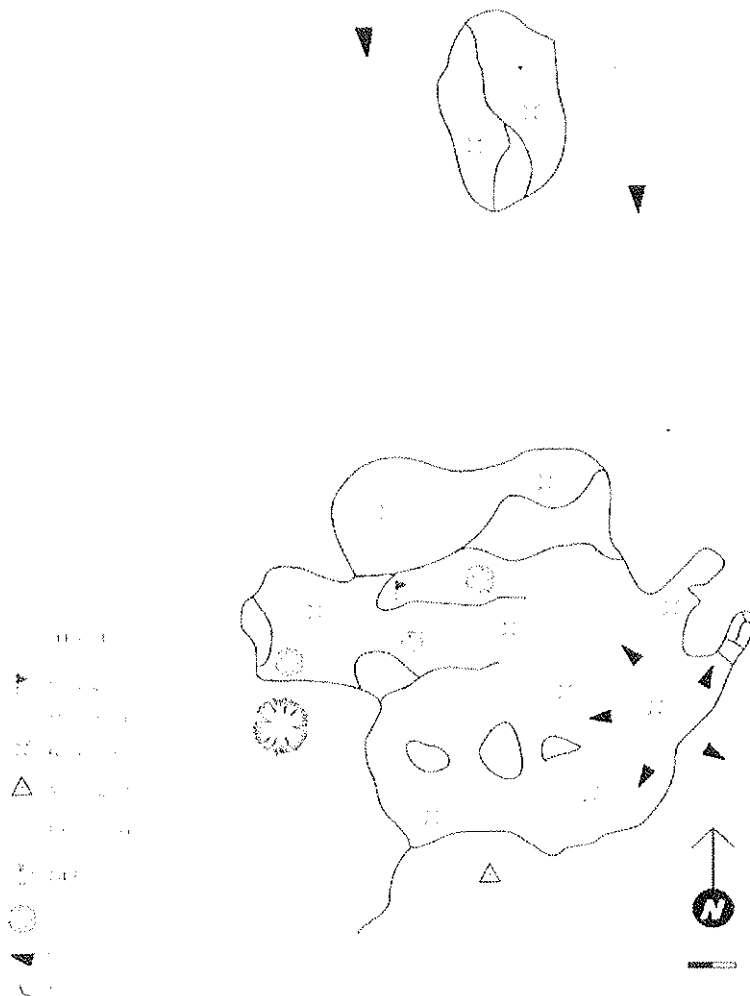


Figure 4. Site 21671 Feature 11

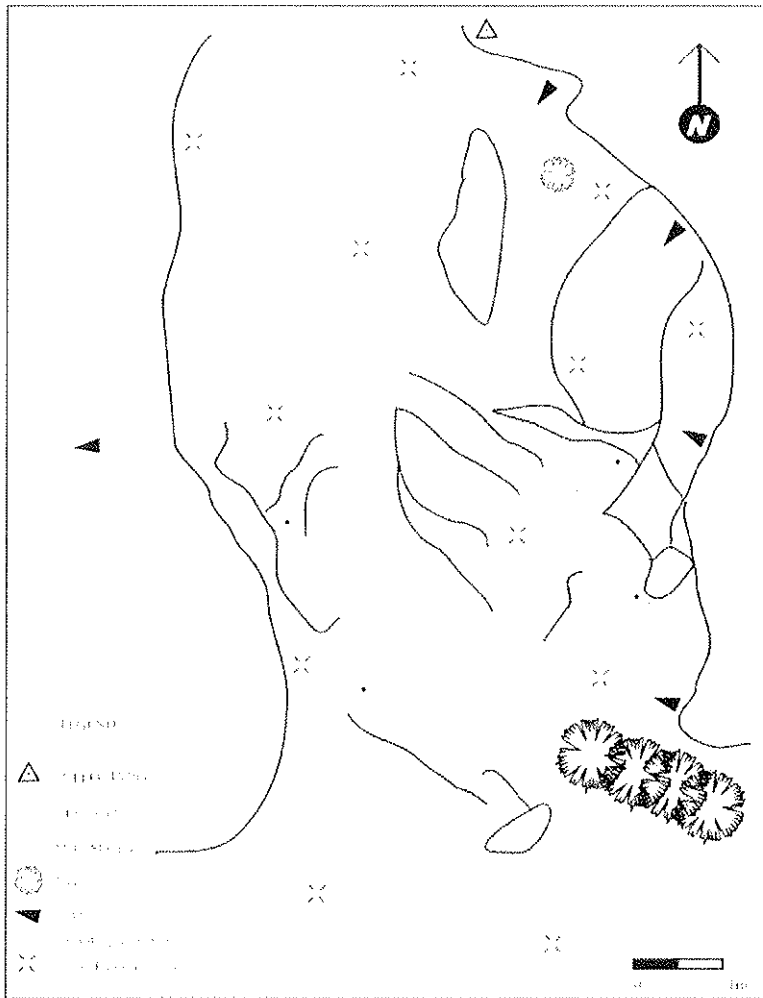


Figure 5. Site 21671 Feature 12

Most of the remaining features were visited in an effort to identify unquestionable artifacts. This was not possible, and for many of these features the GANDA field notes stated that no artifacts had been identified. After this monitoring at this site was suspended pending further research into lithic technology that can assist in quarry identification.

21290 is a rock platform on the north slope of Pu'u Koli at the southern end of Redleg Trail. The platform is constructed of stacked pāhoehoe slabs, with some placed on end. The site was first documented in Williams ed. 2002. Williams (ed. 2002) noted that there was scattered rock northeast of

the platform that might have been part of it, or another platform. This aspect of the site was diffuse and not very clear during this visit. No cultural materials were observed in the surrounding area. The existing plan maps of the site were found to be sufficient for monitoring, therefore a new map was not drawn up. Photographs were taken, and a monitoring form completed. The site appeared to be in good condition during this visit.

18676 is another rock platform on the north slope of Pu'u Koli, southeast of 21290. The platform is constructed of stacked pāhoehoe slabs and has the shape of a rectangle. The site was first reported in Shapiro & Cleghorn 1998. Collapse of the northern and eastern sides was noted at that time. The site was photographed; the existing plan map was found to be sufficient, therefore no additional plan map was made. The site is in good condition.

18675 is a fine grained basalt quarry site at the south end of a collapsed lava tube on the north slope of Pu'u Koli. The dyke that of basalt is in a scree area at the southern end of the collapsed tube and upslope from it. Basalt blocks appear to have been picked up from the scree area and moved to either side to remove flakes. The two work areas on either side of the scree and lava tube area have scattered basalt cores and flakes. The two work areas have been identified as features A and B. The site was in good condition, and there does not appear to have been any scattering of the artifacts. Goat scat was noted at Feature B.

24385 consists of three blister shelters in the collapsed lava tube north of site 18675. The site was previously recorded by PTA Cultural Resources staff. The coordinate location for this site that was loaded into the GPS placed us about 95-100m away from the actual site washer. A point was collected at the washer location during this monitoring. A dense basalt possible core and some possible flakes were identified at Feature B. A small rock that might be a manuport, and might have been used as a hammerstone, was found in Feature A. Flakes and bird bones were noted on a ledge on the western side of the blister, as was a gourd. The items noted in the site description on the eastern ledge were also located, with the addition of some feathers. Feature C was also relocated. The existing plan maps were found to be sufficient. Photographs were taken of all three features. All three features were in good condition at the time of this monitoring and no impacts were observed.

T-0419-1 is a cairn or *ahu* to the north of Pu'u Koli on a high spot on a pāhoehoe flow that slopes downward to the north away from Pu'u Koli. The site was previously recorded by PTA Cultural Resources staff. Vesicular pāhoehoe slabs are stacked between one and five courses high. The site is in good condition, with no indication of any impacts.

T-0419-2 is another cairn or *ahu* three meters to the south of T-0419-1. The site was previously recorded by PTA Cultural Resources staff. The construction and general location (on the same lava ridge) are the same for this cairn. The structure is more collapsed than the other. However, no indications of recent impact to this site were observed. The collapse is thought to be natural.

T-0419-3 are three cairns to the north of T-0419-1 and -2. The site was recorded by PTA Cultural Resources staff. These are single stacks of rocks, as opposed to the more mounded appearance that characterizes the other two features. These three cairns were not photographed during this monitoring. They are in good condition.



T-092204-1 & T-092204-2 lithic scatters on top of Pu'u Koli. We located a group of 8-10 basalt flakes at the very top of Pu'u Koli. The GPS points were different, so we took a new point. After this the crew proceeded to the next GPS point, found blocks of fine grained basalt about 20-30cm in diameter that bear some characteristics of artificial modification but were not diagnostic. Blocks were spread over an area about 7 m by 5 m to the east of the road. During our attempts to locate the coordinate locations given on the site forms, we found many places on the top of the Pu'u where fine grained basalt chunks were loose on the surface. We found what may be flakes produced by humans, but in most cases the pieces were not diagnostic. There are ATV tracks at various places around the Pu'u. Goat scat was noted, and bullet casings from a small caliber were found at the southern edge of the Pu'u. A return visit will be required to correlate the locations recorded on the site forms with the physical remains present on the Pu'u.

14638 is a site complex located in Training Area 5 at the northern end of the training areas. This site was only partially monitored. The features recorded by Welch (1993) and the University of Hawaii Field School (Bayman et al 2001) were relocated. Some of the other features that have been added through additional fieldwork by PTA Cultural Resources staff were relocated and monitored, but others remain to be monitored. The site includes several lava blisters and rock shelters, surface lithic scatters, structures, excavated pits, and modified outcrops. There are also modern structures on the site that were probably built for military training. Most of the site is located on older Mauna Kea volcanics dating to 14000-65000 BP with extensive deposits and vegetation cover. To the east, north and northwest is a Mauna Loa flow dating to 1500-3000 B.P. The easternmost features at the site may be within this latter geological unit. The topography of the site steps down almost in a series of benches from the northeast toward the southwest.

Feature 1 (also referred to as Structure 1 in Bayman et al 2001) is a structure with a pavement, hearth and enclosing basalt alignment. Basalt and volcanic glass artifacts are present across the interior of the feature as well as outside of it. Bone and shell was also identified at this site. The feature appears to be in good condition; most of the rocks are still recognizable from the map in Bayman et al 2001. Goat scat was noted across the feature, but no other recent debris was found. Fountain grass is growing out of the hearth feature. Ungulate bones, including a cranium with horns and loose horn sheaths of sheep, were noted on the surface to the north of Feature 1. Concertina wire stretches along the south side of Feature 1 to the south side of Feature 5. A GPS point was taken and the feature was photographed; the existing plan maps are sufficient, and the feature was not re-mapped.

Feature 2 is a wall (also referred to as Structure 2 in Bayman et al 2001) at the north and eastern edge of the site, on a higher elevation than and to the northeast of Feature 1. There are level areas on both sides of the wall. The wall seems to be in good condition. Basalt flakes were noted on the surface to the northwest of the wall, as was a rusted tin can. Dense goat scat and vegetation debris covered the surface on the southwest side of the wall, and possible dog feces were noted on the surface here. This area is covered with a small naio thicket that makes surface inspection challenging. A long piece of glassy basalt with a triangular cross-section was found in a crevice of the wall. The feature was photographed, a GPS point taken and a plan map was made of the feature (see Figure 6).

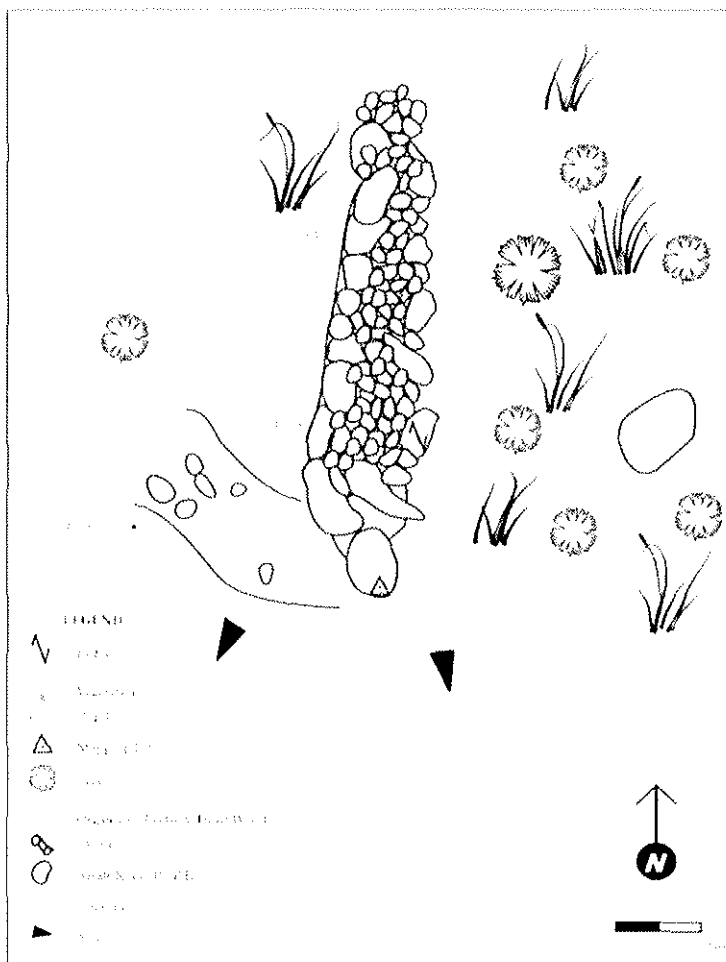


Figure 6. Site 14638 Feature 2 plan view

Feature 3 is a small lava tube blister immediately west of Feature 1 (Figure 7). Opihi shells and lithics were noted by Bayman et al 2001. Basalt flakes were present on top of the blister, some of which were quite small. The blister floor is largely covered with soil, approximately 75% of the area. Plants, including a stinging plant, are growing across most of the area, including in shaded areas. Basalt flakes were observed under the northern overhang area; the grass matting across the exposed portion makes surface visibility negligible. A can and a remnant of cloth-based tape were present in the western side near some scattered basalt flakes. Opihi shells and a bird breast bone were present on the northern side of the blister, and other sea bird bones were present. Bird bone was also present to the northwest. An oblong stone with one end broken, potentially a bird stone or pestle, was noted on the western side of the blister. Charcoal was present on the southwestern side. Volcanic glass nodules were present on the edge

of the surface on the eastern side, as were some small flakes. Goat scat was noted on the surface of the lava. The feature appears to be in good condition with very little disturbance. The blister was mapped during this monitoring project as no plan map of the feature had previously been made. GPS point was taken and the feature was photographed.

Feature 4 is a lava blister south of Feature 1. Lithics and opihi shells were noted by Bayman et al 2001. About 5-10 basalt flakes were noted during this visit in the open area during this monitoring event, and a possible mammal long bone was visible under the overhang to the southeast. Soil appears to cover the entire floor of the shelter. The exposed area has plants growing across it, and there is something of a vegetation mat on the surface as well. There is a flat area to the east/southeast of the blister that is about 4 m x 5 m with small, half fist-sized to double fist-sized cobbles and pebbles across it. A shotgun shell, rusted can, and goat scat were observed on this area. No lithics were noted here. Opihi shells were not noted. The feature was mapped (see Figure 8), photographed, and a GPS point taken. The feature appears to be in good condition.

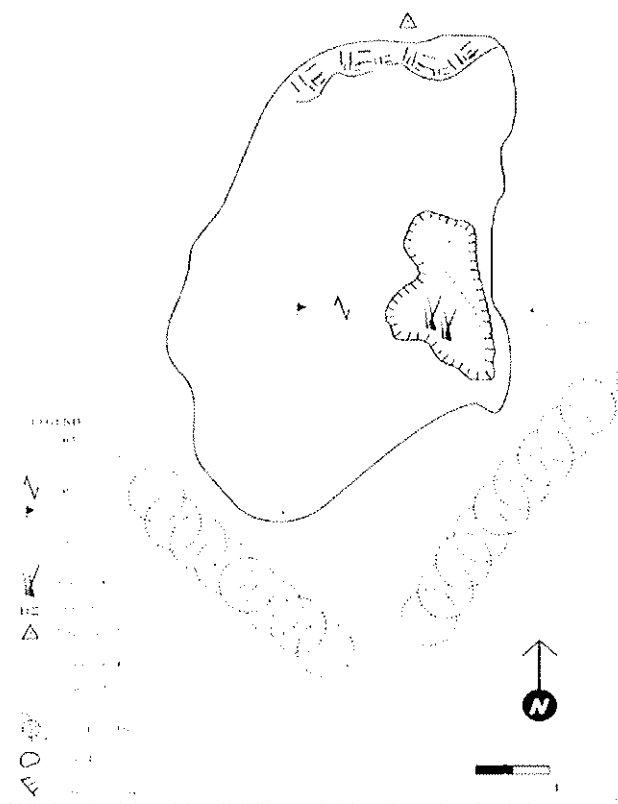


Figure 7. Site 14638 Feature 3 plan view.

Note: Grayed elements are subsurface, black are on the surface of the lava blister.



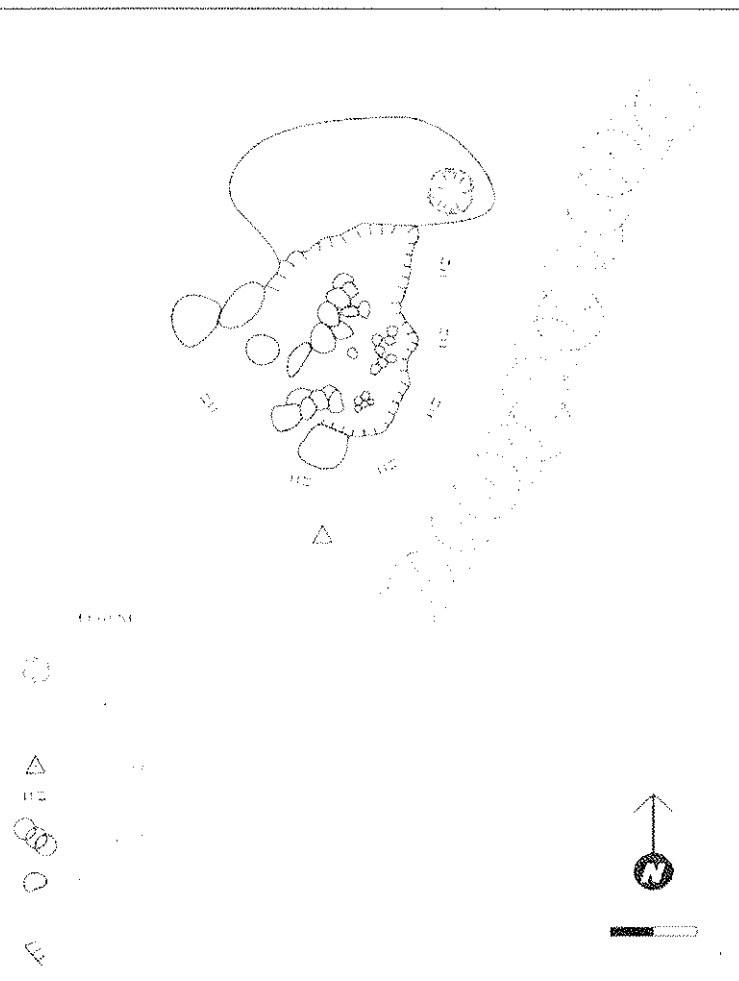


Figure 9. Site 14630 Feature 5 Plan map

Feature 8 is a small *kīpuka* with overhangs and was identified by PTA Cultural Resources staff. Approximately three naio trees are present in the *kīpuka*, the floor of which has soil deposits. No artifacts were observed within the *kīpuka*, though surface visibility was poor. A broken bird stone and an oblong rock were noted on the surface of the pāhoehoe to the west of the *kīpuka*. The feature appears to be in good condition, and was mapped (see Figure 10), photographed, and a GPS point taken.

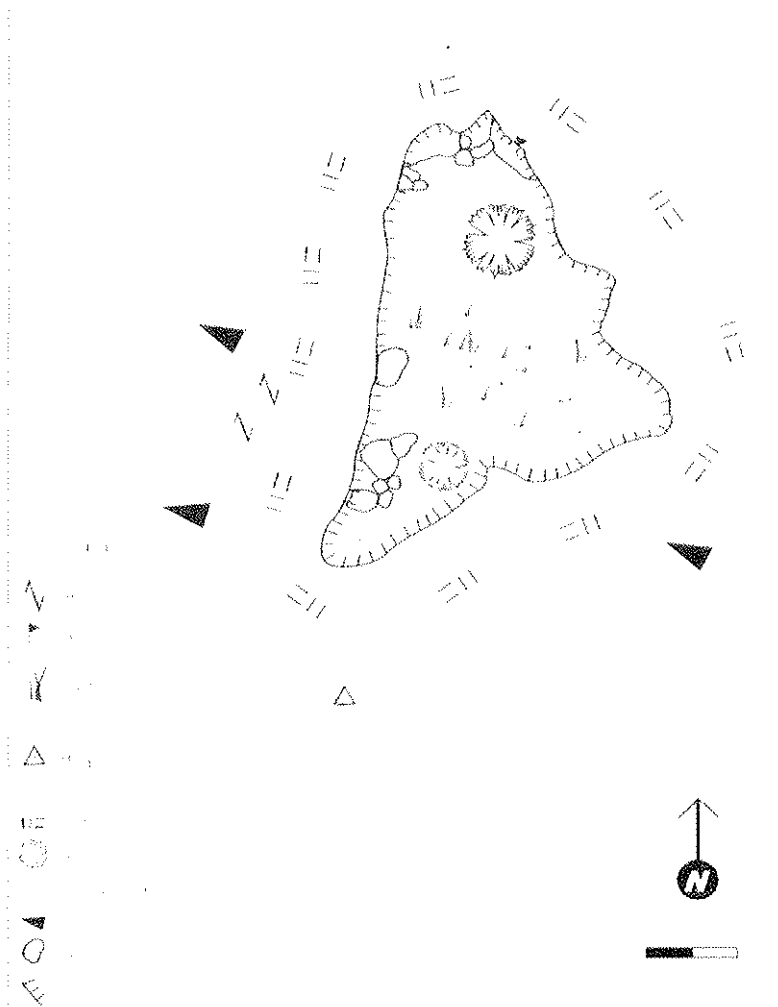


Figure 10. Site 14638 Feature 8 Plan map

Feature 9 was identified by PTA Cultural Resources staff as a lithic scatter between features 8 and 3, to the north of Feature 8. The area lies down slope from Feature 3 and the lithic scatter between features 3 and 1. Only a few nodules and flakes were located during this monitoring event. The highest concentration of artifacts was near Feature 3, indicating that they could have been deposited by water. There was no evidence of recent activity in this area. Excavation would assist significantly in interpreting this feature, and sorting out natural and cultural processes that take place in this area.

The remainder of the features were not located during the current monitoring period. Future monitoring will relocate these features. Interpretation of the site would benefit from excavation units placed in some of the features to document subsurface deposits and determine the nature of the deposits in the area.

#### CONCLUSIONS AND RECOMMENDATIONS

Monitoring was successfully carried out at ten sites, and part of an eleventh. Other projects prevented additional time for quarterly monitoring during the first quarter of calendar year 2008. Much of the field time was spent gathering baseline data that had not been collected in the past, particularly plan maps. In addition, relocating many of the sites and features was a challenge. The time spent on these activities will diminish as the project progresses and the crew becomes more familiar with the site locations, and as baseline data is established. In general, no notable disturbance to the sites was noted. Rubbish was present at many of them, but this had been noted in the past.

The primary recommendation is to dedicate more time to this activity. Some time also needs to be dedicated to gathering specific information on depositional processes that affect the sites, as well as the nature of the cultural material likely to be found so that the nature of the sites and the resources that are being monitored is better understood. In particular, a detailed lithic analysis of materials recovered from habitation sites at PTA would assist in understanding the type of material culture that was used in the past. This will assist in evaluating sites such as the volcanic glass quarry areas. Understanding the nature of natural processes on the materials in this area will also assist in evaluating physical remains as cultural or natural phenomena. Staff members who have previously visited site T-092202 need to participate in a future visit to assist in locating the lithic scatters referenced on the temporary site forms. It is also recommended that monitoring at site 21671 be put on hold until such time as the nature of the cultural resources to be monitored can be clarified. There do not appear to be any imminent threats to the sites visited during this quarter.

## PHOTOGRAPHS



Plate 15. Site 21671 Feature 12 photo to the north-northwest. Extraction area with lithics on northeast side of site.



Plate 16. Site 21671 Feature 12 photo to the southeast. Extraction area and lithics on the east side of the feature.





Plate 17. Site 21671 photo to the north, west side of feature



Plate 18. Site 21671 Feature 12 Large piece of shrapnel on north side of feature



Plate 19. Site 21671 Feature 12 overview photo from mapping datum to the south



Plate 20. Site 21671 Feature 11 Extraction location and artifacts, interface of glassy and dull lava, photo toward the south.





Plate 21. Site 21671 Feature 11 photo to the south. Extraction area with artifacts, flow interface. Possible ammunition impact area on the right of the photo.



Plate 22. Site 21671 Feature 11 photo to the west.



Plate 23. Site 21671 Feature 11 Overview photo to the north



Plate 24. Site 21671 Feature 11 Overview photo to the south, toward mapping datum.



Plate 25. T-092202 vicinity, possible lithic scatter



Plate 26. Site T-092202 area Second lithic scatter, to southeast of previous photo. Photo toward the southwest.



Plate 27. Site T-092202 vicinity. Possible lithic scatter 2.





Plate 28. Site 21290 to the north-northeast



Plate 29. Site 21290 Photo to the west.



Plate 30. Site 21290 to the South-southeast. Photo from site tag.

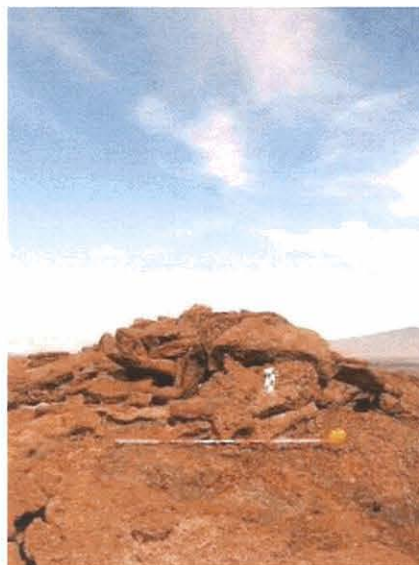


Plate 31. Site 21290 Photo to the north



Plate 32. Site 18676 photo to the north

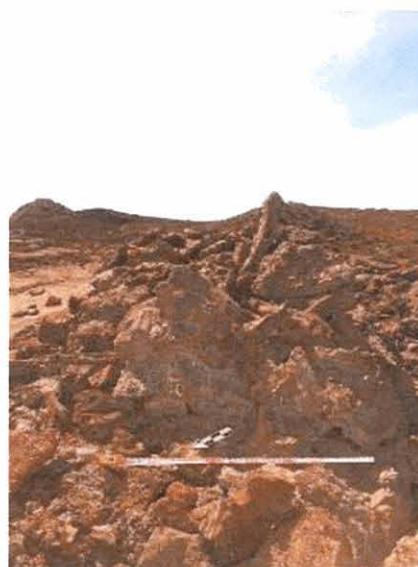


Plate 33. Site 18676 photo to the southeast



Plate 34. Site 18676 photo to the south-southwest



Plate 35. Site 18676 photo to the northeast





Plate 36. Site T-0413-1 photo taken to the west



Plate 37. Site T-0419-2 Photo to the southeast



Plate 38. Site 24385 Feature C facing west



Plate 39. Site 24385 Feature A facing west



Plate 40. Site 24385 Feature B facing northeast



Plate 42. Site 14638 Feature 3 facing southwest



Plate 41. Site 14630 Feature 4 photo to the west



Plate 43. Site 14630 Feature 1 facing east





Plate 44. Site 14638 Feature 5 facing northwest



Plate 45. Site 14638 Feature 2 facing east



Plate 46. Site 14630 Military Feature 1 facing northeast



Plate 47. Site 14638 Feature 8 photo to the west



## QUARTERLY MONITORING 2008 QUARTER 2

10268 is a lava tube site with six openings. Two of these are sinks that provide access to the lava tube (Sinks A and F) while the other four are skylights. The site tag for 10268 was located, but no sinks matching the descriptions of A or F could be found. It appears that the lava tube with the site tag is parallel to 10268. Sink A is said to provide the easiest access and have extensive modifications with a terraced talus slope leading into the lava tube (Reinman & Schilz 1999). No sink with any modifications was found despite extensive search. The area will have to be revisited to locate the site.

23450 is a sink with five features recorded by Brown et. al 2006. Feature 1 is a rockshelter overhang with pictograph panels in red. Feature 2 is a stack of rocks near the base of the sloped area that provides a natural entry way into the sink. Feature 3 is a small lava blister opening, as is Feature 4, and Feature 5 is the floor of the sink, where lithic artifacts are scattered. The site was basically in good condition, though goats use the Feature 1 rockshelter to sleep. Some form of restricted access to the sink would better protect the pictographs, which could be rubbed or butted by the goats. The existing site plan map is sufficient for monitoring.

19528 is a trail that runs along the western boundary of PTA. The site was documented in a Phase I survey by PTA Cultural Resources staff in 2005 (Escott 2007), and had been previously noted (Shapiro & Cleghorn 1998). The initial field visit for this site sought to establish whether a point recorded in the PTA Sites GIS did in fact have some relationship to the northern end of the trail. Previously the northernmost end of the trail had been documented about 850m southwest of this point, and an effort to located more trail segments north of that location were unsuccessful. This old point was pursued, and within about 50m trail segments were identified. The trail continued to the north, ending in an area that had been significantly affected by firebreak construction during a fire in the 1990's. A possible platform was located on top of a high spot just north of the last clear segment of trail, but no additional trail was identified.

An attempt was made to locate trail segments between the newly discovered trail segment and the northern portion of the previously recorded trail. The area between the two portions is primarily pāhoehoe lava, over which trails are not usually built because travel is easy. No cairns were noted along the potential route connecting the two segments. Two temporary sites were visited during this attempt. Site T-012805-01 is a low rock overhang in a lava blister with a low mounded cobble and boulder wall located in the pāhoehoe. It is about 450 m south of the northernmost segment of 19528, and 430 m from the trail to the south. Although this site may have been used by people traveling on the trail, it should be given a separate site number as any connection with the trail is conjectural. Site T-060206-10B was also revisited; this is a low platform 1.2 x 2.0 m on a natural 'a'a hillock. The feature is over 40 m northwest of a point given for site 19528 by Pearthree, Howarth and Stone (1996), and over 150 m north-northeast of a trail segment recorded during the 2005 fieldwork. Therefore the site should be assigned a separate site number.

The remainder of the field visits during this quarter were spent mapping the trail to a level that will both assist in making a determination about how the site, which is almost 6 km long, will be

monitored and provide the field crew with an accurate baseline from which visits to judge if the trail has been disturbed in any way. Twenty-seven plan maps were produced, covering about 324 meters. Mapping began at the northernmost end of the trail and proceeded southward in 12 m increments. Twenty-six of the field maps are presented below; one (AA-4) remains to be field checked to clear up some uncertainties that arose during the drafting.

The trail is generally in good condition where it has not been crossed by bulldozer activity. The construction incorporated basalt boulders and other elements of the landscape around the trail. In some places there is curbing along the sides, in others this is absent. Some sections are densely paved, while others have more sparse paving. The landscape around the trail in this northern section consists primarily of undulating 'a'ā and pāhoehoe lava. In places where the trail crosses a low spot, a causeway-like structure is built up.

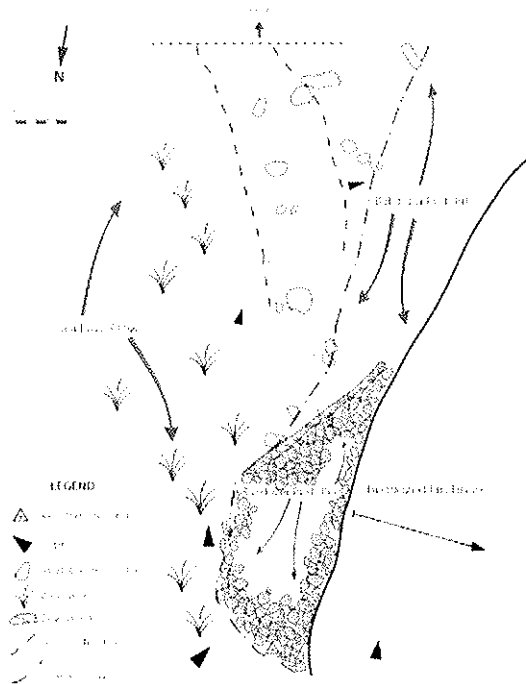


Figure 10. 19528 Trail, mapping segment AA-1, at the northern terminus of the trail with areas of dozer impact indicated.

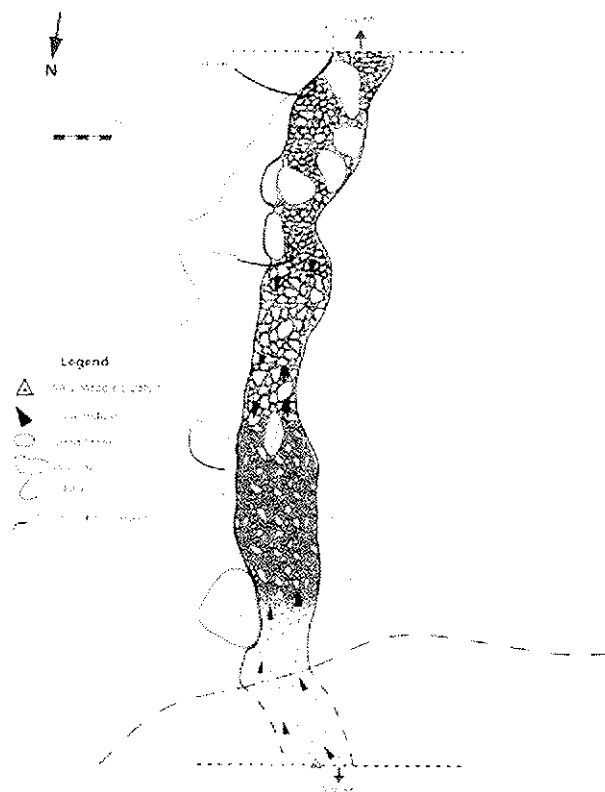


Figure 11. 19528 Trail, mapping segment AA-2, near the northern terminus of the trail with areas of dozer impact indicated.

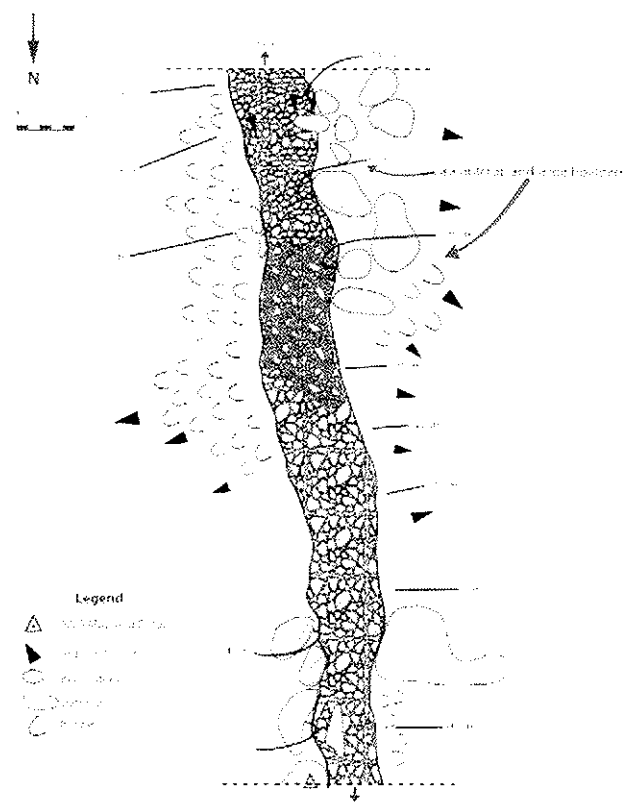


Figure 12. Site 19528 Trail segment AA-3 plan map.

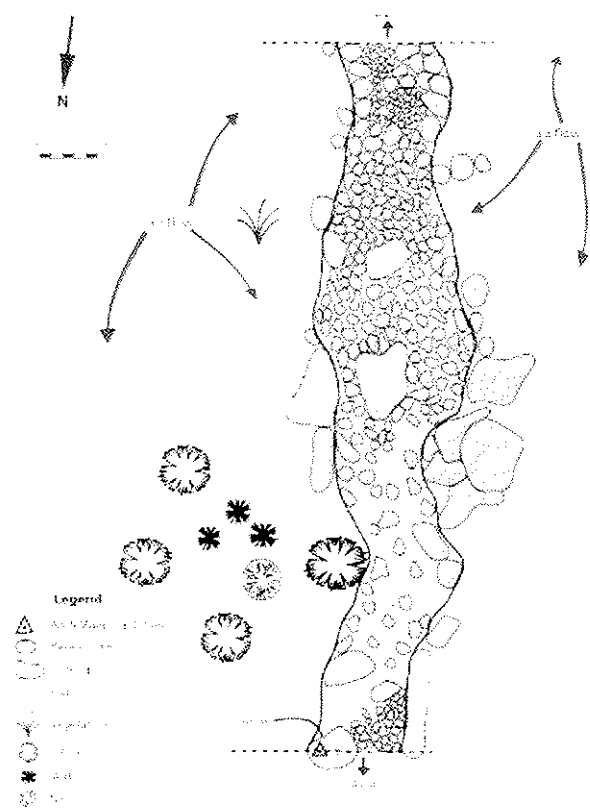


Figure 13. Site 19528, Trail Segment AA-5 plan view.

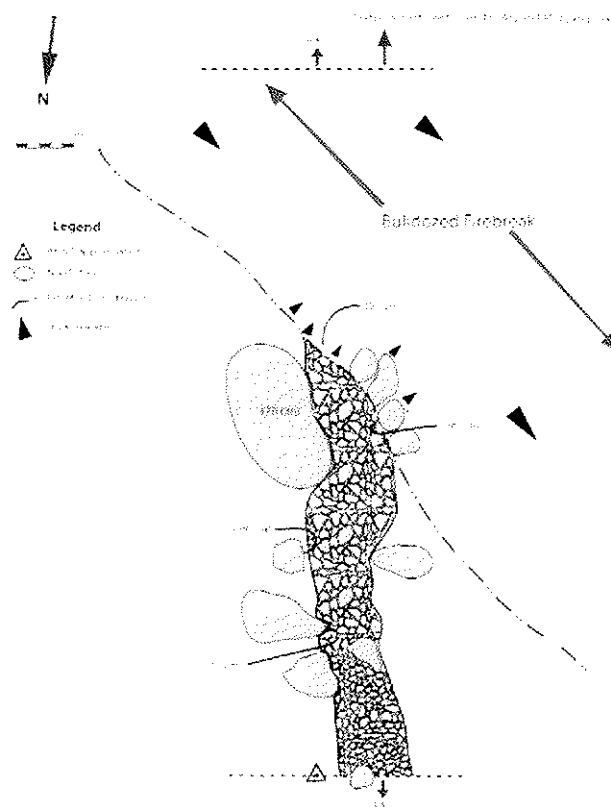


Figure 14. Site 19528, Trail Segment AA-6 plan view.

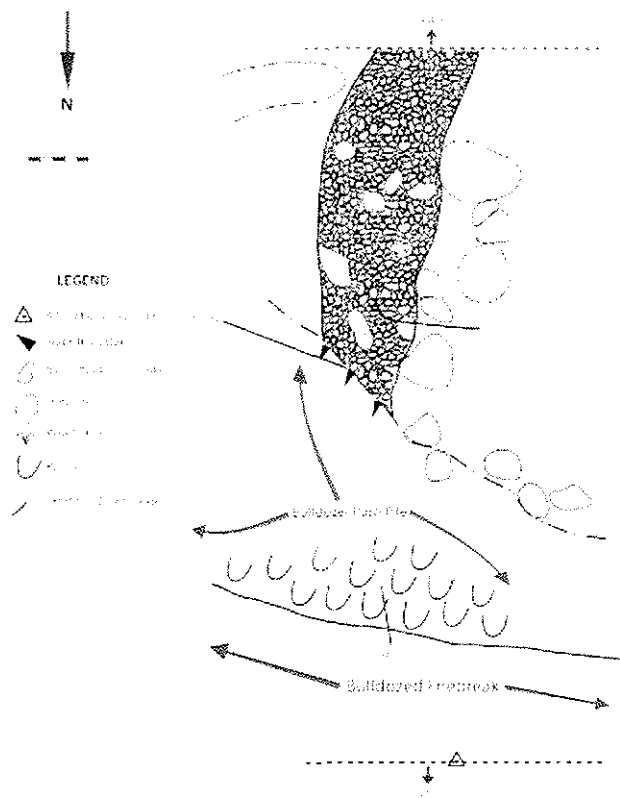


Figure 15. Site 19528 Trail Segment AA-7 plan view.

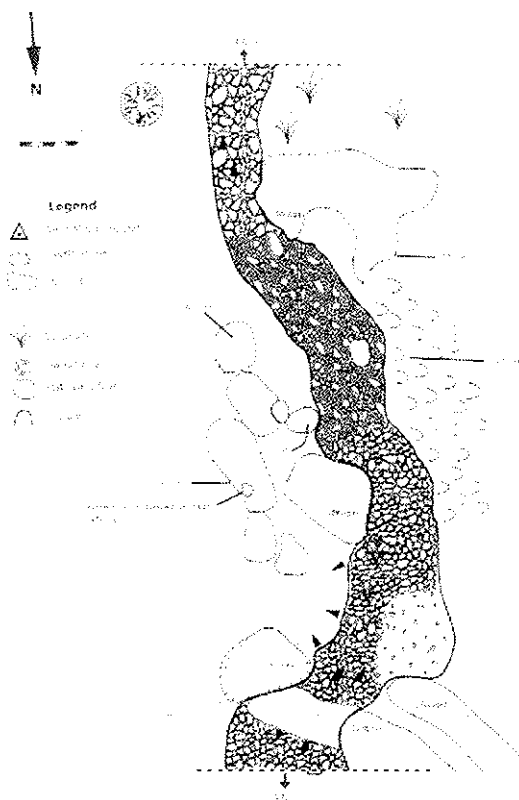


Figure 16. Site 19528 Trail Segment AA-8 plan view.

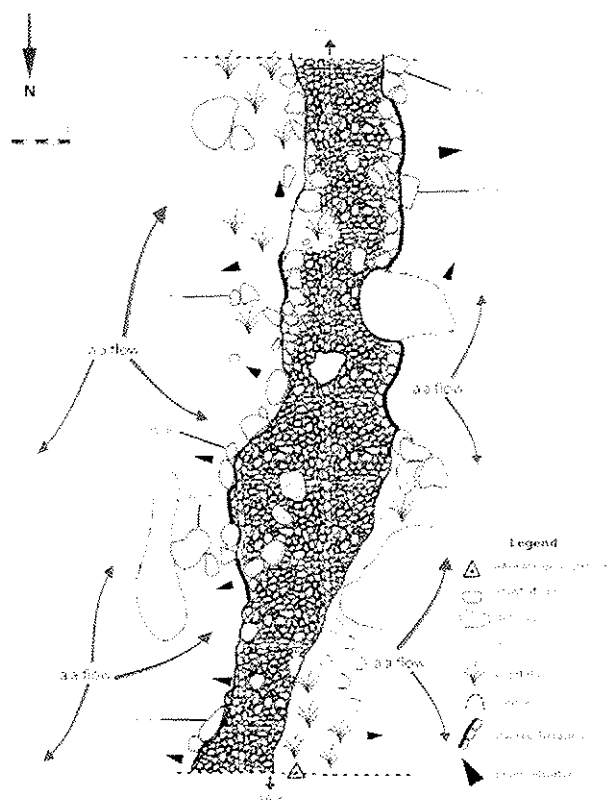


Figure 17. Site 19528 Trail Segment AA-9 plan view.

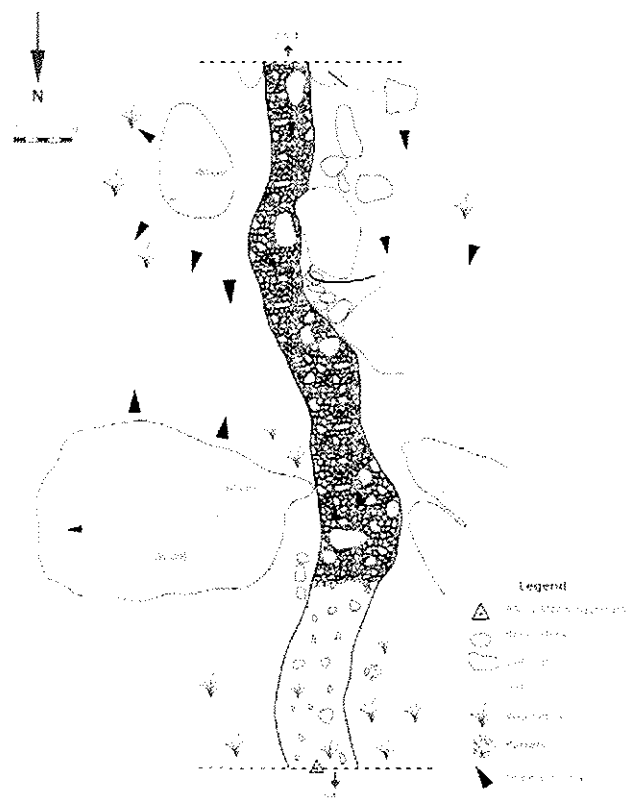


Figure 18. Site 19528 Trail Segment AA-10 plan view.

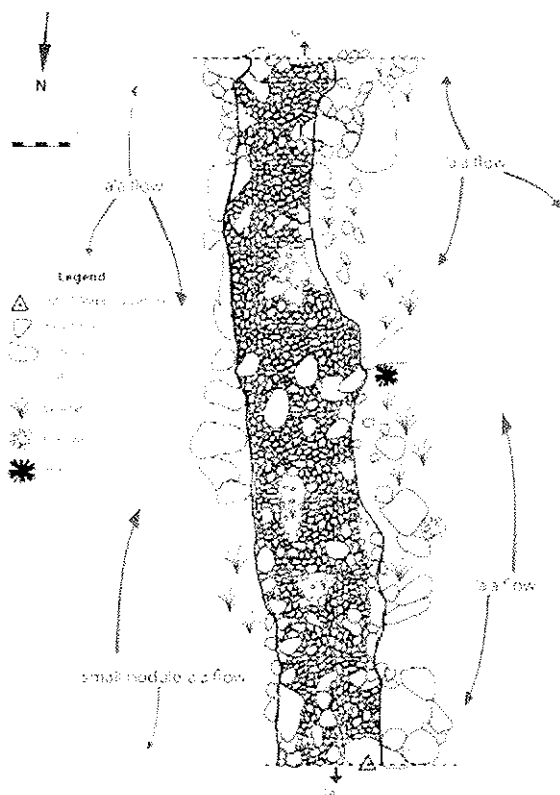


Figure 19. Site 19528 Trail Segment AA-11 plan view



Figure 20. Site 19528 Trail segment AA-12 plan view

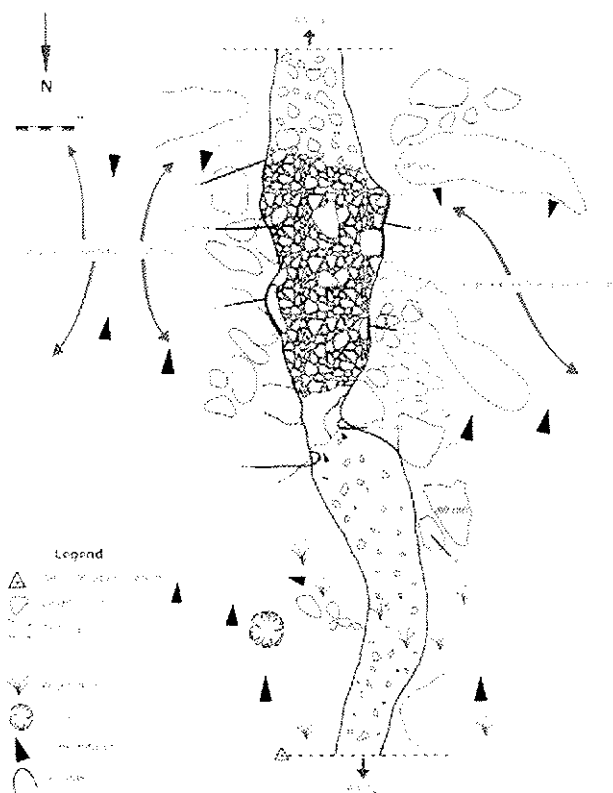


Figure 21. Site 19528 Trail segment AA-13 plan view

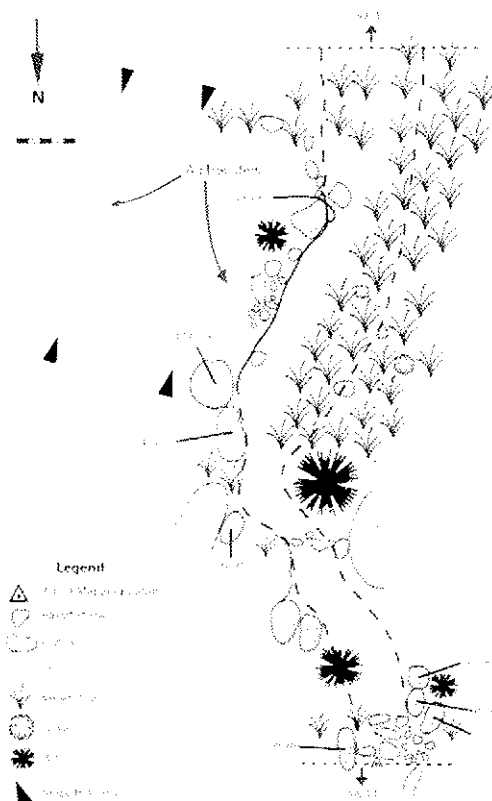


Figure 22. Site 19528 Trail segment AA-14 plan view





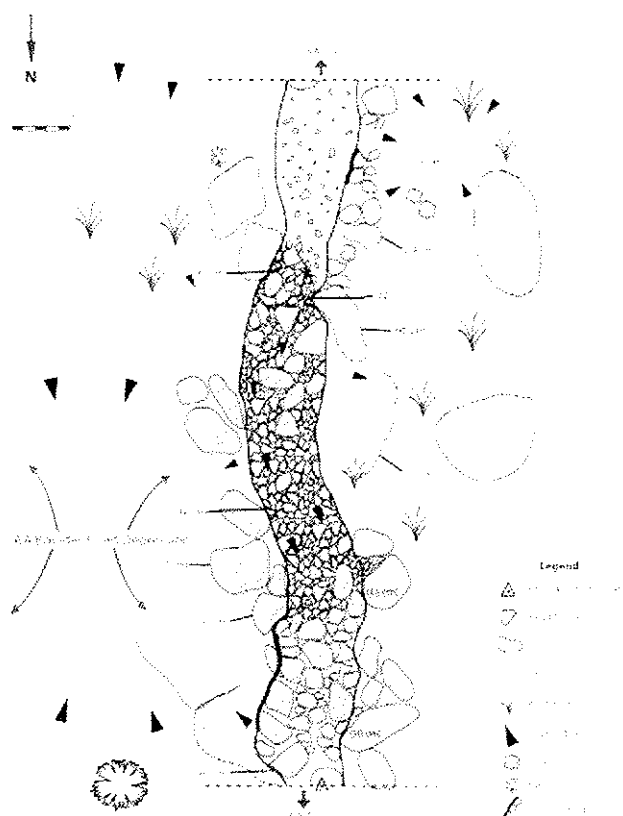


Figure 25. Site 19528 Trail segment AA-17 plan view

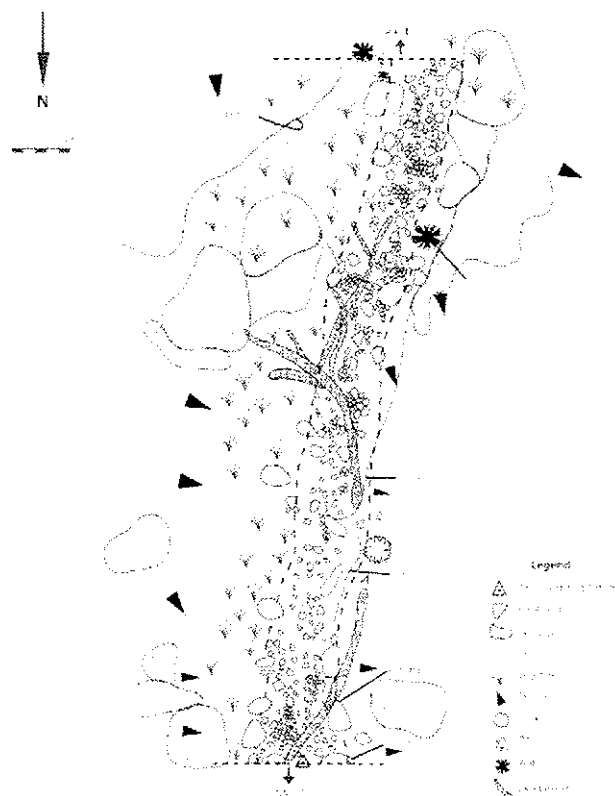


Figure 26. Site 19528 Trail segment AA-18 plan view



Figure 27. Site 19528 Trail segment AA-19 plan view

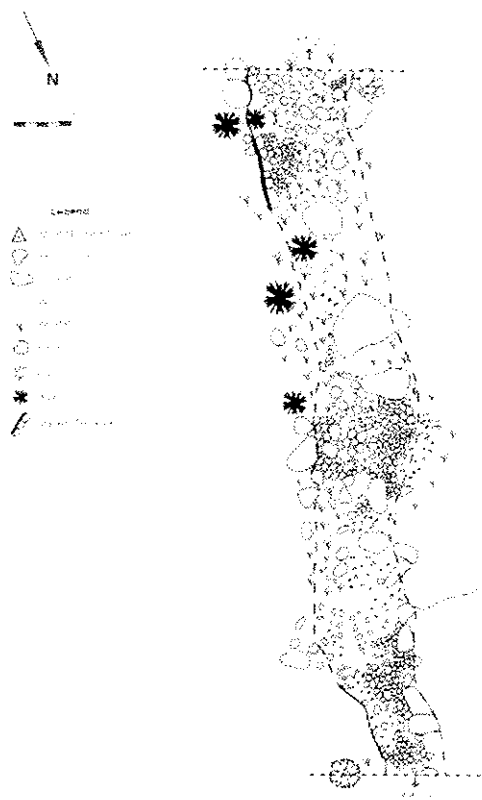


Figure 28. Site 19528 Trail segment AA-20 plan view

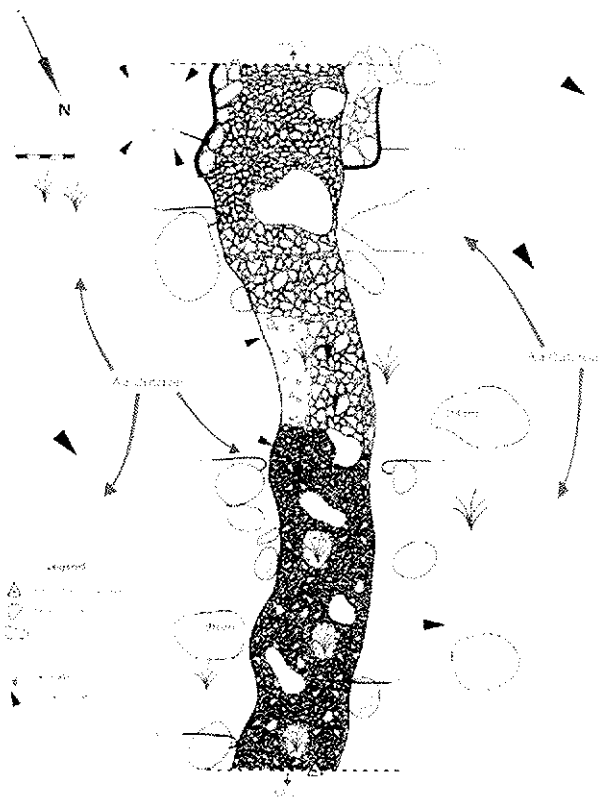


Figure 29. Site 19528 Trail segment AA-21 plan view

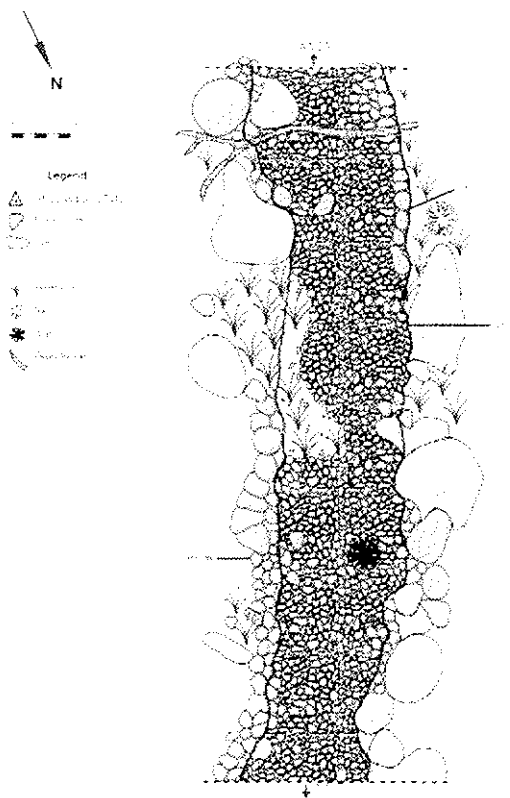


Figure 30. Site 19528 Trail segment AA-22 plan view



Figure 31. Site 19528 Trail segment AA-23 plan view



Figure 32. Site 19528 Trail segment AA-24 plan view

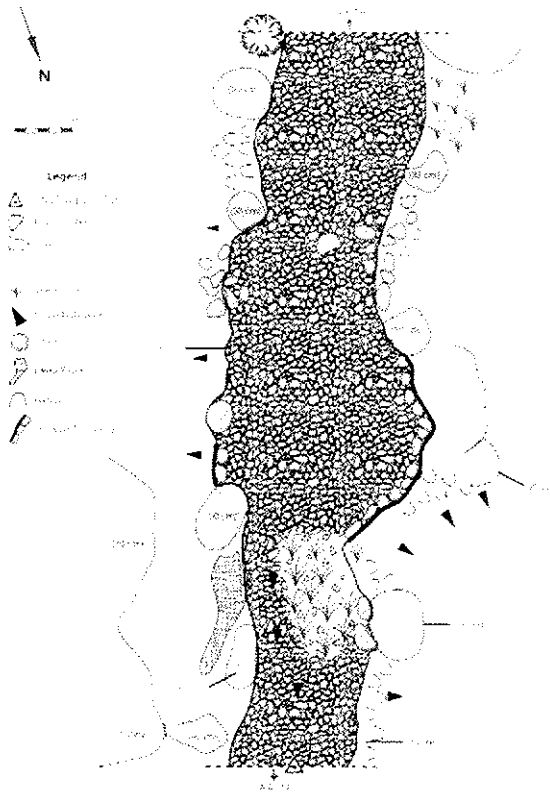


Figure 33. Site 19528 Trail segment AA-25 plan view



Figure 34. Site 19528 Trail segment AA-26 plan view



Figure 35. Site 19528 Trail segment AA-27 plan view

## CONCLUSION AND RECCOMENDATIONS

Monitoring was successfully carried out at one site, and begun at a second. Other projects prevented additional time for quarterly monitoring during the second quarter of calendar year 2008, as did the size of the trail site. Much of the field time was spent gathering baseline data that had not been collected in the past, particularly plan maps. In addition, one site was not relocated and further examination of the area is required to located the site. The time spent on these activities will diminish as the project progresses and the crew becomes more familiar with the site locations, and as baseline data is established. In general, no notable disturbance to the sites was noted. Site 19528 has been breached in several locations by firefighting activities in the past. Current established fire breaks have been established to limit the need to cut breaks during a fire in the future.

The primary recommendation for this quarter is to dedicate more time to this activity. There do not appear to be any imminent threats to the sites visited during this quarter, with the possible exception of goats at 23450.





Plate 48. Site 23450 Feature 1



Plate 49. Site 23450 Feature 1



Plate 50. Site 23450 Feature 1 pictograph panel



Plate 51. Site 23450 Feature 1 pictograph panel



Plate 52. Site 23450 Feature 1 pictograph panel



Plate 53. Site 23450 Feature 1 pictograph panel



Plate 54. Site 23450 Feature 1 pictograph panel



Plate 55. Site 23450 Feature 1 pictograph panel



Plate 56. Site 23450 Feature 1 pictograph panel



Plate 57. Site 23450 Feature



Plate 58. Site 23450 Feature



Plate 59. Site 23450 Feature 5





Plate 60. T-052908-01



Plate 61. Site 19528



Plate 62. Site 19528



Plate 63. Site 19528

## **COMPLIANCE FIELDWORK**

Archaeological fieldwork took place in support of a number of projects during this reporting period. The field work included archaeological monitoring of construction activities, archaeological survey in proposed project areas, and collection of additional information as needed. These data collected during these projects is presented in this section.

### **KMC Septic Tank Construction Monitoring**

CULTURAL RESOURCES MONITORING OF SEPTIC TANK SYSTEMS, KĪLAUEA MILITARY CAMP, ISLAND OF HAWAII, HAWAII.

**James Head, B.A.**

Cultural Resources Specialist

*With contributions by*

**Julie M. E. Taomia, Ph.D.**

Senior Cultural Resources Specialist

## **I. MANAGEMENT SUMMARY**

U.S. Environmental Protection Agency (USEPA) requirements mandated that all cesspool collection systems be converted to septic tank systems. A portion of the camp has been proposed as an historic district containing over 100 historic structures. The U.S. Army Garrison Hawaii (USAG-HI) committed to archaeological monitoring of subsurface disturbance at KMC in the Section 106 consultation for this project. This document reports on the results of that monitoring activity.

There are no known prehistoric archaeological sites at Kilauea Military Camp (KMC). A bas relief petroglyph was found in a curbing stone in the driveway of the old Fire Station (Bldg. #38), but this is in a secondary context (Tomonari-Tuggle and Slocumb 2000:I-17) and is of questionable age (Head 2007). Clearance surveys by Hawaii's Volcanoes National Park in 1995 identified five historic period features, none of which were considered eligible to the National Register of Historic Places (NRHP). These isolated features were all found within KMC and consisted of a stone walkway, an earth mound, a stone path, an L-shaped foundation, and badly disturbed cement foundation (Tomonari-Tuggle and Slocumb 2000:I-17).

No prehistoric archaeological sites were found during the monitoring of the KMC Septic Tank replacement project. Three areas (discussed below) appear to have potential for historic subsurface concentrations areas, and five historic or recent rock features were also located.

***Map removed to protect rare resources. Available upon request***

***Map removed to protect rare resources. Available upon request***

at this divide, it often receives moisture from the windward rains which are often stalled at the divide, but the bulk of the heavy rains come from Kona (or winter) storms from the southwest. The dominant montane rainforest found in the wetter areas to the north and northeast are characterized mostly by large 'ōhi'a lehua (*Metrosideros polymorpha*) and an understory of hāpu'u (tree ferns, *Cibotium* spp.). These plants form a forest that ranges in height up to 20m. On the Ka'u or leeward side of KMC, the climate forms open forests of 'ōhi'a trees distributed within cracks in the pāhoehoe basalt lava which form moisture sinks that enable the plants to grow. Also found in the drier areas to the west are native shrubs including 'a'ali'i (*Dodonea viscosa*), pūkiawe (*Stryphelia tameiameia*), and kukae-nene (*Coprosma ernodeoides*). These plants are generally not found within the confines of KMC, but are in the surrounding area.

Kīlauea Military Camp occupies about 50 acres of Hawai'i Volcanoes National Park's 300,000+ acres, and its history is as old as the Park as it was established in the same year, 1916. What once began as an idea of Hilo Board of Trade members for a training ground for the National Guard and an Army "vacation and health recruiting station" has become one of Hawaii's most unique resorts for the military. However, the first visitors to the camp may have felt differently. On November 6, 1916, a group of 68 enlisted men from Company A, Second Infantry of the United States Army, arrived to find Kīlauea Military Camp's three main buildings unfinished and unfit to be occupied. As a result, the men were forced to sleep under whatever shelter they could find during that rainy weeklong stay. Since then, the wonders of Kīlauea Volcano have drawn millions of soldiers, their families and guests to KMC. In its eighty-nine years of existence, KMC had served as a training facility, housed a Navy camp, and hosted numerous dignitaries. The camp briefly served as an internment camp and later as a prisoner-of-war camp during World War II. KMC has also experienced the power and destruction of Kīlauea Volcano. While the camp still maintains its historical charm, renovations to the camp in the last decade have enhanced KMC facilities and services making it one of the military's favorite vacation resorts (Farquar 2006)

### III. PURPOSE OF THE MONITORING

Monitoring of the construction of sewage septic tanks, seepage pits, leach fields, and associated sewer lines was undertaken due to the threat of disturbance to potential buried prehistoric and historic archaeological sites. The U.S. Army Garrison, Hawaii (USAG-HI) conducted a Section 106 consultation with the Hawai'i State Historic Preservation Division (SHPD), Hawai'i Volcanoes National Park, the Office of Hawaiian Affairs, Historic Hawai'i Foundation, the Hawai'i Island Burial Council, Hui Malama I Na 'O Hawai'i Nei, and the Hawai'i National Park Kūpuna Consultation Group in 2004. The consultation letter discussed the proposed sewer upgrades, potential threats to historic structures within the proposed historic district (Tomonari-Tuggle and Slocumb 2000), as well as potential effects to 1) plantings and trees that contribute to the landscape of the historic district, 2) lava tubes that may have biological, cultural, or paleontological value, and 3) undisturbed cultural deposits. The consultation letter also committed USAG-HI to document subsurface soils for future management purposes.

An Integrated Cultural Resources Management Plan (ICRMP) has been prepared for KMC (Tomonari-Tuggle and Slocumb 2000) as a five-year plan for compliance with federal law, Army regulations and Department of Defense Instruction. The goal of the KMC ICRMP "...is to preserve and protect the significant archaeological and architectural resources of Kīlauea Military Camp in a manner



that meets legal compliance requirements, as well as supports the rest and recreation mission of KMC” (ibid: iii). To accomplish this, the KMC ICRMP describes the cultural resources (historic buildings and archaeological sites) that exist at KMC, identifies preservation and protection strategies for KMC cultural resources, makes specific preservation recommendations, identifies opportunities for public education that will contribute to the appeal of KMC as a unique rest and recreation facility, establishes standard operating procedures (SOPs) for activities that can be considered routine occurrences at KMC and that could have a potential for adverse impact to cultural resources, establishes consultation procedures for, and assigns historic preservation responsibilities to ensure the ICRMP procedures and recommendations are consistently and effectively carried out. This document has been used to formulate subsequent archaeological work at KMC.

The Integrated Cultural Resources Management Plan for KMC (Tomonari-Tuggle and Slocumb 2000: 1-24) notes that although only one possible archaeological feature has been identified at KMC (the bas-relief petroglyph in secondary context), the potential remains for subsurface deposits. Consequently, USAG-HI committed to archaeological monitoring during earth-disturbing activities associated with the KMC Sewer Construction project. An Archaeological Monitoring Plan (AMP) was drafted and provided guidance for the project. USAG-HI determined that through implementation of the proposed mitigation measures contained within the AMP, potential adverse effects to historic properties resulting from the proposed action would be mitigated.

To date, all recent archaeological work (with the exception of HAVO Cultural Resource Staff and Tomonari-Tuggle and Slocumb 2000) performed at Kilauea Military Camp has been done by the Pōhakuloa Training Area Cultural Resources (PTA-CR) Staff. The first of these eight PTA-CR projects took place in 2004, and the most recent in August of 2006. All of the archaeological survey and monitoring projects were completed in conjunction with Kilauea Military Camp-Department of Public Works (KMC-DPW) for development projects at KMC (Figure 38).

Previous archaeological work at KMC has indicated a potential for subsurface historic deposits related to the 20<sup>th</sup> century history of KMC itself. No prehistoric items or features were found. A single historic feature was found east of Bldg. 19 in the southern portion of KMC (Head 2006c). Historic items and/or trash were found in several sub-surface locations near Bldg. #38 (Head 2004), Bldg. #97 (Head 2005a), and Bldg. 35A (Head 2006a).

## V. ARCHAEOLOGICAL FIELD METHODS

Laurie Lucking, Ph.D., Cultural Resource Manager, USAG-HI served as Principal Investigator of the Archaeological Monitoring Project, William Godby, Archaeologist, USAG-HI served as Project Manager, Julie Taomia, Ph.D., PTA Senior Cultural Resources Specialist served as Field Director, James Head, B.A. and Laura Gilda, M.A. performed the fieldwork.

Archaeological monitoring of the ground-disturbing activities began on May 29, 2007 and was completed on November 16, 2007. The primary construction contractor was Niking Corporation, and Leslie Drilling served as the secondary contractor. All machine and hand excavation of undisturbed soil areas was monitored by an archaeologist.

Construction of the KMC Septic Project began in the northwest corner of the Camp at Individual Waste System (IWS) #10 and #10A (Figure 39) and generally progressed in a clockwise direction with IWS #09, #12 and #13 completing the project. A total of 16 IWS locations with septic tanks, seepage pits, absorption pits, and associated pipelines were constructed during the project.

In general, construction of the IWS systems began with locating and excavating the existing sewer outflow pipes leading to the present cesspool to determine their *invert* (depth of the bottom of pipe). When all inlet pipes were found, the depth of the bottom of the new septic tank could be calculated. Based on this figure, the septic tank hole was excavated by machine, a gravel bed and textile liner was placed in the pit, the tank was set in place, and associated inlet pipes were connected. Once the septic tank was in place and receiving outflow material, the existing cesspool was opened, pumped, and then enlarged to convert it to a vertical absorption pit (VAP). Once the excavation was the proper size for the placement of the concrete rings, a geo-textile fabric was placed in the hole to prevent soil migration, gravel was placed in the bottom, and a number of concrete rings were stacked in the hole. An outlet pipe from the septic tank was placed into the side of the stacked rings, a flow test was conducted to determine the absorption rate, and if appropriate, the cover was positioned on the unit. Clean gravel was spread between the concrete structure and fabric to aid in the flow of gray water. The cesspool was now a VAP which received and dispersed the outflow of gray water from the associated septic tank. The gray water was first passed through a cleanable filter to remove any solids before emptying into the VAP.

This methodology was used for most IWS constructions with the exception of IWS #10A and #20A. These particular locations serve two laundries, Bldg. #84 and Bldg. #51. At these excavations, septic tanks were not installed, as no solid materials were involved. Since only gray water came from the buildings, it was piped into a 500-gallon lint trap, which is generally the same as a grease trap with a filter to catch all lint. The gray water was then routed to distribution boxes that were used to transport the gray water into Horizontal Absorption Pads (HAP) which dispersed the water below ground level for absorption.

At IWS #12 and #13, grease interceptors (traps) were used between Bldg. #34 and #35 and the associated septic tanks. Commercial kitchens are present in these buildings and the systems were designed to trap the incoming kitchen grease before it reached the new septic system. Downstream of the grease traps, standard septic tanks with Vertical Absorption Pits were utilized.

At most of the Individual Waste System (IWS) locations, soil profiles were drawn and samples of each stratigraphic layer was taken for later analysis. No profile was drawn at IWS #10 since it was a very small deep hole and deemed unsafe to enter. At the remaining 15 IWS locations at least one profile was recorded; these are illustrated in Head 2008: Appendix A.

*Map removed to protect rare resources. Available upon request*

*Map removed to protect rare resources. Available upon request*

## VI. ARCHAEOLOGICAL FIELDWORK (AND IWS DESCRIPTIONS)

### **IWS (Individual Wastewater System) - #01**

**Buildings Connected** – Buildings #23 (Rental with kitchen), #73 (Rental with kitchen), and # 100 (Rental with kitchen), located in the east-central portion of Kilauea Military Camp.

**Absorption Area** – Existing Cesspool #01 was converted to a VAP by demolishing the existing cesspool cover, pumping the organic material, excavating the hole to fit new precast concrete rings, and placing the rings with a cover in the hole. The existing influent pipe to the cesspool was removed and a new Poly Vinyl Chloride (PVC) pipe to transport gray water from Septic Tank #01 was installed through the side of the stacked concrete rings.

**Date Archaeological Monitoring Begun and Completed** - July 30, 2007 to August 15, 2007

**Activities Monitored** – Excavation for Septic Tank #01 commenced after inverts were determined for all three of the sewer inlet lines (Bldg. #23, #73, and #100). The S.T. #01 excavation measured 5.7m (170/350°) by 3m by 2.5m deep. The testing for the existing pipe inverts was monitored by the archaeologist, as were the replacement pipes from Buildings #23, #73, and # 100, and the removal of now-abandoned pipes from the same buildings. The archaeologist also monitored the removal of the cover at Cesspool #01, the excavation of Cesspool #01, and the excavation of an overflow pipe between Septic Tank #01 running to the new VAP #01 (formerly Cesspool #01).

**Findings** – A small void, measuring 2.4m across (90/270 °) by 0.40m high by 1.8m deep was found in the northwest corner of the Septic Tank #01 excavation. An examination disclosed no archaeological material in the small closed space. Photographs were taken (Plate 64) and excavation continued. Seven natural levels were recorded in a stratigraphic profile of west wall of S.T. #01 (IWS #01 – Profile #01, Plate 65).

A small crack or hole was located in the pāhoehoe at the bottom of a machine trench located south/southwest of the Cesspool #01. The small natural hole is ca. 0.20m<sup>2</sup> by ca. 0.30m deep and full of reticulate and small pieces of 'a'ā lava. No cultural material was found in this location. It appears to be a void possibly associated with construction or collapse of Cesspool #01 found immediately to the northeast.

The west side of the Cesspool #01 excavation uncovered another void. It measured ca. 1.0m across by 0.50m high by 2.5m deep (Plate 66). It did not contain any cultural material and did not extend on to the west. The two voids are probably connected since they both occur in the same general area.

The monitoring of IWS #01 produced no cultural material.

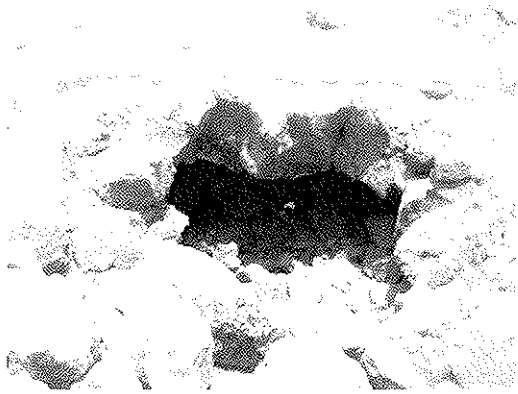


Plate 64. The small void found at the Septic Tank #01 looking to 300° (northwest). The scale is 1m long.



Plate 65. IWS #01 – Profile #01 looking to 260° (west). The scale is ca. 1.2m long.

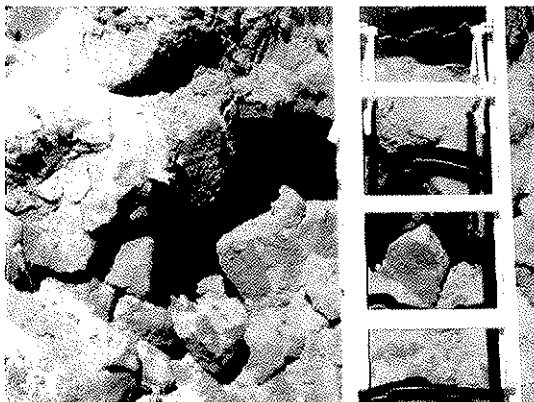


Plate 66. View of the small void found in the western wall of the Septic Tank #01 excavation.

## **IWS (Individual Wastewater System) - #02**

**Buildings Connected** – Bldg. #45 (Theatre), Bldg. #46 (Church), Bldg. #51 (Lavatory) located in the Northeast portion of Kilauea Military Camp.

**Absorption Area** – Existing Cesspool #02 was converted to a VAP by demolishing the existing cesspool cover, pumping the organic material, excavating the hole to fit new precast concrete rings, and placing the rings with a cover in the hole. The existing influent pipe to the cesspool was removed and a new PVC pipe to transport gray water from Septic Tank #02 was installed through the side of the stacked concrete rings at VAP #02.

**Date Archaeological Monitoring Begun and Completed** – July 10, 2007 to August 3, 2007

**Activities Monitored** – Plans called for the location of Septic Tank #02 to be under the paved road just north of Bldg. #45. Following the cutting of the pavement and location of the existing lines, excavation for Septic Tank #02 commenced. The final excavation measured ca. 5.5m (55/230°) by 3m by 3.5m deep. The archaeologist monitored the testing for the existing pipe inverts and the replacement pipes from Buildings #45, #46, and #51. The removals of portions of abandoned pipes from the buildings were monitored as well. The removal of the cover at Cesspool #02 and the machine excavation of Cesspool #02 were monitored, as well as excavation of an overflow pipe between Septic Tank #02 and VAP #02.

**Findings** – Excavation of Cesspool #02 disclosed five small pieces of rusted corrugated roofing material and three rotted logs. These appeared to be associated with an earlier temporary roof of the cesspool and did not appear to be in context. Monitoring of IWS #02 produced no other cultural material. Nine natural stratigraphic layers were recorded in a sample stratigraphic profile of the southeast wall of Septic Tank #02 (IWS #02 – Profile #01, Plate 67).



Plate 67. IWS #02 – Profile #01 to 280° (west). The horizontal scale is 1.0m, the vertical is ca. 1.4m.

## **IWS (Individual Wastewater System) - #04**

**Buildings Connected** – Bldg. #97 (Rental with kitchen), Bldg. #98 (Rental with kitchen), and Bldg. #99 (Rental with kitchen) located in the northern portion of Kilauea Military Camp.

**Absorption Area** – The plans for IWS #04 called for a Sewer Manhole (to serve as a Distribution Box) placed in the Cesspool #04 location, Septic Tank #04 to be placed down line, a Type II Distribution Box below that, and the gray water flow finally traveled to the HAP or leach field at the terminus. The Sewer Manhole installation in the existing Cesspool #04 area collects material from Bldg. #97, #98, and #99, and then pipes it down slope to Septic Tank #04. The gray water exits the north side of S.T. #04 and enters a Distribution Box which equally splits the flow into five pipes. Each of these pipes empties into separate high capacity leaching chambers where the gray water leaches into granular material (gravel or crushed rock) and flows into the subsurface.

**Date Archaeological Monitoring Begun and Completed** – June 4, 2007 to July 26, 2007

**Activities Monitored** – Prior to the beginning of construction at IWS #04, a truck-mounted drill rig operated by Leslie Drilling dug test holes (Plate 68). The drilling was to determine buried stratigraphy and to test for the presence of voids. These test holes were approximately 4" (0.10m) in diameter. Monitoring of the drill cuttings found no cultural materials.

Several projects were monitored during the construction of IWS #04 since it was a large and complex development. All activities were monitored by the archaeologist. Construction monitoring began with backhoe testing of the area selected for the HAP/leach field to determine if existing pipes were present at the site. None were found. The area of the HAP was shifted approximately 45° to the west from the original design to minimize disturbance to large 'ōhi'a lehua trees to the east.

The machine testing was followed by excavation of the large (50' [15.2m] L by 40' [12.2m] W by 6' [1.8m] D) pit for Septic Tank #04 using the large excavator. The existing concrete parking pad north of Bldg. #97 was demolished and removed.

A trench for the sewer inlet pipe was dug southeast up the slope to the existing Cesspool #04. The existing Cesspool #04 was demolished, and the contents pumped out. The enlargement of the original cesspool excavation followed, and a Sewer Manhole (SMH) Box cemented into place. The existing sewer outfalls from Bldg. #97, #98, and #99 were replaced and linked to the SMH #04. The archaeologist monitored all activities.





Plate 68. A view of the Leslie Drilling rig during operations at IWS #04.

**Findings** – Removal of the cover of existing Cesspool #04 on July 23, 2007, disclosed a rough semi-circular wall of joined cinder blocks resting atop the pāhoehoe surrounding the cesspool. A poured concrete collar set on top of the pāhoehoe, topped by stacked alternating rectangular cement blocks. Sections of rebar tied these blocks together and concrete filled in the holes of the blocks. IWS #04 – Feature #01 served to support the concrete and rebar cover on top of Cesspool #04. The feature was designated IWS #04 – Feature #01 and measured approximately 1.5m (N/S) by 1.0m (E/W) by 0.70m high. The feature was described, photographed (Plate 69), and both a plan and profile drawing were completed (Figures 40 & 41).



Plate 69. IWS #04 – Feature #01 with a view to 125° (southeast). The scale is 1.0m long.

A single orange, blue and white glass marble (Plate 70) was found in the back-dirt pile from the trench excavation between SMH #04 and Septic Tank #04. It appears to have come from near the northeast corner of Bldg. #97, but this is uncertain. Further discussion of this artifact is given in the Findings section.

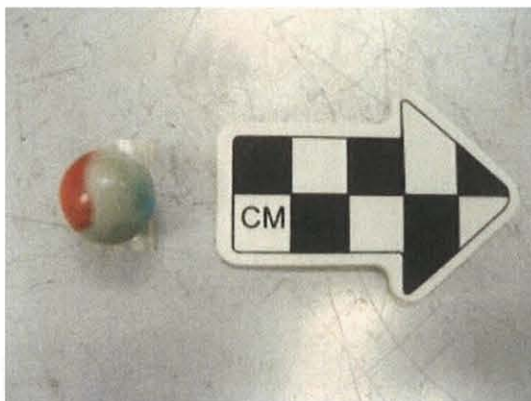


Plate 70. The small marble found during monitoring of IWS #04.

Two soil profiles (IWS #04 – Profiles #01 and #03) were recorded in the sides of the excavations. Profile #01 was in the northeast corner of the HAP #04 excavation (Plate 71) and #02 was located in the trench near SMH #04 near the eastern end of the IWS (Plate 72).

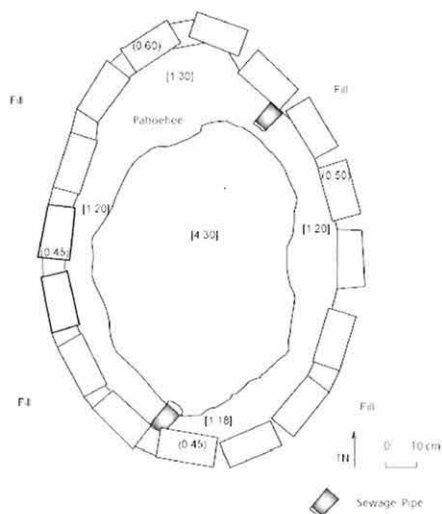


Figure 40. IWS #04 – Feature #01 plan view.

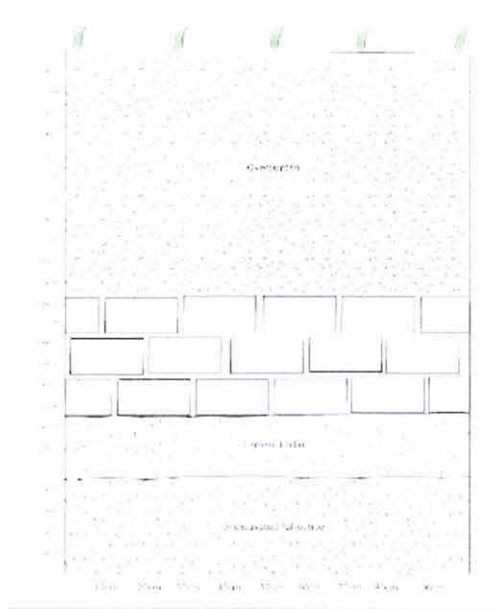


Figure 41. An idealized profile view of Feature #01. The feature was not entered due to safety concerns.



Plate 71. IWS #04 – Profile #01 looking to 330° (northeast) in the Absorption Bed. The scale is truncated, but is ca. 1.0m long.



Plate 72. IWS #04 – Profile #02 looking to 155° (south\southeast). The scale is ca. 1.3m long.

### **IWS (Individual Wastewater System) - #06**

**Buildings Connected** – Bldg. #88 (Dormitory – East Half) located in the Northern portion of Kilauea Military Camp

**Absorption Area** – Existing Cesspool #06 was converted to a VAP. The existing influent pipe to the cesspool was removed and a new PVC pipe to transport gray water from Septic Tank #06 was installed through the sides of the stacked concrete rings at VAP #06.

**Date Archaeological Monitoring Begun and Completed** – June 6, 2007 to July 24, 2007

**Activities Monitored** - Septic Tank #06 was placed under the paved road just north of the east side of Bldg. #88. The pavement was cut and the existing lines were located. Excavation for Septic Tank #06 commenced and the final excavation measured ca. 6.5m (75/255°) by 5m by 3.5m deep. The archaeologist monitored the digging for the location of the existing pipe inverts, as well as the replacement pipes from Buildings #45, #46, and #51. The removal of portions of the abandoned pipes from the buildings took place under the archaeologist's guidance. The cover removal at Cesspool #06 and the machine excavation of Cesspool #06 was also monitored, as was the placement and excavation of an overflow pipe between Septic Tank #06 and VAP #06.

**Findings** – No prehistoric or historic cultural items were observed during the monitoring of construction activities at IWS #06. The area located to the northwest of Cesspool/VAP #06 appeared to be previously disturbed to a depth of ca. 0.50m as observed in the western trench wall. This disturbance was indicated by a lack of definite soil strata which was commonly observed in excavations at KMC. The area in this portion of IWS #06 appeared to be dug and then replaced in the past.

Two soil profiles (IWS #06 – Profiles #01 and #02) were recorded of the sidewalls of the excavations. Profile #01 was in the south corner of the Septic Tank #06 excavation (Plate 73) and #02 was located in the trench between Septic Tank #06 and the new VAP #06 near the eastern side of the IWS (Plate 74).





Plate 73. IWS #06 – Profile #01 to 180°. The horizontal scale is 1m and the vertical is ca. 1.3m long.



Plate 74. IWS #06 – Profile #02 looking to 180° (south). The vertical scale is ca. 1.5m long.

#### **IWS (Individual Wastewater System) - #07**

**Buildings Connected** – Bldg. #88 (Dormitory – West Half) and Bldg. #36 (Dormitory) located in the Northern and Central portion of Kilauea Military Camp.

**Absorption Area** – The plans stipulated the placement of Septic Tank #07 under the paved road just north of Bldg. #88. The pavement was cut and the existing lines were located. Excavation for Septic Tank #07 commenced and the final excavation measured ca. 6.5m (65/245°) by 4m by 3.5m deep. The archaeologist monitored the hand digging of the existing pipe inverts, as well as machine excavation for replacement pipes from Buildings #88 and #36.

Monitoring also took place during the removal of the cover at Cesspool #07 and the machine excavation of Cesspool #07. The archaeologist watched the excavation and placement of an overflow pipe run between Septic Tank #07 and VAP #07.

**Date Archaeological Monitoring Begun and Completed** – June 7, 2007 to July 24, 2007

**Activities Monitored** - Septic Tank #07 was to be located under the paved road just north of the west side of Bldg. #88. Marking and cutting of the pavement took place and the crew located and marked existing lines. Excavation for Septic Tank #07 was performed and the final excavation measured ca. 6.5m (75/255°) by 4.5m by 3.5m deep. Testing for existing pipe locations and placement of new pipes from Buildings #88, and #36 was also monitored. The archaeologist monitored both the removal of the cover and the machine excavation of Cesspool #07. The archaeologist observed the excavation of an overflow pipe between Septic Tank #07 and VAP #07.

**Findings** – Construction monitoring at IWS #07 disclosed no prehistoric or historic items. On July 9, 2007, the workers noted a void in the sidewalls of Cesspool #07 after the concrete cover was removed. Construction activities at Cesspool #07 ceased until a determination of the nature of the void could be made. As stipulated in the letter to Ms. Cindy Orlando, Park Superintendent at Hawai'i Volcanoes National Park, the design of the development would be altered if the void was discovered to be a lava tube.

Mr. Michael Lum, COE (Corps of Engineers) representative, Dr. Laurie Lucking, USAG-HI Cultural Resource Manager, and Mr. Roger Panzer, head of KMC Maintenance were alerted on July 9, 2009 of the finding. Mr. Panzer alerted Keola Awong, Anthropologist at Hawai'i Volcanoes National Park of the discovery. Mrs. Awong then consulted with the Hawai'i Volcanoes National Park Kūpuna Consultation Group about the void. This Kūpuna group felt a need of further study to determine whether the void represented a blister cave with finite boundaries or a lava tube with larger limits. If the void represented a lava tube large enough to permit entry, then the project would require re-alignment to avoid the lava tube. Until this was determined, no further construction work should take place at IWS #07.

On July 16, 2007, Roger Panzer (KMC), Steve Takeguchi (COE), Larry Peck (Niking Corporation) and James Head (PTA-CR) attempted to lower a digital camera attached to a PVC plastic pipe down into the cesspool. The team was attempting to photograph the walls of the void to determine its limits. The camera got wet from the inflow and did not work. Mr. Takeguchi devised a system to lower a mirror into the cesspool, enabling the team to use sunlight to light up the sidewalls of the void and to make a determination that the void did represent a blister with finite walls.

On July 17, 2007, a team from Hawai'i Volcanoes National Park consisting of Keola Awong (Anthropologist), Jadelyn Moniz-Nakamura (NPS Archaeologist), and Laila Tamimi (Landscape Architect) visited Cesspool #07 to view the void and also make a determination. All parties agreed that the void represented a blister cave and not a lava tube. The NPS team approved that work could proceed on IWS #07 pending proper documentation of the existing Cesspool #07.

After this determination was complete, James Head took photographs (Plate 75) and drew a plan and profile of the cesspool (Figures 42 & 43). After all recording was completed, and construction work resumed at Cesspool #07 on July 23, 2007.

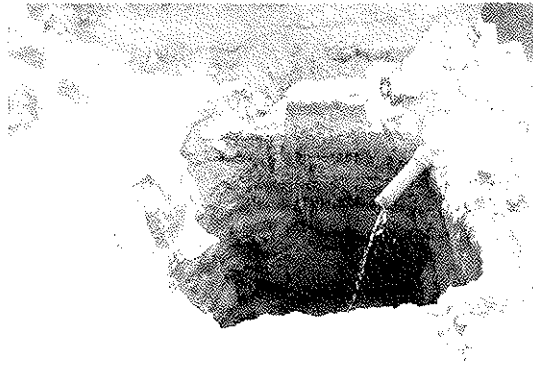


Plate 75. Cesspool #07 after removal of the cement/rebar cover. The view is to 90°, the scale is 1.0m.

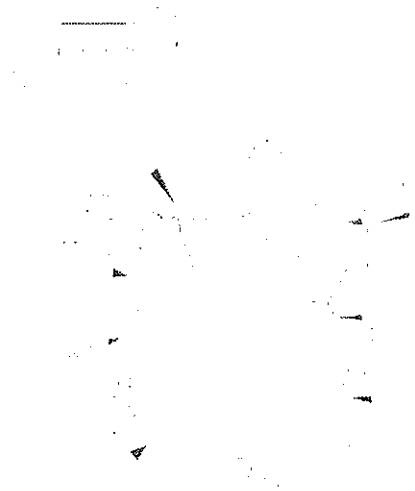


Figure 42. Plan drawing of Cesspool #07 at IWS #07.

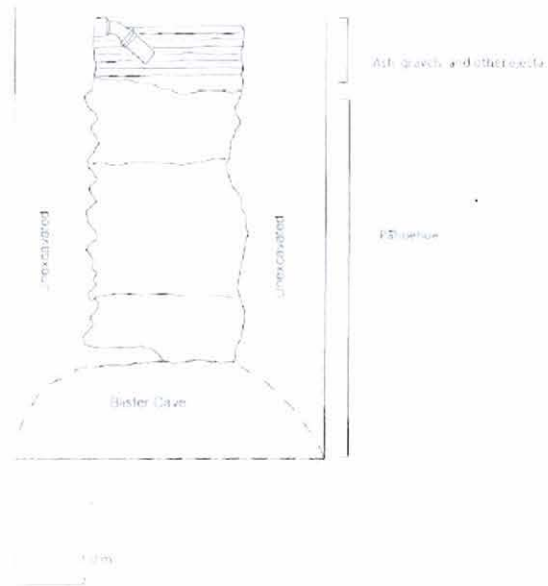


Figure 43. An idealized profile view of the walls and floor of Cesspool #07. Entry into the feature was not allowed due to safety concerns.

A soil profile (IWS #07 – Profile #01) was recorded in the north wall of the trench running from Septic Tank #07 to VAP #07 (Plate 76).



Plate 76. IWS #07 – Profile #01 looking to 180° (south). The scale is 1.0m long.



## **IWS (Individual Wastewater System) - #09**

**Buildings Connected** – Bldg. #35A (Bowling Alley) and Bldg. #38 (Office) located in the Central portion of Kilauea Military Camp.

**Absorption Area** – Existing Cesspool #09 was converted to a VAP by demolishing the existing cesspool cover, pumping the organic material, excavating the hole to fit new precast concrete rings, and placing rings (with cover) into the hole. The existing influent pipe to the cesspool was removed and a new PVC pipe to transport gray water from Septic Tank #09 was installed through the stacked concrete rings at VAP #09.

**Date Archaeological Monitoring Begun and Completed** – September 6, 2007 to November 8, 2007.

**Activities Monitored** – Designs for Septic Tank #09 called for placement under the paved road just northwest of Bldg. #35A (Bowling Alley). The pavement was cut and the existing utility lines were located. Excavation for Septic Tank #09 commenced and the final excavation measured ca. 3.5m (90/270°) by 3m by 3m deep. The archaeologist monitored the testing for the existing pipe inverts and the excavation for replacement pipes from Buildings #35A and #38.

After the construction company had placed Septic Tank #09 in the excavation, another pipe coming from Bldg. #35A was found. This necessitated tying in the second #35A pipe into Septic Tank #13 at IWS #13. This was accomplished by hand digging a trench under Bldg. #35. This activity was monitored by the archaeologist. Both the removal of the cover and machine excavation at Cesspool #09 were monitored. The contractor ran an overflow pipe between Septic Tank #09 and VAP #09. The archaeologist observed the excavation of the trench.

**Findings** - Monitoring of construction activities at IWS #09 did not locate any prehistoric cultural items. Two probable rusted wire nails and three small charcoal bits were found approximately 0.30 – 0.50m below the paved surface of the street. These appear have been associated with either road construction or some other recent activity. One soil profile (IWS #09 – Profile #01) was recorded in the southeast corner of the Septic Tank #09 (Plate 14).

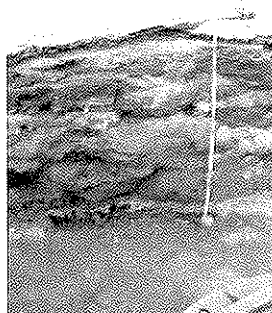


Plate 77. IWS #09 – Profile #01 with a view to 130°.

The horizontal scale is ca. 1.20m, the vertical scale about 1.45m.

## **IWS (Individual Wastewater System) - #10**

**Buildings Connected** – Bldg. #59 (Fire Station) located in the Northwest portion of Kīlauea Military Camp.

**Absorption Area** – It was determined prior to the project that Cesspool #10 possessed a concrete lining, thus Cesspool #10 required only pumping. Manhole risers and a round metal cover were installed above the existing Cesspool #10. The existing influent pipe to the cesspool was removed and a new PVC pipe for gray water from Septic Tank #10 was installed through the upper concrete ring (manhole riser) at Cesspool #10. An abandoned sewer line between Bldg. #84 and Cesspool #10 was left in place.

**Date Archaeological Monitoring Begun and Completed** – May 30, 2007 to June 19, 2007.

**Activities Monitored** – Cesspool #10 was located just to the east of the east side of Bldg. #84. Cutting of the cement sidewalk took place and existing lines were located. The excavation for the cover for the cesspool measured ca. 1.5m<sup>2</sup>. The archaeologist monitored testing for the existing pipe inverts, as well as the installation of the replacement pipes from Building #59. Septic Tank #10 was located just south of the southwest corner of Bldg. #59. The pavement was cut and the final excavation for the tank measured ca. 3m (80/250°) by 2.5m by 3.5m deep.

**Findings** - Construction activities at IWS #10 disclosed no prehistoric or historic cultural items. No soil profile was recorded at IWS #10, as the small deep excavation was deemed unsafe for entry.

## **IWS (Individual Wastewater System) - #10A**

**Buildings Connected** – Bldg. #81 (Housekeeping) located in the Northwest portion of Kīlauea Military Camp.

**Absorption Area** – A HAP was constructed at IWS #10A. This absorption pad consisted of four high capacity leaching chambers sitting horizontally and resting on a surface of geo-textile (used to prevent material migration) fabric over granular wash rock material. The gray water comes from the washers at Bldg. #84, and travels into the lint trap where solids are captured. The liquid then travels down slope to a Type II distribution box where the flow separates into four pipes passing into the leaching chambers. The gray water leaches into granular material (gravel or crushed rock) and is absorbed.

**Date Archaeological Monitoring Begun and Completed** – May 29, 2007 to June 18, 2007.

**Activities Monitored** – Prior to the beginning of work at IWS #10A, a construction entrance was built just to the south of the southwest corner of Bldg. #84. A trench running ca. 250° and 50' (15.2m) long was both hand and machine dug from the north side of Bldg. #84 to the area of the HAP #04. At the HAP #04 location, a large hole measuring ca. 25' (7.6m) by 20' (6m) by 9' (3m) deep was excavated for the leaching chambers. The archaeologist monitored all hand and machine excavations.

**Findings** – The monitor located no prehistoric or historic items or features during the construction activities at IWS #10A. One soil profile (IWS #10A – Profile #01) was done in the long trench near Lint Interceptor #10A (Plate 78).



Plate 78. IWS#10A – Profile #01 looking to 160° (south\southeast). The scale is 1.0m long.

### **IWS (Individual Wastewater System) - #11**

**Buildings Connected** – Bldg. #24 (Rental with kitchen), Bldg. #30 (Rental with kitchen), Bldg. #31 (Rental with kitchen), and Bldg. #32 (Rental with kitchen) located in the West-central portion of Kīlauea Military Camp.

**Absorption Area** – Existing Cesspool #11 was converted to a VAP by demolishing the existing cesspool cover, pumping the organic material, excavating the hole to fit new precast concrete rings, and placing the rings (with cover) into the hole. Removal of the existing influent pipe to the cesspool took place and a new PVC pipe to transport gray water from Septic Tank #11 ran through the stacked concrete rings at VAP #11.

**Date Archaeological Monitoring Begun and Completed** – September 6, 2007 to October 4, 2007

**Activities Monitored** - Cesspool #11 was located just to the east of Bldg. #26 (Cold Storage Facility) and northwest of Bldg. #24. Cutting of the cement sidewalk took place and the existing lines were located. Monitoring included the excavation for the cover of the cesspool as well as the enlargement of Cesspool #11 for the placement of rings. The archaeologist monitored the testing for the existing pipe inverts, as well as the replacement pipes from Bldg. #24, #30, #31, and #32 running to Septic Tank #11. Testing for existing pipe inverts was normally done by hand excavation in order to prevent pipe damage that could have resulted from machine digging. Septic Tank #11 was located under the paved street northwest of Bldg. #24. The pavement was cut and the final excavation for the tank measured ca. 6.4m (135/315°) by 2.5m by 3.5m deep.

**Findings** –Testing for existing pipes at IWS #11 located Concentration #01 during hand excavation. Concentration #01 was located just to the west of Bldg. #30. A grouping of three artifacts was found in an area approximately 0.30m<sup>2</sup>. The concentration included a partial military rifle cartridge, one piece of clear bottle glass, and an aluminum twist-off Schlitz Beer cap (Plate 79). Further discussion is given in the Artifacts section. Reburial of the artifacts took place after photography and description were

completed. No prehistoric items or features were found. One soil profile (IWS #11 – Profile #01) (Plate 80) was recorded in the Septic Tank #11 excavation pit.



Plate 79. The three items found in IWS #11 – Concentration #01.



Plate 80. IWS #11 – Profile #01 looking to 260° (west). The vertical scale is 1.0m long.

#### **IWS (Individual Wastewater System) - #12 (a & b)**

**Buildings Connected** – Bldg. #33 (Gym), Bldg. #94 (Rental with kitchen), Bldg. #95 (Rental with kitchen), and Bldg. #96 (Rental with kitchen) are connected to IWS #12a. Bldg. #34 (Cafeteria) is connected to IWS #12b. Both portions of IWS #12 are located in the Central portion of Kilauea Military Camp.

**Absorption Area** – Both IWS #12a (on the west) and #12b (on the east) empty gray water into VAP #12. Existing Cesspool #11 was converted to a VAP by demolishing the existing cesspool cover, pumping the organic material, excavating the hole to fit new precast concrete rings, and placing the rings (with cover) into the hole. Removal of the existing influent pipe to the cesspool took place and new



PVC pipes to transport gray water from Septic Tanks #12a and #12b ran through the stacked concrete rings at VAP #12.

**Date Archaeological Monitoring Begun and Completed** – October 9, 2007 to October 31, 2007.

**Activities Monitored** – Two separate excavation projects were completed at the IWS #12 project. IWS #12a (on the west) included an excavation for a 3000 gallon septic tank under the road northeast of Bldg. #95, a series of sewer outfall lines, and the conversion of Cesspool #12 into VAP #12. IWS #12b, to the east, is located immediately north of Bldg. #34 and south of Bldg #35. This project includes a 500-gallon grease trap, an inspection manhole, and a 1,500-gallon septic tank. The gray water from IWS #12B flowed to VAP #12 as well. The archaeologist monitored all hand and machine-dug excavations associated with the construction of IWS #12a and #12b.

**Findings** – Two features, both of which appear to be historic, were located during the monitoring of IWS #12a. IWS #12 – Feature #01 (Plate 81) was a rock-filled pit located in the southeast corner of the Septic Tank #12a excavation. The pit measured approximately 2.4m wide by 1.5m deep and was filled with soil and many small basalt rocks, many of which still had concrete adhering to the surfaces. The pit was covered with soil and was resting below the sidewalk. A test unit (1m<sup>2</sup> by 0.44m deep) was placed to the south of the sidewalk to determine the extent to the south, but the results were not conclusive. The southeast wall of the pit appeared to be approximately 0.50m from the exposed face of the excavation. The feature appears to be a trash pit from a former cement-rock feature and did not appear to contain any cultural material other than the concrete-covered rocks (Figure 44).



Plate 81. IWS #12 – Feature #01 looking to 210° (south\southwest). The scale is 1.0m.

IWS #12 – Feature #02 was a square enclosure of dry-laid basalt masonry used to support a concrete and rebar cover at Cesspool #12 (Plate 82, Figure 45). It was built of pāhoehoe cobbles and small boulders stacked seven to nine rough courses high resting on pāhoehoe. This feature measured about 3.1m (N/S) by 2.5m (E/W) by 1.9m high. The eastern wall was capped with a concrete cap that

supported a rusted sewer inlet line. On the south, the wall was about the same height, but the western wall had collapsed into the cesspool. The northern wall was gone except for a single stack of rocks near the eastern wall. The structure was photographed and recorded when it was exposed.

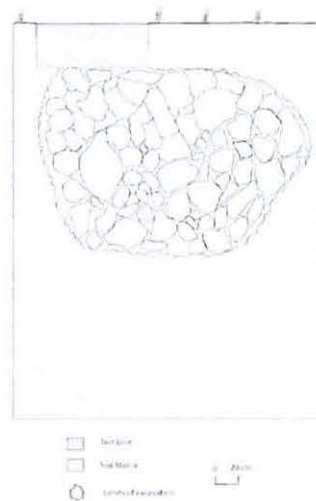


Figure 44. Profile of Feature #01.



Plate 82. IWS #12 – Feature #02 after the cover removal. View to 210° with a 1.0m scale.

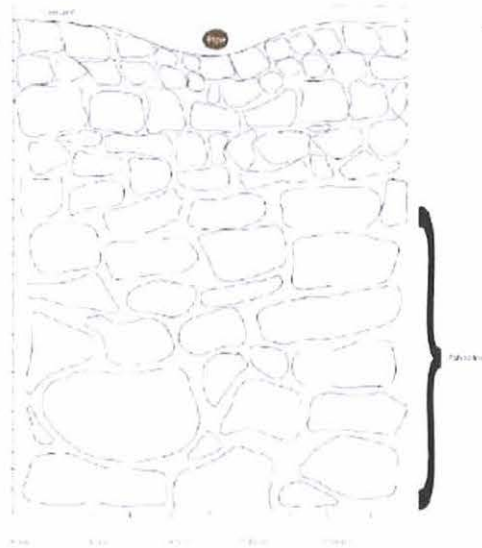


Figure 45. Profile of the east wall of IWS #12 – Feature #02.

IWS #12 – Feature #02 appears to have functioned as support for the concrete\ rebar cover that rested atop the structure. The feature also provided support for the incoming septic lines that emptied into the old cesspool. It is believed that the concrete and rebar cover was a later addition, and the original was simply wooden supports topped with corrugated roofing material. After consultation with the USAG-HI Cultural Resources Manager, it was decided to attempt to place the new inlet pipe and preserve the structure, but the feature collapsed into the cesspool before this could be carried out.

Five historic artifacts were located during the IWS #12 monitoring project (Plate 83). All items were found at the IWS #12a portion of the project. The original depths of the items are unknown, since all were located in back dirt piles. Table 1 lists the items.



Plate 83. The collection of artifacts found during monitoring of IWS #12. The scale is 0.40m long.

**Table 1. Artifacts found during monitoring at IWS #12.**

Item	Dimensions	Easting (m)	Northing (m)	Comments	Plate No.
IWS #12 Artifact #01	0.016m	236195	2150354	Small yellow Marble	40
IWS #12 Artifact #02	0.17 by 0.14 by 0.02m	261201	2150367	Mule or Horseshoe	41
IWS #12 Artifact #03	0.125 by 0.11 by 0.063m	261232	2150377	Partial Brick	42
IWS #12 Artifact #04	0.19 by 0.14 by 0.64m	261232	2150377	Partial Brick	43
IWS #12 Artifact #05	0.22 by 0.02 by 0.01m	261206	2150376	Table Knife	44

One soil profile (IWS #12 – Profile #01) (Plate 84) was done in the long north/south trench excavation located west of VAP #12.



Plate 84. IWS #12 – Profile #01 to 130°. Horizontal scale is 1.50m, the truncated vertical scale is 1.2m.

### **IWS (Individual Wastewater System) - #13**

**Buildings Connected** – Bldg. #35 (Cafeteria), Bldg. #37 (General Store), Bldg. #38 (Storage with sink) and Bldg. 35A (Snack Bar) located in the Central portion of Kīlauea Military Camp.

**Absorption Area** – Grease from the grill in the Bldg. 35A Snack Bar flows from the building via an insulated 6" o.d. pipe passing below Bldg. #35 to a Jensen precast cement Grease Interceptor near the



septic tank. An inspection manhole lies just upstream of the Grease Interceptor. Filtered liquids from the Grease Interceptor flow into Septic Tank #13 as do septic from Bldg. #37. Existing Cesspool #13 was converted to a VAP by demolishing the existing cesspool cover, pumping the organic material, excavating the hole to fit new precast concrete rings, and placing the rings (with cover) into the hole. Removal of the existing influent pipe to the cesspool took place and a new PVC pipe to transport gray water from Septic Tank #13 running through the stacked concrete rings at VAP #13.

**Date Archaeological Monitoring Begun and Completed** – October 16, 2007 to November 7, 2008

**Activities Monitored** - Cesspool #13 was located just to the south Bldg. #35. The cement sidewalk was cut and the existing lines were located. Removal of the cover for the cesspool resulted in the discovery of IWS #13 – Feature #01 (see below). After the documentation of the feature was completed, it was removed and excavation continued until sufficient for the placement of stacked rings and cover of VAP #13. The archaeologist did monitoring of testing for the existing pipe inverts, as well as the replacement pipes. Archaeological monitoring also examined the excavation of the new pipeline passing under Bldg. #35A

Septic Tank #13, Grease Interceptor #13, and Inspection Manhole #13 were located south of the main steps on the south side of Bldg. #35. The pavement was cut and the final excavation for the tank complex measured ca. 3m (80/250°) by 2.5m by 3.5m deep.

**Findings** – One historic feature, a mortared stacked wall enclosure (IWS #13 – Feature #01) was identified during the excavation of Cesspool #13 for conversion into VAP #13. The dimensions of IWS #13 – Feature #01 were ca. 2.40 (N/S) x 2.80 x 2.60m deep (Plate 85, Figures 46 & 47). Construction materials were basalt blocks piled up to 13 courses high and resting on top of the pāhoehoe bedrock. The stones were mortared and a thin veneer (0.02-0.04m) of concrete and corrugated roofing placed over the inside. The top of the wall enclosure formed a level surface with a cement cap and a cement cover was placed over the top. After documentation of the feature, it was removed for enlargement of the conversion to a VAP.

As at IWS #12 – Feature #01, this construction appears to have functioned as support for the concrete and rebar cover that rested atop of the structure and it also provided support for the incoming septic lines that emptied into the old cesspool. It is thought that the concrete and rebar cover was a later addition, and the original covering consisted of wooden supports with corrugated roofing materials that was later upgraded. One soil profile (IWS #13 – Profile #01) was recorded in the trench excavation located just to the south of Bldg. #35 (Plate 86).

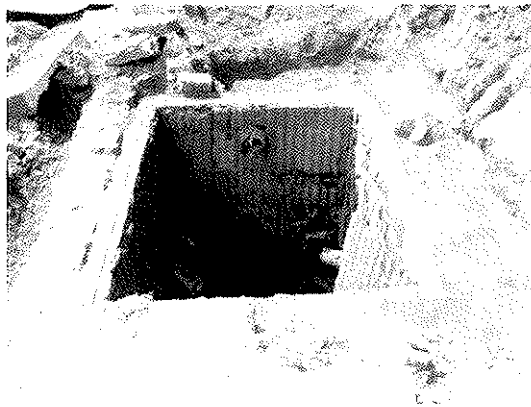


Plate 85. IWS #13 – Feature #01 after removal of the concrete-rebar cover. View to 270°, scale is 2.0m.  
IWS #13 - Front view

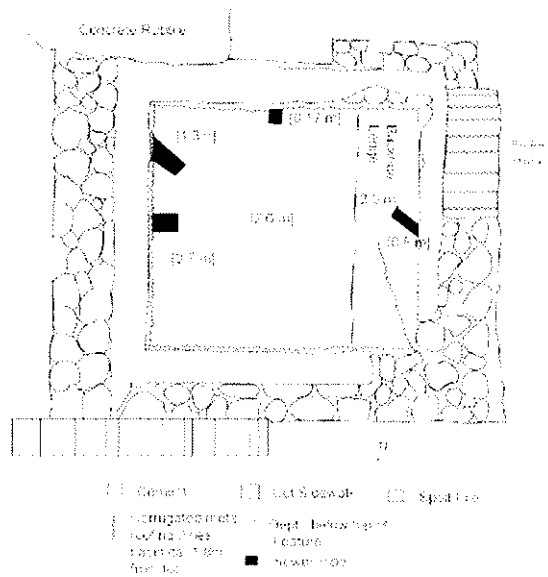


Figure 46. Plan view of IWS #13 – Feature #01.



Plate 86. IWS #13 – Profile #01 looking to 270° (west). The scale is 1.0m long.

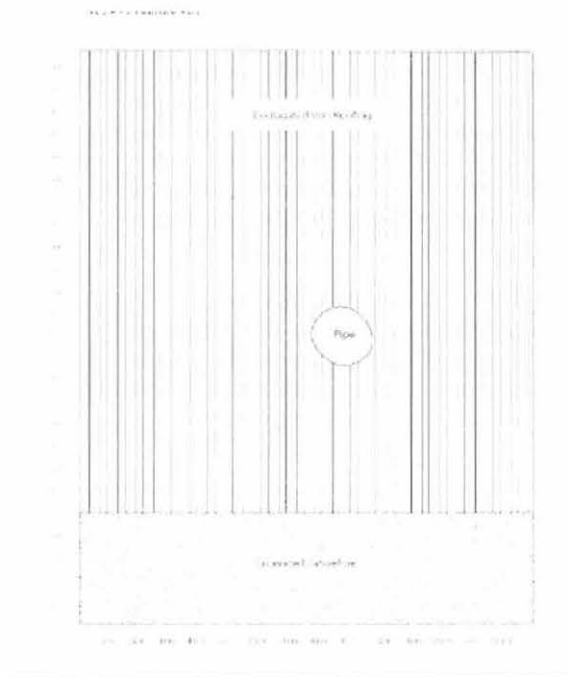


Figure 47. Idealized plan view of the south wall of IWS #13 – Feature #01. The feature was not entered due to safety concerns.

## **IWS (Individual Wastewater System) - #14**

**Buildings Connected** – Bldg. #1 to #19 (Rentals w/o kitchens), Bldg. #27 to #29 (Rentals w/o kitchens), and Bldg. #40 (Office) located in the Central portion of Kīlauea Military Camp.

**Absorption Area** – Existing Cesspool #14 was converted to a VAP by demolishing the existing cesspool cover, pumping the organic material, excavating the hole to fit new precast concrete rings, and placing the rings (with cover) into the hole. Removal of the existing influent pipe to the cesspool took place and a new PVC pipe to transport gray water from Septic Tank #14 ran through the stacked concrete rings at VAP #14.

**Date Archaeological Monitoring Begun and Completed** – June 4, 2007 to September 24, 2007

**Activities Monitored** - Cesspool #14 was located just to the southeast of Bldg. #25 in a grassy area. The existing sewage lines for Bldg. #1 – 19, #27 – 29, #40, and Cesspool #15 were located. Monitoring included the excavation for the cover for the Cesspool #14 as well as the enlargement of the cesspool for the placement of concrete rings. Cesspool #15 was not found during the testing phase (Head 2006a), but was a new find during this project (see below). The archaeologist also monitored testing for the existing pipe inverts, as well as the replacement pipes running to Septic Tank #14. Septic Tank #14 was located under the paved street southeast of Bldg. #26. The pavement was cut and the final excavation for the tank measured ca. 6.4m (135/315°) by 2.5m by 3.5m deep.

**Findings** – No prehistoric items or features were observed, but a number of probable historic items were found during the excavation of Septic Tank #14. The first of these was a concrete pipe support measuring 0.95m long by 0.45m diameter. The materials are a rough concrete/rock mixture with a rusted pipe (or pole) sticking 0.28m out of the top. The pipe is very rusty, but appeared to be ca. 2½” outside diameter (o.d.) (Plate 87). The item's locale was in the extreme northeast corner of the Septic Tank #14 excavation. Although the pipe and concrete unit was in place when found, it collapsed into the excavation.

Approximately 2m to the north, a concentration (IWS #14 – Concentration #01) of rusted roofing material, planed lumber, rusted 6” O.D. Cast Iron pipe, a piece of black cotton, and a white plastic grocery bag were also noted (Plate 88). This latter grouping is thought to represent materials from the replacement of the original roof on Cesspool #14 with the current cement cover. The black cotton and plastic grocery sack appear to be more recent.



Plate 87. This is a view of the concrete pipe base found during excavation of Septic Tank #14.  
The scale is 0.50m long. Note the mold of the feature in the wall below the horizontal ladder.



Plate 88. IWS #14 – Concentration #01 in the north wall of Septic Tank #14 excavation.  
The view is looking to 0° (north) and the scale is ca. 2.0 long.

Before beginning excavation at IWS #14, a review of historic maps (Tomonari-Tuggle and Slocumb 1980:III-50) indicated the possibility of locating Bldg. #24 in the general area. No indication of the structure was found, however, the pipe base mentioned above might have been associated with the structure.

The missing Cesspool #15 was also found lying under an existing road during the IWS #14 excavations on September 14, 2008. Although the Cesspool was only partially exposed, it appeared to be a cement tank with cement and rebar cover measuring ca. 10 (N/S) x 12 x 3-4m high. It was avoided by the construction, was pumped, isolated from the new system, and back-filled. One soil profile (IWS #14 – Profile #01) (Plate 89) was recorded in the trench excavation located to the west of Bldg. #28.



Plate 89. IWS #14 – Profile #01 looking to 90°. The horizontal scale is 1.0m long.

#### **IWS (Individual Wastewater System) - #17**

**Buildings Connected** – Bldg. #44 (Rental with kitchen), Bldg. #74 (Rental without kitchen) and Bldg. #89 (Rental without kitchen) located in the East-central portion of Kilauea Military Camp.

**Absorption Area** – Existing Cesspool #17 was converted to a VAP by demolishing the existing cesspool cover, pumping the organic material, excavating the hole to fit new precast concrete rings, and placing the rings (with cover) into the hole. Removal of the existing influent pipe to the cesspool took place and a new PVC pipe to transport gray water from Septic Tank #17 ran through the stacked concrete rings at VAP #17.

**Date Archaeological Monitoring Begun and Completed** – August 2, 2007 to August 31, 2007

**Activities Monitored** - Cesspool #17 was located just to the east of Bldg. #74 and north of Bldg. #89. Probing took place in the grassy area and the existing lines were located. Monitoring included the excavation for the cover for the cesspool as well as the enlargement of Cesspool #17 for the placement of concrete rings. The archaeologist also monitored testing for the existing pipe inverts, as well as the placing of pipes from Bldg. #44, #74, and #89 running to Septic Tank #17. Septic Tank #17 was located under the paved street northwest of Bldg. #74. The pavement was cut and the final excavation for the tank measured ca. 7.6m (90/270°) by 3.5m by 3.5m deep.

**Findings** – There were no prehistoric or historic items found during the excavation and construction at IWS #17. A series of existing basalt curbs were removed during construction activities at IWS #17 since they were in the Septic Tank #17 excavation area. These were photographed before removal (Plate 90), and the stones were numbered and replaced in the same sequence. This project was useful,



since the contractor also had to remove and replace the basalt curbing stones at IWS #11, #12, #13, #14, #18, and #20. The basalt curbing in the original alignments had often collapsed, and the replacement activities restored them to nearly the original state. The basalt curbs were apparently built by the CCC (Civilian Conservation Corps) (Tomonari-Tuggle & Slocumb 2000:III-45) in the 1930s.



Plate 90. This is a view of the eastern end of the basalt curbing before removal.  
The pencil marks 1.0m on the vertical scale.

One soil profile (IWS #17 – Profile #01) was recorded in the Septic Tank #17 excavation located northwest of Bldg. #74 (Plate 28).



Plate 91. IWS #17 – Profile #01 looking to 90° (east).  
The scale resting on the pavement is 1.0m long.

#### **IWS (Individual Wastewater System) - #18**

**Buildings Connected** – Bldg. #20 (Rental without kitchen), Bldg. #21 (Rental with kitchen), Bldg. #41 (Rental with kitchen), Bldg. #42 (Rental without kitchen), Bldg. #43 (Rental with kitchen), Bldg. #62 (Rental with kitchen), Bldg. #71 (Rental without kitchen) and Bldg. #72 (Rental without kitchen) located in the Central portion of Kilauea Military Camp.

**Absorption Area** – Existing Cesspool #18 was converted to a VAP by demolishing the existing cesspool cover, pumping the organic material, excavating the hole to fit new precast concrete rings, and placing the rings (with cover) into the hole. Removal of the existing influent pipe to the cesspool took place and a new Poly Vinyl Chloride pipe to transport gray water from Septic Tank #18 ran through the stacked concrete rings at VAP #18.

**Date Archaeological Monitoring Begun and Completed** – September 4, 2007 to October 11, 2007

**Activities Monitored** - Cesspool #18 was located just to the southeast of Bldg. #41 and north of Bldg. #62. The grassy area was probed and the existing lines were located. Monitoring included the excavation for the cover for the cesspool as well as the enlargement of Cesspool #18 for the placement of concrete rings. The archaeologist also monitored testing for the existing pipe inverts, as well as the replacement pipes from Bldg. #20, #21, #41, #42, #43, #62, #71, and #72 running to Septic Tank #18. Septic Tank #18 was located under the paved street northwest of Bldg. #41. The pavement was cut and the final excavation for the tank measured ca. 7.6m (0/180°) by 3.8m by 4.5m deep.

**Findings** – As found at IWS #04, #12, and #13, a masonry wall was constructed on top of the pāhoehoe lava in which Cesspool #18 was excavated (Plate 92, Figures 48 & 49). This feature consisted of a stacked basalt rock enclosure forming a square wall. The lower enclosure (IWS #18 – Feature #01) walls are single course stacked 3-10 courses high with cement grouting between the stones. All four of the walls rested on solid pāhoehoe and four cast iron pipes were projecting through the walls. IWS#18 – Feature #01 measured ca. 2.3m<sup>2</sup> and 1.8m high. The enclosure appears to have functioned as support for the concrete and stacked rock cover that rested atop of the structure and it also provided support for the incoming septic lines that emptied into the old cesspool. The feature was removed after recordation since VAP #18 was scheduled for placement in that location.



Plate 92. IWS #18 – Feature #01 at Cesspool #18.

The photograph is looking to 90° (east) and the scale is 0.50m long.

IWS #18 – Feature #02 (Plate 93, Figure 50) was also a stacked rock enclosure exposed on the surface and resting on top of the Cesspool #18 cover. The old enclosure was built of basalt rock stacked 2-3 courses high with cement grout and capped with smooth cement. The interior portion of the feature has a smooth floor with an access hole measuring about 0.40m<sup>2</sup>. It measures approximately 2.5m<sup>2</sup> by 0.40m high. Since it was resting on the ground surface, it likely served as both a cover for the cesspool



and as a vegetation planter. Initially, this feature was slated for demolition, but the contractor was able to move it to a nearby location where it will be preserved and used again as a planter.

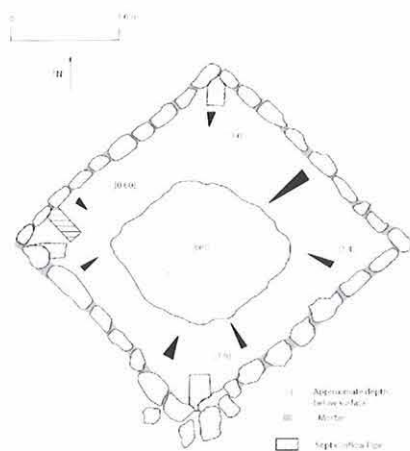


Figure 48. Plan view of IWS #18 – Feature #01.



Plate 93. IWS #18 – Feature #02 at the original location.  
The view is looking to 90° and the tape is 2.0m long.

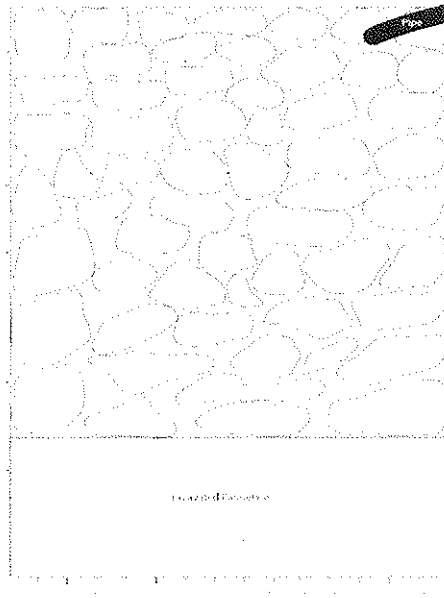


Figure 49. An idealized profile of IWS #18 – Feature #01.  
Entry was not allowed due to safety concerns.

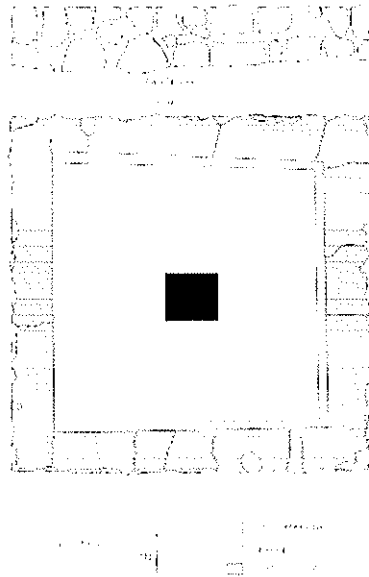


Figure 50. This is a plan and profile view of IWS #18 – Feature #02.

IWS #18 – Artifact #01 is a partial historic bottle found under the Northwest corner of IWS #18 – Feature #02 during the removal. This bottle (Plate 94) is a mostly complete green glass bottle with “Property of Hilo Soda Works Hilo, Hawaii” in raised (embossed) letters on the front. There is a large “HS” on the base and it measures ca. 0.20m by 0.08m diameter. The finish is broken off.



Plate 94. IWS #18 – Artifact #01, a partial Hilo Soda Works beverage bottle.

Several historic items (IWS #18 – Concentration #01) were also located during the excavation of VAP #18, probably 3-4 cm below the surface. Further discussion and photographs of the artifacts are given in the Artifacts section. A listing is in the table below:

**Table 3. Artifacts found during monitoring of VAP #18**

Item	Dimensions (approx.)	Easting (m)	Northing (m)	Comments	Plate No.
IWS #18 Artifact #02	0.12 by 0.06m	261325	2150361	½ of a white ware bowl with a possible C. transfer on the base	48
IWS #18 Artifact #03	0.12 by 0.05m	261325	2150361	Enamelware or Graniteware lid possibly dating to pre-1940	49
IWS #18 Artifact #04	unknown	261325	2150361	Rusted flat metal strap	No Photo
IWS #18 Artifact #05	various	261325	2150361	Three pieces of green bottle glass, including two body fragments, and a base	50
IWS #18 Artifact #06	0.27 by 0.09m	261325	2150361	Complete Heinz Bottle with small mouth external thread screw closure (Clear)	51
IWS #18 Artifact #07	0.27 by 0.09m	261325	2150361	Complete Heinz Bottle with small mouth external thread screw closure (Clear)	51
IWS #18 Artifact #08	0.25 by 0.09m	261325	2150361	Complete Hilo Soda Works with crown closure (Green)	51
IWS #18 Artifact #09	0.07 by 0.09m	261325	2150361	Base of Heinz Bottle with embossed mark -H.J. Heinz 401	51

One soil profile (IWS #18 – Profile #01) was recorded in the Septic Tank #18 excavation located southwest of Bldg. #41 (Plate 95).



Plate 95. IWS #18 – Profile #01 looking to 180°. The scale is 2.0m long.

#### **IWS (Individual Wastewater System) - #20 (a & b)**

**Buildings Connected** – Bldg. #22 (Rental with kitchen), Bldg. #68 (Rental without kitchen) and Bldg. #70 (Rental without kitchen) flow into IWS #20a and Bldg. #47 (Rental with kitchen), Bldg. #48 (Rental without kitchen), Bldg. #63 (Rental with kitchen), Bldg. #65 (Rental with kitchen), Bldg. #66 (Rental with kitchen) and Bldg. #67 (Rental without kitchen) are tied into IWS #20b.

**Absorption Area** – Both IWS #20a (on the west) and #20b (on the east) empty gray water into VAP #20. Existing Cesspool #20 was converted to a VAP or Seepage Pit by demolishing the existing cesspool cover, pumping the organic material, excavating the hole to fit new precast concrete rings, and placing the rings (with cover) into the hole. Removal of the existing influent pipe to the cesspool took place and new PVC pipes to transport gray water from Septic Tanks #20a and #20b ran through the stacked concrete rings at VAP #20.

**Date Archaeological Monitoring Begun and Completed** – June 6, 2007 through August 30, 2007.

**Activities Monitored** - Two separate excavation projects were completed at the IWS #20 project. IWS #20a (on the west) included an excavation for a 2,000 gallon septic tank under the road southwest of Bldg. #68, a series of sewer outfall lines, and the conversion of Cesspool #20 into VAP #20. IWS #20b, to the east, is located east-northeast of Bldg. #67. This project included a 5,000-gallon septic tank and the associated sewer lines. The gray water from IWS #20a and #20b flow to VAP #20 for seepage. The archaeologist monitored all hand and machine-dug excavations associated with the construction of IWS #20a and #20b.

**Findings** – No buried prehistoric cultural features or items were observed during the monitoring, but a small number of probable historic items were noted. IWS #20 – Artifact #01 is a small fragment of white crockery (Plate 96) measuring ca. 0.05m (long) by 0.01m (wide) by 0.01m (thick) was found in a

back dirt pile roughly between Septic Tank #12a and Septic Tank #12b. IWS #20 – Artifact #02 was a small green and white marble (Plate 97) In addition, two nondescript fragments of brown bottle glass were found in the back dirt.

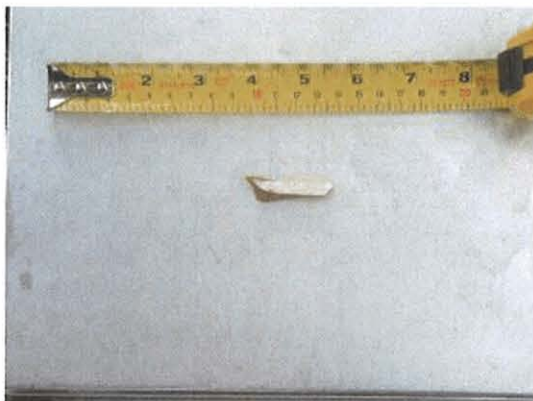


Plate 96. IWS #20 – Artifact #01 that was found in a spoil pile near IWS #20a.



Plate 97. IWS #20 – Artifact #02, found in a spoil pile near IWS #20a.

Two soil profiles (IWS #20 – Profile #01 and #02) were completed in the area. Profile #01 (Plate 98) was recorded near the Cesspool/VAP #20a location, with Profile #02 (Plate 99) drawn in the long trench containing the gray water pipe running from Septic Tank #20b to VAP #20.





Plate 98. IWS #20 – Profile #01 to 180°.  
The scale is 1.50m in length.



Plate 36. IWS #20 – Profile #02 to 210° (southwest).  
The scale against the profile is 1.0m long.

#### **IWS (Individual Wastewater System) - #20A**

**Buildings Connected** – Bldg. #64 (Laundry)

**Absorption Area** – A HAP was constructed at IWS #20A. This development will function in the same manner as the one described earlier at IWS #10A.

**Date Archaeological Monitoring Begun and Completed** - August 20, 2007 through August 24, 2007

**Activities Monitored** - Prior to the beginning of work at IWS #20A, a construction entrance was built just off the paved street east of Bldg. #64. At the HAP #20A location, a large hole measuring ca. 50' (15.2m) by 20' (6m) by 9' (3m) deep was excavated for the leaching chambers. The western end of the pit was the location of the lint interceptor and distribution box with a single trench leading on to the existing sewer connection at Bldg. #64. The archaeologist monitored all hand and machine excavations.

**Findings** - No prehistoric or historic cultural items or features were found during monitoring activities at IWS #20A. One soil profile was recorded in the southwest corner of the VAP #20A excavation located southeast of Bldg. #64 (Plate 100).



Plate 100. IWS #20A – Profile #01 looking to 270°. The horizontal scale is ca. 1.5m long.

## **VII. LABORATORY ANALYSES**

### **KMC Septic Project Artifacts**

Twenty-two artifacts (and a concentration of recent materials) were found during construction monitoring of the KMC Septic Project. These included game marbles, glass bottles and fragments, a horseshoe, construction bricks, tableware, domestic stoneware, and electrical components. These items were listed in the IWS discussion and further details can be found in Head 2008.

### **Soils**

A total of 16 IWS (Individual Waste Systems) were installed at KMC during this project. All involved excavation of soils for features including septic tanks, absorption pads, absorption pits, pipelines et al. These excavations ranged in depth from less than 1m to over 4m deep. The locations of

the excavations were generally in all areas of KMC and an attempt has been made to correlate the strata across the KMC area.

All of the IWS units, with the exception of one (IWS #10) was sampled with profiles made of an excavated wall within the development. Some of the IWS units (#04 and #06) were profiled in separate areas, so a total of 18 profiles were done. The strata within the profile areas were drawn and are presented in Figures A-1 to A-18 in the original report. Each strata was also sampled and the soils were brought to PTA for analysis. The samples were dried and examined for such markers as texture, structure, color, inclusions and boundary between the intervening layers. These data are presented in tables in the full report (Head 2008).

The surface of all of the profiles has been disturbed either by previous construction, planting of lawns, or grading and paving. It also appears likely that the surface soils, especially in the lawn and other planting areas, have been imported into KMC.

Profiles at KMC disclosed from seven to eleven strata, based on differences in colors or textures. Strata are generally indicative of ejected material from Kilauea Volcano. These materials include ash, lapilli, bombs and eolian materials deposited at the sample areas. The majorities (68%) of the sampled walls are resting on a pāhoehoe flow which has been dated to ca. AD1400 (Don Swanson – personal communication). From these observations, it is likely that the AD 1400 flow forms the basement rock throughout the KMC area and that all soil and ash deposits at KMC are younger. For purposes of this discussion, this pāhoehoe will be called KMC Layer A and the following discussion will use KMC Layer A at the bottom and proceed to the surface. The layers were compared for similarities in attributes, especially percentages of olivine, ped size, as well as the amount and morphology (form) of basalt inclusions

All profiles that exhibited this pāhoehoe (KMC Layer A) were overlain by a reticulite layer that ranged in thickness up to 0.30m, although these reticulate strata were significantly thinner (>0.10m) in the east central portion of KMC. This reticulite layer is designated as KMC Layer B. This layer can be compared with Swanson's Unit 2 (Swanson 2008).

Overlying this reticulite layer, there is another layer which varies in texture from clay to sandy clay and between 0.03-0.25m in thickness (KMC Layer C). This layer is present in over 72% of the profiles and also present in the three profiles where KMC Layer A was not observed.

The next layer that appears in just over 55% of the profiles is a sandy clay layer between 0.10-0.55m thick that is designated as KMC Layer D.

Moving into the younger sediments above KMC Layer D, the picture becomes more muddled. There a number of clay, silty clay, sandy, and small gravels with fines noted in the profiles, but these are sparse.

There appears to be a clay layer (KMC Layer E) ranging in thickness from 0.07-0.25m but it is not directly above KMC Layer D. It is found at varying depths with alternating numbers of strata between layers D and F due either to varying depositional occurrences across the Camp area or invalid correlations.

When the profiles were examined both individually and as an overall deposit of strata at KMC, the following was found. The vertical distance between Present Ground Surface (PGS) and the underlying basement rock (KMC Layer A) is listed below for each of the IWS excavations (Table 4). Data are not available for six profile areas (32%) which were not dug to KMC Layer A, and one



excavation (0.5%) that was not profiled because of safety concerns. These deposits (clay, sands, gravels, et al.) were then averaged for a relative depth in excavated areas.

**Table 4. Depths of excavations to Pāhoehoe basement layer (KMC Layer A)**

<b>IWS Excavation</b>	<b>Minimum Depth (m)</b>	<b>Maximum Depth (m)</b>	<b>Average Depth Below P.G.S. (m)</b>
#01	1.12	1.24	1.18
#02	1.36	1.42	1.39
#04 – Profile #01	Unknown <sup>1</sup>	Unknown <sup>1</sup>	Unknown <sup>1</sup>
#04 – Profile #02	1.14	1.26	1.20
#06 – Profile #01	1.26	1.45	1.36
#06 – Profile #02	1.27	1.38	1.33
#07	Unknown <sup>1</sup>	Unknown <sup>1</sup>	Unknown <sup>1</sup>
#09	1.26	1.38	1.32
#10	Not Profiled	Not Profiled	Not Profiled
#10A	Unknown <sup>1</sup>	Unknown <sup>1</sup>	Unknown <sup>1</sup>
#11	0.70	1.13	0.92
#12	1.42	1.45	1.44
#13	Unknown <sup>1</sup>	Unknown <sup>1</sup>	Unknown <sup>1</sup>
#14	1.24	1.29	1.27
#17	1.04	1.15	1.10
#18	1.20	1.50	1.35
#20 – Profile #01	1.30	1.33	1.32
#20 – Profile #02	Unknown <sup>1</sup>	Unknown <sup>1</sup>	Unknown <sup>1</sup>
#20A	1.55	1.69	1.62
<b>Average Depth Below P.G.S. (m)</b>	<b>1.22</b>	<b>1.36</b>	<b>1.29</b>

<sup>1</sup>KMC Layer A not encountered during excavation.

Sample data from the 13 profiles in which KMC Layer A was encountered indicate that it laid a minimum of 1.2m below and maximum of 1.3m below the disturbed surfaces. An average depth below surface for the pāhoehoe in the sampled areas is about 1.3m. These data indicate that in other areas within KMC, it is probable that the KMC Layer A pāhoehoe should not be encountered above 1m below the surface. Any natural features such as lava tubes or blisters would be expected to lay within the KMC Layer A pāhoehoe. The intervening deposits between KMC Layer A and the surface should consist of Kīlauea ejecta such as lapilli, ash, and bombs. Because these deposits are aerial by nature, it would be unlikely to encounter such natural features as lava tubes or blisters, which were sometimes used for human habitation. The possibility, however, of prehistoric and historic artifacts or other features in these upper layers cannot be discounted.

## VIII. CONCLUSIONS

As stated above, archaeological monitoring was performed at the KMC Septic Replacement Project during the period beginning May 29, 2007 and ending November 16, 2007. Approximately 130 person-days or 1300 person-hours were expended in the monitoring of this project and approximately 6,500 m<sup>2</sup> of surface area was excavated and replaced. During that time, 16 Individual Waste Systems

(IWS) were installed and brought into use. Each of these IWS locations required a minimum of two large excavations for the septic tank and an outlet (vertical or horizontal absorption pit or pad), as well as a number of other features including pipes, distribution boxes, grease traps, and so forth. Other areas outside of the construction area were also disturbed to build silt fences, clean oil and fuel spills, as well as to perform hand excavations to locate existing buried pipes. All hand and machine excavations were done only when an archaeological monitor was present.

The area on the west side of IWS #06 appeared to have been previously excavated and then filled. This was indicated by the lack of clearly defined soil strata which was evident in all other areas. Other excavations (outside of previously-disturbed cesspools) that reached below roughly 0.50m encountered undisturbed deposits.

The monitoring of these activities failed to disclose any features with a positive prehistoric connection, but historic features, mostly associated with earlier sewage activities, were noted at several of the IWS excavations. These historic features consisted of stacked blocks or basalt stone, either dry-laid or with concrete masonry which were often used to support wood and metal tops on the old cesspools. All of these historic features, with the exception of IWS #18 – Feature #02, are no longer in place. They were documented, and either collapsed or were removed to allow the excavation of the cesspools to be completed. IWS #18 – Feature #02 was sitting on the surface, and the crew was able to move it away to preserve this feature.

Other possible historic features were found at IWS #12 – Feature #01 and IWS #14 – Concentration #01. The former appears to be a pit that was excavated and filled with construction rock and rubble, and the latter is likely construction material and recent trash associated with the removal of an earlier roof at Cesspool #14. Both were photographed, a sketch was drawn at IWS #12 – Feature #01 and then both were re-buried.

The profiles recorded during this project indicate that the surface of KMC has been highly disturbed both by prior construction and the ubiquitous lawns found throughout the installation. There were remarkably few artifacts located during the excavations, but three areas of concentrations of historic artifacts were found during this project.

The first of these was located during excavations at IWS #12 and IWS #13. Both of these sewer features are located in the area enclosed by Bldg #34, #35, #95, and #96 in the oldest part of KMC. The first two buildings (#34 and #35) were part of the original construction in 1916 or 1917, with the two later buildings built in 1947 (Tomonari-Tuggle and Slocumb 2000:I-18 & I-19). Items found here include two bricks (dating to the 1930s – 1940s), a horseshoe, and a silver-plated table knife (dating after 1951). Unfortunately, these items were found in the back dirt, so the exact provenience (esp. depth) is not known, but the depth was not over 1.0m deep. All artifacts, except for the horseshoe for which no temporal information is available, relate to mid-20<sup>th</sup> century activity at KMC.

The second area is in the IWS #20 excavations. Again, no vertical provenience is known for the artifacts found here, but the items include a small piece of crockery or stoneware, and an insulator made for the military between the 1920s and 1950s. The buildings in this area are Bldg. #67 and #68, both constructed in 1944 (Ibid.). Tomonari-Tuggle and Slocumb (2000:III-39) indicate possible usage of the area as part of the “Naval Camp” as early as 1928. The artifacts do not seem to contradict mid-century use of the area, though they provide no definitive information about early 20<sup>th</sup> century activity.

The last area lies to the west of the “stone row” of cabins (Bldg. #27 through #32). These buildings were built as recreation billets in 1933 and were slated to be occupied by permanent KMC staff (Tomonari-Tuggle and Slocumb 2000:I-18, III-43). There is an aerial view of KMC dated 1923 (Ibid III-34), which shows a large building in the general area, so it is likely the area has been in use since 1916. Two of the artifacts found in the small excavation west of Bldg. #30 are not temporally

diagnostic, but IWS #11 – Artifact #03 is a partial military rifle cartridge. According to the headstamp, it was manufactured by the Frankford Arsenal in 1927.

Should future excavations be planned for any of these three areas, it is recommended that a monitor be present. It is interesting, however, that all three of these areas were highly disturbed by construction, and only these few items were found.

Previous work at KMC located other historic items as well. Historic items and/or trash was found in several sub-surface locations including near Bldg. #62 (Head 2004), Bldg. #97 (Head 2005a), and Bldg. 35A (Head 2006a). Any future excavations should be monitored within these areas as well.

Also noted above was the discovery of a “void” at the IWS #07 location during the planned excavation of Cesspool #07. This opening was closely investigated because the HAVO Kūpuna Council was concerned that a lava tube might be present. Their concerns were that a lava tube might lead into Halema‘uma‘u Crater at Kīlauea Caldera, and any overflow of gray water could drain there. Using mirrors, it was determined that the void represented a lava blister with defined walls that did not lead to Halema‘uma‘u. Archaeologists at HAVO, along with Kūpuna Council agreed with this determination and the work at Cesspool #07 was allowed to proceed. The possible presence of “voids” in this and all other excavations was closely monitored throughout the project.

As discussed above, the depth to the underlying pāhoehoe layer (KMC Layer A – this report) was examined in all of the sampled profiles. It is likely that if lava tubes are present within the KMC boundaries, they will lie within KMC Layer A. Subsequently, it is expected, from the sampled areas, the overlying stratum at KMC consists of Kīlauea ejecta, with little or no chance of encountering lava tubes or blisters. It is also expected that any prehistoric or historic features will lie within these upper ejecta layers. Although no prehistoric features or artifacts were found during the monitoring for this project, the presence of both historic features and artifacts was confirmed.

It has become clear through a series of projects at KMC that subsurface historic deposits associated with activity at the Camp over the last 92 years are present. Deposits that are more than 50 years old are potentially eligible for nomination to the National Register of Historic Places, or inclusion as part of the historic district. It is recommended, therefore, that all surface disturbances continue to be monitored at KMC. Although only small amounts of materials were found during the present project, it is likely that materials remain in undisturbed areas. Approximately 6,000 m<sup>2</sup> were sampled during the present project with roughly another 500 m<sup>2</sup> sampled during earlier projects. The total ground surface at KMC (which includes lands under buildings, water tanks, and roads) approaches 210,000 m<sup>2</sup>. This means ca. 3% of area has been sampled for prehistoric and historic archaeological features and artifacts. Since this is a small percentage of KMC, the recommendation for continued monitoring should be considered.

## Fire Break Construction Monitoring

APVG-GT-ENV

2 August 2007

### MEMORANDUM FOR THE RECORD

SUBJECT: Archaeological and Historical Monitoring Activities Associated with Kē'āmuku dip tank construction, Pōhakuloa Training Area, TMK (3) 6-7-001:003, Waikoloa Ahupua'a, South Kohala District, Hawai'i Island, Hawai'i.

1. On August 1, 2007 Cultural Resource Specialist Cary Stine and Army Archaeologist Bill Godby drove to the location of the proposed Dip Tank 2 in Keamuku from Mamalahoa Highway in the area of Waikoloa *ahupua'a* within TMK (3) 6-7-001:003.
2. The purpose of this trip was to investigate the location of the proposed Dip Tank 2 and determine how far it was from site 23517 nearby. The location information would be used in a section 106 report which would determine if the dip tank will have any effect on the site.
3. A GPS position was recorded of site 23517 and photographs were taken of the cultural site and the proposed location of Dip Tank 2.
4. Although the proposed dip tank location is a considerable distance away from site 23517 there is a concern about helicopter rotor wash when retrieving water from the tank during a fire. This will have to be addressed by a qualified person in the 106 report.

Cary Stine  
Cultural Resource Specialist  
Environmental Office, PTA

## MEMORANDUM FOR THE RECORD

SUBJECT: Archaeological and Historical Monitoring Activities Associated with the West Side Firebreak road and fence constructions, Pohakuloa Training Area, TMK (3) 7-1-004:007, Pu'u Anahulu Ahupua'a, North Kona District, Hawai'i Island, Hawaii.

1. On September 21 2007 Cultural Resource Specialist Cary Stine and Army Archaeologist Bill Godby performed a vehicular survey in Training Area 22 along the West Side Firebreak Road en route to the Firebreak Priority 2 intersection.
2. Along the way a stop was made at the section where the Westside firebreak and the Hawaiian trail site 19528 cross. Pink flagging along the sides of the firebreak road marked the general area where the Hawaiian trail probably crossed based on a line drawn between features 20m to the north and 40m to the south of the firebreak road.
3. Approximately 80m south of the trail along the firebreak there was a turnout created within a gully in an 'a'a flow. The firebreak intruded 40m up the gully in the direction of the trail and managed to slightly damage a three meter section of the trail. Digital photos were taken and GPS data was collected of the turnout perimeter and the damaged section of trail (Figure 52).
4. There was a second point about 560m further south from where the Hawaiian trail site 19528 was crossed by the West Side Firebreak road (Figure 52) to where it was crossed by Firebreak 2 (Figure 53). The trail paralleled the West Side firebreak between the two crossing points coming as close as 30 m and no more than 50 meters from the firebreak. The close proximity between the firebreak roads and the Hawaiian trail within this 560 meter section of the trail is of concern.
5. On September 28<sup>th</sup> Cary Stine and Bill Godby met with DPW Range Maintenance Manager, Derek Awong to make him aware of the area of concern and get assurances that no further damage will occur to the trail or any other historic property with regards to firebreak activity. DPW Tech assured us that there was no more work being done on the Westside firebreak and we would be notified if he heard otherwise.
6. It is recommended that a cultural monitor be present if any further firebreak construction or maintenance activity occurs on the Westside firebreak and Firebreak 2 roads where the Hawaiian trail site 19528 comes within 50 meters of the road.

Cary Stine  
Cultural Resource Specialist  
Environmental Office, PTA

*Map removed to protect rare resources. Available upon request*

*Map removed to protect rare resources. Available upon request*



## MEMORANDUM FOR THE RECORD

SUBJECT: Archaeological and Historical Monitoring Activities Associated with Firebreak Priority 3 and 4 turnout construction, Pohakuloa Training Area, TMK (3) 7-1-004:006, Pu'u Anahulu Ahupua'a, North Kona District, Hawai'i Island, Hawaii.

1. Cary Stine, Cultural Resources Technician accompanied by Steve Evans, Natural Resources Botanist, Erick Moller, PTA Fire Chief, and Derek Awong, Range Maintenance Manager surveyed select areas along Firebreak Priority 4 and parts of 3 proposed for turnout locations (Figure 54).
2. Starting at the north end of Firebreak Priority 4 off of Old Kona Road, the survey crew drove the full length of Firebreak 4 Road surveying 5 areas for proposed turnouts and one then drove east on Firebreak Road Priority 3 and identified one area for a proposed turnout. The extents of the surveyed areas were marked with flagging and GPS points were taken of the flagged extents.
3. Starting from the north end of the Firebreak Priority 4 road, turnouts 1-3 are no more than 15 meters deep from the road with a width of about 20 meters starting at the road and narrowing to about 15 meters at the back of the turnout.
4. Turnouts 4 and 5 are existing turnouts which will be enlarged to about 25 meters deep from the road and 35 meters wide. Turnout 4 might be made a helicopter landing site. As both turnouts 4 and 5 are located on 'a'ā flows there should be no issue with rotor wash.
5. Turnout 6 is located on the Firebreak Priority 3 Road about 400m north from the Firebreak Priority 3-4 juncture. It is proposed as a modification of an existing push and will be 20 meters deep from the road and 15 meters wide.
6. All 6 areas proposed for turnouts were surveyed and found to have no cultural resources.
7. The proposed project will have no effect on historic properties. No monitoring is recommended.

Cary Stine  
Cultural Resource Specialist  
Environmental Office, PTA

***Map removed to protect rare resources. Available upon request***

## MEMORANDUM FOR THE RECORD

SUBJECT: Archaeological Survey of Four Proposed Turn-Arounds in Training Area 22, Pōhakuloa Training Area, in the *ahupua'a* of Pu'u Anahulu, North Kona District (TMK (3) 7-1-040:006 and (3) 7-1-040:007), Hāmākua District, Hawai'i Island, Hawaii.

1. On January 17, 2008, Derek Awong, Work Leader for DPW - Pōhakuloa Training Area, and James Head, Cultural Resource Specialist traveled to Training Area 22 Pōhakuloa Training Area (Figure 55). This trip was to examine locations of four potential turn-arounds and materials borrow areas along segments of the existing West-Side Fire Breaks. These locations were examined for cultural resources.
2. The developments are planned to serve three purposes. They will be flattened for use as turn-around areas for fire trucks and other equipment; the excess rock at the locations will be used for continued road construction and upkeep of the Fire Break roads; and the locations will serve as staging areas for heavy equipment used in road construction and maintenance.
3. At each of the proposed areas, Mr. Awong disclosed the rough size of the area needed, and then the archaeologist walked around the perimeter with the GPS. When this had been recorded, the archaeologist then did transects across the area to look for cultural resources.
4. Turn-Around #01 is located near 219420m E, 2184358m N, on the east side of the intersection of Priority #02 and Priority #03 (Plate 101). Proposed Turn-Around #01 is located specifically in a large 'a'ā field bounded by the two roads. The examination area is approximately 1100 m<sup>2</sup> with a buffer of 5-10m between the edge of the 'a'ā flow and the vegetation beyond. The turn-around measures ca. 33m (N\S) by 75m (E\W). The sub-strate found in the general area is Mauna Loa k3 pāhoehoe flows dating ca. 750 – 1500 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is Barren Lava (Shaw and Castillo 1997). The area terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during surface examination.
5. Turn-Around #02 is located near 219409m E, 2184367m N, on the west side of the intersection of Priority #02 and Priority #03 (Plate 102). Proposed Turn-Around #02 is located specifically in a large 'a'ā field bounded by the two roads. There is an existing dozer push on the northwest as well. An area measuring approximately 55 (N\S) by 35m (E-W) or about 1,400 m<sup>2</sup>, along with a 5-10m buffer between the turn-around and the vegetation was examined. The sub-strate found in the general area is Mauna Loa k3 pāhoehoe flows dating ca. 750 – 1500 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is Barren Lava (Shaw and Castillo 1997). The terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during surface examination.

5. Turn-Around #03 is located near 218641m E, 2185067m N, on the east side of Priority #03 in another area of 'a'ā (Plate 103). An area measuring ca. 350 m<sup>2</sup> 20m (N\S) by 45m (E\W) was examined for this development. A buffer of 5m was established between the turn-around and vegetation. The sub-strate found in the general area is Mauna Loa k3 pāhoehoe flows dating ca. 750 – 1500 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is an Open *Metrosideros* Treeland with sparse shrub understory (Shaw and Castillo 1997). The terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during surface examination.
6. Turn-Around #04 is located near 218898m E, 2184165m N, on the east side of Priority #02 in an 'a'ā flow (Plate 104). The examination area measured roughly 15 (N\S) by 23 m (E\W) (190m<sup>2</sup>) and consists of 'a'ā flows. The sub-strate found in the general area is Mauna Loa k3 pāhoehoe flows dating ca. 750 – 1500 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is an Open *Metrosideros* Treeland with sparse shrub understory (Shaw and Castillo 1997). The area terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during surface examination.
7. After examination of the four proposed turn-arounds, it is recommended that no further archaeological work is needed since no cultural remains were located during the survey. It is also recommended that no monitoring of construction should be done.

James Head  
Cultural Resource Specialist  
Environmental Office, PTA

*Map removed to protect rare resources. Available upon request*



Plate 101. This is a view of Turn-Around #01 looking to the southeast.  
It will be located in the 'a'a field in the background.



Plate 102. This view is looking west to the proposed Turn-Around #02.  
Note the bulldozer push marking the end of the proposed area.



Plate 103. This photograph is looking southeast to the location of Turn-Around #03, in 'a'a field.



Plate 104. This is a view of Turn-Around #04 looking to the southwest.  
The location is in the 'a'a field to the left of the Priority #02 Fire Break.



## MEMORANDUM FOR THE RECORD

SUBJECT: Archaeological Survey of Four Proposed Road Barricades and Six Borrow Areas in Training Area 22, Pōhakuloa Training Area, in the *ahupua'a* of Pu'u Anahulu, North Kona District (TMK (3) 7-1-040:006), North Kona District, Hawai'i Island, Hawaii.

1. On January 17, 2008, Danny Collins, Equipment Operator for DPW - Pōhakuloa Training Area, and James Head, Cultural Resource Specialist, traveled to Training Area 22 Pōhakuloa Training Area (Figure 56). This trip was to examine locations of four potential road barricades and six borrow areas along segments of the proposed Fire Break #02. All locations were examined for cultural resources during this visit.
2. The road barricades will be used to close existing roads and bulldozer pushes in order to limit off-road traffic through the area. They will be constructed by placing large boulders in the existing alignments. In the case of Barricade #01 which will be placed at the southern limits of Borrow Area #01 the wall of the development will be contoured to prevent vehicle access to the bulldozer alignment.
3. The material borrow areas are planned to serve three purposes. They will be flattened for use as turn-around areas for fire trucks and other equipment, the excess rock at the locations will be used for construction and upkeep of the Fire Break roads, and the locations will serve as staging areas for heavy equipment used in construction and maintenance.
4. At each of the proposed areas, Mr. Collins disclosed the rough size of the area needed, and then the archaeologist walked around the perimeter. When this had been recorded, the archaeologist then performed several transects across the area to check for cultural resources.
5. Barricade #01 (and Borrow Area #01) is located near 219199m E, 2184150m N, on the south side of Priority (Fire Break) #02 (Plates 105 & 106). The development area is located specifically in a large 'a'ā field. An area approximately 10m<sup>2</sup> was examined for cultural resources at the proposed Barricade #01 location. Borrow Area #01 measures ca. 125m (N/S) by 100m (E/W) and 5500m<sup>2</sup> in area. There is an approximate 5m buffer between the turn-around and existing trees. The sub-strate found in the general area is Mauna Loa k3 pāhoehoe flows dating ca. 750 – 1500 years B.P. (Trusdell, Wolfe and Morris 2005) and the sparse vegetation is an Open *Metrosideros* Treeland with sparse shrub understory (Shaw and Castillo 1997). The general area terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse vegetation cover. No cultural remains were located during surface examination.
6. Barricade #02 is located near 218306m E, 2183906m N, on the northwest side of the new road segment of Fire Break #02 (Plate 107). An area approximately 10m<sup>2</sup> was examined for cultural resources at the proposed Barricade #02 location. A small area just south measuring about 20m<sup>2</sup> was also examined to provide a cleared area to re-align a sharp turn of Barricade #02. Barricade #03 is located close by at 218334m E, 2183875m N, on the south side of the new road (Plate 108). An area approximately 10m<sup>2</sup> was examined for cultural resources at the proposed Barricade #03 location. Both are located in pāhoehoe fields on either side of the road. The sub-strate found in the general

area is Mauna Loa k3 pāhoehoe flows dating ca. 750 – 1500 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is an Open *Metrosideros* Treeland with dense shrub understory (Shaw and Castillo 1997). The terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during the surface examination.

7. Barricade #04 is located near 218038m E, 2183905m N, on the northeast side of Fire Break #03 in another area of 'a'ā and pāhoehoe lava (Plate 109). An area approximately 10m<sup>2</sup> was examined for cultural resources at the proposed Barricade #04 location. The sub-strate found in the general area is Mauna Loa k2 pāhoehoe flows dating ca. 1500 – 3000 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is an Open *Metrosideros* Treeland with dense shrub understory (Shaw and Castillo 1997). The terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during surface examination.
8. Borrow Area #02 is located near 218506m E, 2184174m N, on the north side of Fire Break #02 in an 'a'ā flow (Plate 110). This borrow area measures ca. 70m (N\S) by 60m (E\W) and is about 2300 square meters in size. The standard 5m buffer areas around the north, east, and west sides were maintained. The sub-strate found in the general area is Mauna Loa k3 pāhoehoe flows dating ca. 750 – 1500 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is a Sparse *Myoporum* Treeland (Shaw and Castillo 1997). The terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during surface examination.
9. Borrow Area #03 is located near 218424m E, 2184034m N, on the east-southeast side of Fire Break #02 in an 'a'ā flow (Plate 111). The development measured roughly 2300m<sup>2</sup>, 60m (N\S) by 70m (E\W) with a 5m buffer between the activities and existing vegetation. The sub-strate found in the general area is Mauna Loa k3 pāhoehoe flows dating ca. 750 – 1500 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is a Sparse *Myoporum* Treeland (Shaw and Castillo 1997). The terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during surface examination.
10. Borrow Area #04 is located near 218115m E, 2183791m N, on the south side of Fire Break #02 in an 'a'ā flow (Plate 112). The turn-around measures approximately 65m (N\S) by 60m (E\W) and is roughly 2200 sq. meters in size. A 5m buffer is suggested between the blading in existing vegetation outside of the 'a'ā flow. The sub-strate found in the general area is the Mauna Loa k2 pāhoehoe flows dating ca. 1500 – 3000 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is an Open *Metrosideros* Treeland with dense shrub understory (Shaw and Castillo 1997). The terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during surface examination.
11. Borrow Area #05 is located near 217517m E, 2183687m N, on the east side of Fire Break #02 in an 'a'ā flow (Plate 113). The proposed turn-around measures about 25m (N\S) by 40m (E\W) and is roughly 450m in area utilizing an approximate 5m buffer to protect the vegetation. The sub-strate found in the general area is Mauna Loa k2 pāhoehoe flows dating ca. 1500 – 3000 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is an Open *Metrosideros* Treeland with dense shrub understory (Shaw and Castillo 1997). The terrain is rough with numerous 'a'ā and pāhoehoe

flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during surface examination.

12. Borrow Area #06 is located near 217431m E, 2183817m N, on the west side of Fire Break #02 in an 'a'ā flow (Figure 114). The area will be approximately 670 square meters in size and measures roughly 40m (N\S) by 30m (E\W) with the standard 5m buffer area. The sub-strate found in the general area is Mauna Loa k2 pāhoehoe flows dating ca. 1500 – 3000 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is an Open *Metrosideros* Treeland with dense shrub understory (Shaw and Castillo 1997). The terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during surface examination.
13. An examination of Figure 56 will disclose that Areas #05 and #06 do not appear to lie along the present route of Fire Break (Priority #02) as shown. These locations are near the route being constructed and the final route will be updated.
14. After examination of the four proposed barricades and six proposed borrow areas, it is recommended that no further archaeological work is required since no cultural remains were located during the survey. It is also recommended that no further monitoring of construction is required at these segments.

James Head  
Cultural Resource Specialist  
Environmental Office, PTA

*Map removed to protect rare resources. Available upon request*



Plate 105. This is a view of Barricade #01 looking to the south.  
It will be located in the area marked by yellow tape.



Plate 106. This view is looking southwest to the proposed Borrow Area #01.  
The photograph was taken from the existing bulldozer cut.



Plate 107. Looking northwest to the location of Barricade #02 to be built at the yellow tape.



Plate 108. View of Barricade #03 looking to the southeast.





Plate 109. View of the Barricade #04 looking to the northeast. Construction will be at the yellow tape.



Plate 110. Borrow Area #02 looking to the north with a 1.0m scale.





Plate 111. Borrow Area #03 looking to the east.



Plate 112. Borrow Area #04 looking to the south.



Plate 113. Borrow Area #05 looking to the northeast.



Plate 114. Borrow Area #06 looking to the northwest. Fire Break #02 alignment is to the right.

## MEMORANDUM FOR THE RECORD

SUBJECT: Re-location of Construction Route of FAR #02 in Training Area 22, Pōhakuloa Training Area, *ahupua'a* of Ka'ohe (TMK (3) 7-1-040:06), Hāmākua District, Hawai'i Island, Hawaii.

1. On January 15, 2008, Ken Spencer and Tim Guiteras, Fencing Crew at Pōhakuloa Training Area (PTA), Bill Godby, PTA Archaeologist, and James Head, Cultural Resource Specialist at PTA, traveled to Training Area 22 in the Pōhakuloa Training Area (Figure 57). This trip was to acquire a final alignment for the Priority #02 (Fire Access Road #02) construction. This action was required when it was discovered the existing PTA shapefile did not agree with the previous firebreak alignment. This previous alignment will be the route used for FAR #02 construction.
2. After leaving a vehicle on Priority #02 at 218431mE, 2184145m N, or the end of the re-alignment survey, the crew proceeded with another vehicle to the intersection of Priority #01 and #02. The latter location is near 214905m E, 2183459m N.
3. The four-crew members began walking to the southeast, recording the route with a Trimble XH, and discussing the proposed fence construction.
4. Two sites that were investigated for possible human modification during the original survey (Luscomb 2006) were noted and examined once again. The small sinks and small overhang still appeared to be natural and do not have any cultural modification.
5. The majority of the newly mapped route appears to coincide with the previously mapped route. The notable exception is the long loop to the south that is currently under construction for the Priority #02 Fire Break.
6. The team returned to the truck at 1500 hrs. No further archaeological work is recommended on this segment of the construction project.

James Head  
Cultural Resource Specialist  
Environmental Office, PTA

*Map removed to protect rare resources. Available upon request*

## MEMORANDUM FOR THE RECORD

SUBJECT: Archaeological Survey of Two Proposed Material Borrow Areas in Training Area 22, Pōhakuloa Training Area, in the *ahupua'a* of Pu'u Anahulu, North Kona District (TMK (3) 7-1-040:06), Hawai'i Island, Hawaii.

1. On March 19, 2008, Danny Collins, Equipment Operator for DPW - Pōhakuloa Training Area, and James Head, Cultural Resource Specialist, traveled to Training Area 22, Pōhakuloa Training Area (Figure 58). This trip was to examine locations of two potential borrow areas along segments of the proposed Fire Break #02. All locations were examined for cultural resources during this visit.
2. The material borrow areas are planned to serve three purposes. They will be flattened for use as turn-around areas for fire trucks and other equipment, the excess rock at the locations will be used for construction and upkeep of the Fire Break roads, and the locations will serve as staging areas for heavy equipment used in construction and maintenance.
3. At both of the proposed areas, Mr. Collins disclosed the rough size of the area needed, placed flagging tape, and the archaeologist walked around the perimeter. When this had been recorded, the archaeologist then performed several transects across the area to check for cultural resources.
4. Borrow Area #A is located near 217898m E, 2183800m N, on the west side of Priority (Fire Break) 02. The development area is located specifically in a large 'a'ā field. Borrow Area #A measures ca. 25m<sup>2</sup> and 625m<sup>2</sup> in area. There is an approximate 5m buffer between the turn-around and existing trees. The sub-strate found in the general area is Mauna Loa k2 pāhoehoe flows dating ca. 1500 – 3000 years B.P. (Trusdell, Wolfe and Morris 2005) and the sparse vegetation is an Open *Metrosideros* Treeland with dense shrub understory (Shaw and Castillo 1997). The general area terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse vegetation cover. No cultural remains were located during surface examination.
5. Borrow Area #B is located near 218004m E, 2183593m N, on the west-southwest side of the new road segment of Fire Break #02 (Plate 115). The development area is located specifically in a large 'a'ā field and measures ca. 60m x 60m and 3600m<sup>2</sup> in area. There is an approximate 5m buffer between the turn-around and existing trees. The sub-strate found in the general area is Mauna Loa k2 pāhoehoe flows dating ca. 1500-3000 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is an Open *Metrosideros* Treeland with dense shrub understory (Shaw and Castillo 1997). The terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during the surface examination.
6. After examination of the two proposed borrow areas, it is recommended that no further archaeological work is required since no cultural remains were located during the survey. It is also recommended that no further monitoring of construction for this particular segment of the firebreak is required.

James Head  
Cultural Resource Specialist  
Environmental Office, PTA

*Map removed to protect rare resources. Available upon request*



Plate 115. Barricade #01 looking to the south.  
It will be located in the area marked by yellow tape.



## MEMORANDUM FOR THE RECORD

SUBJECT: Archaeological Survey of Four Proposed Material Borrow Areas in Training Area 22, Pōhakuloa Training Area, in the *ahupuaʻa* of Puʻu Anahulu, North Kona District (TMK (3) 7-1-040:06), Hawaiʻi Island, Hawaii.

1. On May 15, 2008, Tony Brandt, Equipment Operator for DPW - Pōhakuloa Training Area, and James Head, Cultural Resource Specialist, traveled to Training Area 22, Pōhakuloa Training Area (Figure 58). This trip was to examine locations of four potential borrow areas along segments of the proposed Fire Break #02. All locations were examined for cultural resources during this visit.
2. The material borrow areas are planned to serve three purposes. They will be flattened for use as turn-around areas for fire trucks and other equipment, the excess rock at the locations will be used for construction and upkeep of the Fire Break roads, and the locations will serve as staging areas for heavy equipment used in construction and maintenance.
3. At all of the proposed areas, Mr. Brandt disclosed the rough size of the area needed, placed flagging tape, and the archaeologist walked around the perimeter. When this had been recorded, the archaeologist then performed several transects across the area to check for cultural resources.
4. Borrow Area 051508-#01 is located near 217563m E, 2183884m N, on the west side of Priority (Fire Break) #02 (Plate 116). The development area is located specifically in a large 'a'ā field. Borrow Area #A measures ca. 30m (N\S) x 25m (E\W) and 750m<sup>2</sup> in area. There is an approximate 5m buffer between the borrow area and existing trees. The substrate found in the general area is Mauna Loa k2 pāhoehoe flows dating ca. 1500 – 3000 years B.P. (Trusdell, Wolfe and Morris 2005) and the sparse vegetation is an Open *Metrosideros* Treeland with sparse shrub understory (Shaw and Castillo 1997). The general area terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse vegetation cover. No cultural remains were located during surface examination.
5. Borrow Area 051508-#02 is located near 217352m E, 2184133m N, on the north side of the new road segment of Fire Break #02 (Plate 117). The development area is located specifically in a large 'a'ā field and measures ca. 35m (N\S) x 100m (E\W) and 3500m<sup>2</sup> in area. There is an approximate 5m buffer between the borrow area and existing trees. The substrate found in the general area is Mauna Loa k2 pāhoehoe flows dating ca. 1500-3000 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is an Open *Metrosideros* Treeland with sparse shrub understory (Shaw and Castillo 1997). The terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during the surface examination.
6. Borrow Area 051508-#03 is located directly across the proposed road near 217352m E, 2184133m N, on the south side of Fire Break #02 (Plate 118). The development area is located specifically in a large 'a'ā field and measures ca. 20m (N\S) x 100m (E\W) and 2000m<sup>2</sup>

in area. There is an approximate 5m buffer between the borrow area and existing trees. The substrate found in the general area is Mauna Loa k2 pāhoehoe flows dating ca. 1500-3000 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is an Open *Metrosideros* Treeland with sparse shrub understory (Shaw and Castillo 1997). The terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during the surface examination.

7. Borrow Area 051508-#04 is located near 217352m E, 2184133m N, on the north side of the new road segment of Fire Break #02 (Plate 119). The development area is located specifically in a large 'a'ā field and measures ca. 60m (N\S) x 90m (E\W) and 5400m<sup>2</sup> in area. There is an approximate 5m buffer between the borrow area and existing trees. The substrate found in the general area is Mauna Loa k2 pāhoehoe flows dating ca. 1500-3000 years B.P. (Trusdell, Wolfe and Morris 2005) and vegetation is a sparse *Metrosideros* Treeland (Shaw and Castillo 1997). The terrain is rough with numerous 'a'ā and pāhoehoe flows, sinkholes, overhangs, and tumuli with sparse to heavy vegetation cover. No cultural remains were located during the surface examination.
8. An invasive plant, probably *Nicotiana glauca* or Tree Tobacco, was noted near 215985m E, 2183140m N. The PTA Natural Resources Staff was notified, since it is an undesirable plant in the area.
9. After examination of the two proposed borrow areas, it is recommended that no further archaeological work is required since no cultural remains were located during the survey. It is also recommended that no further monitoring of construction for this particular segment of the firebreak is required.

James Head  
Cultural Resource Specialist  
Environmental Office, PTA

*Map removed to protect rare resources. Available upon request*



Plate 116. This is a view of Borrow Area 051508-#01 looking to the west.



Plate 117. This is a photograph of Borrow Area 051580-#02 looking to the east



Plate 118. This view looking to the southwest towards Borrow Area 051508-#03



Plate 119. This view looking to the southeast towards Borrow Area 051508-#04.

## Fence Monitoring

APVG-GT-ENV

2 August 2007

### MEMORANDUM FOR THE RECORD

SUBJECT: Archaeological and Historical monitoring activities associated with the West Side Fence Line Construction, Pohakuloa Training Area, TMK (3) 7-1-040:006, Pu'u Anahulu *ahupua'a*, North Kona District, Hawai'i Island, Hawaii.

1. On July 31 2007 Cultural Resource Specialist Cary Stine and Fencing Manager Kenneth Spencer performed a vehicular survey of the Westside Firebreak Road in Training Area 22 between the Old Kona Road and the intersection with firebreak 3.
2. The purpose of this trip was to survey the areas identified in the June 28<sup>th</sup> monitoring trip where the firebreak road started at about 850 meters south of the Old Kona Road. In this section the revised fence line diverged from the firebreak road to take a more direct route south for about 350 meters to where the firebreak road converged back with the fence line (Figure 59). Mr. Stine walked about 300 meters of this cleared fence line and did not observe any cultural resources.
3. Further south Mr. Stine investigated a small lava tube sink less than a meter east of the fence line and 2 kilometers south from the Old Kona Road (Figure 59). The sink opening was about one meter in diameter and increased to two meters in diameter at the base which was about two meters below the surface opening. There were several ungulate bones including a sheep, a goat and a couple of pigs. The presence of charcoal scattered throughout the floor was probably from the surface where there was a fire in the recent past. The sink is small and it would not have been practical to use it for a shelter. However, there was a stick with cut marks on one end found in the west end of the sink. I marked the sink opening with a GPS point; however the satellite coverage was bad. It would be good to get another GPS point in the future.
4. Although the proposed fence line was within a meter of the sink, the posts will be spaced no more than two meters from the sink opening to avoid any impact on the lava tube sink.

Cary Stine  
Cultural Resource Specialist  
Environmental Office, PTA

*Map removed to protect rare resources. Available upon request*



## MEMORANDUM FOR THE RECORD

SUBJECT: Archaeological and Historical Monitoring Activities Associated with Firebreak Priority 2 and West-Side Firebreak road and fence constructions, Pohakuloa Training Area, TMK (3) 7-1-004:007, Pu'u Anahulu Ahupua'a, North Kona District, Hawai'i Island, Hawaii.

1. On September 21 2007 Cultural Resource Specialist Cary Stine and Army Archaeologist Bill Godby performed a vehicular survey in the area of the Westside Firebreak Road where it intersects Firebreak Priority 2 in Training Area 22. This is where the Firebreak 2 road crosses the trail site 19528.
2. The purpose of the monitoring was to inspect the area of planned fencing along Firebreak 2 and determine if it might impact the Hawaiian trail site, 19528 where it was crossed by Firebreak 2. The Army committed to monitoring the fencing project in consultation with the State Historic Preservation Division.
3. The survey revealed impacts to the trail in the area of concern by past firebreak construction activity as it crossed perpendicular to the Hawaiian trail site, 19528 (Figure 60). In addition to the bulldozer cut a pushed soil berm was built up on the trail on the south side of the cut.
4. In a discussion with fence crew manager, Ken Spencer, the area in question was explained as an area where no further impacts were desired to avoid any 106 conflicts. Ken's suggestion was to put a gate at the location where the fence line crossed the Hawaiian trail site avoiding any further impacts to the trail. This will be the procedure followed in all areas where the fence line crosses the Hawaiian trail site, 19528.
5. It is recommended that a cultural monitor be present when the gates are installed in the areas where the fence crosses the Hawaiian trail site 19528.

Cary Stine  
Cultural Resource Specialist  
Environmental Office, PTA



## MEMORANDUM FOR THE RECORD

SUBJECT: Archaeological Survey for Northern Fence Unit in Ka'ōhe Ahupua'a, Hāmākua District (TMK: (3) 4-4-16:001), Waikoloa District in South Kohala District (TMK: (3) 6-7-01:003), and Pu'u Anahulu in North Kona District (TMK: (3) 7-1-04:007), Hawai'i Island, Hawai'i.

1. Beginning on August 16, 2007, Dr. Julie Taomia, Senior Cultural Resource Specialist, and Mr. Cary Stine, Cultural Resource Specialist, performed a cultural resources survey of an area of fence construction to protect endangered plants. With a few exceptions, fence posts and fencing material will be installed along existing roadways. A corridor approximately 20 m wide was surveyed for historic properties. Some portions of the area to be covered by the fence unit have previously been surveyed. The objectives of this survey were to survey previously unsurveyed areas along the fence route, and to assess whether the proposed fence line in the northeastern quadrant will affect an historic fence line (State Site number 23452; Figure 61). The survey extended over several days.

**August 16, 2007**

2. The field crew proceeded to the northern end of the fire access road along the western boundary of PTA, or Fire Access Road priority 1 (FAR 1). The area to be surveyed includes an 'a'ā flow that begins just north of the end of this road, the Ke'amuku flow (Plate 120).
3. The lava flow is open terrain with good visibility. Some trees are distributed across this area (Plate 121).
4. The fence route has been flagged, and the survey transects were walked to either side of this flagging. The survey crew walked north to the end of the flagging (Plate 122), and the returned by the same route to the vehicle.
5. No historic properties were identified along this transect.

**August 22, 2007**

6. The same field crew proceeded to the western end of the Old Kona Highway about 300m east of the FAR 1 intersection to begin the next segment of the fence unit survey. This portion of the survey area is an older lava flow with weathered rocks and extensive areas of silty soil. Overall the landscape is one of gently undulating knolls and ridges. Most of the rocks are pebbles and cobbles, though outcrops are present in some areas. Some areas that were clearly pāhoehoe flows where visible. Vegetation consists primarily of fountain grass with shrubs dispersed throughout. Ground visibility is poor (Plate 123).
7. A 20 m corridor north of the road was determined to be adequate to allow the fence crew room to shift the lines. The corridor was based on a line file provided by Mr. Kenneth Spencer of the fence crew. Approximately 5 m of this area had been previously surveyed for a proposed road widening. The survey crew therefore walked within this 15m corridor, to take the reduced visibility into account.
8. The first transect on this day was walked from 300m east back to the west toward the existing fence.
9. An old road, overgrown with grass, was present within the area of this first transect. Some modern rubbish was also noted. No other historic properties were identified.
10. Upon completion of this transect, the crew returned to the starting point and continued to the east. The terrain remained the same as before. Several military features were encountered.

11. MT-082207-01: 1 small pile of rocks on a low rise. The rocks are about cobble to small boulder size, and stacked two courses high. The pile measured 1.25m at 18° by 0.4m by 0.25m high (Plate 124).
  12. MT-082207-02 is a C-shaped structure on the northern side of a knoll adjacent to the road (Plate 125). Rocks along the southern, eastern and northern sides of the feature. The area enclosed to the northwest appears to have been dug out. The position provides a good view of the road. The top of the knoll is very rocky. A shell was found near the feature, and a beer can on a nearby portion of the knoll.
  13. Immediately prior to the discovery of this feature, the transect passed just south of Fire Point 517. Substantial portions of this survey corridor exhibit evidence of bulldozing activity, and in many areas the land is unnaturally flat. It became increasingly clear that the area has been substantially modified beyond the immediate road corridor. Knolls and other high areas in the corridor have outcrops and scattered rock, which is missing in the level areas.
  14. Survey continued in a generally eastward direction. The transect passed Fire Point 516. This area showed evidence of extensive bulldozing activity with push piles and a large berm with boulders incorporated.
  15. MT-082207-03 was probably a foxhole (Plate 126). The feature consisted of a circular depression with slabs of rock built up on the northern side (toward the ridge). The rocks were piled three courses high. White canvas was found on the south side, and a small plastic bottle was also found near the feature. The interior was covered with heavy vegetation. The feature measured 1.6m on the north-south axis with an additional 0.45m covered by rocks, 1.15m east-west. The rocks stood 0.5m above the surrounding ground surface, and the pit measured 0.35m below the ground surface.
  16. Located an apparent benchmark adjacent to a cairn four courses high. The entire area continues to show the effects of bulldozing activity.
  17. The fieldwork was ended by rain and fog. No other historic properties were identified.
- August 31, 2007**
18. The field crew returned to the end of the August 22 survey transect to continue a short distance to the end of the unsurveyed area. The terrain remained the same as that described above on August 22, 2007.
  19. Wire, possibly for communications, was encountered, and a series of depressions. There was no rock associated with these depressions.
  20. MT-083107-01 Possible foxhole. This feature was a pit on a knoll with rocks placed around the edges (Plate 127). The feature overlooks the road, and is on an inclined slope on the west edge of a flat area. The interior measurements of the feature were 1.3m north-south by 1.8m east-west. The rock rim around the edge averaged between 0.5 and 1.0m wide in a low stacking. The pit was 0.6m below the surrounding ground surface. The excavation exposed large rocks embedded in the soil.
  21. MT-083107-02 is a C-shaped structure located on the ridge top (Plate 128). The feature measures 2.8 (east-west) by 2.5 and is composed of loosely piled rock. The feature is open on the northeast side, and the southwestern side has collapsed. A concentration of ammunition was located on the southwest side of the feature, some loose and some held together as in a clip or a belt (Plate 129).
  22. Toward the end of the transect a bivouac was identified to the north of the survey area, on the side of a ridge facing the road. This completed this section of the survey. The remainder of the area had been previously surveyed (Desilets et. al 2005), and no archaeological sites were

identified within the survey corridor. Therefore, no historic properties were identified in this part of the project area.

23. The crew moved in the afternoon to the intersection of Kapele Road and Kīpuka Road. Survey was conducted from this intersection along the western side of Kīpuka Road to the southern side of Pu'u Kapele. The area is an undulating jumbled 'a'ā flow with many boulders and other large rocks. There is little to no fountain grass, and very little soil in this area. Visibility was excellent (Plate 130). Rubbish was found throughout the area indicating recent use, including several large pieces of metal.
24. MT-083107-03 a military fortification was located on top of a high spot just west of Kīpuka Road (Plate 131). The construction consisted of jumbled rocks, with large blocks on top of smaller rocks. C rations (3 cans and 1 spoon) were located just north of the structure. The structure measured 3.3m on the east-west axis by 3.4m on the north-south axis. The walls stood 0.6m above the ground surface on the interior of the eastern wall, and 1.3m above the ground surface on the exterior of the northern wall.
25. Survey continued from this location to the southern side of Pu'u Kapele. No historic properties were identified. There is extensive bulldozer modification of the area. Fieldwork ended due to rain. No historic properties were identified.

#### **September 6, 2007**

26. Dr. Taomia and Mr. Stine traveled to the northern end of Kīpuka Road on the southeastern side of Pu'u Ke'eke'e. From this point the field crew walked south along the proposed fence route to identify locations where the new fence line may intersect with Site 23452, an historic fence line.
27. The area north of Pu'u Kapele is an old lava flow with rocky soil deposits and extensive vegetation cover. Visibility was fair to good depending upon the amount of fountain grass present. The area immediately south of the intersection is quite flat, and may have been modified by bulldozing activity. Firing Point 505 was passed on the west side of the survey transect (and Kīpuka Road).
28. MT-090607-01 is an enclosure on a ridge to the south of Firing Point 505 (Plate 132). It is an irregular ring of rocks stacked in a haphazard manner. The rocks do have lichen, but it is not consistently on the same side, indicating that they have been stacked relatively recently. Bullet casings and links for ammunition were found nearby. The feature measured 3.2m by 3.9m. The width of the rock perimeter wall was highly variable. The long axis (north-south) is perpendicular to the trend of the ridge line. The center appears to be somewhat depressed below the level of the surrounding ground surface.
29. From this location south to Pu'u Kapele the landscape is more rolling, possibly the result of collapsed lava tubes with higher ridges and linear low areas between the ridge lines (Plate 133).
30. A fence post of site 23452 was located at the western edge of the survey transect (Plate 134). The fence post was flagged with orange flagging tape so that it is obvious to the fence crew and can be avoided. Barbed wire was present on the ground surface near the post. The barbed wire continues without posts to within about 10m of the road. The area between the historic fence line and the road shows evidence of extensive bulldozing.
31. Closer to the road, two more fence posts were identified, along with additional barbed wire. The southernmost fence post on the western side of Kīpuka Road appears to have been a tree that was cut off and used as a fence post; it stands within a copse of trees (Plate 135). Both of these fence posts were also flagged with orange flagging tape and labeled with the site number so that the fence crew can be certain of avoiding the posts. Barbed wire was located to the southeast of the fence post in the copse of trees. A GPS point was collected on the southernmost end of the

- barbed wire, and the location was flagged with orange flagging tape. This location is to the west of the berm that lines Kipuka Road on the western side. The new fence line should be able to avoid these features.
32. The remainder of Kipuka Road to the northern side of Pu'u Kapele has been previously surveyed (Desilets et. al 2005, Desilets & Roberts 2005). Therefore the crew returned to the truck to move down the 4WD road on the south side of Pu'u Ke'eke'e to check several locations where Site 23452 comes close to the road. The proposed new fence route lies close to the road, and is roughly parallel to Site 23452 in this area.
  33. First location to check was in the vicinity of a State owned animal holding pen. Several fence posts that appear to be part of site 23452 were located near this pen. The crew progressed southward to a ridge that trends in an east-west direction.
  34. On the south side of the ridge, and area with extensive rock construction was identified as T-090607-02. Communications wire, cans (possibly from C-rations), plastic plates, cardboard, foil, and bullet casings were all present in this area. At least two rectangular rooms were present along the southern edge of the ridge line (Plates 136 and 137). The front (southern) wall continues to the west (Plate 138), and ends in a rounded construction that has the appearance of a C-shaped structure (Plate 139), probably of military construction. Two more C-shaped structures, probably of military construction, were located west of this. Some construction appears along two natural ridges of lava, probably adding rocks to them, that run perpendicular to the southern wall along the ridge line (Plate 140). The walls generally stand about 0.5m above the ground surface. This site was minimally recorded. The crew then progressed to a fence post that was visible to the east on the south side of the ridge.
  35. This post had both barbed wire and heavy gauge wire wrapped around it. A linear pile of rocks about two courses high extended on the western side of the post to the north (Plate 141). The rock pile was about 1.5m long (north-south) by 0.5m wide. Large boulders were located on the east side of this pile at the northern and southern ends. The southern boulder was between the fence post and the linear pile.
  36. Another fence post was located to the southeast, incorporated into a military feature. This feature was not recorded, as this area was well outside of the proposed fence line corridor. A roll of barbed wire was located between this military feature and the post described in point #35, somewhat to the west.
  37. The field crew took the line indicated by the location of these two fence posts, and continued to the northwest back toward the proposed new fence line. This route proceeded back up the ridge line. Another military feature was located on the ridge top, built around a large vertical slab (boulder size). A fence post was located on the northern side of this feature. Additional fence posts continued to the northwest toward the State holding pen. No additional barbed wire was located in this area to the north of the ridge. The posts associated with the State holding pen appear to be the northernmost posts in this area, and are well south of the proposed new fence line route.
  38. The entire area is littered with old rusted cans (C-rations?), foil, bullet shells, and miscellaneous other rubbish.
  39. The crew returned to the truck, and moved to the end of the 4WD road at Ke'eke'e Road. Site 23452 originally traversed this area, but previously field work by PTA CRM staff indicates that it is no longer present in this area. The crew found the Site 23452 fence posts west of Ke'eke'e Road and used the apparent trajectory to check on the east side of Ke'eke'e Road for any other

remains of the historic fence line. No features of Site 23452 were identified within the fence line corridor in this area.

40. No new archaeological sites were identified during this survey within the fence line corridor. The western portion of the proposed new fence line corridor crossed an 'a'ā flow with no historic properties and no previous military activity. The remainder of the proposed new fence line corridor, which is generally very close to existing roads, shows evidence of extensive modification by bulldozers. Recent military features, as well as rubbish, were identified throughout the survey area. The proposed new fence line can easily avoid any impact on Site 23452 as it traverses areas of this site that have been previously disturbed. Therefore this project will have no effect on historic properties.

Julie M. E. Taomia  
Senior Cultural Resource Specialist  
J. Cary Stine  
Cultural Resource Specialist  
Environmental Office, PTA



***Map removed to protect rare resources. Available upon request***



Plate 120. View of August 16 Survey Area, to north



Plate 121. View of August 16 Survey Area, to south.



Plate 122. Northern end of August 16 Survey Area.  
Stake for final fence post is immediately to the right of  
field crew member.



Plate 123. View of August 22 Survey Area.  
Photo is toward the west, truck is sitting on the Old  
Kona Highway, which is also visible in the center of  
the photo



Plate 124. T-082207-01 Cairn



Plate 125. T-082207-02 Military C-shape



Plate 126. T-082207-03 Foxhole



Plate 127. T-083107-01 Military Fortification





Plate 128. T-083107-02 Military C-shape



Plate 129. T-083107-02 Ammunition



Plate 130. View to South in survey area south of Pu'u Ka Pele.  
Fence line is to run along the near side of the road visible  
in the mid-left of the photo.



Plate 131. T-083107-03 Military fortification



Plate 132. T-090607-01 Military fortification



Plate 133. Photo of Survey area north of Pu'u Ka Pele, looking southeast toward Pu'u Ka Pele.



Plate 134. Site 23452 Fence Post



Plate 135. Site 23452 Fence Post.  
New fence line is to run just to the left of the photo





Plate 136. Western T-090607-02 Room



Plate 137. T-090607-02 Eastern room



Plate 138. Wall of T-090607-02



Plate 139. C shape toward western end of T-090607-02



Plate 140. Modified outcrop on northern side of T-090607-02



Plate 141. Site 23452 Fence post with associated linear mound



## MEMORANDUM FOR THE RECORD

SUBJECT: Fence Line monitoring (TMK:(3) 7-1-004:007) in Pu'u Anahulu Ahupua'a, North Kona District, Hawai'i Island.

1. On November 1, 2007, Julie Taomia, Senior Cultural Resource Specialist, and J. Cary Stine, Cultural Resource Specialist, travelled to the new west side fire break (fire break priority 1) to meet with Baylan Paiva, PTA Natural Resources fence line crew leader. The objectives of the trip were to monitor fencing activities, look at possible locations for the fence to traverse a pull-out along the archaeological trail, and to examine a proposed fence route through a dense cluster of sites beyond the southern end of the road.
2. The fence crew was working between the Old Kona Road and the intersection with fire break priority 2. No historic properties will be affected by the work in this area as the fence has been placed clear of any historic properties in the area. This location is north of the northern extent of Figure 62.
3. Dr. Taomia and Mr. Stine proceeded with Mr. Paiva and Tony Rosa of the fence crew to the pull-out in question (Figure 62). This location is close to a place where the trail is believed to have crossed the road. Immediately to the east of the pull-out the trail is present, but the physical remains in this area fade out before encountering the road. The trajectory of the trail can be projected based upon the end point on the eastern side of the road and the location of the next physical indications on the western side. The fence line will extend along one side of the road, probably the eastern side. A gate will be placed in the fence line adjacent to the road in the location of the projected trail.
4. The trail was walked in this area so that the fence crew is aware of its location and can avoid it when installing the fence line through this area. The fence line will pass through the area where there have not been any physical remains of the trail found.
5. The group then proceeded to the intersection of fire access road priority 2 and fire access road priority 1 (Figure 62). The trail locations on either side of the fire access road 2 were identified, and it was clear that it had been disturbed in this area prior to the recent creation of the fire access road 2. Fire Access road priority 3, which will be the basis for one of the proposed cross-fences, was not visited during this field trip.
6. From here, the group continued to the end of the fire access road priority 1 (Figure 142). We parked the trucks in a pull-out and walked across the lava to the location where the fence crew had encountered this cluster of sites (Figure 63, Plate 142). This cluster of sites was recorded on June 28 and June 29, 2006, and given temporary site numbers corresponding to those dates. They are reported in Escott 2007. The sites include a lava tube shelter and surface structures. The two temp sites closest to the proposed fence line were T-062806-05 and T-062806-01. The cultural resource specialists discussed the proposed fence route with the fence crew, and determined a route that will avoid the features in this area.

7. The fence project is avoiding historic properties identified along the proposed on the western side of the Pohakuloa Training Area (Plate 143). We recommend that monitoring and the close working relationship with the fencing program continue to ensure continued avoidance of historic properties.

Julie M. E. Taomia  
Senior Cultural Resource Specialist  
Environmental Office, PTA

*Map removed to protect rare resources. Available upon request*

*Map removed to protect rare resources. Available upon request*



Plate 142. Overview of June 2006 sites area



Plate 143. View of Proposed Fence Line Route

## MEMORANDUM FOR THE RECORD

SUBJECT: Fence Line monitoring (TMK:(3) 7-1-004:007) in Pu'u Anahulu Ahupua'a, North Kona District, Hawai'i Island.

1. On February 28, 2007, at 0800, Julie Taomia, Senior Cultural Resource Specialist, and Kelly L. Luscomb, Cultural Resource Specialist, travelled to the new west side fire break (fire break priority 1). The objectives of the trip were to monitor fencing activities and examine the cluster of archaeological sites in close proximity.
2. The fence crew moved the fence line even further away from the culturally sensitive sites then had been originally planned. This was done to ensure no impact to these sites. No historic properties were affected by the work in this area.
3. Dr. Taomia and Ms. Luscomb proceeded approximately 50 meters beyond the cluster of archaeological sites before proceeding back. Photographs and two GPS points were taken along the fence line to plot its exact location.
4. At approximately 1300 hours, Dr. Taomia and Ms. Luscomb returned to the vehicle and arrived back to the cantonment at approximately 1400 hours.
5. The fence project is avoiding historic properties identified along the western fence line of the Pohakuloa Training Area. We recommend the close working relationship with the fencing program continue to ensure continued avoidance of historic properties.

Kelly Leialoha Luscomb,  
Cultural Resource Specialist  
Environmental Office, PTA

*Map removed to protect rare resources. Available upon request*



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Plate 144. Overview of June 2006 sites area



Plate 145. View of Proposed Fence Line Route

## MEMORANDUM FOR THE RECORD

SUBJECT: Construction Route of Animal Control Fence in Training Area 22, Pōhakuloa Training Area, in the *ahupua'a* of Ka'ōhe (TMK [3] 7-1-040:06), Pōhakuloa Training Area Hāmākua District, Hawai'i Island, Hawaii.

1. On March 4, 2008, Ken Spencer and Tim Guiteras, Fencing Crew at Pōhakuloa Training Area (PTA), Don Coons, Cave Resource Specialist, and James Head, Cultural Resource Specialist at PTA, traveled to Training Area (Figure 66). This trip was planned to serve two purposes: 1) To locate a fence route across the top of the "D" cave system, and 2) to locate a fence route across the north end of the large road loop to the west of the "D" cave system.
2. After leaving a vehicle on Fire Break Priority #02 at 218431mE, 2184145m N, or the end of the re-alignment survey, the crew proceeded to the area of the proposed fence construction at 218133m E, 2184007m N (Area #01).
3. The four crew members agreed on the corner post locations to avoid impacts to the "D" cave system. These were flagged and will be utilized when fence construction takes place.
4. The team next walked to the loop under construction along Priority #02. It was thought from examination of the existing aerial photograph, there was an existing bulldozer track across the route, which would serve as the fence construction route (Area #02).
5. The potential route was examined on both the east and west sides of the loop, but no bulldozer push could be found on the ground.
6. The team returned to the truck at 1530 hrs. After no route was located, Mr. Spencer and Mr. Guiteras recommended that the fence be constructed along the present road currently under construction. The present road alignment has been archaeologically surveyed and no impacts are anticipated from the construction of the proposed fence. As long as the present road route is followed, no further archaeological work is recommended on this portion of the project.

James Head  
Cultural Resource Specialist  
Environmental Office, PTA

*Map removed to protect rare resources. Available upon request*

## MEMORANDUM FOR THE RECORD

SUBJECT: West side fence monitoring (TMK:(3) 7-1-004:007) in Pu'u Anahulu Ahupua'a, North Kona District, Hawai'i Island, Hawai'i.

6. On Friday May 9, 2008, Dr. Julie Taomia, Senior Cultural Resource Specialist, and Ms. Kelly Luscomb, Cultural Resource Specialist, visited the area north of Fire Access Road 2 to evaluate a proposed re-routing of the fence line around archaeological sites previously identified in the vicinity (see Figure 67). They were also to evaluate some proposed gate locations.
7. Mr. Kenneth Spencer, CSU Fence Manager, provided a line file of the proposed route to the Cultural Resource Specialists. Dr. Taomia and Ms. Luscomb proceeded to the area. The sites that had been highlighted in the office as of concern were located. Some fence stakes were found to the east of site 19528 (trail), which was confusing as Mr. Spencer had stated that the proposed route had not been staked.
8. Dr. Taomia and Ms. Luscomb recorded some information about the observed staking, and walked the proposed fence line provided in the GPS line file. The proposed line passed well away from the trail and other features in the area, and will have no adverse effect on the archaeological sites.
9. Through phone messages with Mr. Spencer, it was determined that the fence stakes were an old line, and not the proposed route represented by the GPS line file.
10. The proposed gate locations indicated on a paper map were visited (approximately), and GPS points taken at these locations for use in presenting the proposed locations to the Cultural Advisory Committee.
11. Dr. Taomia and Ms. Luscomb returned to the cantonment.
12. The proposed route for the fence line falls within areas previously surveyed, and will not have any adverse effects because it will avoid historic properties. GPS point data was collected for the proposed gate locations; the points were numbered from south to north (see Figure 67).

Julie M. E. Taomia  
Senior Cultural Resource Specialist  
Environmental Office, PTA

*Map removed to protect rare resources. Available upon request*