Archaeological Inventory Survey of a 363.106-Acre Parcel within Portions of Kaloko Ahupua‘a North Kona District, Hawai‘i Island

TMK: [3] 7-3-009:028

Prepared for
Stanford Carr Development LLC

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March 2008

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Management Summary

Reference	Archaeological Inventory Survey of a 363.106-Acre Parcel within Portions of Kaloko Ahupua‘a, North Kona District, Hawai‘i Island TMK: [3] 7-3-009:028 (Esh et al. 2008)
Date	March 2008
Project Number (s)	Cultural Surveys Hawai‘i (CSH) Job Code: KOHAN 1
Investigation Permit Number	CSH performed the inventory survey fieldwork under state archaeological permit number 07-19 and 08-14, issued by State of Hawai‘i Department of Land and Natural Resources / State Historic Preservation Division (DLNR / SHPD).
Project Location	The project area is comprised of TMK: [3] 7-3-09:028. The project area is located in a portion of Kaloko Ahupua‘a, and the *makai* edge is approximately 2.4 kilometers east from the western coast of Hawai‘i Island. The project area is bound by Hina-Lani Street to the north and the Kaloko Industrial Area to the west, with generally undeveloped land to the south and east. This area is depicted on the 1996 USGS 7.5-Minute Series Topographic Map, Keahole Point Quadrangle (Figure 1). Fieldwork for the present project area was conducted concurrently with fieldwork for three other adjacent parcels (TMK: [3] 7-3-009:017, 025, 026).
Land Jurisdiction	Private, Stanford Carr Development Kaloko Makai, LLC
Agencies	State Historic Preservation Division / Department of Land and Natural Resources (SHPD/DLNR).
Project Description	The proposed project comprises the development of a residential subdivision with limited retail establishments near Queen Ka‘ahumanu Highway. Associated ground disturbance will include grading and excavation related to the project area’s development, to include engineering topography, placement of structural footings, utility installation, roadway, and parking area installation, and landscaping. Importation of substantial construction gravel and fill dirt will also likely accompany much of the construction.
Project Acreage	363.106-acres
Area of Potential Effect (APE) and Survey Acreage	The project's APE was generally conceived as the project's footprint (delimited by the boundaries of TMK: [3] 7-3-009:028). However, consideration was also given to potential project effects to known or potential historic properties outside the project footprint, for example those historic properties in the Kaloko-Honokōhau National Historic Park, located *makai* of the project area.
Historic Preservation Regulatory Context	At the request of Stanford Carr Development LLC, CSH undertook this archaeological inventory survey. In consultation with SHPD, the inventory survey investigation was designed to fulfill the state requirements for archaeological inventory survey (HAR Chapter 13-276). This document was prepared to support the proposed project’s

	historic preservation review under Hawaii Revised Statutes (HRS) Chapter 6E-42 and HAR Chapter 13-284.
Fieldwork Effort	The fieldwork effort for the archaeological inventory survey was carried out by Matthew Bell, B.A., Kelley Esh, M.A., Mindy Simonson, M.A., David Shideler, M.A., Jason Pickin, B.A., Juanita Bonnifield, M.A., Sarah Wilkinson, B.A., Amy Hammermeister, B.A., Todd McCurdy, M.A., Michelle Pammer, B.A., Doreen Hrivnak, B.A., Mark Oxley, B.A. and Hallett H. Hammatt, Ph.D (principle investigator). The fieldwork took place intermittently between March and December 2007 (usually only one to two day periods) and continuously January 2 - February 1 2008, taking 140 person-days to complete.
Number of Historic Properties Identified	A total of 41 historic properties were identified within the project area, with a total of 61 features. All of the historic properties were newly recorded as part of the current inventory survey investigation.
Historic Properties Recommended Eligible to the Hawai‘i Register of Historic Places (Hawai‘i Register)[1]	All 41 historic properties identified within the project area are recommended eligible to the Hawai‘i Register: SIHP # 50-10-27-26371, Criterion D SIHP # 50-10-27-26414, Criterion D SIHP # 50-10-27-26415, Criterion D SIHP # 50-10-27-26416, Criterion D & E* SIHP # 50-10-28-26417, Criterion D SIHP # 50-10-28-26418, Criterion C & D SIHP # 50-10-28-26419, Criterion D SIHP # 50-10-28-26420, Criterion D SIHP # 50-10-28-26421, Criterion D SIHP # 50-10-28-26422, Criterion D SIHP # 50-10-28-26423, Criterion D & E* SIHP # 50-10-28-26424, Criterion C, D & E SIHP # 50-10-28-26425, Criterion D & E* SIHP # 50-10-28-26426, Criterion D SIHP # 50-10-28-26427, Criterion D & E* SIHP # 50-10-28-26428, Criterion D SIHP # 50-10-28-26429, Criterion D SIHP # 50-10-28-26430, Criterion D

[1] To be considered eligible for listing on the Hawai‘i Register a cultural resource must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet one or more of the following broad cultural/historic significance criteria: “A” associated with events that have made an important contribution to the broad patterns of our history; “B” associated with the lives of persons important in our past; “C” embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, or possesses high artistic value; “D” have yielded, or is likely to yield information important for research on prehistory or history; and, “E” have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property, or due to associations with traditional beliefs, events or oral history accounts – these associations being important to the group’s history and cultural identity.

	SIHP # 50-10-28-26431, Criterion D SIHP # 50-10-28-26432, Criterion D SIHP # 50-10-28-26433, Criterion D SIHP # 50-10-28-26434, Criterion D SIHP # 50-10-28-26435, Criterion D SIHP # 50-10-28-26436, Criterion D SIHP # 50-10-28-26437, Criterion D SIHP # 50-10-28-26438, Criterion D & E* SIHP # 50-10-28-26439, Criterion D SIHP # 50-10-28-26440, Criterion D & E* SIHP # 50-10-28-26441, Criterion D SIHP # 50-10-28-26442, Criterion D SIHP # 50-10-28-26443, Criterion D SIHP # 50-10-28-26444, Criterion D SIHP # 50-10-28-26445, Criterion D SIHP # 50-10-28-26446, Criterion D SIHP # 50-10-28-26447, Criterion D SIHP # 50-10-28-26448, Criterion D SIHP # 50-10-28-26449, Criterion D SIHP # 50-10-28-26450, Criterion D SIHP # 50-10-28-26451, Criterion D SIHP # 50-10-28-26452, Criterion D & E* SIHP # 50-10-28-26453, Criterion D & E* (*E applies if a burial is within the site or the site is a probable burial)
Historic Properties Recommended Ineligible to the Hawai‘i Register	None
Effect Recommendation	The proposed project will affect historic properties recommended eligible to the Hawai‘i Register. CSH’s project specific effect recommendation is “effect, with agreed upon mitigation measures.”
Mitigation Recommendation	The following recommended significant historic properties will potentially be adversely affected by the proposed project. The recommended mitigation measures listed below are intended to alleviate this adverse effect. The scope and methods for these mitigation measures should be developed in consultation with SHPD. Historic properties not listed below have been adequately documented as part of this investigation and are not recommended for further cultural resource management work. SIHP # 50-10-27-26371, preserve SIHP # 50-10-27-26414, preserve SIHP # 50-10-27-26416, preserve SIHP # 50-10-28-26418, preserve SIHP # 50-10-28-26423, preserve SIHP # 50-10-28-26424, preserve

	SIHP # 50-10-28-26425, preserve and data recovery SIHP # 50-10-28-26427, preserve SIHP # 50-10-28-26428, data recovery SIHP # 50-10-28-26430, data recovery SIHP # 50-10-28-26431, data recovery SIHP # 50-10-28-26434, data recovery SIHP # 50-10-28-26438, preserve and data recovery SIHP # 50-10-28-26439, data recovery SIHP # 50-10-28-26440, preserve SIHP # 50-10-28-26443, preserve SIHP # 50-10-28-26445, data recovery SIHP # 50-10-28-26446, data recovery SIHP # 50-10-28-26449, data recovery SIHP # 50-10-28-26452, preserve and data recovery SIHP # 50-10-28-26453, preserve

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Section 1 Introduction

1.1 Project Background

At the request of Stanford Carr Development, LLC, Cultural Surveys Hawaii, Inc. (CSH) conducted an archaeological inventory survey of an approximately 363.106-acre parcel within a portion of Kaloko Ahupua‘a, North Kona District, Hawai‘i Island, TMK: [3] 7-3-009:028 (Figures 1-4). The *makai* project area boundary is located approximately 2.4 kilometers east of the western coastline of Hawai‘i Island. The Kaloko Industrial Area is within one kilometer west of the *makai* project boundary, while lands immediately to the south and east of the project area are mostly undeveloped and partially utilized for cattle grazing. The project area is bound by Hina-Lani Street to the north.

The approximately 363.106-acre parcel is privately owned by Stanford Carr Development Kaloko Makai, LLC. The proposed project comprises the development of a residential subdivision with limited retail establishments near Queen Ka‘ahumanu Highway. Associated ground disturbance will include grading and excavation related to the project area’s development, to include engineering topography, placement of structural footings, utility installation, roadway, and parking area installation, and landscaping. Importation of substantial construction gravel and fill dirt will also likely accompany much of the construction.

Fieldwork for the present project area was conducted simultaneously with fieldwork for three other adjacent parcels (TMK: [3] 7-3-009:017, 025, and 026), for the same private owner (see Figure 2). The CSH project number (job code) for the entire project is “Kohan 1”. Given the large size of the total project area (over 1,100-acres), a decision was made to split the archaeological inventory survey reports by individual TMK, producing a total of four reports. The present report is the archaeological inventory survey for TMK: [3] 7-3-009:028 only, but because fieldwork was occasionally conducted simultaneously, certain numerical sequences span all four TMKs. Specifically, burials were reported to SHPD upon their discovery, and therefore their numerical sequence reflects the discovery date for the entire Kohan 1 project. These numerical designations are consequently not necessarily sequential within the TMK, but they do reflect the designations as originally reported to SHPD.

The survey area for the current investigation included the entire approximately 363.106-acre APE/project area. The proposed project was considered for its potential to impose adverse visual, auditory or other environmental impact to any known historic properties, including standing architecture, located outside the project area. Based on available information about the proposed development and the visual gravity of industrial/commercial development flanking the *makai* portion of the project area (i.e., the Kaloko Industrial Area, Queen Ka‘ahumanu Highway, and Hina-Lani Street), the proposed project is considered to add to an established urban trend in coastal North Kona. Due to the standing precedent of visual, auditory and other potential environmental impact from existing and ongoing urban developments not related to the project, the project’s APE is formally defined as the same as the project area. However, potential for the proposed project to affect nearby historic properties, such as those in Kaloko-Honokōhau National Park to the west, is taken into consideration in the Project Effect and Mitigation Recommendations section.

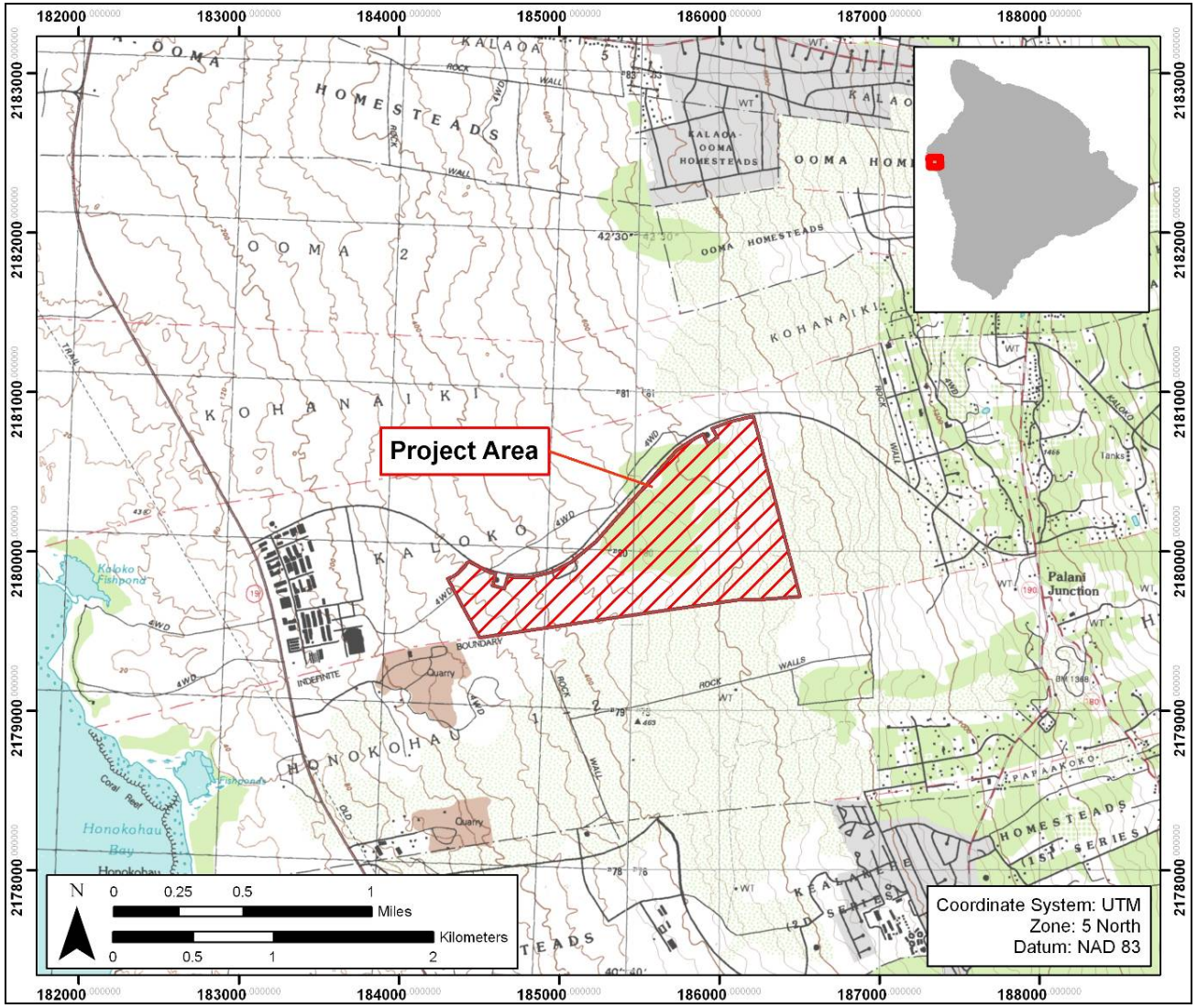

Figure 1. USGS 7.5 Minute Series Topographic Map, Keahole Point and Kailua Quadrangles (1996), showing the location of the project area

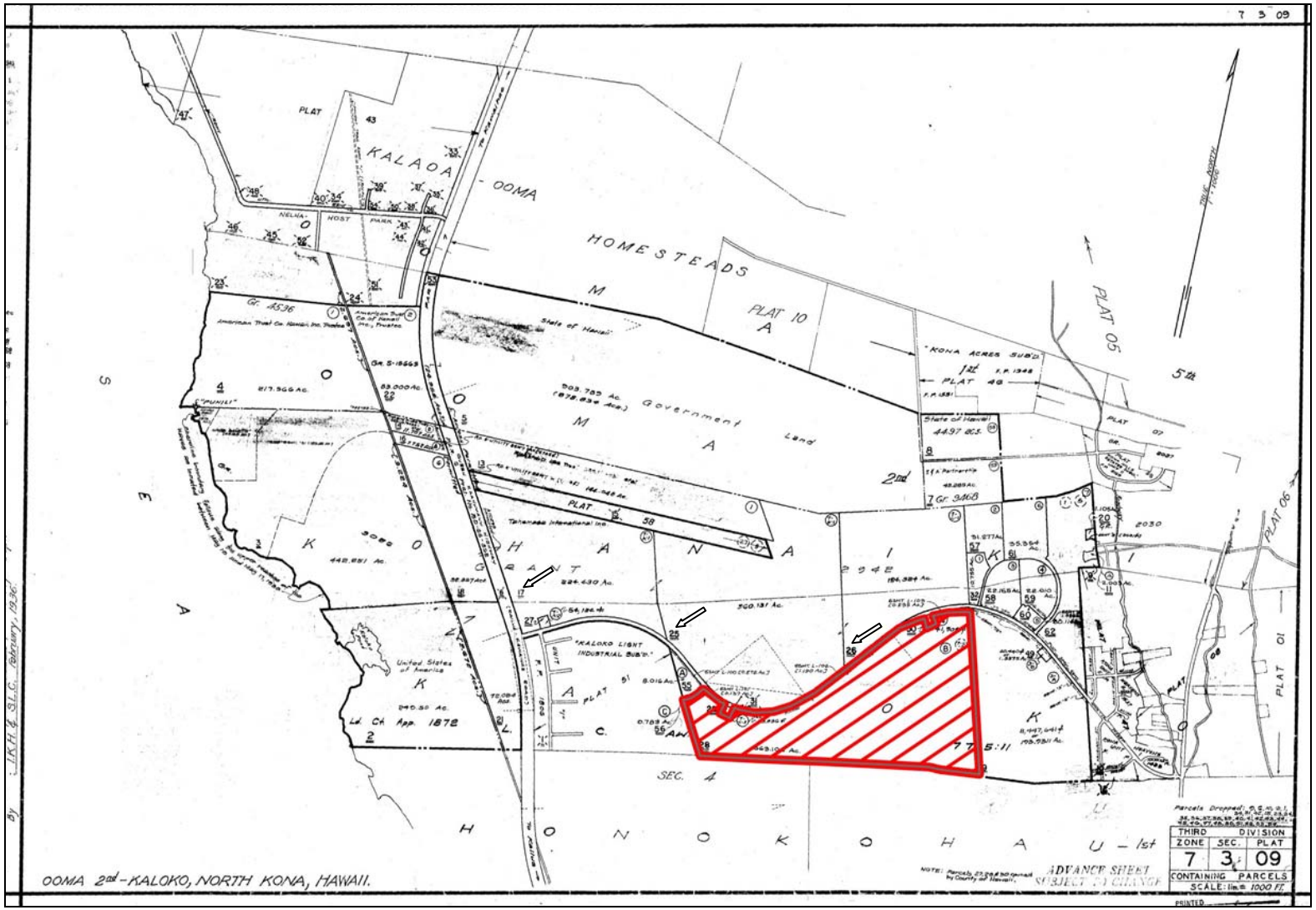

Figure 2. Tax Map Key (TMK) [3] 7-3-009: 028, showing location of project area; arrows point to the three additional parcels that are part of the “Kohan 1” project

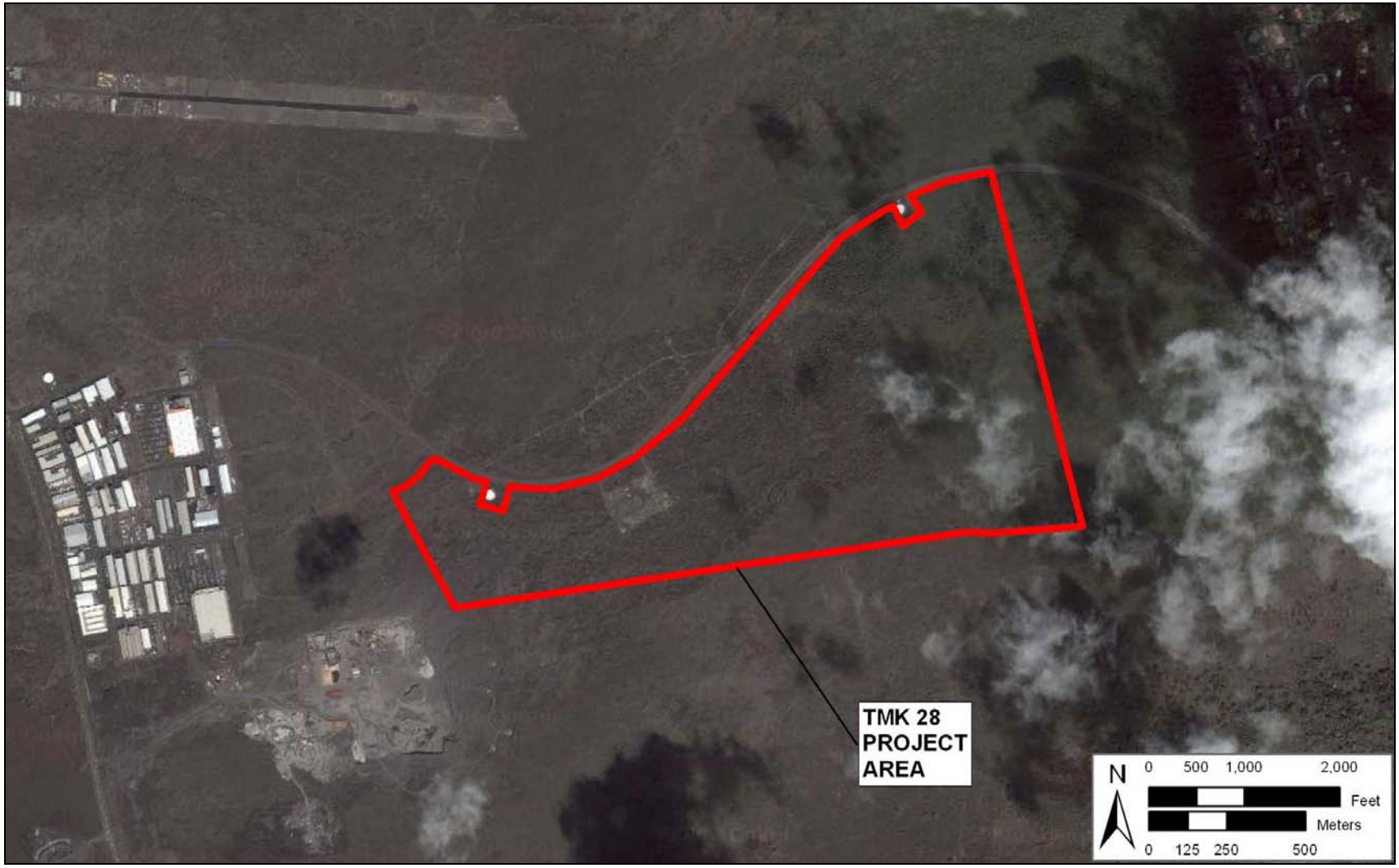

Figure 3. Aerial view of the project area location (source: USGS Orthoimagery 2005)

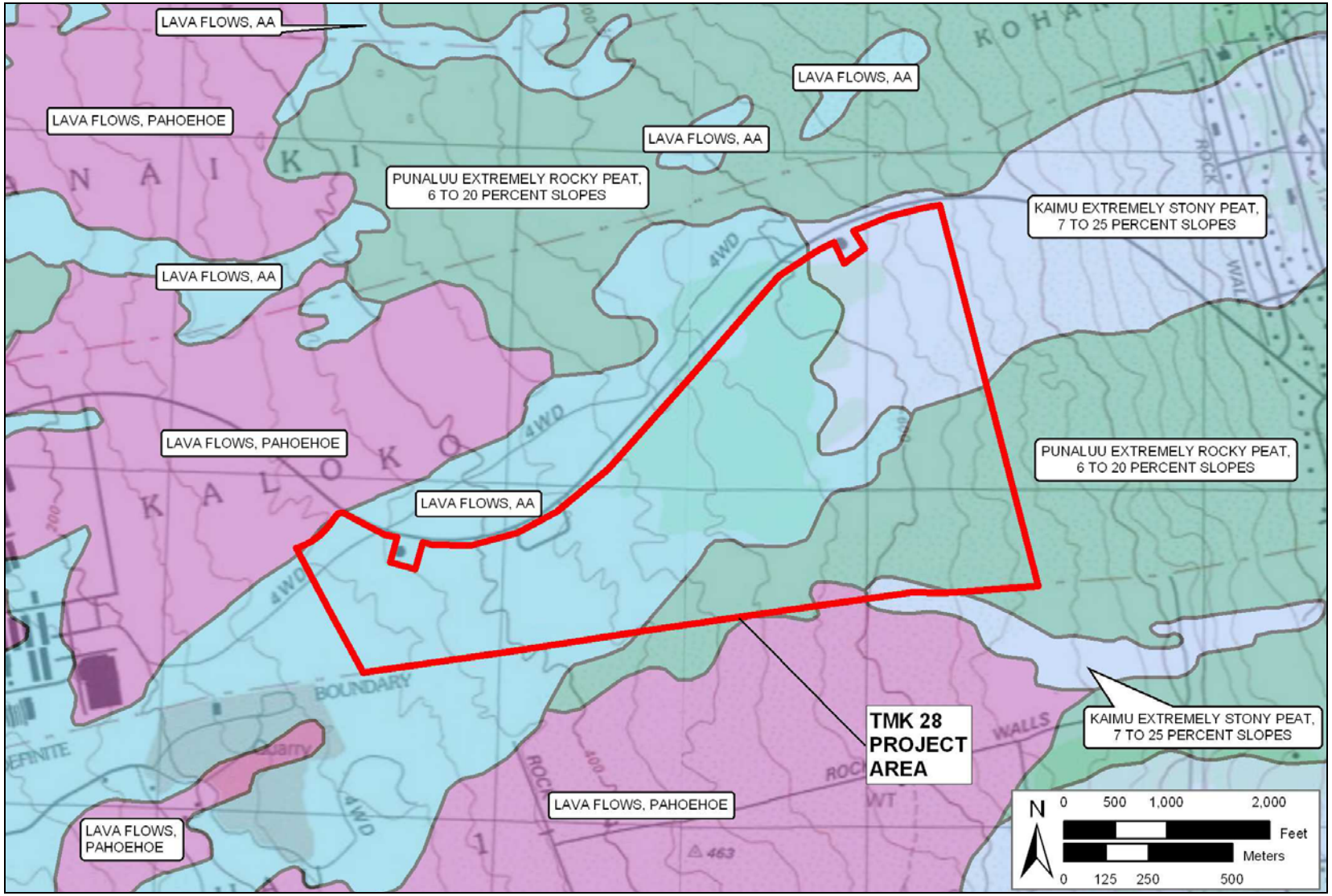

Figure 4. Soils map showing location of project area and lava flows

1.2 Historic Preservation Regulatory Context and Document Purpose

As a privately funded venture on private lands, the proposed development is a “project” subject to state of Hawai‘i historic preservation review legislation (Hawaii Revised Statutes [HRS] Chapter 6E-42 and Hawai‘i Administrative Rules [HAR] Chapter 13-284). Based on the project’s scope, cultural setting, and the results of previous cultural resource management investigations in the vicinity, Stanford Carr Development, LLC had this archaeological inventory survey investigation completed. This investigation was carried out as part of and in compliance with the proposed development’s historic preservation review.

Under Hawai‘i state historic preservation legislation, archaeological inventory surveys are designed to identify, document, and provide significance and mitigation recommendations for historic properties. Under this legislation, historic properties are defined as any “building, structure, object, district, area, or site, including *heiau* and underwater site, which is over fifty years old.” A project’s effect and potential mitigation measures are evaluated based on the project’s potential impact to “significant” historic properties (those historic properties determined eligible, based on established significance criteria, for inclusion in the Hawai‘i Register of Historic Places [Hawai‘i Register]). Determinations of eligibility to the Hawai‘i Register result when a state agency official’s historic property “significance assessment” is approved by the State Historic Preservation Division (SHPD), or when SHPD itself makes an eligibility determination for an historic property (HAR Chapter 13-284).

In consultation with SHPD, this inventory survey investigation was designed to fulfill the state requirements for archaeological inventory surveys (HAR Chapter 13-276). This inventory survey report was prepared to support the proposed project’s historic preservation review. The report includes a project-specific effect recommendation and mitigation recommendations for the project area’s historic properties that are recommended eligible to the Hawai‘i Register. This document is intended to support project-related historic preservation consultation among state agencies and interested Native Hawaiian and community groups.

1.3 Scope of Work

The following archaeological inventory survey scope of work was developed and implemented to satisfy SHPD requirements. The scope of work for this inventory survey was designed in accord with State Historic Preservation Division rules governing standards for archaeological inventory surveys and reports (HAR 13-13-276):

1) Appropriate consultation with knowledgeable members of the community, requesting information on historic properties in the project area.
2) A complete ground survey of the entire project area for the purpose of historic property identification and documentation. All historic properties would be located, described, and mapped with evaluation of function, interrelationships, and significance. Documentation is to include photographs and scale drawings of selected historic properties. All historic properties are to be assigned *Inventory of Historic Properties* numbers by the State.
3) Subsurface testing to determine if subsurface deposits are located in the project area, and, if so, evaluate their significance. If appropriate samples from these excavations were found, they were analyzed for chronological and/or paleoenvironmental information.

4) Research on historic and archaeological background, including search of historic maps, written records, and Land Commission Award documents. This research was to focus on the specific area with general background on the *ahupua‘a* and district and was to emphasize settlement patterns.
5) Preparation of a survey report to include the following:
    a. A topographic map of the survey area showing all historic properties;
    b. Results of consultation with knowledgeable community members about the property and its historical and cultural issues.
    c. Description of all historic properties with selected photographs, scale drawings, and discussions of function;
    d. Historical and archaeological background sections summarizing prehistoric and historic land use as they relate to the project area's historic properties;
    e. A summary of historic property categories and their significance in an archaeological and historic context;
    f. Recommendations based on all information generated that will specify what steps should be taken to mitigate impact of development on the project area's significant historic properties - such as data recovery (excavation) and preservation of specific areas. These recommendations will be developed in consultation with the client and the State agencies.

This scope of work includes full coordination with the State Historic Preservation Division (SHPD) relating to archaeological matters. This coordination takes place after consent of the landowner or representatives.

1.4 Environmental Setting

1.4.1 Natural Environment

The project area comprises approximately 363.106-acres in the *ahupua‘a* of Kaloko, located just north of Kailua-Kona Town, North Kona District, Hawai‘i Island. The lands are located on the leeward coast of Hawai‘i Island on the lower west slope of Hualālai Volcano. The project area stretches *mauka* (inland) from the Kaloko Industrial Area, and is bordered by Hina-Lani Street to the north and cattle grazing land to the south, with the southern boundary being designated by a historic *ahupua‘a* wall on the *mauka* portion of the project area. Elevation within the project area ranges from 300 ft. a.m.s.l. at its western boundary to 780 ft. a.m.s.l. along the eastern boundary.

Kona weather is typified by afternoon showers brought on by warm air which has been moved inland by light sea breezes. The humid air gradually condenses over higher altitudes throughout the day. At night the land cools resulting in breezes that send warm air back out to sea. Rainfall in the Kaloko project area averages 10 inches per year (Cordy 1991) at the lower (*makai*) end increasing to approximately 35 inches at the *mauka* end. There are no natural springs or perennial streams within the project area.

The land surface is comprised predominately of exposed *‘a‘ā* and *pāhoehoe* lava. A single large *mauka*/*makai* running *‘a‘ā* flow dominates the project area (see Figure 4). The majority of the surface of the *‘a‘ā* lava in the western (*makai*) portion of the project area is rough and

undulating, with some steep ridges. The eastern (*mauka*) end of the *‘a‘ā* flow tends to have more level expanses, but also has more heavily eroded areas with rough loose *‘a‘ā* cobbles and rough fractured ridges. The *mauka* end of the *‘a‘ā* flow has considerably more vegetation cover, with the *makai* end being largely barren.

Pāhoehoe lava covers the far eastern (*mauka*) and southeast portions of the project area. The *pāhoehoe* surface tends to be relatively level, with some minimal soil development, especially within the *mauka* portion. At the southern edge of the *‘a‘ā*, the boundary between *pāhoehoe* and *‘a‘ā* is very abrupt, with some areas having sharp drop-offs from the top of the *‘a‘ā* to the lower *pāhoehoe*. Alternatively, the *mauka* boundary between *‘a‘ā* and *pāhoehoe* is much less distinct, with intermittent areas of older *‘a‘ā* flows and very rough *pāhoehoe* interspersed with more level areas. Expanses of Punalu‘u extremely rocky peat and Kaimu extremely stony Peat are located on the east side of the project area (see Figure 4 above).

The non-native *koa haole* tree (*Leucanena glauca*) dominates the project area vegetation (Figure 6), along with the non-native air plant (*Kalanchoe pinnata*), non-native Christmas berry trees (*Schinus terebinthifolius*) and grasses (predominately non-native fountain grass, *Pennisetum sectacacum*, but the native *pili* grass, *Heteropogon contortus*, may also be present). At higher elevations Christmas berry (*Schinus terebinthifolius*) becomes more dominant, often growing in dense thickets that seriously impede pedestrian passage and greatly decrease ground visibility. Other non-native plants observed include lantana (*Lantana camara*) and *lilikoi* (*Passiflora edulis*). Native plants present include: *‘ilima* (*Sida fallax*) in scattered numbers, *noni* (*Morinda citrifolia*), *‘ōhi‘a* trees (*Metrosideros polymorpha*), *lauaʻe* (*Phymatosorus scolopendria*), *‘ohe* trees (*Reynoldsia sandwicensis*), *alaheʻe* (*Psydrax odorata*), *kukui* (*Aleurites moluccana*), *kī* (*Cordyline fruticosa*; also often referred to as *tī*) and *halapepe* (*Pleomele* spp.). Native plants observed at higher elevations include: *naio* (*Myoporum sandwicense*), *‘a‘ali‘i (Dodonaea* sp.) and *‘ulei* (*Osteomeles anthyllidifolia).* Vegetation on the *mauka* slopes of the project area is often extraordinarily dense (especially *koa haole*), whereas the majority of the *makai ‘a‘ā* flow is barren. In general, vegetation in the *mauka* half of the project area becomes increasingly dense with increased elevation, considerably obscuring ground (and site) visibility.

1.4.2 Built Environment

Though much of the land around the project area remains rural, the built environment is distinct on the north and west sides of the parcel (see Figure 3 above). Hina-Lani Street, a major coastal/inland (*makai/mauka*) connector road, forms the northern boundary of the project lands. Two 1-million-gallon water tanks and a fairly large base-yard have been developed along Hina-Lani Street and are convenient points of reference. An unpaved jeep road enters the south side of the project area at approximately the 320 foot elevation, and crosses to the north of Hina-Lani Street, continuing outside of the current project area. *Makai* (west) of the project area is a large industrial area often referred to as “Kaloko Industrial” or “New Industrial” (in reference to an older industrial area near the old Kona airport). This area features numerous large warehouses, light industrial and commercial occupying industrial style buildings (Home Depot and Costco, among others). As of the writing of this report, construction has commenced on additions to this commercial/industrial area *mauka* of the existing warehouses.

The project lands themselves are generally undeveloped, and appear not to have been dramatically impacted by modern activity other than bulldozing (Figure 5 and Figure 6). Fairly extensive historic and modern cattle ranching has taken place in the eastern portion of the project area, with barbed-wire fencing, small sheds, and a metal feeding trough present (Figure 7). The parcel south of the project area is currently being used for cattle ranching, which has created a very distinct vegetation difference between the north and south sides of the *ahupua‘a* wall that runs between these parcels. Modern trash was found at some historic properties, but generally only near the project boundaries (i.e., near Hina-Lani Street or the southern *ahupua‘a* boundary).

Portions of the *‘a‘ā* and *pāhoehoe* flows throughout the project area have, however, been heavily bulldozed; bulldozer roads and intermittent bulldozing activity is shown in Figure 7. A large portion of the bulldozing on *pāhoehoe* areas is probably related to the ranching activities, and bulldozer push piles and tracks are especially prevalent in the northeastern and southeastern corners of the project area. There are additional swaths of bulldozing on the *‘a‘ā* around the water tanks located on Hina-Lani Street and at the large base-yard off of Hina-Lani Street. Most bulldozer activity tends to be concentrated either near Hina-Lani Street, near the southern *ahupua‘a* wall, or near barbed-wire fences within the central portion of the project area. There are a few distinct bulldozer roads in the project area, but less distinct signs such as bulldozer tread scars on bedrock were also noted in various locations.

Figure 5. Photograph of bulldozed portion of *‘a‘ā* flow in west portion of project area

Figure 6. Overview photos of project area: top photo is facing *makai* from east end of project area, showing dense vegetation; bottom photo is facing northwest from south side of *ahupua‘a* wall, with large *‘a‘ā* flow visible on horizon (arrows)

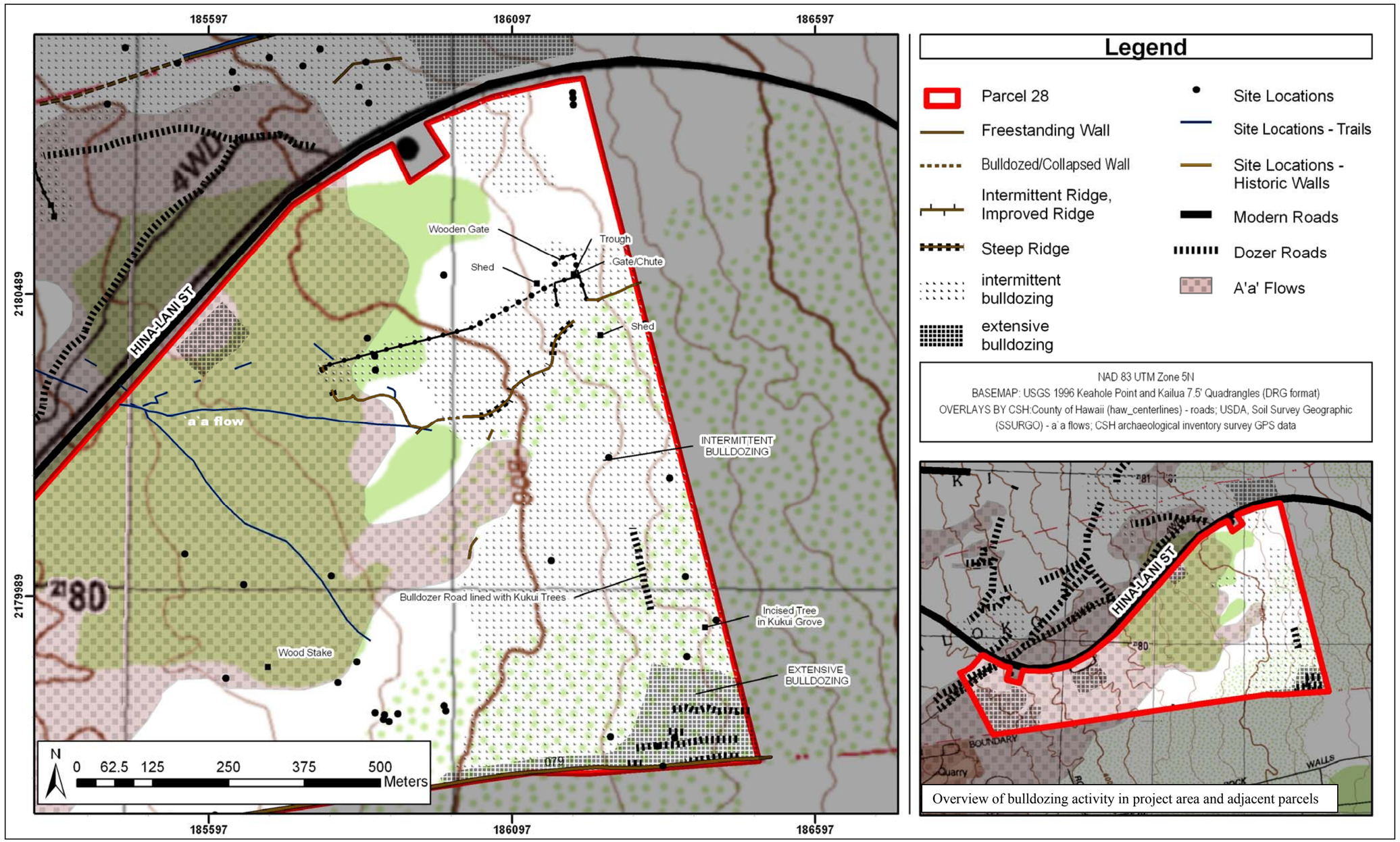

Figure 7. Overview of bulldozer and ranching activity within the project area; ranching activity includes both historic and modern use of the area, with historic sites also shown in Figure 15

Section 2 Methods

2.1 Field Methods

The fieldwork effort was carried out by Matthew Bell, B.A., Kelley Esh, M.A., Mindy Simonson, M.A., David Shideler, M.A., Jason Pickin, B.A., Juanita Bonnifield, M.A., Sarah Wilkinson, B.A., Amy Hammermeister, B.A., Todd McCurdy, M.A., Michelle Pammer, B.A., Doreen Hrivnak, B.A., Mark Oxley, B.A. and Hallett H. Hammatt, Ph.D (principle investigator). The fieldwork took place intermittently between March and December 2007 (usually only one to two day periods) and continuously January 2 - February 1 2008, taking 140 person-days to complete.

The fieldwork component of the archaeological inventory survey was carried out under archaeological permit number 07-19 and 08-14 issued by the Hawai‘i State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR), per Hawai‘i Administrative Rules (HAR) Chapter 13-282.

Fieldwork consisted of a 100% coverage pedestrian inspection of the approximately 363.106-acre study area with limited subsurface testing at select archaeological sites. The pedestrian inspection of the study area was accomplished through systematic sweeps. The interval between the archaeologists was generally 5 to 10 meters, varying based on visibility due to vegetation cover. All historic properties encountered were recorded and documented with a written field description, scale drawings, photographs, and located with high quality GPS units including Garmin 60CSx high sensitivity units (accuracy +/- 3 m). Sites requiring the highest precision available, such as those recommended for preservation, were further located using Trimble Pro XR GPS survey technology (accuracy +/- 1 m).

Subsurface testing consisted of the partial excavation, by hand, of selected surface archaeological features located during the pedestrian survey. The purpose of the subsurface testing was to aid in determining the function of located surface sites, as well as to possibly obtain datable materials for later radiocarbon dating. In order to focus subsurface testing at sites with the best excavation potential, depth of deposits or construction was assessed as part of determining excavation potential. This assessment consisted of careful observation of the depth of crevices, stacked rock and piled rock that included careful removal and replacement of small portions of the top course of construction. In the event this minor removal of material allowed a natural ground surface to be observed and an absence of cultural material to be confirmed, excavation potential was generally observed to be poor. Otherwise, if necessary to determine or confirm function, a formal excavation was generally undertaken and reported in detail in conjunction with the respective site description.

All excavated material was sifted through a 1/8-inch wire mesh screen to separate out the soil matrix. Any cultural material was collected for analysis in the lab, except in the event excavation determined the site was a burial (or probable burial) in which case cultural material was carefully returned to the excavation. Each test excavation was documented with a scale section profile, photographs, and sediment descriptions. Sediment descriptions included characterizations of Munsell color designations, compactness, texture, structure, inclusions, cultural material present, and boundary distinctness and topography. While a stratigraphic profile is usually generated for

at least one soil profile per test unit, all excavation units during inventory survey had very shallow soil layers, if any. Almost all soil layers encountered were a shallow natural deposition with no cultural material, and no excavation units had more than one soil stratum present. Graphic presentations would thus not aid in strata description and were therefore not included with most testing results.

2.1.1 Recording Agricultural Sites

Agricultural features in the project area tended to be minimal modification, low-intensity and spread over broad areas (sometimes over several hundred meters). For recording purposes, a single agricultural site number (SIHP # 50-10-28-26417) was assigned for these pervasive agricultural features, with feature and sub-feature designations serving to differentiate various levels of intensity and variations in form. Minor agricultural activity associated directly with a site primarily functioning for other purposes (i.e., habitation), was included in the description for that site.

2.1.2 Recording Lava Tubes

Lava tubes are common within the project area, especially on the *pāhoehoe*, and vary greatly in size and shape. All openings in the bedrock were examined for the presence of cultural modification or cultural material. Any opening that appeared large enough to explore was examined thoroughly. Generally, an average size person can fit through a tube entrance 30 centimeters in diameter or greater, but the shape and geology of lava tubes varies greatly and occasionally a smaller size opening could be entered; likewise, sometimes a larger than 30 centimeter opening could not be traversed due to jagged edges, etc. Every effort was made to explore the entirety of all lava tubes to their terminus, within reason as far as tube size and safety (i.e., heavily collapsed tubes were entered with caution). When a tube can no longer be explored due to size or safety, this is considered its cultural terminus, and is denoted as impassable on maps. It should be noted that cultural material and burials have been located in lava tubes with entrances which were only barely physically passable, even for the most petite archaeologists in our group, suggesting that Native Hawaiians did utilize some passages measuring far less than 30 centimeters in diameter.

The primary purpose for the intensive exploration of lava tubes is to locate any human remains that may be present in remote areas of a lava tube, in addition to locating other cultural material. Lava tubes were traditionally used for concealment of burials, and human remains are often located far from any other cultural modification, sometimes at great distances from tube entrances; these burials may have been placed in the lava tube using an entrance that was then filled and concealed on the surface. Therefore, in an effort to locate all burial locations within the project area, a thorough effort was made to explore all lava tubes and side tubes to their natural or cultural terminus.

As mentioned above, human utilization of lava tubes sometimes involved blockage of entrances and inner side tubes. In order to complete the inventory survey, it was necessary to pass this type of blockage; when possible, this was done by finding another passageway for access behind the blockage or attempting to assess what was behind the blockage (i.e., solid lava tube wall vs. a continuing passageway) without disturbing the blockage. If it was determined that the tube did continue past blockage and there was no other way to access the tube, a photo was

taken of the blocked area and then rocks were carefully removed until an archaeologist could pass through. After inspection of the lava tube, the rocks were replaced as carefully as possible to their original position.

All lava tubes with cultural material present were mapped using a compass for bearing and a laser for distances (Stanley FatMax Tru-laser Distance Measurer; stated accuracy for this device is +/- 6 cm). The laser reflects well off most surfaces in tubes, and is an excellent alternative to the rather impractical method of pulling measuring tapes through cramped areas, or simply estimating distances (it is extremely difficult to accurately estimate distances in lava tubes; see Wolforth 2005:24). The laser method may actually increase the efficiency of mapping tubes, since accurate measurements can be obtained nearly instantaneously; overall the laser method seems to produce more accurate maps than simply estimating distances in about the same amount of time. In small tubes a regular measuring tape was used when practical.

Occasionally lava tubes extend long distances beyond any cultural modification. When this occurs, lava tubes are explored to their natural or cultural terminus. Maps are produced for all areas containing cultural materials, and the rest of the lava tube is described but not necessarily mapped. A distance and bearing from the site tag is given for all burials within lava tubes.

2.2 Laboratory Methods

Laboratory analyses of material recovered from limited subsurface testing within the project area included:

1. Preparation and submittal of datable material, such as charcoal, to Beta Analytic for radiocarbon dating.
2. Identification of invertebrate midden. Common marine shells were identified and analyzed at the Cultural Surveys Hawai‘i laboratory in Kailua, Hawai‘i.
3. Identification of vertebrate faunal material. All vertebrate faunal material was identified and analyzed at the Cultural Surveys Hawai‘i laboratory in Kailua, Hawai‘i.
4. Identification and cataloguing of traditional Hawaiian artifacts. Any artifacts collected *in situ* at the project area or contained within sediment samples were measured, weighed and classified by material type and artifact form. The analysis then focused on distinguishing artifact function.

2.3 Document Review

Background research included a review of previous archaeological studies on file at the State Historic Preservation Division (SHPD) of the Department of Land and Natural Resources (DLNR); a review of geology and cultural history documents at Hamilton Library of the University of Hawai‘i, the Hawai‘i State Archives, the Mission Houses Museum Library, the Hawai‘i Public Library, and the Archives of the Bishop Museum; study of historic photographs at the Hawai‘i State Archives and the Archives of the Bishop Museum; and a study of historic maps at the Survey Office of the DLNR. Information on LCAs was accessed through Waihona ‘Āina Corporation’s Māhele Data Base (www.waihona.com).

This research provided the environmental, cultural, historic, and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected type and location of sub-surface pre and post-contact historic properties in the project area.

2.4 Consultation

A cultural impact assessment (Hammatt & Shideler 1996) was conducted for TMK 7-3-09:17, adjacent to the project area, in 1996. Informants knowledgeable of TMK 7-3-09:17 and the project area vicinity were interviewed. These consultations focused on identifying traditional cultural practices conducted adjacent to the project area as well as addressed community concerns regarding possible burial sites.

Cultural Surveys Hawaii, Inc. is currently conducting consultation with organizations and the community to identify *kūpuna* and other individuals with knowledge of the history of the project area and its surroundings. The results of these interviews will be presented in a companion report for this project, titled “Cultural Impact Assessment for the Kohaniki Project (Magat et al. 2008)”, and will include consultation for all four parcels within the “Kohan 1” project (including the current project area). The on-going consultation with organizations includes the State Historic Preservation Division (SHPD), the Office of Hawaiian Affairs (OHA), and the Big Island Burial Council.

Section 3 Background Research

3.1 Traditional and Historical Background

3.1.1 Mythological and Traditional Accounts

The *ahupua‘a* of Kohanaiki and Kaloko lie at the southern end of Kekaha, the portion of North Kona extending from Honokōhau in the south to ‘Anaeho‘omalu in the north. The character of Kekaha - as it had been established in the Hawaiian consciousness - is represented in a traditional saying recorded by Mary Kawena Pukui and in a brief description by John Papa ‘Ī‘ī. The saying, "*Kekaha wai ‘ole na Kona*", is defined by Pukui as "waterless Kekaha of the Kona district" and explicated by her as "Kekaha in Kona, Hawai‘i, is known for its scarcity of water but is dearly loved by its inhabitants" (Pukui 1983:184). ‘Ī‘ī describes

> ...a cold wind from Kekaha, the Hoolua. Because of the calm of that land, people often slept outside of [*sic*] the tapa drying sites at night. It is said to be a land that grows cold with a dew-laden breeze, but perhaps not so cold as in Hilo when the Alahonua blows. [‘Ī‘ī. 1959:122]

These passages suggest that Kekaha was firmly identified with its austere physical environment. A legend told in Maguire (1966) reveals the importance of water resources in this general area (see also Wolforth 2005:8-9). The story takes place at the Cave of Mākālei, which is located outside of the current project area near *‘Akahipu‘u* (a nearby mountain). The story focuses on a man named Ko‘amokumokuohe‘eia, who moved to this area and was told by the current residents that water is very scarse. Water, he was told, could be obtained in “celebrated” caves, but these caves were *kapu* (forbidden), and if caught, trespassers would be killed by the owner of the cave. However, Ko‘amokumokuohe‘eia discovered a very small cave entrance which apparently no else knew about. The cave had water dripping from the roof of the cave (Maguire 1966:30). Ko‘amokumokuohe‘eia and his father used carved *‘ōhi‘a* and *wiliwili* trees to capture the dripping water, and his family was thus able to survive during dry spells. This legend clearly demonstrates the importance of water as a difficult to procure resource, as well as highlighting the importance of water collection caves.

Describing the apportioning of land by the *ali‘i* before the ascendancy of Kamehameha, the pioneer nineteenth-century Hawaiian historian Samuel M. Kamakau records this information about the lands of Kekaha:

> Waimea was given to the Pa‘ao kahuna class in perpetuity and was held by hem up to the time of Kamehameha III when titles had to be obtained. But there was one land title held by the kahuna class for many years and that was Puuepa in Kohala. In the same way the land of Kekaha was held by the kahuna class of Ka-uahi and Nahulu. (Kamakau 1961:231)

Kamakau further records that during the 1770s, "Kekaha and the lands of that section" were held by descendants of the Nahulu line, specifically by Ka-me‘e-ia-moku and Ka-manawa, the twin half-brothers of Ke‘e-au-moku, the famous Hawai‘i island chief (Kamakau 1961:310).

Kamakau mentions Kaloko in an episode that suggests that *ahupua‘a*'s significance within the pre-contact Kekaha landscape. Kamakau recounts an extraordinary day's reconnaissance of the west coast of Hawai‘i island by the spy Ka-uhi-o-ka-lani, sent to the island by Kama-lala-walu, chief of Maui. Having reached Kawaihae by canoe at night, Ka-uhi-o-ka-lani "ran about that same evening [reaching as far south as Ka‘awaloa] and returned before the canoes were dismantled..." Ka-uhi-o-ka-lani, recounting his journey and the landmarks he had observed, relates: "I went on to the long stretch of sand, to the small bay with a point on that side and one on this side. There are large inland ponds." He is told that the "sandy stretch is ‘Ohiki, and the walled-in ponds are Kaloko and Honokōhau" (Kamakau 1961:56). This event unfolds during the time of the sixteenth-century Hawai‘i Island *ali‘i* Lono-i-ka-makahiki, suggesting that by the 1500s Kaloko and its fishpond were well-known features in the Kekaha landscape.

Intensive archaeological investigation during recent decades has clarified the picture of pre-contact Hawaiian life within Kekaha and the two *ahupua‘a* under study. Especially detailed study of Kaloko has resulted in the following analysis of the development of pre-contact settlement throughout the *ahupua‘a*:

> Throughout its span of occupation Kaloko was but part of a larger society. Kaloko was apparently a unified community after A.D. 1200-1300. When initially occupied (A.D. 1000-1500), it may have been an outlier of another community. Nevertheless, from its initial occupation, Kaloko had 1 or more internal local residence groups containing constituent households. By A.D. 1200-1300 at least 2 residential groups were present in the community, and by contact (*circa* A.D. 1778) at least 4 residential groups had dwelled in the area. Each residential group performed religious functions as well as being a leisure unit. Members of the group held use rights to adjacent farm lands and probably to areas where forest and marine resources were located. Within each residential group, 1 household seems to have been dominant, being the spatial focus for its group's religious activities. It is suggested that such dominance was a function of consanguineal seniority and/or wealth. (Cordy et al. 1993:45)

While exact population figures for Kaloko were not possible, the study suggested that the "community seems to have gradually grown in size but could never have been larger than 118 and most likely was about 60-100 in size" (Cordy et al. 1993:45). The general pattern of land use and settlement suggested for Kaloko may also have existed within the similar environment of neighboring Kohanaiki.

A detailed study of Kaloko by Cordy et al. (1991) for the National Parks Service has developed a model of pre-contact settlement throughout the *ahupua‘a.* The following is a summary of this model provided by the National Parks Service:

> Permanent settlements in the leeward portions of Hawai'i Island began by the A.D. 900s to 1000s, and possibly earlier. These would have occurred near favorable water sources, Kaloko bay probably having been one of the most sheltered and inviting large inlets along the Kona Coast. Coastal habitations had expanded by the 1200s, utilizing inland fields as well as sea resources for subsistence. The Kekaha lands north of Kaloko and extending to Kohala are thought to have undergone initial permanent settlement beginning in the 1400s,

> with subsequent occupation of the coast north and south over the next few centuries.
>
> Sometime during the period of 1580 to 1600, Laeanuikaumanamana, the kahuna-nui of the ruling chief, Liloa, acquired the Kekaha region. It is thought that the construction of fishponds at Kaloko and Honokahau began during this time, with Kaloko Fishpond dating from at least the 1400s to 1500s. During the 1600s to 1700s, as the Kona Coast population grew with the establishment of the royal residence of 'Umi-a-Liloa at Kona and the consequent increased demand for food production, Kaloko also increased to probably almost 200 residents. It continually supported a higher population than other Kekaha areas because of its fishpond and extensive inland field system [Cordy et al. 1991 summarized online by the National Parks Service, http://www.nps.gov/history/history/online_books/kona/history8a.htm].

Into the last decades of the 18th century - following western contact - Kohanaiki and Kaloko - as elements of the larger Kekaha area - remained under the control of Ka-me‘e-ia-moku, who resided to the north at Ka‘upulehu (Kamakau 1961:147).

3.1.2 Early Historic Period

By the first decades of the 19th century, the inhabitants of Kaloko and Kohanaiki would have long experienced the social pressures and consequences of western contact. “As early as 1788, Hawaiians began enlisting as seamen on the foreign ships that stopped at Island ports, and their number increased rapidly with the growth of whaling in the Pacific” (Schmitt 1973:16). As trade centers were developed at Kailua, Kealakekua, Keauhou and Kawaihae during the early 1800s, these burgeoning ports became centers of a population drawn from increasingly isolated (economically and socially) areas like Kaloko and Kohanaiki. Newly-introduced diseases cut the population severely.

Kaloko is recorded by Kamakau as the site where Kamehameha's bones were cached after his death in 1819:

> Kamehameha had...entrusted his bones to Ulu-maheihei Hoa-pili with instructions to put them in a place which would never be pointed out to anyone. At midnight, therefore, when black darkness had fallen and no one was likely to be on the road and the rough lava plains of Pu‘ukaloa lay hushed, Hoa-pili sent his man, Ho‘olulu, to bring the container of wicker work in which the bones of Kamehameha were kept to Kaloko in Kekaha...The next morning Hoa-pili and Ke-opu-lani took canoe to Kaloko where Hoa-pili met the man who had charge of the secret cave and together they placed the bones there [Kamakau 1961:215].

Kamakau’s account, if accurate, suggests that Kaloko’s population, toward the end of the 19th century’s second decade, had diminished to such an extent that the *ahupua‘a* could provide the necessary isolation and secrecy for the burial.

Missionary censuses of the 1830s chart the diminishing population of Kekaha and North Kona. In 1834, the total population of Kekaha is recorded as 1,244, comprising 21% of the total North Kona population of 5,957 (Schmitt 1973:31). The North Kona figure represents a

population loss of 692 since the previous census of 1831 (during which no figure specific to Kekaha was noted), which recorded 6,649 persons in the district (Schmitt 1973:9). One factor - inter-island migration - inducing the diminishing population of Kona was specifically noted by missionaries in 1832: “We have been sensible for some time that the number of inhabitants in this island is on the decrease. There is an almost constant moving of the people to the leeward islands, especially since the removal of the governor (Kuakini) to Oahu. Some leave by order of the chiefs, and others go on their own responsibility” (cited in Schmitt 1973:16).

Records generated during the 1840s for Land Commission Awards (LCAs) conferred at mid-century document the disposition of population and land use within Kaloko and Kohanaiki *ahupua‘a* that had evolved since western contact. At the Māhele of 1848, Kaloko was claimed by and awarded (LCA 7715) to Lot Kamehameha (who would become Kamehameha V). Kohanaiki was classified as Government Land. Subsequently, 18 *kuleana* claims - by commoners claiming to occupy and/or cultivate land parcels - were made in Kaloko. Twelve of these claims were awarded. All claims were for *mauka* lands - between 1200 and 1700 ft. elevation - adjacent to or just *makai* of the Government Road. Only testimony for Kahiona’s LCA 9205/9237 claim (which was not awarded) mentions a fishpond; no site within the coastal area is claimed. Farmlands claimed are *māla*, *kīhāpai*, and *mo‘o,* i.e. forms of dry land agriculture; actual crops identified in the award testimonies are taro and sweet potato. Only five of the total 18 claims mention residence on or use of the Kaloko lands dating to the time of Kamehameha I, the first decades of the nineteenth century; the remaining claims testify to residence/use beginning in the 1830s and 1840s.

Parcels within Kohanaiki, having become Government Land, were subject to sale – as designated grants - by the Hawaiian government. Land sales began in the 1850s with Grant 2030 to Kaiakoili in 1856, awarding 102 acres adjacent to and *makai* of the Government Road. Also beginning in the 1850s, the first taxpayer rolls for Kohanaiki and Kaloko were documented: they indicate, within Kohanaiki, 8, 13 and 12 taxpayers during the years of 1857, 1859 and 1860, respectively; within Kaloko, during the same years, 19, 21 and 23 taxpayers were recorded. Just past the middle of the 19th century, the populations of Kaloko and Kohanaiki have been drawn beyond the original subsistence-based economy into the western commercial paradigm.

As Cordy notes about Kaloko: “The historical documents suggest that by the 1840s-1850s, the Coastal Zone had been abandoned as a residential area, except probably for a house used by the fishpond’s caretaker. This pattern would have been a stunning change from prehistoric and early historic times, when many coastal residences were present” (Cordy 1991:288). This pattern likely also held for Kohanaiki.

3.1.3 Mid- to late-1800s

The division of Kohanaiki - through sales of Government lands - continued throughout the remainder of the 19th and into the 20th century. Grant 2942 in 1864 awarded to Hulikoa 929.75 acres which included the width of the *ahupua‘a*, extending *makai* from Kaiakoili's grant. In 1871, Grant 3086 awarded 154 acres to Kapena; this parcel extended *makai* from Hulikoa's grant to the shoreline.

Kaloko is documented during the 1870s in testimonies by Hawaiians before the government’s Boundary Commission. Testifying on August 12, 1873, Nahuina (who had earlier received LCA

10327 in Kaloko) describes himself as “born at Kaloko North Kona Hawaii at the time of Keikepuipui, the building of the *heiau* at Kailua, and have always lived there” and states that the boundaries of Kaloko were shown to him by his father, the former *konohiki* of the *ahupua‘a*. Identifying the *mauka* portions of the boundary, Nahuina notes bounds defined by vegetation and a wall (*iwi ‘āina*), and recalls a former habitation site:

> ...From the *maka*i side of Kaupulehu the boundary runs along said land, the *koa* being on Kaloko and the *mamani* and *pukeawe* [*sic*] on Kaupulehu to the corner of Lanihau 2nd Keahuolu and Honokohaunui...Ohiawela, a *pali*, on the road through the woods is a point on the boundary. This place is above Honokohaunui, thence turn makai to Kahua, a place in the fern where houses used to stand, from thence the boundary runs *makai* along an *iwi aina* to Kapokalani, at the Government road. Thence *makai* still following the *iwi aina* to Kiikii an *ili aina*, thence to Kaohe, a grove of trees thence to *aa*...

Nahuina adds that Kaloko has “ancient fishing rights extending out to sea.” Testifying on the same date, Hoohia, who “moved to Honokohauiki when quite small and reside[s] there now”, adds details that suggest the *mauka* Kaloko-Honokōhau boundary was defined by different vegetation that also reflected former traditional gathering rights: “Honokohaunui ends at Ohiawela, a *pali*. Kaloko takes the *koa*, and Honokohaunui, the *ohia*...The *olona* grows on Honokohaunui and Kealakehe and the *koa* on Kaloko."

During the 1880s, Kona lands - including Kaloko and Kohanaiki - were surveyed by J. S. Emerson for the Hawaiian government. Emerson produced three maps corresponding to the project area during this time period: Registered Map (RM) 1280, RM 1449, and RM 1512. Emerson’s assistant, J. Perryman also produced sketches of the west slopes of Hualālai. Though other surveyors and historians have produced maps for the area, these maps are the most comprehensive known. RM 1280 (Figure 8) is perhaps cited and reproduced with the most frequency. It is often dated to 1888, but in fact the map does not indicate the date, only the date the map was traced by another surveyor in 1952 for reproduction purposes. An independent attempt to verify its date during the present study was unsuccessful, as the original map is now retired and not available from the State Survey office. Circumstantial evidence dating the map includes the sketches of J. Perryman dated to 1882 which match the features of this map well and a date range penciled on the back of the traced map on file - “1877-1903.” RM 1449 and RM 1512, dating to 1888 and 1889 respectively, are essentially maps of the same series. RM 1449 is a broad overview map ranging from Kaloko to Kūki‘o in the north, RM 1512 is a detail of the land grants around the government road.

A portion of the map of North Kona derived from Emerson's survey (Figure 8) shows the locations of the three Kohanaiki grants described above. Also indicated are "Kealiihelepa Hse" at the coast above the Kaloko fish pond and, near the government roads, "Kaloko Cath. Church" and "Kohanaiki Church" which is likely the Protestant church recorded as built by a minister, Kaanohimaka, and his congregation in the 1870s (Kelly 1971:14). As noted by Cordy (1991:418), Emerson's 1888 map of the area (Figure 8) including the Kohanaiki Church indicates "a set of about 16 stone house enclosures and a Protestant church, collectively called the Kohanaiki Homesteads"; Cordy suggests a "late 1880s age for the formation of the Kohanaiki Homesteads." The resident population in the late 1880s is understood to have been in a belt at the

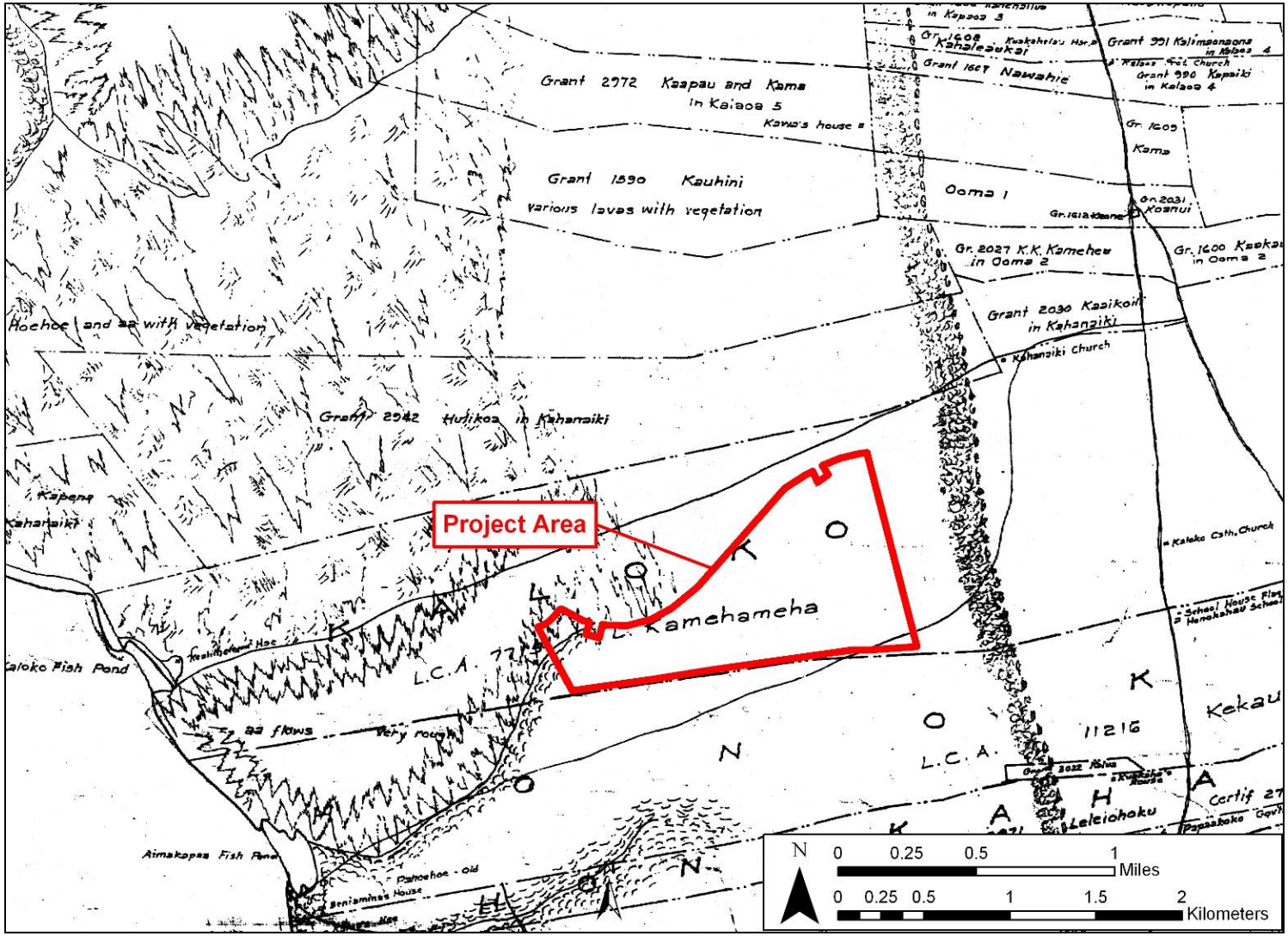

Figure 8. Portion of RM 1280, J. S. Emerson’s survey map showing approximate location of project area

elevation of the Kohanaiki Church, Kaloko Catholic Church and Honokōhau School house shown on the Emerson map (Figure 8) as located well east of the present project lands at an elevation of greater rainfall. Kelly (1971) notes that the Kohanaiki Homesteads would draw people as other areas of North Kona were abandoned. Government records of Kohanaiki grants show 18 parcels ranging in size from .73 acres to 25.45 acres awarded between 1895 and 1904.

While all three Emerson maps are informative of the area, there are inconsistencies between them that are difficult to interpret. RM 1280 was likely produced with a somewhat different intent than the other two maps though they were all surveyed in such a short time period. Suggestive of the different intent, RM 1280 does not indicate survey stations as the others do. However, perhaps the largest inconsistency is the route of the two roads extending *makai* from the homesteads – on RM 1280 crossing into Kaloko just outside of the homesteads and on RM 1449 further *makai*. Since RM 1280 does not give a name to this road and the date of the map is somewhat uncertain, it could be that there were two roads, one superseding the other. It is also likely that RM 1280 was a simply a preliminary survey (if the dates for J. Perryman's sketches date the map) and was less accurate (didn't extensively use survey markers).

A few newspaper articles detailing life and the customs in Kekaha during the last half of the 19th century (written between 1928 and 1930) mention water collection. Kepa Maly (2003:41-42) translated serial accounts from *Ka Hōkū o Hawai‘i* written by John Ka‘elemakule Sr., a Kekaha native, and the following two excerpts demonstrate the significance of water catchment:

> There were not many water holes, and the water that accumulated from rain dried up quickly. Also there would be weeks in which no rain fell… The water which the people who lived in the uplands of Kekaha drank, was found in caves. There
>
> are many caves from which the people of the uplands got water… [*Ka Hoku o Hawaii*, September 17, 1929:3].
>
> …The kūpuna had very strict *kapu* (restrictions) on these water caves. A woman who had her menstrual cycle could not enter the caves. The ancient people kept this as a sacred *kapu* from past generations. If a woman did not know that her time was coming and she entered the water cave, the water would die, that is, it would dry up. The water would stop dripping. This was a sign that the *kapu* of Kāne-of-the-water-of-life (Kaneikawaiola) had been desecrated. Through this, we learn that the ancient people of Kekaha believed that Kāne was the one who made the water drip from within the earth, even the water that entered the sea from the caves. This is what the ancient people of Kekaha wai ‘ole believed, and there were people who were *kia‘i* (guardians) who watched over and cleaned the caves, the house of Kāne… [*Ka Hoku o Hawaii*, September 24, 1929:3].

Oral history interviews (Maly and Maly 2003) relate that in the mid 1800s only a few residences were on the coastal lands, in the uplands above 900 ft. elevation, and in the vicinity of Māmalahoa Highway. The land between 900 ft. and the coast was cattle, donkey, and goat pasturage. *Mauka/makai* trails through Kohanaiki, Kaloko, Kalaoa, and Honokohau were utilized by upland families to access the coast to fish, and gather water during upland droughts.

3.1.4 1900s

During the 20th century, major developments focused on Kaloko Ahupua‘a, with continuing commercial use of the fishpond and increasing animal husbandry. The Kohanaiki Homesteads were apparently in decline during the early part of the century (Maly and Maly 2003), and are mentioned only in passing in H.W. Kinney's 1913 visitor's guide, which notes that it is an "inland settlement without much interest".

Ranching, however, steadily increased. Once John Maguire purchased the former chiefly lands of Kaloko in 1906, the uplands of the *ahupua‘a* were developed into the Huehue Ranch. Maly and Maly (2003) discuss the acquisition of these lands and the types of ranching that were common:

> In 1899, John A. Maguire, founder of Huehue Ranch applied for a Patent Grant on… lots in ‘O‘oma 2nd, but he only secured Grant No. 4536…. Maguire's Huehue Ranch did secure General Lease No.'s 1001 and 590 for grazing purposes on the remaining government lands in the Kohanaiki and ‘O‘oma vicinity. Thus, by the turn of the century, Huehue Ranch, utilized both the upper forest lands and lower kula lands to the shore for ranching purposes. Oral history interviews with elder former ranch hands record that this use extended across the Kapena and Huliko‘a grant lands of Kohanaiki, from the fee and leasehold lands of Kaloko and ‘O‘oma. Nineteenth century goat drives, gave way to formalized cattle drives and round ups on these lands. [Maly and Maly 2003:78].

Until the construction of the Queen Ka‘ahumanu Highway in the 1970s, access to the "kula kai (shoreward plains)" (Maly and Maly 2003:101) was limited to local residents (Figure 9). In the first half of the century, the primary method of travel was "by foot or on horse or donkey, and those who traveled the land, were almost always native residents of Kalaoa, ‘O‘oma,

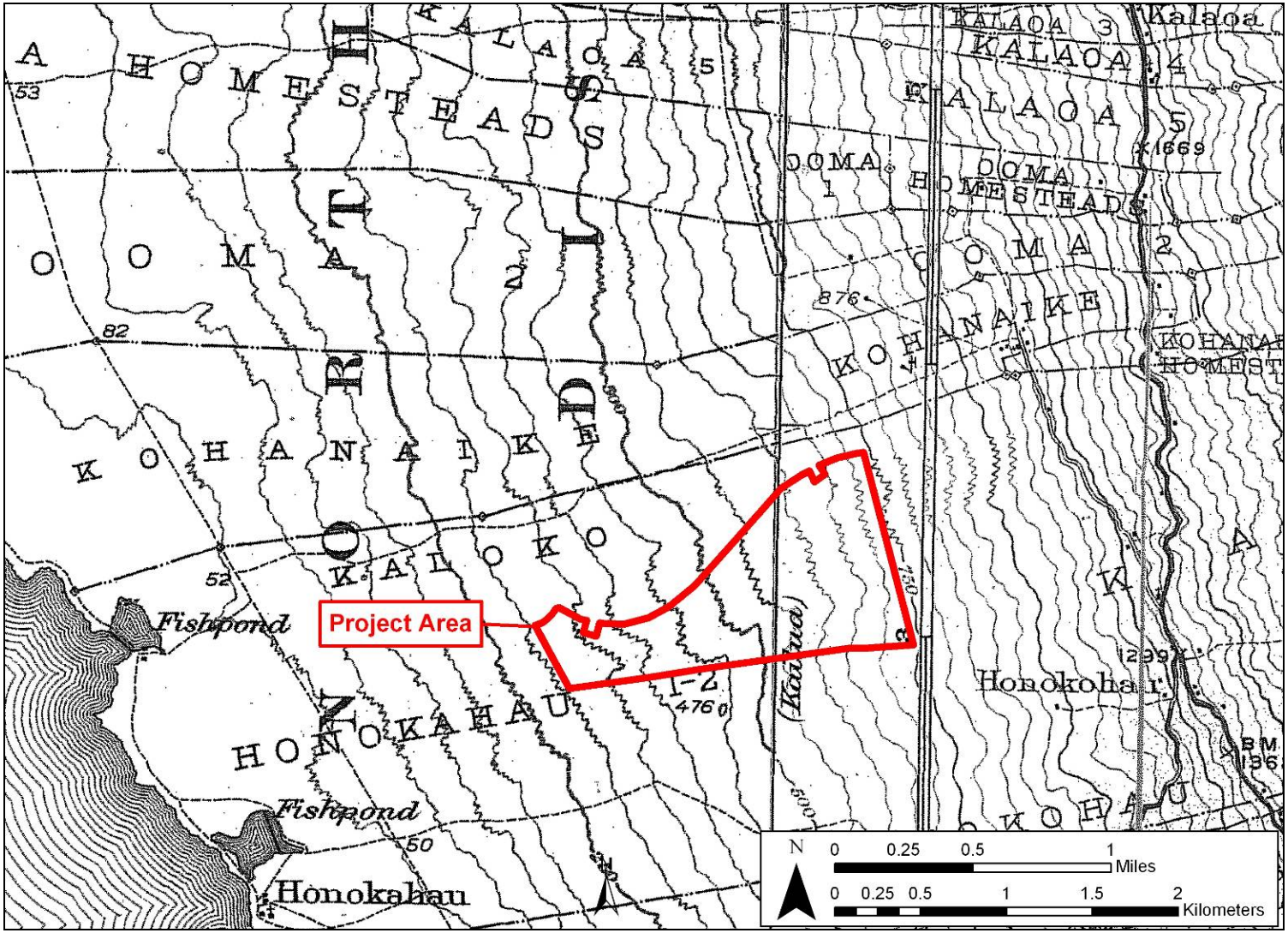

Figure 9. Historic USGS Topographic Map, Keahole Point and Kailua Quadrangles (1924), showing the location of the project area

Kohanaiki, Kaloko and Honokōhau" (Maly and Maly 2003:99). Huehue Ranch bulldozed a jeep road to the shore around 1955 during the construction of the Kailua pier, and this was used primarily by the ranch employees for duties or for going fishing along the coast.

The Kaloko fishpond - leased from the Huehue ranch - continued as a commercial fishing operation until the 1950s. During the 1970s, the pond was incorporated into the newly-established Kaloko-Honokōhau National Historic Park.

3.1.5 Modern Land Use

While the present project area is largely undeveloped, surrounding areas have seen increasing modern use. The Kaloko Industrial Area is just *makai* of the project area, including large stores such as Home Depot and Costco. Hina-Lani Street runs along the north border of the project area, and leads *mauka* to a residential area (Kona Heavens) before the Palani junction (at Māmalahoa Highway). The area south of the project (a portion of Honokōhau Ahupua‘a) is presently used for cattle grazing, as well as a quarry on the *makai* end; bulldozing related to the quarrying activity has crossed over the *ahupua‘a* boundary and is present at the *makai* end of the project area, covering large swaths of the *‘a‘ā* (see Figure 7 above). A large base yard (Kaloko Industrial crusher site) is present in the central portion of the project area (on the *‘a‘ā*) adjacent to Hina-Lani Street, and some of this area has been used by squatters for campsites, leaving a variety of trash and furniture. Two water tanks and an additional base yard are also present, and are discussed below in the Previous Archaeology section.

3.2 Previous Archaeological Research

3.2.1 Overview of Archaeological Studies Conducted within Kaloko Ahupua‘a

This section provides a general overview of archaeological studies in Kaloko and Kohanaiki *ahupua‘a*. Table 1 lists archaeological studies in this area with brief comments; studies most relevant to the current project are discussed in additional detail in the text. The section following this discusses previous archaeological studies within the present project area in greater detail.

Previous archaeological surveys (Figure 10 and Table 1) conducted within portions of Kaloko and adjacent Kohanaiki *ahupua‘a* began with the early coastal survey conducted by John Reinecke for the Bernice P. Bishop Museum in 1929-1930 (Reinecke 1930). This was a cursory survey in which approximate site locations and very brief site descriptions were recorded. John Reinecke (1930) recorded eight sites at the coast of Kohanaiki; the sites - minimally documented and mapped - included habitation sites and a *heiau*. The next survey was undertaken by Kenneth Emory and Lloyd Soehren in 1961 (Emory and Soehren 1971). This was also a coastal survey, and focused specifically upon the coast of Kaloko, Honokōhau and Kealakehe. In 1970 and 1971, Robert Renger and students from the University of California at Santa Barbara conducted an intensive survey of Kaloko and Honokōhau between present day Queen Ka‘ahumanu Highway and the coast (Cordy et al. 1991). This survey also included subsurface testing of selected sites. These three surveys identified a total of 94 sites within Kaloko between the coast and Queen Ka‘ahumanu Highway.

Additional archaeological work and historical research undertaken within or about Kaloko during the 1970s and 1980s include: an historical study by Marion Kelly (Kelly 1971); research relating to the establishment of the Kaloko-Honokōhau National Park (e.g. Honokōhau Study Advisory Commission 1974, National Park Service 1975); research stemming from the fieldwork conducted by Renger in 1970-71 (see the list presented in Cordy et al. 1991:2), and several reconnaissance-level studies (Ching 1980, Hammatt 1980, Soehren 1983).

Cordy (1981) conducted a survey of the coastal area (up to 1/2 mile inland) of Kohanaiki in 1975; twelve sites were recorded including: pavings, platforms, enclosures and a trail. Eleven of the sites were interpreted as habitation constructs including sleeping houses, men's houses, special purpose, and a canoe house/men's house.

During the 1980s, PHRI began investigations of the entire *makai* portion of Kohanaiki Ahupua‘a, bounded by with ‘O‘oma 2 and Kaloko Ahupua‘a, and by the Pacific Ocean and the Māmalahoa Trail. During an inventory survey in 1986 (Donham 1986), "14 previously recorded sites were relocated and 91 sites were newly identified...Habitation sites represented over half of the identified site total, and included habitation complexes, habitation/ceremonial and/or habitation/burial complexes, and temporary habitation sites" (Donham 1986:7-8). In 1991, PHRI performed data recovery of the project area (O'Hare and Goodfellow 1992); this work included: "detailed recording of (a) 31 sites (224 features) previously recorded in the project area, and (b) seven sites newly recorded during the Phase II work" (O'Hare and Goodfellow 1992: ii). Summarizing Kohanaiki settlement pattern within the zones represented by the project area, the report notes:

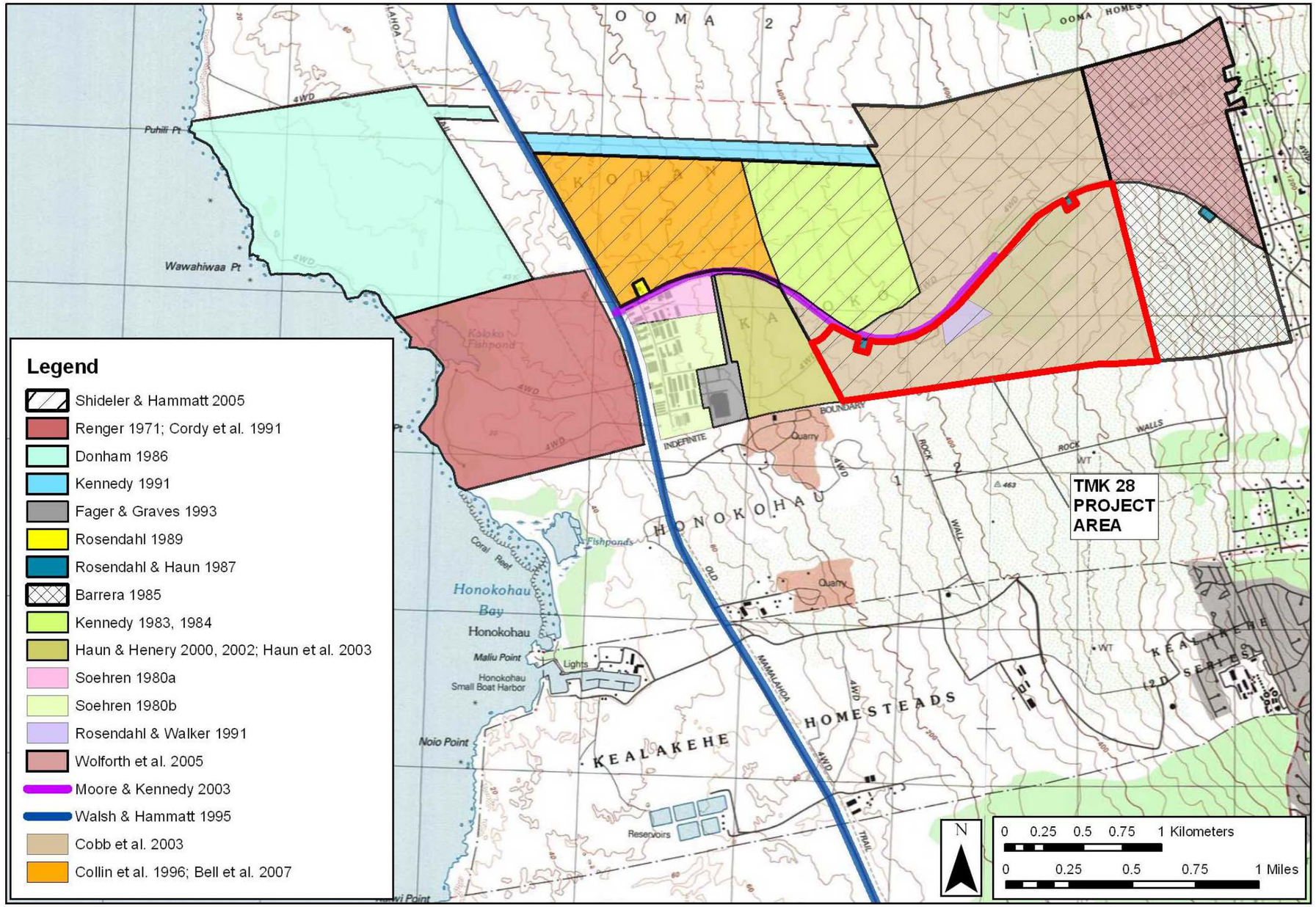

Figure 10. USGS 7.5 Minute Series Topographic Map, Keahole Point Quadrangle (1996), showing previous archaeological studies in the vicinity of the project area (indicated in red)

Table 1. Previous archaeological studies within Kohanaiki and Kaloko *ahupua‘a* (projects within present study area are in bold)

Source	Nature of Study	Area of Study	Finds	Comments
Reinecke 1930	Cursory survey	Coastal Survey	Briefly notes numerous sites	All sites *makai* of present project area
Emory & Soehren 1971	Cursory survey	Coastal Survey	Briefly notes numerous sites	All sites *makai* of present project area
Kelly 1971	Historical survey and background	Kaloko and Kuki‘o *ahupua‘a*	Background study	Good background study
Renger 1971	**“Field Notes” of “*Mauka* excavations”**	**“*Mauka* excavations”**	**“Field Notes” describe several sites**	**No site location map thus hard to be sure where sites are**
Soehren 1979	**Letter Report Reconnaissance Survey**	**Kaloko Access Road Corridor (Hina-Lani Street)**	**No finds**	**Letter Report not actually seen**
Soehren 1980a	Letter Report Reconnaissance Survey	Kaloko lowlands	No finds	Letter Report not actually seen
Soehren 1980b	Letter Report Reconnaissance Survey	Kaloko Access Road Corridor	Discusses 3 stepping stone trails, 2 *ahu* & a lava tube complex	Hina-Lani Street Letter Report not actually seen
Hammatt (ARCH) 1980	Archaeological Reconnaissance	410 acre parcel	Identified 2 sites	*Mauka* of present project area
Barrera Jr. 1983	Archaeological Reconnaissance	TMK 7-3-9:19	No finds	No map
Soehren 1983	Archaeological Reconnaissance Letter Report	-	-	Not seen
Kennedy 1983	Archaeological Reconnaissance	North of present project area	Identifies 27 sites	North of present project area
Kennedy 1984	Intensive Archaeological Survey	North of present project area	Results of investigations of 25 sites	North of present project area
Barrera Jr. 1985	Archaeological Survey	409 acres 700 to 1080’ elevation	58 sites	*Mauka* of present project area

Source	Nature of Study	Area of Study	Finds	Comments
Donham 1986	Archaeological Reconnaissance Survey	470-acres *makai* of Queen K Hwy	105 sites	Kohana-iki development
Rosendahl & Haun 1987	Archaeological Reconnaissance Survey	3 1-acre parcels, 2 in present project area	Their project area *mauka* of present project area had one site	Correspond to two present project area water tanks
Barrera Jr. 1988	Archaeological Excavations	YO Project Area	60 sites	Report not actually seen
Rosendahl 1989a	Letter Report Addendum to Archaeological Inventory Survey	Addl info re: site 13493 stepping stone trail by *makai* tank	Identified one *pāhoehoe* slab trail (site 13493)	Water tank *makai* of present project area
Rosendahl 1989b	Field Inspection	Kaloko Mauka Parcel # 1	Identified 4 sites	Report not actually seen
Rosendahl 1989c	Field Inspection	Kaloko Mauka Parcel # 2	No sites identified	Report not actually seen
Rosendahl & Walker 1990	Addendum to Archaeological Inventory Survey	Addl info re: site 13493 trail by *makai* tank	Addl info re: site 13493 trail by *makai* tank	Water tank *makai* of present project area
Rosendahl & Walker 1991	Archaeological Field Inspection	Industrial crusher site, 2 adjacent 10 acre parcels within present project area	Identified a trail with two cairns	Within present project area
Barrera Jr. 1991	Archaeological Inventory Survey & Data Recovery Report	800 to 1100’	Identified 61 sites	*Mauka* of Present Project Area
Cordy et al 1991	An Ahupua‘a Study: The 1971 Archaeological Work at Kaloko	Kaloko-Honokōhau National Park	94 sites identified, 20 sites relocated	*Makai* of Present Project Area
Kennedy 1991	Surface Reconnaissance	Long thin industrial development	No significant finds	*Makai* of present project area
Barrera Jr. 1993	Archaeological Inventory Survey	5.7 acres; 1450 to 1630’ elevation	Identified 40 features of Kona Field System	*Mauka* of Present Project Area

Source	Nature of Study	Area of Study	Finds	Comments
Fager & Graves 1993	Archaeological Inventory Survey	Kaloko Industrial Park parcel	Identified 17 sites with 60 component features	Just *makai* of present project area, south of Hina-Lani Street
Fager & Rosendahl 1993	Interim Report Archaeological Inventory Survey	Kaloko Industrial Park parcel; 15+ acres	Identified 17 sites with 60 component features	Just *makai* of present project area, south of Hina-Lani Street
Henry & Graves 1993	Archaeological Inventory Survey	Transmission line project Mauka side of Queen K Hwy.	Identified 8 sites in *makai* of project area	*Makai* of present project area
O‘Hare & Rosendahl 1993	Report on burials	On coast	Report on burials	Kohana-iki Resort project
Rosendahl 1993	Archaeological Field Inspection	Kaloko Mauka Parcel	4 sites discussed	Report not actually seen
Nees & Williams 1995	Archaeological Investigations	110 acres, 2100 to 2900’ elevation	Identified enclosure, lava tube, terrace, wall, mounds	*Mauka* of Present Project Area
Walsh & Hammatt 1995	Archaeological Inventory Survey	Queen K Hwy Right-of-Way	Identified 9 sites adjacent to makai side of Hwy in Kohanaiki & Kaloko	*Makai* of Present Project Area
Colin et al. 1996	Archaeological Inventory Survey	224 acres north of present project area	Identified 55 sites	North of present project area
Rechtman 1998	Archaeological Field Inspection	2400-2500’ elevation	No finds	*Mauka* of Present Project Area
Rechtman & Henry 1999	Archaeological Inventory Survey	1450-1620’ elevation	Identified 15 sites	*Mauka* of Present Project Area
Wolforth 1999	Monitoring Report	HELCO Keāhole-Kailua Transmission line corridor	Describes one site 21258	Says Walsh & Hammatt previously id’d site as 19946 (on *makai* side of hwy)

Source	Nature of Study	Area of Study	Finds	Comments
Haun & Henry 2000	Archaeological Inventory Survey	Kaloko Industrial Park TMK: 7-3-51:60; 102-acre parcel	45 sites with 81 features	Just *makai* of present project area south of Hina-Lani Street
Rosendahl 2000	Archaeological Assessment	2435-2730’ elevation	No finds	*Mauka* of Present Project Area
Clark & Rechtman 2002	Archaeological Inventory Survey	1200’ to 1600’ elevation	Identified 5 sites	*Mauka* of Present Project Area
Haun & Henry 2002	Data Recovery Plan	Kaloko Industrial Park TMK: 7-3-51:60; 102-acre	Data Recovery Plan addresses 8 specific sites	Just *makai* of present project area south of Hina-Lani Street
Rechtman & Rivera 2002	Archaeological Assessment	3-7-3-26:4; 3,100’	No finds	*Mauka* of Present Project Area
Cobb, Elmore, and Kennedy 2003	**Archaeological Assessment**	**TMK: 7-3-09:25, 26 & 28 at Kaloko and Kohanaiki (400 acres)**	**Briefly identifies 154 features**	**Descriptions quite brief; map hard to correlate with sites found in present survey**
Haun 2003	**Archaeological Assessment**	**400-Acre Portion of TMK 7-3-09:28 Kaloko**	**Identifies 8 sites (63 features) in present project area**	**Helicopter flight overhead led him to focus on open *‘a‘ā* area**
Haun et al. 2003	Data Recovery Report	Kaloko Industrial Park TMK: 7-3-51:60; 102-acre	Data Recovery Report addresses 8 specific sites	Just *makai* of present project area south of Hina-Lani Street
Moore & Kennedy 2003	Archaeological Inventory Survey	Roadway Corridor	Identified 1 site (23973) 2 mounds	North boundary of project area
Puette & Dye 2003	Archaeological Inventory Survey	22 acres 2100 to 2400’ elevation	No finds	*Mauka* of Present Project Area
Rechtman 2003	Archaeological Assessment	3-7-3-26:5; 3,100’ elevation	No finds	*Mauka* of Present Project Area

Source	Nature of Study	Area of Study	Finds	Comments
Elmore et al. 2004	Archaeological Inventory Survey	1400’ elevation	Identified one historic site 24133	*Mauka* of present project area
Shideler, and Hammatt 2005	**Archaeological Field Inspection and Literature Review**	**1,200+ Acres in Kaloko and Kohanaiki**	**Numerous pre-contact sites observed, including: habitations, agricultural features, petroglyphys, boundary walls, and burials**	**Within present project area**
Wolforth et al. 2005	Archaeological Inventory Survey	TMK: [3] 7-3-09: 032	A total of 89 sites were identified, consisting of burials, perm. habitation, temp. habitations, religious sites, trails, boundary walls, and agricultural sites	*Mauka* of present project area

> The data recovery work indicates that permanent habitation sites between Puhili and Wawahiwaa Points are concentrated in the coastal zone, near the shoreline. In the coastal area south of Wawahiwaa Point permanent habitation sites were near the shoreline and further inland. Temporary habitation sites were present in all areas of the coastal zone and in the barren rockland zones. The radiocarbon date ranges indicate that sites in the northern coastal zone might have been inhabited as early as AD 1020. Sites in the southern coastal zone may have been inhabited as early as AD 1370, and sites in the barren rockland zones may have been inhabited as early as AD 1180. In the barren rockland zones, use of the sites was terminated before the historic period, and in the coastal zone most of the sites were not used in the historic period [O'Hare and Goodfellow 1992:ii].

In 1983 Joseph Kennedy conducted a reconnaissance and subsequent intensive survey (1984) of a parcel that is just north of the present project area (on the north side of Hina-Lani Street). The 1983 reconnaissance located and briefly described twenty-seven sites. These sites included 17 lava tubes, 3 *ahu* or cairns, 2 walls, 2 platforms, an enclosure, a modified outcrop, and a trail. The 1984 intensive survey identified:

> 45 separate cave openings and approximately 200 chambers in these caves. In addition there were 4 walls recorded, 5 enclosures, 13 platforms, 9 *ahu*, 2 trails and 2 sets of petroglyphs. Out of the 79 separate features on the property, 30 were judged to be worthy of re-investigation ... the remaining 49 sites that were not reinvestigated were comprised almost exclusively of relatively shallow caves with little or no evidence of cultural remains or associated modifications [Kennedy 1984:18].

In 1985, Barrera (1985) surveyed approximately 409 acres within Kaloko and Kohanaiki *ahupua‘a*; the 409-acre parcel is located between Māmalahoa Highway and Queen Ka‘ahumanu Highway, a portion being directly *mauka* of the present project area. Four sites were recorded in Kaloko, including an enclosure, a lava tube cave, a wall and a platform (possible burial). However, it appears that Kaloko was not systematically surveyed because of extensive bulldozing in the area. Fifty-five sites were recorded within Kohanaiki and include mounds, platforms, habitation complexes, walls, and terraces. A portion of that study area included the historic period Kohanaiki Homestead. Barrera's site #59 comprises constructions associated with the homestead and is described as a "series of Habitation areas enclosed by large stone walls." No estimate is given of the ages of the other fifty-eight sites.

In 1988, Cordy et al. (1991) began preparing a study of Kaloko *ahupua‘a* for the new Kaloko-Honokōhau National Park. The study was based on Renger’s 1971 fieldwork conducted for planned development of coastal Kaloko for Huehue Ranch. The fieldwork “included survey work in the intermediate and upland zones of Kaloko, which located additional sites, extensive excavation in the coastal area, and some excavation in the intermediate and upland sites” (Cordy et al. 1991:2). Renger identified, and in some cases re-identified, 94 sites that included 59 in the Coastal Zone, 30 in the Middle Zone, and five *mauka/makai* trails that crossed both zones and continued heading inland. As only “summary papers” had been previously written, the monograph published in 1991 includes the 1971 fieldwork data and resultant analyses, and

additional fieldwork conducted by Cordy and Hitchcock in the 1970s and 1980s (Cordy et al. 1991:2, 44).

In 1989, a water tank site in parcel (TMK: 3-7-3-10:Por.17) - measuring 360 ft. N/S and E/W - was subject of an archaeological inventory survey (Rosendahl 1989a, Rosendahl and Walker 1990). This work was done in addition to previous work (Rosendahl and Haun 1987) further *mauka* that is discussed below in the section on archaeological work within the present project area. The parcel bordered the north side of the then "proposed Kamanu Street extension in the Kaloko Light Industrial Park" - i.e., north of the present project area and north of Hina-Lani Street (the seaward most water tank location). One site was recorded and designated state site 50-10-27-13493:

> a steppingstone trail segment measuring 7.5 m long (E-W) by 0.6-0.7 m wide (N-S)...located on a section of *‘a‘ā* lava...The segment consists of approximately six flat and roughly round *pāhoehoe* slab steppingstones set on worn *‘a‘ā* gravel. The steppingstones measure c. 0.4 m in diameter by 0.1 m thick. The trail is oriented c. 159 degrees Az. (magnetic). No portable remains were present in association with the trail. The trail appears to be prehistoric, and appears to have been used as a secondary transportation route [Rosendahl 1989a:1].

In 1991, Archaeological Consultants of Hawaii (Kennedy 1991) performed a reconnaissance survey of a narrow corridor - 500 ft. N/S by 7260 ft. *mauka/makai* E/W (TMK: 7-3-09:15) - in Kohanaiki extending *mauka* from Queen Ka‘ahumanu Highway, located adjacent to the northern boundary of the present study area. No sites or features were observed; seven caves "were examined to term and were determined to be devoid of cultural materials" (Kennedy 1991:C-1).

In 1991 William Barrera produced an archaeological inventory survey and data recovery report of an extensive area just inland (*mauka*/east) of the present study area (Figure 11) in which he identified 61 sites. These sites were rather clumped in the east central portion of his project area (his inset figures 5 & 6).

In 1993 Henry and Graves carried out site identification along a Keāhole to Kailua 69 kV transmission line, which comprised a 50-100 ft wide alignment on the *mauka* (east) side of Queen Ka‘ahumanu Highway (Figure 12; Henry and Graves 1993). Also in 1993, Paul H. Rosendahl Inc. conducted an inventory survey (Fager and Graves 1993, Fager and Roendahl 1993) of an approximately 15-acre parcel adjacent to, and *mauka* of the Kaloko Industrial Park, which includes a road corridor that extended from the main project area to Kamanu Street. This road corridor abuts the southern boundary of the current project area. The survey recorded 17 sites incorporating 60 component features. The sites were judged:

> ...in poor to good condition and comprised the following formal types: terraces, modified outcrops, mounds, walls, caves, pahoehoe excavations, cairns, filled cracks, enclosures, and a trail. The formal types comprised the following functional types: animal husbandry, temporary habitation, agriculture, marker, quarry, and transportation [Fager and Graves 1993:ii].

In 1995, Cultural Surveys Hawai‘i conducted an archaeological inventory survey with limited subsurface testing within a narrow strip of land, averaging 300 ft wide, along Queen Ka‘ahumanu Highway between Palani Road and the Keāhole Airport entrance road (Walsh and

Hammatt 1995). Three sites were identified in Kohanaiki: two trails and a set of three cairns. One of the trails - a *mauka-makai* trail - had been previously identified and designated Site 50-10-27-15324. The site is described as consisting of:

> ...two converging trail segments designated Features A and B...Both trail segments extend in a roughly *mauka-makai* direction, but angle toward each other and converge into one trail that continues inland. The point where the two trails meet is located at the edge of the bulldozed portion of the present highway right of way, 164 feet (50 m.) from the *makai* edge of the highway pavement...On the *mauka* side of the highway, the trail was observed at the edge of the bulldozed portion of the power line (the new right-of-way boundary) and continuing inland at 65 degrees T.N. for at least another 100 feet (30 m.). [Walsh and Hammatt 1995:51].

In 1996, Cultural Surveys Hawai‘i conducted an archaeological inventory survey (Colin et al. 1996) with limited subsurface testing within a 224.43-acre project site (TMK [3] 7-3-09: 017) for Kimura International. Fifty-five (55) sites were identified within the project area. All identified sites were of pre-Contact traditional Hawaiian origin and included the following site types: *ahu* (rock cairn) simple agricultural features, recurrent and temporary habitation sites, trails, enclosures, walls, and a quarry. The Colin et al. 1996 report was reviewed by the State Historic Preservation Division twice (8/15/1996 and 4/7/1997), however, during the review process the project was terminated; project funding stopped and final revisions to the report were not completed. Thus the Colin et al. report (1996) was never accepted by SHPD. An update for this report is currently in the process of being re-submitted to SHPD after recent re-survey; the recent fieldwork was done concurrently with the fieldwork for the present project area, consisting of the TMK 17 portion of the CSH Kohan 1 project.

A series of studies (Haun & Henry 2000, 2002, Haun et al. 2003) were carried out on a 102-acre Kaloko Industrial Park parcel immediately adjacent to the west of the present project area on the south side of Hina-Lani Street. Of note is the fairly dense and widely distributed site concentration and also extensive areas of both *‘a‘ā* flow and bulldozing that are shown as widening as they approach the present study area adjacent to the east. Also of note is the jeep road in their project area (Figure 13) labeled “Huehue Ranch Road”, which continues into the current project area. This is likely the road that was cut around 1955 by Huehue Ranch during construction of the Kailua pier.

In recent years a number of studies have been undertaken in the Kaloko Mauka lands (east and upslope from the present project area) including studies by Barrera Jr. 1993, Nees & Williams 1995, Rechtman 1998, Rechtman and Henry 1999, Rosendahl 2000, Clark & Rechtman 2002, Rechtman and Rivera 2002, Puette & Dye 2003, Rechtman 2003, and Elmore et al. 2004.

In 2005, Wolforth et al. conducted an archaeological inventory survey of the northern portion of the Kaloko Heights Project (TMK [3] 7-3-09: 032), located northeast of the current project area. A total of 89 sites were identified, consisting of burials, permanent habitations, temporary habitations, religious sites, trails, boundary walls, and agricultural sites.

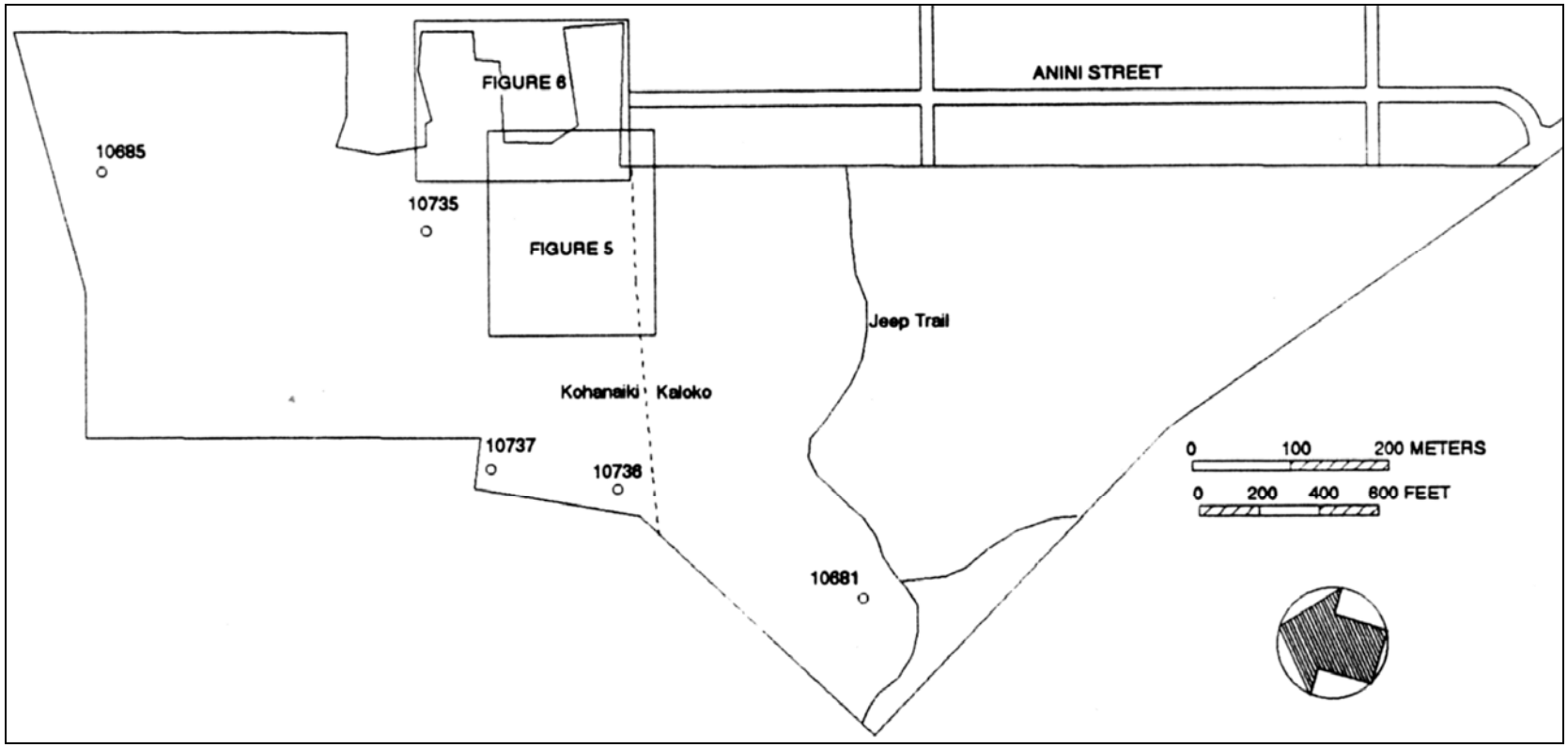

Figure 11. Barrera 1991 master site location map for project area just northeast of present study area (Hina-Lani Street is at south edge) in which 61 sites were documented, primarily in the Figure 5 and Figure 6 areas of his map

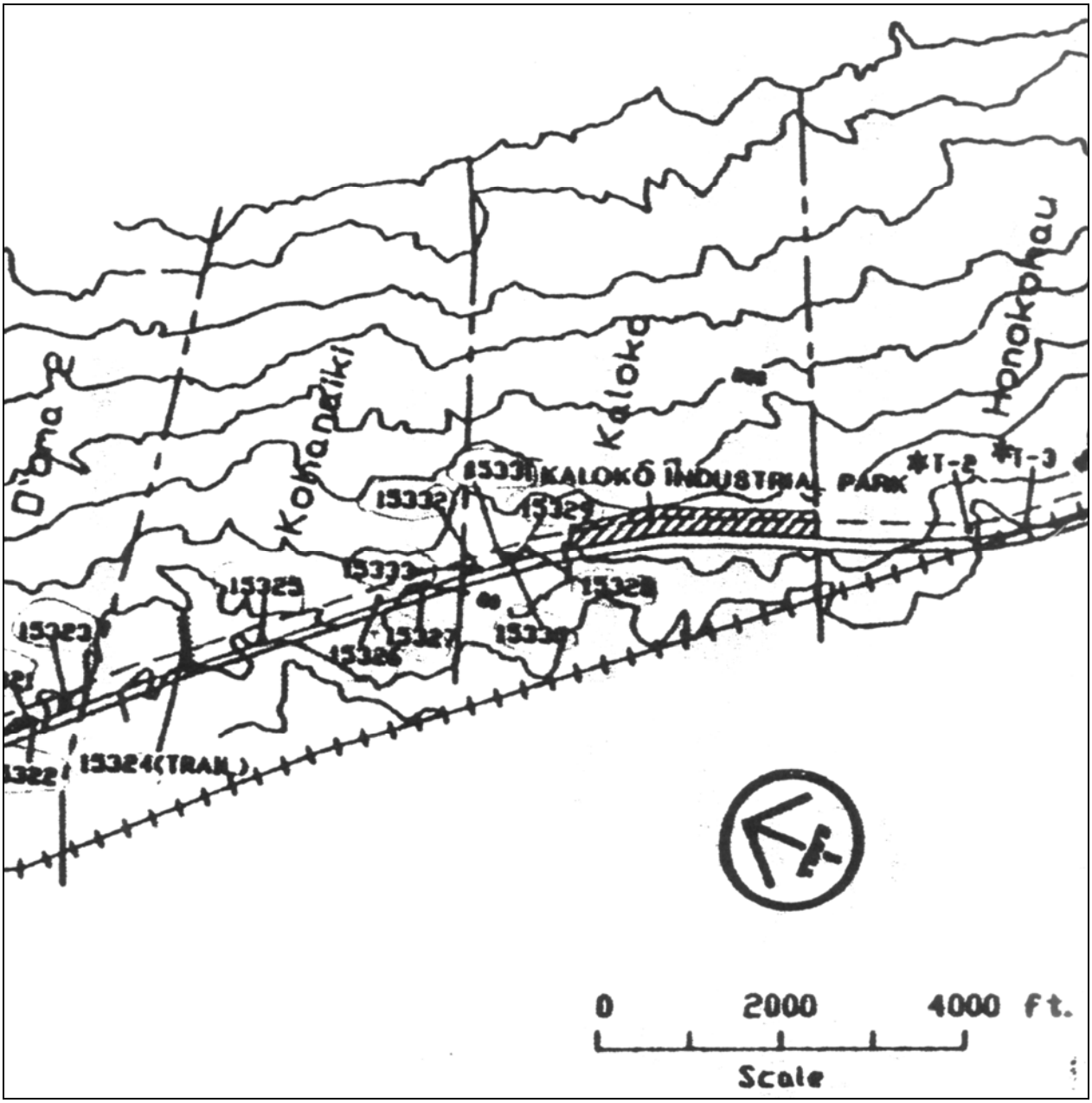

Figure 12. Sites identified by Henry and Graves (1993) to the northwest of present project lands

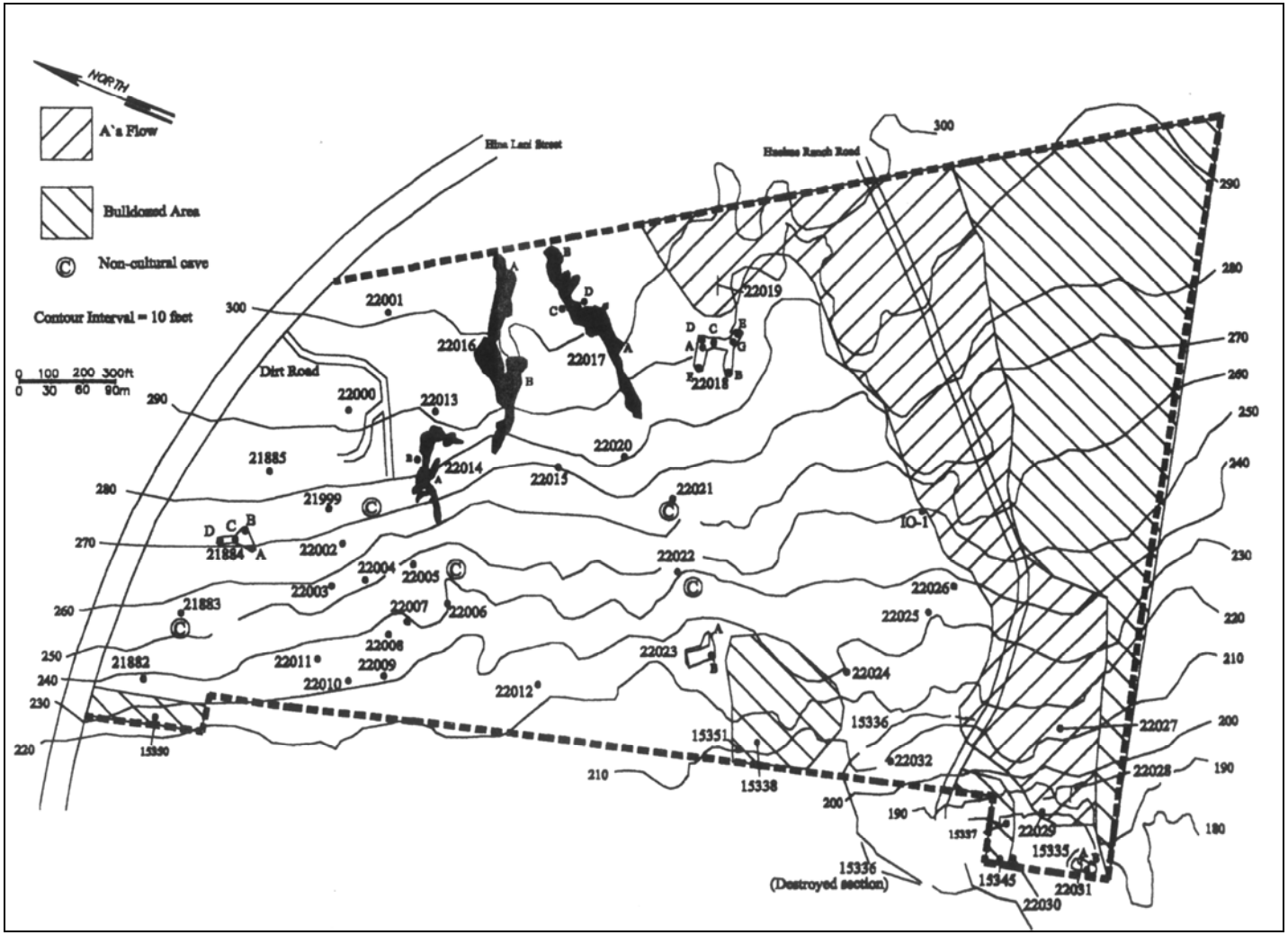

Figure 13. Site location map (adapted from Haun & Henry 2000) for the Kaloko Industrial Park 102-acre project area adjacent to the west of the present study area (Hina-Lani Street at left)

3.2.2 Archaeological Studies Conducted within the Present Project Area

The following is a summary of previous archaeological studies conducted within the current project area, discussed in chronological order (see Table 1, bold entries). Table 2 and Table 3 (in Section 4 of this study) list temporary field numbers assigned to historic properties during prior field inspections, but no State Inventory of Historic Property numbers were given to any sites within the project area prior to the current study.

Survey work was undertaken in 1970-71 by Renger inland of the highway - i.e. that middle zone of Kaloko which includes a portion of the present study area. Although the findings of much of this fieldwork within the middle zone were written up in detail (Cordy et al. 1991), the findings from the survey sample conducted specifically within the project area (i.e. that portion of the middle zone situated on the inland side of the Queen Ka‘ahumanu Highway) were not included because, "regrettably... it appears that the maps and survey records have been misplaced since the end of the 1971 field season" (Cordy et al. 1991:340). Renger's summary of the findings from that part of the survey indicated that fifteen features were identified:

> Very few sites were discovered within the "transitional middle zone" ... between the coastal and upland exploitation zones ...Seven lava tube shelters, four trails (coast-upland), three platforms, two cairns ... two low-walled enclosures, and an L-shaped structure were recorded. (cited in Cordy et al. 1991:340)

These sites are presumably the subject of a set of Renger’s (1971) “Kaloko Field Notes” that begins “*Mauka* Excavations” but in the apparent absence of any site location map it is difficult to relate these notes to specific sites in the field.

It is our understanding that Lloyd Soehren (1979) conducted a reconnaissance survey of the Kaloko access road corridor, understood as the present alignment of present Hina-Lani Street, but identified no sites.

In 1987, Paul H. Rosendahl Inc. accomplished an archaeological reconnaissance survey of three one-acre parcels - proposed water tank sites - in Kaloko (TMK: 7-3-09:Por.1, 17) (Rosendahl and Haun 1987), along the south side of the then "main access road between Queen Ka‘ahumanu Highway and Kona Heavens Subdivision" - *i.e.* the present Hina-Lani Street. The parcels were located at 350 ft. a.m.s.l., 630 ft. a.m.s.l. and 910 ft. a.m.s.l. The lower two parcels are within the present project area, and the highest is outside of it. Only one site (State site 10-28-10887) - an historic wall interpreted as a boundary or cattle wall - was recorded and that was within the *mauka*-most parcel.

Rosendahl and Walker (1991) carried out an Archaeological Field Inspection for proposed Kaloko Industrial crusher sites just south of Hina-Lani Street within the present study area. Their study began with the examination of a 10-acre study area that identified a trail and 2 associated cairns, passing through the east corner at about 450 ft. a.m.s.l. The presence of archaeology lead to a determination to examine an adjacent 10-acre area that proved to be free of archaeological concerns.

In 2003, two studies completed archaeological assessments within the project area. A field inspection by Cobb et al. (2003) gives very brief descriptions of possible historic properties within the current project area as well as in two parcels to the north. Because of the large area

covered, the maps are generalized, and this combined with the brief descriptions make it difficult to confidently correlate the sites mentioned with sites identified during the current inventory survey (but see Table 2 & Table 3 below, in Section 4 of this study). Haun (2003) also did an archaeological assessment of the current project area, largely via helicopter to cover the *‘a‘ā* terrain, but also by foot in the thicker vegetation. He identified eight sites, all of which correlate to sites presented in the current document (Figure 14, Table 2 & Table 3).

In 2005 CSH completed an archaeological field inspection of a 1200+ acre project area in Kaloko and Kohanaiki [TMK (3) 7-3-009:017, 025, 026, and 028]. Numerous pre-Contact sites including habitations, agricultural features, petroglyphs, boundary walls, and burials were observed (Shideler & Hammatt 2005). This field inspection included the present project area.

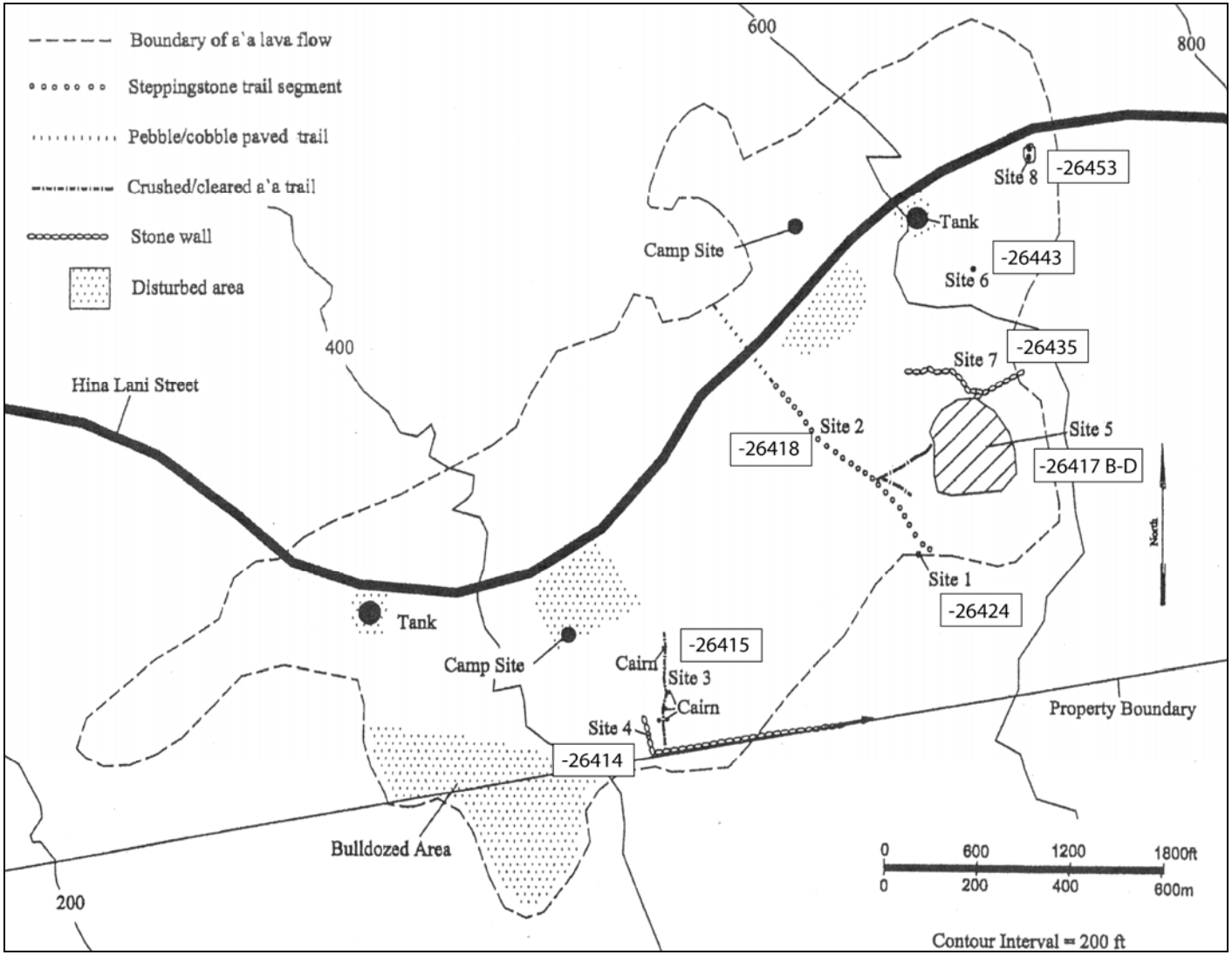

Figure 14. Site location map from Haun (2003:2), with corresponding SIHP numbers from the current project added to map

3.3 Background Summary and Predictive Model

3.3.1 Settlement Pattern

Kaloko Ahupua‘a is located within the Kekaha region of North Kona. The Kekaha region, or "Kekaha-Waiole, the desolate land without water" (Kelly 1973:74) refers to the barren lava fields extending north from Kailua-Kona to Anaeho‘omalu (Kelly 1973:74).

As has been observed in Kaloko and other *ahupua‘a* in Kekaha, this band of barren lava fields does not encompass entire *ahupua‘a* nor does it inhibit land usage from occurring along the coast and inland where rainfall is sufficient for intensive agriculture. Instead, Kekaha refers more accurately to portions or “zones” of the regions where lava flows encompass the lands, which - according to elevation - sustain little rainfall. Correspondingly, the lands of Kekaha are suggested, based on ethnographies, ethno-histories and archaeological sources, to contain three general terrestrial zones that directly influenced land usage of pre-contact and historic populations. These three zones include: (1) Coastal; (2) Intermediate or Transitional and; (3) Upland. Based on the archaeological record of the present study area and previous archaeology in the Kaloko Ahupua‘a (Cordy et al. 1991) a land usage summary of each zone is provided below.

3.3.1.1 Coastal Zone

The Coastal zone begins at sea level and extends to approximately 15 ft. a.m.s.l. The zone contains evidence of pre-contact and historic settlement in Kaloko.

Traditional Hawaiian Land Use-Coastal Zone

Kaloko contained a permanent settlement concentrated along the coast. The settlement probably comprised several local residential groups with constituent households (Cordy et al. 1991). Radiocarbon dating for the coastal region within Kaloko Ahupua‘a has produced dates ranging between A.D. 920 and A.D. 1430 (Cordy et al. 1991:465). Cordy concludes that one site (D13-3) on the Kaloko coast - with date ranges between A.D. 920-980 and A.D. 1005-1290 is one of the oldest permanent habitations known in leeward Hawaii (Cordy et al. 1991:473).

Although few absolute dates are known for the construction of fishponds, Cordy conjectures that the Kaloko and Honokōhau fishponds were constructed by at least the A.D. 1400-1500 period (Cordy et al. 1991:576).

3.3.1.2 Intermediate Zone

The Intermediate Zone extends from the *mauka* margin of the coastal zone (15 ft a.m.s.l.) to approximately 400 ft. a.m.s.l. Similar to other portions of Kekaha, the intermediate zone of Kaloko is characterized by low rainfall and un-eroded lava terrain.

Traditional Hawaiian Land Use-Intermediate Zone

The Intermediate Zone of Kaloko contained a scattered distribution of habitations of different modes (i.e. temporary and recurrent) which were generally located within the vicinity of *mauka*/*makai* trails or in association with other functional site types like agricultural and lithic resource procurement.

The general lack of consistent rainfall and virtual absence of soil directly limits agricultural use within the Intermediate Zone. Nonetheless, small concentrations of mounds, modified outcrops (enclosing minimal soil areas), enclosures, and some *pāhoehoe* excavations evidence a degree of agricultural productivity. Lava tubes and blisters are abundant in this zone and contain temporary components, and post-habitation burial interments.

The Intermediate Zone is also characterized by an extensive network of *mauka/makai* trails. These trails facilitated inter-*ahupua‘a* travel of residents between their coastal habitation and the Upland agricultural fields.

Within the Intermediate Zone permanent habitation may occur directly adjacent to the Coastal Zone and are associated with small scale agricultural activities.

3.3.1.3 Upland Zone

The Upland Zone of Kaloko begins at approximately 400 ft. a.m.s.l. and continues *mauka*. The Upland Zone is characterized by an increase in permanent habitation sites, in association with intensive non-irrigated (dry land) agricultural features. Gradually, the ascending natural landscape contains a greater soil base and due to an increase in elevation, the rainfall is more plentiful and consistent.

Traditional Hawaiian Land Use-Upland Zone

Intensive non-irrigated agriculture is characteristic of the Kona slopes and other regions of Hawaii and Maui where irrigation, because of the lack of perennial waterways, is not possible. The "Kona Field System" - generally defined by a grid-like patterning of stone constructed field boundaries - represents an interrelated network of intensive non-irrigated agriculture covering an estimated area of 139 km² (Kirch 1985:225) between Kealakekua Bay and Kailua Bay. Archaeological studies beyond the arbitrary northern boundary of the "Kona Field System", have documented evidence of intensive non-irrigated agriculture in the Kekaha region within the Upland Zone between 400 to 1200 ft. a.m.s.l. (i.e., Cordy 1985; Hammatt et al. 1987; Walker and Rosendahl 1990; Robins et al. 1993).

Intensive non-irrigated agriculture is characterized by concentrated occurrences of similar feature types (i.e. field walls, modified *‘a‘ā* lava, *pāhoehoe* excavations, and mound complexes). Variations in the methods of non-irrigated agriculture occur as a response to topographical and geological variation, and rainfall in the region. Radiocarbon dates taken from upland field shelters within the Kona Field System indicates that intensive agriculture began developing between ca. A.D. 1400 - 1600 and intensified with permanent upland settlements between ca. A.D. 1600 - 1779 (Schilt 1984).

3.3.1.4 Settlement Pattern Summary

The settlement pattern described above reveals a variety of land uses across all zones - including the Intermediate Zone - during the pre-Contact and early historic period. The pattern then dramatically changed during the middle to late historic period (post *māhele* ca. 1850's).

The original settlement of Kaloko Ahupua‘a was focused on the coast starting around 900 A.D. (Cordy et al. 1991). These earlier settlers were likely drawn to the coast by the presence of potable water found in the brackish ponds, the excellent fishing, and Kaloko specifically to which offered one of the most protected inlets on the Kona Coast (Cordy et al. 1991:575).

Radiocarbon dates from the Kekaha region may indicate that all three zones of the Kaloko Ahupua‘a were utilized to some degree or another as early as A.D. 1280 (Walker and Haun 1988). This period of time correlates with an apparent population increase and geographical expansion in the Hawaiian Islands identified as the "Expansion Period" (Kirch 1985:303) or the middle of the "Pioneer Settlement" (Schilt 1984:276). Permanent settlement continued to be centered on the coast and agriculture developed upland as the endemic forest lands were gradually reduced by slash-and-burn methods.

Development of the intensive upland agricultural system probably occurred between ca. A.D. 1400 and 1650 (Schilt 1984:277) and focused along the more prime agricultural lands, at elevations where soil was abundant and rainfall sufficient for productive cultivation. During this period permanent settlement continued to be centered at the coast but also began to be developed in the upland localities of Kaloko, as the distance between the upland farms and original coastal settlement expanded. By the end of this period it is expected that most of the upland permanent habitations were occupied. This period is when the fishponds in Kaloko were likely constructed and a four class hierarchy: "ruler, high chiefs, local chiefs and commoners" was formed in Hawaii (Cordy et al. 1991:575).

During early historic times (ca A.D. 1800-1840) following western contact, Kaloko populations undoubtedly declined rapidly due to disease, and there was a major shift in the traditional Hawaiian settlement pattern. The residents who survived disease likely shifted their residences to economic centers - such as Kailua-Town - or in closer proximity to major roadways and localities of churches and schools established by the missionaries.

Following the Māhele (ca 1850's), Kaloko shorelines were virtually abandoned "with the Kohanaiki Homesteads the new upland population focus in the Kaloko area" (Cordy et al. 1991:580). As a result, the vacant lands were subsequently acquired for cattle ranching.

3.3.2 Project Area Predictive Model

The present project area spans from approximately 300 to 780 ft. a.m.s.l., with all of the historic properties present being over 400 ft. a.m.s.l. in elevation. Therefore the majority of the project area is within the Upland Zone, but at the lower portion of the Upland Zone. The project area's location thus suggests that permanent habitation sites and dry-land agricultural features will be more abundant in the *mauka* portion. The *makai* end of the project, which is partially within the interpreted "intermediate zone", places it outside the major areas of pre-Contact Hawaiian habitation and activity which would have focused at the coast. Moreover, the large and mostly barren *‘a‘ā* flow that dominates the project area is unlikely to have been used intensively. It is thus suggested that traditional Hawaiian sites likely to occur within the project area would include:

1) temporary or recurrent habitations, with some permanent habitation *mauka*;
2) agricultural activity areas including minimal soil enclosures, field walls, modified *‘a‘ā* lava, *pāhoehoe* excavations, and mound complexes;
3) *mauka/makai* trails connecting coastal residences and upland agricultural areas, with branch trails extending to specific use areas within the project area; and
4) burial sites utilizing features of the terrain - including lava tubes and cracks.

As noted above, during the decades following western contact, populations of the *ahupua‘a* would have declined significantly - reduced by disease and migration out to developing commercial centers. As the western commercial model continued to displace the traditional subsistence economy, localities like the present project area would have been further marginalized and abandoned. Land Commission Award documents indicate that by the middle of the 19th century, habitation and activity within Kaloko had shifted far *mauka* to land between 1200 and 1700 ft. elevation near the Government Road. During the second half of the 19th century this *mauka*-ward shift is fully established with the formation of the Kohanaiki Homesteads near the Government Road. Throughout the 19th century, use of the project area would likely have been limited to use of existing *mauka*/*makai* trails for ocean access by *ahupua‘a* residents of the uplands.

In the last century, major developments within Kaloko have occurred outside the project area, which has remained undeveloped. Activities of the Huehue Ranch (established early in the century) - including walls and fencing – are very likely to have impacted the project area. Such activities are evidenced by the wall along the Kaloko-Kohanaiki boundary - site 40 - recorded by Kennedy (1984) in a project area immediately north of the present project area; as Cordy (1991) notes, documentary evidence - including the absence of the wall in J.S. Emerson's 1888 notes and maps - suggests that the wall was constructed for the ranch in this century. This is likewise probably true for the *ahupua‘a* wall that runs between Kaloko and Honokōhau Ahupua‘a on the south boundary of the current project area (SIHP # 50-10-27-26414; see Table 3 in Section 4 of this study).

Section 4 Results of Fieldwork

4.1 Survey Findings

A total of 41 historic properties (a total of 61 features) were identified within the project area; all sites are newly recorded as part of the current inventory survey investigation (Table 2, Table 3 & Figure 15). Eight of the historic properties were previously noted in an archaeological assessment by Haun (2003), and some features were also noted by Cobb et al. (2003). CSH temporary field numbers and corresponding State Inventory of Historic Properties numbers for each historic property are listed in Table 2 & Table 3, as well as previously assigned temporary field numbers from the aforementioned studies, when a definite match could be made. See Table 11 for significance and mitigation recommendations, as well as site type and function for specific features within sites (only primary site type and function are listed in Table 2 & Table 3). Definitions of site/feature types and functional categories are discussed below, and a summary of findings can be found in the Summary and Interpretation section. All sites within the USGS Keahole Quad (a total of four sites within the project area) have a state site number with prefix "50-10-27", and all sites within the USGS Kailua Quad (a total of 37 sites within the project area have a state site number with prefix "50-10-28".

Table 2. Archaeological Site Summary (Keahole Pt. Quad)

SIHP No. (50-10-27)	CSH Temp. Field No.	Other Temp. Field No.	Site Type	Function	Age
26371	07-175		Trail	Transportation	Historic
26414	07-079	TF-222, Haun 4*	Wall	Animal Husbandry	Historic
26415	07-080	Haun 3	Trail	Transportation	Pre-contact
26416	07-109		Lava Tube	Burial	Pre-contact

Table 3. Archaeological Site Summary (Kailua Quad)

SIHP No. (50-10-28)	CSH Temp. Field No.	Other Temp. Field No.	Site Type	Function	Age
26417	07-522	TF-104, Haun 5	Mounds/Modified Depressions	Agriculture	Pre-contact
26418	07-551	Haun 2	Trail	Transportation	Pre-contact
26419	07-553		Trail	Transportation	Pre-contact
26420	07-557	TF-213	Lava Tube	Activity Area	Pre-contact
26421	07-559		Lava Tube	Temp. Habitation	Pre-contact
26422	07-564		Trail	Transportation	Pre-contact
26423	07-568		Lava Tube/ Modified Tumulus	Burial	Pre-contact
26424	07-569	Haun 1	Enclosure	Ceremonial	Pre-contact

SIHP No. (50-10-28)	CSH Temp. Field No.	Other Temp. Field No.	Site Type	Function	Age
26425	07-571		Lava Tube/ Modified Tumulus	Temp. Habitation/ Burial	Pre-contact
26426	07-572		Modified Tumulus	Marker	Historic
26427	07-573		Lava Tube	Burial	Pre-contact
26428	07-575		Platform	Perm. Habitation	Pre-contact
26429	07-576		Modified Tumulus	Activity Area	Pre-contact
26430	07-578	TF-215	Modified Tumulus/ Platform/Terrace	Temp. Habitation	Pre-contact
26431	07-584		Lava Tube	Activity Area	Pre-contact
26432	07-589		Wall	Animal Husbandry	Historic
26433	07-590		Trail	Transportation	Pre-contact
26434	07-592		Lava Tube	Temp. Habitation	Pre-contact
26435	07-596	Haun 7	Wall	Animal Husbandry	Historic
26436	07-600		Wall/Cairn	Animal Husbandry	Historic
26437	07-601		Cairn	Marker/Animal Husbandry	Historic
26438	07-611		Lava Tube	Temp. Habitation/ Burial	Pre-contact
26439	07-612		Lava Tube	Temp. Habitation	Pre-contact
26440	07-613		Lava Tube	Temp. Habitation/ Burial**	Pre-contact
26441	07-615		Lava Tube	Activity Area	Pre-contact
26442	07-617		Wall	Animal Husbandry	Historic
26443	07-629	Haun 6	Enclosure	Perm. Habitation	Pre-contact
26444	07-632		Wall	Animal Husbandry	Historic
26445	07-634		Modified Tumulus	Temp. Habitation	Pre-contact
26446	07-638		Lava Tube	Temp. Habitation	Pre-contact
26447	07-641		Lava Tube	Temp. Habitation	Pre-contact
26448	07-644		Modified Tumulus	Temp. Habitation	Pre-contact
26449	07-649		Lava Tube	Temp. Habitation	Pre-contact
26450	07-651		Wall	Animal Husbandry	Historic
26451	07-652		Modified Tumulus	Temp. Habitation	Pre-contact
26452	07-653		Lava Tube	Activity Area***	Pre-contact
26453	07-656	Haun 8	Platform	Burial**	Pre-contact

* Field numbers beginning with “TF” are from Cobb et al. (2003); numbers beginning with “Haun” are from Haun (2003).

** Site is a probable burial

*** Site contains burials located outside of the project area

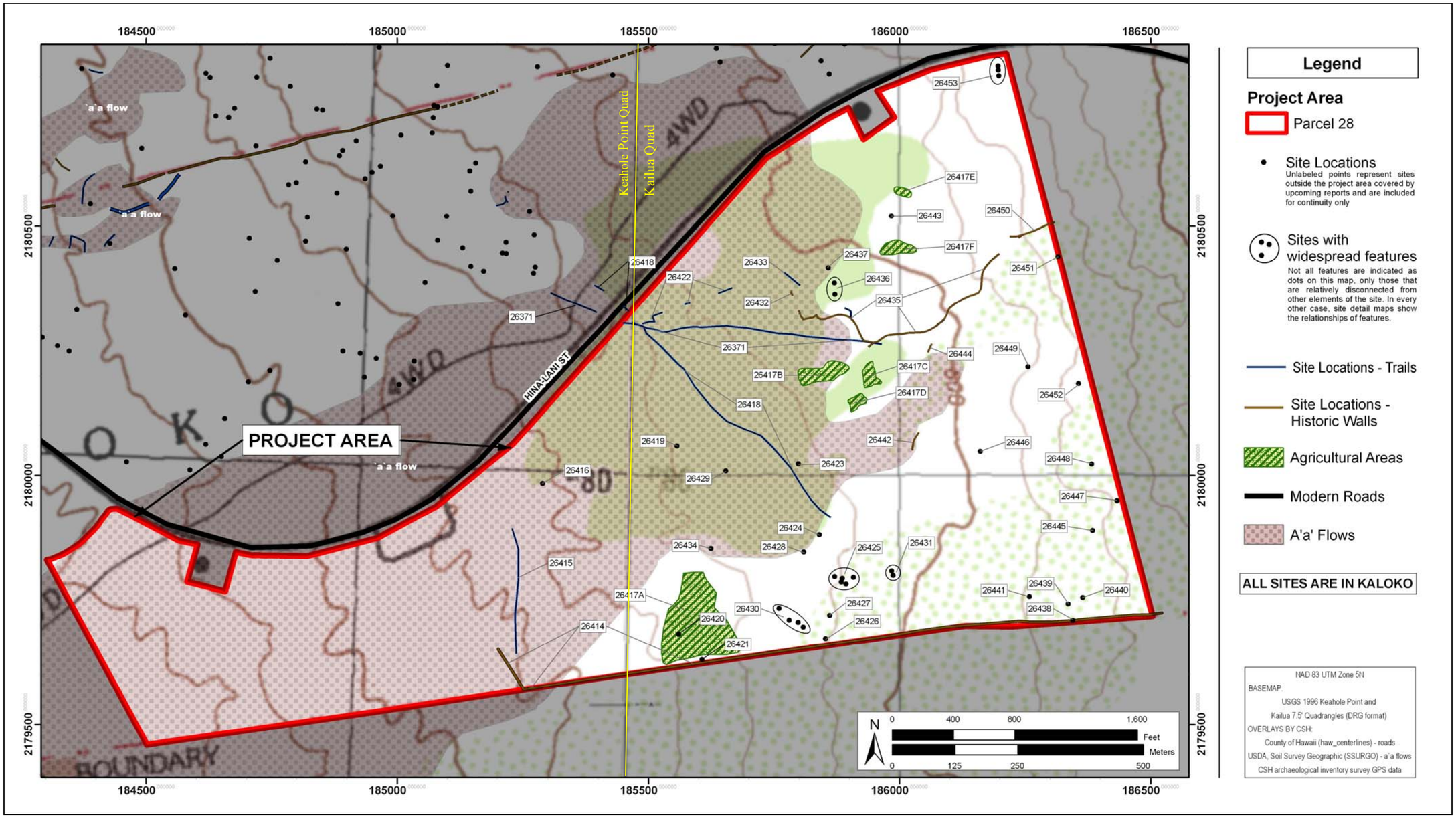

Figure 15. Project Area Site Location Map, USGS 7.5 Minute Series Topographic Map, Keahole Point and Kailua Quadrangles (1996), showing the locations of historic properties within the project area

4.1.1 Formal Feature Types

Formal feature type designations are descriptive - based on physical characteristics - and commonly refer to structural elements of a site rather than the functional aspects. Ten primary feature types were identified within the project area (Table 4). The following are brief descriptions of the different feature types commonly encountered in this general area:

Alignment: A single row of stones one or more courses high. Alignments have less formal construction than walls and may represent a structural remnant.

Cairn: A marker of stacked or piled stones. A cairn may be square, rectangular, oval, round, or irregular. Generally cairns are stacked higher (greater overall height relative to the base width) and are smaller than mounds. Cairns are frequently referred to as *ahu*.

Enclosure: A walled structure which completely encloses an area (square, rectangular, oval, round, or irregular in shape) or which partially encloses an area (C-, L-, or U-shape).

Lava Blister: Modifications or apparent usage of a small subterranean lava formation with an opening to the surface. Blisters are formed by the swelling of the crust of a lava flow due to gas or vapor beneath the flow, creating an opening under the surface. This subterranean space is the primary focus for utilization and modification, unlike excavated shallow collapsed blisters which are utilized as a modified depression. Unlike lava tubes, blisters tend to be relatively circular and do not extend in any direction for a great length.

Lava Tube: Modifications or apparent usage of a subterranean lava formation characteristic of *pāhoehoe* lava flows with an opening to the surface. Lava tubes are typically larger and longer than blister caves.

Modified Depression: An area in which stones have been removed to create a depression or to expose a soil area. Types of modified depressions include: shallow collapsed blisters that have been excavated; areas of exposed *‘a‘ā* that have been excavated, and modified collapsed lava tubes that create a natural linear depression or sink. The purpose of utilizing a depression is commonly to create an area suitable for agriculture (possibly through soil or mulching) or as a storage area.

Modified Outcrop or Tumulus: An area within an existing lava flow exposure (outcrop) in which a portion of the flow has been humanly modified by the placement or removal of stones. This feature type includes modified tumuli (tumulus being geologically defined as an area where the pressure of slow-moving molten lava pushes the overlying crust upward to create an uplifted area, often with fractures running the length of the tumulus). A feature can be classified as a modified outcrop when the primary modification of the site is focused on the utilization of the bedrock exposure; often this involves filling cracks in the exposure or terracing edges to accommodate usage of the outcrop. For the purposes of this report, modified tumuli refer to bedrock exposures that are raised significantly above the surrounding terrain, usually more than a meter high; the rather prominent nature of these high tumuli significantly increases the frequency of human utilization, making a distinction useful for archaeological purposes.

Mound: Linear, circular or amorphous stone pile which typically lacks a vertical face and level surface. Mounds are used for purposes other than markers, such as planting, land clearing, and burial.

Pavement: A stone-filled floor or surface, which creates a flat and relatively smooth area flush with the ground surface.

Platform: A raised free-standing stone structure with three or more vertical faces and a relatively flat surface. A platform may be square, rectangular, oval, round, or irregular in shape.

Rock art: A carving or inscription on rock (petroglyph) or painting on rock (pictograph).

Rock shelter: Varying degrees of construction which modifies an outcrop overhang. This structure is distinguished by an apparent primary focus on the enhancement of natural features to create a shelter.

Terrace: A raised stone construction partially built against, or level to, a ground or outcrop surface. A terrace has no more than two vertical faces and is not totally free-standing. Terraces create relatively flat surfaces that are bounded by a steeper ascending slope on one side and by a steeper descending slope on the opposite side.

Trail: A trodden surface, pavement, step-stone, or stone alignment set into the ground or outcrop surface that defines a pathway for transportation.

Wall: A bi-faced and free-standing stone structure which is an isolated segment or defines large boundaries. A wall is generally higher, longer and more formally constructed than an alignment.

Table 4 tallies the total occurrences of these formal feature types in the project area by feature. There are a total of 61 features in the project area at 41 sites. Lava tubes are by far the most common feature type, followed by modified tumuli, walls, and trails. All walls represent historic animal husbandry, and some trails, modified tumuli, and cairns are historic sites. Nearly all other feature types in the project area represent a pre-contact style of modification.

Table 4. Occurrences of Formal Feature Types (for individual features)

Formal Feature Type	Number	Percentage
Cairn	2	3.3
Enclosure	2	3.3
Lava tube	17	27.9
Modified depression	4	6.6
Modified tumulus/outcrop	9	14.7
Mound	4	6.6
Platform	5	8.2
Terrace	3	4.9
Trail	7	11.5
Wall	8	13.1

4.1.2 Functional Categories

Function interpretation of a site or feature is determined by criteria which included: site construction and complexity; locational context (association with other sites and/or geological determinates); analysis of cultural remains (surface and subsurface); and external correlations with other archaeological sites in Hawai‘i. Eight primary function categories were identified among the sites within the project area, and are summarized in Table 5. The following are brief descriptions of the different function types commonly encountered in this general area:

Activity area: The feature represents the extent of space serving a special function, or the scope of a specific activity; this category may include lithic production, water collection, storage, fishhook manufacture, quarrying or mining, etc.

Agriculture: Primary function is for farming, horticulture, or subsistence planting.

Animal husbandry: The feature is associated with the care of livestock.

Burial: Used for the interment of human skeletal remains. This functional category is also used for human remains found out of primary context.

Ceremonial: Used for ritual or religious purposes.

Fireplace: Burn pit or lens of burned material in a limited area.

Habitation: A place for living, which may be either temporary or permanent habitation. Habitation sites are generally distinguished from shelters by an increased energy investment in modification and formal construction.

Marker: A point visibly marked for the purpose of identifying a point on a line on the surface of the earth such as a boundary or trail.

Rock art: Petroglyphs and pictographs are functionally rock art.

Transportation: The feature was used as a road or trail.

Water control: The feature was used as a drain, irrigation ditch, or a terrace in valley bottoms.

Table 5 tallies the total occurrences of these functional categories in the project area. There are a total of 41 sites in the project area. The majority of sites function as habitation areas, with animal husbandry and transportation being the next most frequent functions of sites. A large percentage of sites also function in whole or in part as a burial, most of which occur in lava tubes (one site contains probable burials within three platforms).

Table 5. Occurrences of Formal Function Types (primary function of site)

Function	Number of sites	Percentage
Agriculture	1	2.4
Activity Area (water collection)	3	7.3
Activity Area (mining)	1	2.4
Animal Husbandry	7	17.1
Burial	4**	9.8
Burial and Activity Area (water collection)	1*	2.4
Burial and Temporary Habitation	3**	7.3
Ceremonial	1	2.4
Marker	2	4.9
Permanent Habitation	2	4.9
Temporary Habitation	10	24.4
Transportation	6	14.6

* Site contains burials located outside of the project area

** One site is a probable burial

4.2 Test Excavations Findings

Of the 41 sites recorded in the project area, six sites required subsurface testing to aid in determining the function of the site (Table 6; see also discussion of subsurface testing methods in Field Methods section above and Results of Laboratory Analysis section below). Most subsurface testing was conducted to ensure that no burials were present at the site (i.e., testing of large mounds at site -26417), but testing also examined subsurface deposits and attempted to collect charcoal for radiocarbon dating analysis.

Of a total fourteen features excavated, only three sites (-26428, -26430A, and -26443) contained midden, and only one (site -26443) had charcoal in good context for dating. All subsurface testing confirmed the initial function determination for the site, except for site -26430 Feature C. This feature was originally suspected to be a burial platform, but excavation revealed no burial or possibility of burial. The function was changed to temporary habitation, consistent with the function for the rest of the site.

Table 6. Summary of Subsurface Testing

SIHP No. (50-10-28-)	Feature	Unit No.	Site Type	Original Function	Findings resulted in function change?
26417	A_5	6	Mound	Agriculture	No
	A_4	8	Mound	Agriculture	No
	B_4	11	Mound	Agriculture	No
	B_5	12	Mound	Agriculture	No
	C_1	14	Mound	Agriculture	No
	D_1	13	Mound	Agriculture	No
	E_1	1	Mod. Depression	Agriculture	No
	F_1	3	Mound	Agriculture	No
26428	-	10	Platform	Perm. Habitation	No
26430	A	5	Mod. Tumulus	Temp. Habitation	No
	C	9	Platform	Possible Burial	Yes, no burial present; function changed to habitation
26431	B	7	Mod. Depression	Agriculture	No
26443	-	2	Enclosure	Perm. Habitation	No
26453	B	4	Platform	Possible Burial	No

4.3 Site Descriptions

4.3.1 State Site # 50-10-27-26371

SIHP #	50-10-27-26371
FUNCTION:	Transportation
SITE TYPE:	Trail
TOTAL FEATURES:	1
DIMENSIONS:	Approximately 500 meters in length
CONDITION:	Good
AGE:	Historic
ELEVATION:	600 ft. a.m.s.l.

DESCRIPTION: Site 50-10-27-26371 is a trail that runs approximately 500 meters east-west over the large *ʻaʻā* flow that dominates the project area. It begins just north of the project area (on the north side of modern Hina-Lani Street) in TMK [3] 7-3-009:25, where it is a relatively short trail remnant. Hina-Lani Street bisects the trail, but the trail is in good condition on the south side of Hina-Lani Street (within the project area). Immediately on the south side of Hina-Lani Street, site -26371 intersects site -26418, and is partially built on top of site -26418. Site -26422 also meets site -26418 at this same intersection. Site -26371 continues east from the intersection about 500 meters (see Figure 15), and is a continuous trail throughout. It eventually peters out near the area where it intersects with site -26435 (a long historic wall, which it parallels for a long stretch). The end of the trail may be destroyed due to vegetation and possible bulldozer disturbance; the vegetation is heavy where the trail peters out because the substrate is gradually transitioning to *pāhoehoe*, and there is also evidence of some bulldozer activity in this area. Regardless, constructing a trail over level *pāhoehoe* requires considerably less effort than over rough *ʻaʻā*, and a minimally constructed trail would likely not be visible or have survived on the vegetation-dense *pāhoehoe*. There has also been disruptive cattle grazing in this area, probably associated with the bulldozing.

The trail is primarily a crushed *ʻaʻā* path with a large percentage of the trail having curbing, causeways, and small-cobble paving on the trail surface. The curbing generally consists of medium size *ʻaʻā* cobbles to small boulders lining the edge of the crushed *ʻaʻā* area. Some of the curbing appears to be simply removed from the trail area and then placed as a curb, but some of the curbing is more formal with the *ʻaʻā* cobbles set into the ground as uprights. The causeways range from 30 to 120 centimeters in height, with some causeways taking advantages of a level upraised area of *ʻaʻā*, whereas other causeways are heavily constructed with partially faced sides (usually in areas where the trail was forced to traverse a natural ditch). For descriptive purposes only, the trail has been split into sections, described below.

Section A is the western-most section and is disturbed by bulldozing from construction of Hina-Lani Street. The rest of this section is in good condition, with small *ʻaʻā* cobbles and curbing, and thick grass growing in the central portion of the trail. The trail is somewhat excavated down into *ʻaʻā* approximately 20 centimeters. This portion of trail runs over the site -26418 trail, with cobbles and north side curbing directly over some of the *pāhoehoe* slabs. Other slabs have been thrown aside and are strewn around the sides of the trail. Curbing continues as does the trail floor of small *ʻaʻā* cobbles. Prior to a vertical *ʻaʻā* cliff, there is a nicely

constructed causeway, built up at maximum 1.5 meters above the ground surface and utilizing the natural slope of *‘a‘ā* which continues up the steep cliff (Figure 16).

Section B has a rough natural step up, ascending the cliff edge that the constructed causeway leads to. Once on top of the cliff, there is not much curbing; the trail is constructed via cleared and crushed *‘a‘ā* cobbles. This area is disturbed somewhat by heavy vegetation (*koa haole* and grasses), and is in generally poor condition.

Section C of the trail begins at a nicely constructed causeway (1.2 meters tall). Beyond the causeway the trail continues east with a nicely cleared *‘a‘ā* pebble surface and *‘a‘ā* boulder curbing, and is generally in good condition. In some areas the curbing is quite tall, approximately 70 centimeters. Section C has several small causeways and curbing throughout. There are also some rounded small stones present on trail, presumably worn from horse travel over the trail, as well as some large set-in rough slabs. Dense Christmas berry trees cover portion of the trail, and vegetation has damaged portions of the trail. Vegetation tends to be thicker on the trail than in surrounding areas.

Section D has less pronounced curbing, and heavier vegetation makes the trail difficult to discern (primarily air plant and low *koa haole*). The trail is most evident simply by looking for cleared level areas. In some areas the trail surface is notably clear, flat, smooth and even, but is definitely difficult to follow and is less well constructed than previous sections. There is overall less curbing in this section, and almost no causeways.

Section E has a causeway 120 centimeters high and the beginning of a wall running along the north side of the trail 75 to 110 centimeters (three to five courses high). This wall and causeway are a portion of site -26435, and this is where the trail intersects the main wall of that site as well as Feature B of site -26435. East of the causeway are some larger rough *‘a‘ā* cobbles on the trail, but then the trail narrows down to 1 meter in width. After this point the trail becomes impossible to follow, with thick vegetation covering the trail. Site -26435 is also disturbed to the east of this section, and bulldozer activity may have destroyed both sites in this area. Site -26371 could not be followed east of this section, and is the end of the known portion of the trail. While the trail probably did continue, the visibility of trails over *pāhoehoe* versus *‘a‘ā* is poor, given that there is less need for significant construction.

The trail is thought to be historic because of its consistent width, generally averaging 150 centimeters. The size of the trail is wide enough for a horse trail, and wider than necessary for just a walking path (compare with site -26418, which is only 70 to 100 centimeters wide on average, and whose width can vary greatly over short distances). The -26371 trail also tends to have dense vegetation growing on it (especially grasses) compared with surrounding terrain, which is possibly due to horse manure acting as a fertilizer.

Function of this trail is historic transportation over the *‘a‘ā.* It is an especially interesting trail, given its length and sometimes formal construction, as well as the fact that it intersects and is partially built on top of another large trail (-26418) that is pre-contact in style. Site -26422 also seems to lead to this intersection of trails, and appears to be a footpath that mixes the *pāhoehoe* slab and crushed *‘a‘ā* style of trail building. Overall the -26371 trail has portions that are in good condition, and should be considered for preservation, at least in the area where it intersects site -26418.

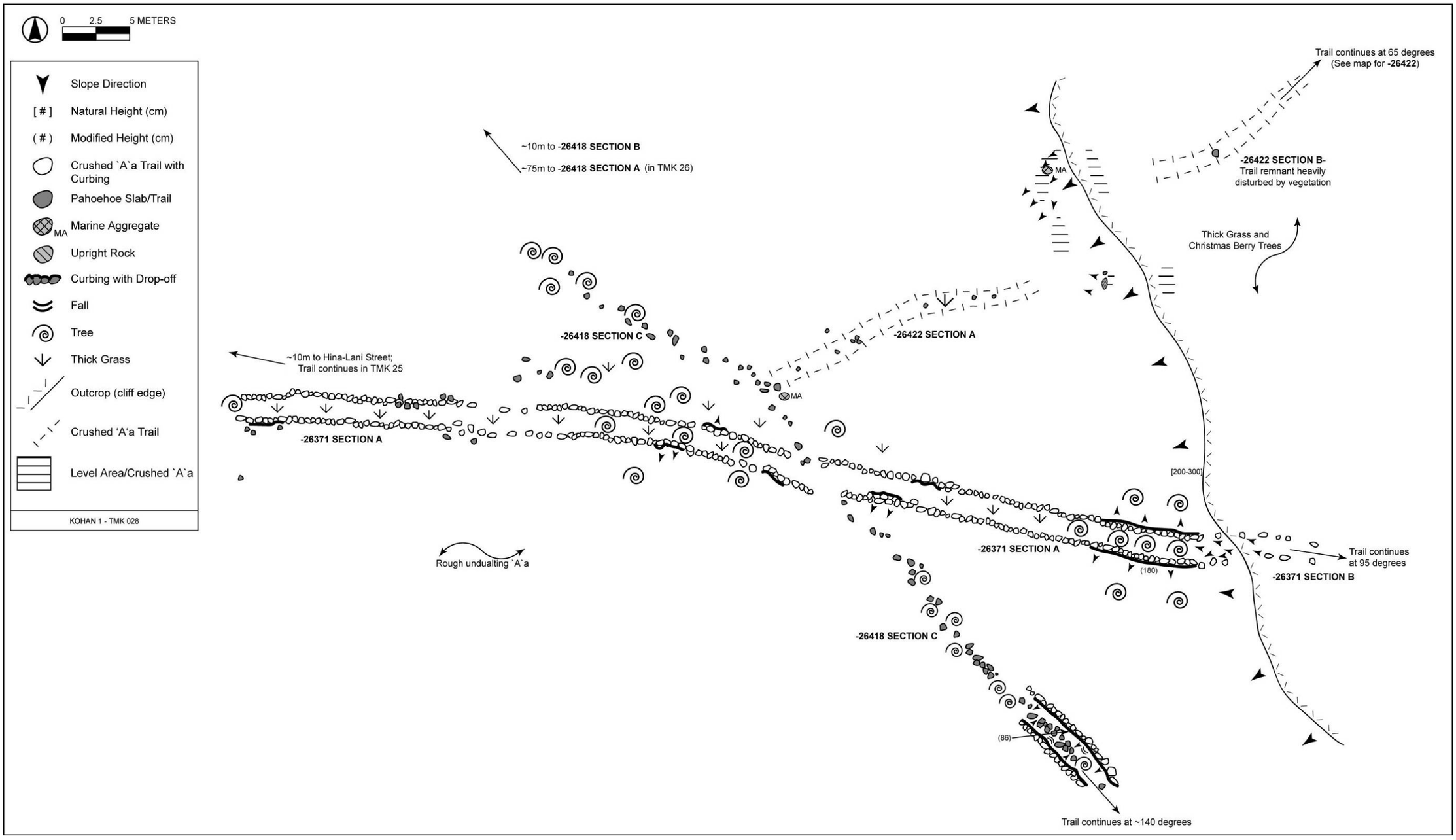

Figure 16. SIHP # 50-10-27-26371, SIHP #50-10-28-26418 and SIHP #50-10-28-26422, plan view of intersection of trails

Figure 17. SIHP # 50-10-27-26371, Section C, photograph of tall causeway (at left) and level trail (at center), with 2 m scale, facing northwest

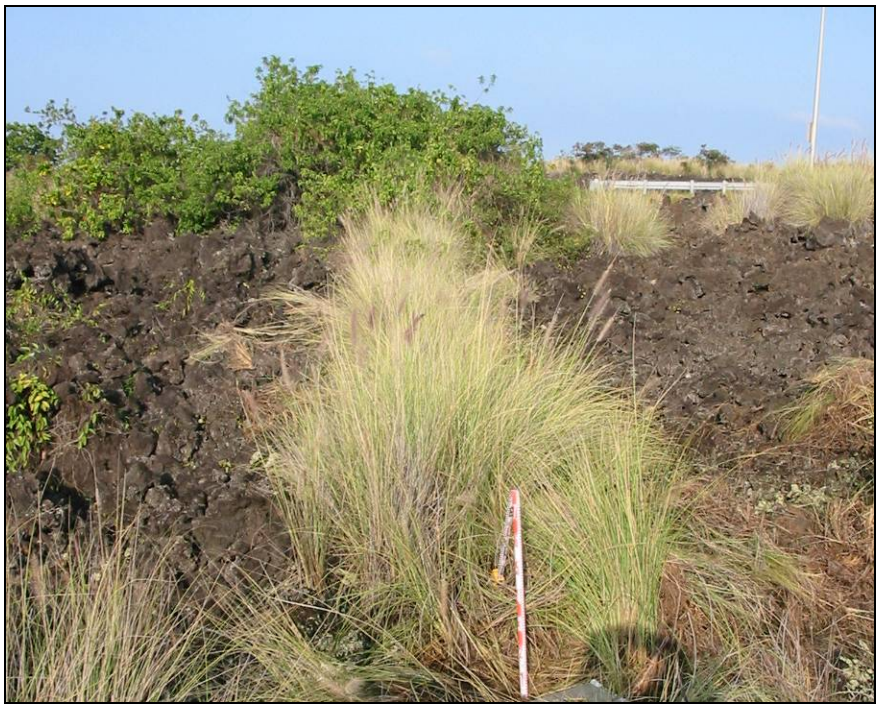

Figure 18. SIHP # 50-10-27-26371, Section A, photograph near modern Hina-Lani Street facing north, with tall grass and large Christmas berry tree growing along trail route

4.3.2 State Site # 50-10-27-26414

SIHP #	50-10-27-26414
FUNCTION:	Animal husbandry
SITE TYPE:	Wall
TOTAL FEATURES:	1
DIMENSIONS:	1.4 km in length (within project area)
CONDITION:	Good
AGE:	Historic
ELEVATION:	500 to 750 ft. a.m.s.l.

DESCRIPTION: Site 50-10-27-26414 is a historic wall previously observed in Haun (2003). The wall begins on the large *‘a‘ā* flow that dominates the project area and runs for 95 meters at 147 degrees. When the wall intersects the south boundary of the project area, it turns sharply to the east and follows the project area boundary to its eastern extent. This portion of the wall is 1.3 kilometers (0.8 miles) in length within the project area, runs at an angle of 82 to 85 degrees, and continues *mauka* (east) outside of the project area. The majority of the *mauka-makai* running section of the wall is on *pāhoehoe*. The wall delineates the boundary of the *ahupua‘a*, separating Kaloko Ahupua‘a on the north side (the project area side) and Honokōhau Ahupua‘a on the south side (see Figure 15 above for location of wall within project area).

While on the *‘a‘ā* flow, the wall is constructed of small *‘a‘ā* cobbles and boulders and is rubble filled (Figure 19). When the wall transitions to the *pāhoehoe* flow, it is built of formally stacked *pāhoehoe* cobbles and slabs with smaller rubble fill (Figure 21). Generally it is in very good condition with occasional (every 50 meters or so) collapses. Intact portions of the wall are “crisp” with very sharp edges, and there are occasional large uprights. Height of the wall ranges from 0.80 meters to 1.50 meters, with an average thickness of 1.0 meters.

Function of site 50-10-27-26414 is primarily for historic animal husbandry. The wall is still in use for animal control; in general the land on the project area side is covered in dense shoulder high *koa haole*, while on the southern side of the wall the vegetation is considerably less dense with only sparse *koa haole* and grasses, an indication of relatively heavy grazing (Figure 20). The wall also functioned as a historical marker to designate the *ahupua‘a* boundary. Excavation potential for this site is poor given the type of construction and lack of potential for recovering cultural material.

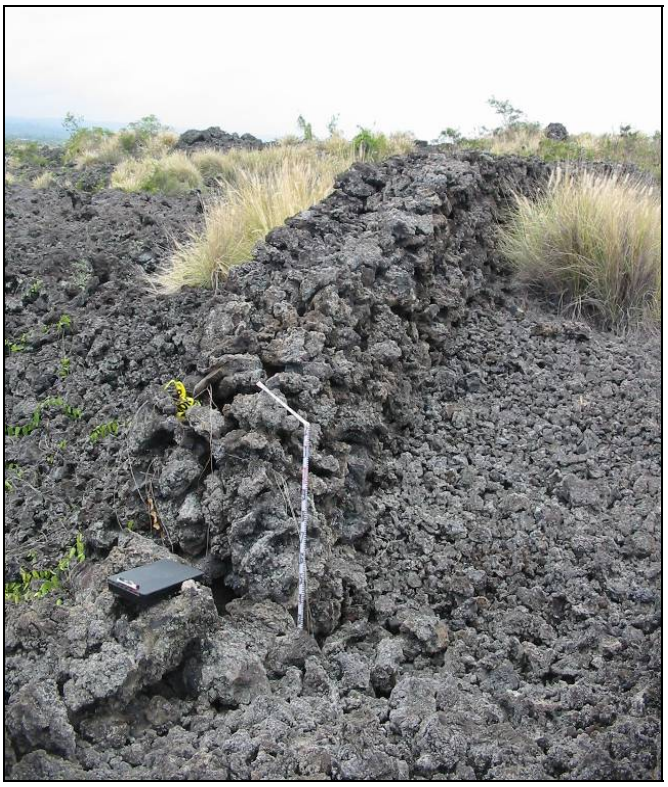

Figure 19. SIHP #50-10-27-26414, photograph looking southeast at *‘a‘ā* portion of historic wall

Figure 20. SIHP #50-10-27-26414, overview photograph of distinct vegetation difference on either side of the *ahupua‘a* wall, looking to the east with project area on left

Figure 21. SIHP #50-10-27-26414, photograph looking northwest from Honokōhau side of wall, showing construction of *pāhoehoe* portion of wall

4.3.3 State Site # 50-10-27-26415

SIHP #	50-10-27-26415
FUNCTION:	Transportation
SITE TYPE:	Trail
TOTAL FEATURES:	1
DIMENSIONS:	270 m in length
CONDITION:	Good
AGE	Pre-contact
ELEVATION:	492 ft. a.m.s.l.

DESCRIPTION: Site 50-10-27-26415 is a trail previously identified by Haun (2003), located on the large *‘a‘ā* flow that dominates the project area (see Figure 15 above for location of trail within project area). This trail may be the same trail noted by Rosendahl and Walker (1991; see above in this report, Section 3.2 Previous Archaeological Research), but to our knowledge no state site number was previously given to the trail.

The trail is approximately 0.7 meters wide and is constructed of crushed *‘a‘ā* rubble exposed and worn after removal of larger cobbles from the trail (Figure 22). The trail was observed to run for a total of approximately 270 meters oriented approximately north-south. Near the historic *ahupua‘a* wall (site -26414) the trail angles to the west (towards the wall) and disappears 10 meters past this turn, prior to reaching the wall. It seems likely that the southern portion of the trail (the final exit/entrance from the *‘a‘ā*) was obscured by the construction of the wall, suggesting that the trail pre-dates the historic wall. The trail is marked by a number of small cairns ranging from single cobbles stacked four courses high to small mounds of approximately a dozen large cobbles (on average 0.6 meters high). There is also a small cupboard along the trail about 0.5 meters in diameter and approximately 0.5 meters deep. It consists of a natural depression that may have functioned as a small storage cupboard in association with the trail.

Function of site -26415 is transportation across the *‘a‘ā* flow. The cairns functioned as markers and the cupboard was likely utilized for storage. Excavation potential is minimal given the type of construction and lack of cultural material on the surface.

Figure 22. SIHP # 50-10-27-26415, photograph looking south at crushed *‘a‘ā* trail with cairn on left side of trail

4.3.4 State Site # 50-10-27-26416

SIHP #	50-10-27-26416
FUNCTION:	Burial
SITE TYPE:	Lava Tube
TOTAL FEATURES:	2
DIMENSIONS:	10 m by 1.5 m
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	518 ft. a.m.s.l.

DESCRIPTION: Site 50-10-27-26416 consists of a lava tube (Feature A) and an excavated blister (Feature B) located on a *pāhoehoe* tumulus that is elevated above the surrounding terrain.

Feature A, the lava tube, is accessed through a fairly large entrance beneath which approximately six large *pāhoehoe* slabs are stacked to enable access down into the tube (creating informal steps) (Figure 23, Figure 24 and Figure 25). The floor of the tube is small *pāhoehoe* cobbles that naturally eroded and fell into this entrance chamber. Beyond the entrance chamber the tube makes a sharp turn and the floor drops to a lower level. It is just beyond the turn of this corner that there is a burial (CSH Burial 3; burial is scattered 1 to 4 meters north of the site tag). Burial 3 was determined to be human based on identification of a partial mandible, several teeth (primarily molars), and a partial temporal bone. There is a natural shelf in the cave on which most of identifiable bone is located, and the remainder of the burial is scattered on the floor below the shelf. The burial is in poor condition and is highly fragmentary. There are scattered small pieces of marine shell amongst the scattered bones on the tube floor. The shell was identified as *Isognomon* sp. There are also several goat bones within one meter of the burial. The tube ends shortly beyond the burial.

Feature B is an excavated area of *‘a‘ā* located 10 meters east of Feature A (Figure 26). The excavated area is 3 meters in length (east-west) by 1.5 meters wide (north-south) with an approximate depth of 1.0 meters. Possible function of this feature is storage, due to the cupboard-like form and the natural overhang which protects it, but given the proximity to Feature A it almost certainly related to the burial.

Function of site -26416 is primarily as a burial. Feature A consists of modifications within the lava tube that appear related to the placement of the burial, especially the stacking of slabs at the entrance for access. Feature B may also be related to burial practices or storage of related items. Excavation potential for this site is poor due to lack of soil and/or cultural material, as well as the presence of a burial.

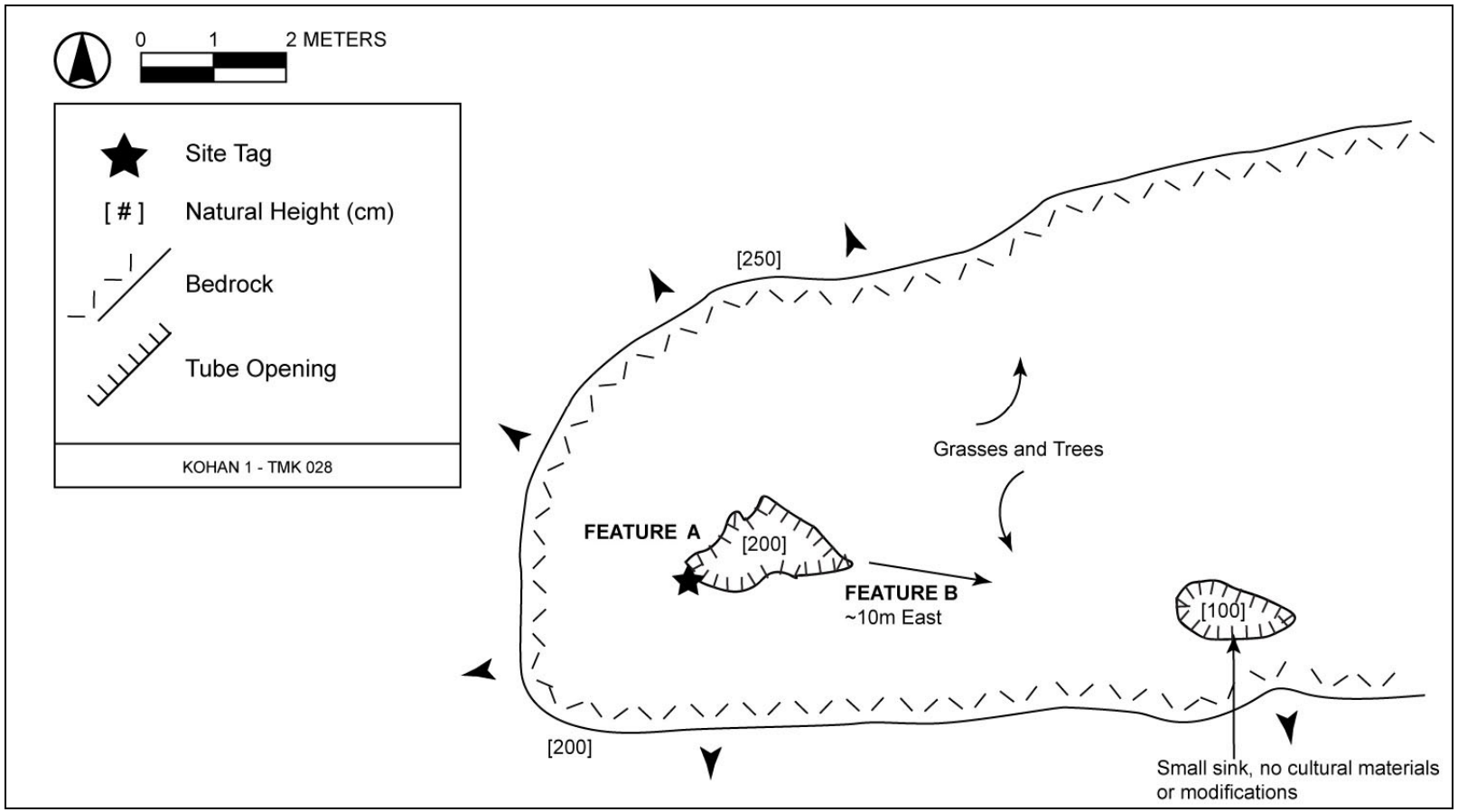

Figure 23. SIHP # 50-10-27-26416, Feature A, plan view of tumulus

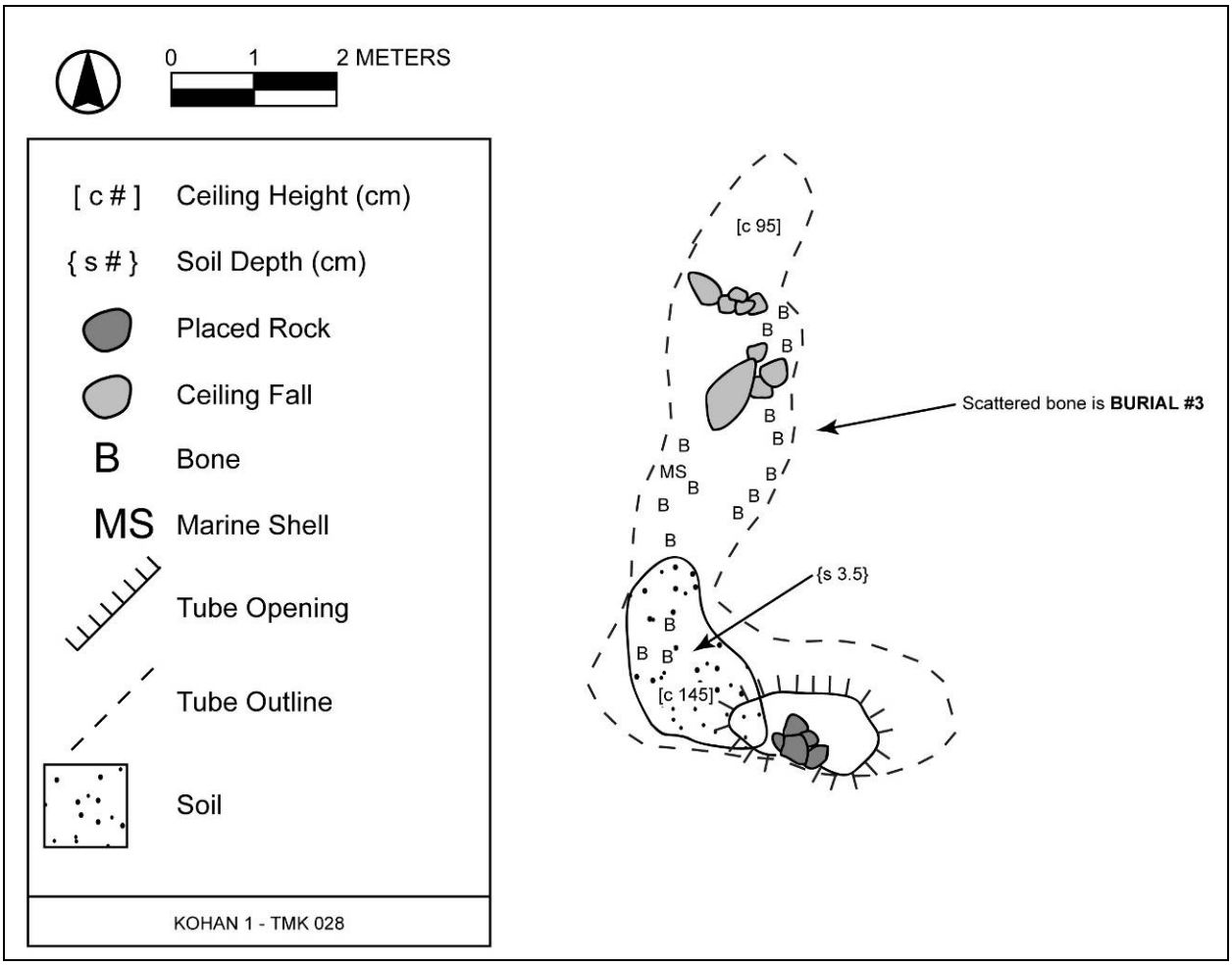

Figure 24. SIHP # 50-10-27-26416, Feature A, plan view of lava tube

Figure 25. SIHP # 50-10-27-26416, Feature A, photograph of tube entrance facing east

Figure 26. SIHP # 50-10-27-26416, Feature B, photograph of excavated blister facing north

4.3.5 State Site # 50-10-28-26417

SIHP #	50-10-28-26417
FUNCTION:	Agriculture
SITE TYPE:	Mounds, terraces, modified outcrops, and clearing
TOTAL FEATURES:	6
DIMENSIONS:	24,726 m^2 (266,148 $ft.^2$, 6.1 acres)
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	550 to 700 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26417 is a pervasive agricultural site that occurs throughout the *mauka* half of the project area. Six areas of concentrated agricultural activity were designated, Feature A through Feature F (see Figure 15 above). These features vary somewhat in the type and intensity of agricultural modifications, but differences between features appear to be largely a function of the local geology and topography. Additional agricultural activity does occur within the project area (in addition to Features A through F) in direct association with other sites (i.e., site -26425, -26430, -26431). Features B, C, and D of site -26417 correspond to Haun (2003) site #5, which was initially described as an agricultural area containing at least fifty mounds.

Function of site -26417 is agricultural. The minimal, dispersed modifications indicate no function other than agriculture; the widespread nature and types of modification present are consistent with pervasive agricultural modifications. Several test excavations were conducted (see testing results below) with no findings in any of the excavations. Based on these results, it appears that excavation potential for this site is very minimal, as the features do not tend to yield any cultural material or datable material.

Feature A consists of an area extending about 200 meters north-south and 140 meters east-west from the southern and eastern edge of the large *‘a‘ā* flow that dominates the project area. The total area of agricultural modification is approximately 17,888 m^2 (4.4 acres). Several sub-features were designated to describe variation within this agricultural area (Features A_1 through A_5). Despite these designations, the agricultural features within Feature A are nearly continuous, although they are not particularly intense (relatively low density of agricultural features spread over a large area). The agricultural features extend from approximately the edge of the *‘a‘ā* flow (which turns to the south on the *makai* side, creating an “L” shape that defines the north and west edges of the agricultural area) and continue south nearly to the *ahupua‘a* wall. Isolated agricultural activity associated with sites continues to occur to the east (i.e., -26425, -26430, -26431) but the large continuous agriculture area designated Feature A ends about 140 meters east of the *‘a‘ā*. In general vegetation in this area is thick *koa haole* and grass, with eroding bedrock (*pāhoehoe*), and is overall fairly level. There is minimal soil development and most of the area is exposed bedrock. This area has very low site density other than agriculture, with only a few small lava tube shelters in the immediate area.

Feature A_1 is located at a well-defined excavated blister measuring approximately 2 meters by 1.5 meters, with excavated *pāhoehoe* boulders piled along the southwest lip of the blister (Figure 27). The other modifications within the feature area include small cleared areas, dispersed areas

of tossed and piled boulders (likely the result of clearing activities) and a few small clearing mounds.

Feature A_2 is an excavated blister that is located on the edge of a *pāhoehoe* bedrock exposure southeast of Feature A_1. There is a small (about 0.2 meters) blister opening along the southwest edge of the blister that has been blocked with piled boulders and cobbles, which presumably was a result of the blister excavation process. This small blister opening is too small to contain anything such as a burial, and nothing could be seen in the small opening. There are also several agricultural mounds to the west, on average 1.5 meters by 1.0 meters in size.

Feature A_3 is an informal agricultural enclosure and a mound (Figure 28 and Figure 29). There are also several filled crevices, excavated blisters, and other mounds in the immediate area. The enclosure was constructed off of one side of a *pāhoehoe* bedrock exposure. It consists of a low wall that curves around from the outcrop toward an area of jumbled cobbles and boulders. The wall was built of mostly boulders and slabs in an informal manner (not stacked or faced, but rather tossed). It enclosed an area about 2 by 2 meters that is fairly level and that abuts the bedrock down-slope on its east, open side. There is a fairly large mound (about 2 meters by 2 meters) to the south of the enclosure area, which appears to be a planting rather than clearing mound. It consists of smaller size cobbles and the ground in the area is rough and not cleared. In general, the mounds in this area seem to follow this pattern, possibly indicating an area of sweet potato cultivation or other plants that are amenable to growing in rock mulch.

Feature A_4 is a filled blister. The blister occurs in a *pāhoehoe* bedrock outcrop and has been filled in with cobbles. Some of the cobbles were removed to determine the depth of the feature, but the natural floor of the blister could not be determined without further excavation (see testing results below). This feature occurs at the southeast extent of Feature A, where the density of agricultural features is very low.

Feature A_5 is a mound located near the southwest extent of Feature A. The size, shape, and construction of the mound suggest an agricultural function. It consists of boulders and cobbles piled informally on a *pāhoehoe* bedrock exposure. There are other similar mounds and tossed rocks in the immediate area. This feature lies about 15 meters north of the *ahupua‘a* wall. The vegetation in the immediate area is extremely dense, so identifying the agricultural feature density nearby is difficult.

Figure 27. SIHP # 50-10-28-26417, Feature A_1, photograph of an excavated blister facing west

Figure 28. SIHP # 50-10-28-26417, Feature A_3, photograph of an informal agricultural enclosure facing east

Figure 29. SIHP # 50-10-28-26417, Feature A_3, photograph of an agricultural mound facing east

Feature B is an agricultural area in the central region of the east half of the project area, with a total area of approximately 2,925 m^2 (0.72 acres). Sub-features B_1 through B_5 consist of small to large *‘a‘ā* mounds in varying concentrations and sizes (Figure 30). All mounds tend to be constructed of small to medium size *‘a‘ā* cobbles and appear to be more consistent with agricultural planting mounds rather than clearing mounds, especially given the lack of surrounding cleared areas and soil depth. The mounds occur in a natural *‘a‘ā* flow that is comparatively very level considering the rough undulating nature of the surrounding *‘a‘ā* flows. This distinction between the rough surrounding area of *‘a‘ā* and the more level eroding small cobble *‘a‘ā* appears to be the difference between newer and older (heavily eroded) flows. The geologic difference is easily distinguished and marks the boundary of Feature B; there are mounds throughout on the older flow but stop rather abruptly when the natural ground surface becomes rougher. Overall it appears that the natural small cobble *‘a‘ā* area was ideal for planting mounds, and this area (approximately 95 m by 30 m) was used fairly intensively. Site -26371 and site -26435 are nearby; the site -26435 wall may have been used in part to restrict cattle from entering the planting areas. In general, however, this site appears to be pre-contact in nature. Although sub-features have been used to describe the site, mounds within this area are basically continuous, with less than 15 meter spacing between mounds, and often less than 1 to 2 meter spacing. The vegetation in this area is dense *koa haole* with some interspersed Christmas berry trees. The topography is level with a substrate of small ‘a‘a cobbles.

Feature B_1 is an area approximately 15 meters in diameter containing closely grouped *‘a‘ā* mounds. The mounds are constructed with small to medium size *‘a‘ā* cobbles and the mounds are generally about 2 meters in diameter and 50 to 75 centimeters in height. The distance between individual mounds ranges between 2 to 10 meters.

Feature B_2 is another concentration of mounds 25 meters southeast of Feature B_1, and is very similar to B_1 (Figure 31). The mounds are about 2 meters in diameter and approximately 60 centimeters in height, with similar spacing between mounds and similar construction.

Feature B_3 consists of approximately seven to ten medium to large *‘a‘ā* mounds in an area of relatively flat, clear *‘a‘ā* with relatively little vegetation. The mounds are all within 5 meters of each other, and some are within 1 meter of each other. They are 1.5 to 3 meters in size and approximately 60 to 80 centimeters in height. They are composed of small to medium *‘a‘ā* cobbles (on average about 20 centimeter diameter). Feature B_3 mounds are slightly less concentrated than B_1 and B_2, probably because B_3 is very near the northwest edge of Feature B. B_3 also differs slightly in that the area between the mounds appears to have been intentionally partially leveled.

Feature B_4 consists of two parallel linear mounds, arranged somewhat differently than the mounds in the rest of the area (Figure 32). These two mounds are immediately adjacent to each other, approximately 0.90 meters apart. Both are small *‘a‘ā* cobble mounds and measure approximately 2 to 3 meters northeast-southwest by approximately 1 meter, and are about 65 centimeters high.

Feature B_5 consists of two mounds approximately 10 meters apart that are larger than the average mounds in this area, both mounds being about 2.7 meters in diameter with a constructed height of approximately 1 meter. The actual height on the north side of each mound, due to the naturally sloping *‘a‘ā* on the north side, is closer to 1.5 meters.

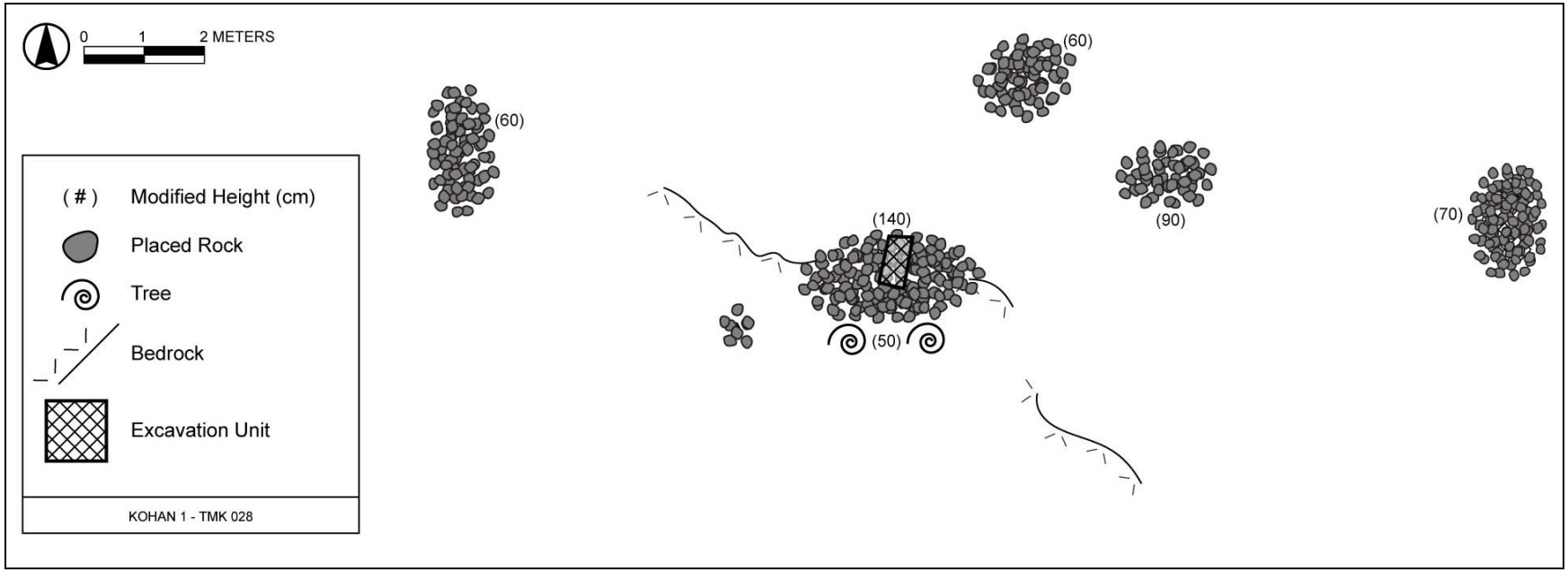

Figure 30. SIHP # 50-10-28-26417, Feature B_5, plan view showing typical size and distribution of *‘a‘ā* mounds in this area

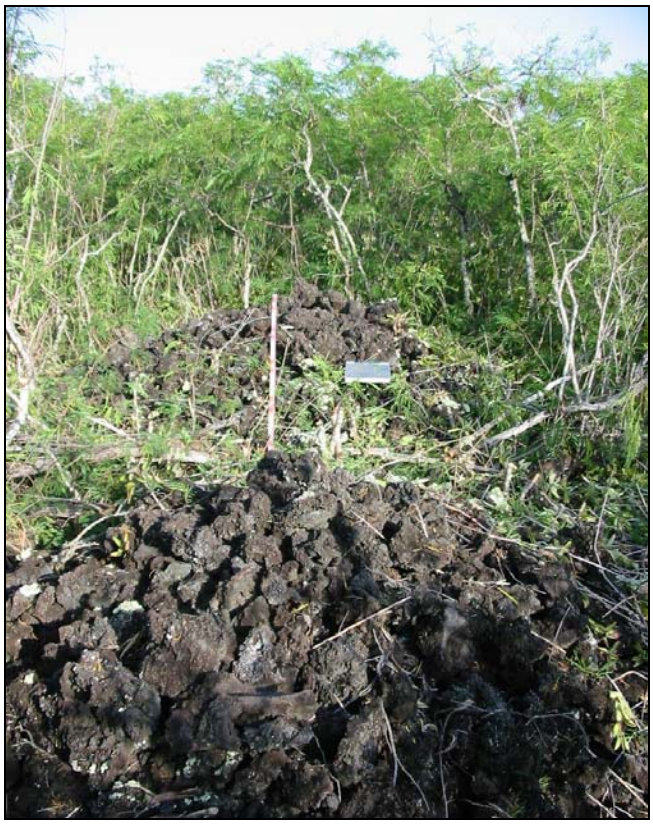

Figure 31. SIHP # 50-10-28-26417, Feature B_2, photograph of two *‘a‘ā* mounds facing north

Figure 32. SIHP # 50-10-28-26417, Feature B_4, photograph of two parallel linear mounds facing north

Feature C is an area encompassing a ridgeline and adjacent depression in the *‘a‘ā* flow located approximately 45 meters south of site -26435 (Feature B) and 50 meters east of the eastern extent of site -26417 Feature B. Feature C consists of two sub-features (C_1 and C_2), and comprises a total area of approximately 1,153 m^2 (0.28 acres). The entire Feature C area measures approximately 35 meters north-south by 35 meters east-west, and consists of a modified outcrop (a naturally raised ridge) with a depression on its south side. Portions of the outcrop are modified and there are also a number of small *‘a‘ā* mounds in the depressed area. These mounds are constructed of *‘a‘ā* cobbles and small boulders, and some naturally raised areas of *‘a‘ā* have been utilized for mound construction. Feature C should be considered an extension of the more concentrated area Feature B, as well as a continuation with the nearby Feature D. A single isolated water-worn stone (approximately 8 by 10 centimeters in size) was found 12 meters north of the Feature C northeast corner (about 30 meters south of site -26435 Feature B). The stone is broken in half and is roughly oval, and appears consistent with use as a large hammer-stone (“*‘āina* basher”). The presence of this artifact also supports the agricultural function for this area.

Feature C_1 consists of a terrace on the north edge of the ridgeline that measures 2.1 meters east-west by 1.3 meters north-south with a constructed height of 70 centimeters (Figure 33). The north face of the terrace has collapsed down slope slightly. The top surface of the terrace is not level but rather slightly mounded. There is formal stacking evident on the east face of the terrace, two to three courses high. The south and west sides of the terrace are flush with the natural surface. The second component of C_1 is a large mound over 2 meters in diameter and over 1 meter in height. It was found to be a natural protrusion after excavation (see testing results).

Feature C_2 is located in a low depression southeast of Feature C_1. It consists of approximately ten small to medium size *‘a‘ā* cobble mounds in an approximately 30 meter east-west by 15 meter north-south area. There is also some clearing evident in this area, especially to the south where there is slightly more soil development. The mounds average 1.2 meters in diameter and are constructed approximately 60 centimeters high, and are most consistent with agricultural clearing mounds.

Feature D consists of an area about 35 meters in diameter that contains about fifteen mounds (an area approximately 753 m^2). The mounds are on average 2 meters by 1.5 meters in size, with a constructed height of 60 to 80 centimeters. They are constructed of small to medium size *‘a‘ā* cobbles averaging 30 centimeters in diameter (larger on average than in Feature B). Feature D is in an area that is naturally slightly depressed (bowl-shaped), with the mounds generally being within the depressed area. This area is very similar to Feature C_2, and is nearly continuous with that feature (they are essentially adjacent “bowls”). The mounds in Feature D may have functioned as clearing mounds rather than planting mounds, as there are cleared areas nearby and the *‘a‘ā* cobbles tend to be larger in size. In general, the Feature D area is bounded by naturally upraised areas on all sides except for the east, where it is cleared and level with some soil formation until meeting Feature C; this level area may also have been used as an agricultural area. Function of this feature is agricultural clearing mounds in addition to possible planting mounds. This feature is strongly related to nearby Features B and C.

Feature D_1 is an area with three to four large mounds, all about 2.5 meters in diameter and about 80 centimeters high, in close proximity to one another. See testing results below.

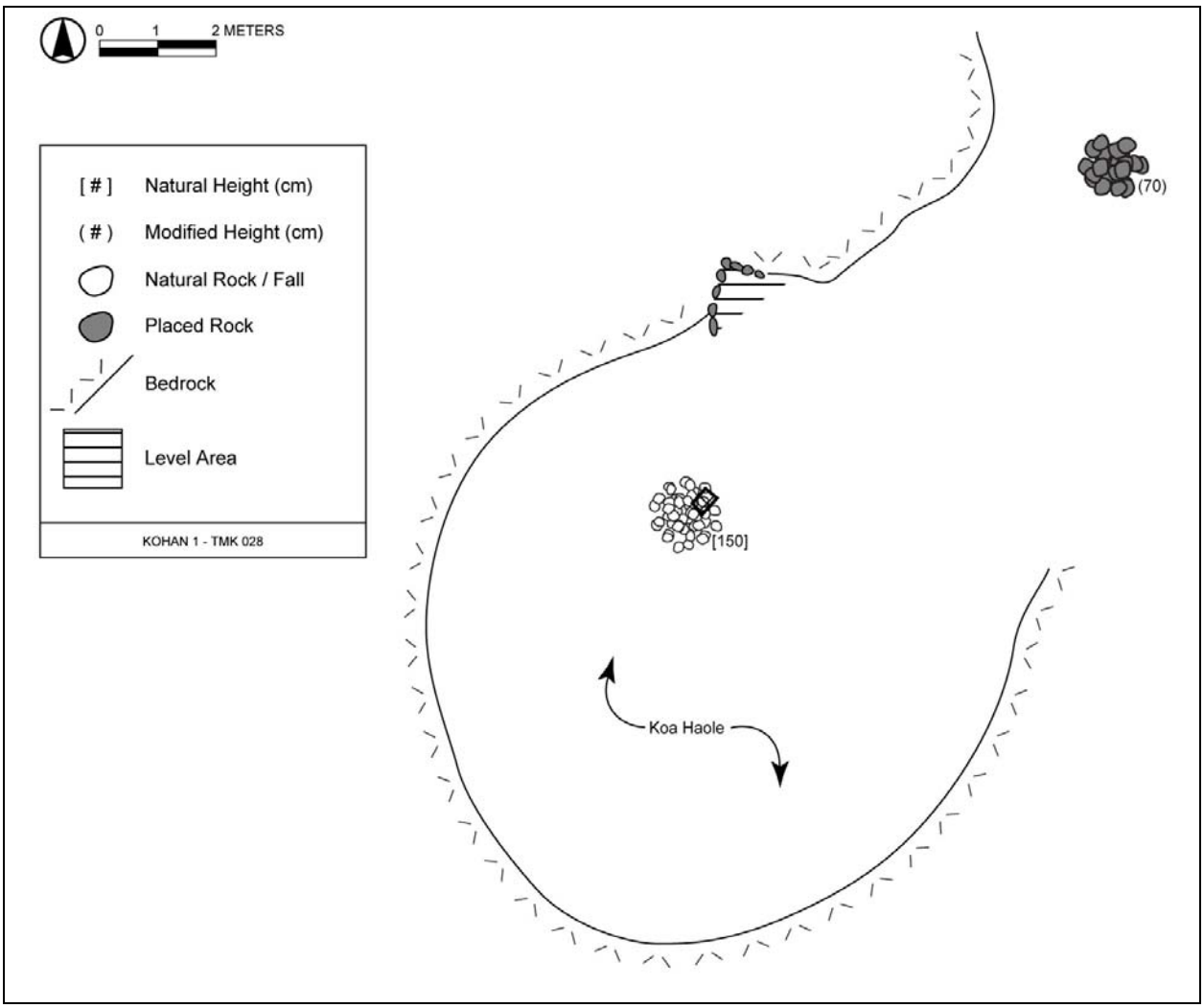

Figure 33. SIHP # 50-10-28-26417, Feature C_1, plan view showing small terrace on north side of outcrop and mounds

Feature D_2 is an area with several medium size mounds in close proximity, with two fairly linear mounds (about 60 centimeters tall, and 2.0 by 0.8 meters in size) that are roughly parallel to one another. These linear mounds are constructed of smaller *‘a‘ā* cobbles, and were likely planting mounds (see also Feature B_4). The parallel mounds are 6 meters north of the Feature D_2 site tag.

Feature E consists of areas cleared for agricultural purposes and some rough clearing piles in the northeast corner of the project area (Figure 34). Geologically this area is very level and has soil formation, unlike immediately adjacent areas to the south, north, and west, which is all very rough undulating *‘a‘ā*. The level area is about 20 meters wide (north-south), and extends at least 60 meters to the east (approximately 513 m^2). It is possible that this area has been disturbed by bulldozer activity (given the proximity of Hina-Lani Street and bulldozer roads nearby) and cattle ranching, as well as heavy vegetation in the area (many large Christmas berry trees and thick *koa haole*). This possible disturbance and the minimal modification at the site make it difficult to confirm specific agricultural areas. Function of this feature is agricultural, with no other function apparent.

Feature E_1 is the most distinctive agricultural clearing area (at the site tag) consists of an area about 4 by 3 meters that is roughly rectangular. There are some piled cobbles along the edge of this and to the north that appear to be tossed from the clearing activity. Excavation of the area at the Feature E_1 did not reveal any cultural material (see excavation test unit results below).

Feature E2 is a large (5 by 6 meters) area that has been cleared of large and medium cobbles about 30 meters east of Feature E_1.

Feature F is located in the northeast corner of the project area about 50 meters south of site -26443 and about 100 meters south of Feature E_1, both of which are likely related features (Figure 35). The agricultural site is geologically located at the *pāhoehoe*/*‘a‘ā* interface where the *‘a‘ā* is very rough and the *pāhoehoe* is undulating. Feature F is comprised of three sub-features which define the entire site, which is approximately 80 by 30 meters in size (approximately 1,494 m^2, or 0.37 acres). The area has bulldozer activity within it, with bulldozer scars on the exposed *pāhoehoe* bedrock. Feature F contains mounding, leveled clear areas, and minimally modified large depressions. Of particular importance in identifying this site was the presence of several *tī* plants within modified depressions.

Feature F_1 is about 20 by 12 meters in size and is the northernmost sub-feature. It consists of a small modified depression with a *tī* plant and a small blister opening with no cultural materials (a previous site tag found at the blister says “ACP TF-104”). A mound near feature F_1 was excavated as a burial check (see testing results below) but was found to be natural.

Feature F_2 is a level cleared area with some soil development, very similar to Feature E_2 and with similar dimensions.

Feature F_3 is an area about 15 by 3 meters that consists of a long linear depression that is slightly modified (tossed rocks) and has several *tī* plants as well as small *kukui* trees growing in it. There is a small blister shelter on the east side of the depression but no cultural material was observed.

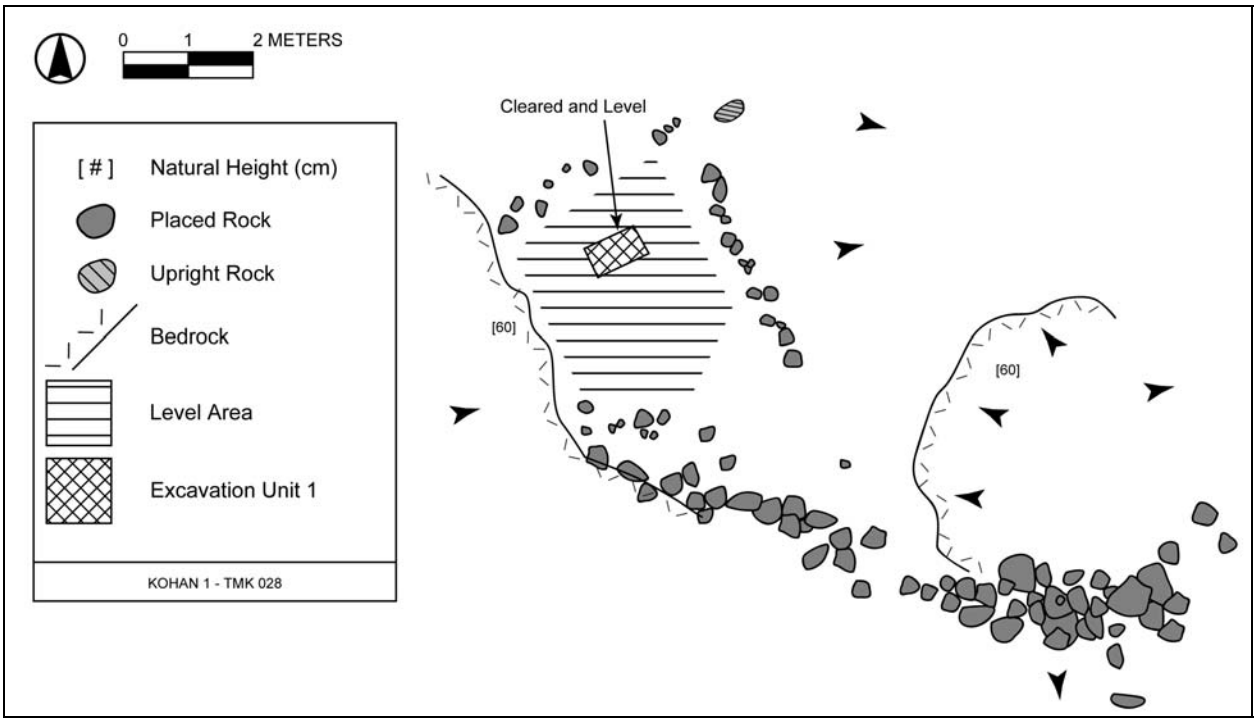

Figure 34. SIHP # 50-10-28-26417, Feature E_1, plan view with excavation unit

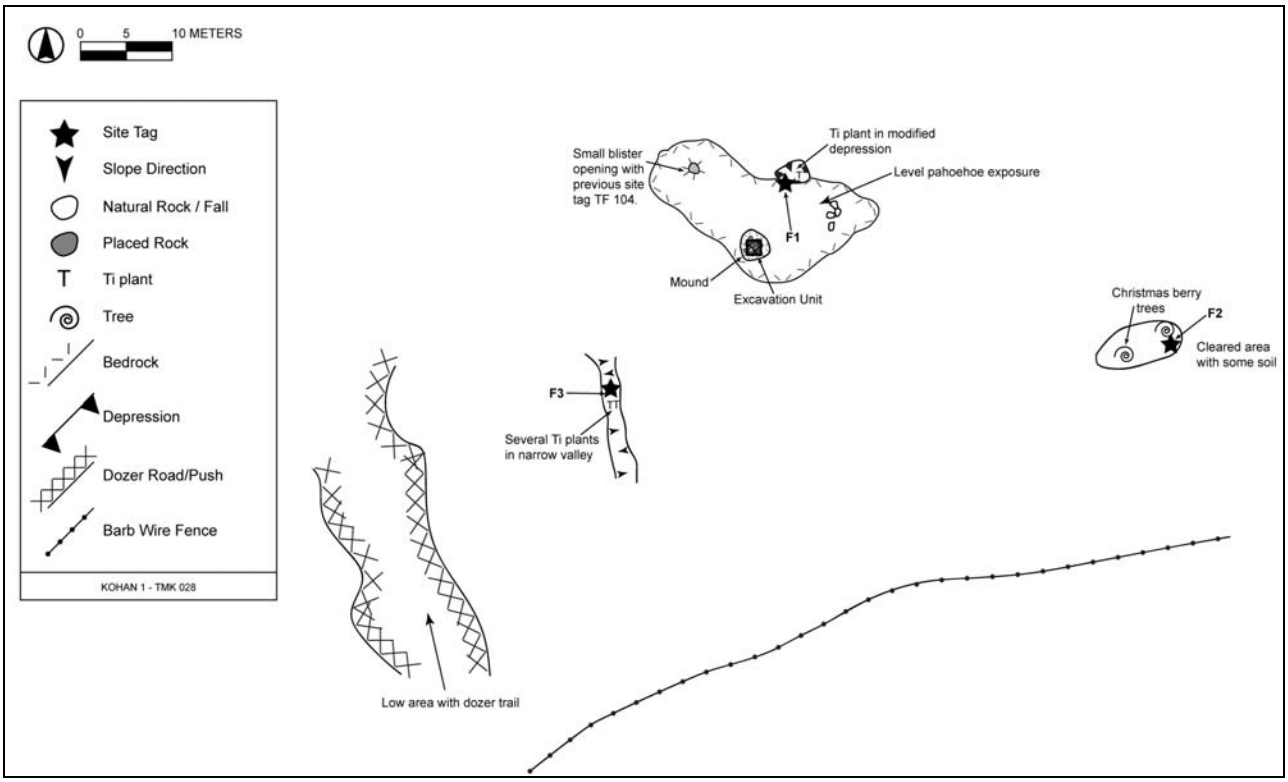

Figure 35. SIHP # 50-10-28-26417, Feature F_1, plan view with excavation unit

Testing Results

Subsurface testing was conducted at site -26417 to better define the site's function and to ensure that there is no possibility of burial at individual features. Eight excavations were completed, with at least one excavation at each feature. In most cases, the decision of which sub-features to excavate was based on the likelihood that the particular feature may function as something other than agricultural (i.e., a sub-feature large enough to be a burial mound). Some sub-features were selected for excavation as random sample to confirm function. None of the excavation at site -26417 revealed any cultural material, and overall excavations confirmed an agricultural function for this site.

Two excavations were conducted within **Feature A**, at sub-features A_4 (Unit 8) and A_5 (Unit 6), both of which are mounds covering low natural bedrocks (Figure 36 and Figure 37). Because the mounds could conceal an entrance to a tube, a burial check was needed for both. Unit 6 was 0.65 by 0.45 meters and 45 centimeters deep; Unit 8 was 0.85 by 0.80 meters and 60 centimeters deep. At both excavations (Unit 6 and Unit 8), construction (Stratum I) consisted of medium to large size cobbles (20 to 50 centimeters diameter) thrown haphazardly on a low bedrock exposure. In both cases, excavation ended at solid bedrock with no possibility of tube openings under the constructed mound. There was a small amount of natural (and apparently recent) sedimentation, consisting primarily of decomposing *koa haole* leaves and seeds. No cultural material was found during either excavation. The type of mound construction (tossed rocks on a bedrock exposure) revealed by excavation is consistent with an agricultural function for both sub-features, and confirms an agricultural function for Feature A of site -26417.

Two excavations were conducted at **Feature B**, in sub-feature B_4 (Unit 11, Figure 38) and B_5 (Unit 12, Figure 39). Unit 11 was placed in the western-most of two parallel linear *ʻaʻā* mounds at the sub-feature B_4 site tag, and the unit was 0.55 by 0.45 meters in size, and 50 centimeters deep. Unit 12 was placed in an unusually large *ʻaʻā* mound at the sub-feature B_5 site tag, and the unit was 1.0 by 0.60 meters in size, and 40 centimeters deep. Results at each of these excavations are essentially identical. Stratum I (mound construction) consisted of small to medium *ʻaʻā* cobbles (10 to 35 centimeters in size) tossed on top of a naturally upraised area of eroding *ʻaʻā* flow. Stratum II is the naturally decomposing (older) *ʻaʻā* flow with a matrix of small *ʻaʻā* cobbles. The distinction is between strata is quite clear, and this sub-feature is virtually identical to the mounds in Feature D as far as construction style and underlying substrate. No cultural material was found during either excavation. Given the small size of the cobbles used to construct these mounds, it is probable that Feature B was utilized as an area for agricultural planting mounds, rather than clearing mounds. Excavation of this feature confirms an agricultural function, and suggests that the older *ʻaʻā* flow was being selected for agricultural purposes.

One excavation was conducted at **Feature C**, in sub-feature C_1 (Unit 14, Figure 40). This sub-feature consisted of a fairly large mound on top of a naturally eroding bedrock exposure, at the sub-feature C_1 site tag. Given the mound's size and the possibility of a blister opening underneath, a burial check was deemed necessary. The excavation unit was 1.0 by 0.60 meters in size, and 65 centimeters deep. Upon excavation, the mound was found to be a naturally eroding *ʻaʻā* exposure with a few tossed rocks in the general area. There was no cultural material found, and the mound was determined to be largely natural (although other mounds within Feature C

are definitely constructed, and very similar to those is Feature B and Feature D. This excavation does not alter the previous function designation for this feature, which is agricultural.

One excavation was conducted at **Feature D**, at sub-feature D_1 (Unit 13, Figure 41). The excavation was placed in a large *‘a‘ā* mound 5 meters north of the site tag for this sub-feature. The unit was 0.65 by 0.60 meters in size, and 68 centimeters deep. Stratum I (mound construction, 0 to 50 centimeters in depth) consisted of small to medium *‘a‘ā* cobbles (10 to 35 centimeters in size) tossed on top of an eroding *‘a‘ā* flow. Stratum II (50 to 60 centimeters in depth) is the naturally decomposing (older) *‘a‘ā* flow with a matrix of small *‘a‘ā* cobbles. The distinction is between strata is quite clear, and this sub-feature is virtually identical to the mounds in Feature B as far as construction style and underlying substrate. No cultural material was found during excavation. Given the small size of the cobbles used to construct this mound, it is probable that this feature was utilized as an agricultural planting mound, rather than a clearing mound. Excavation of this feature confirms an agricultural function, and suggests that the older *‘a‘ā* flow was being selected for agricultural purposes.

One excavation was conducted at **Feature E**, at sub-feature E_1 (Unit 1, Figure 42). The unit was 0.80 by 0.40 meters in size, and less than 15 centimeters in depth, and was placed in a rectangular cleared area. Stratum I consisted of a natural silty loam with no cultural material. The excavation unit ended in naturally eroding bedrock. The results of this excavation do not alter the original functional interpretation of the feature, which is an agricultural clearing area.

One excavation was conducted at **Feature F**, in sub-feature F_1 (Unit 3, Figure 43). This sub-feature consisted of a fairly large mound on top of a naturally eroding bedrock exposure, and given its size required a burial check. The unit was 0.45 by 0.45 meters in size, and less than 30 centimeters in depth Upon excavation, the mound was found to be a naturally eroding *‘a‘ā* exposure with a few tossed rocks on top. There was no cultural material found, and the mound was determined to be largely natural. This excavation does not alter the previous function designation for this feature, which is agricultural.

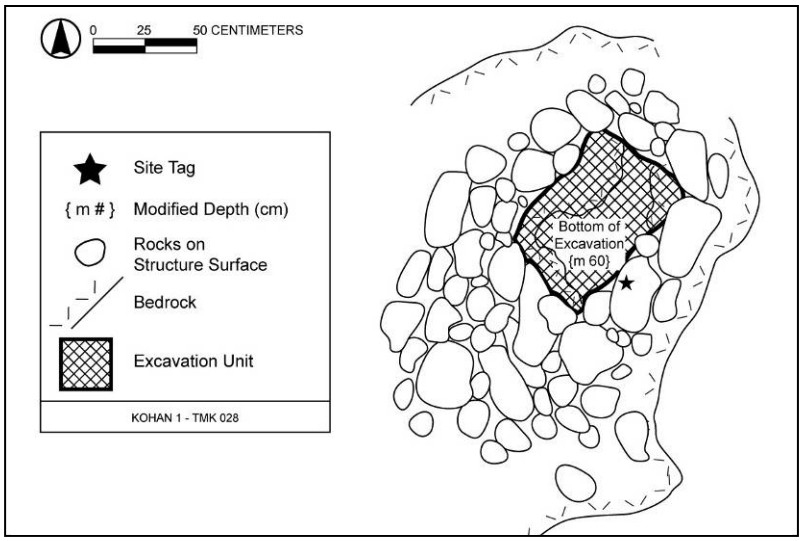

Figure 36. SIHP # 50-10-28-26417, Feature A_4, excavation figures. From top to bottom: plan view of excavation unit; photograph of mound pre-excavation facing southwest; same photograph post-excavation

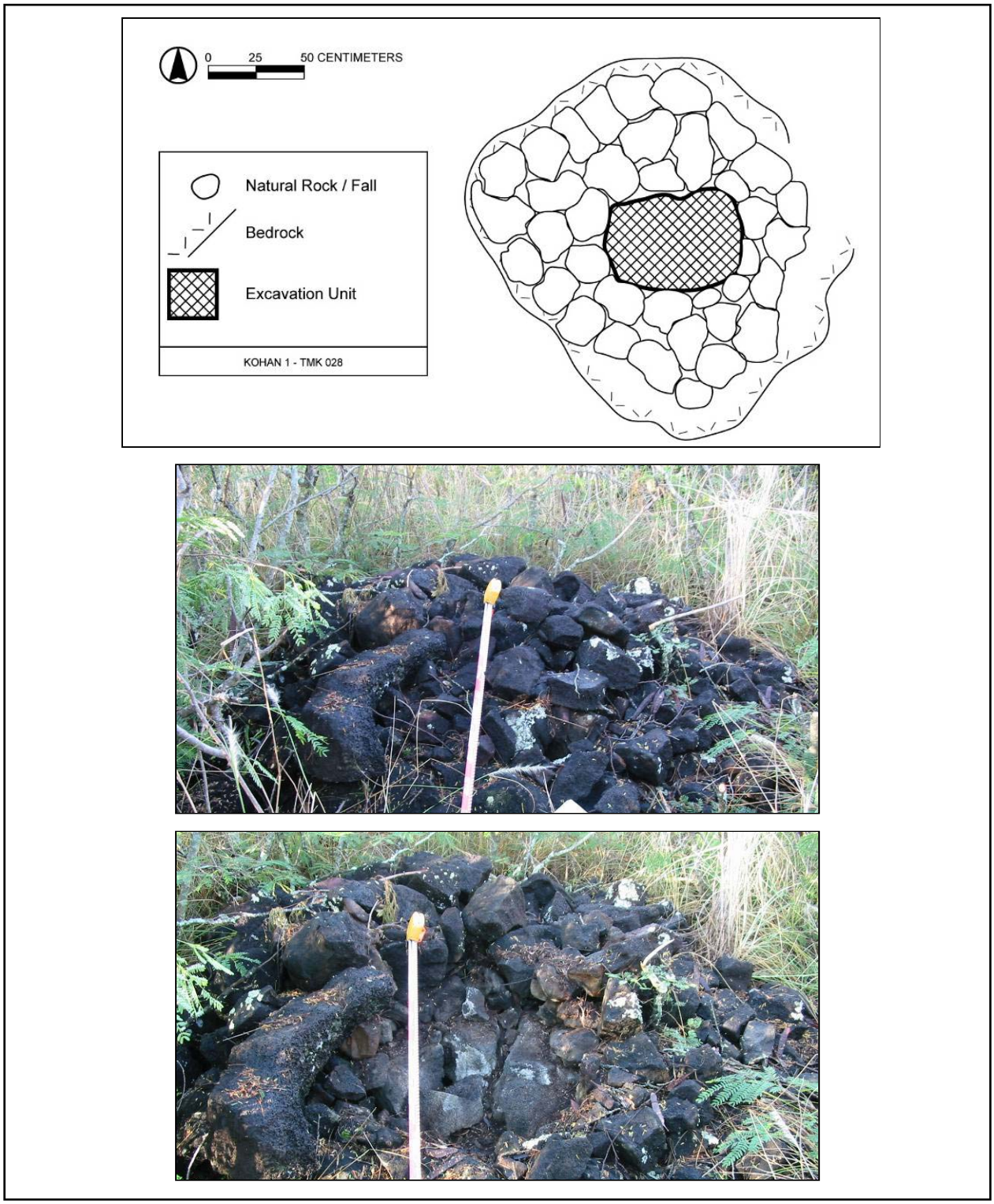

Figure 37. SIHP # 50-10-28-26417, Feature A_5, excavation figures. From top to bottom: plan view of excavation unit (maximum depth 60 cm); photograph of mound pre-excavation facing southwest; same photograph post-excavation

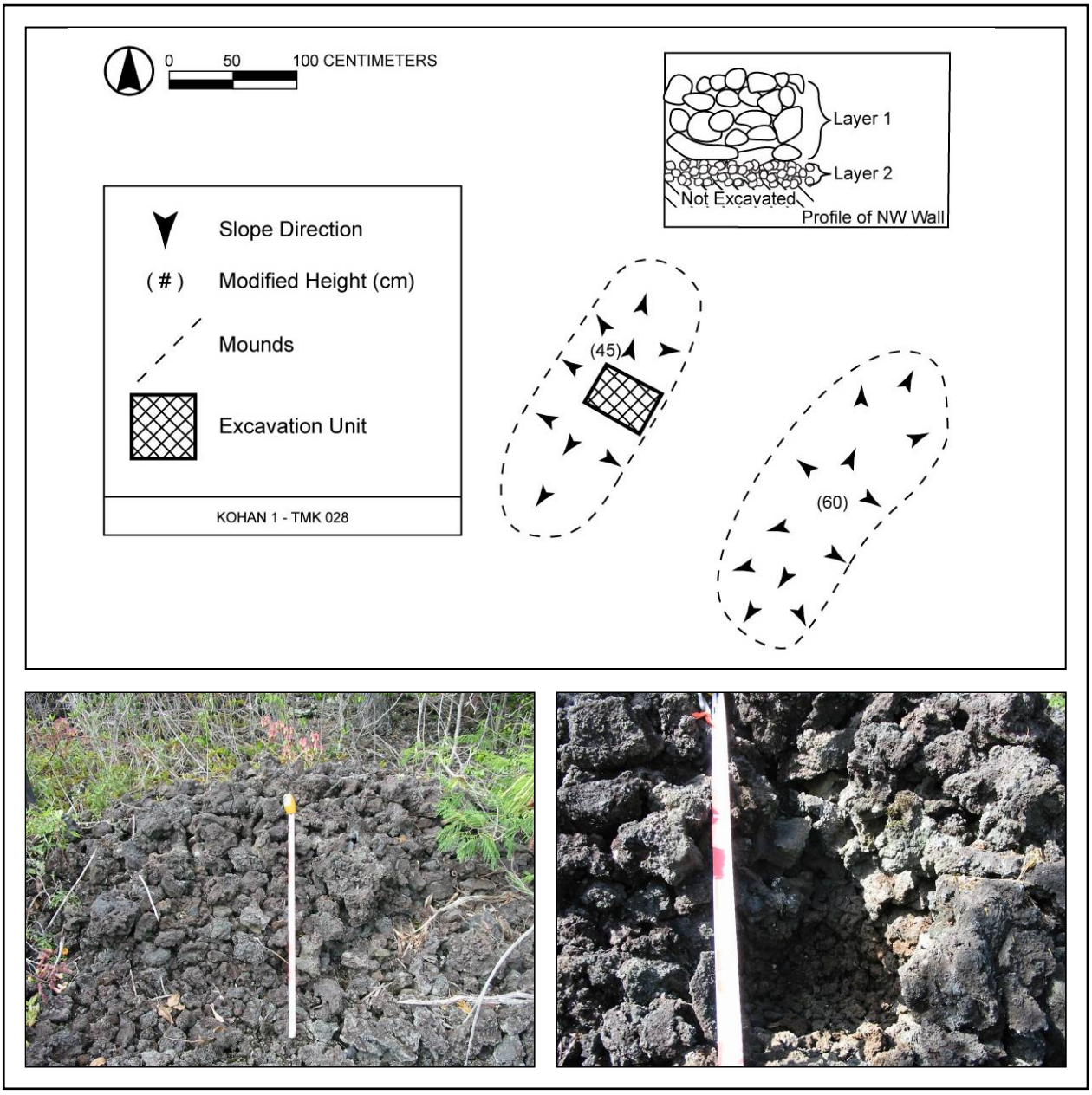

Figure 38. SIHP # 50-10-28-26417, Feature B_4, excavation figures. From top to bottom: plan view and profile of excavation unit; overview photograph of west linear mound pre-excavation (facing west, standing on eastern mound); close-up photograph post-excavation, showing eroding *ʻaʻā* bedrock at base of excavation and mound construction in profile

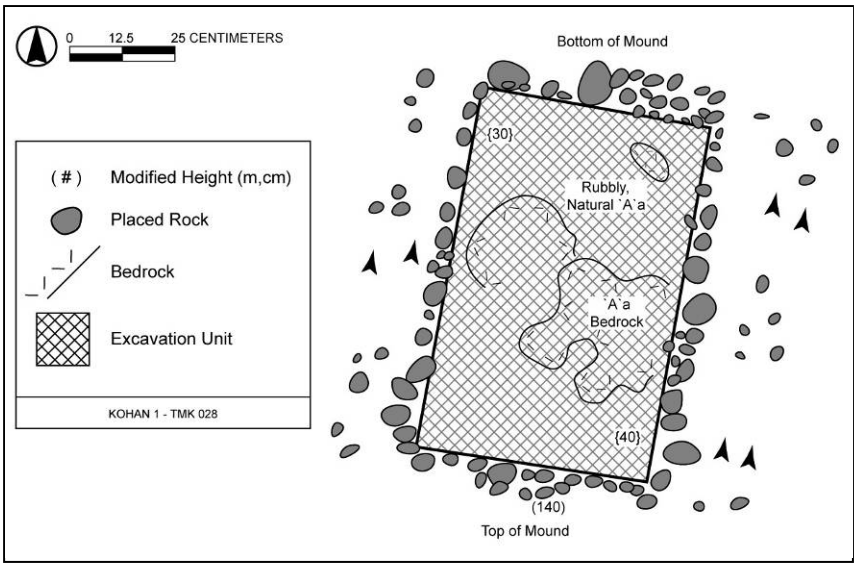

Figure 39. SIHP # 50-10-28-26417, Feature B_5, excavation figures. From top to bottom: plan view of excavation unit; photograph of mound pre-excavation facing south; same photograph post-excavation

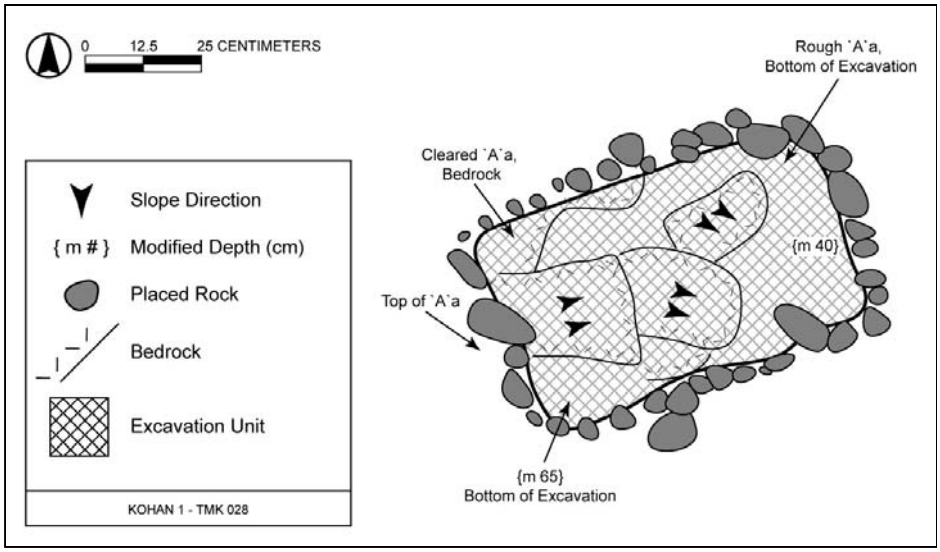

Figure 40. SIHP # 50-10-28-26417, Feature C_1, excavation figures. From top to bottom: plan view of excavation unit; photograph of mound pre-excavation facing south; same photograph post-excavation

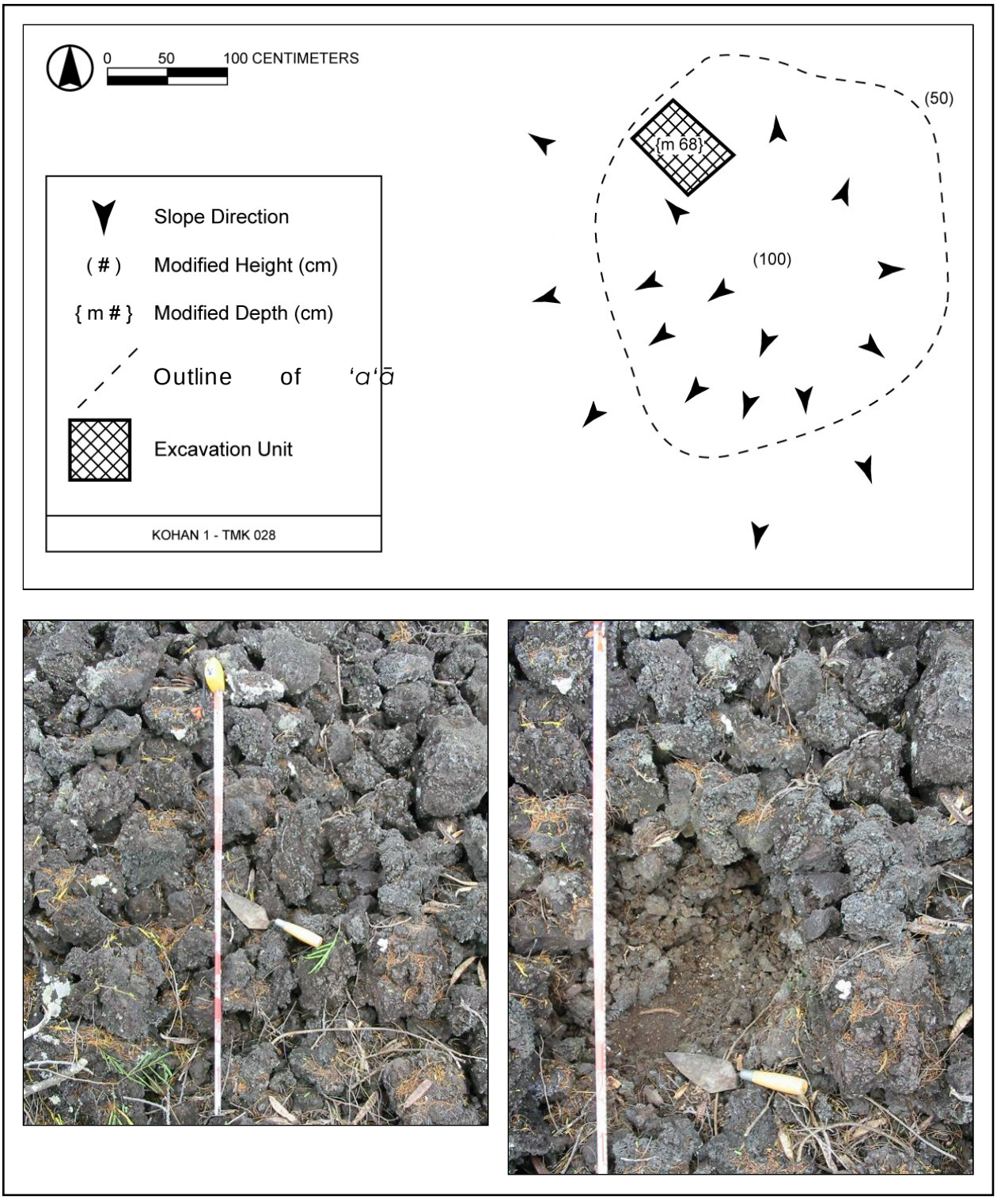

Figure 41. SIHP # 50-10-28-26417, Feature D_1, excavation figures. Counter-clockwise from top: plan view of excavation unit; close-up pre-excavation photograph; close-up post-excavation photograph

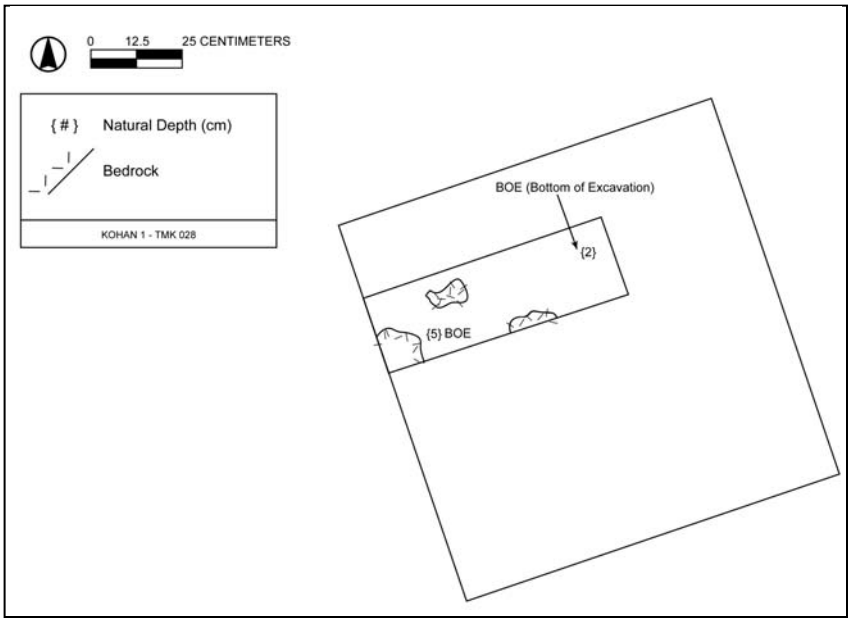

Figure 42. SIHP # 50-10-28-26417, Feature E_1, excavation figures. From top to bottom: plan view of excavation unit; close-up post-excavation photograph

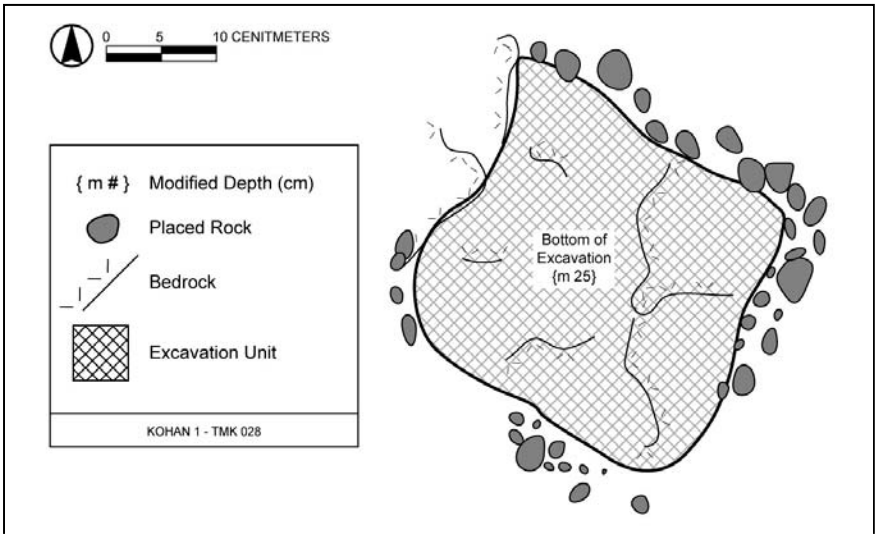

Figure 43. SIHP # 50-10-28-26417, Feature F_1, excavation figures. From top to bottom: plan view of excavation unit; photograph of mound pre-excavation facing northwest; same photograph post-excavation

4.3.6 State Site # 50-10-28-26418

SIHP #	50-10-28-26418
FUNCTION:	Transportation
SITE TYPE:	Trail
TOTAL FEATURES:	1
DIMENSIONS:	660 meters in length
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	Approximately 600 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26418 is a long, formal *pāhoehoe* slab trail that traverses almost the entire width of the project area. It runs over the large *ʻaʻā* flow that dominates the project area, beginning on the north side of Hina-Lani Street (in TMK [3] 7-3-009:26) and ending at the abrupt transition of the *ʻaʻā* to *pāhoehoe* towards the southern boundary of the project area. Vegetation in this area is generally sparse, with only occasional low bushes and morning glory vines for much of the trail's length. However, some areas of the trail (especially closer to *pāhoehoe* flows on the north and south ends) are considerably more heavily vegetated, with *koa haole* and Christmas berry trees sometimes seriously threatening the integrity of the trail.

Unlike many *pāhoehoe* slab stepping trails in this area, which generally have a slab every meter or so (just enough slabs to step from one to the next), the site -26418 trail is a continuous path of *pāhoehoe* slabs for over 600 meters (running at approximately 130 degrees). The slabs are directly adjacent to one another for its entire length, often with two to four smaller slabs arranged to make a larger continuous stepping surface, or one large slab adjacent to the next (Figure 44). Overall, this creates a trail that varies somewhat in width, but is generally 70 to 110 centimeters wide, and is in overall very good condition throughout its length. Given the length and formality of the trail and the nature of the *ʻaʻā* flow (which is a very large, rough flow that cuts through the middle of this portion of Kaloko Ahupuaʻa; see Figure 4), this suggests an impressive amount of energy investment in transportation over the *ʻaʻā* flow. The trail has been split into sections for descriptive purposes.

Section A is the portion of the trail that is located outside the project area in the adjacent northern parcel (TMK [3] 7-3-009:26). It is similar in form to Section B, which is the only other portion of the trail that does not consist of continuous *pāhoehoe* slabs. Section B runs south from Hina-Lani Street (where it is bisected by the modern road and continues north in the northern parcel) for about 20 meters before being lost on the rough *ʻaʻā*. It runs at the same angle as the rest of the trail and is located just north of the intersection of the -26418 trail with the -26371 trail (see Figure 16 above). The trail consists of heavily crushed *ʻaʻā* in this area, and may have been stripped of *pāhoehoe* slabs during construction of the historic site -26371, which sometimes utilized *pāhoehoe* slabs to level *ʻaʻā* areas.

Section C begins about 15 meters south of Section B and is the beginning of the continuous *pāhoehoe* slab portion of the trail. Section C is in somewhat poor condition, and may also have been partially deconstructed for use in the site -26371 trail. There is a large amount of heavy vegetation in this area which also makes the trail somewhat difficult to follow. This section of

the trail intersects with two other major trails in the project area, sites -26371 and -26422 (Figure 16). The site -26422 intersection is marked by a marine aggregate (cemented sand slab with shell inclusions; these occur naturally along the shore). The intersection with site -26371 indicates that the *pāhoehoe* slab trail is older than -26371, since that trail runs over and partially destroys the site -26418 trail at their intersection. Section C continues to the south in a partially constructed depressed area (see Figure 16) and eventually becomes considerably less vegetated as it runs over barren *‘a‘ā*. This portion of the trail starts to be in very good condition, south of the intersection with site -26371; the continuously intact condition of the trail is maintained nearly all the way to its southern terminus.

Section D begins at a constructed causeway over which *pāhoehoe* slabs continue the trail south (Figure 45). The causeway is about 1 meter high and allows the trail to stay level over a dip in the *‘a‘ā.* Section D ends at an area where the trail ascends a 1.5 meter high ridge of *‘a‘ā*; slabs continue up this ridge although they are partially collapsing. This section also has several marine aggregate markers along the trail (Figure 46).

Section E is contiguous with Section D, and the trail continues to head at approximately 130 degrees. Section E has a small excavated blister (70 cm in diameter by 60 cm deep) on its eastern edge, which may have been used for storage.

Section F continues over another small *‘a‘ā* ridge with a constructed causeway about 1.4 meters high. The causeway allows the trail to stay level over a fairly deep and wide ditch, utilizing large adjacent slabs for the continuation of the trail over the constructed berm. Vegetation in the area remains scarce, and the trail is in very good condition throughout this section (Figure 45).

Section G is contiguous with Section F and begins at another small causeway (0.8 meters high) built over a depression in the *‘a‘ā*. There is also another excavated blister along Section G on its west side, which is about 80 cm in diameter by 80 cm deep, and has placed stones along its edge. This excavated blister may also have been used for storage, but no cultural remains were found in either blister. There is some informal curbing along the edge of Section G, and the vegetation here becomes considerably denser. The remainder of the trail has increasingly dense vegetation which is presently compromising the integrity of the trail in some places. Although the trail remains in good condition, Christmas berry tree roots have lifted and displaced some slabs.

Section H is the final section of the trail. The trail ends at the edge of the *‘a‘ā*, where it drops steeply down to the *pāhoehoe*. A portion of Section H is in a depressed area of *‘a‘ā*, which appears to have been intentionally excavated down to maintain the level trail, but otherwise this section is similar in character to previous trail sections. An attempt was made to follow the trail off the *‘a‘ā* on the *pāhoehoe* flow, but no discernable trail was found. However, the *pāhoehoe* is level and somewhat cleared below the *‘a‘ā*, and would be easily traversed without a formal trail.

Site density near the trail is generally very low throughout its length, as it traverses the *‘a‘ā* flow. However, site density at the south end of the trail is rather high for the project area, one of the highest site densities in the parcel (see Figure 15). Moreover, two important sites are located nearly adjacent to the southern end of the trail. Site -26423 is a burial located in a small lava tube on a high tumulus adjacent to the trail. Site -26424 is a very formal enclosure which is

interpreted as a probable *heiau* (ceremonial structure). The -26418 trail appears to be associated with this ceremonial structure, utilizing a *pāhoehoe* route to actually access the structure on its south side. The formality and energy investment in both these sites, as well as their spatial association, raises the possibility that they are functionally related; this should be considered during preservation planning for both sites. At the northern end of the trail, the intersection with site -26371 is of interest as it shows the continuous utilization of the area for transportation through several time periods. There is also a fairly high site density at the northern terminus of the -26418 trail, outside of the current project area.

Function of site -26418 is transportation over the large, rough *ʻaʻā* flow that dominates the project area. It is notable that this *ʻaʻā* flow, which is very rough and would be difficult to traverse without a trail, runs *mauka-makai* through the middle of Kaloko Ahupuaʻa at this elevation. Thus, to get from the northern *pāhoehoe* area of Kaloko to the southern *pāhoehoe* area, the *ʻaʻā* must be traversed, as it is too large to conveniently bypass. The formality of the trail and the density of sites on the *pāhoehoe* on either end of the trail are likely related to the trail's importance in connecting these two areas of Kaloko Ahupuaʻa. Overall this site is an excellent example of a pre-contact *pāhoehoe* slab trail and is in very good condition throughout much of its length. It is recommended for preservation.

Figure 44. SIHP # 50-10-28-26418, photograph of Section F facing southeast, showing a typical section of the trail

Figure 45. SIHP # 50-10-28-26418, photograph of Section D, showing partially constructed causeway along trail

Figure 46. SIHP # 50-10-28-26418, close-up photograph of trail showing *pāhoehoe* slabs and two marine aggregate trail markers (cemented sand, arrows)

4.3.7 State Site # 50-10-28-26419

SIHP #	50-10-28-26419
FUNCTION:	Transportation
SITE TYPE:	Trail
TOTAL FEATURES:	1
DIMENSIONS:	2 m in length
CONDITION:	Remnant
AGE:	Pre-contact
ELEVATION:	580 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26419 is a *pāhoehoe* trail remnant on the large *ʻaʻā* flow that dominates the project area. Only two *pāhoehoe* slabs remain, and no others could be located (Figure 47). This area of the *ʻaʻā* flow is relatively level with areas of level small cobble *ʻaʻā* flow, as opposed to surrounding areas with rough undulating *ʻaʻā* that is difficult to traverse. To the south of site -26419 is a level area that runs approximately east-west, and could have been traversed relatively easily. Vegetation in general is minimal, but there are some thick groves of *koa haole* and Christmas berry trees. Given the proximity of site -26418 (105 meters to the east) which is a long *pāhoehoe* slab trail, the original site -26419 trail may have been dismantled for re-use in the site -26418 trail. The two remaining slabs of site -26419 are about 30 by 50 centimeters and about 1 meter apart, and it appears the trail would have run approximately north-south. There is no excavation potential for this site, given the site type and that it is a remnant trail. Function is transportation with no other function being apparent.

Figure 47. SIHP # 50-10-28-26419, photograph of *pāhoehoe* slab trail remnant

4.3.8 State Site # 50-10-28-26420

SIHP #	50-10-28-26420
FUNCTION:	Activity Area
SITE TYPE:	Lava Tube
TOTAL FEATURES:	1
DIMENSIONS:	210 m by 5 m
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	548 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26420 is a lava tube located on an undulating, southwest sloping *pāhoehoe* flow in the center of the south side of the project area. The vegetation in the area consists of thick grass and dense *koa haole* with a few *noni* trees in the main sink area. There is a previous site tag on top of a *pāhoehoe* bedrock exposure with a blister opening, located 19 meters northeast of the -26420 site tag, which reads "ACP TF-213 2-21-03". The blister and outcrop were investigated but no cultural material or modification was found.

The site consists of a single long northeast-southwest running lava tube with minimal modification (Figure 48 and Figure 49). The tube itself is mostly very humid and warm, with stale air. The modification consists of approximately thirteen water collection features, the majority of which are in the southwest half of the tube. The only midden present at the site is a single small piece of cowry at the base of some natural fall under one of the tube entrances. It is of interest that despite the high moisture and easily accessible tube entrance, there is still only very minimal modification of the tube, and overall very little water catchment given the size of the tube. This may be due to the noticeably stale air in the tube; generally this type of tube tends to have minimal modification and use as opposed to lava tubes that are cooler but still moist. Site -26421 is a very similar lava tube that also has very minimal modification, despite the size and easy access to the tube.

The function for site -26420 is an activity area for water collection, as this is the sole modification of the lava tube. There are nearby agricultural modifications suggesting this site may have been used as a source of water for people engaging in agricultural activity nearby, but there is no evidence of any extended habitation of the tube, only water collection. Excavation potential is poor given the lack of soil, midden, or intensive modification.

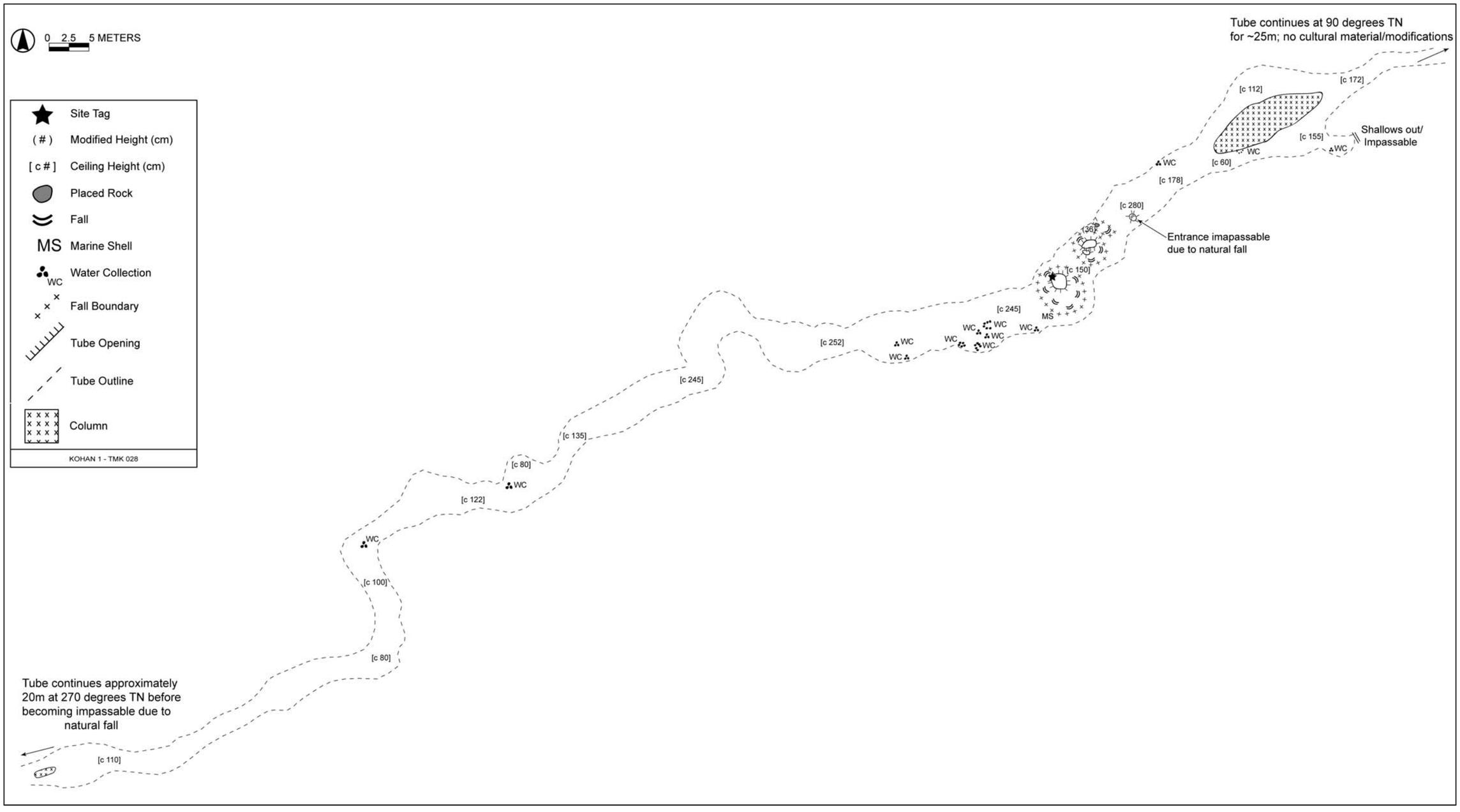

Figure 48. SIHP # 50-10-28-26420, plan view of lava tube

Figure 49. SIHP # 50-10-28-26420, photograph of lava tube entrance facing northeast

4.3.9 State Site # 50-10-28-26421

SIHP #	50-10-28-26421
FUNCTION:	Temporary Habitation and Activity Area
SITE TYPE:	Lava Tube
TOTAL FEATURES:	1
DIMENSIONS:	130 m by 50 m
CONDITION:	Poor
AGE:	Pre-contact
ELEVATION:	554 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26421 is a lava tube system just off of the *ahupua‘a* wall at the southern edge of the project area. The site is located within the pervasive agricultural area designated site -26417 Feature A. The topography is characterized by a gentle slope to the southwest and the area is dominated by tall thick grass, *koa haole*, and Christmas berry trees. Site -26420 is a similar site located 70 meters north of site -26421.

The site consists of three main lava tubes (Tube 1, Tube 2 and Tube 3) leading off of a central sink (Sink 1) (Figure 50). Sink 1 is only a few meters north of the *ahupua‘a* wall, and has two skylight entrances directly northeast of the main sink entrance. There is another sink (Sink 2) that can be accessed via Tube 3, but it is more than 30 meters outside of the project area (southeast of Sink 1, on the south side of the *ahupua‘a* wall). Both at the main sink (Sink 1) and the skylight entrances, cobbles and boulders have been piled up informally to create easier access to the tubes. Modern refuse was found in all of the tubes, especially near the main sink entrance, indicating that it was probably used in modern times as a shelter (trash includes batteries, gloves, paper scraps, beer bottles, tarp remnants, and kneepads).

Tube 1 is the main tube off of Sink 1, and it travels east-northeast from the skylight area. The tube has minimal modification other than a few water collection features, a small mound near the sink entrance with modern trash and charcoal nearby, and a cairn at the eastern intersection of Tubes 1 and 3 (see map). Tube 1 continues to both the west and east (the east side being far larger) and on both ends continues for long distances (more than 30 meters) with no cultural modification. The areas with no modification tend to be small and have very thick stale air. Tubes were followed until it was considered no longer safe given small areas, large amounts of fall, and the distance to the sink being over 50 meters or more. In all cases tubes were followed at least 30 meters beyond the last cultural modification. There was modern trash (a single kneepad) found about 100 meters east from the Sink 1 entrance, indicating a possibly large amount of modern disturbance at the site.

Tube 2 extends west from Sink 1. Initial access to the tube is difficult, either from the rubble-filled Sink 1 or via a small side tube off Tube 1. Although Tube 2 is fairly level and extends about 50 meters west, there is no cultural modification in this tube, other than modern trash near Sink 1.

Tube 3 parallels Tube 1, extending east-southeast from the skylight entrances near Sink 1. This tube has no modification but does continue for more than 30 meters to eventually connect to Sink 2 (outside the project area). Sink 2 has some midden (marine shell, charcoal, and a coral abrader) in its main tube entrance, but given its location outside the project area it was only

cursorily inspected. It is unlikely Tube 3 was used frequently to access Sink 2, given the small size of the tube and stale air throughout. There is charcoal and midden in Tube 3 near the Sink 2 entrance, which all appears to be wash from the sink. A kneepad was also found behind the fall in Sink 2. The cairn in Tube 1 (at the intersection between Tube 1 and Tube 3 on the east side) may have been an indicator to warn against going into Tube 3 or a sign that Tube 1 is the easiest path out to Sink 1. Either way, Sink 2 appears different enough in character from Sink 1 to be considered a separate site, with a site boundary drawn arbitrarily at the *ahupua‘a* wall.

The function of this site is temporary habitation and activity area (water collection). There is a small amount of modification of the tube (informal stacking at entrance, one mound, a few water catchments, and a few cairns), but overall the modification is minimal given the size of the tube. This indicates minimal use of the tubes and minimal investment, typical of a shelter. Some cultural modification could have been destroyed by modern use of the tube, and there is one area that does appear to have formerly been fairly intense water collection that is now just a cobble scatter in Tube 1. Lack of abundant midden or artifacts also points to use only as intermittent habitation and water collection. Similar to site -26420, much of this tube system is uncomfortably moist and hot with stale air, and this may in part explain the minimal use of the site. Excavation potential for this site is poor, as there is little cultural material, no soil depth, and a lack of datable material in good context.

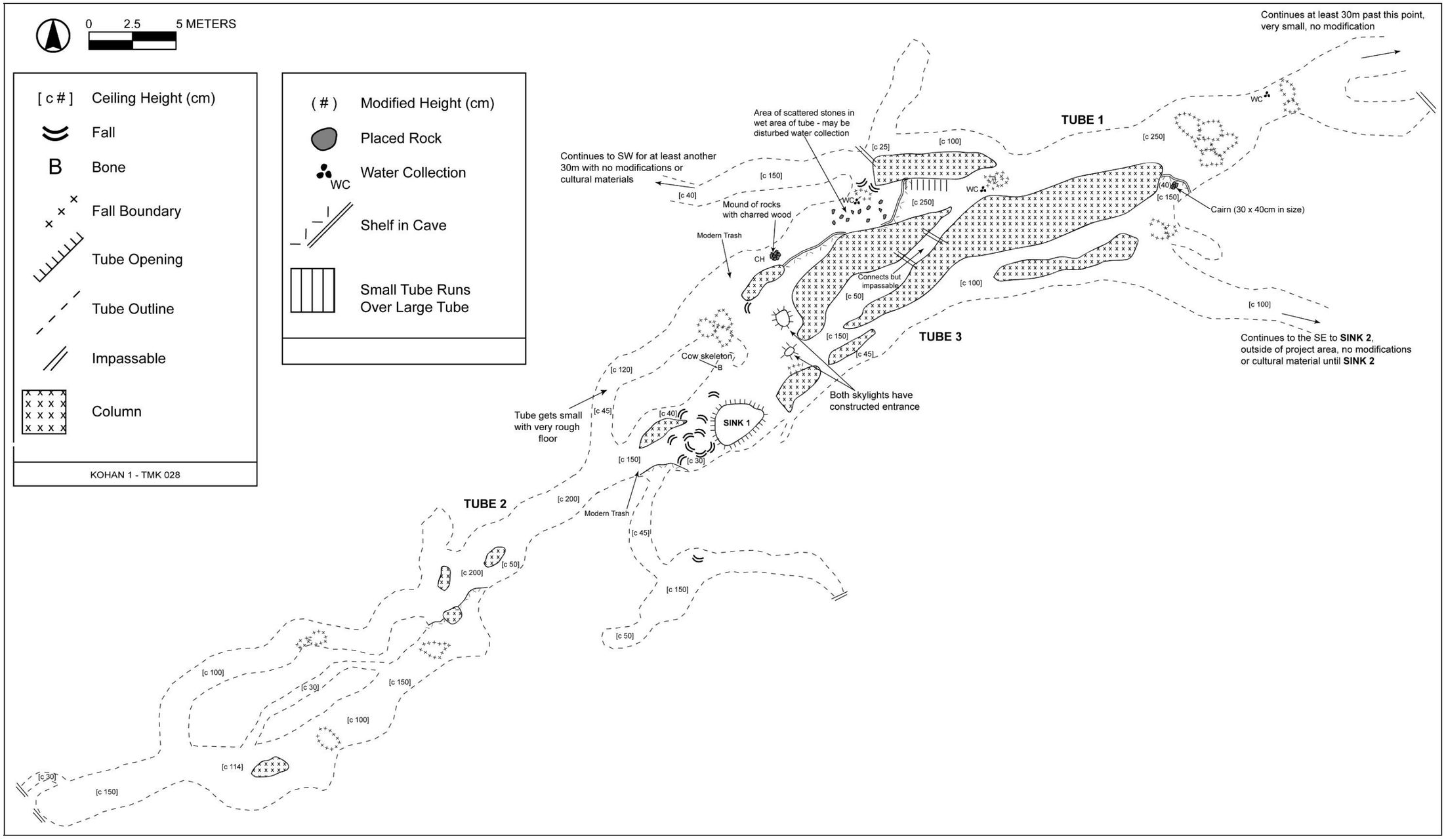

Figure 50. SIHP # 50-10-28-26421, plan view of lava tube

4.3.10 State Site # 50-10-28-26422

SIHP #	50-10-28-26422
FUNCTION:	Transportation
SITE TYPE:	Trail
TOTAL FEATURES:	1
DIMENSIONS:	Approximately 200 m in length
CONDITION:	Poor
AGE:	Pre-Contact
ELEVATION:	607 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26422 is a trail located on the large *‘a‘ā* flow that dominates the project area. Vegetation at the site consists of Christmas berry trees, thick grass, and *koa haole* trees, with vegetation often being particularly dense on the trail route itself.

The site consists of a *pāhoehoe* slab and crushed *‘a‘ā* trail that runs approximately 200 meters at 265 degrees tN before becoming too disturbed to follow on its eastern end (see Figure 15 above for overview of trail location). At the western end, the trail intersects the site -26418 trail near modern Hina-Lani Street (see Figure 16 for an overview of the intersection of the three major trails in this area). The trail has been split into sections for descriptive purposes.

Section A of the trail consists of its western portion where it intersects the site -26418 trail (Figure 16). At the intersection there is a large marine aggregate (cemented sand slab with shell inclusions). This type of marine aggregate occurs naturally along the coast and was apparently placed along trails within the project area as a marker (the slabs are naturally white, although they are now sun-bleached grey on top; see also site -26418 and -26433 for other trails with marine aggregate markers). The -26422 trail does not continue west past its intersection with the -26418 trail. Section A is largely a crushed *‘a‘ā* portion of the trail with only a few *pāhoehoe* slabs, and continues east about 25 meters before coming to a near vertical cliff that is several meters high. There is one *pāhoehoe* slab set upright into the cliff to create a step up, and several leveled areas going up the cliff which serve to create a steep ramp up. Towards the top of the cliff there is at least one large marine aggregate (Figure 16 and Figure 52).

Section B is the portion of the trail that continues east after ascending the cliff. This portion of the trail is difficult to follow because of heavy vegetation and the fact that the trail is only a remnant in this area. There are, however, several small marine aggregate pieces and a few *pāhoehoe* slabs that can be followed, as well as level crushed *‘a‘ā* areas. This portion of the trail can be followed most easily by following the vegetation; the grass and Christmas berry trees are noticeably thicker along the trail route.

Section C of the trail has several *pāhoehoe* slabs, several small marine aggregate pieces, and is less heavily vegetated (Figure 51 and Figure 53). However, this portion of the trail cannot be followed to the east because it is only a remnant and the area is heavily vegetated with some signs of bulldozing in the area. The trail is lost to the east of Section C for about 60 meters.

Section D of the trail is an intact *pāhoehoe* slab portion of the trail, which runs approximately 30 meters before being lost completely in vegetation (Figure 51). No further trail remnant could be found east of Section D. This section of the trail also is heavily covered in vegetation, especially along the route of the trail.

Function of site -26422 is transportation over the large *‘a‘ā* flow that dominates the project area. The trail is marked by marine aggregates and utilizes *pāhoehoe* slabs, suggesting a pre-contact style of trail construction. The trail also intersects site -26418 near that trail’s northern terminus, suggesting that site -26422 was an east-west trail built to complement the larger north-south running -26418 trail. The intersection of these two trails combined with the nearly adjacent intersection of site -26418 and -26371 suggests that this was a well-traveled area both in pre-contact and historic time periods. The utilization of this particular area is likely due to the geography of the *‘a‘ā* flow to the north of the project area, where it drops down to *pāhoehoe* not far from the current project area’s north boundary. Overall site -26422 is in poor condition, with the trail having large gaps and areas of only remnant trail. Excavation potential is also poor, given the type of trail construction. No further work is recommended, although the possibility of partial preservation at its intersection with site -26418 (in conjunction with that site’s preservation plan) should be considered, as they may be related and/or contemporaneous sites.

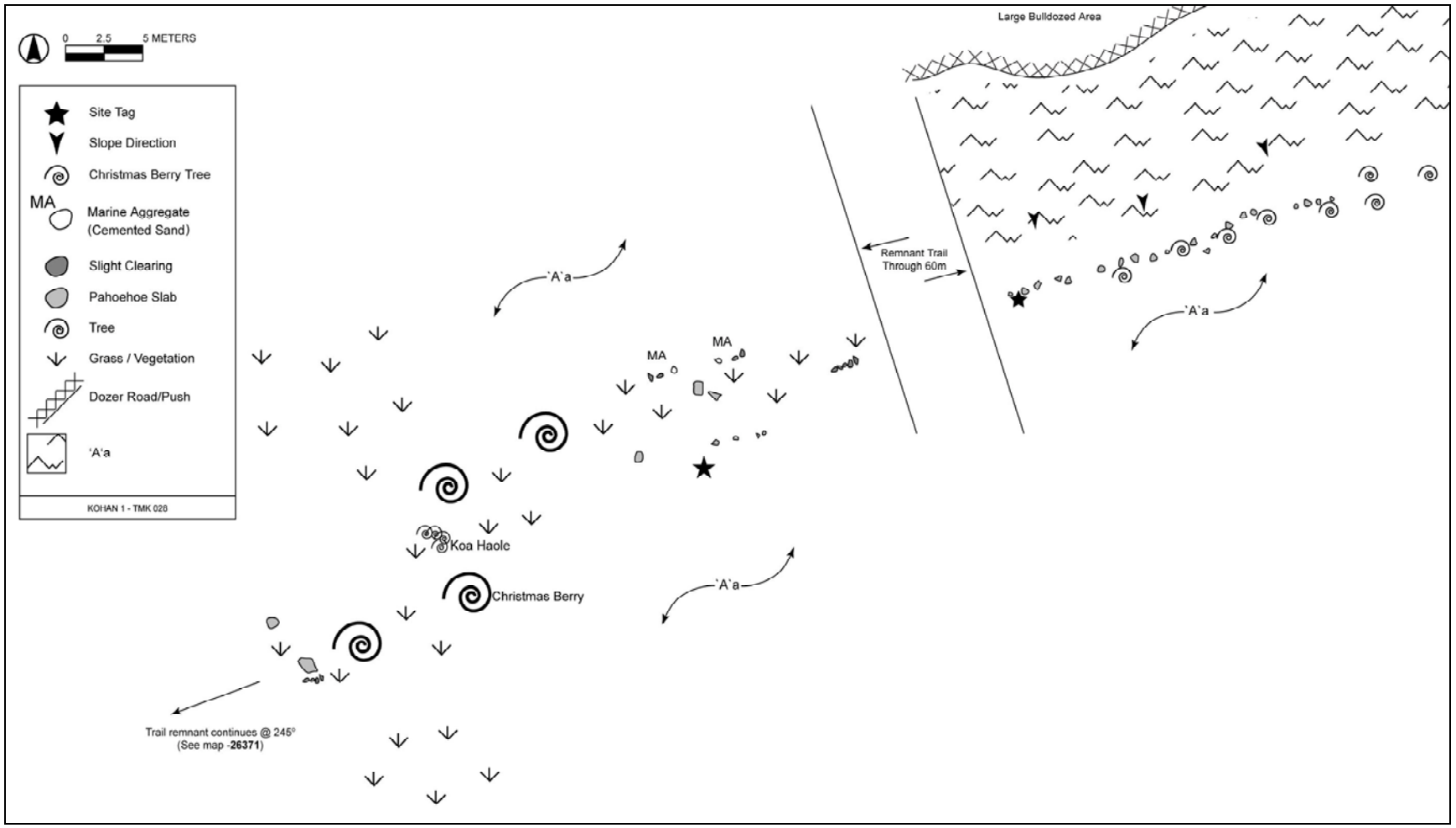

Figure 51. SIHP # 50-10-28-26422, plan view showing portions of trail Section C (left) and Section D (right); see Figure 16 for plan view of Section A and Section B

Figure 52. SIHP # 50-10-28-26422, photograph of trail, Section A, looking down (southeast) from cliff edge; intersection with -26418 is at far right; arrow marks marine aggregate

Figure 53. SIHP # 50-10-28-26422, photographs of trail facing northeast (1 m scale). At left, heavy vegetation covering portion of trail Section C (marine aggregates marked with arrows); at right, *pāhoehoe* slabs and crushed *‘a‘ā* at trail Section D

4.3.11 State Site # 50-10-28-26423

SIHP #	50-10-28-26423
FUNCTION:	Burial
SITE TYPE:	Lava Tube and Modified Tumulus
TOTAL FEATURES:	2
DIMENSIONS:	40 m by 15 m
CONDITION:	Good
AGE:	Pre-Contact
ELEVATION:	663 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26423 consists of two features on a high, level *‘a‘ā* tumulus, located on the large *‘a‘ā* flow that dominates the project area. The site is approximately 15 meters east of site -26418 (near Section G), but there are no other sites in the immediate area. Vegetation in this area is relatively sparse (some *koa haole* and Christmas berry) and the surface is primarily rough undulating *‘a‘a* flows. The *‘a‘ā* tumulus is elevated 1.5 to 2 meters above the surrounding area (often with near vertical edges) and is approximately 40 meters long and 10 to 15 meters wide, with the tumulus running northeast-southwest. The top surface of the elevated tumulus is very level and has areas of placed small cobbles that create level surfaces. There is no formal modification of this area other than leveling (see Feature B). The view from the top is excellent (near 360 degrees) and it is higher than any nearby outcrops. The top of the tumulus has four small sinks, which are areas on the surface that have collapsed and created small overhangs or exposed small lava tubes. None of the sinks are larger than about 3 meters in diameter and all are less than 1 meter deep, with tubes extending no more than 3 meters.

Feature A consists of a modified lava tube with a burial (Burial 56). The tube is located off the southwestern sink, which is about 1 meter in diameter and 1 meter deep, with the tube entrance to the north-northeast (50 by 70 centimeters in size; see Figure 55). The tube is 3 by 2 meters in size with a 70 centimeter ceiling height. Feature A and Burial 56 are located in this small tube 2 meters at 40 degrees from the site tag at the tube entrance. The burial area appears to have been cleared, with *‘a‘ā* cobbles stacked one to two courses around the northwest side of the burial. A large piece of roof fall (about 1.0 by 0.6 centimeters) has been propped up on these smaller cobbles to create a small covered space about 40 centimeters high. *‘A‘ā* cobbles have also been piled on the west side of the tube (one to two courses high), and cobbles and roof fall have been arranged to delineate a 1.5 by 1 meter space (running northwest-southeast) that contains Burial 56. Within the space delineated for the burial, there are four or five somewhat flatter cobbles (about 25 centimeter diameter) that have been placed on top of the burial, especially to the northwest side. The burial consists of a nearly complete mandible with several teeth, several small cranial fragments, a portion of a maxilla, several long bones, at least one fragmented vertebrae and many small pieces of unidentifiable bone. All cranial elements were at the southeast end of the burial, and all leg bones at the northwest end, suggesting that this is a primary burial and (given the size of the burial area) in a flexed position. This individual appears to be an adult, and all indications suggest that this is a pre-contact style burial. There were no associated burial goods. This tube does connect to another sink to the northeast, but the area is impassable due to large natural fall.

Feature B is located on the southwest end of the tumulus (at its base, see Figure 54 and Figure 55). It consists of a small constructed terrace that is approximately 1.5 meters wide and extends approximately 4 meters along the outcrop edge. It is constructed of small *‘a‘ā* cobbles (5 to 10 centimeters in size) and some larger *‘a‘ā* cobbles along its edge (up to 60 centimeter cobbles) stacked two to three courses high in some areas. The small cobbles create a paved surface ideal for walking, and this terrace extends along the edge and heads upward toward the surface of the elevated tumulus; it may have been a ramp for accessing the top of the tumulus. The top of the tumulus is also cleared and somewhat leveled (as mentioned above); this leveling is considered part of Feature B, as general modification to the tumulus. Given the proximity of site -26418, Feature B may have functioned as transportation from site -26418 to site -26423.

Function of site -26423 is primarily as a burial. Other functions may include habitation or ceremonial uses, as this is a large level area with an excellent view near a major trail system. However, there is no evidence to support any function other than burial (i.e., no hearth, enclosures, etc.), and the leveling of the tumulus surface may be part of the modifications arranged for Burial 56. Excavation potential for this site is minimal due to a lack of soil, depth of construction, or midden.

Figure 54. SIHP # 50-10-28-26423, Feature B, photograph of constructed terrace facing east

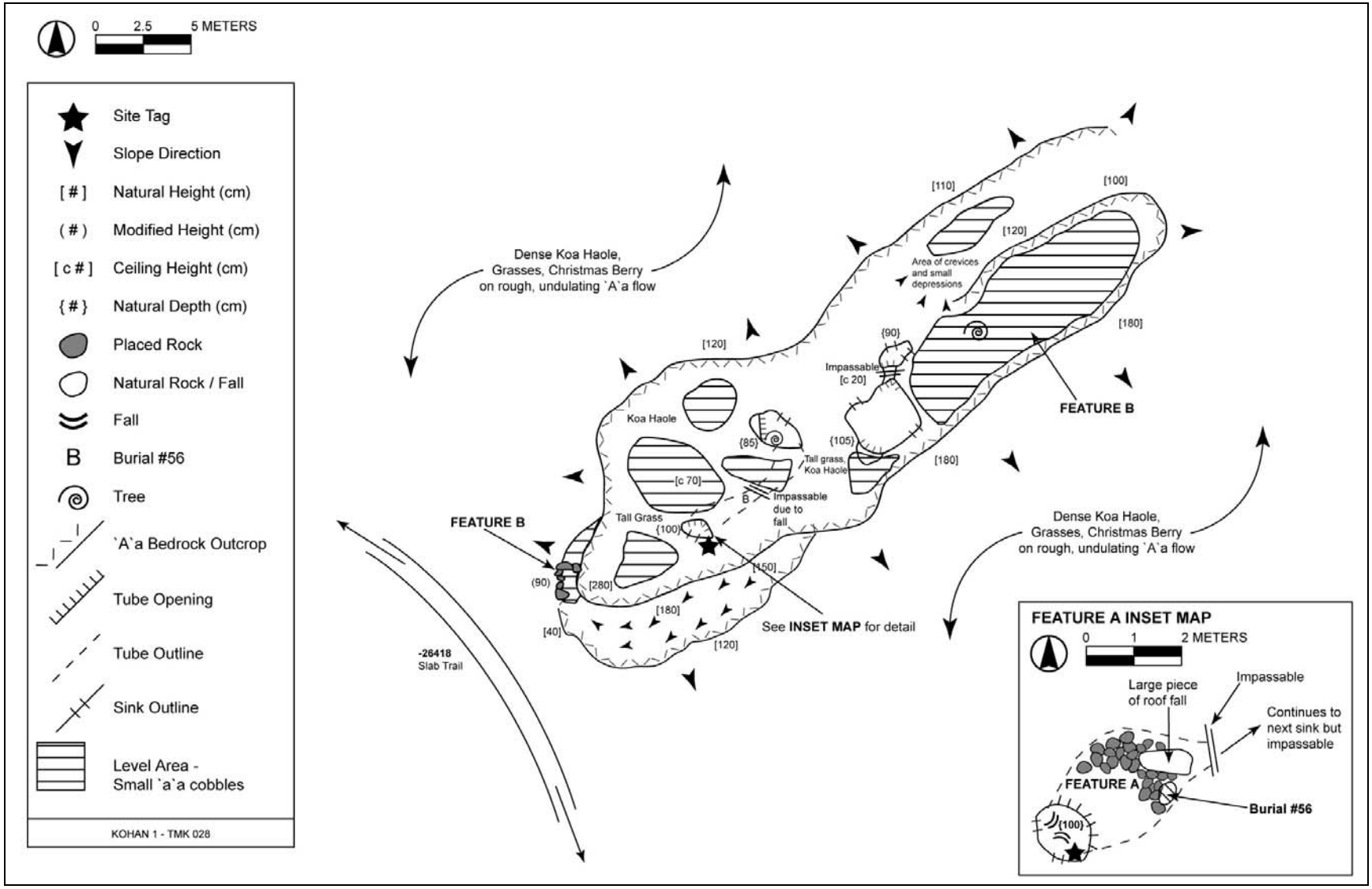

Figure 55. SIHP # 50-10-28-26423, plan view

4.3.12 State Site # 50-10-28-26424

SIHP #	50-10-28-26424
FUNCTION:	Ceremonial
SITE TYPE:	Enclosure
TOTAL FEATURES:	1
DIMENSIONS:	15 m by 15 m
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	627 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26424 is a large formally constructed enclosure with a formally paved interior surface (Figure 56 and Figure 58). It is located at the edge of the large *‘a‘ā* flow that dominates the project area, at an area where there is an abrupt transition from rough undulating *‘a‘ā* to level *pāhoehoe* with soil formation. The edge of the *‘a‘ā* varies naturally from a steep to a gradual drop at the transition to *pāhoehoe*; at the area where site -26424 is constructed it is a fairly steep drop of 1 to 2 meters. The *‘a‘ā* flow immediately surrounding the structure is fairly level, and especially on the northwest side it is very level and fairly well cleared of larger loose cobbles (consisting of all small *‘a‘ā* cobbles with minimal undulation, it appears worn down through repeated use of the area). The *pāhoehoe* area on the east side of the structure is very level and fairly well cleared. There is an informal mound about 5 meters east from the east edge of the structure, which may be related to the function of the enclosure, but is at least partially a natural outcrop. There is also a piece of marine aggregate that is located about 8 meters east of the structure in the *pāhoehoe* area, which is likely related to the nearby site -26418 trail. Vegetation in the area consists of dense *koa haole* in the *pāhoehoe* area as well as thick air plant, with *koa haole*, Christmas berry trees, and grass growing in the enclosure and around it (on the *‘a‘ā*). There are large Christmas berry trees within the enclosure which have damaged both the surface paving and the enclosure walls. This site is located at the northern edge of an area of relatively high site density within the *pāhoehoe* area, and it is only 35 meters southwest of the southern terminus of site -26418. Site -26428 is 55 meters to the southwest, and is also located on the edge of the *‘a‘ā*.

The enclosure is approximately 15 by 15 meters in size, with walls averaging 80 to 100 centimeters thick and 80 to 110 centimeters high (with the eastern and southern edges being considerably higher in total height due to the natural drop-off of the *‘a‘ā* down to *pāhoehoe*; Figure 57). The enclosure is roughly square but the walls in the southwest corner are more complex (see map). The walls are formally constructed primarily by stacking *‘a‘ā* cobbles 10 to 60 centimeters in size, with most cobbles being 20 to 40 centimeters in size. Most areas of the wall that have not collapsed are faced, with some uprights in the wall, but primarily the facing is constructed by stacking rough *‘a‘ā* slabs. *Pāhoehoe* slabs and cobbles are also used in the wall construction but much less frequently. The natural *‘a‘ā* undulations and elevated areas have been utilized as high points to build the wall on top of, which may partially explain the complexity of the southwest corner.

In the interior of the structure, the floor is formally paved with small *‘a‘ā* cobbles on the west half and *pāhoehoe* slabs on the east half; both sides are nicely level with a small step down from the *‘a‘ā* paving to the *pāhoehoe* slab paving. This small step down (30 to 40 centimeters high) is

formalized by a divider of *pāhoehoe* cobbles, slabs, and small uprights, formally faced in some areas. There is one *pāhoehoe* slab upright in the *‘a‘ā* cobble paving area that measures 40 by 10 centimeters and is 45 centimeters tall. In the *pāhoehoe* slab paved area, towards the southeast corner of the structure, there are two *pāhoehoe* cobbles and one slab that form a small triangle; in the middle is a branch coral head (15 by 12 centimeters by 20 centimeters high) that is slightly damaged (eroding; Figure 58). The coral was intentionally placed at the center of these stones, as it is wedged in tightly. The coral piece is near an area of the enclosure that is asymmetrical and partially collapsed; at the southwest corner of the enclosure the wall turns inward and creates an additional corner. The interior of the structure at this southeast edge is raised near this point by 30 to 40 centimeters and is not nicely paved like the rest of the interior, although much of this area has suffered some collapse due to vegetation. This southern area may represent an add-on to the original structure or delineation of space within the enclosure.

On the east edge of the structure, where it drops down from the *‘a‘ā* to the *pāhoehoe*, the wall is faced on the inside but then extends as much as 3 meters out to the east before dropping down more than 180 centimeters in some spots. From the north corner, the east outer edge is faced. Moving south, it then extends out in a low (about 70 centimeters high) constructed outcrop that extends about 2 meters (60 centimeters lower than the height of the wall, for a 1.3 meter drop total). After this outcrop there is a low spot in the wall and an area that utilizes the natural bedrock as well as several *pāhoehoe* slabs, which create a series of steps down to the *pāhoehoe*; these are largely collapsing and it is difficult to discern how formal they might have been. Moving further south along the east wall is an area where the wall extends east 3 meters and has an area of *pāhoehoe* slab paving (covering an area of about 2 by 2 meters; this entire extension of the structure is about 3 by 3 meters). This area is stacked over 1 meter high, and then there is a second constructed tier below this that is 1.5 meters wide and 60 centimeters high. This second tier is somewhat collapsed. The facing along the outer edge of the east wall past the 3 by 3 meter extension is informal and largely follows the naturally elevated *‘a‘ā* edge.

Function of this site appears to be ceremonial, given its fairly large size, formal construction of walls and paving, and the presence of a placed coral head. The presence of leveled areas around the enclosure suggests either intentional smoothing of walking areas or crushing of the *‘a‘ā* through extensive use (probably frequent walking over the surface). The location of the structure at the edge of the *‘a‘ā* and near the end of the site -26418 trail, as well as near a higher site density on the *pāhoehoe*, may also indicate ceremonial importance. The coral head and very formal construction (high energy investment) strongly suggest ceremonial importance, and this site is a probable *heiau* (see discussion of ceremonial function in Summary and Interpretation section of this report). Excavation potential for this site is good, since an excavation within the structure could recover datable material and/or cultural material, although no cultural material was found on the surface other than the placed coral. Overall this site is an excellent candidate for preservation.

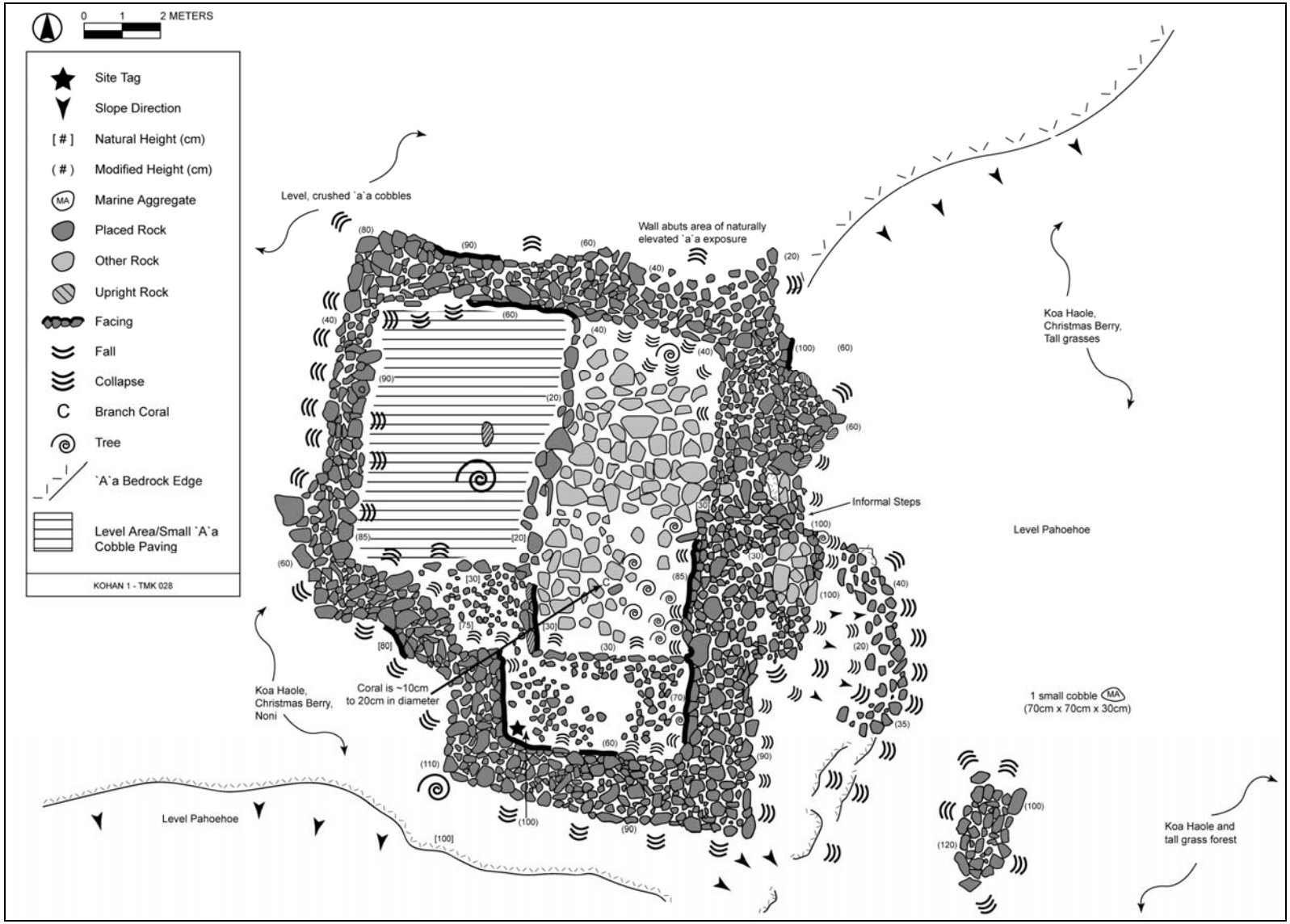

Figure 56. SIHP # 50-10-28-26424, plan view

Figure 57. SIHP # 50-10-28-26424, overview photograph of enclosure facing southeast, north wall in foreground

Figure 58. SIHP # 50-10-28-26424, photograph from inside structure looking at southwest corner; slab paving in foreground and placed coral head at bottom left (arrow)

4.3.13 State Site # 50-10-28-26425

SIHP #	50-10-28-26425
FUNCTION:	Temporary Habitation and Burial
SITE TYPE:	Lava Tube, Modified Outcrop, Terrace
TOTAL FEATURES:	4
DIMENSIONS:	30 m by 22 m
CONDITION:	Good
AGE:	Pre-Contact
ELEVATION:	613 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26425 has four features and consists of a lava tube system with a modified outcrop and terrace nearby. The site is located about 130 meters north of the *ahupua‘a* wall, and the end of the large slab trail (site -26418) is about 100 meters north, with site -26424 and site -26428 about 80 meters away to the northwest. From Feature B, site -26427 can easily be seen about 75 meters to the south. There is agricultural activity associated with the site, in the form of informal terracing, some mulching, filled crevices, and cleared areas. However, this agricultural activity does not extend beyond the immediate vicinity of the site, and therefore is considered a minor component of the site. There is also bulldozer activity nearby. The site is located on *pāhoehoe* that slopes gently to the southwest, with some soil formation. Vegetation consists of dense *koa haole* and thick air plant with intermittent Christmas berry trees in the immediate vicinity.

The lava tube consists of a series of interconnected chambers and small tube sections that can be accessed via three small sinks (Sink 1, Sink 2, and Sink 3). The tube is about 30 meters long, runs roughly east-west, and connects on its far east side to site -26431; the site boundary is designated on the plan view map and is at Sink 3 of site -26425 (Figure 59).

Sink 1 is the westernmost (*makai*) entrance, and is about 3 by 3 meters in size. Feature A is located on the southwest side of the sink, and Tube 1 extends off the sink to the east. Under the southeast ledge of the sink is a large piece of cowry, some pig bones including a mandible, and a soil deposit that is probably washed in from the sink. There is also an ashy soil area about 7 centimeters deep and some charcoal on the surface on the east side of the sink overhang. There is a boulder on the floor with a roughly square depression that contains more of this ashy soil; this depression may have been partially incised. There are a few other informally placed rocks in the sink and tube entrance area, and some rocks cleared out of the way of the area that leads to Sink 2. The tube extends east past an area of fall into a chamber that has been partially cleared of fall. There is charcoal and *kukui* endocarps scattered in the chamber, as well as some cowry shell and sea urchin remains. There are also some scattered animal bones, likely pig or goat. The south side of the chamber drops into a small fissure through which Sink 2 can be accessed through a very tight area; there is more sea urchin and *kukui* in this area. The north side of the chamber drops down and heads back toward the west, coming back along the edge of Sink 1 but underground. This area has quite a bit of natural fall as well as *kukui*, marine shell, sea urchin, and charcoal in an ashy sediment that all appears to be wash from the surface. This side tube ends about 7 meters back, ending in a small chamber. Finally, on the east end of the middle chamber there is a side tube that also leads up to Sink 2, with some midden and charcoal nearby.

Sink 2 is a fairly large tube entrance that leads into a lava tube chamber mostly open to the surface light. This sink has been largely cleared, with piles of cleared rocks at the edges and various placed stones. There is some marine shell scattered on the floor and there is a slightly ashy soil deposit. There are three coral abrader blanks on the tube floor. At the far east end of the cavern is a small tube (leading east over a shelf) that leads into a larger chamber that has a large amount of fall and is fairly rough. The back of this rougher chamber is the informal portion of Feature D. The natural fall in this room appears to have been utilized to block entrance from Sink 2 to the Sink 3 chamber where Burial 58 is located.

Sink 3 consists of a skylight entrance that leads into a large chamber. The area under the skylight has been informally piled to create an easier access into the tube. Portions of the cavern have been cleared, and there is a large cow skeleton. Near the cow skeleton is Burial 58 (4.3 meters at 280 degrees tN from the Sink 3 site tag), which consists of a single human bone (hand bone), and which possibly was washed out from the Feature D area. Next to Burial 58 is a small cowry shell (*Cypraea granulata*) that has a single distal-dorsal perforation and is interpreted as a possible burial item. West and south of the cow skeleton are some constructed areas which constitute Feature D. At the east side of the chamber, two more tubes head east – the entrance to these tubes constitutes the boundary of this site and site -26431.

Feature A is located at the far west end of the lava tube, and is a modified section of Sink 1 that formally modifies a small cavern (Figure 60 and Figure 62). In the entry area, the modification is extensive for this site. The north side of the entrance chamber has modified fall stacked into a retaining wall that does a relatively good job of sealing the chamber from the exterior, where it should have been open to the surface prior to modification. Across the small entrance (measuring approximately 40 centimeters tall and 125 centimeters wide) is an alignment of large cobbles and small boulders creating a somewhat formalized “threshold” that seems to retain sediment from the sink well. The center of the chamber appears at one time to have had considerable fall that has largely been cleared to the back (west wall) where loose fall has naturally ended the tube in this direction. The south side of the chamber is notable for numerous small cobbles mounded up to 50 centimeters tall and 1 meter thick along the south wall. One portion of this mounded area serves as an informal wall blocking an extension of the tube to the southwest. Enough of these mounded cobbles were moved aside by archaeologists to allow access to the continuation of the tube. No modification or cultural material was found in the tube extension; however, the south side of the mounded wall (inside the extending tube) was well marked with about four upright small boulders that retained the mounded small cobbles, preventing them from sliding into the extension. In the mounded cobbles were *kukui* endocarps, limited charcoal in poor context, one marine shell, a portion of a dog mandible and, notably, a small (about 7 centimeters long) fragment of branch coral. In the interior of the entrance chamber, a considerable soil deposit is present (approximately 5 centimeters deep) and one marine shell (*Nerita* sp.) was noted. Pig bones are also numerous (femur, vertebrae) but are not believed to be cultural. Function of the feature is consistent with the remainder of the site, as temporary habitation. The modification of the chamber improves the living surface and stabilizes the edges of the chamber. The presence of branch coral and the very well blocked tube extension are highly suggestive of a burial, and though a very thorough inspection of the tube beyond to its natural end was done and no burial was found, it is possible a burial remains hidden in the plentiful fall from the ceiling.

Feature B is southeast of Sink 2, and is a modified outcrop (Figure 61 and Figure 63). The east side of the outcrop has informal stacking along its length that creates a platform-like area on top of the naturally elevated outcrop. The view from on top of the outcrop is excellent. The east, or upslope side of the outcrop, stands about 0.9 meters above the surface. The outcrop has been extended along this side via an informal stacking of large cobbles and small boulders. This modification is not faced and does not have identifiable courses, but it does have a clear vertical edge. Informal corners are apparent at either end of the construction, but collapse has occurred. A large Christmas berry tree lies along the center section of this construction and likely contributed to collapse. Initially this extension may have been quite level, but currently it is rather jumbled. The west, or downslope side of the outcrop, drops down about 2 meters, with Feature C at the base of the outcrop. On the northwest corner is an extension that runs toward Sink 2. The extension consists of the informal placement of rocks; it is raised on both sides above the bedrock reaching a maximum width of 35 centimeters and height of about 1 meter total. It abuts the outcrop in an almost perpendicular fashion. The extension is a remnant, but it may have served as an approach or walkway up from Sink 2. The surface of the outcrop is split into sections by a series of natural fissures which have filled in with mulch and sediment (maximum sediment depth is 10 centimeters). The proximity of this outcrop to the hearth at Feature C and the lava tube suggest that this feature was used for habitation. On the south end of the outcrop there is a natural vertical protrusion about 1 meter high that would have served as a good protective wall during habitation, and the height of the outcrop affords an excellent view and a cool breeze.

Feature C is a terrace just below the elevated outcrop that Feature B is built on (Figure 61, Figure 64 and Figure 65). The terrace creates a level, cleared area along the down-slope flank of the outcrop and has a formally constructed rock-lined hearth. The terrace runs approximately southeast-northwest across the down-slope, reaching a height of 50 centimeters above an area of cleared ground surface. The terrace was constructed using mainly small and medium *pāhoehoe* cobbles, and the front edge of the terrace is collapsed. There are a few uprights down-slope about 50 centimeters from the existing edge; it is possible that these once served as retaining stones or facing at some point. On top of the terrace is the hearth (Figure 65). It is roughly square, and is formed by one upright slab, set into the ground, on each side, for a total of four uprights. The interior of the hearth is nearly filled with small cobbles and a *koa haole* tree growing out of it. The terrace creates a nice, level surface for the hearth, and a comfortable space for habitation with the hearth in a protected area. The level area below the terrace may be related to habitation or agricultural activity but there is no formal construction. This informal modification appears to be isolated agricultural activity related to this site, and has been grouped with site -26425. This modification includes minor mulching, clearing, and small filled crevices.

Feature D is located in the large chamber below sink 3, at the east end of the tube system, and is associated with Burial 58 (Figure 59). It consists of constructed and filled areas along the southwest and western sides of the chamber. There is a rough informal stacking of large cobbles and small boulders along the south chamber wall near a large cow skeleton. This construction encloses a small side tube opening and may have been used as a partial blockage for the small tube. West of this construction is a fill area that blocks access to the tube east of the Sink 2 chamber. This fill is made of mostly cobbles and some boulders. The fill continues along the west wall and blocks a skylight; presumably this opening was several meters wide prior to being

filled. This area has been filled in with larger cobbles, boulders and slabs, but may be partially natural fall. Abutting the filled skylight area is a stacked construction made of large cobbles, boulders, and slabs with vertical sides. It is not formally faced and does not have obvious coursing, but it has a formal appearance nonetheless, and is the most formal area of Feature D. This construction reaches the ceiling and a height of 1.4 meters. A cleared area extends across the floor from the stacked area to the cow skeleton. It is probable that Burial 58 came from one of these filled or stacked areas within Feature D.

Function of this site is permanent habitation and burial. There is enough modification to the sinks (i.e., Feature A) and midden to suggest at least temporary habitation, and the presence of Features B and C strongly suggest more frequent habitation (i.e., construction of formal hearth). There is a fair amount of midden in the tubes and the presence of activity related remains (coral file blanks). At the very least this level of modification represents intermittent habitation, but given the hearth it is more likely permanent. The immediate area was also used for agricultural purposes, and there are nearby (but isolated) burials (see Feature D and Burial 58). The single bone that comprises Burial 58 most likely came from the Feature D area, which apparently functioned as a blockage of the tube leading between Sink 2 and Sink 3, possibly to isolate the burial from the rest of the tube that was used for habitation. Excavation potential for this site is good, given the presence of midden throughout and several areas that could be excavated. The best area for data recovery would be the hearth at Feature C, as it is likely to yield datable material. There are also several other areas with enough sediment and/or construction and midden to consider excavation, such as Sink 1 or Feature B.

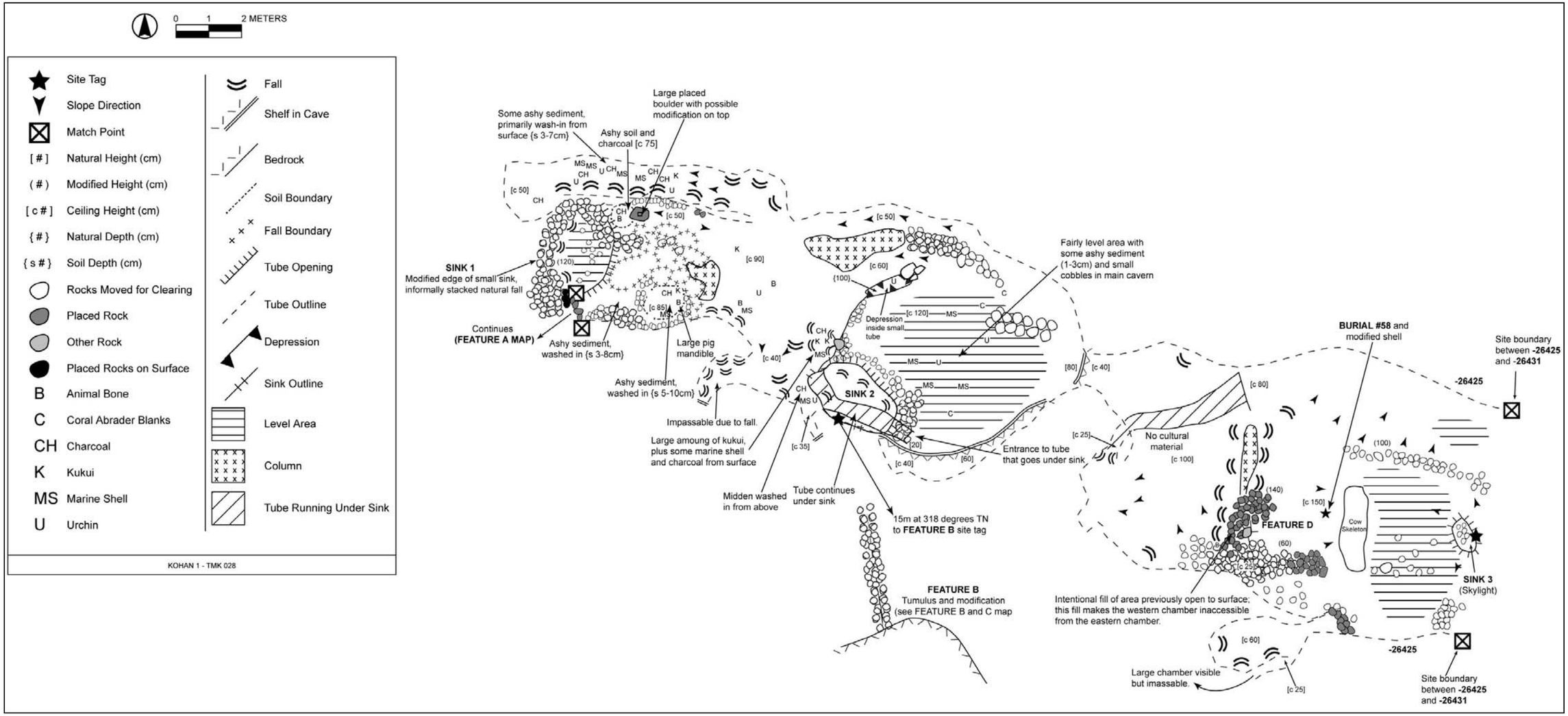

Figure 59. SIHP # 50-10-28-26425, plan view of Tube 1 and Feature D

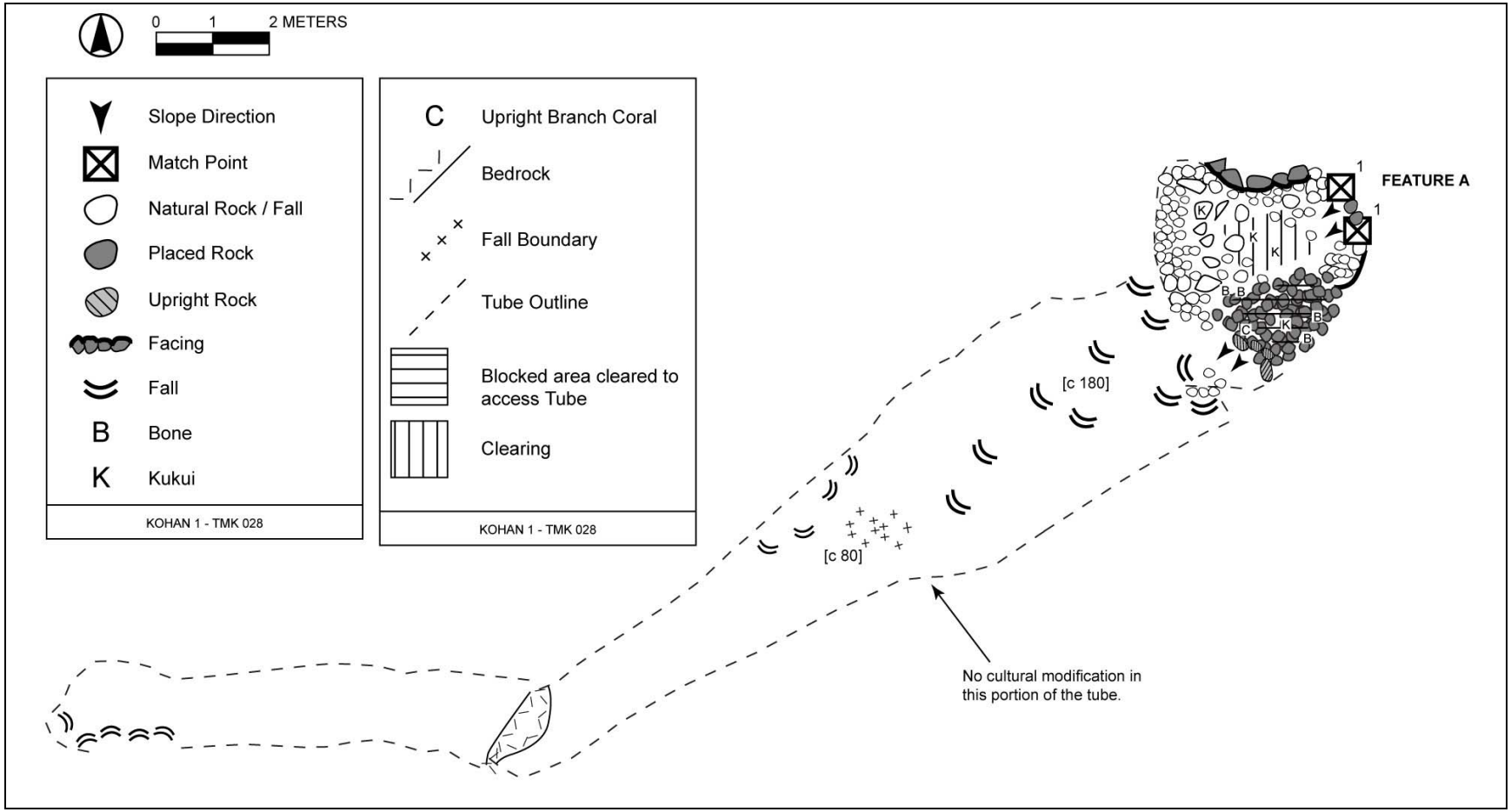

Figure 60. SIHP # 50-10-28-26425, Feature A, plan view

Figure 61. SIHP # 50-10-28-26425, Features B and C, plan view

Figure 62. SIHP # 50-10-28-26425, Feature A, photograph of cobble fill facing south

Figure 63. SIHP # 50-10-28-26425, Feature B, photograph of modified outcrop facing southwest

Figure 64. SIHP # 50-10-28-26425, Feature C, photograph of terrace facing southeast, with stone hearth immediately behind scale

Figure 65. SIHP # 50-10-28-26425, Feature C, photograph of stone hearth close-up

4.3.14 State Site # 50-10-28-26426

SIHP #	50-10-28-26426
FUNCTION:	Marker
SITE TYPE:	Modified Tumulus
TOTAL FEATURES:	1
DIMENSIONS:	6 m by 2.5 m
CONDITION:	Good
AGE:	Historic
ELEVATION:	627 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26426 is an historic datum located near the southern boundary of the project area. The site is situated on an elevated tumulus approximately 15 meters north of the *ahupua‘a* wall. The tumulus rises approximately 1.7 meters above the surrounding terrain, providing an excellent view of the surrounding area, especially to the north and west. The top of the tumulus measures about 2.5 by 6 meters.

The historic datum and associated artifacts are located on the top of the tumulus, concentrated on the western portion (Figure 66 and Figure 67). Modification consists of an “X” inscribed in the exposed *pāhoehoe*. Surrounding the inscribed “X” is a paved cement pad measuring approximately 70 by 50 centimeters. The cement has been poured such that it creates a thick ring around the “X”. The temper of the cement is sand and shell, as small pieces of shell are clearly visible. Inscribed in the cement adjacent to and slightly north of the “X” is the symbol “9”, which appears to be the numeral nine, but also could be a backwards “P”. The leg of this symbol points roughly north. This symbol could be marking this as datum number 9, or the symbol could act as a sort of brand (like a cattle ranching brand). Slightly northeast of the datum is a pile of large *pāhoehoe* cobbles, which were likely placed there when clearing the datum spot or as an anchor for a datum post. Artifacts associated with the datum include several wire nails, a milled lumber square post, and wire. The wooden post measures 2.5 meters in length and is fallen over to the south-southwest, with a wire nail protruding out the bottom of the post (side nearest the datum). There is a wire wrapped around the middle of the post where another nail is located, and via this wire the post is still attached to a larger nail that is nailed into the tumulus. There are also several other nails set into the tumulus surrounding the datum, and with the wire these likely held up the tall post. The nails and wire are heavily rusted, and the wire has broken from where it was originally attached to several of the nails.

The function of site -26426 is a historic datum marker. The primary element of the site (the “X” and surrounding cement) is a permanent marker and the post would have been a visible marker when upright. The associated artifacts are historic period, specifically the early to mid-20th century. Excavation potential is limited, as the site type is limited use with little potential for subsurface deposits.

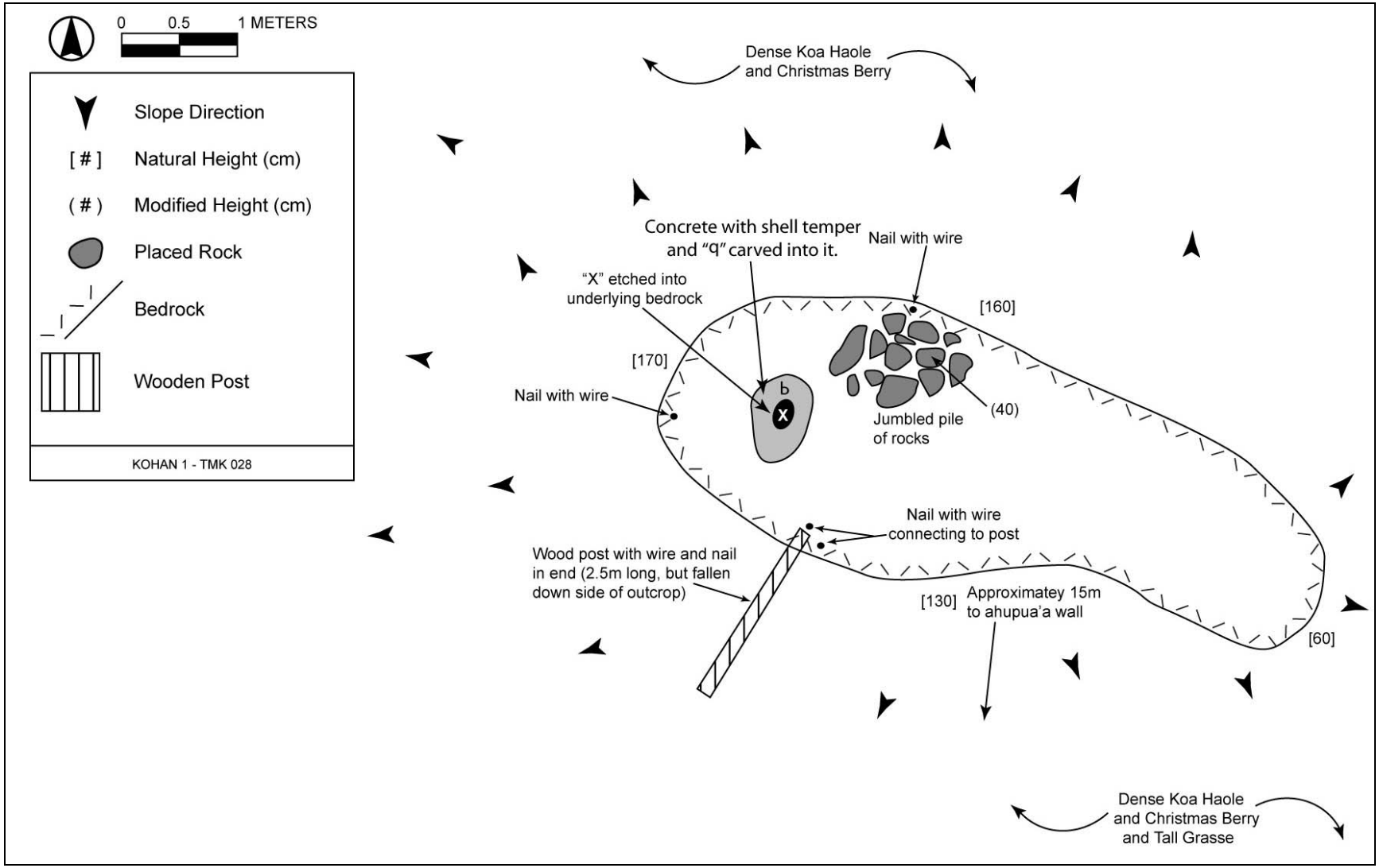

Figure 66. SIHP # 50-10-28-26426, plan view

Figure 67. SIHP # 50-10-28-26426, photograph of historic datum facing south, with engraved symbol “9” and fallen wooden pole in background

4.3.15 State Site # 50-10-28-26427

SIHP #	50-10-28-26427
FUNCTION:	Burial
SITE TYPE:	Lava Tube and Modified Tumulus
TOTAL FEATURES:	1
DIMENSIONS:	12 m by 10 m
CONDITION:	Good
AGE:	Pre-Contact
ELEVATION:	656 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26427 is one of the most prominent tumuli in the southern *pāhoehoe* portion of the project area, naturally raised over 3 meters above the surrounding terrain (Figure 68 and Figure 69). This tumulus has a very commanding view of the entire coastline from beyond Keahole point to Kailua town.

The top of the tumulus contains a small blister in which a juvenile human burial is located (Burial 57). The tumulus has a small linear opening to the blister chamber. Burial 57 is comprised of a few bones scattered on a thin silty deposit on the south end of the chamber (located approximately 2 meters at 140 degrees tN from the site tag). These include both temporal bones (small portions around the external auditory meatus), a fragment of the right maxilla (posterior) including a molar and premolar, and an un-fused ilium. Approximately three other teeth are present (one canine and two molars), located in the sediment, as were a couple of small unidentifiable limb bones (possible radius, fibula). The maxilla shows an erupting first molar, fully erupted second premolar, and a cavity suggesting a developed but un-erupted second molar. This suggests a child between six and twelve years of age. The south end of the blister appears to be slightly cleared of fall and a single *pāhoehoe* slab is placed near the center of the chamber. No other modification was noted.

The tumulus top itself is noticeably lacking any major modification. A level rest area (shelter) is located fairly low on the south side of the tumulus. The leveled area is shallow (about 15 centimeters) and appears to be unrelated to the burial. It consists mainly of small boulders filled with very local rubble cobbles from the eroding bedrock.

Function of the site is burial, with a possible secondary function of temporary habitation. This site is similar to both site -26423 and site -26416, both of which are burials on top of high tumuli. Excavation potential for this site is minimal given the lack of midden and the presence of a burial.

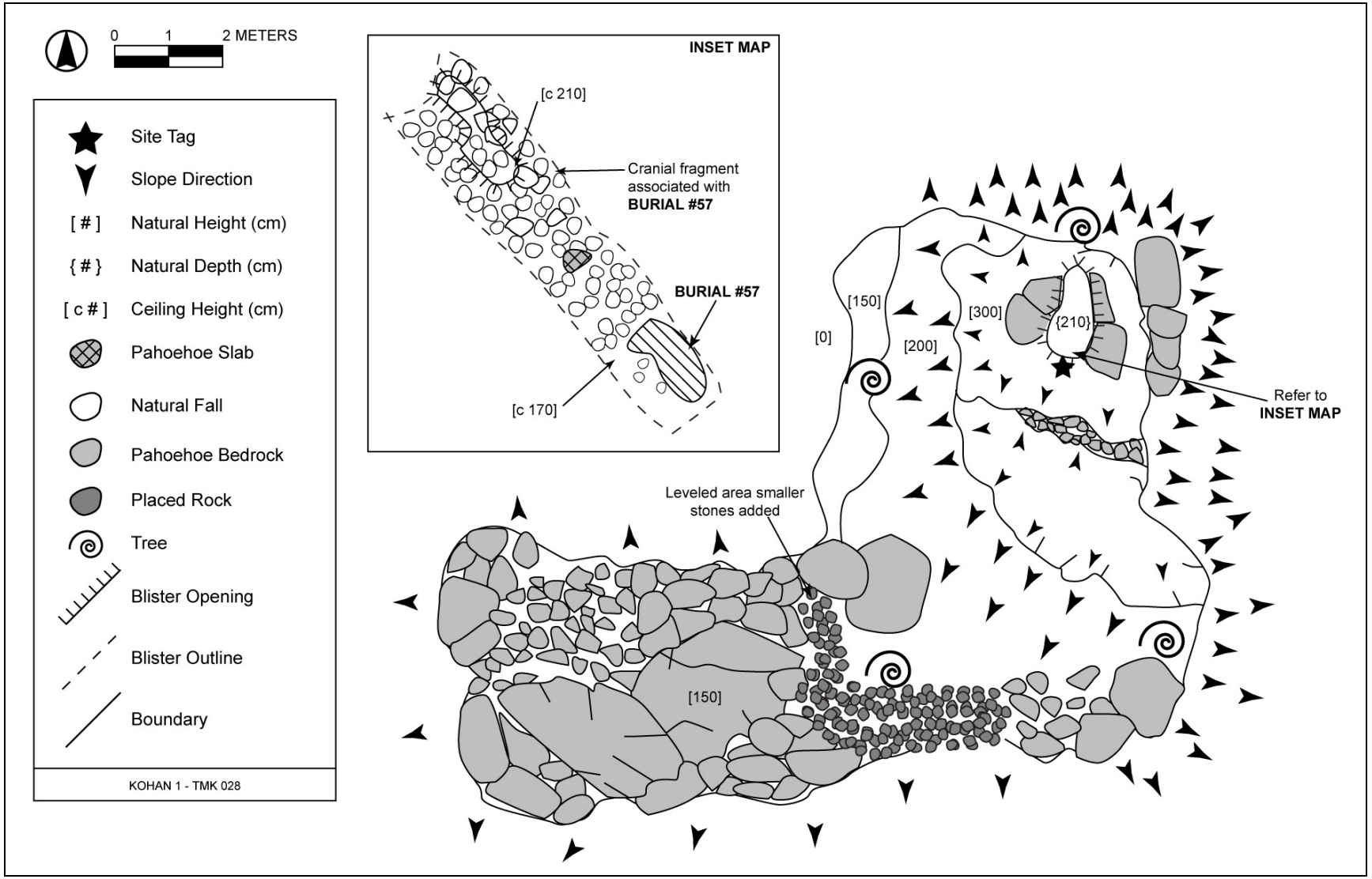

Figure 68. SIHP # 50-10-28-26427, plan view

Figure 69. SIHP # 50-10-28-26427, photograph of tumulus facing southwest

4.3.16 State Site # 50-10-28-26428

SIHP #	50-10-28-26428
FUNCTION:	Habitation
SITE TYPE:	Platform
TOTAL FEATURES:	1
DIMENSIONS:	12.5 m by 6 m
CONDITION:	Good
AGE:	Pre-Contact
ELEVATION:	633 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26428 is a large platform built against the edge of the large *‘a‘ā* flow that dominates the project area. The site is at a southern portion of the *‘a‘ā* edge, approximately 200 meters from the south project area boundary, 55 meters southwest of site -26424, and 75 meters southwest of site -26418 (a large ceremonial enclosure and a major trail, respectively). The *‘a‘ā* flow slopes steeply at its edge where it transitions to *pāhoehoe*, and the site is located on this sloped portion just above the *pāhoehoe*. Vegetation in this area is thick, with *koa haole* and grass on both the *‘a‘ā* and the *pāhoehoe*; the platform was nearly completely covered in very dense vegetation.

The platform consists of several distinct areas, primarily a west side and an east side (Figure 70, Figure 71 and Figure 72). In general, the platform utilizes the natural *‘a‘ā* bedrock exposure to build upon, with stacking at the edges (informal vertical facing) and small *‘a‘ā* cobble fill to create a level surface. The entire platform is approximately 12.5 by 6 meters and an average of 1 meter in height above the *pāhoehoe* on the south end. Stacking at the south edge of the west side is primarily medium *‘a‘ā* cobbles, stacked three to six courses high. On the east side there are on average larger *‘a‘ā* cobbles stacked three to five courses high, with some *pāhoehoe* cobbles.

The west end is the most formal side of the platform, due to a very nicely laid out tightly fitting *‘a‘ā* cobble fill that creates a level surface. This area of the platform is about 1.2 meters high (south side) and 3 by 2 meters in size (length east-west). There is a small (30 centimeters) step up on its north side, and north of this step it is about 3 by 2 meters (length east-west) and the surface is leveled with a small cobble fill (but with on average larger cobbles and less tightly fitted than the south side). The platform ends at the west side with aligned stones (30 to 50 centimeters in size) arranged against the southward sloping natural *‘a‘ā*.

Between the west and east areas of the platforms is a somewhat jumbled area that appears to be largely disturbed by vegetation (larger trees). It seems most likely to have originally been an extension of the upper (north) portion of the west side, but with more large pieces of the natural bedrock exposed. On the south side of this jumbled portion, there is a tier extending approximately 1.5 meters to the south, about 70 centimeters below the platform surface and 50 centimeters above the *pāhoehoe* ground. This tier extends along the edge to the east side of the platform, where there is an oblique corner and the south wall turns to the north slightly.

The southern and eastern edge of the east half of the platform are informally stacked on *‘a‘ā* bedrock, and this area is approximately 5.5 by 3.5 meters in size and 1 meter tall. The surface of the platform here is flat with some small *‘a‘ā* cobbles, but mostly is filled with approximately 5 centimeters of sediment. The sediment may be a result of the large amount of grass and

vegetation growing on this side of the platform, but some of the soil may have been intentional fill to create a level surface. The north side of the east half of the platform is also informally arranged *‘a‘ā* cobbles against the southward sloping *‘a‘ā* flow.

Along the edge of the *‘a‘ā* on both the east and west side of site -26428, there is minor modification in the form of cleared areas and minor stacking of rocks. There is some minor agricultural activity (clearing, tossed rocks) in the *pāhoehoe* area to the south, but there is also evidence of bulldozer activity. Agricultural activity does not appear to extend beyond the immediate adjacent areas. The modification of the *‘a‘ā* edge to the west consists of another level area with small cobble fill, all very informal. To the east there is a small cleared area with a small *‘a‘ā* cobble fill that may have been a trail along the *‘a‘ā* edge leading to/from the platform; however, it is too collapsed to discern function definitively. Views from the platform and surrounding *‘a‘ā* outcrops are excellent.

Function of the site is most likely as a permanent habitation platform. A small test excavation revealed a small amount of midden (see testing results below), but not enough to definitively confirm function as habitation. The platform is, however, large enough to reside on and is conveniently located at the edge of the *‘a‘ā* only 95 meters from the site -26418 trail. The excellent view from the platform would be ideal for permanent habitation. Burial within this platform is unlikely given that its construction largely takes advantage of the natural *‘a‘ā* slope and does not appear to be very deep. The only other likely function for this platform would be ceremonial, which has some merit given the proximity of site -26424 (a probable *heiau*). However, given the relatively less formal nature of the platform and lacking any specific evidence for ceremonial function, this platform appears more consistent with permanent habitation. Excavation potential for this site is good due to some soil on the east side of the platform and the possibility of recovering cultural material from the *‘a‘ā* paving on the west side of the structure.

Testing Results

Subsurface testing was conducted at site -26428 to aid in determining the function of the site, to examine subsurface deposits, and to attempt to collect charcoal for radiocarbon dating analysis. The testing consisted of excavating a 0.50 by 0.60 meter test unit placed within the small *‘a‘ā* cobble paving on the west side of the platform (Figure 70 and Figure 73). The unit was excavated to underlying rough *‘a‘ā* bedrock, to a maximum depth of 75 centimeters. Stratum I consisted of the construction of the formal surface (small cobble paving), with *‘a‘ā* cobbles ranging from 5 to 10 centimeters in size, on top of a rough natural *‘a‘ā* flow that has been partially leveled (prior to adding the small cobble paving), mainly via filling cracks in the *‘a‘ā*.

The only midden recovered was a few *kukui* endocarps (0.3 g) and a single (but nearly whole) sea urchin shell (17.1 g). The presence of this very small amount of midden and the construction of the small cobble paving supports a habitation function for this site. Excavation also confirms that there is very little likelihood of burial at this location. Data recovery at this site should focus on larger scale excavation to recover additional datable material and increase the midden sample.

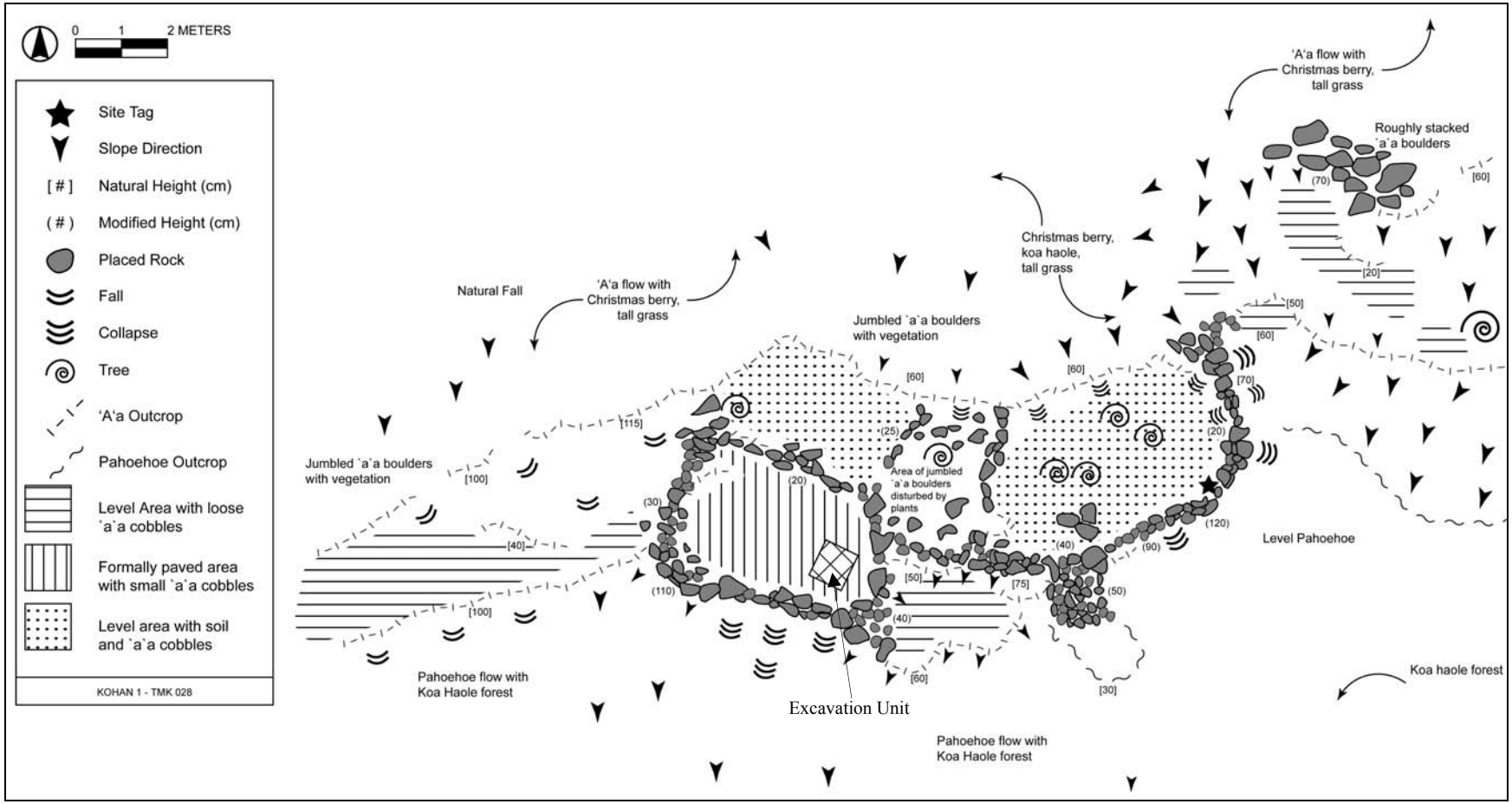

Figure 70. SIHP # 50-10-28-26428, plan view

Figure 71. SIHP # 50-10-28-26428, photograph of west half of platform, facing northeast

Figure 72. SIHP # 50-10-28-26428, photograph of east half of platform, facing southwest

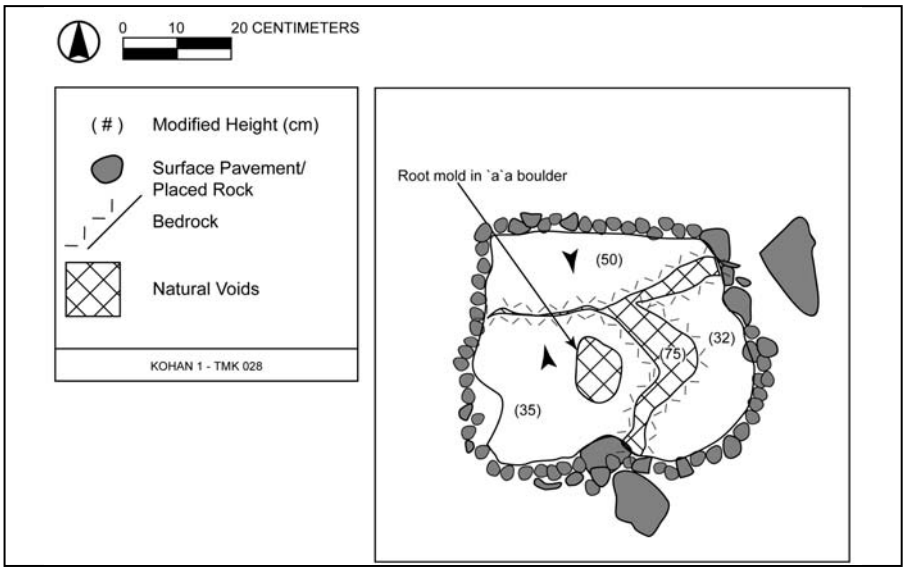

Figure 73. SIHP # 50-10-28-26428, excavation figures. From top to bottom: plan view of base of unit; photograph pre-excavation facing east; same photograph post-excavation.

4.3.17 State Site # 50-10-28-26429

SIHP #	50-10-28-26429
FUNCTION:	Activity Area
SITE TYPE:	Modified Tumulus
TOTAL FEATURES:	1
DIMENSIONS:	20 m by 10 m
CONDITION:	Good
AGE:	Pre-Contact
ELEVATION:	590 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26429 is an elevated area of *ʻaʻā* exposure that has been utilized as a quarry. A single artifact was found in the vicinity and is likely related to the activity at this site. The surrounding area is a rough undulating *ʻaʻā* flow with very low site density. The nearest site is site -26418, a major *pāhoehoe* slab trail that leads north-south over this *ʻaʻā* flow; site -26429 is located 100 meters west of site -26418.

Site -26429 is located at an area where the *ʻaʻā* flow is elevated 2 to 3 meters above the surrounding area with a vertical face on the south side (Figure 74 and Figure 75). The top of this elevated tumulus is often more *pāhoehoe*-like (smoother, slab-like chunks) than the surrounding *ʻaʻā* flow. At the base of one area of the vertical face, there is a modified water-worn stone (Figure 76). This stone is oblong in shape and 20 by 12 by 5 centimeters in size. Around the middle of the stone is a pecked area 2 to 3 centimeters thick and several millimeters deep, running around the "waist" of the stone (perpendicular to the length of the stone). The smaller end of the oblong stone appears to have wear on it (small chunks missing) from utilization. Given the context and size/weight of the stone, it appears to be an "*ʻāina* basher" (large hammer-stone), possibly used for acquiring slabs for use in site -26418 or other construction. There are small slabs in this area that are actually quite smooth and *pāhoehoe*-like, despite deriving from an *ʻaʻā* flow. The vertical face and areas of the top of the elevated *ʻaʻā* tumulus appear to have been modified for the removal of stones, and this area has rocks tossed about, consistent with use as a quarry.

Function of this site is as an activity area, most likely a quarry, and possibly was used for construction of site -26418. The water-worn stone is most likely associated with this function as a large hammer-stone. The artifact was collected and is Accession #1 (see Results of Laboratory Analysis section below). There is no excavation potential for this site, given the lack of soil and unlikelihood of retrieving cultural material other than the single artifact.

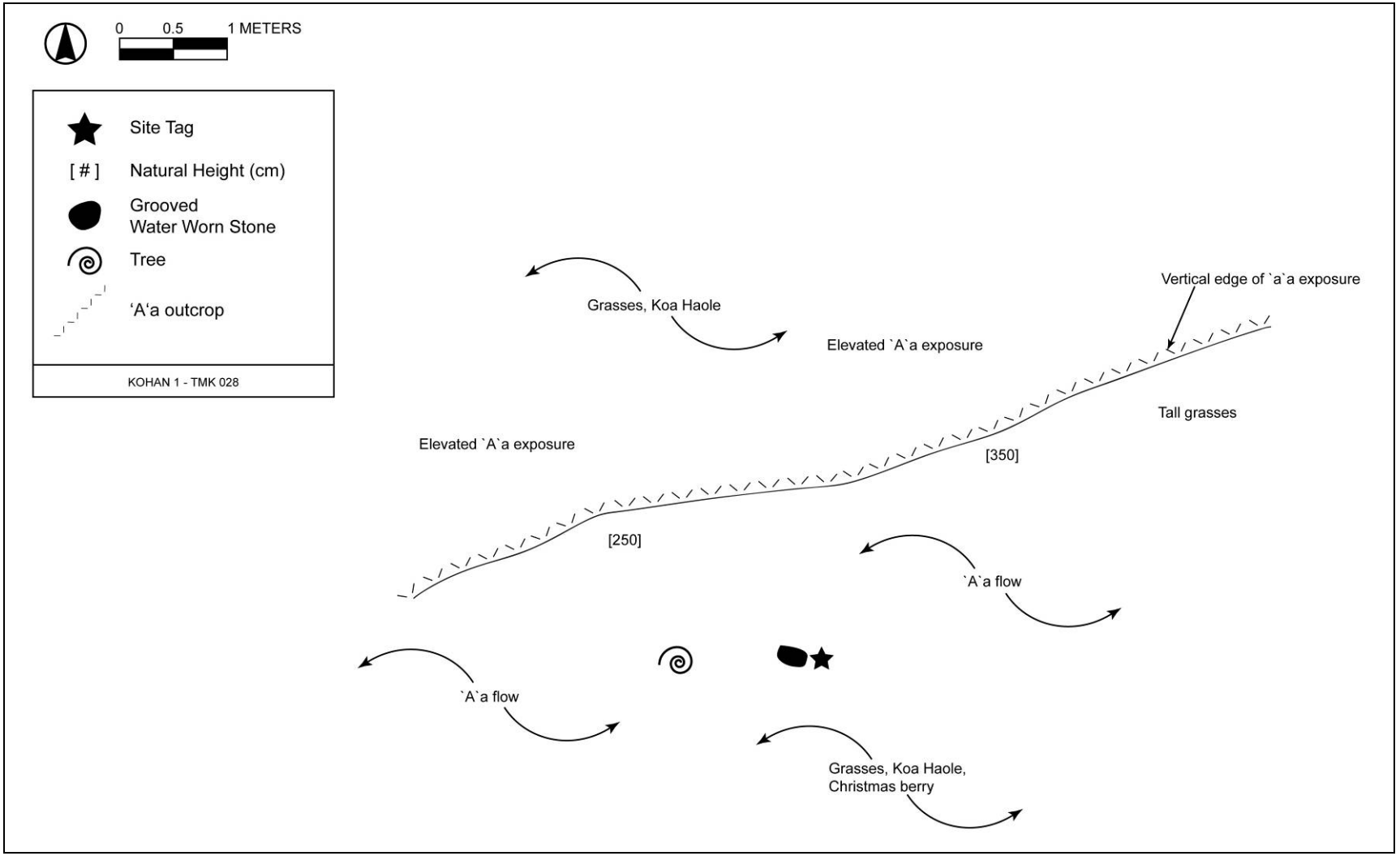

Figure 74. SIHP # 50-10-28-26429, plan view

Figure 75. SIHP # 50-10-28-26429, modified *‘a‘ā* tumulus and hammer-stone (arrow)

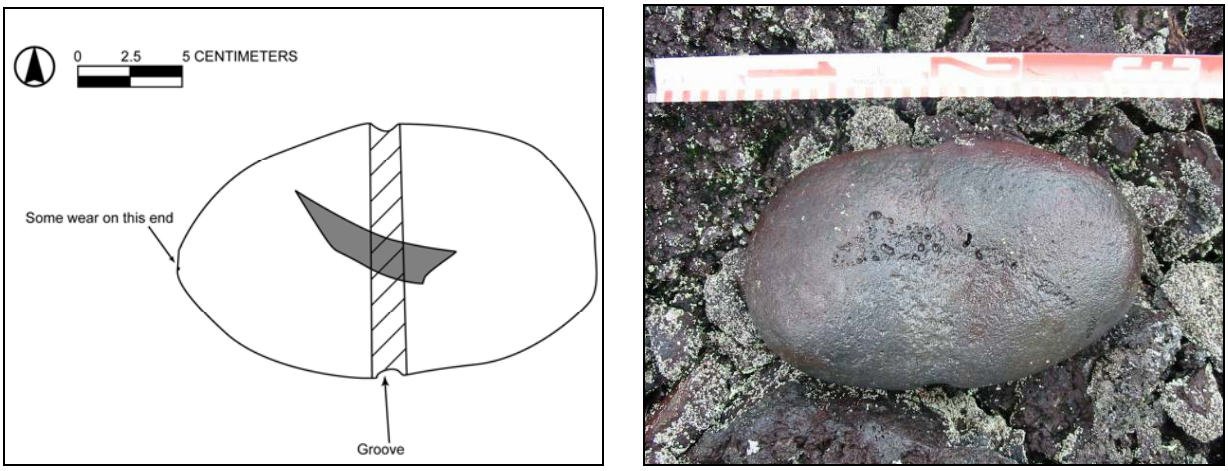

Figure 76. SIHP # 50-10-28-26429, sketch and photograph of water-worn stone with pecking (hammer-stone); the darker grey area on the sketch is a more porous portion of the basalt that can also be seen in the photograph

4.3.18 State Site # 50-10-28-26430

SIHP #	50-10-28-26430
FUNCTION:	Habitation
SITE TYPE:	Modified Tumuli, Terrace, and Platform
TOTAL FEATURES:	4
DIMENSIONS:	70 m by 20 m
CONDITION:	Good
AGE:	Pre-Contact
ELEVATION:	613 to 636 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26430 is located along the south boundary of the project area, on an undulating, southwest sloping *pāhoehoe* flow. The vegetation on the site consists of thick, over head-high *koa haole*, morning glory vines, and Christmas berry trees.

The site is comprised of four dispersed features (two modified tumuli, a terrace, and a small platform) and an area in between and immediately surrounding the features of slight agricultural modification. The agricultural modification consists primarily of cleared areas around the bases of the two tall tumuli (Feature A and Feature D) and in the natural depression between Feature A and Feature D. There are also a few areas of tossed boulders, likely the result of clearing activity.

Feature A is a very pronounced tumulus *mauka* of a broad expanse of relatively level *pāhoehoe* to the south, west, and northwest (Figure 77 and Figure 81). The view from the top of the tumulus spans from just south of Keahole Point to just north of modern Kailua town. The tumulus is on average 3 meters above the surrounding terrain upslope and 4 to 5 meters above the surrounding terrain to the south. The natural surface of the terrain is rough, eroding small boulders as seen near the north and east edges of the tumulus top. Modification of the outcrop consists of a fairly formal pavement leveling the top of the tumulus and some minor modification of the north base of the tumulus. The pavement on top is the primary modification, and it consists of cracks filled with cobbles and a small cobble paving over this fill, and other low areas with rubble and small cobbles. The west edge of the tumulus top shows the most formal pavement where small slabs and flat cobbles are relatively dense. Excavation (see test results below) revealed that this area has an informal slab paving covering the natural rough surface, with a small cobble fill on top of it. Modification of the north base of the tumulus is somewhat less formal and consists of semi-level piled cobbles. Though at first this appears similar to agricultural clearing, the density of cobbles and proximity to the tumulus is highly suggestive of auxiliary habitation activities. Given the excellent view and paved surface, this feature functioned as a habitation area.

Feature B is a formal linear terrace immediately down-slope (to the west) of the prominent tumulus Feature A (Figure 78 and Figure 82). The terrace generally runs across the slope, beginning at the west base of the outcrop. The terrace is constructed of small boulders and large to medium cobbles. Near its center it is the most intact. At its tallest the terrace measures approximately 50 centimeters on its down-slope side. The north end is particularly collapsed, barely raised above the surrounding terrain. The most intact section of the wall includes a relatively thick upright slab. Function is habitation based on the proximity to Feature A. There is also a small very informal terrace near the base of the tumulus in the cleared area on the north

side of Feature A. It is constructed of large *pāhoehoe* cobbles and boulders and exhibits no formal construction such as facing, but is also likely part of the habitation function for the site.

Feature C consists of an informal mound (C_2) and a fairly formal small platform (C_1) nearly adjacent to one another (Figure 79 and Figure 83). They are located in the low area between Feature A and Feature D (Feature C is 30 meters at 121 degrees from the Feature A site tag). Feature C_1 is a naturally upraised bedrock exposure modified to form a small and slightly formal platform, approximately 3 by 2.5 meters and about 1 meter tall. The northeast and southeast ends are largely a natural bedrock exposure, but the other sides are stacked three to five courses high. Although the stacking is vertical and fairly nice, it could not be considered formal facing. There are at least two intact corners and the structure is fairly square, and it is constructed with rocks ranging in size from 15 to 40 centimeters. The central portion of the platform is somewhat level and filled with small cobbles. On the northwest and southwest sides of the structure, it steps down and has one more terrace of informally stacked rocks. On the southwest side, there are several small uprights, about 25 centimeters in size, defining the base of the structure, and these appear to be blocking a small blister opening behind the uprights. Function of this feature seemed possible as a burial, but excavation revealed that this is unlikely (see excavation unit 9). Although this feature is too small for habitation on top of it, it does appear to be part of the larger habitation complex of this site, possibly also associated with agricultural activity. There is a previous site tag on Feature C_1: “TF 215 ACP 21-2-03”. Feature C_2 is an informally constructed mound on top of a naturally slightly raised outcrop. It is likely agricultural in function.

Feature D is a modified tumulus located 62 meters at 126 degrees from the Feature A modified tumulus and 32 meters at 137 degrees from Feature C (Figure 80 and Figure 84). The tumulus rises steeply 1.5 to 2.6 meters above the surrounding terrain. The smooth *pāhoehoe* ground surface at the base of the tumulus has been cleared of larger cobbles and boulders, likely for agricultural purposes. The modification that comprises Feature D consists of three leveled areas and a small natural depression on top of the tumulus. The top of the tumulus is not naturally level. Two of the leveled areas are flush in height with each other and the third leveled area is a lower natural tier in the tumulus. These leveled areas are small, an average of 2 by 2 meters. The modification in leveled areas consists of the clearing of larger boulders and the filling in of small cracks with small cobbles to level the top surface. The third leveled area (on the lower tier) exhibits some formal stacking on the northeast side to create the leveled surface up from the sloping side of the tumulus. In the center of the tumulus is a natural depression that appears to have a relatively smooth floor, likely the result of some slight clearing. The tumulus affords a fantastic view to the south and west with the coastline and fishponds clearly visible. The tumulus also provides a good view to the north and a decent view of the upslope areas to the east. The function of Feature D is temporary habitation; the leveled areas created small living surfaces as does the small depression. The elevated nature of the tumulus also provides an excellent view and a nice breeze; Feature A can easily be seen from the top, and vice versa.

Function of this site is primarily for temporary habitation, with associated nearby agricultural activity in the natural depression between the tumuli. There was also a possible secondary function associated with Feature C, which required a burial check. No burial was found, and all evidence from excavations suggests that this was a habitation site. Excavation potential for this site is fair given the possibility of recovering midden or datable material from Feature A, B or D.

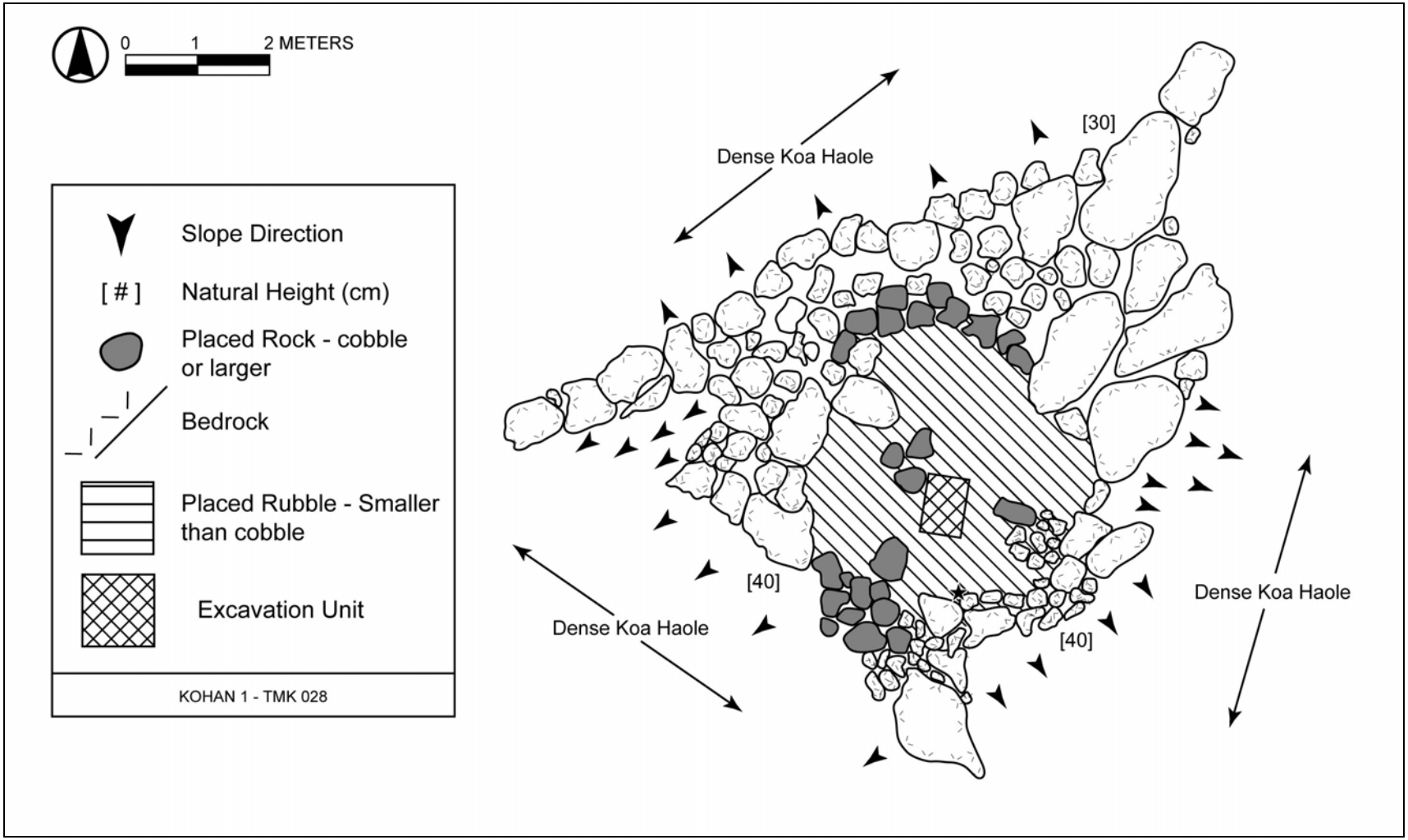

Figure 77. SIHP # 50-10-28-26430, Feature A, plan view

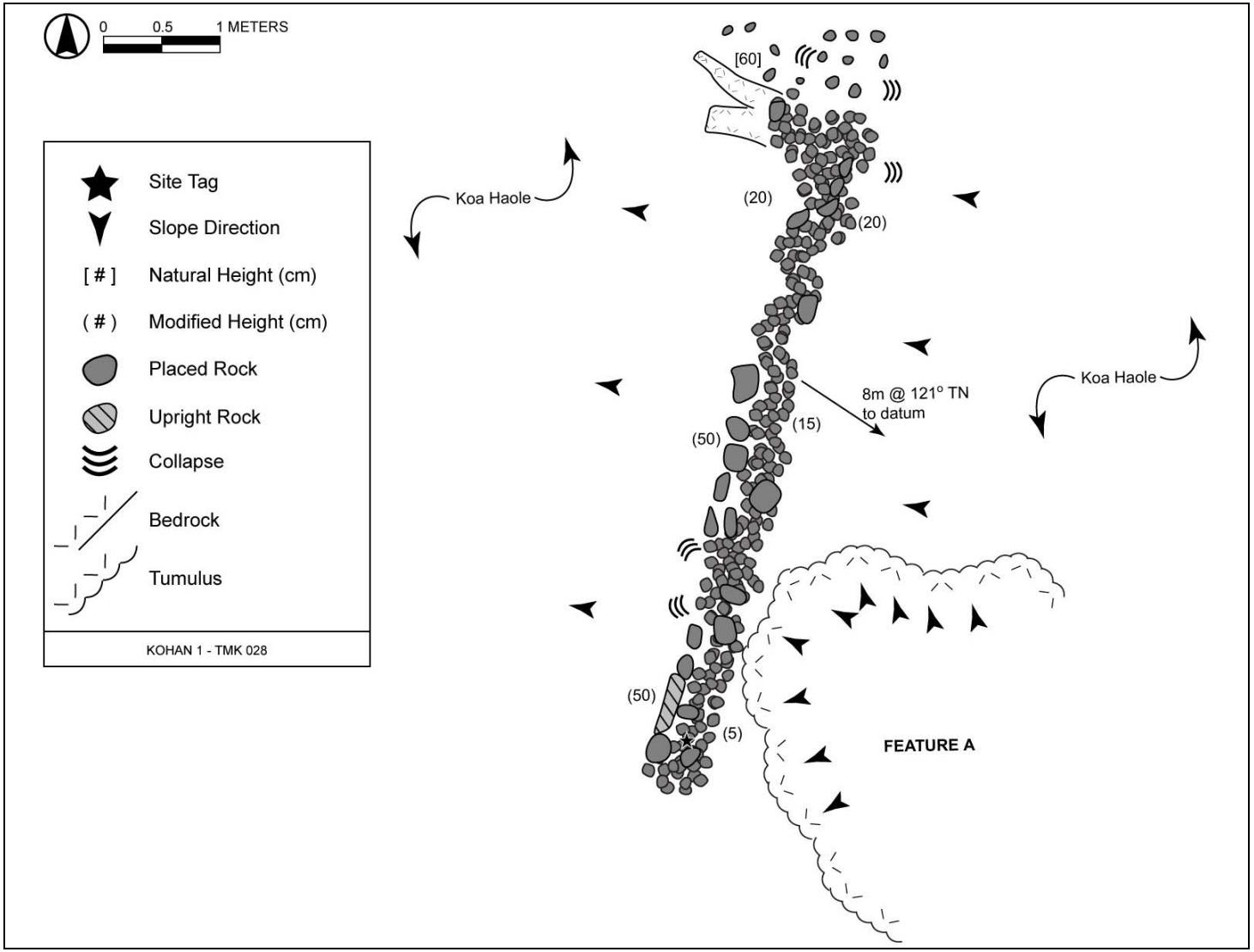

Figure 78. SIHP # 50-10-28-26430, Feature B, plan view

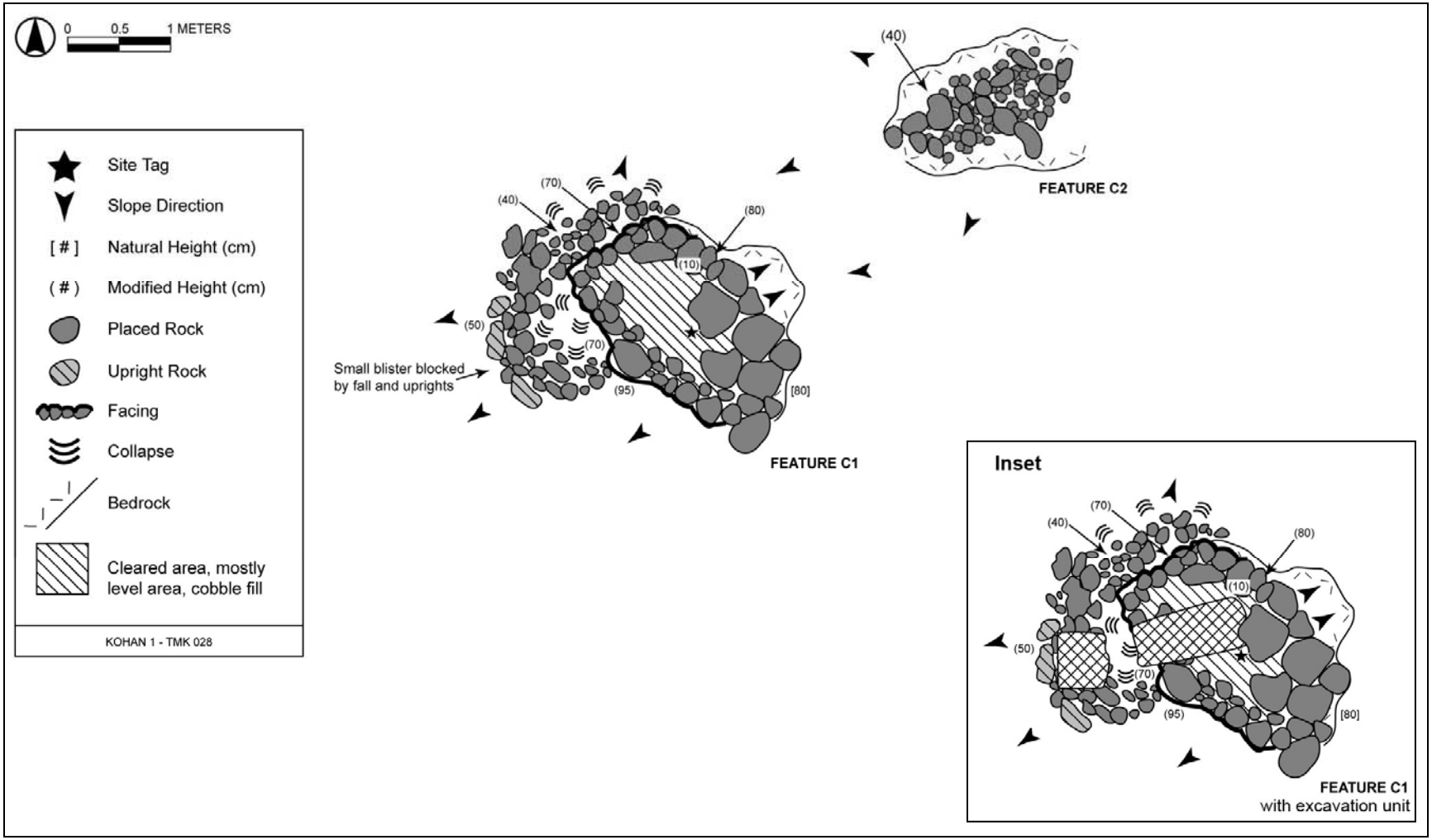

Figure 79. SIHP # 50-10-28-26430, Feature C, plan view

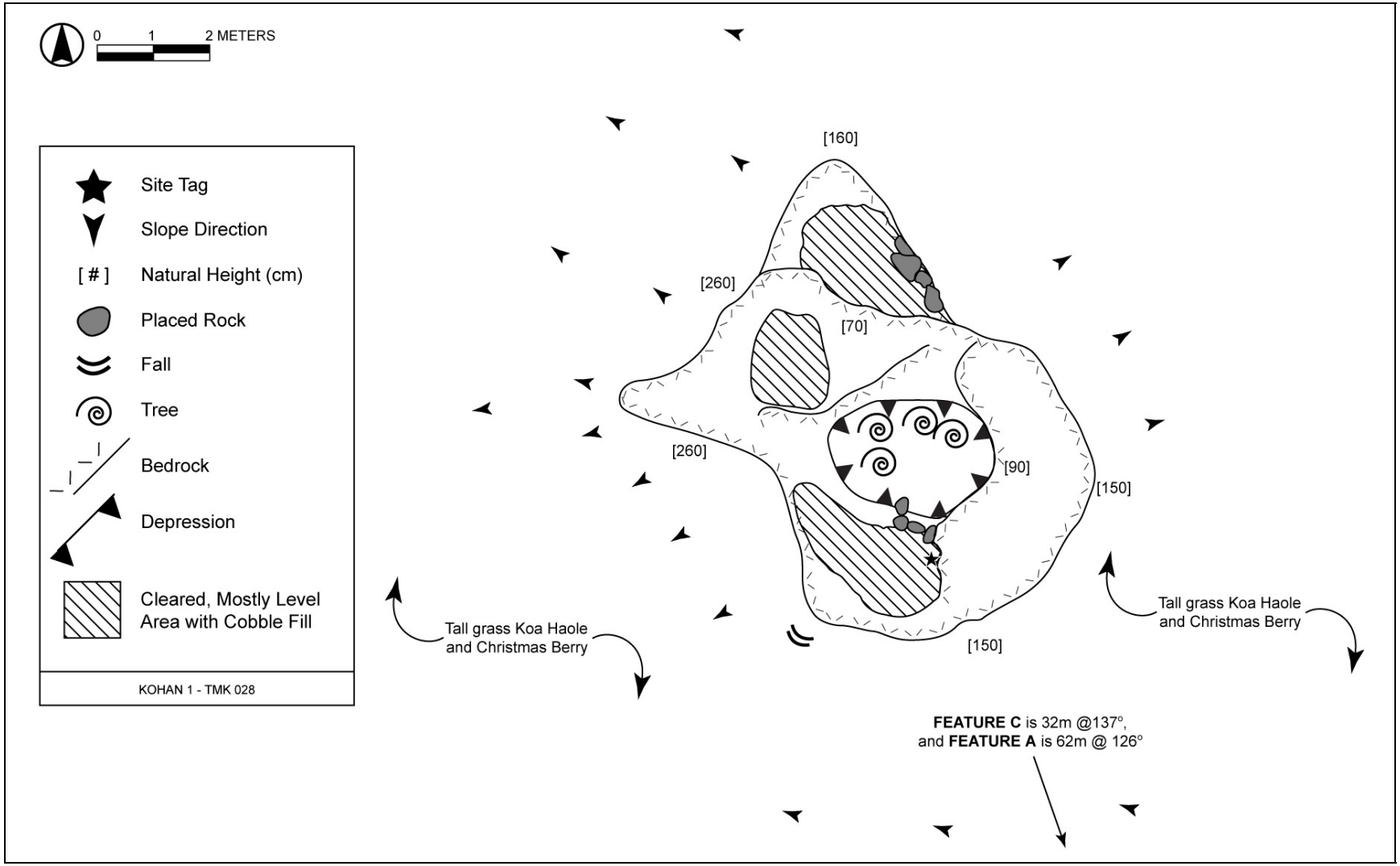

Figure 80. SIHP # 50-10-28-26430, Feature D, plan view

Figure 81. SIHP # 50-10-28-26430, Feature A, photograph of modified tumulus facing northwest

Figure 82. SIHP # 50-10-28-26430, Feature B, photograph along terrace facing southeast, with large upright near center of 2 meter photo scale

Figure 83. SIHP # 50-10-28-26430, Feature C, photograph of small platform facing east

Figure 84. SIHP # 50-10-28-26430, Feature D, photograph of modified tumulus facing west

Testing Results

Two excavations were conducted at site -26430 to aid in determining the function of the site, to examine subsurface deposits, and to attempt to collect charcoal for radiocarbon dating analysis. Feature A (Unit 5) was chosen for subsurface testing as the most formal area of paving, and most likely to reveal evidence of habitation. Feature C (Unit 9) was excavated specifically as a burial check, since the feature consists of a semi-formal but small platform that could contain a burial.

The subsurface testing at **Feature A** consisted of a unit 0.70 by 0.65 meter test unit in the central portion of the modified outcrop (Figure 85). The unit was excavated to underlying bedrock to a maximum depth of 33 centimeters. Stratum I consisted of a small cobble paving (5 to 10 centimeter cobbles) on the surface, with small to medium size slabs (10-35 centimeter diameter) laid horizontally underneath, to create a level surface for the small cobble paving. Under the slabs is natural undulating *ʻaʻā* bedrock, that has been somewhat filled in to create a more level area for placing slabs. Midden is present in Stratum I, and it is apparent that midden has slipped down into unreachable crevices within the natural *ʻaʻā* underlying Stratum I. All midden appears to be contemporaneous with Stratum I and habitation on the surface of the structure. The midden inventory includes the following from Stratum I: 0.3 g of polished nerite (*Nerita polita*); 0.6 g of sriate mussell (*Brachidontes crebristriatus*); and 0.5 g of *kukui* endocarp. No charcoal was recovered, probably because any charcoal present would have washed down into the natural cracks in the *ʻaʻā*. The presence of midden and the construction of the small cobble paving with slabs formally placed underneath strongly supports a habitation function for this site, and excavation has therefore confirmed the function of the site as temporary habitation. Data recovery at this site should focus on larger scale excavation to recover datable material and increase the midden sample.

The subsurface testing at **Feature C** consisted of a unit that was a total of 1.83 by 1.10 meters in size (Unit 9A was 1.43 by 0.60 meters and 85 centimeters deep, and Unit 9B was 0.40 by 0.50 meters and 55 centimeters deep; see Figure 79 and Figure 86). Excavation began in the upper (eastern) portion of the platform where it abuts a bedrock outcrop. Construction (Stratum I) consists of tightly packed small to medium size cobbles placed on top of the bedrock outcrop, with a level top. The base of excavation is solid bedrock (with some large fissures) with a thin layer of natural sediment (Stratum II, 10 YR 3/2 silty loam) on top. There was no cultural material found, and no blisters that could contain burials. To further ensure that there was not a blister opening under the platform, Unit 9B was excavated at the bottom (western) portion of the platform. Construction (Stratum I) is similar to the upper portion, except that the western edge has upright slabs defining it. Stratum II is identical to the upper portion, and there was no cultural material found or any indication of a blister opening or crypt under the platform. Excavation therefore indicates that this feature is not a burial mound, as previously was considered. A reasonable conclusion is that this feature is related to temporary habitation at the site, and/or agricultural activities.

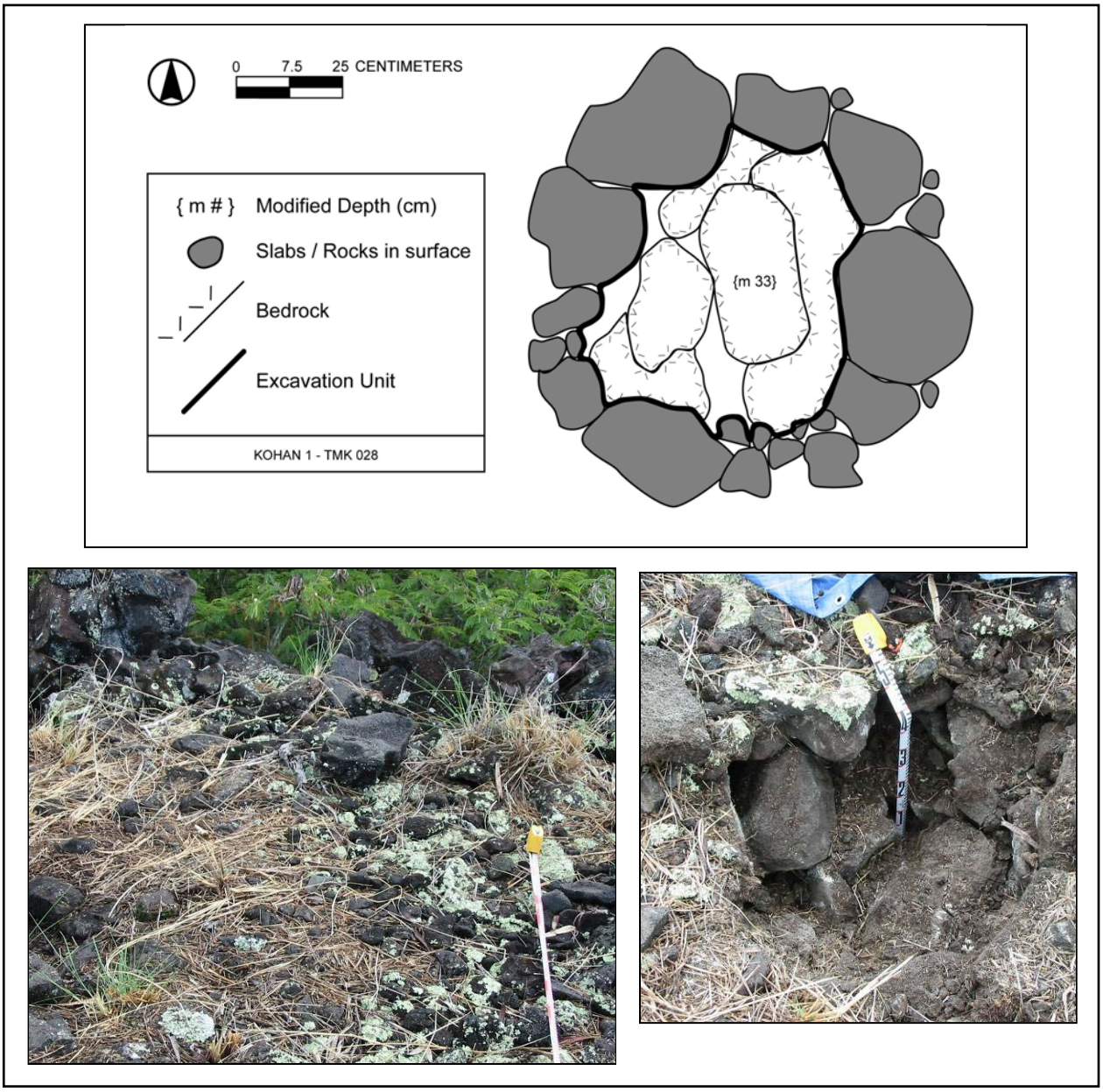

Figure 85. SIHP # 50-10-28-26430, Feature A, excavation figures. Counter-clockwise from top: plan view of base of excavation unit, photograph pre-excavation facing east, photograph post-excavation facing east, close-up of unit

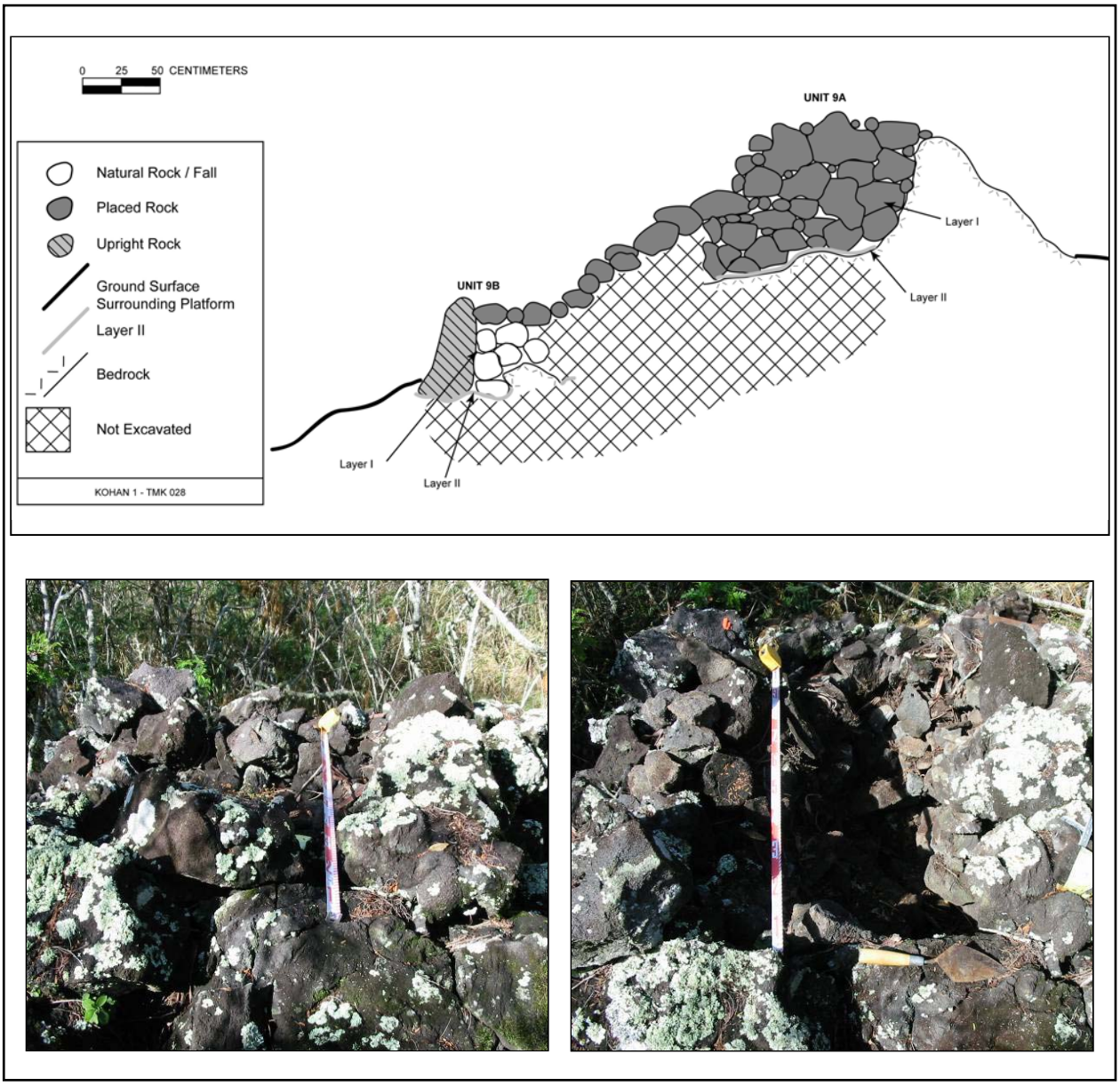

Figure 86. SIHP # 50-10-28-26430, Feature C, excavation figures. Counter-clockwise from top: profile of north wall of excavation unit; photograph pre-excavation facing west; same photograph post-excavation (see Figure 79 for plan view of excavation unit)

4.3.19 State Site # 50-10-28-26431

SIHP #	50-10-28-26431
FUNCTION:	Activity Area
SITE TYPE:	Lava Tube and Modified Depressions
TOTAL FEATURES:	2
DIMENSIONS:	110 m by 40 m
CONDITION:	Good
AGE:	Pre-Contact
ELEVATION:	664 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26431 is a relatively large lava tube with a moderate amount of water collection, *kukui* nuts and charcoal related to this activity, and slightly modified sinks and tube entrances (Figure 87). It is located in the southern portion of the project area, adjacent to site -26425, and consists of two features. There are two main sinks (Sink 1 on the west end of the tube and Sink 2 to the east) that connect via the main lava tube. Sink 1 is approximately 1.5 meters in diameter and consists of a skylight over a high mound of slightly modified fall. This sink is the same as Sink 3 of site -26425, leading to the same chamber. Once inside this chamber, the site boundary separates the east-running tubes leading to -26431, and the rest of the chamber as site -26425 (see Figure 87). These sites are distinguished primarily by a difference in function, despite being essentially the same lava tube. Sink 2 of site -26431 is a large (approximately 25 meters long) linear sink, which has two large natural depressions that have been modified by clearing from their lowest parts; the rocks removed are informally stacked on the sloping rubble/boulder edges of the sink. Feature A also consists of modification of the tube entrances of Sink 2.

The main lava tube has been split into Tube 1A and 1B for descriptive purposes. Tube 1A has a west entrance (Sink 1) and eastern entrance (Sink 2). Trending primarily east, there are at least three branches paralleling the main chamber. There is a moderate amount of cultural material, including burnt *kukui* nut, water collection features, and charcoal. There are several entrances to the tube from Sink 2, two of which have been modified (see Feature A). Tube 1B parallels Tube 1A and can be accessed via a larger tube split on the east side (1.2 meter high ceiling) or a very small entrance on the west side (near Sink 1, 35 centimeter choke point on the south side of the main tube). This tube trends east-west and has a fairly large number of water collection features, some of which are fairly formal. There is scattered charcoal throughout the tube, with some concentrations of charcoal associated with the water catchment. There are also a few cairns in the tube, which apparently mark the way to the exit (the small entrance near Sink 1 is difficult to see when inside Tube 1B, but the cairn marks the way to this very nearby exit). The other cairn at the far eastern end of the tube apparently marks the end of cultural modification and water collection, indicating that the tube is largely collapsed and difficult to crawl through beyond the cairn. In addition to water collection, some areas of the tube have modified areas of fall (leveled areas with a few uprights) but none of this modification is particularly formal.

Feature A consists of the modification of the two main entrances of Sink 2, which are modified to improve access to water collection (Figure 89). The westernmost Sink 2 entrance is modified with several uprights formally lining the entryway passage, which is nearly vertical. The area below this entrance (inside the tube) is cleared with several placed slabs. The other

modified entrance is largely unmodified on the outside, but has an area just inside of it that is paved with large slabs and fall to create a level crawling surface; this leads to the modified area under the aforementioned entrance. These modifications are likely related to ease of access for water collection, as they significantly increase a person's ability to move in and out of the tube, while maintaining restricted entrances that appear to retain moisture inside the tube.

Feature B consists of a filled crevice, an agricultural mulching area, and a small unmodified blister (Figure 88). These features (modified depressions) are located about 15 meters apart on a fairly level *pāhoehoe* bedrock exposure, among tall grasses, Christmas berry trees, and *koa haole* trees. Feature B is about 20 meters north of Sink 2. The filled crevice is an area where small to large cobbles have been placed inside of a blister in the bedrock exposure. The crevice is 2.5 by 1 meter in size. A small blister opening can be seen under the filled area, but excavation revealed that this area does not contain a large blister or burial. The small lava tube (unmodified blister) nearby has no cultural material, but one impassable portion of it likely leads to this filled crevice area. The nearby mulching area is about 2 by 2 meters in size and consists of an area of small cobbles (5 to 15 centimeters in size) that have been placed in a slightly low area in a single layer, fairly close together (covering the ground surface). Any larger cobbles have been cleared. This feature is 14 meters at 70 degrees tN from the filled crevice. Feature B appears to be an isolated agricultural area. This pattern of minor agricultural activity associated with larger sites is typical for this area (i.e., site -26425 and site -26430).

Site function for site -26431 is primarily as an activity area focused on water collection and minor agriculture. The Sink 2 entrances are modified for ease of access to the tube and the tubes have a fairly large number of water collection features. Similarly, the cairns in Tube 1B appear to mark exits/entrances for ease of access to water collection. Feature B, which is agricultural in function, may have been in close proximity to the tube because of the water collection. There are very few large lava tubes in this area that are good for water collection, so it is not surprising that this tube is heavily modified. The site is also undoubtedly related to site -26425, which is a small shelter and temporary habitation area that also contains a burial in the same cavern as -26431 Sink 1. Excavation potential is minimal, given a lack of soil. However, data recovery should concentrate on recovery of datable material associated with water collection, as Tube 1B has several areas of charcoal that are in good association with water collection features.

Testing Results

Subsurface testing was conducted at site -26431 Feature B to aid in determining the function of the filled crevice feature and to ensure it was not a burial (Figure 90). Excavation consisted of a unit 0.90 by 0.95 meter in size and 60 centimeters deep at the east end of the filled crevice. Stratum I (0 to 55 centimeters) is a *pāhoehoe* cobble fill, with no formal stacking of the fill. Stratum II (55 to 50 centimeters) is a natural silty loam (10YR 2/2) sediment. No cultural material was found in either stratum, and there was solid bedrock at the base of excavation. Excavation confirmed that this filled crevice does not represent a burial, and is part of the minor agricultural modifications surrounding site -26431.

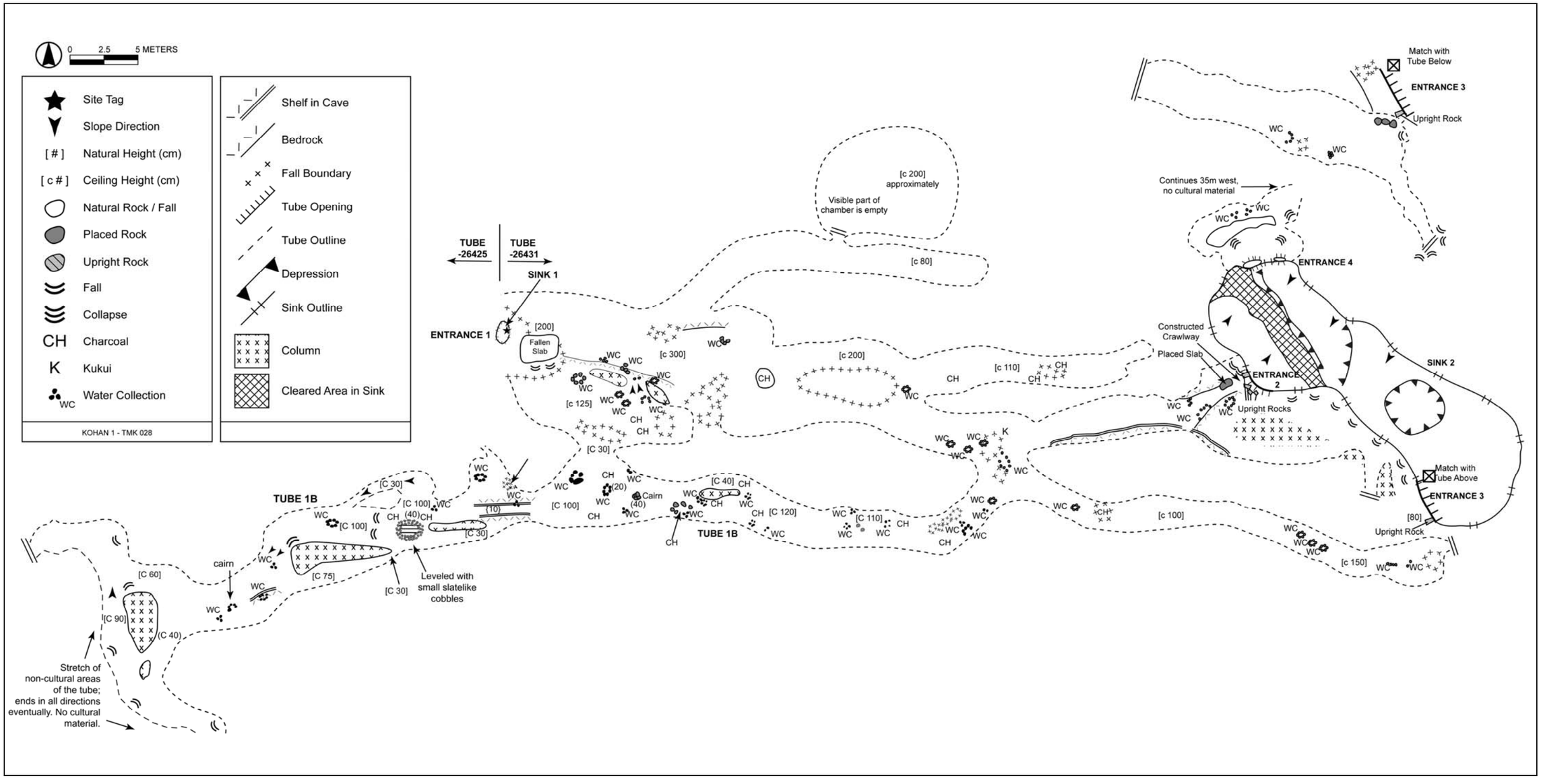

Figure 87. SIHP # 50-10-28-26431, Tube 1 and Feature A plan view

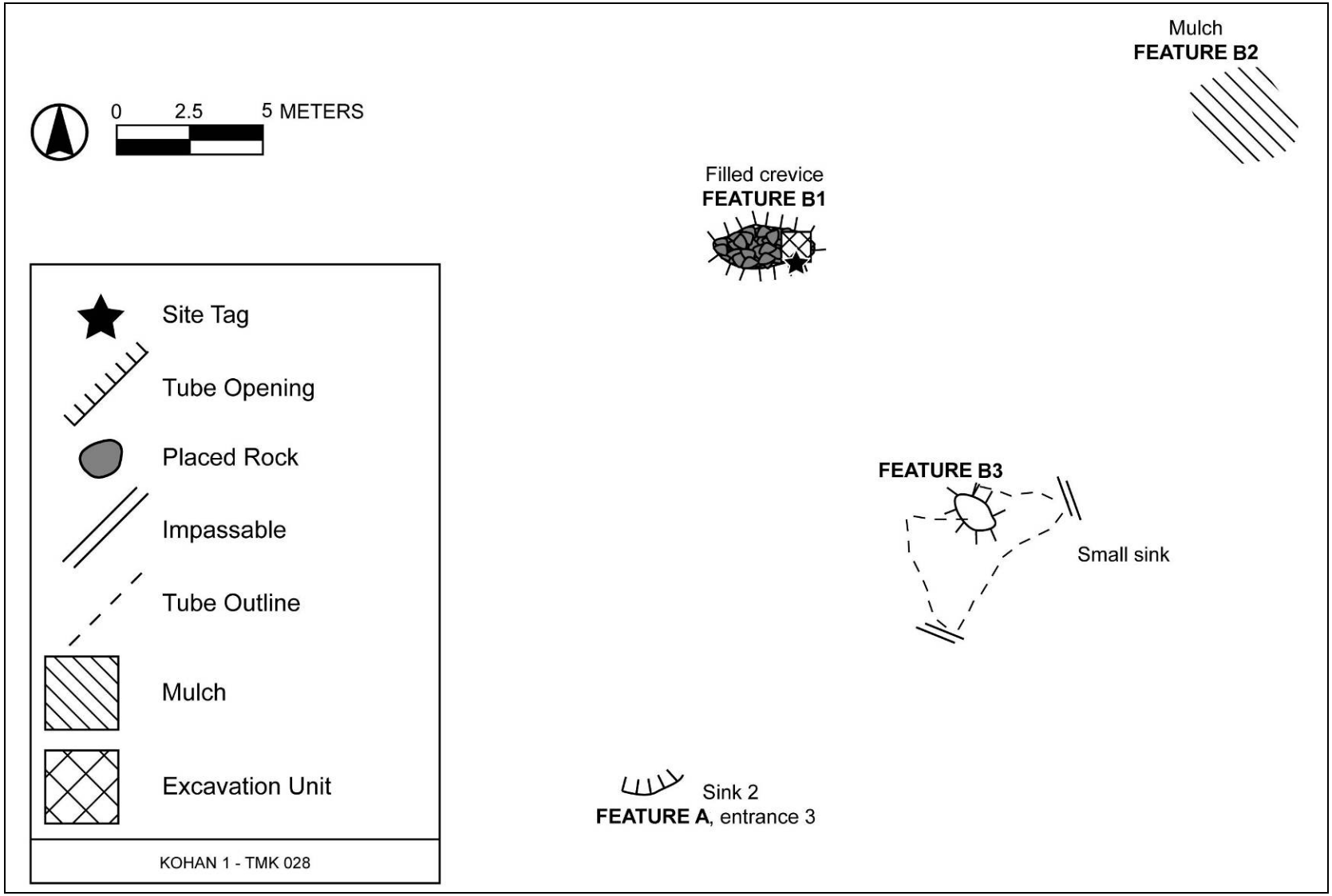

Figure 88. SIHP # 50-10-28-26431, Feature B, plan view

Figure 89. SIHP # 50-10-28-26431, photograph of Feature A, *makai* entrance from Sink 1; note placed stones in foreground

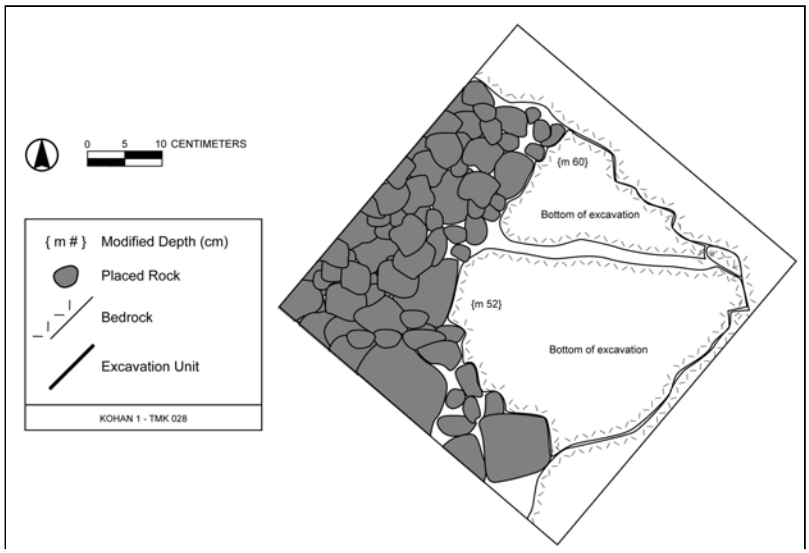

Figure 90. SIHP # 50-10-28-26431, Feature B, excavation figures. From top to bottom: plan view of base of excavation unit; photograph pre-excavation facing northwest; same photograph post-excavation, close-up

4.3.20 State Site # 50-10-28-26432

SIHP #	50-10-28-26432
FUNCTION:	Animal Husbandry
SITE TYPE:	Wall
TOTAL FEATURES:	1
DIMENSIONS:	2 m by 1 m
CONDITION:	Good
AGE:	Historic
ELEVATION:	656 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26432 is a stone wall associated with a barbed wire fence, located on the large *ʻaʻā* flow that dominates the project area. This area has Christmas berry trees and *koa haole*, as well as some air plant, all relatively thick for a rough *ʻaʻā* area. The site -26433 trail intersects the barbed wire fence approximately 20 meters to the east of site -26432. There is bulldozer activity in the vicinity, associated with and running alongside the barbed wire fence. Neither the barbed wire fence nor the site -26432 wall continue to the west past a large *ʻaʻā* outcrop.

The wall is built against a naturally elevated *ʻaʻā* outcrop on the west side and abuts the barbed wire fence on its east side (Figure 91 and Figure 92). There is a Christmas berry tree between the wall and the fence that the fence is attached to; the wall then abuts the tree and *ʻaʻā* outcrop to create a solid boundary. The wall is only about 2 meters long, and is 95 centimeters thick and 110 centimeters tall. The south side of the wall is nicely stacked and faced, and the north side is primarily built along the natural outcrop edge. The wall is constructed of cobbles and slabs 15 to 45 centimeters in size, with most cobbles being angular *ʻaʻā*. Overall the landscape here is fairly level but the *ʻaʻā* undulates quite a bit and is fairly rough, especially to the west where there are several 1 m to 2.5 meters high ridges. One of these ridges runs approximately north-south for at least 20m (perpendicular to site -26432), and is the *ʻaʻā* ridge that the wall abuts on its west side, with the wall intersecting the *ʻaʻā* ridge at its northern extent.

Function of this site is primarily for animal husbandry. The site is clearly historic given the association with the barbed wire fence. The short, stacked wall was created to fill the space between the tree and the *ʻaʻā* ridge to create a continuous boundary. Looking at an overview of nearby sites, the site -26435 wall and the barbed wire fence (plus site -26432) appear to create a large livestock enclosure, along with site -26450. The naturally unappealing rough *ʻaʻā* may have been enough of a deterrent to act as a boundary to the west, with the north-south running *ʻaʻā* ridge being used as a good boundary to end the fence at. There is no evidence for prehistoric use of the site, and it fits better with the historic cattle ranching era up to modern time. This area also may have been used as an enclosure, as there is a low depression between the western *ʻaʻā* ridge and another *ʻaʻā* ridge parallel to it about 12 meters east; this creates a depressed area 20 by 12 meters with the two ridges, the wall/barbed wire fence, and another *ʻaʻā* outcrop 20 meters south that runs parallel to the fence (see Figure 91). There is a large boulder near the only easy exit from this depressed area, which could have been used as an entry/exit point, again for animal husbandry. This area appears to have some bulldozer activity as well. There is no excavation potential given the site type.

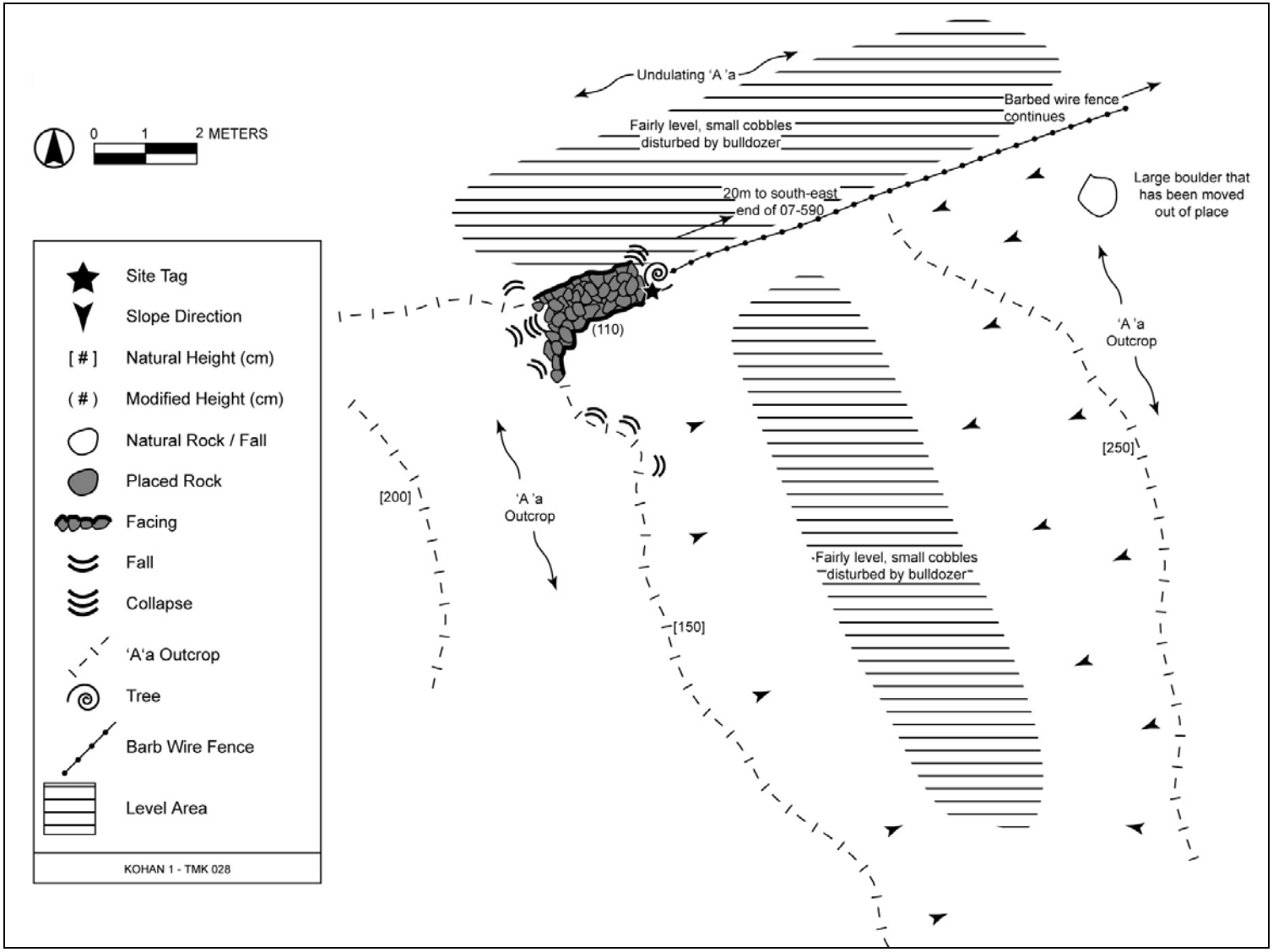

Figure 91. SIHP # 50-10-28-26432, plan view

Figure 92. SIHP # 50-10-28-26432, photograph of wall facing west, with barbed wire fence on right

4.3.21 State Site # 50-10-28-26433

SIHP #	50-10-28-26433
FUNCTION:	Transportation
SITE TYPE:	Trail
TOTAL FEATURES:	1
DIMENSIONS:	40 m in length
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	656 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26433 is located on an undulating *ʻaʻā* flow in the northeast quadrant of the project area. The vegetation in this area consists of a few sparse patches of grass and a few thick patches of Christmas berry trees. The site consists of a relatively short stretch of *pāhoehoe* slab trail, a few scattered surface artifacts, and some minor modifications of the surrounding area.

The trail runs for approximately 40 meters at 110 degrees (Figure 93 and Figure 94). The trail surface is cleared *ʻaʻā* cobbles with an approximate 5 meter stretch of immediately adjacent inlaid 50 centimeter diameter *pāhoehoe* slabs. At the east end of the trail remnant is a small 2 meters long and only 50 centimeters high constructed causeway. There is also some slight curbing along a small 1 meter stretch of the east half of the trail. The east side of the trail terminates at a bulldozer path for a barbed wire fence (see also site -26432). Beyond the fence and bulldozing there is no discernable trail.

Near the west end of the trail, approximately 2 meters off the trail, is a slab of cemented beach sand (5 by 8 centimeters in size) with bits of coral, water-worn stone, and cowry inclusions (marine aggregate, Figure 95). At the same angle off of the trail, approximately 15 meters further west-southwest, is a single piece of surface marine shell and a water-worn stone (about 5 by 7 centimeters in size, hammer-stone). Approximately 90 meters beyond these surface cultural materials is the site -26422 trail, which is also marked by marine aggregates (cemented sand slabs) and may be related to site -26433 (see Figure 15 for site location). To the northeast of site -26433 there is some very slight stacking and some small *ʻaʻā* boulders. This stacking primarily constitutes the minor modifications surrounding the trail, and appears to minimally modify an *ʻaʻā* edge.

Function of this site is as a trail for transportation. The marine aggregate, the inlaid slabs, causeway and curbing suggest that this was at one time a more formally constructed and well-defined trail. The use of *pāhoehoe* slabs suggests a pre-contact style of trail building. Given the relative proximity of site -26422 and the similarities of the trails (i.e., the marine aggregates as markers), they may well have been the same trail or connected at some point. Looking at an overview of sites in this area (see Figure 15 above), it is also possible that -26435 Feature A connected at one time to site -26433. The artifacts and minor modification of the surrounding area suggest heavy use of this trail at one point in time. Excavation potential for this site is minimal, given the site type and lack of concentrations of surface midden.

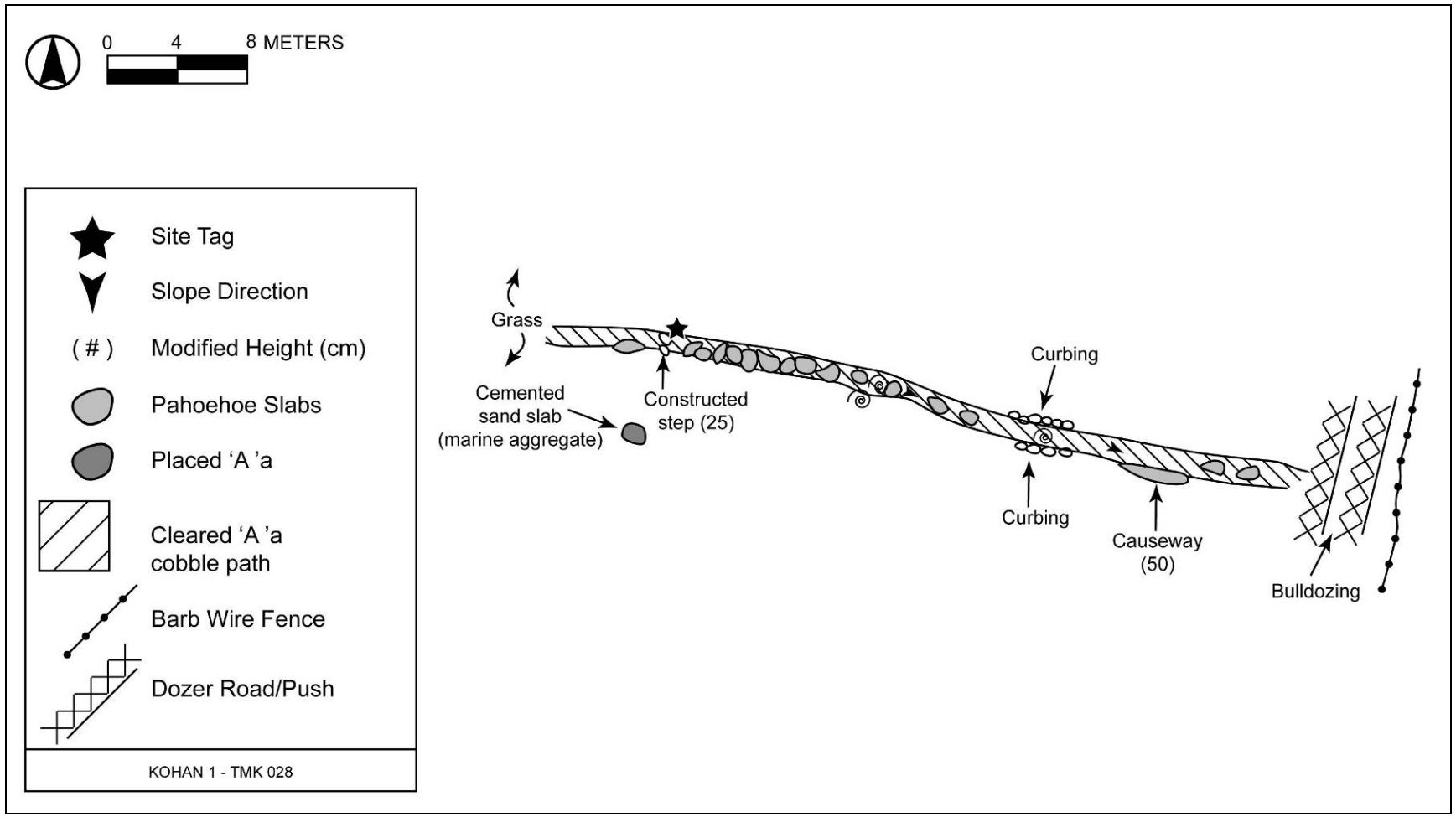

Figure 93. SIHP # 50-10-28-26433, plan view of trail

Figure 94. SIHP # 50-10-28-26433, photograph of west end of trail facing northwest

Figure 95. SIHP # 50-10-28-26433, photograph of marine aggregate near trail

4.3.22 State Site # 50-10-28-26434

SIHP #	50-10-28-26434
FUNCTION:	Temporary Habitation
SITE TYPE:	Lava Tube
TOTAL FEATURES:	1
DIMENSIONS:	18 m by 4 m
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	564 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26434 consists of a small lava tube shelter in the central portion of the southern edge of the project area. The *ahupua‘a* wall is approximately 250 meters south and site -26418 (section H) is 238 meters at 72 degrees from the site. The lava tube is located in an undulating *pāhoehoe* flow just below the edge of the *‘a‘ā*. The vegetation surrounding the site is comprised of dense *koa haole*, Christmas berry trees, and tall grass.

The site consists of a small lava tube with modification and soil deposits. The flow surrounding the main tube contains three small blister openings with no cultural material (Figure 96). All of the blisters have been created by the geologic upheaval of large pieces of bedrock, creating a jumble of large rocks (a fairly unique geologic occurrence for this area). The largest of the tube entrances has an entrance chamber that has been modified, primarily via the clearing of ceiling fall to the edges of the main chamber to create a comfortable sitting space (Figure 97 and Figure 98). The far end of the chamber has cobbles informally stacked about 40 centimeters high, partially blocking access to the continuation of the tube. One portion of this area is stacked an extra three courses high, reaching the ceiling (100 centimeters tall). The tube past this stacking was accessed but there are no cultural materials behind the partially blocked area, even though the tube continues for a fair distance. Within the main chamber the soil deposition is 5 to 10 centimeters deep and is slightly ashy. Items observed in the midden include cowry shell (*Cypraea* sp.), *Isognomon* sp., sea urchin, charcoal, and other marine shells. There are also several seabird bones located behind some large fall, which were tentatively identified as *Sula* sp. (booby).

The function of the site is temporary habitation, as determined by the presence of slight modification in the form of clearing and stacking, and the relatively extensive midden deposit. Data recovery is recommended given the presence of midden and ashy soil with depth, as excavation will likely provide datable material as well as a midden deposit.

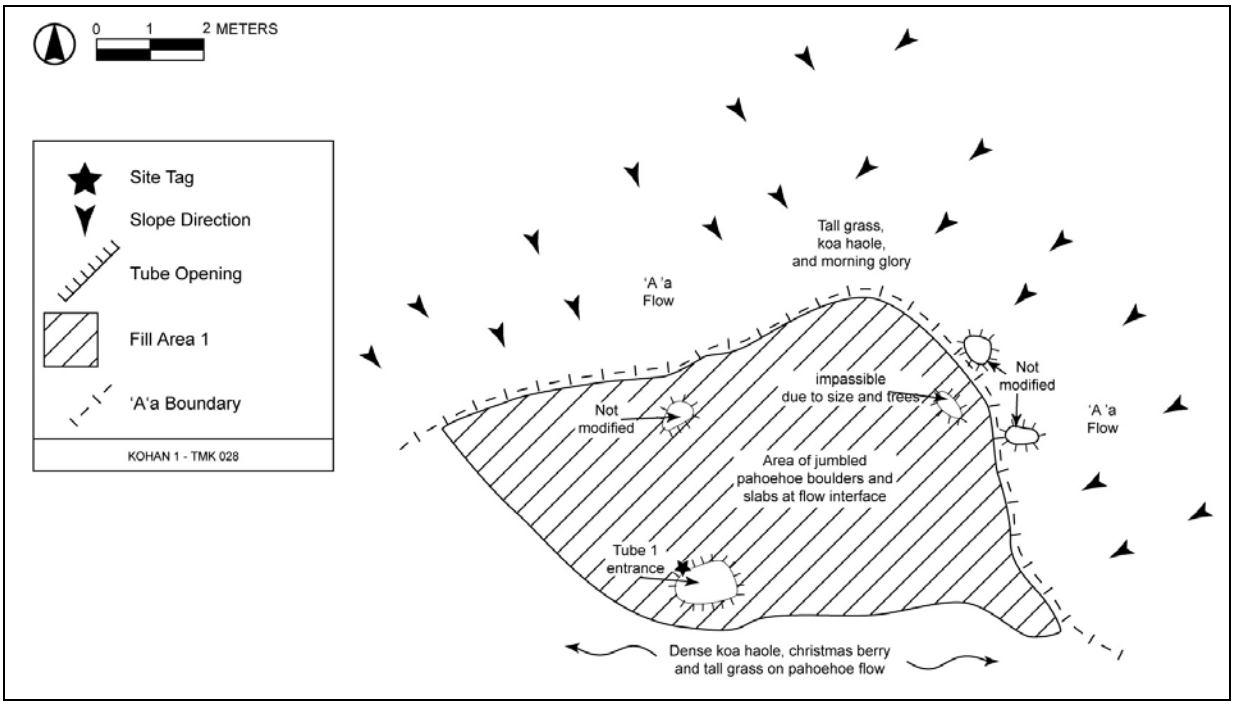

Figure 96. SIHP # 50-10-28-26434, plan view of surface

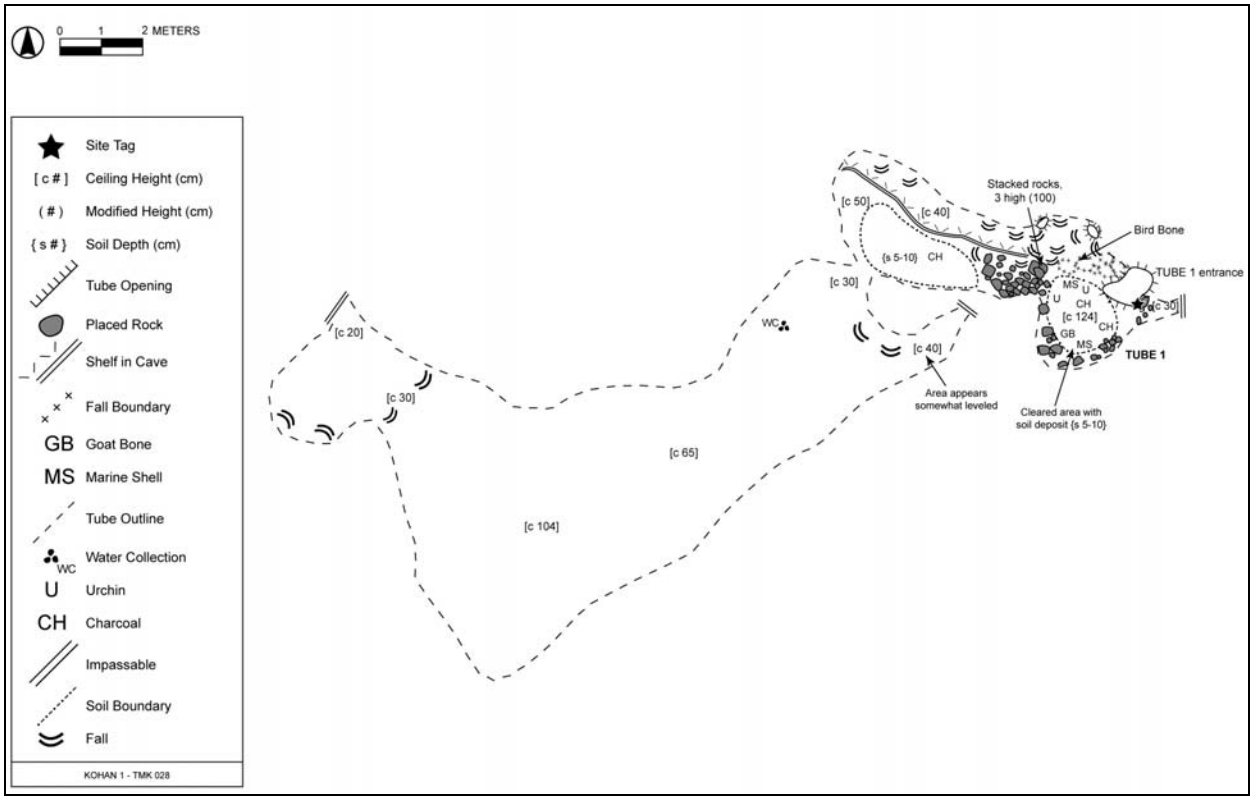

Figure 97. SIHP # 50-10-28-26434, plan view of lava tube

Figure 98. SIHP # 50-10-28-26434, tube entrance with cleared chamber below

4.3.23 State Site # 50-10-28-26435

SIHP #	50-10-28-26435
FUNCTION:	Animal Husbandry
SITE TYPE:	Wall
TOTAL FEATURES:	2
DIMENSIONS:	375 m in length
CONDITION:	Good
AGE:	Historic
ELEVATION:	689 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26435 is a long wall that runs on an east-west course over the large *‘a‘ā* flow that dominates the project area, and continues off of the eastern edge of the flow. Site -26435 roughly parallels, 30 to 40 meters off, the site -26371 trail, and eventually intersects the trail on its east end. Vegetation surrounds and periodically is overgrowing or damaging the wall, and consists primarily of *koa haole*, Christmas berry trees, and air plant.

The site consists of two features in addition to the wall, which is it main component (Figure 99). The wall is constructed primarily of medium to large *‘a‘ā* cobbles and some *pāhoehoe* cobbles and slabs, in an irregular stacking pattern (no distinct courses). The height of the wall varies between 60 and 100 centimeters with an average height of 80 centimeters. Generally, the north side of the wall is tallest on the western portion of the wall, and on the eastern portion of the wall the south side tends to be tallest (primarily a function of the natural outcrops). The average width of the wall is 60 to 80 centimeters. Approximately 20 meters west of the intersection with site -26371 the wall becomes a retaining wall against a natural ledge of the *‘a‘ā* flow, as opposed to a freestanding wall prior to that point. The retaining wall continues east where the wall is directly adjacent to site -26371, and then intermittently switches between being a retaining wall, a freestanding wall, or minor modification to a tall (1 to 2 meters in height) natural cliff edge.

Figure 99 shows points along the wall that will aid in description. The far western edge of the wall abuts the *‘a‘ā* flow which at this point is very rough (point 1, Figure 100). South of point 1 about 12 meters the wall makes a sharp distinct turn east – the corner is nearly a 90 degree angle. The wall abuts another outcrop to the east (point 3, Figure 101), thus forming a small enclosed area. The area within this semi-enclosure is generally far more level than the surrounding areas. Looking at an overall map of this portion of the project area (see Figure 15), it appears that this 90 degree turn is likely meant to head towards site -26432, forming one side of a large enclosed area with -26435 on the south and barbed wire fences on the north.

At point 13 on the map the visible alignment of the wall disappears for approximately 40 meters. The area in which the wall is not visible is a possible bulldozer area, as this is also where the site -26371 trail seems to end. The wall is visible again about 40 meters east at point 14, as a freestanding wall. About 40 meters east of this point the wall again terminates for awhile, but utilizes a steep natural cliff that drops off to *pāhoehoe* on the south side. The area between points 14 and 20 has intermittent construction of retaining walls, freestanding walls, and natural cliff edge, depending on the natural topography.

Feature A is an approximately 30 meters long segment of a crushed *‘a‘ā* trail remnant that extends perpendicular (to the north) of the main wall, prior to the wall intersecting site -26371 trail (Figure 99 and Figure 102). The trail does not appear to continue to the south past the wall, and on the northwest end it peters out until it can no longer be followed. Near the wall it consists of a naturally fairly level area that has been further intentionally leveled with crushed small *‘a‘ā* cobbles. After about 15 meters it turns to the northwest and consists of some paving slabs (20 to 40 centimeters in diameter) in addition to crushed *‘a‘ā*, these slabs occur mostly in an area where a short causeway (about 30 centimeters high) has been constructed. After another 15 meters, the trail can no longer be followed and appears to have been destroyed, possibly by the thick vegetation in the area. Function of the trail is transportation, almost undoubtedly in relation to the animal husbandry wall that is the main feature of -26435. It is possible that the trail once connected to site -26433.

Feature B is a stacked *‘a‘ā* wall and modified *‘a‘ā* outcrop that is located just south of the intersection between the wall and the site -26371 trail (Figure 99 and Figure 103). The feature is on top of an area of modified outcrop that is adjacent to point 11 of the main -26435 wall. This area is elevated 1 to 3 meters above the surrounding area, with especially steep cliffs and an excellent view to the south and southwest. Feature B has a wall running southwest from the main wall about 10 meters, set back a few meters from the cliff edge but running along it. The wall is about 80 centimeters high and 65 centimeters wide, and is constructed in the same manner as the site -26435 main wall. To the south-southeast of the Feature B wall, about 5 meters away, there is a modified area of the *‘a‘ā* outcrop. It has been partially leveled with *‘a‘ā* cobbles placed around a 4 meter square area, to create a low platform-like space about 20 centimeters higher than the surrounding area, which is roughly square and takes advantage of the naturally highest area of *‘a‘ā* (with the best overall view). This does not appear to be a habitation platform as it is very informal and not particularly level, but is more likely an activity area related to animal husbandry and/or agriculture (see site -26417 Feature C). The surrounding area has also been roughly leveled, and there are a few *‘a‘ā* mounds in this area. The *‘a‘ā* mounds are most likely related to agricultural activity at the nearby pervasive agricultural site -26417 (Features B, C, and D).

The function of site -26435 is animal husbandry. The site is consistent with historic period livestock walls, and this site seems to be highly related to -26371 (a probable historic horse trail). It does appear that livestock were kept on the north side of the wall, given that this is where the wall is tallest; this is also a reasonable conclusion when observing where other barbed wire fences and walls are located north of the wall (see Figure 7 for location of modern and historic animal husbandry features). Site -26435 runs toward site -26450, another long east-west running wall, even though it peters out about 100 meters before site -26450 begins. The area between these walls has several barbed wire fences that have been partially cut and/or removed and appear to have utilized the stone walls as well as barbed wire fences for animal husbandry. The extension portion of site -26450 at its west end may have originally connected to site -26435; bulldozing in the area makes it difficult to discern. Excavation potential for this site is minimal, due to a lack of areas to excavate and the unlikely chance of recovering datable material from the wall. Neither Feature A nor Feature B has areas amenable to excavation.

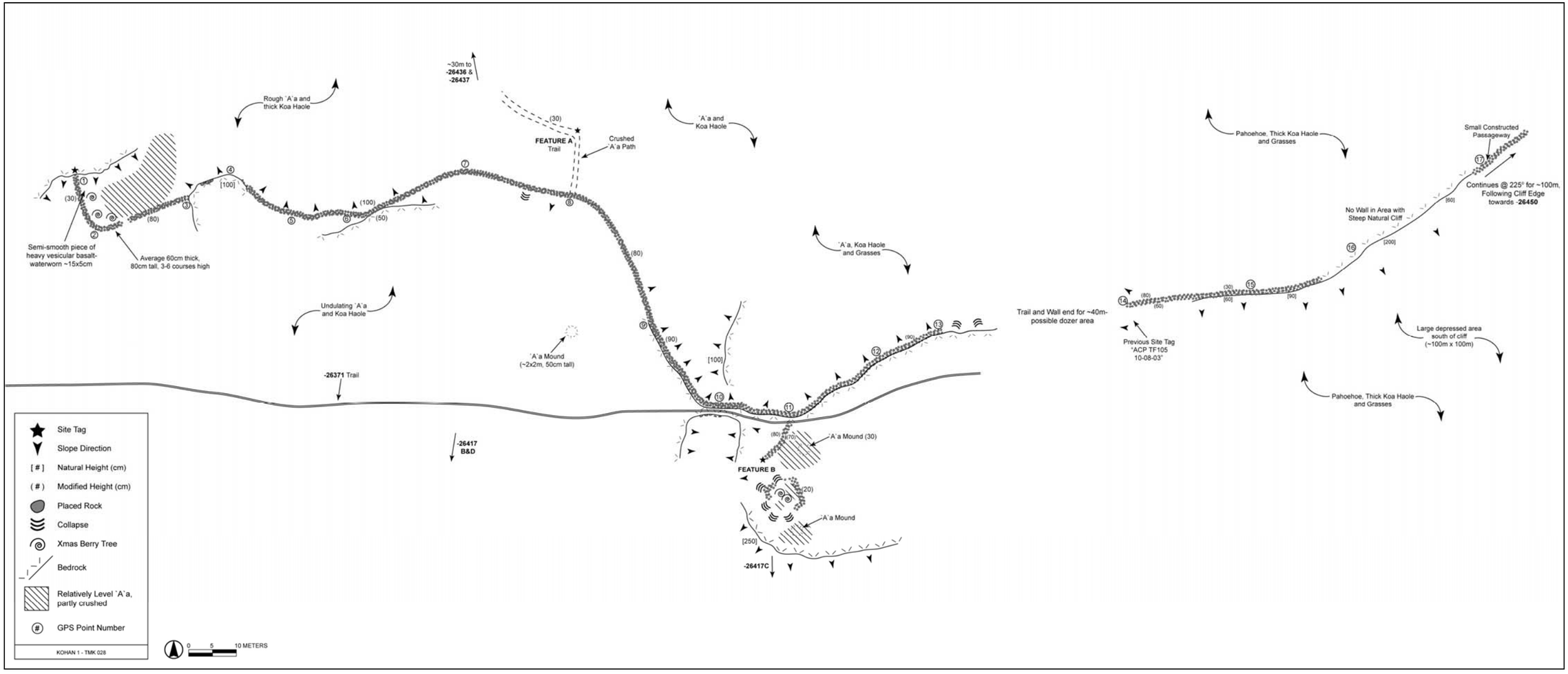

Figure 99. SIHP # 50-10-28-26435, plan view

Figure 100. SIHP # 50-10-28-26435, photograph of far west end of wall facing southeast (right foreground is point 1 on map) and ninety-degree corner (left background, point 2 on map)

Figure 101. SIHP # 50-10-28-26435, photograph of wall curving along *‘a‘ā* outcrop; free-standing continuation of wall in background (area between points 3 and 4 on map)

Figure 102. SIHP # 50-10-28-26435, Feature A, photograph of crushed *‘a‘ā* trail in foreground with main wall near archaeologist in background

Figure 103. SIHP # 50-10-28-26435, Feature B, photograph of wall running along edge of outcrop facing northeast

4.3.24 State Site # 50-10-28-26436

SIHP #	50-10-28-26436
FUNCTION:	Marker and Animal Husbandry
SITE TYPE:	Cairn and Wall
TOTAL FEATURES:	2
DIMENSIONS:	25 m by 5 m
CONDITION:	Good
AGE:	Historic
ELEVATION:	686 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26436 consists of a cairn and an informal wall near the long east-west running barbed wire fence located in the northeastern portion of the project area, on the *ʻaʻā* flow. This portion of the *ʻaʻā* flow has tall north-south running outcrops (2 to 3 meters in height) that create small valleys (5 to 8 meters wide) with rough *ʻaʻā* floors. Evidence of historic animal husbandry is nearby (i.e., sites -26432 and -26435), and given the proximity of the barbed wire fence this site is most likely related to historic animal husbandry. There are also several small informal mounds in a 20 by 20 meter area near site -26436 (see also site -26437). There is not enough modification in the area to consider this an agricultural site, but they may have been modifications from animal husbandry. It should also be noted that there is bulldozer activity nearby, primarily along the north side of barbed wire fence.

Feature A is an informally constructed wall that runs east-west for about 4 meters (Figure 104 and Figure 106). It runs between two naturally elevated, north-south running *ʻaʻā* ridges. The ridges are 1 to 2 meters high and the wall is approximately 90 centimeters high. Overall the wall utilizes a naturally upraised area and depression to create an enclosed valley. The most likely function for this modification is animal husbandry.

Feature B is a small cairn on top of an *ʻaʻā* outcrop that is naturally elevated about 1.5 meters above the surrounding area (Figure 105 and Figure 107). The cairn is 50 centimeters high with a 40 centimeter diameter, and is on a naturally elevated *ʻaʻā* rise that is 1 meter in diameter and 60 centimeters high (for a total height of about 1 meter). It is directly opposite another *ʻaʻā* outcrop naturally raised 2 to 3 meters above the surrounding area that is a prominent natural marker; the barbed wire fence runs directly between these two outcrops. This marker may have been historically used to mark the barbed wire fence and in association with animal husbandry in the area.

Function of this site is most probably animal husbandry. Feature A, the informal wall, appears to enclose an area between it and the barbed wire fence (with parallel *ʻaʻā* ridges enclosing the other two sides). No other function is apparent for this feature. Feature B, a cairn, is near the barbed wire fence and could have been a marker for it, possibly in conjunction with a rather prominent *ʻaʻā* outcrop approximately equidistant from it on the other side of the barbed wire fence; site -26437 is likely a related site. Excavation potential for this site is minimal due to the lack of soil, cultural material, or formal construction.

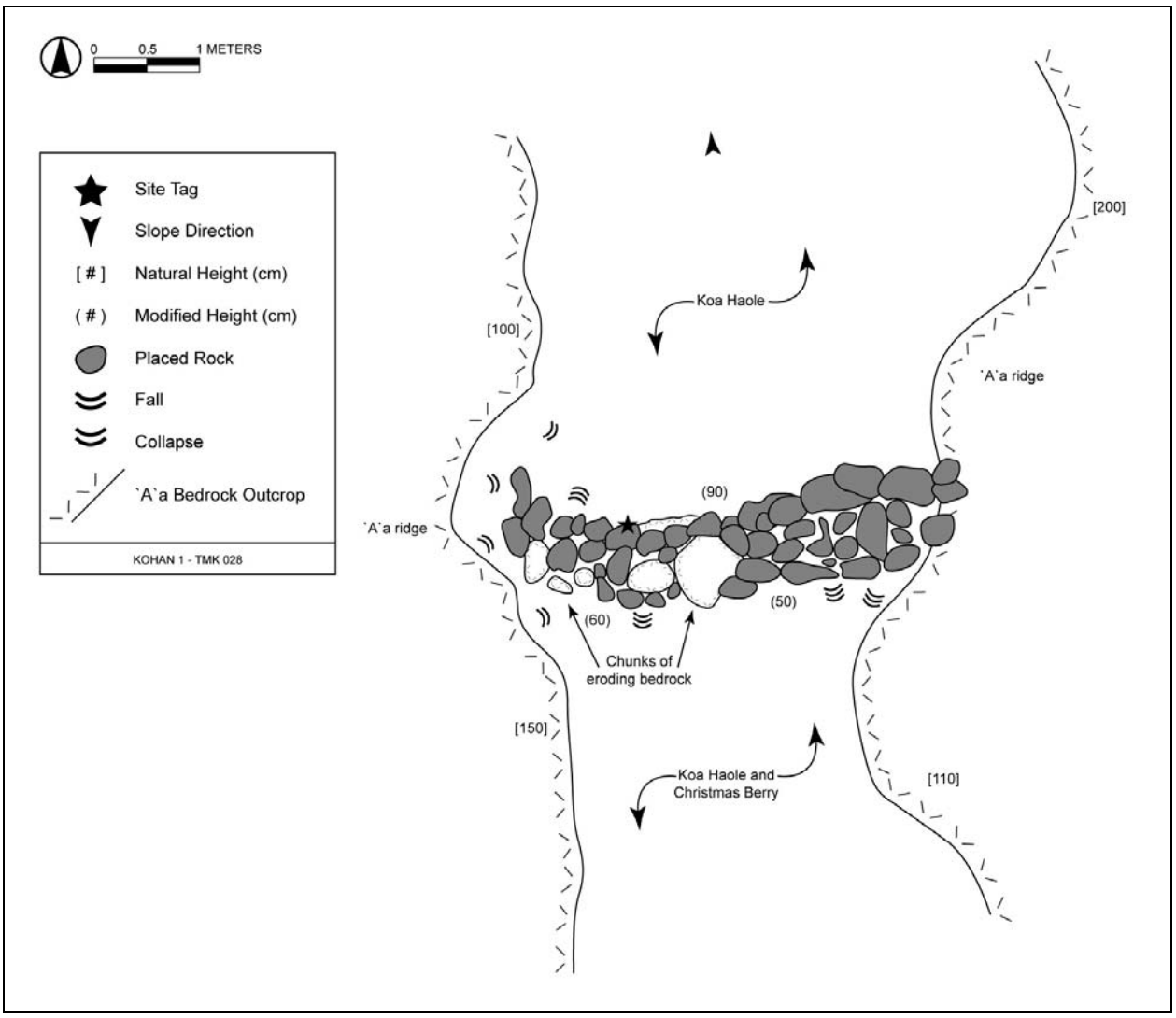

Figure 104. SIHP # 50-10-28-26436, Feature A plan view

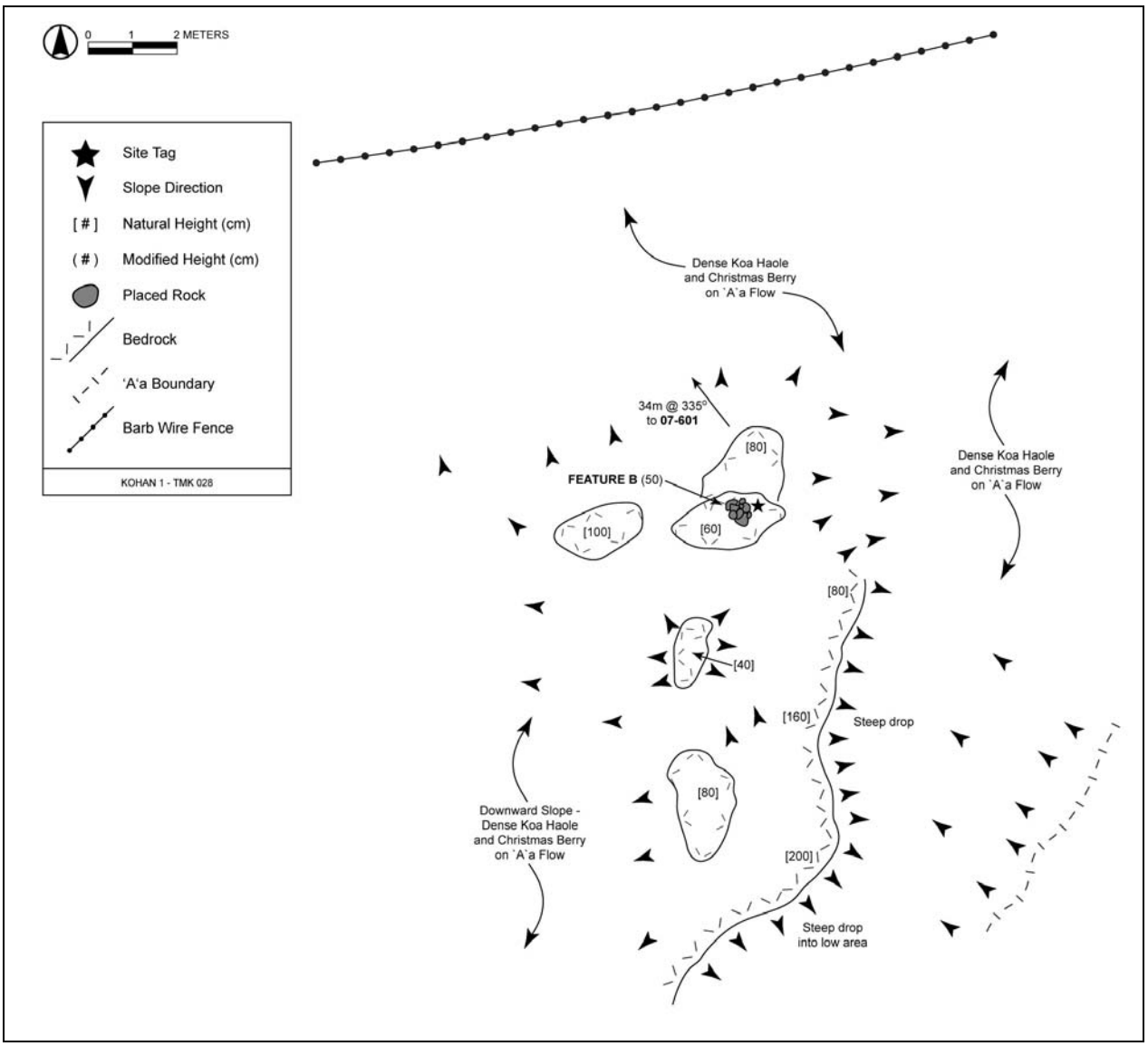

Figure 105. SIHP # 50-10-28-26436, Feature B plan view

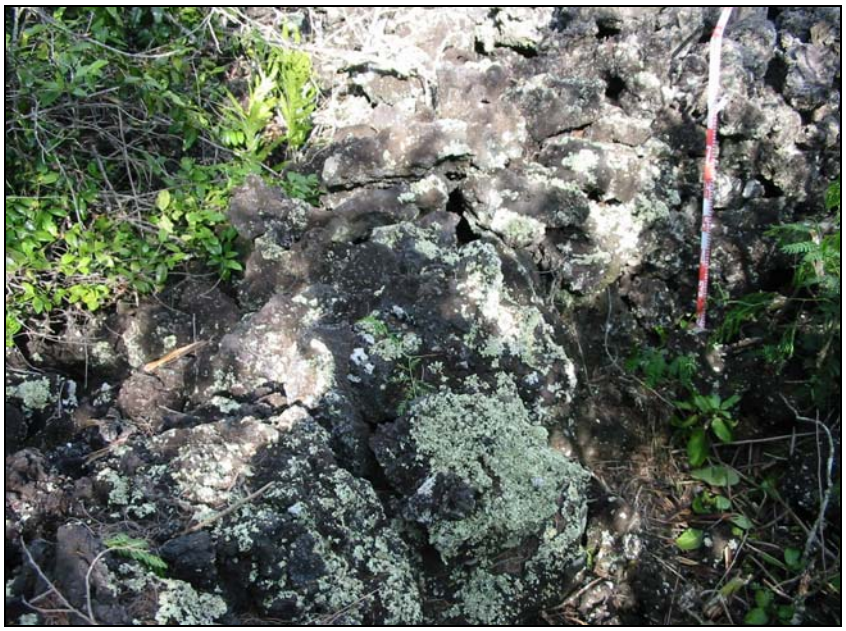

Figure 106. SIHP # 50-10-28-26436, Feature A, photograph of informal wall across natural depression

Figure 107. SIHP # 50-10-28-26436, Feature B, photograph of cairn in foreground with prominent tumulus in background, and barbed wire fence running between them

4.3.25 State Site # 50-10-28-26437

SIHP #	50-10-28-26437
FUNCTION:	Marker
SITE TYPE:	Cairn
TOTAL FEATURES:	1
DIMENSIONS:	3.1 m by 1.75 m
CONDITION:	Good
AGE:	Historic
ELEVATION:	672 ft. a.m.s.l.

DESCRIPTION: Site -26437 is a cairn (Figure 108 and Figure 109). It is located on the northeastern side of the project area on the *ʻaʻā* flow. The cairn is on top of a small natural *ʻaʻā* protrusion that is about 60 centimeters in height. The cairn itself is on the northwest side of the *ʻaʻā* protrusion and is 45 centimeters high and 40 centimeters in diameter. It is constructed of one large (45 centimeters in diameter) *ʻaʻā* slab turned upright and supported by four to five *ʻaʻā* cobbles (20 to 30 centimeters in diameter). The *ʻaʻā* protrusion also has several *ʻaʻā* cobbles (15 to 30 centimeters in diameter) tossed on top of it (on the southeast end and below the cairn). *Koa haole* and other vegetation are very dense in this area, but a few other areas of tossed rocks could be seen. These do not appear to be agricultural mounds as the ground surface is not cleared in any nearby areas.

Function of the site is as a marker. There are several trails in the area (site -26371 and site -26433) and it is possible the cairn is related to a trail. However, given historic sites nearby (i.e., sites -26432, -26435, -26436) it is more likely that this site functioned as a marker for activity related to animal husbandry and/or the barbed wire fence. There is also a small but very tall (2 to 3 meters high) *ʻaʻā* outcrop about 15 meters away that is a very visible natural landmark, and is situated between sites -26437 and -26436. It appears likely that these markers are all related to the animal husbandry in the area. Excavation potential is poor, given the site type.

Figure 108. SIHP # 50-10-28-26437, photograph of cairn on top of *‘a‘ā* protrusion

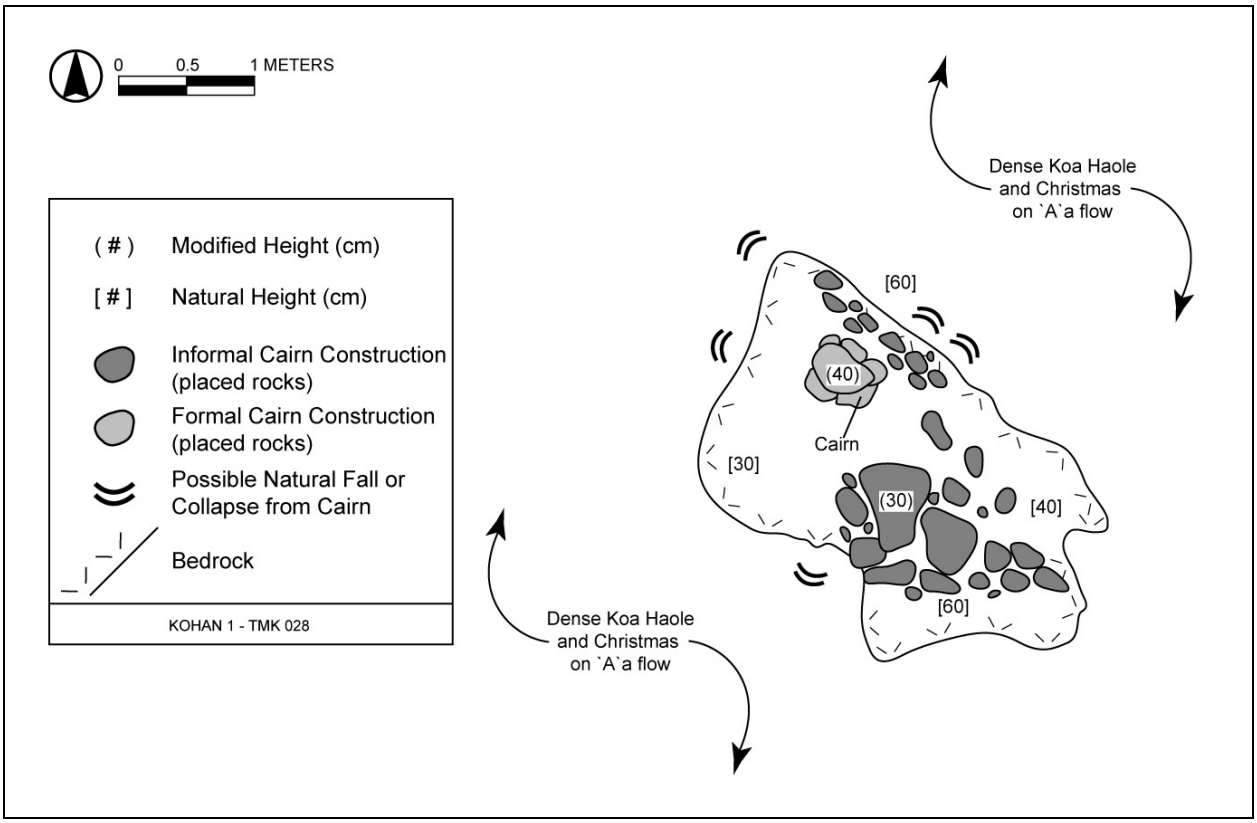

Figure 109. SIHP # 50-10-28-26437, plan view

4.3.26 State Site # 50-10-28-26438

SIHP #	50-10-28-26438
FUNCTION:	Burial and Temporary Habitation
SITE TYPE:	Lava Tube
TOTAL FEATURES:	1
DIMENSIONS:	100 m by 5 m
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	732 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26438 consists of two lava tubes running east-west (Tube 1 to the east and Tube 2 to the west) off a central sink located at the *ahupua‘a* wall in the southeastern corner of the project area. Site -26439, also a lava tube, is 30 meters to the north of site -26438; site -26440 and -26441 are also nearby. The site has been minimally disturbed by modern human use, with modern trash – plastic food containers and plastic bags – in the sink and in Tube 2. The area surrounding the site on the south side has been disturbed by cattle grazing, and the north side shows signs of bulldozing. Vegetation includes *koa haole* and thick grass, as well as one large *kukui* tree in the sink (there are no *kukui* trees in the area surrounding the sink, but see also site -26440).

The sink at site -26438 is not modified, but the *ahupua‘a* wall is constructed up to the edges of the sink on both the east and west sides, and faced where it abuts the sink (Figure 110 and Figure 113). On the south side of the sink a small wall was constructed following the contour of the sink; it is partially collapsed by the *kukui* tree. This “filler” wall was undoubtedly constructed as a continuation of the *ahupua‘a* wall, to keep cattle on the south side of the wall.

Tube 1 contains a burial (Burial 64), a modified entrance, several tools, and assorted midden (Figure 111 and Figure 114). The modification to the entrance is the result of informal stacking of natural fall, which partially restricts access. Beyond the fall area, the tube opens into a large chamber. The burial is located 11.5 meters at 86 degrees from the site tag at the Tube 1 entrance. Between the entrance and the burial there is a concentration of a few tools, marine shell, fish bone, and animal bone. The tools observed were a modified chicken bone and an octopus lure (large cowry with two holes drilled in it, one hole on each end). The modified chicken bone is a long bone (radius) that has been cut through on one end and partially cut on the other end, with a hole drilled through the center of the bone; it appears to be a small fishhook blank. Neither artifact was recovered during the inventory survey, but should be considered for collection during data recovery. Non-tool items observed in Tube 1 include an eel dentary (jaw bone, tentatively identified as Muraenidae), several unmodified chicken bones, medium mammal bone (most likely goat), charcoal, *kukui* endocarps, and marine shell (cowry and *Isognomon* sp.).

Beyond this midden area there are several large pieces of ceiling fall that are about one meter high and cover nearly the entire floor. Directly behind (just east of) the last piece of fall is Burial 64. The burial is generally in poor condition with all the bones scattered and fragmented. The bones are scattered within an area about 2.5 meters (north-south) by 1.0 meters (east-west), with much of the scatter being under a portion of the large piece of ceiling fall (there is a gap between the fall and the floor 5 to 20 centimeters in height). At the south end of the burial there are

several large cranial fragments and a small (30 centimeter diameter) pile of small angular cobbles that appears to have fragments of cranium within it. North of the cranial pieces are several very fragmented long bones, the auricular portion of a pelvis, several hand bones, and various other fragmented pieces of unidentifiable bone. Given its location within the tube, this appears to be a pre-contact style burial. Due to its highly fragmented nature, it is not possible to determine if the burial was flexed, but it does appear to be laid out with the head to the south, and given the presence of small bones this was likely a primary burial. There are no directly associated burial goods; the octopus lure and fishhook blank at the entrance of this tube appear to be related to habitation at the site, rather than associated with the burial that is hidden behind the fall at the eastern end of the tube. There is no modification of the tube east of the burial, except for a small circle of cobbles (60 centimeters in diameter) about 5 meters east of the burial. This feature uses small thin slab-like pieces of ceiling fall to create a low (less than 10 centimeters high) circle. Although this could be a water collection feature, there are no other similar features in the tube, and in general this feature is somewhat inconsistent with a water catchment (rather low, formal, very circular). This circular feature is more likely related to the burial, possibly as an area for burial goods, but there is nothing present within the circle presently.

Tube 2 functioned as a small temporary habitation shelter (Figure 112). A coral abrader blank and a fair amount of midden (*kukui* endocarps, charcoal, and marine shell) were found in this tube. There are two distinct areas of midden and clearing; these areas are roughly rectangular and are a result of clearing medium size cobble rubble off the floor and to the sides of the initial tube chamber, creating distinct cleared areas. The soil within these is about 5 centimeters deep and ashy. Although the tube continues down various side passages, the main modification is within this initial chamber.

Function of this site is as a burial location as well as temporary habitation. Tube 2 has a fair amount of midden and minor modification of the front chamber of the tube (cleared areas), indicative of a pre-contact style shelter. Tube 1 also was apparently used as temporary habitation (midden, minor modification of entrance, artifacts) but also as a burial location (Burial 64). The burial is well hidden behind a large piece of fall, and Tube 1 could have been used as both a shelter (near the entrance) and a burial location (near the back of the tube). The excavation potential for Tube 2 is fair, given the presence of midden and a soil deposit. The midden deposits are fairly shallow, approximately 5 centimeters in depth, and therefore present only fair excavation potential, but given the presence of midden, artifacts, and charcoal it should be considered for data recovery. Given the presence of a burial and the location of this site (centered on the *ahupua‘a* wall and southern project boundary) a search for previous archaeology in the adjacent southern parcel was done, but there apparently has been no archaeological inventory survey completed for this parcel. The location of the burial within a lava tube directly underneath the *ahupua‘a* wall should, however, be taken into account for future preservation of the burial.

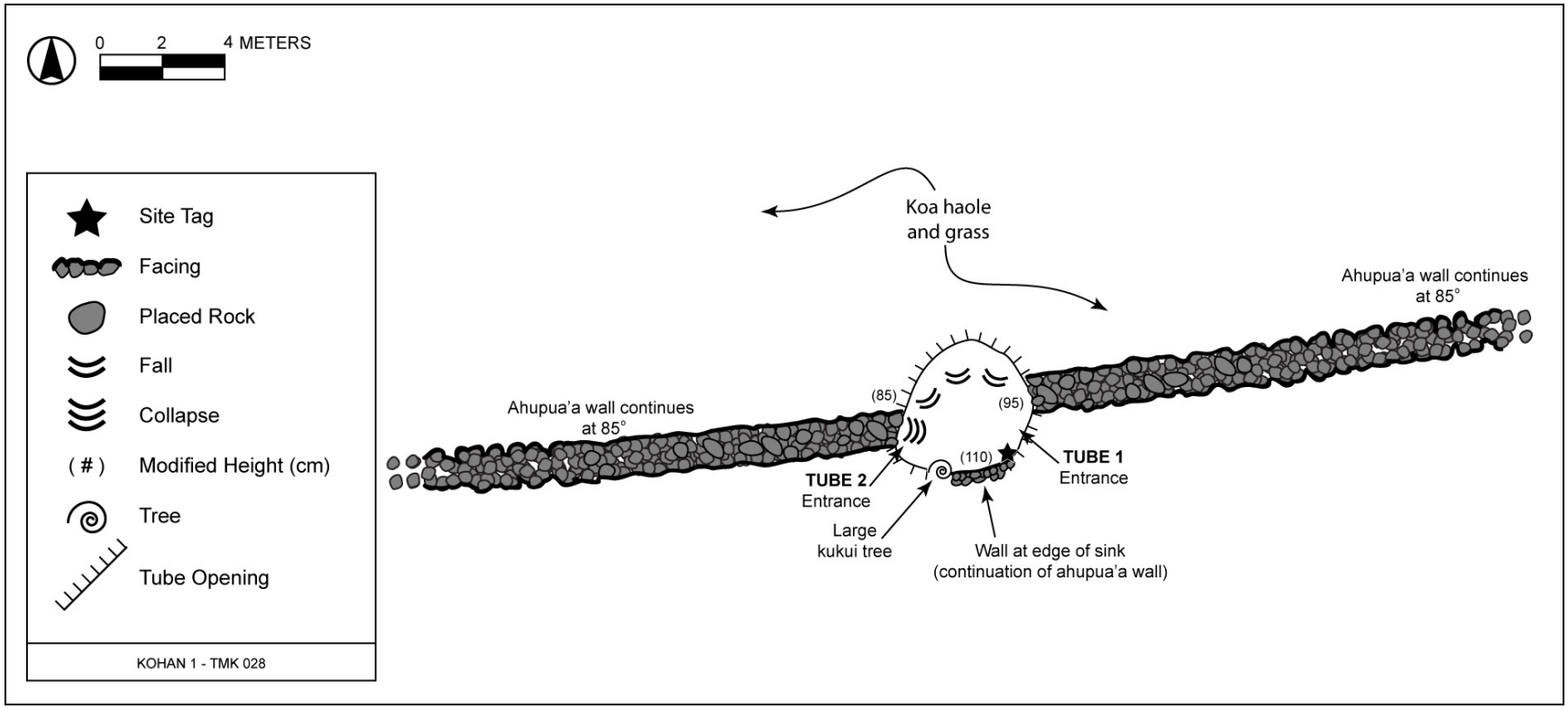

Figure 110. SIHP # 50-10-28-26438, plan view of sink, tube entrances and *ahupua‘a* wall

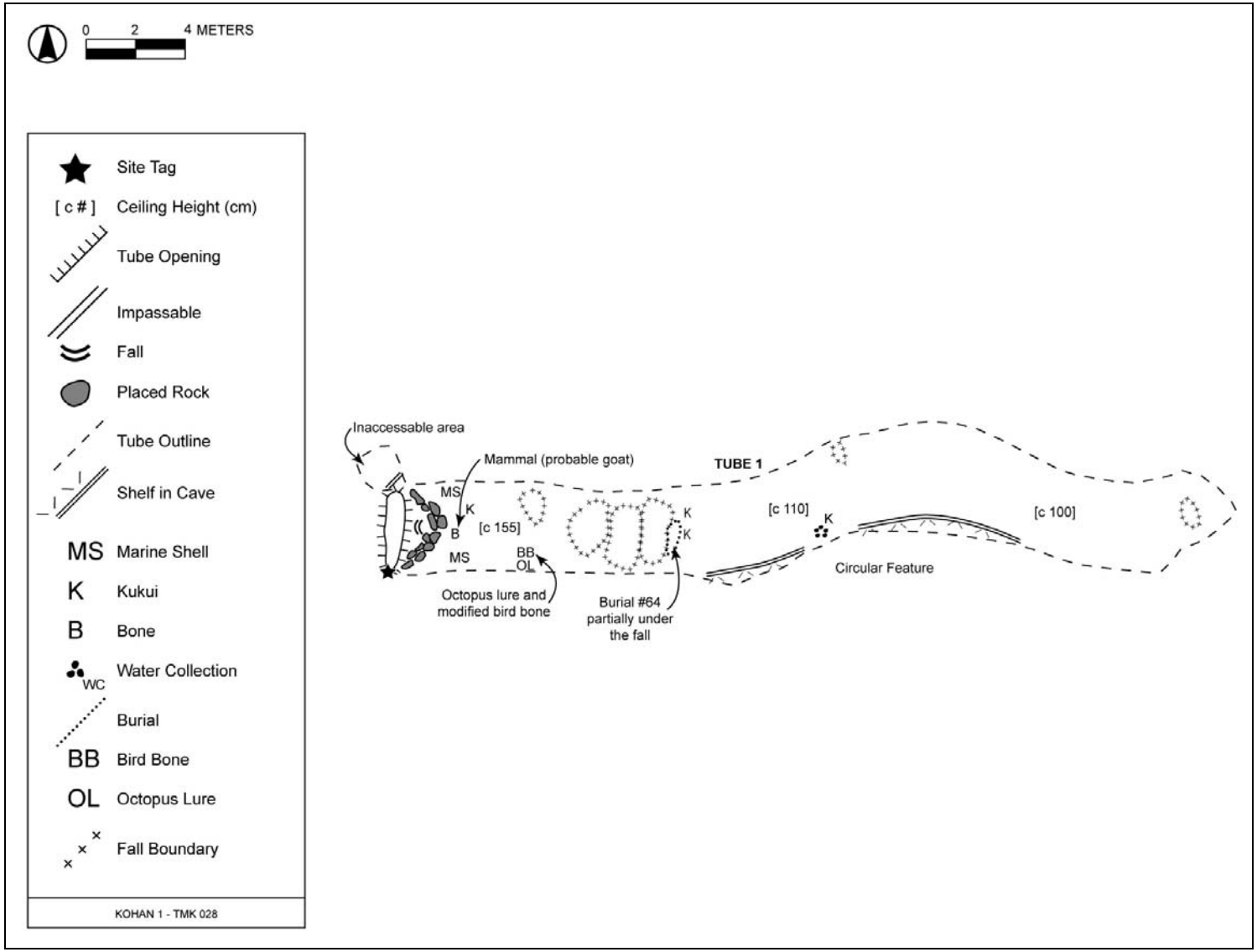

Figure 111. SIHP # 50-10-28-26438, plan view of Tube 1

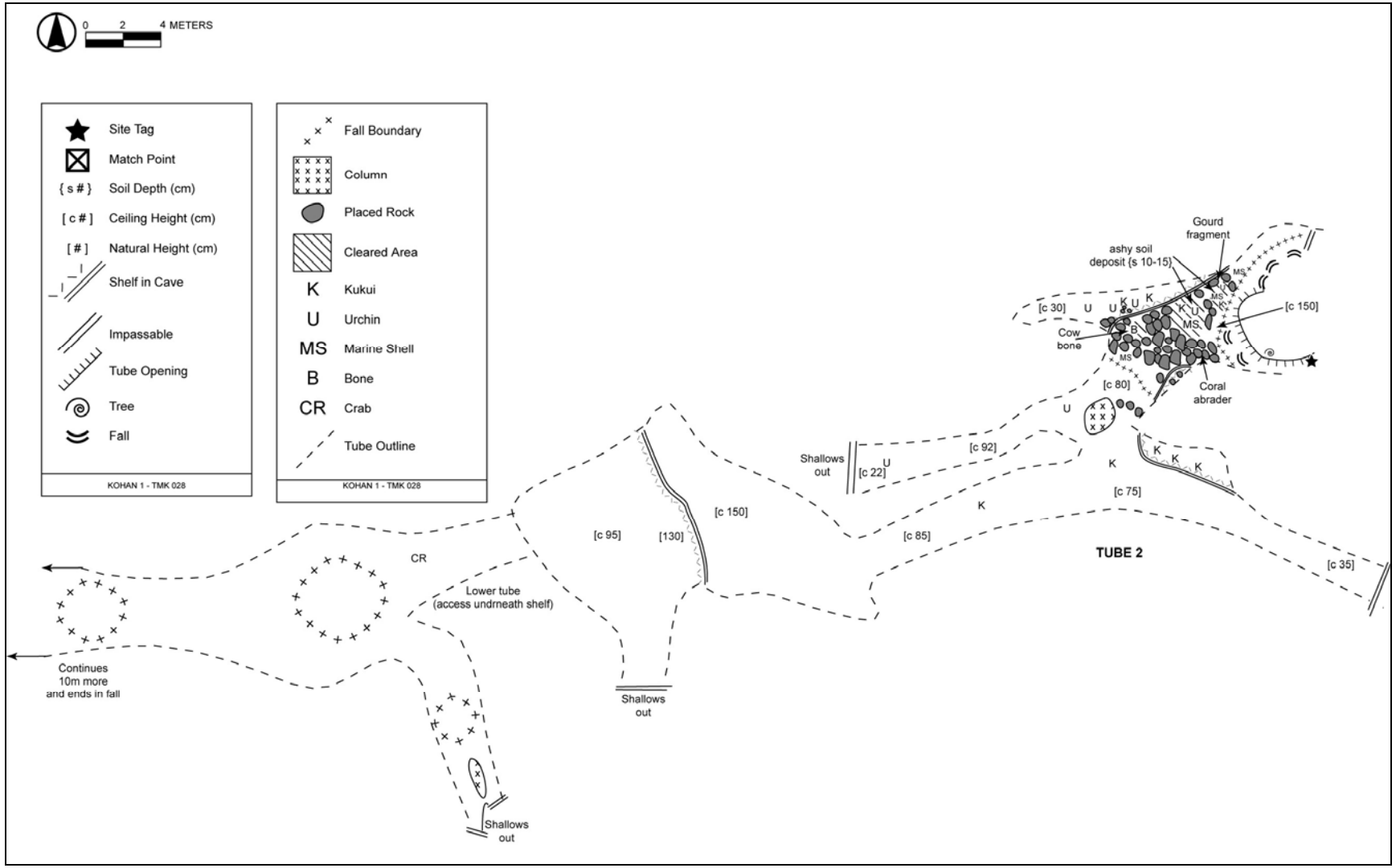

Figure 112. SIHP # 50-10-28-26438, plan view of Tube 2

Figure 113. SIHP # 50-10-28-26438, photograph of sink facing southeast, with *ahupua‘a* wall on far left, entrance to Tube 1 in the center, and small filler wall on right

Figure 114. SIHP # 50-10-28-26438, photograph of octopus lure and modified chicken bone

4.3.27 State Site # 50-10-28-26439

SIHP #	50-10-28-26439
FUNCTION:	Temporary Habitation
SITE TYPE:	Lava Tube
TOTAL FEATURES:	1
DIMENSIONS:	24 m by 18 m
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	745 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26439 is a modified lava tube located in the southeastern corner of the project area. The *ahupua‘a* wall is 30 meters to the south, and site -26440 is approximately 35 meters to the northwest. The surrounding area is fairly level *pāhoehoe* flow, which has been heavily disturbed by bulldozing, although there is no disturbance to the tube entrance itself. Vegetation is comprised of relatively thin *koa haole*, dense grass, and occasional Christmas berry trees.

The site consists of a single small shallow sink with one lava tube entrance (Figure 115 and Figure 116). The entrance to the tube has been modified, and this modification is characterized by the rearrangement of fall and debris to create a level area near the entrance. This leveling, which measures 4 meters north-south by 1.2 meters east-west, appears to have narrowed the entrance and created a crawl area, possibly to retain moisture within the tube for water collection while also increasing ease of access once in the tube.

North of the entrance approximately 4 meters is a midden deposit that includes cowry and nerita shell, *kukui* endocarps, and sea urchin fragments. Adjacent to the midden is a mound of stacked rubble. The mound, which appears to be for water collection, measures 1.0 by 1.1 meters with a height of 50 centimeters, and is roughly three courses high, built against the tube wall. The area with the water collection mound and midden is a distinct activity area in the northern chamber of the tube. There also are a few other informal water catchments nearby.

South of the entrance is another midden deposit and habitation area. The midden contains marine shell including cowry, *Isognomon* sp., and other indeterminate marine shell, as well as sea urchin fragments. Also observed in the midden were *kukui* endocarps and charcoal. Three coral abraders (blanks) and one small hammer-stone (5-7 cm diameter) were identified. The soil deposit has an area of concentrated ash, which is at least 5 centimeters deep and the midden tends to be concentrated around it. The ash, charcoal, and midden are concentrated within this general area and around two small rubble stacks and two uprights. The rubble stacks may have been the result of debris clearing or an intentional stacking to create an area for a fire (the highest concentration of midden and ash is under/adjacent to the rubble stack). Overall the uprights and rubble area create a roughly rectangular cleared habitation space.

South of the area of habitation, the tube is blocked by a large pile of debris. The debris appears to have been a natural tube collapse, and the tube appears to continue past the blockage. Given the presence of upright stones only a few meters from this natural fall area, rocks were removed from the fall at the south end of the tube in an attempt to get beyond it. Due to the large size of some of the fall, this attempt was not successful. The fall does appear to be natural with

the only clear modification being a few tossed rocks on the north end of it, likely a result of the clearing of the adjacent area floor area.

Site -26439 functioned as an area of intermittent habitation. This function is indicated by the overall modification of the tube, including a modified entrance, water collection, several areas of midden deposits, artifacts (coral abraders and a small hammer-stone) and a constructed/cleared area with two upright stones that designate a habitation area within the tube. Excavation potential for this is good, given the presence of an ashy soil deposit that will likely yield radiocarbon samples in good context as well as midden.

Figure 115. SIHP # 50-10-28-26439, photograph of tube entrance with modified fall below

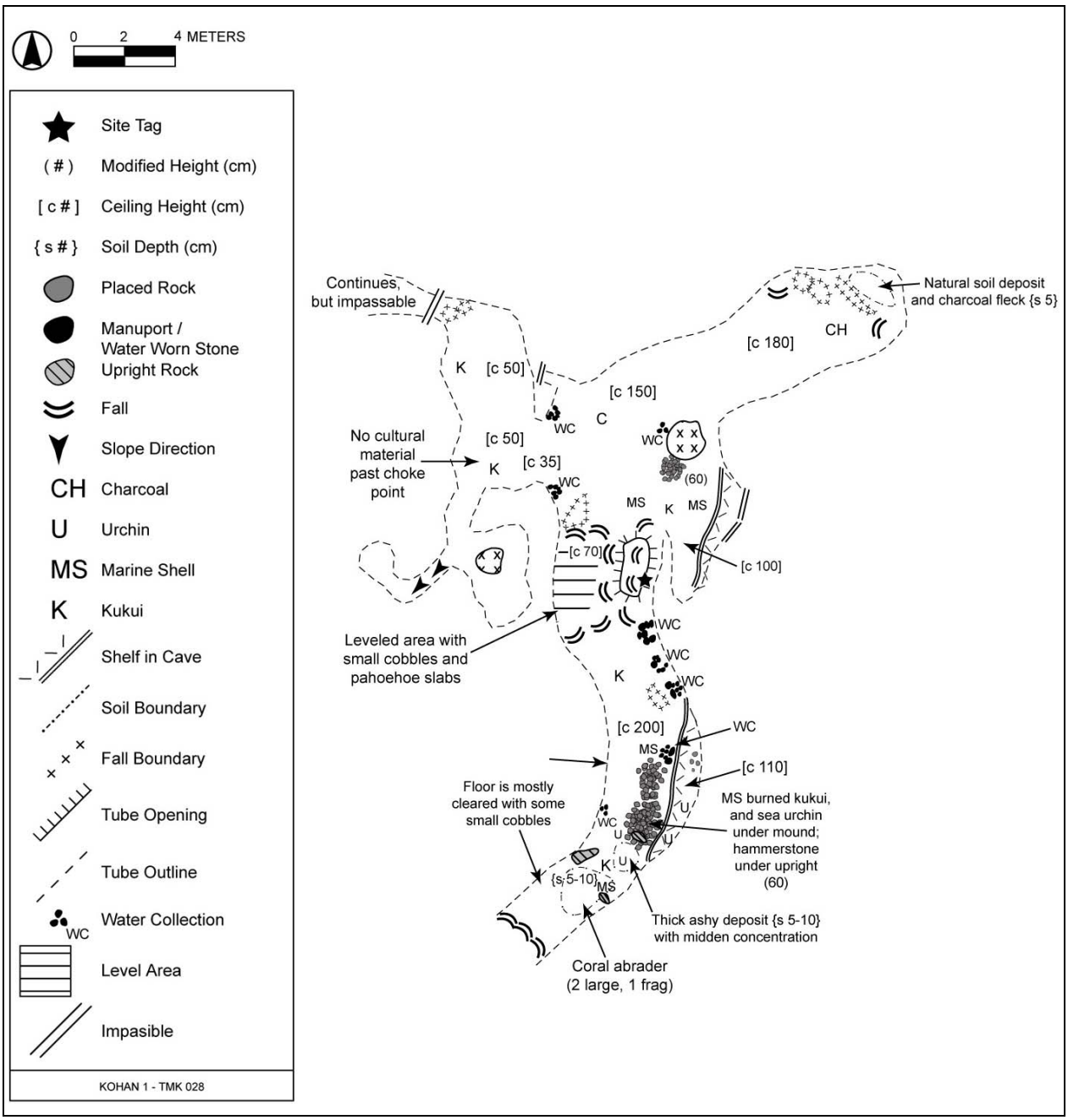

Figure 116. SIHP # 50-10-28-26439, plan view

4.3.28 State Site # 50-10-28-26440

SIHP #	50-10-28-26440
FUNCTION:	Temporary Habitation and Burial
SITE TYPE:	Lava Tube
TOTAL FEATURES:	2
DIMENSIONS:	12 m by 7 m
CONDITION:	Good
AGE:	Historic
ELEVATION:	732 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26440 is a modified sink and lava tube located in the southeast corner of the project area. The *ahupua‘a* wall is approximately 50 meters south, and site -26439 is located about 30 meters away at 230 degrees. Site -26438 is also about 50 meters southwest of site -26440. There is definitive bulldozing throughout much of this area. Vegetation consists of *koa haole*, thick grass, and Christmas berry trees. However, within the sink and immediately surrounding the site -26440 sink are several small and medium size *kukui* trees. The landscape is generally level *pāhoehoe*, sloping slightly to the south-southwest.

The site -26440 main tube runs about 10 meters to the west and then turns to the northeast for another 4 meters (Figure 117). The initial chamber of the tube (within the first 6 meters) is fairly comfortable to sit in and has been partially cleared in the center, where there is a 5 to 10 centimeter ashy soil deposit. There are a few pieces of marine shell in this area, and a few pieces of sea urchin towards the back of the tube, but overall there is very little midden on the surface. Charcoal and/or more midden may be present in the ashy soil, however. The majority of the floor is covered by small to medium size cobbles (5 to 35 centimeters in diameter) which are spread evenly and/or cleared in the initial chamber of the tube. Further back in the tube these cobbles are piled higher making the ceiling height only about 40 centimeters, and this portion of the tube is very difficult to crawl through (see Feature B).

In the initial portion of the tube near the ashy soil is a large piece of what is apparently leather, about 20 by 55 centimeters in size (Figure 119). Along the longest edge of it there are five or six small holes fairly evenly spaced (2 to 5 millimeters in size). Another row of holes (about three) runs directly perpendicular to this, near the center of the leather. These appear to have been holes for rivets or some type of lacing. Overall the leather is fairly thick and rough. Almost directly under the piece of leather was a small fragment (about 5 centimeters in size) of a large marine shell, identified as *Charonia tritonis* (Triton’s trumpet shell).

Feature A is a modification to the sink in the form of a terrace/retaining wall (Figure 118). The modification is located on the eastern edge of the sink, adjacent to the entrance to the lava tube. Constructed of *pāhoehoe* slabs ranging in size from 20 to 60 centimeters in diameter, the entire terrace measures 2.1 by 1.3 meters tall. The terrace is seven courses high. The northern edge of the terrace wall has collapsed because of an intrusive Christmas berry tree. Overall the terrace is formally constructed, and this feature functions to formally modify the sink. It is believed to be historic in nature, associated with use of the sink as temporary habitation (evidenced by a similar construction style to the nearby *ahupua‘a* wall and presence of leather in the sink). The area above and around the sink has been bulldozed, but the wall left intact.

However, it is also possible that the wall serves to block a lava tube entrance. While the wall was examined for possible tubes behind it, there is no way to confirm whether this is possible, as the wall cannot be deconstructed without compromising site integrity. This was not deemed prudent given that Feature B (less than 10 meters away) functions as a probable burial.

Feature B is an alignment of uprights with backfill (towards the back of the tube) that has approximately six small slabs (approximately 10 to 15 centimeters in diameter, 3 to 4 centimeters thick) placed over the top of the fill. The fill appears to be at least 30 centimeters or more in depth. There are three uprights total, which range in size from one meter tall (touches the ceiling and does not appear to have come from ceiling fall) to approximately 50 centimeters tall (the other two uprights). The front side (towards the front of the tube) of the uprights is distinctly shored up with cobbles to improve their stability. These cobbles largely resemble the cobble floor of the majority of the tube. There appears to be no way to account for the slabs or the uprights coming from the ceiling. Small probes into the fill behind the uprights, an informal platform, did not reveal additional artifacts or bones, but were extremely limited due to cramped conditions. However, three independent archaeologists observed essentially the same construction and reasoned that burial is the only possible explanation, as this is a very small space to crawl through and the back of this tube seems an unlikely place to utilize for shelter. The formality of the uprights thus suggests burial. It also seems likely that some of the cobble floor is cultural, hindering access to the back of the tube. This feature is pre-contact in character but is associated with historic artifacts (the leather piece). The probable burial is also associated with a fragment of a Triton’s trumpet shell (*Charonia tritonis*), which is suggestive of a non-habitation function (i.e., burial or ceremonial).

Function of this site is as temporary habitation and probable burial. The leather, midden, ashy soil and clearing suggest a temporary shelter, possibly with a pre-contact and post-contact component. Feature A shows some formal modification of the sink, suggesting recurrent use, although this modification could also be related to the probable burial. Feature B is very likely a burial area, given the formal modification and the placement in a difficult to reach area. The time period is difficult to assess, with possible pre-contact use as a shelter and later post-contact use (as evidenced by the leather); the probable burial would be pre-contact Native Hawaiian in style, however. Excavation potential is minimal given the small amount of surface midden.

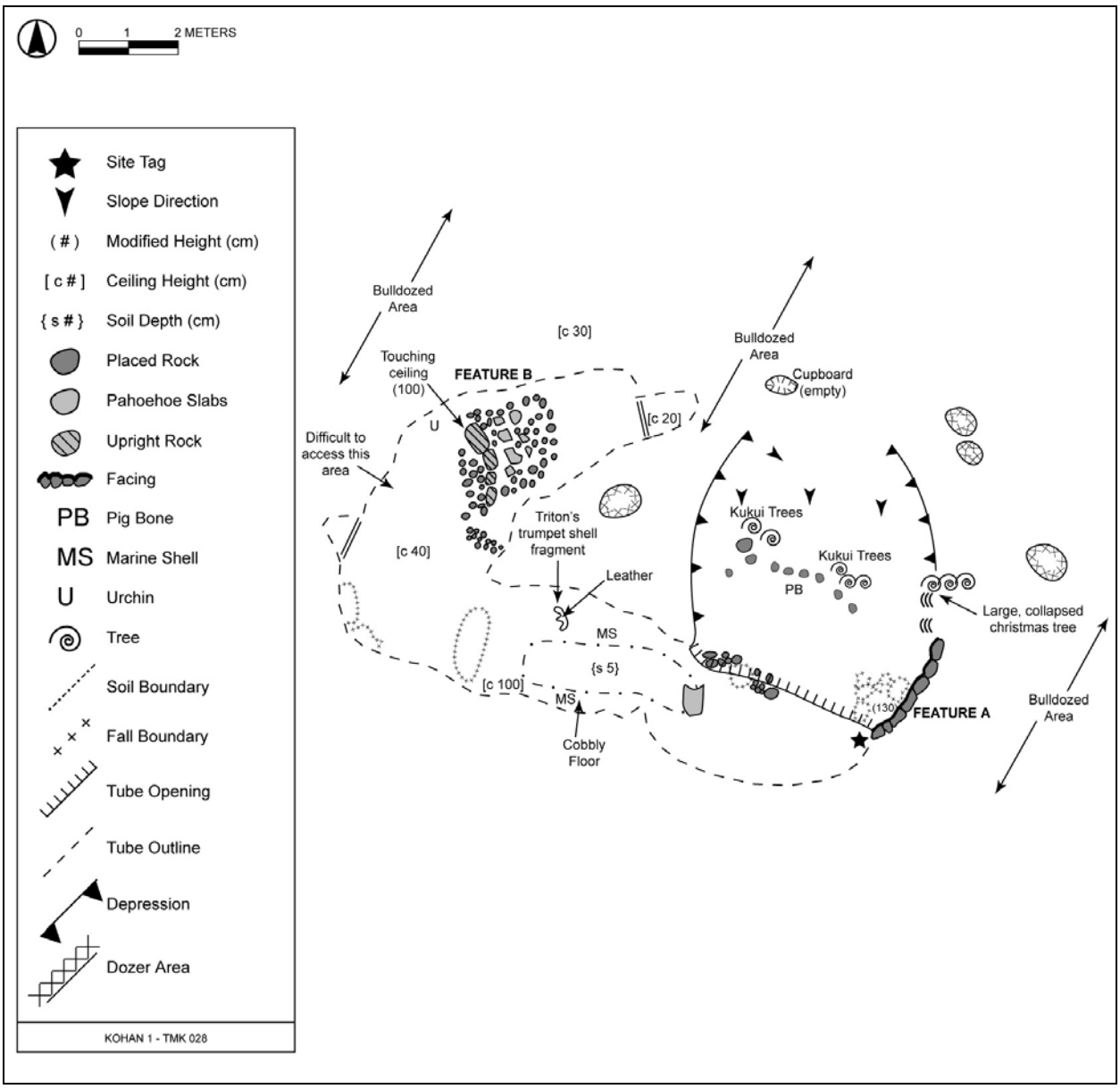

Figure 117. SIHP # 50-10-28-26440, plan view

Figure 118. SIHP # 50-10-28-26440, Feature A, photograph of retaining wall facing east

Figure 119. SIHP # 50-10-28-26440, photograph of large piece of leather found in tube

4.3.29 State Site # 50-10-28-26441

SIHP #	50-10-28-26441
FUNCTION:	Activity Area
SITE TYPE:	Lava Tube
TOTAL FEATURES:	1
DIMENSIONS:	18 m by 8 m
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	708 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26441 is a fairly small lava tube located in the southeast corner of the project area, approximately 55 meters north of the *ahupua‘a* wall. The surrounding area is fairly level *pāhoehoe* with many nearby areas that have been bulldozed. The vegetation is relatively open but *koa haole*, air plants, and grass do cover much of the ground surface.

The lava tube is approximately 18 meters long with an average ceiling height of 85 centimeters (Figure 120). The tube opening is about 1 meter wide and 60 centimeters tall, and slopes downward steeply (Figure 121). Inside the initial chamber, there are some placed stones on a low shelf to the north and the entrance is partially modified for access. The north end of the tube does not continue. To the south, the tube continues after a low ceiling area. In this southern portion of the tube there is a small amount of sea urchin shell, a small amount of marine shell (one large cowry fragment), scattered charcoal, a broken hammer-stone (a water-worn piece of basalt with wear at one end, approximately 10 by 5 centimeters in size), and several informal water collection features. The water collection generally consists of small to medium size cobbles placed in a small mound to support a vessel. There is also one larger mound at the southeast edge of the tube that is about 80 centimeters in diameter, which is informally constructed. The tube floor can be seen under the mound and there is no possibility of burial. Rather, this larger mound also appears to have been part of the water collection in this tube. The ceiling of the tube is dripping water in some areas.

Function of this tube is activity area, specifically for water collection. While the tube may have also been used as a temporary shelter, there is very little midden or modification to make habitation more pleasant, and the majority of the modification appears to have been solely for water collection. No other function is apparent for this site, and there is no likelihood of burial. Excavation potential for this site is minimal, as there is no soil and only a small amount of midden. Charcoal could be collected but it is of poor context. No further work is recommended.

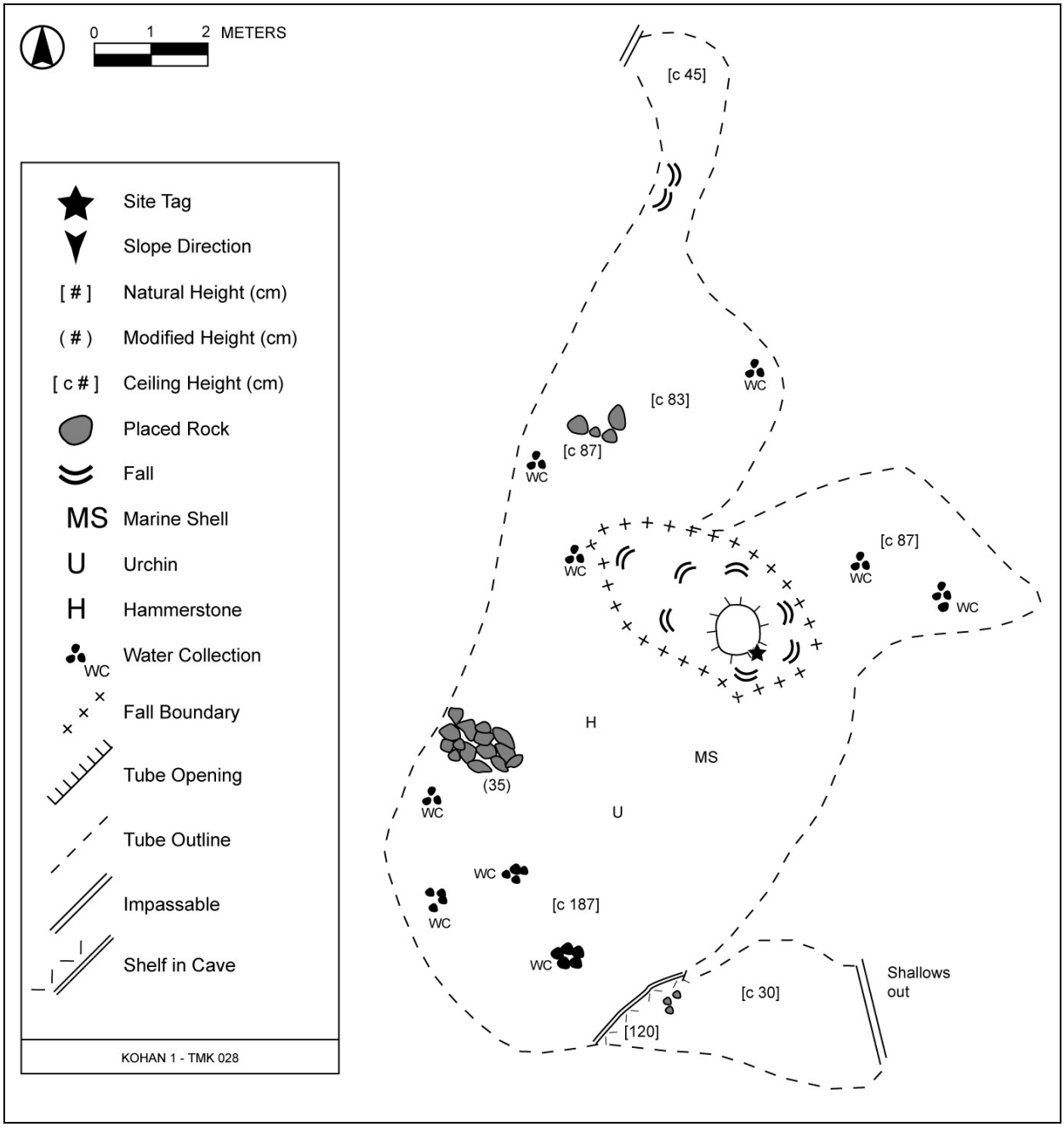

Figure 120. SIHP # 50-10-28-26441, plan view

Figure 121. SIHP # 50-10-28-26441, photograph of entrance to lava tube facing northeast

4.3.30 State Site # 50-10-28-26442

SIHP #	50-10-28-26442
FUNCTION:	Animal Husbandry
SITE TYPE:	Wall
TOTAL FEATURES:	1
DIMENSIONS:	35 m in length
CONDITION:	Good
AGE:	Historic
ELEVATION:	656 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26442 is a wall located in the central eastern portion of the project area. The area has very dense vegetation and overall low site density. Two other wall features are about 200 meters north of -26442 (sites -26435 and -26444).

The site -26442 wall is constructed on top of an *ʻaʻā* ridge that runs north-south (Figure 122 and Figure 123). East of the wall is a *pāhoehoe* area that is somewhat depressed and relatively level and clear. On the west side of the wall, the *ʻaʻā* flow is naturally elevated and is uneven and undulating. The wall is built upon the *ʻaʻā* ridge where the *ʻaʻā* meets the *pāhoehoe*, and which is naturally upraised above the *pāhoehoe*. The wall accentuates this natural height, and the wall averages about 60 to 130 centimeters above the ground surface, with a maximum constructed height of about 100 centimeters (in some areas the height of the wall is greater because it is built on the naturally elevated area). The wall averages 70 to 85 centimeters in width, and is constructed primarily of medium to large *ʻaʻā* cobbles (25 to 50 centimeters diameter) stacked two to five courses high. In total, the wall runs at about 200 degrees for 35 meters. On its north end the wall ends in an area of dense vegetation and appears collapsed. The naturally elevated ridgeline continues although wall construction apparently ends. The ridgeline was searched for more than 20 meters further north, but no continuation of the wall was found. The south end of the wall turns about ninety degrees to the east and then ends after only a few meters.

Function of this site appears to be for animal husbandry, as a way to utilize and enhance the natural topography for use as a boundary or enclosed area, probably for cattle. No other function is apparent. Excavation potential of this site is minimal, as it is unlikely that charcoal could be recovered from under the wall, and there is no midden/cultural material observed. No further work is recommended.

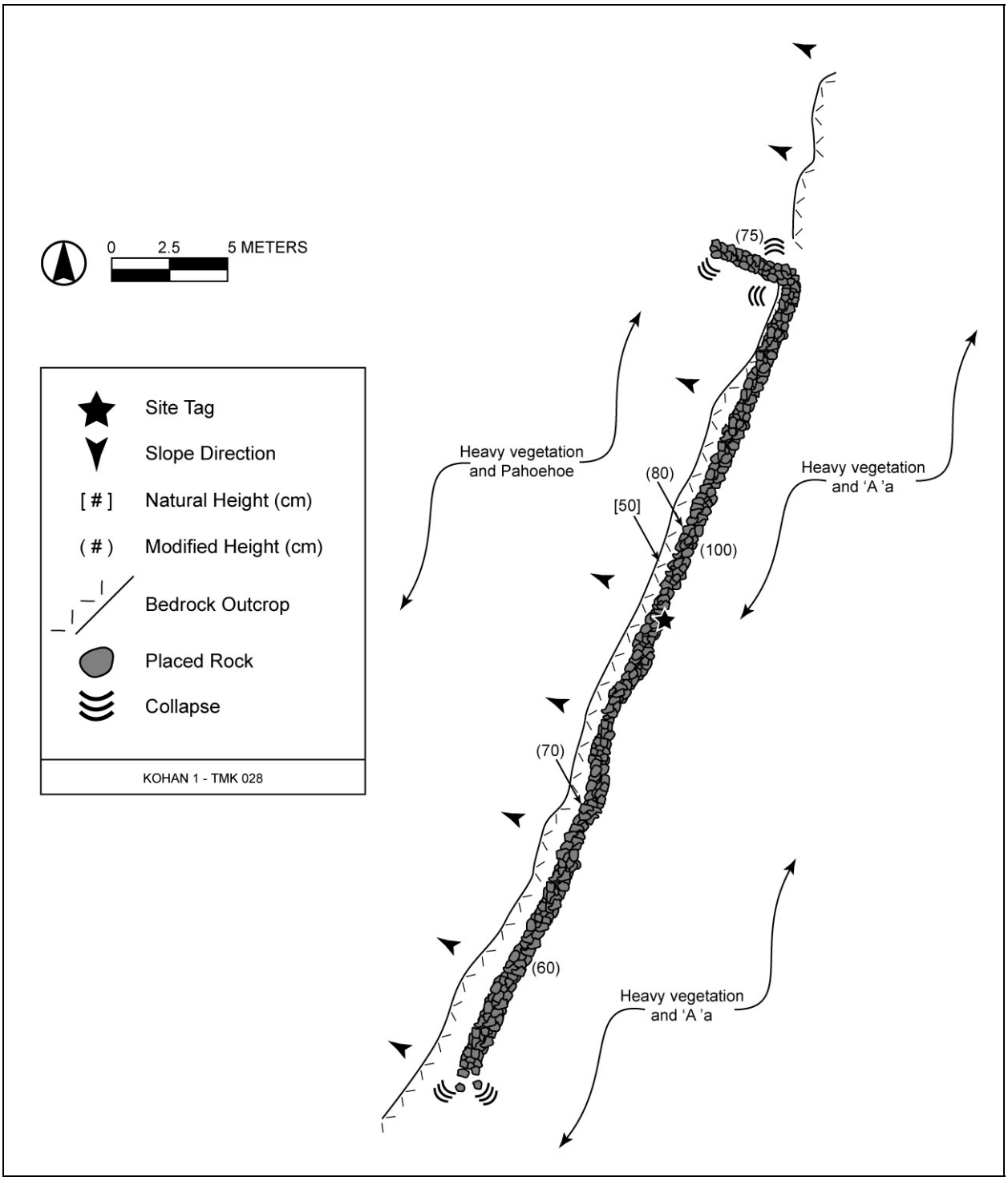

Figure 122. SIHP # 50-10-28-26442, plan view

Figure 123. SIHP # 50-10-28-26442, photograph of *‘a‘ā* wall facing north

4.3.31 State Site # 50-10-28-26443

SIHP #	50-10-28-26443
FUNCTION:	Permanent Habitation
SITE TYPE:	Enclosure
TOTAL FEATURES:	1
DIMENSIONS:	35 m by 14 m
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	715 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26443 consists of an enclosure on an elevated *ʻaʻā* outcrop in the northeast corner of the project area. The outcrop is elevated 1 to 2 meters above the surrounding area. Site -26417 Feature E, an agricultural site, is 60 meters due south. Vegetation in this area is dense, with dense *koa haole*, thick grass, and large Christmas berry trees covering most of the outcrop.

The enclosure is generally formally constructed, utilizing medium to large (predominantly over 30 centimeters in diameter) *ʻaʻā* cobbles, with wall height ranging from 40 centimeters to over 100 centimeters. Within the overall site, there are four distinct areas, labeled Area 1 through 4 (Figure 124).

Area 1 is located in the southeast portion of the site (Figure 124 and Figure 125). This area measures 4 by 4 meters and consists of a distinct small enclosure. Three walls of the enclosure follow the edge of the natural *ʻaʻā* outcrop. The wall remnants of this enclosure average 40 to 60 centimeters in height and are three to four courses high. The northern and eastern walls of this enclosure are nearly completely collapsed. Area 1 shows evidence of clearing and has a rough, small cobble paving. The paving and the wall have both been damaged by extensive vegetation growth.

Area 2 is located directly to the north of Area 1 and consists of a level area with evidence of clearing and some small cobble paving (Figure 124). There are no walls around Area 2. However, the area is delimited to the north and east by a steep drop-off of the elevated *ʻaʻā* outcrop. Area 2 measures 6 by 3.5 meters.

Area 3 is located in the north-northwestern portion of the site (Figure 124, Figure 126, Figure 127 and Figure 128). This area contains the most intact walls and the highest. The eastern wall of Area 3 is nicely faced, 110 cm tall, and five to six courses high. The northern wall is an extension of the natural outcrop face for an external height of approximately 2.8 meters total. The southern wall is the least distinct of the Area 3 walls; it is collapsed near the southeast corner and is indistinguishable at the southwest corner. The area within the walls has extensive small cobble paving. Area 3 shows the least damage by natural vegetation growth. The overall dimensions of Area 3 are 5 by 5 meters. The southwest corner is still intact and is nicely faced. This corner is six courses tall (100 centimeters in height). On the external side of the southwest wall is a small level ledge on the *ʻaʻā* outcrop.

Area 4 is adjacent to the south end of Area 3 (Figure 124 and Figure 127). These areas share a common wall. Area 4 is slightly depressed at a lower elevation than the other areas of the site. The walls of area 4 are largely collapsed. Both the south and west walls of Area 4 follow the

contour of the outcrop. There is some evidence of small cobble paving in Area 4, but this paving has been extensively disturbed by vegetation growth. Area 4 measures 8 by 6 meters.

Overall site -26443 is in fair to good condition. Portions of the enclosure walls are in good condition, showing definitive facing and multiple courses. In contrast, some wall portions are completely collapsed. The greatest disturbance to the site appears to be natural vegetation.

Function of this site is as a permanent habitation enclosure. The time and effort invested in constructing the walls and paving the interior with small *‘a‘ā* cobbles is indicative of a permanent habitation. Excavation (see testing results below) confirmed that there is some excavation potential for this site, as midden was recovered from under the paving in Area 3. The nature of the site – constructed walls and cobble paving – does however indicate a low potential for large intact subsurface deposits. Overall this site is a unique example of habitation within the project area, and is in good condition; it is therefore recommended for preservation.

Testing Results

Subsurface testing was conducted at site -26443 to aid in determining the function of the site, to examine subsurface deposits, and to attempt to collect charcoal for radiocarbon dating analysis. The testing consisted of excavating a 0.50 by 0.45 meter test unit placed within the small *‘a‘ā* cobble paving at the east side of Area 3 (Figure 124 and Figure 129). The unit was excavated to underlying bedrock to a maximum depth of 60 centimeters. Stratum I (0 to 50 centimeters) consisted of the construction of the small cobble paving, with *‘a‘ā* cobbles ranging from 5 to 25 centimeters in size. Stratum II (50 to 60 centimeters) consists of a silt sedimentation (10 YR 3/3) that appears to be primarily natural erosion of vegetation. Stratum II sits on top of rough *‘a‘ā* bedrock.

Midden was recovered from Stratum I and Stratum II, and all midden appears to be contemporaneous with Stratum I and habitation on the surface of the structure. The midden inventory includes the following from Stratum I: 1.9 g of Snakehead cowry (*Cypraea caputserpentis*); 1.9 g of *Theodoxus vespertinus*; 0.1 g of *Heliacus* sp.; and 65.2 g of *kukui* endocarp. The following was recovered from Stratum II: 0.3 g of unidentified marine shell; 0.3 g Sea urchin (*wana* or Echinoderm); and 0.3 g of *kukui* endocarp. A small amount of charcoal was recovered from both strata (<0.1 g from Stratum I and 0.6 g from Stratum II). The charcoal is in fairly good context for dating, given its close association with midden just below the surface of a habitation area (see Results of Laboratory Analysis section below for dating information).

The presence of midden and the construction of the small cobble paving strongly supports a habitation function for this site, and excavation has therefore confirmed the function of the site as habitation. Given the small size of the excavation unit and the recovery of a fair amount of midden, this also supports permanent habitation. Any data recovery at this site should focus on larger scale excavation to recover additional datable material and increase the midden sample.

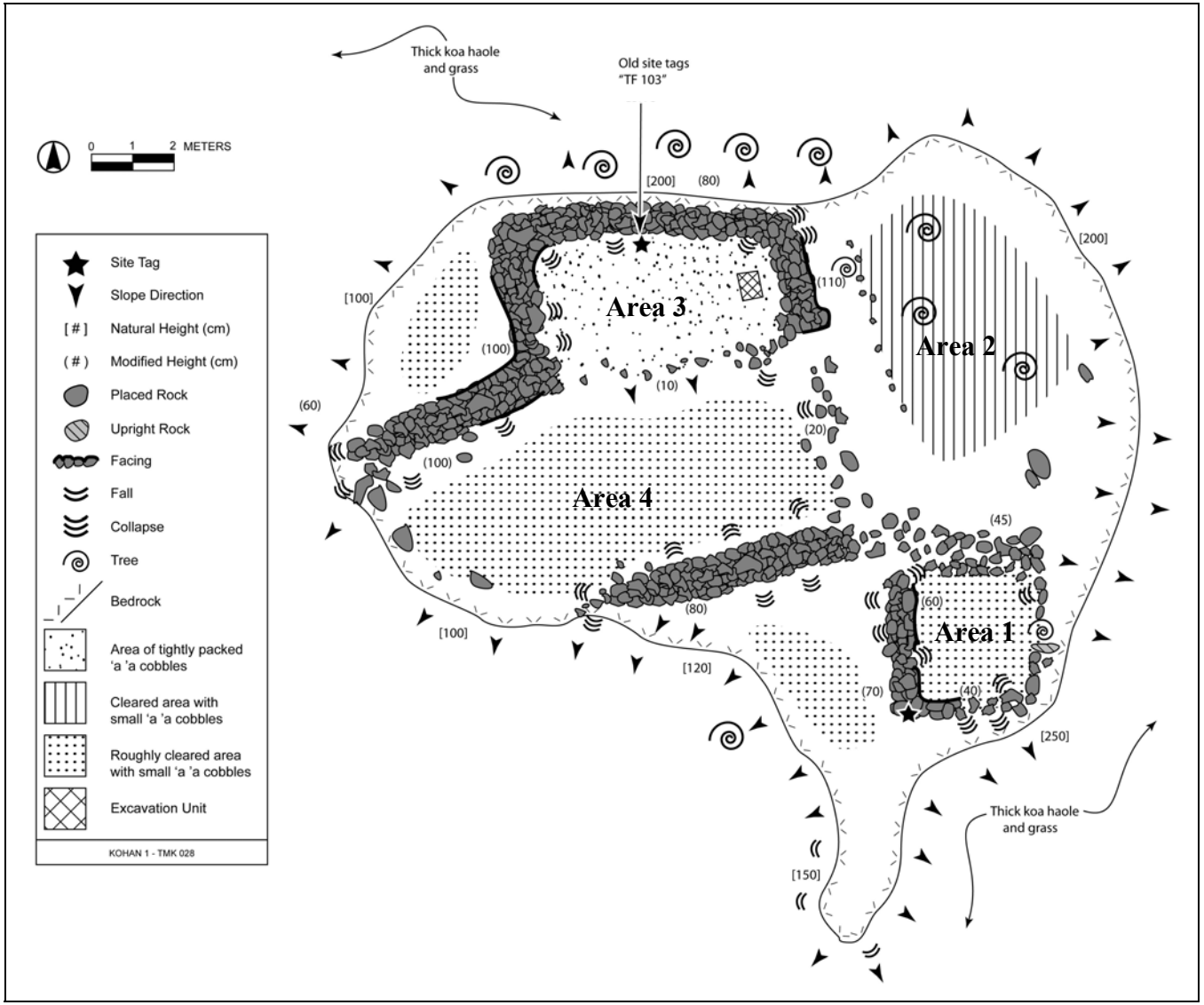

Figure 124. SIHP # 50-10-28-26443, plan view

Figure 125. SIHP # 50-10-28-26443, photograph of Area 1 facing south

Figure 126. SIHP # 50-10-28-26443, photograph of Area 3 facing north

Figure 127. SIHP # 50-10-28-26443, overview photograph facing northwest, showing Area 3 (right) and Area 4 (left)

Figure 128. SIHP # 50-10-28-26443, photograph of southwest corner facing north, showing Area 3 (standing in Area 4)

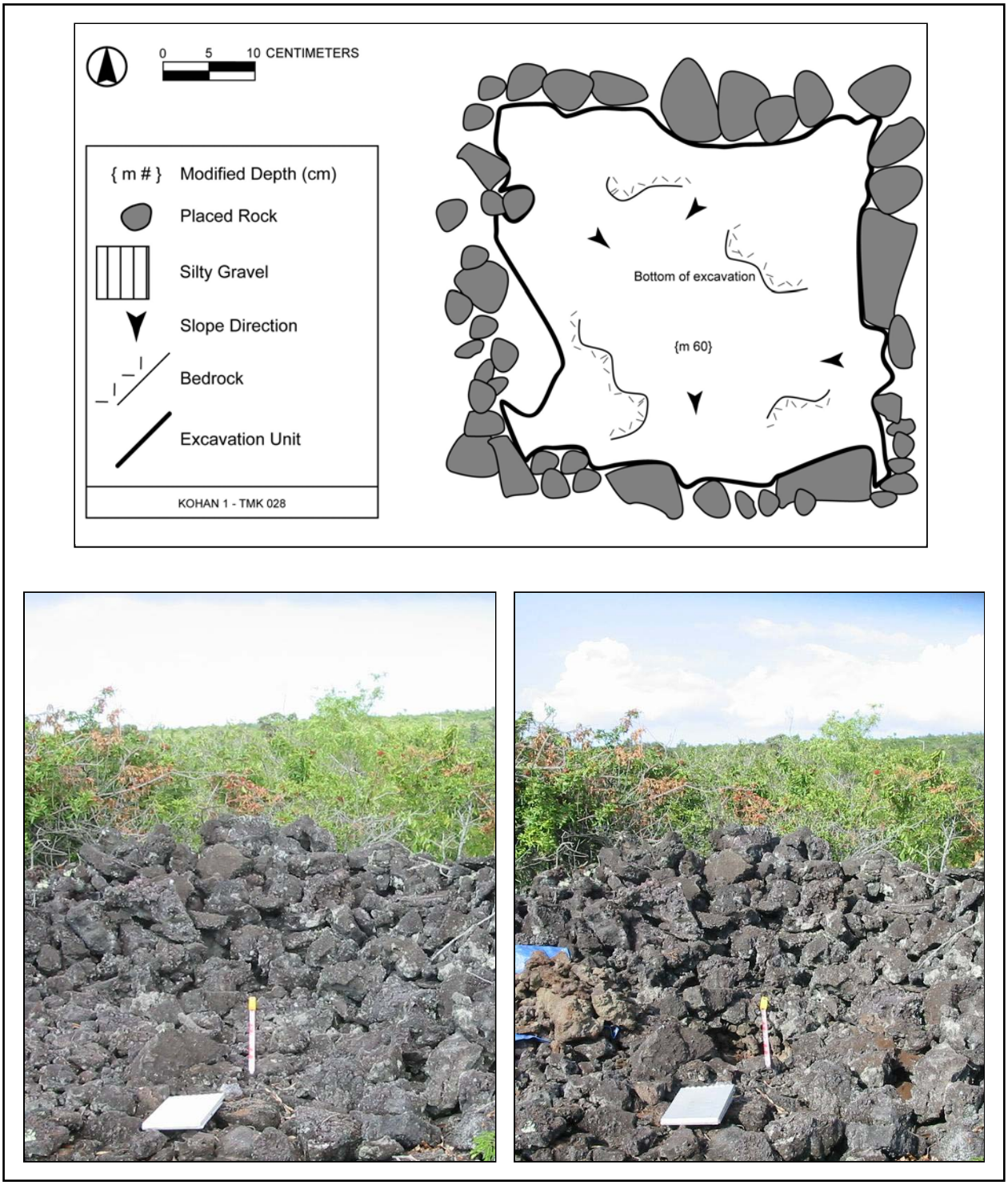

Figure 129. SIHP # 50-10-28-26443, excavation figures. Counter-clockwise from top: plan view of base of excavation unit, photograph pre-excavation facing north, same photograph post-excavation

4.3.32 State Site # 50-10-28-26444

SIHP #	50-10-28-26444
FUNCTION:	Animal Husbandry
SITE TYPE:	Wall
TOTAL FEATURES:	1
DIMENSIONS:	19 m in length
CONDITION:	Good
AGE:	Historic
ELEVATION:	656 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26444 is a wall that runs approximately 19 meters and which parallels a vertical *ʻaʻā* ridge that is 1.2 meters high (Figure 130 and Figure 131). The wall is about 1 to 2.5 meters away from the *ʻaʻā* ridge (west of the *ʻaʻā* ridge) and the wall accentuates the depression between the *ʻaʻā* ridge and the wall (the depression averages about 1 meter in depth). To the west of the wall is a relatively level *pāhoehoe* area with soil formation. The vegetation in the area is thick *koa haole* and air plant. Site -26435 (east portion) is approximately 40 meters north of site -26444, and these two sites are possibly related, as they are similar in construction and both were most likely used for animal husbandry.

The wall averages about 1 meter in height and is 1.2 meters high in some areas. It is formally constructed, with vertical sides that are roughly faced, with medium to large cobbles (25 to 50 centimeters) stacked four to seven courses high. The wall is partly built on top of an *ʻaʻā* rise (which parallels the *ʻaʻā* ridge mentioned above) and the wall serves to increase the height of the western *ʻaʻā* ridge and exaggerate the depression between the *ʻaʻā* ridges. At both the north and south end, the wall ends abruptly (and apparently purposefully), at an area where the depression is naturally shallower. There are several medium to large size *ʻaʻā* cobbles near the ends of the walls, which may have been used to block the ends of the depression, creating an enclosed area between the *ʻaʻā* ridge and the wall.

Function of this site is animal husbandry, most likely in the historic period. No other function is apparent. The wall creates a semi-enclosed depression which may have been used as an animal pen. Excavation potential of this site is minimal, as it is unlikely that charcoal could be recovered, and there is only a small chance of finding other cultural material. No further work recommended.

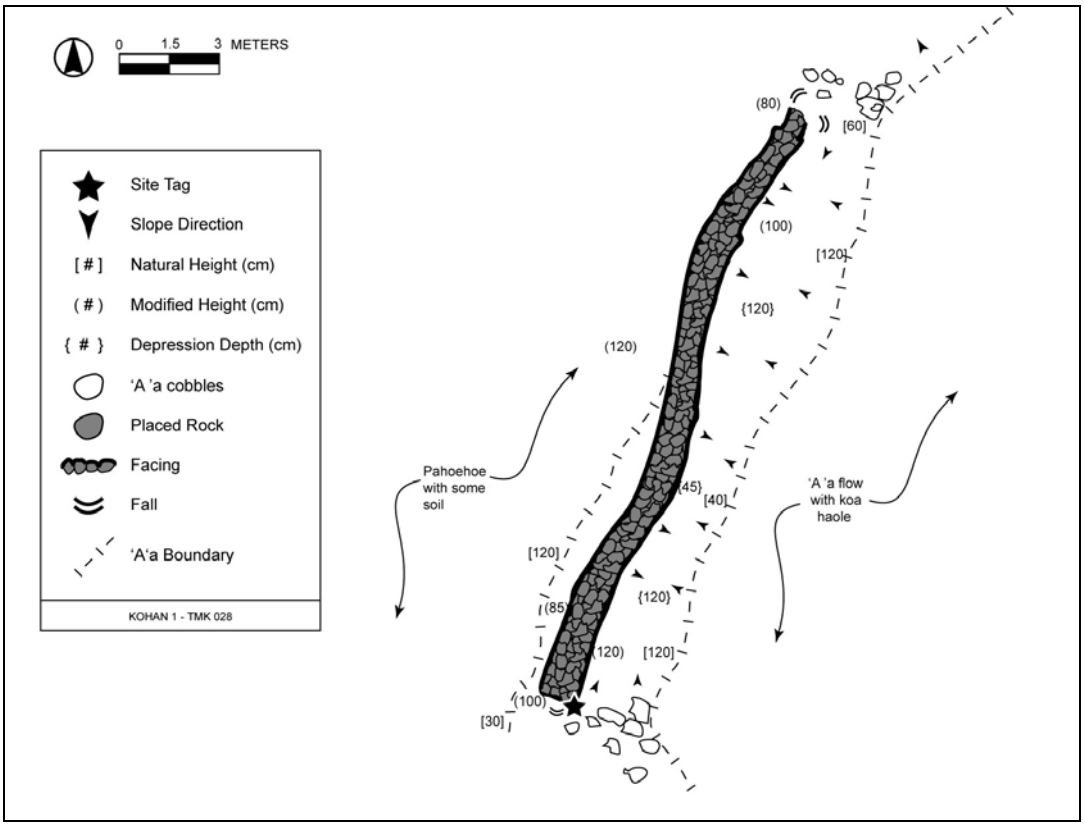

Figure 130. SIHP # 50-10-28-26444, plan view

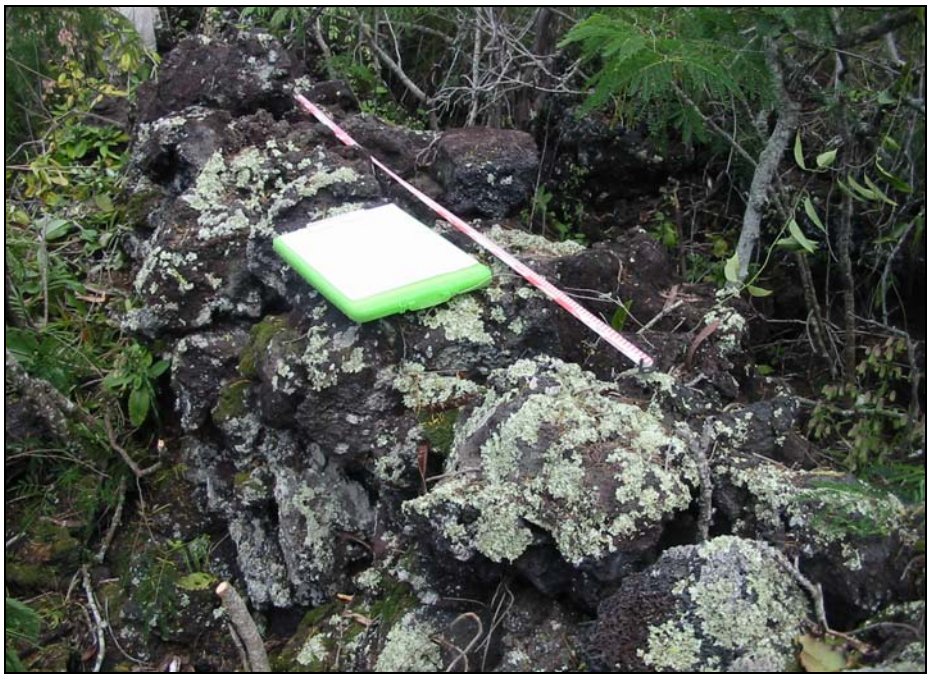

Figure 131. SIHP # 50-10-28-26444, photograph of animal husbandry wall facing northeast

4.3.33 State Site # 50-10-28-26445

SIHP #	50-10-28-26445
FUNCTION:	Temporary Habitation
SITE TYPE:	Modified Outcrop
TOTAL FEATURES:	1
DIMENSIONS:	10 m by 7 m
CONDITION:	Poor
AGE:	Pre-contact
ELEVATION:	764 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26445 is a modified outcrop that has been cleared of rubble and that has a midden deposit on top of it (Figure 132 and Figure 133). The outcrop is 10 by 7 meters in size, with a steep drop-off on its north end (1.9 meters in height), sloping edges on the east and west side (1 meter in height) and a gently sloping (near level) south end. It is located in the southeast corner of the project area, with a large bulldozer road 40 meters east of the site, and many areas of bulldozer activity in the vicinity. The vegetation consists of thick, tall grass and *koa haole*, with some larger trees (i.e., Christmas berry trees) as well. The surrounding area has some smooth clear areas with soil, and some areas that are very rocky (large and medium size cobbles that are loose, eroding and difficult to traverse). The smooth areas may be due to bulldozer activity. There is also a large amount of pig activity in the area.

The top of the outcrop has a midden deposit including a few pieces of cowry, a few nerita shells, a few sea urchin, and at least one small piece of coral (not branch coral, possibly from a coral abrader). Most of the midden is located in the central portion of the outcrop, where there is an ashy soil deposit 10 centimeters or more in depth. Some of the soil deposit is probably derived from the large amount of grass that covers the outcrop, but given the ashy nature of the soil and the fact that it is relatively deep, it could yield a fair amount of midden and datable material. On top of the outcrop and along the east edge there are several medium to large cobbles moved around (cleared from the central area), and on the top of the north end of the outcrop there is a rough linear alignment as well as a semi-circular alignment on the sloping edge of the east side of the outcrop. Neither alignment is formal in any way; they are most likely simply the result of clearing the central portion of the outcrop.

Function of this site is very temporary habitation. The lack of any formal construction, structures, or a formal hearth suggests that this elevated outcrop was used only occasionally as a resting or eating area. The outcrop does have a good view to the west, although it is currently rather obstructed by vegetation. No other function besides intermittent habitation is apparent. Excavation potential is good to fair given the 10 centimeter or greater ashy soil deposit and the presence of midden, and data recovery is recommended. The central area of the outcrop with the highest concentration of midden is also slightly depressed, and could be a hearth area (no charcoal observed, but soil is ashy).

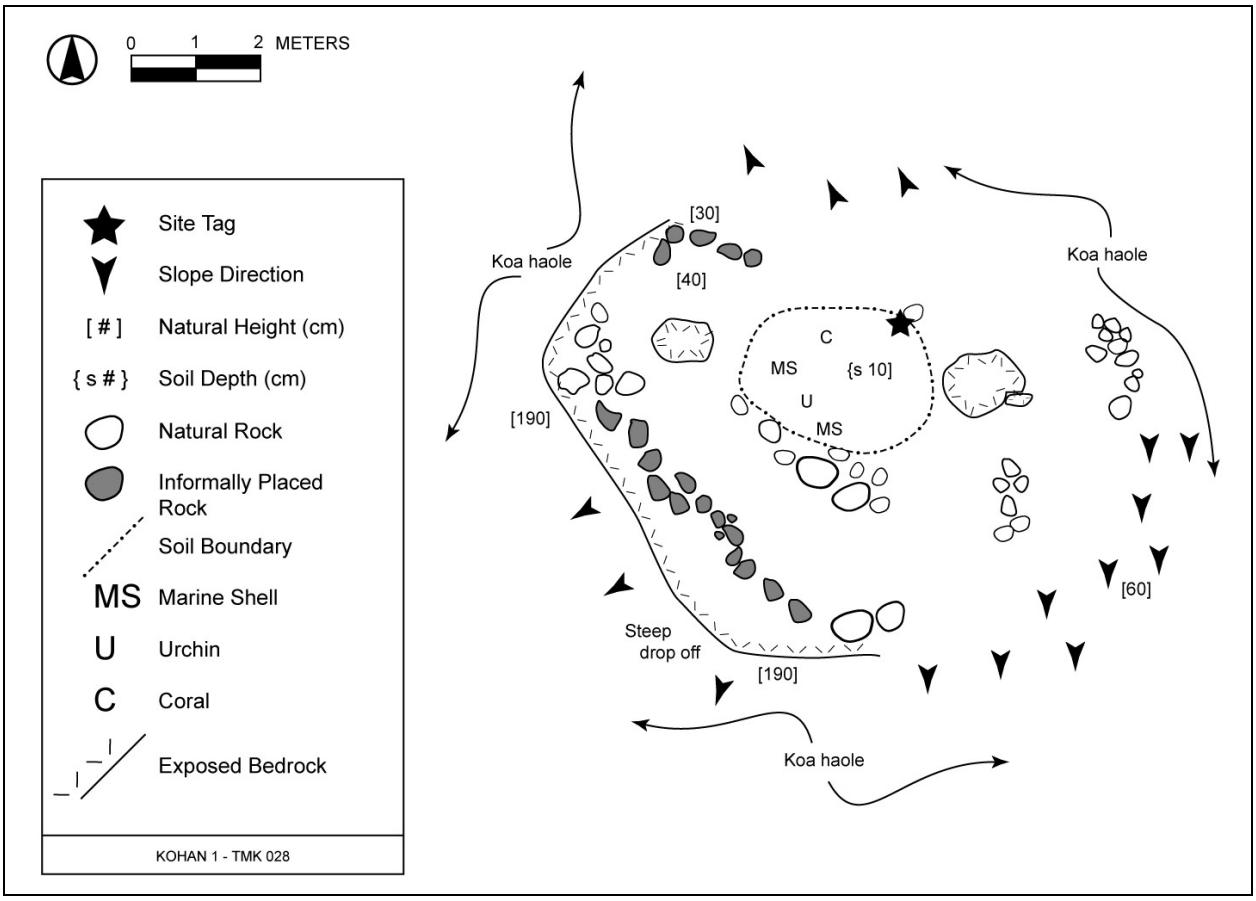

Figure 132. SIHP # 50-10-28-26445, plan view

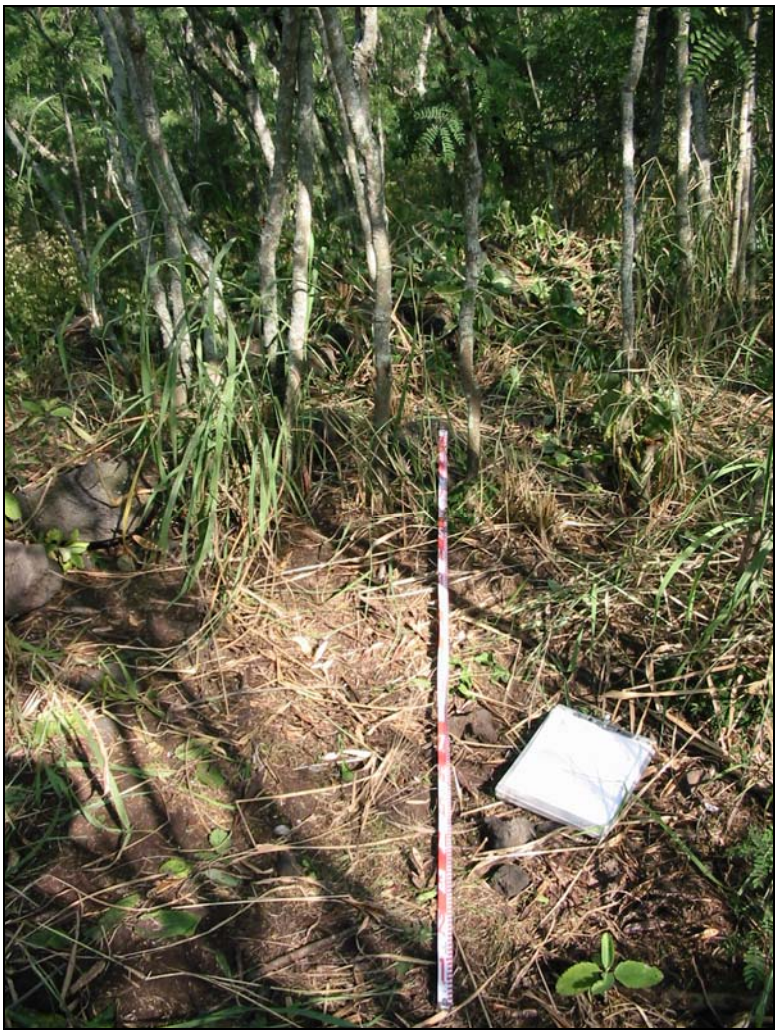

Figure 133. SIHP # 50-10-28-26445, photograph of the top of the modified tumulus, facing northwest

4.3.34 State Site # 50-10-28-26446

SIHP #	50-10-28-26446
FUNCTION:	Temporary Habitation
SITE TYPE:	Lava Tube
TOTAL FEATURES:	1
DIMENSIONS:	3.5 m by 2.7 m
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	702 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26446 is a small lava tube located in the southeast corner of the project area. The lava tube is situated on a *pāhoehoe* flow that slopes to the north-northwest. There are no sites in the immediate vicinity and this area has very low site density. Site -26442 is located 135 meters due west. There is some bulldozer activity in this general area.

The tube has slight modification at the entrance which consists of stacking of rocks (for ease of access) and clearing of the main chamber floor (Figure 134 and Figure 135). Cultural material within the tube is fairly extensive midden. The midden contains marine shell including cowry, nerita, *Isognomon* sp. (the most common shell) and *‘opihi*, as well as sea urchin. There are also *kukui* endocarps, fish bone (tentatively identified as elasmobranch vertebrae as well as several unidentifiable fish spines), a few goat bones (possibly natural deposition) and a fair amount of charcoal. The soil is 5 to 10 centimeters deep and ashy, and covers most of the main chamber.

This site functioned as temporary habitation. Function is indicated by the modification within the entrance of the tube and the midden deposit. Excavation potential for this site is good, since there is both a fair amount of soil and a relatively large amount of midden. Additionally, the soil is somewhat ashy and there is charcoal throughout the tube, and datable material in good context should be attainable. Data recovery is recommended.

Figure 134. SIHP # 50-10-28-26446, photograph of lava tube entrance

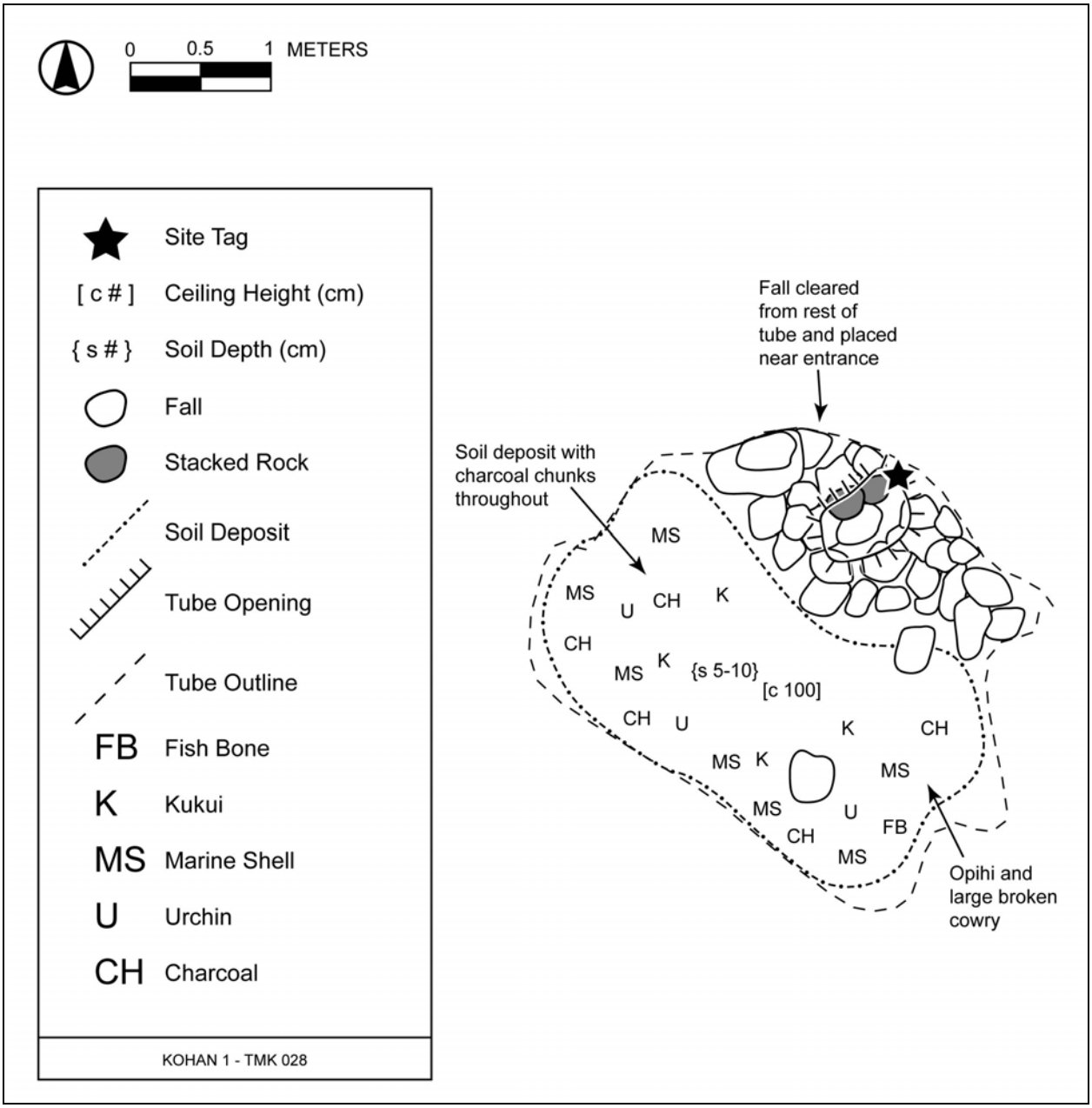

Figure 135. SIHP # 50-10-28-26446, plan view

4.3.35 State Site # 50-10-28-26447

SIHP #	50-10-28-26447
FUNCTION:	Temporary Habitation
SITE TYPE:	Lava Tube
TOTAL FEATURES:	1
DIMENSIONS:	9 m by 5 m
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	745 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26447 is located in an undulating southwest sloping pāhoehoe flow along the east boundary of the project area. The vegetation on the surface of the site consists of over head-high *koa haole*, grasses and air plant.

The site consists of an approximately 9 by 5 meter blister with a single passable entrance and a second entrance blocked by fall (Figure 136 and Figure 137). The modification of the blister is minimal, consisting of the clearing of the central floor area. The cleared rocks have been placed along some of the sidewalls of the blister and at a low-ceiling passageway to a small niche in the back of the blister. The east end of the blister is inaccessible but visible, due to natural fall. The floor of the blister to the west of the entrance has a soil deposit approximately 3 to 10 centimeters deep. There is no midden in the blister. There is a single artifact present, which is a broken piece of water-worn stone that appears slightly ground on one surface. It is located along the south wall of the blister.

The function of site -26447 is temporary habitation. The modification of the blister is extremely minimal and the only cultural material present is the water-worn stone. No function other than temporary habitation is warranted for this site. The excavation potential is considered poor due to the lack of any surface midden. No further work is recommended.

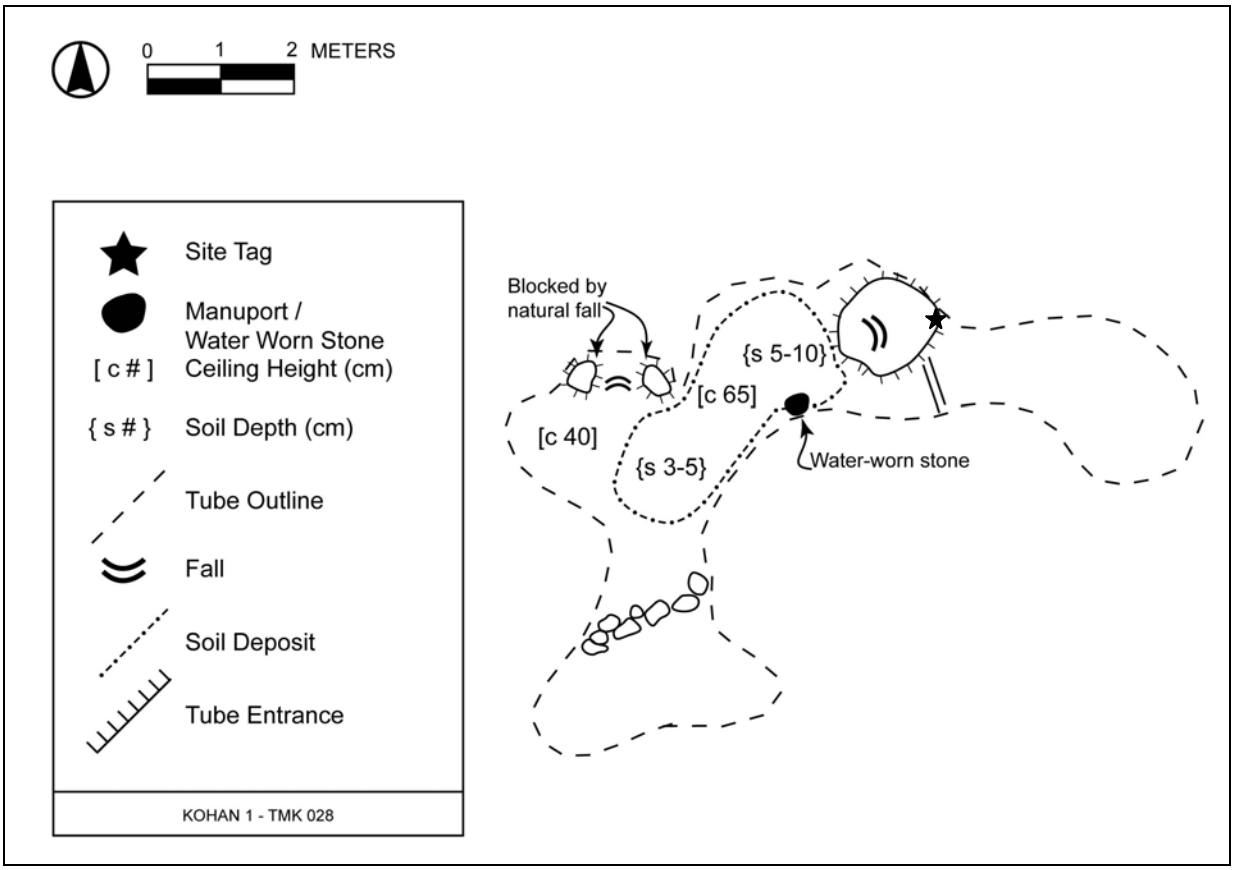

Figure 136. SIHP # 50-10-28-26447, plan view

Figure 137. SIHP # 50-10-28-26447, photograph of lava tube entrance

4.3.36 State Site # 50-10-28-26448

SIHP #	50-10-28-26448
FUNCTION:	Temporary Habitation
SITE TYPE:	Modified Outcrop
TOTAL FEATURES:	1
DIMENSIONS:	9.5 m by 5 m
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	761 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26448 is a modified outcrop, which is naturally elevated above the surrounding area by one to two meters. The site is near the eastern edge of the project area (which is 40 meters away) and is surrounded by *koa haole*. The top surface of the outcrop was completely covered in thick grass. This site is very similar to site -26445, which is 135 meters due south. There is an excellent view from the top of the outcrop to the south-southwest and to the northeast, although this is currently largely obscured by dense vegetation.

The top of the modified outcrop has a soil deposit 5 to 10 centimeters deep that is slightly ashy. There is a small amount of midden on the surface, primarily marine shell fragments (cowry, nerita, bivalves) and some sea urchin. Some of the midden is very fragmented and appears charred. There are also a few large pieces of cowry shell below the outcrop, on its western slope. Most of the ashy deposit is on the north-northwest slope. The top of the outcrop as been cleared somewhat, especially in the area where the ashy soil is, and some rocks have been tossed out of the way for this clearing purpose (Figure 138 and Figure 139).

Function of this site is an area of temporary habitation. There is no formal modification of the outcrop or stacking, but an area has been cleared and apparently used as an eating or cooking area. The good view and elevated area make it a good location for temporary habitation. No other function for this site is apparent. Excavation potential is fair given the presence of a midden deposit and more than 5 centimeters of ashy soil deposit, but site -26445 is a very similar site with a slightly better midden deposit. While the ashy soil deposit does contain (on the surface) several small fragments of marine shell and sea urchin, there is not a large area with soil and concentrated midden, and no further work is recommended.

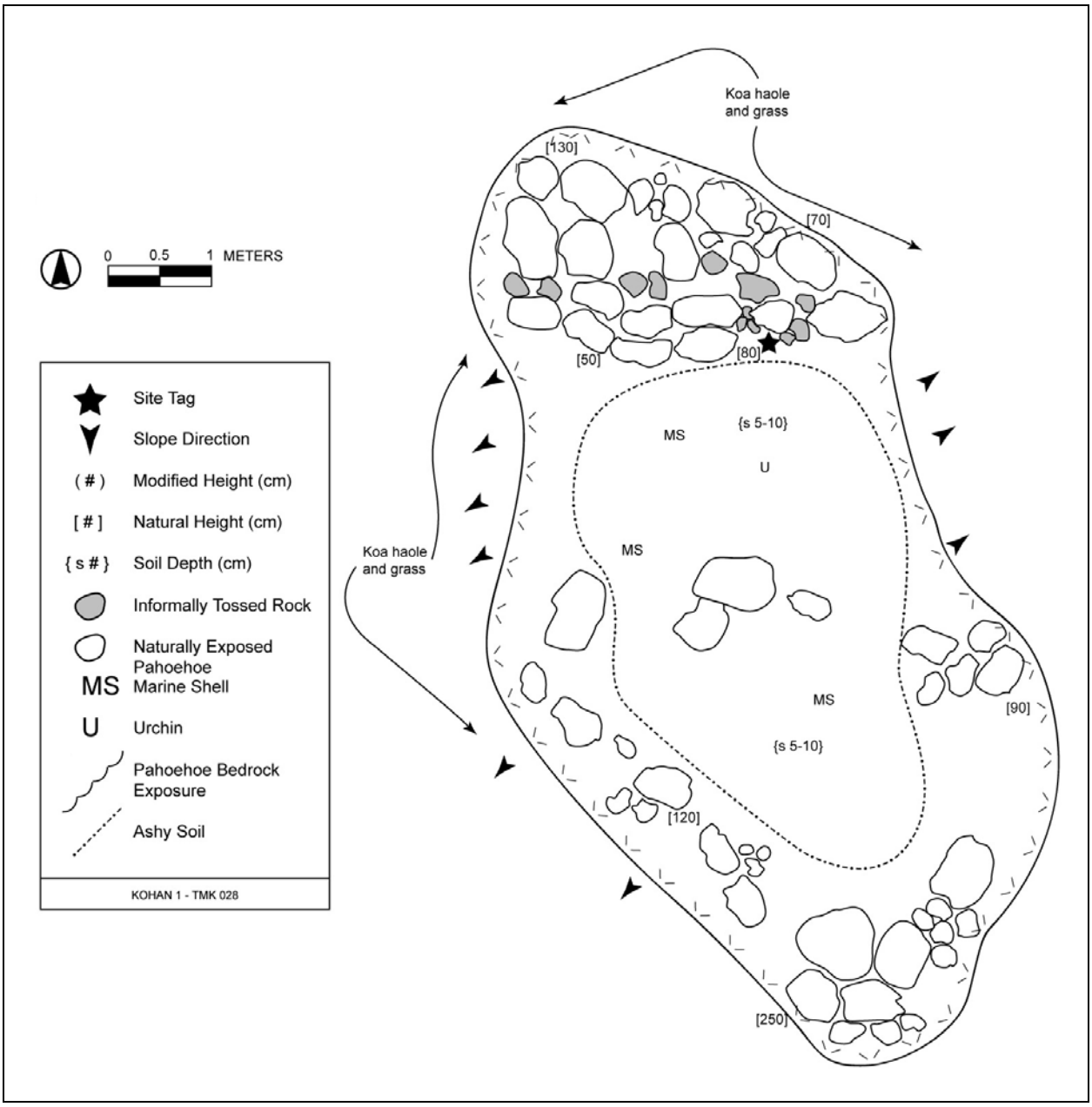

Figure 138. SIHP # 50-10-28-26448, plan view

Figure 139. SIHP # 50-10-28-26448, photograph of modified tumulus with midden deposit, facing north

4.3.37 State Site # 50-10-28-26449

SIHP #	50-10-28-26449
FUNCTION:	Temporary Habitation
SITE TYPE:	Lava Tube
TOTAL FEATURES:	1
DIMENSIONS:	9 m by 2.5
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	725 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26449 is a small lava tube shelter located near the eastern edge of the project area. The surrounding area is generally level, but nearby the landscape slopes to the west. Vegetation is dominated by *koa haole* and grass, but there is a grove of several large *kukui* trees within a few meters of the tube. The surrounding area appears to have been bulldozed heavily as it is very level with many loose cobbles, but there is no definitive bulldozer sign in the immediate area. There is a fairly distinct north-south running bulldozer road just to the east of the site, as well as some modern structures to the north (i.e., sheds for animal husbandry).

The tube is approximately 9 by 2.5 meters, running east-west, with an average ceiling height of only about 1 meter (Figure 140 and Figure 141). The west side of the tube has several pieces of large natural fall and is too small and rubble-filled to comfortably sit in. The east side of the tube has been cleared of rubble and contains a somewhat ashy soil deposit that is more than 10 centimeters deep in some areas. One area of the soil is depressed and may have been used as a hearth area. In the area with soil there is some charcoal, some sea urchin shell, and a few fish bones (spines, tentatively identified as Diodontidae/pufferfish). There are also a large number of *kukui* endocarps but no evidence that these are all cultural, given the presence of *kukui* trees nearby; many of these do appear to be rodent caches. The east side of the tube has small to large rubble pushed against the side of the tube in order to clear the center, especially in the areas of greatest ceiling height. On the far east end, there are large and medium size cobbles informally stacked against the back wall (Figure 142). This stacked area does not appear to be blocking any tube extension, but rather was a convenient location for clearing rocks to. To ensure this was not a burial location, several rocks were removed until enough of the inner structure could be seen to rule out burial. Nothing was found, and there is no indication that this was a burial location.

Function of this site is temporary habitation. It is not a large tube and would not be comfortable for long periods of time, but was used at least briefly for shelter. The clearing of the floor and stacked rocks indicates at least a low level of energy investment. No other function besides temporary habitation is apparent. Excavation potential is good to fair. There is a fairly deep ashy soil deposit but not a lot of midden on the surface. However, the presence of more fish bone than is usually encountered should be considered in terms of data recovery.

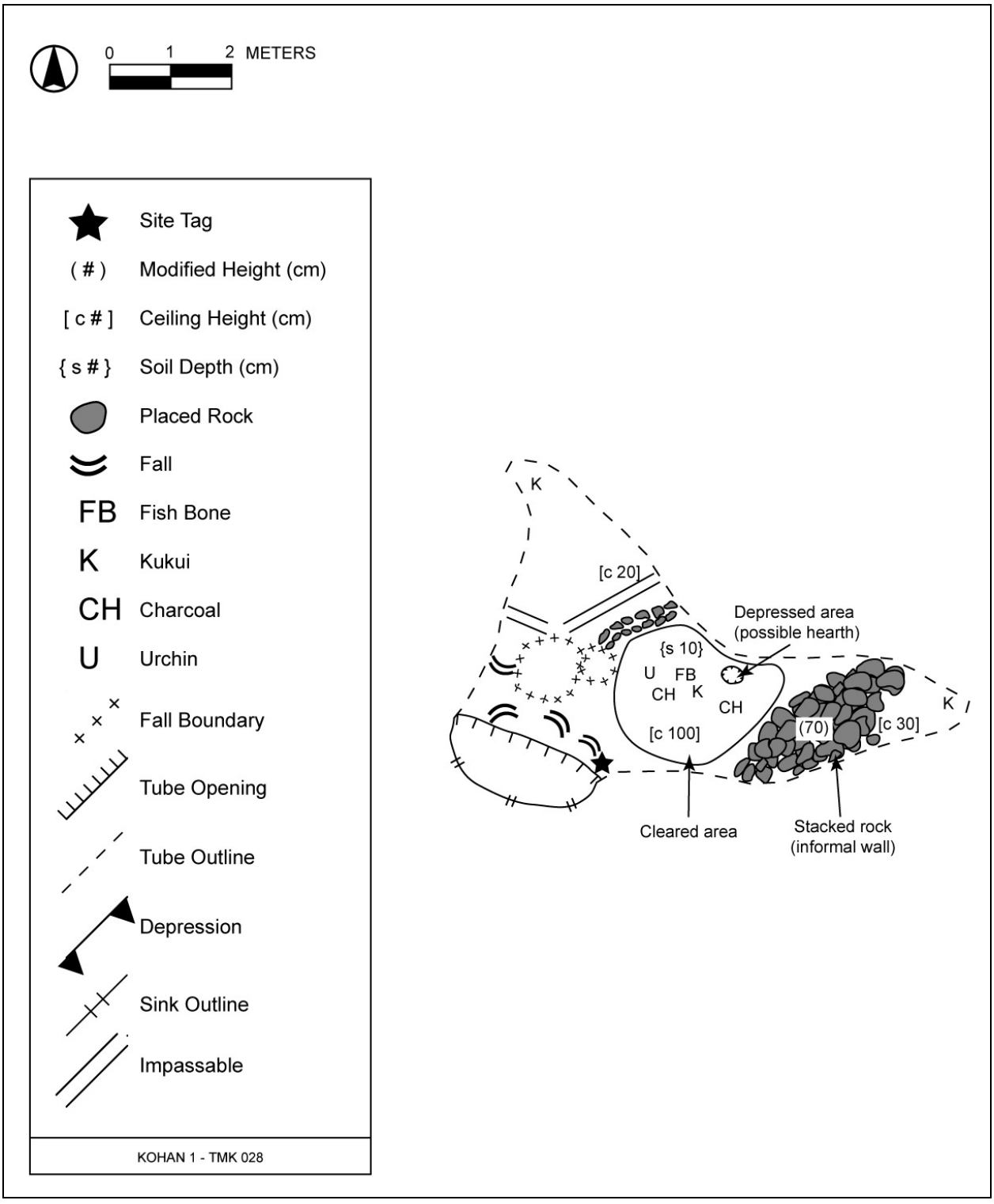

Figure 140. SIHP # 50-10-28-26449, plan view

Figure 141. SIHP # 50-10-28-26449, photograph of lava tube entrance

Figure 142. SIHP # 50-10-28-26449, photograph of stacked wall inside tube; cleared floor is visible at bottom of photo

4.3.38 State Site # 50-10-28-26450

SIHP #	50-10-28-26450
FUNCTION:	Animal Husbandry
SITE TYPE:	Wall
TOTAL FEATURES:	1
DIMENSIONS:	125 m in length within project area
CONDITION:	Good
AGE:	Historic
ELEVATION:	758 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26450 is a historic period stacked *ʻaʻā* wall that abuts a barbed wire fence. This site has a total length of 125 meters (within the project area) and is located in the northeastern portion of the project area. The vegetation surrounding the site is dense *koa haole* and air plant, with some Christmas berry trees. The vegetation within the fenced confines is slightly more open, appearing to have been grazed more recently.

The site is composed of several distinct components, with the constructed rock wall being the primary component (Figure 143). There is also a related barbed wire fence and a galvanized pipe gate/chute. The rock wall is the historic aspect of this site (Figure 144). It is constructed of stacked medium to large *ʻaʻā* cobbles. The average height of the wall is 50 to 100 centimeters, however the constructed heights range from 50 to 180 centimeters (depending on the natural height of the bedrock) with 5 to 15 stacked courses. The width is generally standard at 50 to 75 centimeters. The wall runs over a 100 meters on an east-west axis, and continues running east outside of the project area. In addition to the rock wall running on an east-west axis, there is also a rock wall offshoot that extends southwest. This extension intersects the main wall about 20 meters east of its western terminus. The extension wall is 11 meters long and runs at 235 degrees. The extension is approximately 50 to 75 centimeters tall and 50 centimeters wide, and may have originally been associated with site -26435 (see Figure 143 for a close-up of area).

Where the wall terminates, a barbed wire fence begins heading north (perpendicular to the wall, Figure 145). The fence is a four strand barbed wire fence attached at its southern terminus to a tree and strung between T-bar posts. At the end of the barbed wire fence is a metal post gate/chute (see also Figure 160). The barbed wire fence appears to originally have extended north and west at this gate, but the wire has been cut and no portions of the fence remain. The gate/chute is a modern component of the site dating to the 1960s or 1970s (based on materials). This component is constructed of galvanized pipe, cut by hand with a cutting torch and roughly welded together. The gate latch is large gauge wire welded to a bolt. When closed this component acted as a gate; separating two enclosed areas, and when opened it also acted as a chute, as a triangular passageway was created. The chute appears to have been a one-way chute, allowing passage from the south to the north, but not from the north to the south. The cross bars of the gate/chute are cut at an angle creating a point extending into the northern enclosed area.

The function of site -26450 is animal husbandry; the site is a wall that acts as a partial enclosure, continues outside of the project area, and is fairly typical for historic animal husbandry. Options for data recovery are limited, due to the site type with little possibility for recovery of cultural material or subsurface deposits; no further work is recommended.

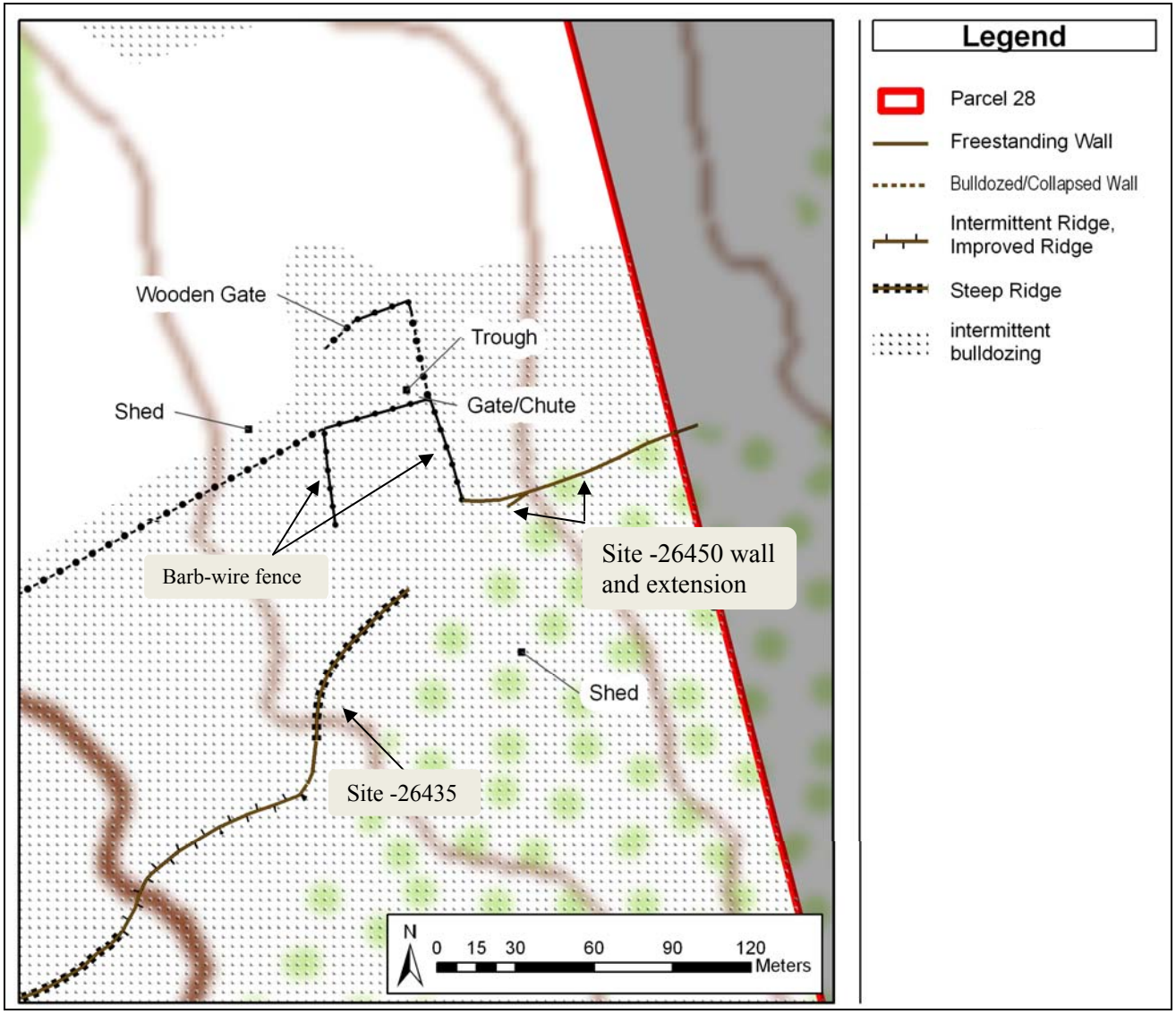

Figure 143. SIHP # 50-10-28-26450, plan view showing location of wall in relation to nearby animal husbandry features

Figure 144. SIHP # 50-10-28-26450, photographs of wall showing construction style

Figure 145. SIHP # 50-10-28-26450, photograph of wall where it abuts barbed wire fence

4.3.39 State Site # 50-10-28-26451

SIHP #	50-10-28-26451
FUNCTION:	Temporary Habitation
SITE TYPE:	Modified Outcrop and Blister
TOTAL FEATURES:	1
DIMENSIONS:	25 m by 15 m
CONDITION:	Poor
AGE:	Pre-contact
ELEVATION:	791 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26451 is a tall, bouldery tumulus just west of a major ridge to the east. The effect of this topography is that the view from the tumulus is superb to the southwest and north. The bouldery slopes and natural roughly level top of the tumulus are unmodified. Modification at the site is minimal, indicating a temporary habitation function and, due to the view, perhaps a recurrent lookout. Modification consists of a few placed rocks that help seal a crack in the top of a small blister, a small amount of midden (marine shell) and a piece of a dense coral cobble in the interior of this same blister. This blister is located to the southwest of the top of the tumulus and is open in this direction, giving a good view of the land below from inside the shelter (Figure 146, Figure 147 and Figure 148).

The top of the tumulus also has a blister on it north side that has two entrances. Though likely utilized to a small degree, no evidence remains of the use of this space. However, immediately outside, between the two entrances are two small tī (*kī*) plants. The very top of the tumulus is also marked with two *kukui* trees, one large and one small. A strictly cultural origin for these trees is uncertain, though they are unusually located and there do not appear to be other *kukui* trees nearby.

Function of the site is temporary habitation. The surrounding terrain is cobbly and steeply sloped and does not appear to be well suited to agriculture. There is, however, some evidence within 30 meters of the tumulus that a bulldozer may have passed by. In general the lack of modification of the surrounding terrain is consistent with the unmodified tumulus, indicating short-term habitation use only. Given the minimal use and lack of significant midden deposits, the site is recommended for no further work.

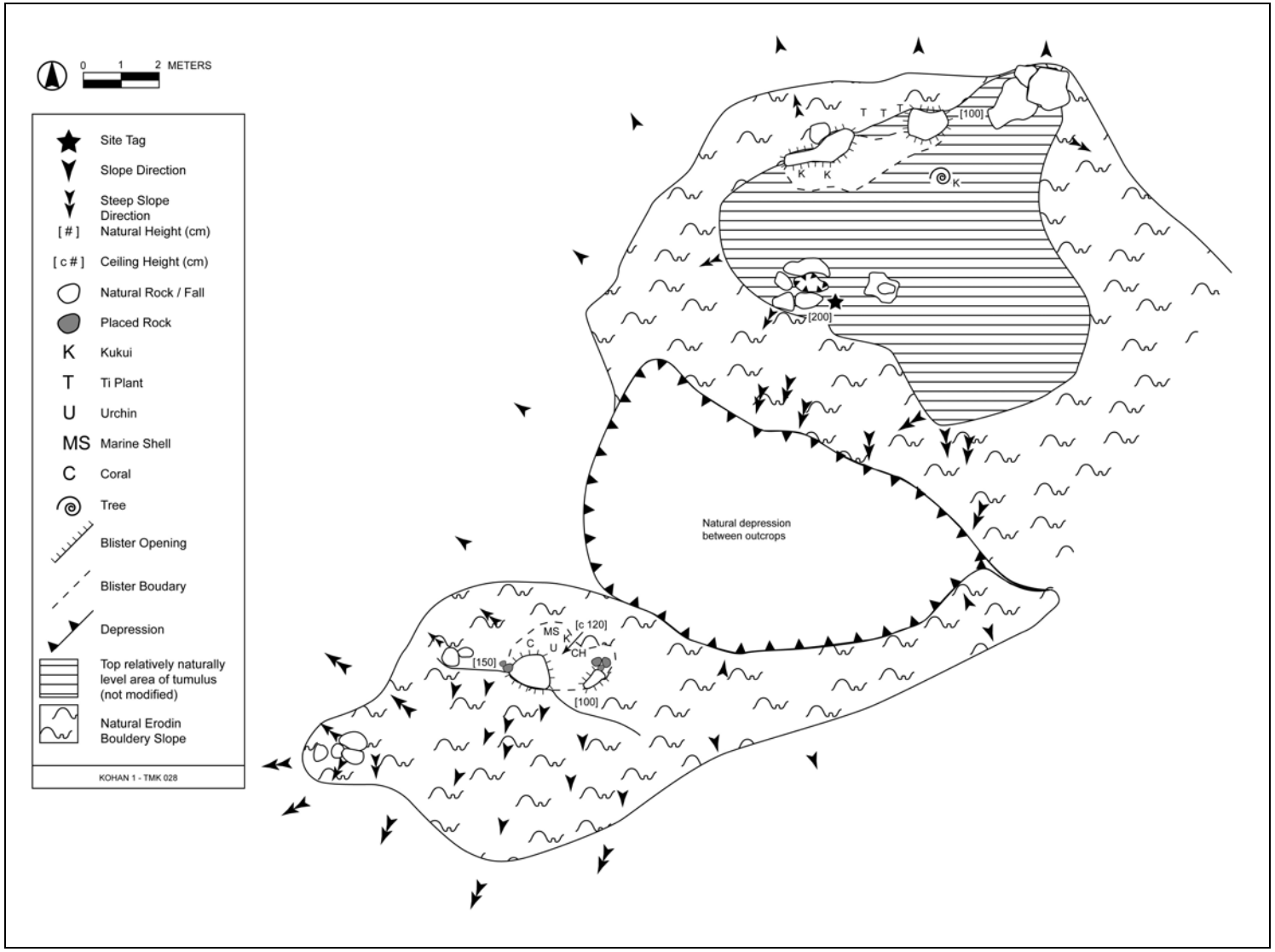

Figure 146. SIHP # 50-10-28-26451, plan view

Figure 147. SIHP # 50-10-28-26451, photograph of small blister with *tī* plants, facing southeast

Figure 148. SIHP # 50-10-28-26451, photograph of top of tumulus

4.3.40 State Site # 50-10-28-26452

SIHP #	50-10-28-26452
FUNCTION:	Activity Area and Burial
SITE TYPE:	Lava Tube
TOTAL FEATURES:	1
DIMENSIONS:	25 m in length within the project area
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	771 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26452 is a lava tube located in the southeast corner of the project area, with the east project area boundary only about 35 meters east of the tube entrance. The nearest site in relationship to site -26452 is site -26449, also a lava tube located 100 meters at 284 degrees tN from site -26452.

The lava tube entrance is naturally very small (Figure 149 and Figure 150). The entry is small enough that any person of larger size or stature would not be able to get through. The west side of the entrance is modified with large cobbles and small boulders; this construction appears to formalize and maintain the entrance passage rather than blocking access to the west (it appears that the tube naturally does not continue west). To the east, immediately after the entrance, the walls of the tube have been modified with placed/stacked rocks lining the walls (Figure 151). These rocks appear to have been intentionally brought into the tube from the surface, as they are weathered and are not ceiling fall. The floor between the placed rocks has been cleared. In this cleared area, which is approximately 2.5 meters east of the entrance, there is some soil (5 centimeters deep) with charcoal and fish bones. The placed rock modification extends for approximately 5 meters at which point the tube opens into a larger chamber. The main tube extends northeast from the entrance for approximately 30 meters at which point the tube divides into two branches; the two branches eventually twist around to reconnect further to the east. It is approximately at this point within the tube that it crosses over the eastern project area boundary (about 30 meters from the entrance; see Figure 149). Within the main tube there are five water collection features and more charcoal and fishbone.

The water catchment features continue in both branches of the tubes (see Figure 161, Figure 162, and Figure 163 below; these figures are photographs from site -26452 water collection areas). In the southeast branch of the tube there is a series of formal, well defined water catchments. Bird bone (a small seabird, possibly a storm petrel) was also identified in this southeast tube. The northeast branch of the tube contained an unusually large number of urchin fragments and charcoal deposits. There is also some fish bone near the urchin remains (identified as Scaridae – pufferfish). This charcoal is characterized by large pieces and is distributed over a large continuous area (approximately 1 by 0.5 meters). Water catchment features throughout the tube also are frequently associated with charcoal concentrations.

While the project area boundary does not alter the context/content of the site, it does dictate the process of recording the site and its contents east of the project area boundary (outside the current project area). This is particularly pertinent to this site because there are several confirmed burials located beyond the project boundary, in an area at the far eastern end of the northeastern

side branch. These burials were discovered while searching for a possible end to the lava tube, but are all outside the current project area. After contacting SHPD and the proper land owner, the far northeastern portion of the lava tube was explored, to attempt to find another entrance to the tube in the eastern parcel via which the burials could be accessed. However, all natural entrances to the tube in the eastern parcel are systematically and intentionally blocked, very likely in relation to the burials. Removing this extensive blockage from inside the tube would likely not be safe, and locating the blocked areas on the surface would likely prove to be very difficult, as they appear to have been thoroughly sealed. This leaves the small opening within the current project area as the sole known access to the burials in the eastern parcel. A sketch map of the lava tube within the eastern parcel was made during exploration, but is not included within this report since it is outside the current project area and should not encumber an area outside the project area. However, this information is pertinent given the sole access via this lava tube to significant cultural resources in the eastern parcel.

The function of this site within the project area is an activity area used for extensive water collection. While the lava tube leads to an area outside the project area with several burials, this was likely not the original access point (the original entrances have been intentionally blocked); given the extremely small entrance to the lava tube, as well as the distance from the tube entrance to the burials, it seems unlikely that this was the entrance used to inter the burials. Regardless, the western portion of this lava tube (the portion within the current project area) was definitely heavily utilized for water catchment and as temporary habitation (as evidenced by large amount of sea urchin, some fish bone, and other midden). Excavation potential of this site is poor; the only soil development is a very small, shallow area near the tube entrance. However, there is excellent potential for recovering charcoal associated with water catchment, and therefore data recovery is recommended. Data recovery should focus on collection of charcoal for radiocarbon dating as well as midden recovery.

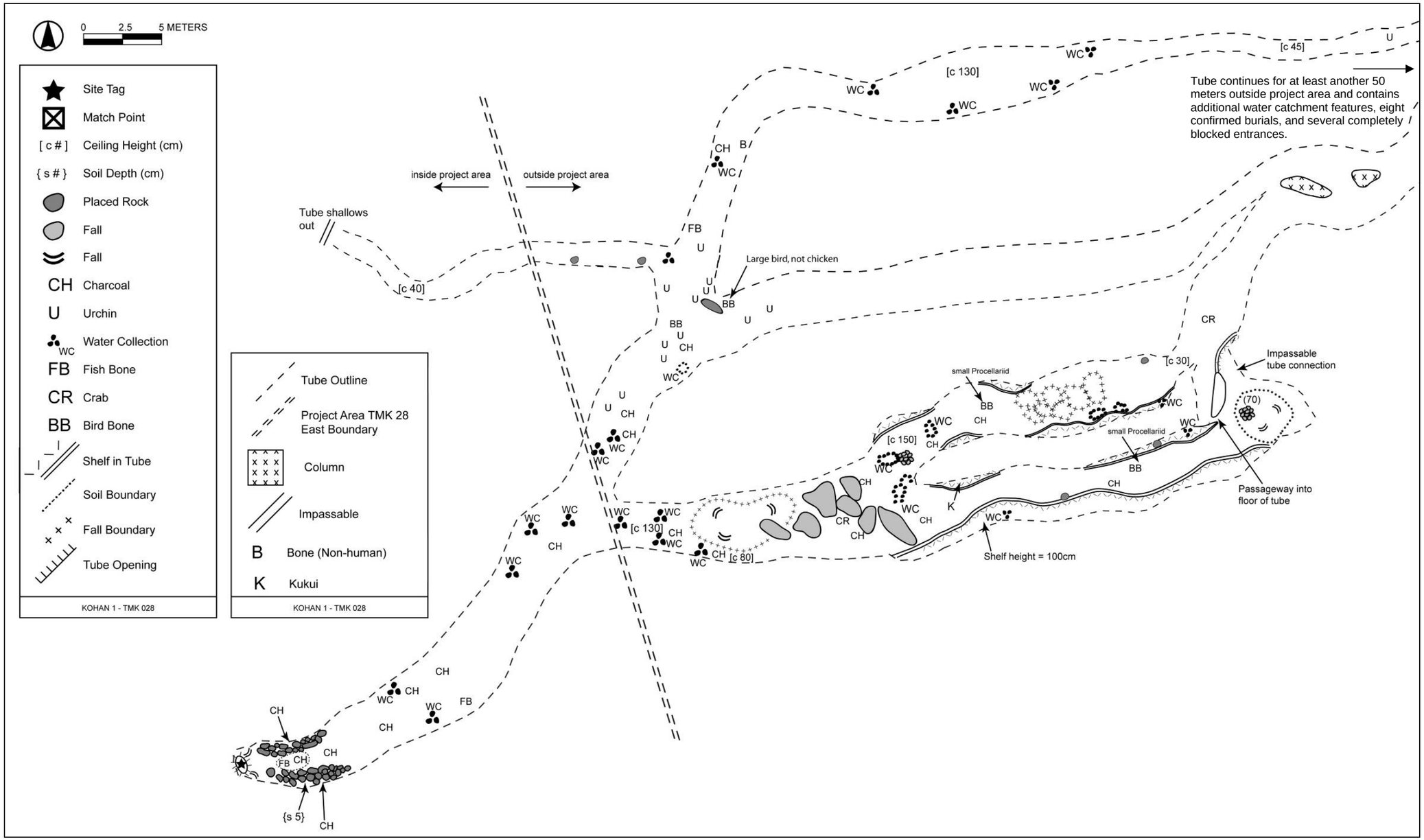

Figure 149. SIHP # 50-10-28-26452, plan view of lava tube

Figure 150. SIHP # 50-10-28-26452, photograph of lava tube entrance from surface

Figure 151. SIHP # 50-10-28-26452, photograph of modified entrance to water collection area, with stacked rocks along edges of tube; surface entrance is just beyond photographed area

4.3.41 State Site # 50-10-28-26453

SIHP #	50-10-28-26453
FUNCTION:	Burial
SITE TYPE:	Platform
TOTAL FEATURES:	3
DIMENSIONS:	25 m by 10 m
CONDITION:	Good
AGE:	Pre-contact
ELEVATION:	680 ft. a.m.s.l.

DESCRIPTION: Site 50-10-28-26453 is a series of three platforms aligned north-south along a ridge with an excellent view to the distant southwest and the surrounding area in all directions. The ridge slopes downward to the west/southwest fairly gently but is steep enough to allow the good view and cool breeze. This area has an extremely dense *koa haole* forest and thick air plant on the ground. Air plant and *koa haole* nearly completely covered all three platforms, and has undoubtedly contributed to much of the collapse seen on the structures. Hina-Lani Street is approximately 35 meters to the north, and the eastern project area boundary is approximately 25 meters east. There are no other sites in this area, but there is evidence of nearby bulldozer activity, which is not surprising given the proximity of Hina-Lani Street.

The site consists of three platforms, Feature A (Figure 152 and Figure 155) is southernmost, Feature B (Figure 153 and Figure 156) is less than 10 meters north of Feature A, and Feature C (Figure 154 and Figure 157) is less than 8 meters north of Feature B. All three platforms are similar in size, averaging 4.5 meters on each side. Feature A is by far the most formally constructed platform and tallest. Feature C is the next most formal, with several faced sides but considerably more collapse than Feature A. Feature B is heavily collapsed and appears to have been the least formal and lowest of all the platforms.

Feature A is a large platform that measures 4.5 by 4.0 meters is approximately 90 to 165 centimeters in height, and is constructed of formally stacked medium to large *ʻaʻā* cobbles, seven to ten courses high and vertical. The top of the platform is level and is nicely paved with small *ʻaʻā* cobbles (5 to 25 centimeters in diameter). Despite the disturbance caused by vegetation growth the structure's walls have only minimally collapsed. No midden or cultural deposits were observed on this platform.

Feature B is platform remnant that measures 6.0 by 4.5 meters in size with a maximum height of 85 centimeters, and an average height of about 60 centimeters, built two to five courses high. The platform is roughly rectangular, but there is extensive disturbance (apparently due to thick vegetation on top of it) that has destroyed any formal facing or corners that may have once existed. Overall the platform is not as tall or as formal as Features A and C, and Feature B was apparently a naturally low *ʻaʻā* exposure that was modified to create a low platform. Feature B has no intact facing, but the south and north sides have stacking visible. The surface of the platform is only roughly level, again likely due to vegetation disturbance. The original rough paving on the surface of the structure appears to have been similar to that observed on Feature C.

Feature C is a large platform located in the northeast corner of the project area. The platform is 4.5 meters square in size. It appears to have originally been a naturally elevated *ʻaʻā* outcrop

that has been modified to increase its height and formalize the edges. The dense vegetation is again probably the cause for the fairly large amount of collapse of the structure. Despite wall collapses, several areas of the structure still have intact facing, especially the northwest corner which is 155 centimeters high and seven to ten courses tall (constructed of smaller cobbles toward the top of the structure and larger cobbles up to approximately 50 centimeters in diameter toward the bottom, Figure 158). The height of the structure ranges between 70 and 165 centimeters and three to ten courses, dependent mostly on the natural topography of the *‘a‘ā* outcrop. The top of the structure has a rough *‘a‘ā* paving, consisting of mostly smaller cobbles, ranging in size from 5 to 25 centimeters. The paving is only semi-level, and is not as formal as the paving seen at Feature A. Also on the top of Feature C is a depressed area approximately 70 by 70 centimeters in size; this may be the result of internal structural collapse.

Function of the site is probable burial. The height and formal construction of the platforms, especially Feature A, is typical of Hawaiian burial platforms. The depression in the central portion of Feature C is interpreted as probable internal collapse of a burial area (crypt) within the platform. Given the proximity of the three structures, it is probable that these structures represent three related burial events. Although a habitation function was considered for these platforms, the formality, height, lack of any midden/artifacts, and lack of any easy way to access the top of features (particularly Feature A, despite the formal surface paving) all suggest non-habitation use. However, the probable burials within the platforms cannot be easily confirmed with excavation, due to the construction of the larger platforms; excavations into the larger portion of the structures would be difficult to do without causing major collapses, since they are constructed of many smaller size cobbles and are fairly tall. This would seriously compromise the integrity of the site. Given that all evidence currently suggests that the structures are burial platforms, they are recommended for preservation.

Testing Results

Subsurface testing was conducted at site -26453 to aid in determining the function of the site, to examine subsurface deposits, and to attempt to collect charcoal for radiocarbon dating analysis. Given concerns about causing damage to the integrity of the platforms (see discussion above), Feature B was chosen for excavation since it was largely collapsed already. The testing consisted of a 0.65 by 0.60 meter test unit on the west end of the platform remnant. The unit was excavated to underlying bedrock to a maximum depth of 65 centimeters (Figure 159).

Stratum I (0 to 50 centimeters) consisted of the construction of the platform with small to medium size *‘a‘ā* cobbles ranging from 5 to 35 centimeters in size. Stratum II (50 to 65 centimeters) consisted of a very coarse sandy silt sediment (10 YR 3/3) that is primarily natural erosion of the *‘a‘ā* bedrock that this stratum sits on top of. The base of excavation was natural eroding *‘a‘ā* bedrock. Only a small amount of charcoal (0.2 g from Stratum II) and one *kukui* endocarp (1.7 g from Stratum I) were recovered from excavation. The charcoal was present only in Stratum II, and it appears to be mixed with the natural substrate. Given the context of the charcoal, it is strongly suspected to be non-anthropogenic. Although no burial was located, the excavation was not extensive. The findings are, however, inconsistent with habitation as there was no midden. Overall, the results support the conclusion that all three features of this site function as burial platforms.

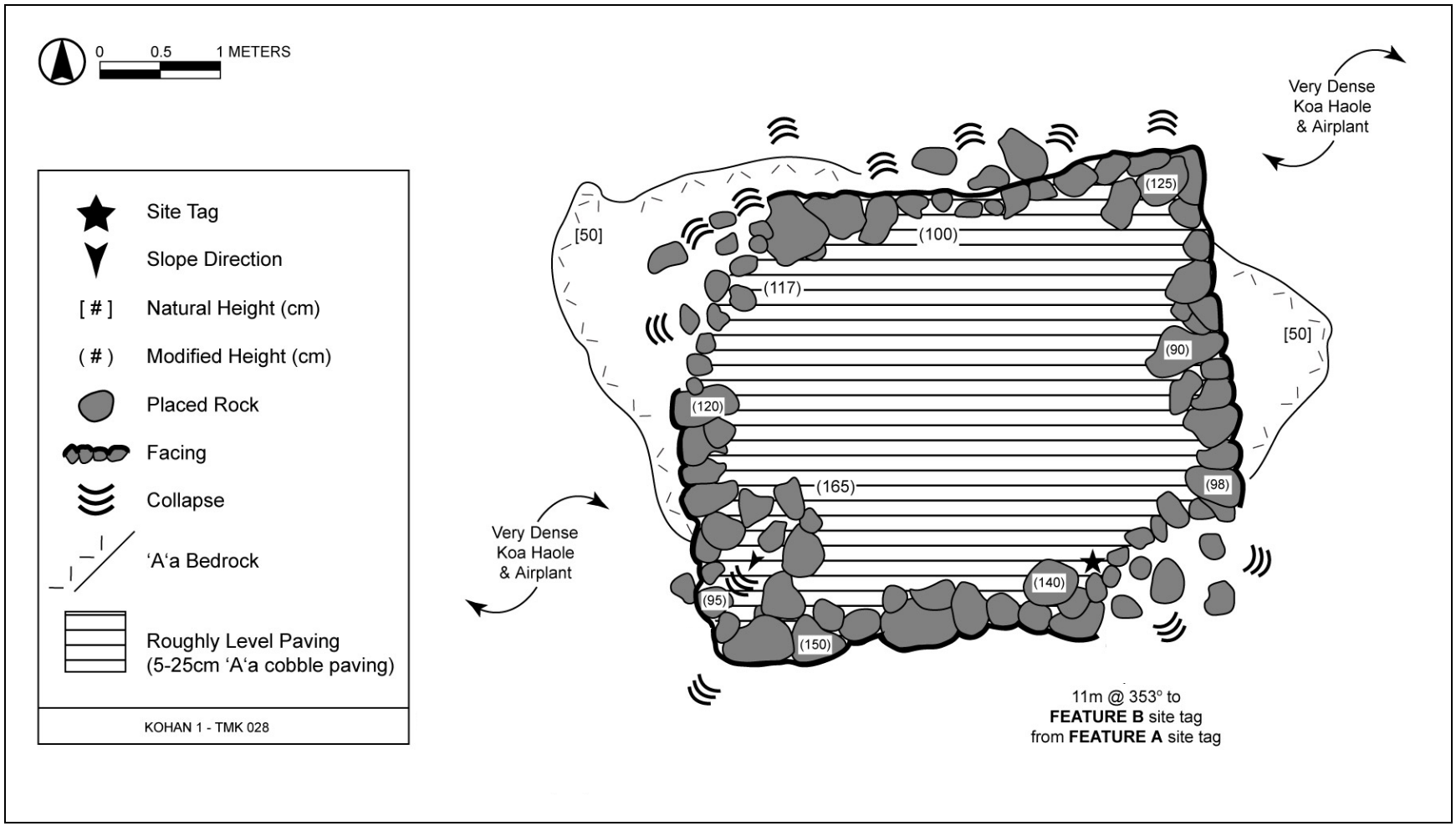

Figure 152. SIHP # 50-10-28-26453, Feature A plan view

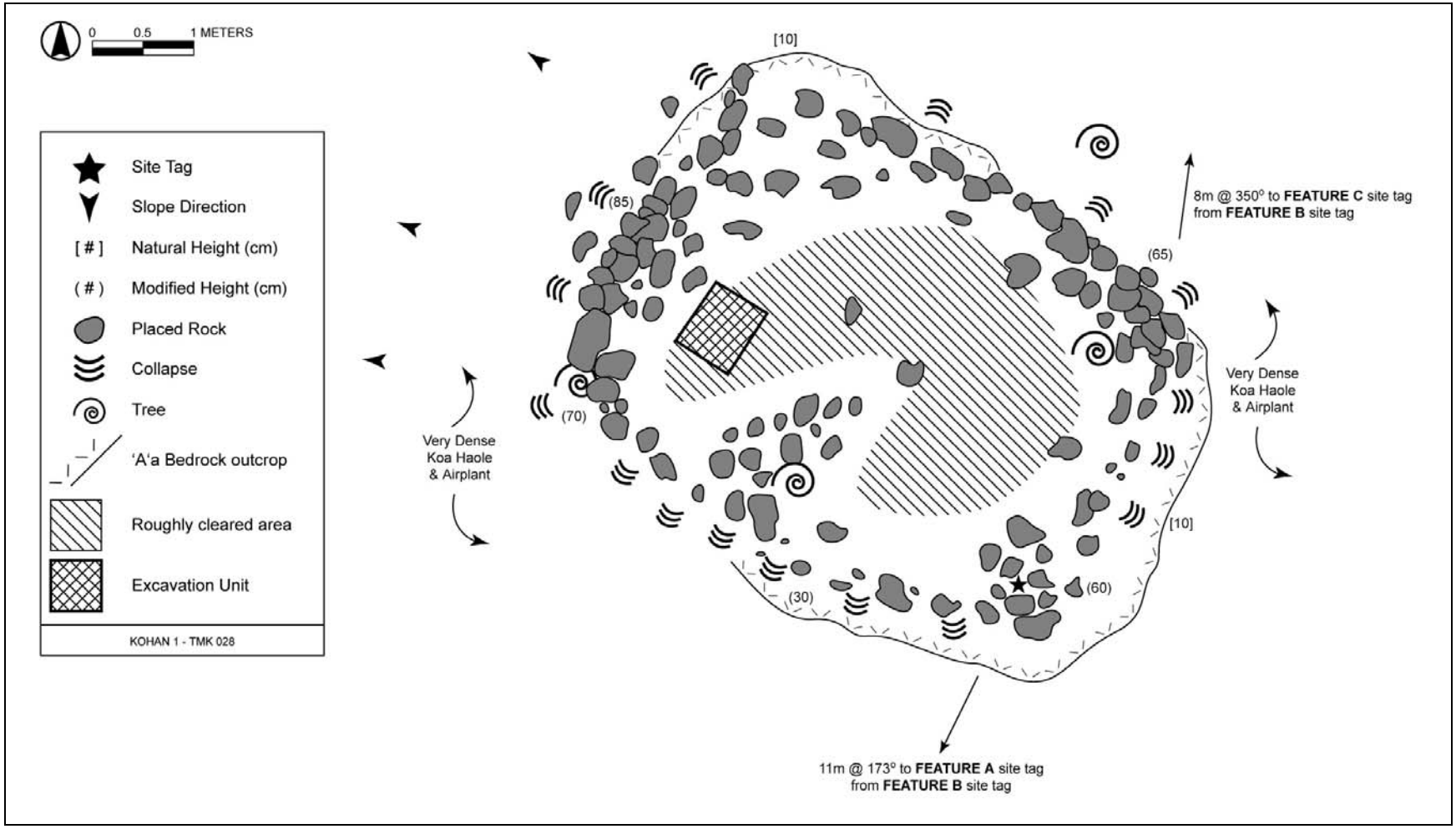

Figure 153. SIHP # 50-10-28-26453, Feature B plan view

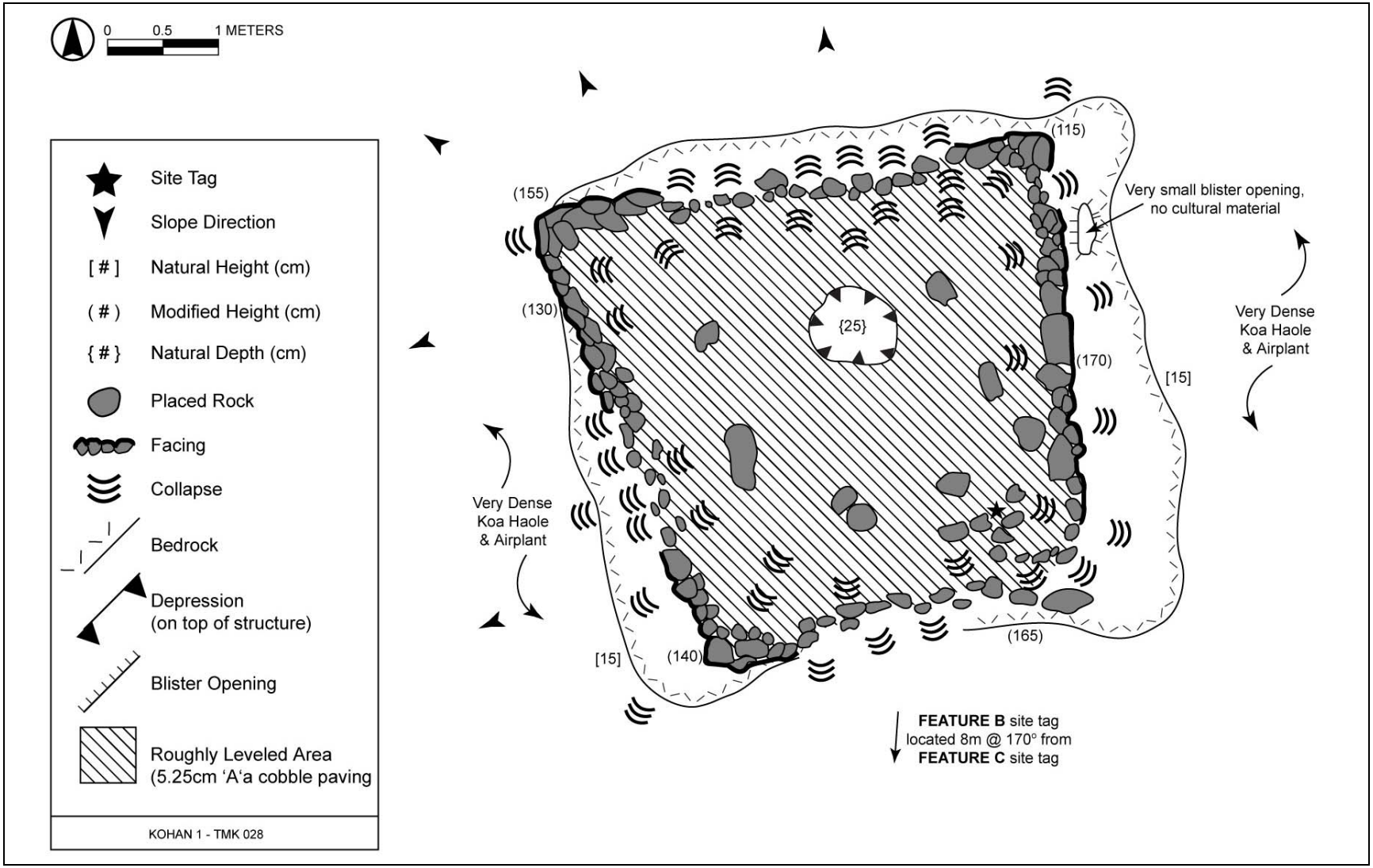

Figure 154. SIHP # 50-10-28-26453, Feature C plan view

Figure 155. SIHP # 50-10-28-26453, Feature A, photograph of large platform facing north

Figure 156. SIHP # 50-10-28-26453, Feature B, photograph of platform remnant facing east

Figure 157. SIHP # 50-10-28-26453, Feature C, photograph of platform facing north

Figure 158. SIHP # 50-10-28-26453, Feature C, photograph of detail of northwest corner of platform

Figure 159. SIHP # 50-10-28-26453, excavation figures. Counter-clockwise from top: plan view of base of excavation unit; photograph pre-excavation facing south; same photograph post-excavation

Section 5 Results of Laboratory Analysis

Subsurface testing was conducted at six sites (-26417, -26425, -26430, -26431, -26443 and -26453) with a total of 14 test units being excavated. Excavation units ranged in size from 0.45 m by 0.45 m to 1.43 m by 0.60 m. No excavations extended beyond 85 centimeters in depth. All material collected was screened through 1/8 inch mesh and, later in the laboratory, washed and sorted. Midden was sorted down to the species level (Table 7). Charcoal was separated, weighed, and catalogued. No artifacts were recovered during excavations, but several were discovered on the surface or inside lava tubes during inventory survey. Table 8 lists all artifacts observed during the inventory survey, their current status, and recommended treatment.

5.1 Midden Analysis

Midden was recovered from four of the 14 test units excavated during the testing phase of the project (Table 7). One excavation unit (site -26453B, Unit 4) contained charcoal and *kukui* endocarp fragments, but these were determined to be natural due to their presence within an eroding *‘a‘ā* layer under the structure. The charcoal was determined to be from a natural burn layer, and the *kukui* may also be naturally deposited. All other recovered midden appears to be in good association with habitation on the surface of a structure.

Marine midden (marine shell and sea urchin) accounted for 24.9% (22.5 g) of all the midden recovered from the project area. The remaining midden (68.0g) consists of *kukui* endocarps. While the *kukui* endocarps are associated with cultural layers, some of these may be naturally deposited. There was no other terrestrial midden. Of the total marine midden inventory, 22.7% (5.1 g) represents shellfish and the remaining 77.3% (17.4 g) consists of echinoderms (sea urchin).

The most common components of marine midden recovered in the project area include the following types in descending order: Sea urchin (Echinoderm), Snakehead cowrie (*Cypraea caputserpentis*), *Theodoxus vespertinus*, Striate Mussel (*Brachidontes crebristriatus*), Polished Nerite (*Nerita polita*) and *Heliacus* sp. The shellfish types represented in the midden inventory are typically found in the tidal zones (shallow water) of both rocky and sandy shores. Most of the shellfish species were likely obtained locally along the Kaloko/Kohanaiki coastline and are attributable to near shore shellfish collection. The presence of marine midden recovered from the project area attests that coastal resources were an important source of protein-related food for the residents of Kaloko Ahupua‘a.

5.2 Radiocarbon Analysis

Charcoal collected during test excavations from site -26443 was sent to Beta Analytic, Inc. for radiocarbon dating, utilizing the accelerator mass spectrometry (AMS) technique, in order to better establish the age range of occupation at the site (Beta Analytic ID # 242607). The radiocarbon analysis is currently in progress, with a due date from Beta Analytic on April 21, 2008. The radiocarbon sample is contextually associated with surface habitation at site -26443. No other test excavations in the project area contained material in good context for dating.

Table 7. Midden and Charcoal Catalog

State Site #50-10-28-	**26428**	**26430**	**26443**		**26453**	
Feature	**-**	**A**	**-**	**-**	**B**	**B**
Trench	**10**	**5**	**2**	**2**	**4**	**4**
Stratum	**II**	**I**	**I**	**II**	**I**	**II**
Depth (cmbs)	**40-50**	**0-33**	**0-50**	**50-60**	**0-50**	**50-65**
Heliacus sp.			0.1			
Cypraea caputserpentis			1.9			
Nerita polita		0.3				
Theodoxus vespertinus			1.9			
Brachidontes crebristriatus		0.6				
Misc./Unidentified shell				0.3		
Total shell midden	**0**	**0.9**	**3.9**	**0.3**	**0**	**0**
Echinoderm	17.1			0.3		
Total marine midden	**17.1**	**0.9**	**3.9**	**0.6**	**0**	**0**
Kukui endocarp	0.3	0.5	65.2	0.3	1.7	
Total Midden	**17.4**	**1.4**	**69.1**	**0.9**	**1.7**	**0**
Total Charcoal	**0**	**0**	**<0.1**	**0.6**	**0**	**0.2**

5.3 Artifact Analysis

A total of 27 indigenous Hawaiian portable artifacts were noted in surface contexts and within lava tubes during the inventory survey (Table 8). Additionally, one historic artifact was noted during the inventory survey (site -26440). Only one artifact was collected (from site -26429). All other artifacts will either be preserved in place or will be retrieved during data recovery.

The majority of the artifacts (17) are manuports, whose primary modification is that the object has been removed from its original context. Ten (10) of the manuports are located along trails and consist of cemented sand slabs (marine aggregates) that occur naturally along the coast. These slabs are placed along trails as markers. The slabs were not collected and it is recommended that they be preserved as appropriate with the trails that they mark; otherwise no further work is recommended. Two (2) of the manuports are unmodified coral. One of these is a coral head placed within the interior of a ceremonial structure, and it is recommended that the coral be preserved in place within the enclosure (see site -26424). The other piece of coral is a fairly smooth and dense coral cobble, which does not appear modified but is located in a small blister at site -26451; no further work is recommended. Five (5) of the manuports are water-worn basalt stones, which also naturally occur along the coast. All of the water-worn manuports are interpreted as hammer-stones, either for lithic manufacture (i.e., lithic tool manufacture), or for quarrying rock and/or land modification. The size of the water-worn stone was used to evaluate function. The water-worn stones at sites -26417C, -26433, -26441 and -26447 are all 10 centimeters in length or longer (oblong shaped) and were most likely used for land modification (i.e., in association with agricultural activity). The water-worn stone at site -26439 is smaller (5 to 7 centimeters in diameter) and was likely used for lithic tool production. The hammer-stone at site -26439 is recommended to be collected during the data recovery phase; all other water-worn stones discussed above are recommended for no further work.

A single formally modified water-worn stone was found during inventory, and this artifact was collected (see site description for site -26429 and Figure 76 above for details, sketch, and photograph). The artifact was given Accession #1 for this project area. The stone has distinct pecking around the middle, most likely to facilitate tying a rope to the dense, heavy stone. The function of the artifact appears to be as an "*ʻāina* basher" – an implement to facilitate breaking up bedrock for the purpose of quarrying, trail construction, etc.

The second most frequent artifact type is coral abraders and abrader blanks. Seven of these were found at three sites, all within lava tubes (site -26425, -26438 and -26439). The coral abraders are generally 5 to 10 centimeters in length, vary in shape, and have wear on at least one surface. All coral abraders will be retrieved during data recovery.

In addition to coral abraders, site -26438 has two additional artifacts (see site description and Figure 114 above for details and photographs). One artifact is a large whole cowry shell with perforations at either end, and is interpreted as an octopus lure. The second artifact is a modified chicken radius that is cut at either end and perforated, and is interpreted as a fishhook blank.

Finally, the single historic artifact is a piece of leather (see site description for -26440 and Figure 119 for details and photograph). Given its possible association with a probable burial, this artifact is recommended for preservation in place along with the site as a whole.

Table 8. Artifact Catalog

SIHP # 50-10-28-	Context	# of pieces	Material	Function	Comments
26418, 26422, 26433	Surface, along trails	10	Cemented sand (marine aggregate)	Marker	Not collected (preserve in site where appropriate)
26417	Surface, near Fe. C	1	Water-worn Basalt	Manuport, probable hammer-stone	Not collected
26424	Surface, in enclosure	1	Branch Coral Head	Ceremonial	Preserve in site; see Figure 58
26425	Surface, in lava tube	3	Coral (not branch)	Abrader	Not collected (data recovery)
26429	Surface	1	Water-worn Basalt	Hammer-stone (large)	Collected (Accn. #1); pecked around middle, see Figure 76
26433	Surface	1	Water-worn Basalt	Manuport, probable hammer-stone	Not collected
26438	Surface, in lava tube	1	Coral (not branch)	Abrader	Not collected (data recovery)
	Surface, in lava tube	1	Modified cowry shell (whole)	Portion of Octopus Lure	Not collected (data recovery), see Figure 114
	Surface, in lava tube	1	Modified bone (chicken radius)	Fishhook Blank	Not collected (data recovery), see Figure 114
26439	Surface, in lava tube	1	Water-worn Basalt	Hammer-stone	Not collected (data recovery)
	Surface, in lava tube	3	Coral (not branch)	Abrader	Not collected (data recovery)
26440	Surface, in lava tube	1	Leather	Leather fragment	Preserve in site; see Figure 119
26441	Surface, in lava tube	1	Water-worn Basalt	Manuport, probable hammer-stone	Not collected
26447	Surface, in lava tube	1	Water-worn Basalt	Manuport, probable hammer-stone	Not collected
26451	Surface, in lava tube	1	Dense coral cobble	Manuport	Not collected

Section 6 Summary and Interpretation

The inventory survey of the 363.106-acre parcel resulted in the identification and documentation of 41 archaeological sites. Based on historic background literature and previous archaeological studies, the site density appears consistent with general ideas about settlement of this area (see the Background Research section of this report). The types, functions, and distribution of sites present match closely the anticipated finds for the lower portion of the upland zone of the Kekaha region of North Kona within which the project area lies.

6.1 Feature Types

The most prevalent feature types observed within the project area are Lava Tubes (17 features), Modified Tumuli/Outcrops (9 features), Walls (8 features) and Trails (7 features). Less common feature types are Platforms (5 features), Mounds (4 features), Modified Depressions (4 features), Terraces (3 features), Enclosures (2 features), and Cairns (2 features).

6.1.1 Lava Tubes

Lava tubes and blisters are numerous throughout the region and - depending on a wide range of factors such as size, accessibility, and interior environmental conditions - were utilized for various functions. Many blisters and small tubes, inspected during the present survey, showed no evidence of utilization. The range of functions for tubes and blisters within the project area include burial, temporary habitation, and activity area (specifically water collection). Lava tubes and blisters also generally offer a greater degree of midden and artifact preservation compared to surface sites. In the present project area, a large number of the indigenous artifacts were located in lava tubes. It should be noted that all confirmed burials within the project area occur in lava tubes. Three of the lava tubes with confirmed burials function solely for burial (all three of these sites are small lava tubes on a high tumulus), while the other two confirmed burials are associated with temporary habitation at the same site. Four of the lava tubes were used specifically for water catchment and the rest were utilized primarily as temporary habitation areas.

6.1.2 Modified Tumuli and Outcrops

Modified tumuli refers to the "dome shaped hillocks" (MacDonald and Abbott 1970:28) of *pāhoehoe* or *ʻaʻā* lava that have been humanly modified for a variety of functions (e.g. temporary habitation and burial). These modified tumuli are generally equivalent to the "modified outcrops" mentioned in other studies done in the region (see definitions in Section 4.1.1). It is notable that over half of the sites within the project either occur on a tumulus or in a lava tube. This is perhaps not surprising given the large amount of bulldozing present in the more agreeable areas for habitation (i.e., on the *pāhoehoe*). Bulldozing would have been less likely to affect sites located on top of tumuli or in underground lava tubes. This suggests the possibility that habitation in this area may have been more intense than is currently reflected by the archaeological remains. There is also a single historic datum located within the project area,

which modified a portion of a high tumulus; this site (-26426) was apparently related to land use and surveying in the historic period.

6.1.3 Trails

As stated previously, trails are a common site type within the Kekaha region in general and one of the more prevalent types specific to the Intermediate Zone. Although some of the trails in the project area were little more than remnants, several run many hundreds of meters and are in good to excellent condition. The intersection of three of the trails (sites -26418, -26422, and -26371) is especially of interest, as it appears to represent trail use during subsequent periods of time. The construction type also is indicative of changing needs in transportation, specifically the creation of trails more amenable to travel by horse or other pack animal (i.e., site -26371 is consistently wider than site -26418, which was probably constructed prior to the introduction of pack animals).

The seven trails or trail segments observed during the inventory survey indicate a network of transportation corridors that focus on transportation over the large *‘a‘ā* flow that dominates the project area (see also the following discussion on trails in the Functional Interpretation section). The trail network includes both *mauka*/*makai* and cross slope-oriented trails. The network of trails thus provides fairly direct coast-to-uplands routes via the project area and access to activity areas within the project area. The activity areas include: agricultural pursuits (e.g. site -26417), a ceremonial site (site -26424), and temporary and recurrent habitation sites (e.g. sites -26425, -26428, and -26431), as well as an animal husbandry area (e.g. -26435). Trail sites -26418 and -26371 are particularly long and impressively constructed trails, which (as mentioned above) appear to overlap one another (with site -26418 pre-dating site -26371) near the modern Hina-Lani Street, as well as intersecting with trail site -26422. Overall the trails suggest a high level of energy investment in constructing paths for traversing the *‘a‘ā* flow, both in pre-contact times as well as historically.

Attempts were made with all trails in the project area to follow them to their full extent and where possible make relevant correlations. It proved impossible to follow trails on the grass-covered *pāhoehoe* adjacent to the *‘a‘ā* lava where the trails were still visible (i.e., the *mauka* end of site -26371). The uniformity of the terrain (usually consisting of undulating *pāhoehoe*) surrounding the *‘a‘ā* flows negates the necessity of extensive trail construction and suggests that while the trails followed a single route over the *‘a‘ā* flows, once the trail exited the *‘a‘ā* more than one path may have been traversed by travelers. Additionally, grass and *koa haole* growth is thickest on the *pāhoehoe* terrain; this, in combination with the lack of trail structure, makes identifying specific trail alignments on the *pāhoehoe* lava essentially impossible.

6.1.4 Walls

Nearly 20% of the sites in the project area are walls or include wall features. Walls built for animal husbandry were a commonly identified feature type within the project area. The walls suggest a fairly major historic presence of cattle or goat ranching within the eastern portion of the project area, which is not unexpected given the presence of the Huehue Ranch in Kaloko beginning in the late nineteenth and early twentieth century. The presence of barbed wire fences,

troughs, and sheds in association with historic walls suggests that ranching continued into the modern area. The two cairns identified in the project area are apparently related to ranching activities.

6.1.5 Other Feature Types

Other feature types occur only occasionally within the project area. Three sites identified during the inventory survey contain platforms, two sites are enclosures, and two sites contain terraces. These feature types are generally associated with areas of temporary and permanent habitation, with site -26424 being an exception as a ceremonial enclosure, and site -26453 being an exception as a series of probable burial platforms. The paucity of these types structures may be due to the heavy bulldozing present, especially in the *mauka pāhoehoe* region of the project area.

Mounds are by far the most common feature type associated with agricultural activity within the project area, especially notable in site -26417 Features B, C and D. Overall agricultural activity is fairly limited and isolated in specific areas, apparently dependent on natural features such as areas of older eroding *‘a‘ā*. Modified depressions are also primarily utilized for agricultural purposes, but occasionally are activity areas related to the primary function of a site (i.e., -26416).

6.2 Functional Interpretation

The bases for functional interpretations are presented in the Survey Results section of this report. Eight primary function categories were identified within the project area and include: temporary and permanent habitation (15 sites), human burial (8 sites), animal husbandry (7 sites), transportation (6 sites), activity areas (4 water collection sites and 1 mining site), marker (2 sites), agriculture (1 site), and ceremonial (1 site).

6.2.1 Agriculture

The terrain throughout the majority of the project area severely limits agricultural productivity, since roughly half of the project area is *‘a‘ā* lava which is virtually vegetation free. Large portions of the *pāhoehoe* are also fairly rough, with numerous pressure ridges and tumuli, or are mixed with areas of old eroding *‘a‘ā* flows. Some of the *pāhoehoe* areas do have soil development, but these tend to be fairly small, and often are simply small pockets or depressions where vegetation decomposition creates a thin highly organic soil horizon. The agriculture related features within the project area represent more of an opportunistic approach versus the more expansive/intensive approach practiced at higher, more productive elevations within Kaloko and Kohanaiki Ahupua‘a. Agricultural features in the project area ranged from minimal constructions, characterized by the removal of stones to clear small depressions in *pāhoehoe* lava (i.e., site -26417 Feature E), to larger more defined concentrations of mounds (i.e., site -26417 Feature B).

During the inventory survey four sites, or 9.8 percent of the total sites, were considered to function, in whole or part, in an agricultural capacity (sites -26417, -26425, -26430, and -26431).

Of these sites, only site -26417 consists of widespread agricultural features and has agriculture as the primary function of the site. The other three sites have minor agricultural features, but represent only a secondary function of the site; they primarily function as habitation or water collection, with minor agricultural activity surrounding the site. Site -26417 consists of six features that are spread throughout the *mauka* end of the project area, and these are generally characterized by low-intensity but widespread areas of agricultural modification. The densest agricultural area within site -26417 is the area comprising Features B, C and D, which largely consist of agricultural mounds. There are more than fifty agricultural mounds in this area; many of these appear to planting mounds, while some are consistent with agricultural clearing mounds.

The agricultural sites within the project area are collectively characteristic of and are a variation of what is currently termed the "Kona Field System" (State site 50-10-37-6601). The Kona Field System is an intensive, non-irrigated dry land agriculture complex, which has been identified along the upland slopes of North and South Kona, leeward Hawai‘i, from Kealakekua Bay to beyond the northern limits of Kailua Town. Numerous archaeological studies in this region (e.g., Newman 1970; Yen 1978; Schilt 1984; Barrera 1990; Hammatt et al. 1995, among others) define the field system as a grid-like patterning of rectangular fields formed by earthen and stone boundaries. Although variants occur, the fields' long axis walls (*kuaiwi*) extend in a *mauka/makai* direction and are intersected by shorter walled boundaries cross-cutting the slope.

The definition of the Kona Field System as a "system" relies on the interaction of four terrestrial ecozones or subzones classifying areas of differential agricultural use in *ahupua‘a* or district, as it is most commonly applied. Classification of these subzones was initially introduced by T. Stell Newman (1970) with subsequent contributions by Marion Kelly (1983). Newman defined the terrestrial subzones using aerial photography in correlation with historic accounts of early visitors to Hawai‘i. Kelly's subsequent research of the Native Claims Registers (from 1846 to 1848) provided Hawaiian names of the subzones and, based on reported claims, what type of traditional or historic crop was cultivated in each subzone. The subzones follow rainfall gradients generally predicted by elevation in Kona and delineate optimum areas for intensive agriculture. Rose Schilt in “Subsistence and Conflict in Kona Hawai‘i” presents a comprehensive summary of the subzones using Newman and Kelly's studies and rainfall data compiled during her research (Schilt 1984:6). The following subzone classifications are based on Schilt's compiled data (the first and second zones, *Kula* and *Kaluulu*, are most applicable to the present study area):

Kula Subzone/Coastal Area

Elevation: Sea level to 500 ft (0 to 150 m)
Annual Rainfall: c. 30-50 in. (0.8-1.2 mm.)
Late Pre-contact crops: Sweet potatoes *(‘uala)*, gourd (*ipu*), and mulberry (*wauke*).

Kaluulu Subzone/Seaward Slope

Elevation: 500-1000 ft. (c. 150-300 m)
Annual Rainfall: c. 40-55 in. (1.00-1.35 mm.)
Late Pre-contact Crop: Breadfruit (*‘ulu*), with sweet potatoes (*‘uala*) and mulberry (*wauke*) interspersed; mountain apple (*‘ōhia‘ai*) and some taro (*kalo*).

‘Apa‘a Subzone/Upland Slope

Elevation: 1000-2500 ft (300-750 m)
Annual Rainfall: c. 55-80 in. (1.35-2.00 mm.)
Late Pre-contact Crop: Taro (*kalo*), sweet potatoes (*‘uala*), ti (*kī*), and sugarcane (*kō*).

‘Ama‘u Subzone/Upland Jungle

Elevation: 2500-4000 ft (750-1200 m)
Annual Rainfall: c. 80 in. (2.0 mm.)
Pre-contact Crops: Bananas and plantains (*mai‘a*)

It is notable that historic period crops were also cultivated in the *Kaluulu* and *‘Apa‘a* subzones and to a lesser degree in the *Kula* subzone. These crops included cabbage, melons, onions, oranges, tobacco, beans, coffee, corn, cotton, pineapple, Irish potatoes, and pumpkin.

The agricultural sites within the project area are regarded as interrelated components of a non-intensive, non-irrigated field system with the *ahupua‘a*, and are believed to generally reflect utilization of the *Kaluulu* subzone presented above. Given relatively low rainfall within the project area, despite its slightly higher elevation, it is reasonable to assume that some areas may follow a pattern more consistent with the *Kula* subzone as well. Overall, this suggests that sweet potato, gourds, mulberry, and possibly taro are the most likely crops to have been grown in this area. As noted in the Background Research section above, the actual crops identified in the award testimonies during the Māhele of 1848 for Kaloko lands are taro and sweet potato.

Sweet potato was likely the most abundantly grown crop in the project area because of its adaptability to stony and dry environments. It was commonly planted in mounds and in excavations, and seems the most likely crop to have been grown in the various features of site -26417 (especially in areas with concentrations of mounds, such as site -26417 Feature B). It is notable that the most intensive areas of agricultural modification are located where there are older (highly eroded) *‘a‘ā* flows, ideal for building planting mounds. Henry J. Lyman, son of a missionary couple who first arrived in Hilo in 1831, describes features in Puna similar to what has been seen in the project area, which were cultivated with sweet potatoes:

> Wherever the lava could be pounded into scoria, a plantation of sweet potatoes was laboriously formed by digging among the stones and filling in the holes with dried grass brought from the mountainside. Placed in the nest, the tuberous buds were covered with gravel, and there grew with astonishing luxuriance, yielding the largest and finest potatoes on the island [in Frierson 1991:167].

During the mid 1800's, Captain Charles Wilkes of the American Exploring Team comments on agricultural use of lava rock areas, which he observed specifically in the Kona region:

> Cultivation is carried on in many places where it would be deemed almost impractible in any other country. The natives, during the rainy season, also plant, in excavations among the lava rocks, sweet potatoes, melons, and pine-apples, all of which produce a crop (Wilkes 1845:91).

Sweet potatoes were also cultivated within walled fields or depressions in the walls themselves. E.S. Craighill Handy and Elizabeth Green Handy reveal this method using an account taken from the Hawaiian newspaper *Ka Nupepa Ku‘oko‘a* March 24, 1922):

> Rocky lands in the olden days were walled up all around with the big and small stones of the patch until there was a wall (*kuaiwi*) about 2 feet high and in the enclosure were put weeds of every kind, *‘ama‘u* tree ferns and so on, and then topped well with soil taken from the patch itself, to enrich it, or in other words to rot the rubbish and weeds to make soil.
>
> After several months, the rotted weeds were converted into soil of the best grade. The farmer waited for the time when he knew that the rains would fall, then he made the patch ready for planting. If for sweet potatoes, he made mounds for them and for taro too, on some places on Hawai‘i [in Handy and Handy 1972:131].

The above accounts describe agricultural modifications in rough rocky terrain similar to that of the present project area, though no walled (i.e. *kuaiwi*) fields are present.

6.2.2 Animal Husbandry

Historical research suggests that both goat and cattle grazing probably took place within the project area. Captain George Vancouver gave Ke‘eaumoku, an *ali‘i*, a pair of goats in 1792, and the following year, he brought Ke‘eaumoku four sheep. Vancouver also brought the first cattle, California longhorns, to Kamehameha in 1793. Historic documents related to the Government Homestead Program of the late 1880s indicate officials determined that goats were the only animals that were adept at grazing within arid, rocky Kaloko and Kohanaiki (Maly and Maly 2003:76, 79). Goats were present in the area prior to the late 1880s and may have been present within the project area. Limited cattle ranching was practiced at the same time, although by 1900, cattle ranching had for the most part replaced the goats (Maly and Maly 2003:75).

Post-contact animal husbandry is extensive in the *mauka* (eastern) portion of the project area, likely associated with nearby activity at the Huehue Ranch (see Background Research above, page 22). The majority of the project area is inappropriate for grazing, and most archaeological remains of animal husbandry in this area appear to be an attempt to keep cattle off the rougher *‘a‘ā* flows (i.e., site -26435 and -26442), and within the level *pāhoehoe* flow at the far *mauka* end (see Figure 7). One of the walls probably functioned as a small animal pen (site -26444).

In addition to the seven historic properties in the project area that functioned for animal husbandry, there are various signs of later (modern) animal husbandry (see Figure 7 above and Figure 160 below). One long barbed-wire fence runs *mauka/makai* to the north of site -26435, and it probably connected to a complex of barbed-wire fences east of it, which are also are associated with site -26450. Near site -26450 are a few small sheds and a metal feeding trough,

as well as a metal gate built to act as a chute for livestock; the site -26450 rock wall intersects a barbed wire fence that is directly associated with some of these modern features. Also nearby the -26450 wall is a wooden fence, mostly collapsed, which appears to also have tied into the barbed wire fence. One portion of the wooden fence/gate is painted yellow with white writing, a portion of which can be made out to say “MAUI” and “8”. Overall the arrangement of historic and modern features in this area suggests that it was used for animal husbandry from historic through modern times. All modern items are rusted and clearly have been in disuse for quite some time.

Another modification to the landscape likely related to historic/modern animal husbandry was noted during the inventory survey, and consisted of initials carved into a *kukui* tree in the southeastern portion of the project area. The carving appears to say “C.O” (see Figure 160). This area has a very large grove of *kukui* trees, which is unusual for the project area. *Kukui* trees do occur in isolated areas (especially near lava tubes; see sites -26438, -26440, and -26449), but this area is the only large grove with many large trees. The presence of the grove along a fairly large bulldozer road suggests late historic utilization of the area, probably in conjunction with animal husbandry.

Figure 160. Overview photos modern activity in project area. Clockwise from top left: metal shed with wooden trough; tree engraved with initials C.O.; metal gate/chute attached to barbed-wire fence (see site -26450); remains of wooden fence with writing in paint

6.2.3 Burials

A total of five sites within the project area contain confirmed burials (all within lava tubes), two sites contain probable burials, and one site (a large lava tube) crosses into an adjacent property where it contains several confirmed burials (Table 9). Numerical designations given to burials by CSH are sequential for the entire Kohan 1 project (including the present project area as well as TMK: [3] 7-3-009: 017, 025 and 026), resulting in non-sequential numbers for burials within the present project area. The CSH burial numbers listed in Table 9 correspond to the burial numbers reported to SHPD upon initial discovery of a burial, and therefore represent the order of discovery during the Kohan 1 project fieldwork. The numerical designations have been retained to ensure consistency between the records of initial discovery (as reported to SHPD) and discussion in the inventory survey report.

All confirmed burials (with identified human remains) are located within lava tubes, which vary in size from very small to fairly large tubes. There is a single burial per site. Three of the five confirmed burials are located within small tubes located on top of high, isolated tumuli. Given the lack of historic artifacts and the burial style (concealed within lava tubes), all confirmed burials are understood to be of Native Hawaiian ancestry and interred in a pre-contact style of burial. There are no directly associated burial goods, although several of the burials have modification associated with them (e.g., placed rocks designating the boundary of the burial area) or possible burial items nearby (e.g., modified shell).

In addition to confirmed burials, there are two probable burials within the project area (no identified human remains, but strong archaeological evidence for presence of a burial). One probable burial (site -26440) was determined based on formal construction in a difficult to access area of a lava tube, with no other purpose for construction apparent. This burial is possibly associated with a piece of worked leather, and therefore may be historic, although the burial style (concealed within a small area of the lava tube) is consistent with pre-contact Native Hawaiian practices. Probable burial site -26453 consists of three adjacent platforms that are consistent with Hawaiian burial platforms. This site may contain multiple burials, as each platform was likely utilized for interment.

Three of the burial sites (-26425, -26438 and -26440) also function as temporary habitation, although the burials are usually located in an area separated from these additional activities at the site. The location of these burials (associated with habitation) is in contrast with the three confirmed burials located in small tubes on high, isolated tumuli, where the sole function of the site is burial. Site -26452 is primarily a water collection site within the project area, but the lava tube does lead to an area outside the project area that contains several burials (see site description for further discussion). The vast majority of site -26452 is located east of the project area, but the single unblocked entrance is located within the present project area.

Table 9. List of Burials and Associated Sites

SIHP No. (50-10-27-/ 50-10-28-)	CSH Burial Number	Site Type	Function	Age
26416	3	Lava Tube	Burial (confirmed)	Pre-contact
26423	56	Lava Tube	Burial (confirmed)	Pre-contact
26425	58	Lava Tube	Burial (confirmed)*	Pre-contact
26427	57	Lava Tube	Burial (confirmed)	Pre-contact
26438	64	Lava Tube	Burial (confirmed)*	Pre-contact
26440	-	Lava Tube	Probable Burial*	Pre-contact/ Historic
26452	A - H	Lava Tube	Several burials but all located outside of project area; however, accessible only via site -26452*	Pre-contact
26453	-	Platforms	Probable Burial	Pre-contact/ Historic

* Site also functions as a temporary habitation area or activity area for water collection

6.2.4 Ceremonial

There is one ceremonial site in the project area, which consists of a formal enclosure with a placed coral head inside (site -26424). The site is located near the end of the site -26418 slab trail, and is constructed at the edge of the *ʻaʻā* near a relatively high density of sites on the *pāhoehoe* below. The spatial relationship of the enclosure and the *pāhoehoe* slab trail, as well as the formal nature of both sites, suggest an important ceremonial function for -26424. This raises the possibility that the site could be a *heiau*.

The general consensus regarding *heiau* (e.g. Bennett 1930, Kolb 1991, and Stokes and Dye 1991) is that they are “extraordinarily diverse” (Kolb 1991:108) and “found in a bewildering variety of forms, sizes, and locations throughout the islands” (Kirch 1985:257). W.C. Bennett’s 1930 dissertation continues to be “the most comprehensive survey of heiau to date” (Kolb 1991:108). Bennett, among others, attempted to provide diagnostic attributes from which *heiau* could be identified and classified. These include size, uprights, depressions, altar, paving, tiers/terraces, coral, historical reference, location, and function.

Size refers to the surface area (i.e. square meters) of the structure. Initially, W. C. Bennett designated two size classifications for *heiau*, small and large. The dividing line between them was arbitrarily set at 50 feet “though this figure is not absolutely fixed” (Bennett 1930:4). Over the years this has been refined to include three general size ranges, small being less than 200 m², “mid-sized” (Kirch 1985:261) ranging from 200 to 400 m² and large being greater than 400 m². Based on these specifications, site -26424 (225 m²) fits into the lower end of the mid-size range. In general, mid-size structures and larger have been interpreted as religious structures (Hammatt et al 1997:181).

Attributes including altars and paving, generally refer to internal features of the structures (Hammatt et al 1997:176-177). Altar in this case is employed to describe a slightly elevated or raised stone foundation within the structure. Bennett designated altars as one of the *heiau* features focusing primarily on ethnographic evidence related to "*lele*" which he described a "a sort of scaffolding supported by posts on which offerings were laid and left to moulder away" (Bennett 1930:39). According to David Malo (1903), "In front of the lele was a pavement of pebbles (or framework) on which offerings were deposited until they were offered up, when they were laid on the lele" (Malo 1990:213-214). The term paving is employed referring to well constructed surface layer(s) of a specific structure. Although a common structural component, paving is suggestive of a "greater construction effort" (Hammatt et al 1997:185). Formal paving of two different types (slabs and *ʻaʻā* cobble) is evident within site -26424, as are various internal features, including a placed head branch coral.

Location refers to our perception of prominent placement of specific structures in terms of view planes from and to the particular structures (Hammatt et al 1997:189). The importance of *heiau* location has been well documented (Bennett 1930:341; Buck 1964:516; Stokes and Dye 1991:21; and Kolb 1991:80-83). When considering location (Kolb 1991):

> …local topography of a temple was intimately tied to the concept of religious "sanctity". Large heiau were generally situated upon prominent locations such as hill tops, bluffs, or knolls. This higher ground affirms the divine and inaccessible nature of high-ranking *aliʻi*, while affording an excellent view of the surrounding countryside and coast. Smaller *heiau*, on the other hand were usually placed within villages, upon mountain slopes, in upland valleys, along the coast, or in any other location that would best serve the people (Bennett 1931:35).
>
> The incorporation of the local topography makes any cursory analysis of *heiau* form suspect in two ways (Hommon 1987:24-5). First, the placement of *heiau* architectural elements tends to be influenced more by the contour of the landscape than by the abstract plan imposed upon the site by the architect. This suggests that the location of a *heiau* played a much more important role in its design than previously thought, and may partially explain the large amount of variability present in *heiau* form. Each promontory varies in its size, shape, and orientation of natural rock outcrops….
>
> Second, some platforms and terraces that appear to be solid architectural elements are actually masonry veneers, and thus are deceptive as to the amount of labor used in their construction. (Kolb 1991:82-83).

Site -26424 is situated at the edge of a very large *ʻāʻā* flow, where the *ʻaʻā* drops steeply to level *pāhoehoe*. Heavy vegetation currently obscures the site, but it likely would have been visible from several sites (high tumuli) if not covered by Christmas berry trees (i.e., site -26423, -26427, and -26430). A prominent platform (-26428) and the *pāhoehoe* slab trail (-26418) are both nearby. Based on the present level of investigation, functional interpretation of site -26424 can only be inferred; however, the above discussion does suggest that this site may have functioned as a *heiau*.

6.2.5 Habitation

Fifteen (15) sites (36.6% of the total sites) in the project area, in part or in whole, are interpreted as habitation sites (-26421, -26425, -26428, -26430, -26434, -26438, -26439, -26440, -26443, -26445, -26446, -26447, -26448, -26449, -26451). Four (4) of these sites also contain non-habitation component features (sites -26425, -26438, and -26440 function as burial locations in addition to habitation; sites -26425 and -26430 are associated with agricultural activity in the immediate vicinity of the site). The temporary and permanent habitation designation for the sites within the project area fit the models of type of habitation expected within the lower portion of the Upland Zone as well as meeting a set of criteria for interpreting modes of habitation (i.e. Cordy et al. 1991:529 and Clark 1986:198).

Two specific types of habitation types – temporary (which includes shelters) and permanent - are used in the present analysis of these sites. Of the total fifteen (15) habitation sites in the project area, thirteen (13) sites fit the characteristics of temporary habitation and two (2) are categorized as permanent habitation (site -26428 and -26443).

The distinction between the two habitation modes is posited based on the following set of criteria, which have been developed by Cultural Surveys Hawai‘i over years doing archaeological research within the Hawaiian Islands. This includes locales where other researchers have developed models for distinguishing temporary and permanent habitation (Cordy 1981, Cordy et al. 1991 and Jensen 1988). Thus, models for distinguishing temporary versus permanent (Cordy et al. 1991, Clark 1986, Weisler and Kirch 1982, Green 1980) are available for comparative analyses.

Cultural Surveys Hawai‘i incorporates aspects of these models into the set of criteria which we then apply to the range of sites within a project area. The process of interpretation involves: 1) in field site recordation and tentative interpretations; 2) laboratory analysis that includes a) reevaluation based on inventory of all sites; b) incorporation of subsurface testing data; c) correlation to previous studies; and d) review of historic background data. In field interpretations can thus be altered based on compilation of full inventory survey data and correlations to previous studies.

The primary criteria utilized for in field interpretations include size, architecture type (e.g. lava tube, c-shape, platform, terrace, etc.) and substantiveness of architecture (i.e. substantial versus insubstantial). These three primary criteria provide essential determining factors that are found in the existing habitation models (e.g., Cordy et al. 1991:527-536, Clark 1987:105-214, Green 1980:54-63), and are discussed in detail below:

6.2.5.1 Size

While there is no set size determination to differentiate temporary and permanent habitation, structures can be roughly categorized as small (□ <20 m²) or large (□ >20 m²), with larger structures having a tendency to be permanent habitation.

Though size can be a key determining factor there are variables which can affect its diagnostic value. These variables include differences in field and recordation methodology related to measuring and reporting on sites or features size. Examples include utilization of interior versus

exterior measurements, defining natural areas or surfaces utilized for habitation (e.g. cave floor areas, modified outcrop surface area) and personal perception(s) of site or feature limits (e.g. exterior perimeters of enclosures, platforms, c-shapes, etc.). Cultural Surveys Hawai‘i utilizes maximum exterior measurements as the basis for calculating area. Thus, based on the documented size range differences and the regional variations in habitation models, as well as the above-mentioned variables Cultural Surveys Hawai‘i utilizes structure size of ca. 20 m^2 as a general dividing line between large and small. The implication here is that large is suggestive of permanent habitations with small indicative of temporary habitations. However, additional criteria are necessary to affix these differing modes of habitation, especially because of variability in architecture or structure type and substantiveness of structures which size (m^2) does not address.

6.2.5.2 Architectural type

1) Temporary Habitation - lava tubes & blisters, irregular shapes, standard C- and L-shapes platforms enclosures, terraces, alignments
2) Permanent Habitation - platforms, enclosures (rectangular, square),terraces

Based on the previous habitation models as well as Cultural Surveys Hawaii's research (Hammatt et al. 1997), certain architectural or structural types tend to be more often associated with one mode of habitation or the other. Types such as C- and L-shaped enclosures, isolated hearths, caves, and modified outcrops, for example, are more often associated with temporary habitations. Platforms, rectangular enclosures and terraces are more often associated with permanent habitations. However, these architectural types are not necessarily mutually exclusive and therefore besides size, and type, substantiveness of architecture is essential in the interpretations.

6.2.5.3 Substantiveness of sites/features

1) Substantial - Well paved, bifaced, (thick) sturdy walls, volume (though no specific m^3), defined areas by alignments
2) Unsubstantial - Minimally or unmodified tubes/blisters, rough, loose paving (or none), uniface (piled versus stacked) walls, incorporated natural features.

Substantiveness of structures refers to quality of construction which in part infers amount of labor invested. Permanent habitations are expected to have more substantial architecture; such as well-paved surfaces; bi-faced, thick, sturdy walls; and in the cases of platforms and terraces, significant rock fill. In contrast, temporary habitations are expected to have less substantial architecture; such as minimally or unmodified lava tubes or blisters; rough, loose pavings; incorporation of natural features (e.g. large boulders, bedrock ledges, outcrops); and unfaced or unifaced walls. Thus the substantiveness criterion suggests mode of habitation based on perceived labor investment as an indicator of the pre-determined use of the structure. In other words, greater investment would be put into permanent habitations to provide stable and comfortable structures versus little effort invested in structures that were pre-determined for short-term or temporary use.

These three criteria: size, architecture type, and substantiveness provide the basis of CSH mode of habitation interpretations. However other criteria are viewed as necessary in supporting these interpretation. These additional criteria include: single versus multi-component site layout; internal features; functional associations and; geographic location.

6.2.5.4 Single versus Multiple Components

1) Temporary Habitation - generally single featured but multiple not all that unusual
2) Permanent Habitation - either single or multiple component but usually other feature associations.

Habitation sites are described as either single-structure site or as a complex of related multiple structures. Typically, but not exclusively, temporary habitation sites are single-structure sites or they contain only one habitation structure in a complex layout. In contrast, permanent habitation residences, although commonly containing one primary habitation structure (i.e. sleeping house), often include other function-specific structures (e.g., men's house, sleeping house and cooking house), in addition to other functional feature types that supplement a permanent household (e.g. garden areas, storage or special-use caves, and family temples).

The variation between single-structure and multiple-structure permanent residences have been described, by several 19th-century Hawaiian scholars (summarized in Cordy 1981:73-76), as being dependent on the inhabitants' social rank. The larger, multiple-structure permanent residences (containing "men's houses, sleeping houses, heiau houses, women's eating houses, houses for the storage of provisions, houses for cooking, and many other houses" [Kamakau 1976:96]) were occupied by the *ali‘i* or wealthy commoners, and the single-house residences were occupied by other commoners (*maka‘āina*). Hawaiian scholar, David Malo, described a *maka‘āinana* house as a "little shanty" in which all residential activities took place, "the fireplace was close to their head, and the poi dish conveniently at hand" (ibid.). Ethnographers E.S. Craighill Handy and Mary Kawena Pukui also noted the presence of single-structure households and multi-structure households, although they emphasized the multi-structure pattern (Handy and Pukui 1972:7, 112). The supposition that a multiple-house (structure) design was common among both social classes has been demonstrated in the archaeological record (e.g. Cordy 1981; Weisler and Kirch 1982). Cultural Surveys Hawai‘i's work in inland settlements, in Waiohinu, Ka‘u, and Honokohau, North Kona (Robins et al. 1992 and 1995 respectively), documented that multiple-structure households were common, accounting for approximately 50% of all permanent habitation sites.

6.2.5.5 Internal features

1) Temporary Habitation - few, if any, from just survey level observation, cupboards (excavation observations, e.g. multiple hearths)
2) Permanent Habitation - cupboards, single, well-defined hearth, constructed entrances or pathways, internal alignments (indicating segregation for multiple purposes)

The presence of internal features in habitation structures tend to indicate longer or permanent use of the structure. The more common internal features associated with permanent habitation are: solitary inlaid hearths, entry ways (including constructed pathways and doorways), and

alternating surfaces (tiers) or internal alignments defining different living areas. Internal features that may occur in both temporary and permanent habitation structures include cupboards, post-holes, alignments, and less substantially constructed hearths.

Observations of cultural material (midden, artifacts, manuports, etc.) at sites provide additional supportive data, however the presence or absence of such material was not a key determining criterion.

If extensive excavation of habitation sites has occurred then thickness of a site's or feature's cultural deposit and the type of associated artifacts may assist in distinguishing between temporary and permanent habitation. For example, thicker cultural deposits that contain a variety of domestic-related tools could be an indicator of permanent habitation activities (Clark 1986: 207), while sparser cultural deposits with a limited variety of tool types may be an indicator of temporary habitation activities (op.cit. 199-200). However, the density of a cultural deposit or artifact types alone does not necessarily distinguish between temporary and permanent use, since similar domestic activities - revealed by similar artifact types - may be found at both temporary and permanent habitation sites (Cordy et al. 1991:528, 533-534). In addition, a dense and thick cultural deposit may be produced at a temporary habitation site that was used frequently over a long period of time (i.e., recurrent habitation). Regardless of whether or not intact cultural deposits can indicate temporary or permanent use, not enough subsurface data was obtained, during the inventory survey of this project, to facilitate this type of comparative analysis.

6.2.5.6 Functional Associations

1) Temporary Habitation - agricultural, natural resources (lithics, mining, sources) fish/shell fish
2) Permanent Habitation - other permanent habitation, burials, religious features/sites (uprights, i.e. heiau), shrines; potable water source(s)

The functional association of other features, sites, or complexes can assist in mode of habitation interpretations. Based on previous research temporary habitations in the central Kona region tend to be associated with *mauka/makai* trails, intensive agriculture, specific resource procurement (e.g. lithics, birds, timber, etc.) and natural features such as lava tubes and/or blisters. Permanent habitations may be associated with other permanent habitations in a cluster or "village" setting, burials, religious sites/features, potable water, and ocean access (Clark 1986, Jensen 1988, Cordy et al. 1991, Robins et al. 1995, Colin et al. 1996). Additionally, historic records related to Land Commission Awards (LCAs) are evaluated when applicable, as providing functional interpretations, possibly related to mode of habitation and thus is included in the column on "other functional associations."

6.2.5.7 Geographic location

1) Temporary Habitation - coast to inland, but more prevalent inland, amongst intensive agriculture, along trails, edges and/or interfaces of lava flows
2) Permanent Habitation - mainly coastal but scattered inland, shoreline access

Similar to other criteria previous research has documented trends pertaining to geographic location of temporary and permanent habitations. This category should be considered in regards to the topography/geology of the specific project area. The trends pertinent to the Kona region for temporary habitations indicate that sites may be found from the coast to inland, but that they are more commonly found inland, especially within an intensive agricultural context (Hammatt and Clark 1980, Robins et al. 1995). Permanent habitations are more commonly documented historically and archaeologically as being coastal with scattered inland sites. The predominance of permanent habitations being coastal is especially true for clustered housing, or "village"-like settings.

6.2.5.8 Habitation Site Interpretation Summary

The interpretations of habitation sites into temporary or permanent can be an uncomplicated process depending on survey area, number of sites, and type of sites present. However as can be seen in large studies, like the present survey, the quantity, variety and varying conditions of habitation sites necessitates utilization of a wide range of interpretive criteria. As explained, Cultural Surveys Hawai‘i makes in-field interpretation based on observable criteria, particular size, architectural type, and substantiveness of architecture. Other criteria are then applied as supportive data of one mode or the other. Table 10 has columns for the individual criterion utilized on a per site/feature basis. Following the tables are summary sections for temporary and permanent habitations within the present project area.

6.2.6 Temporary and Permanent Habitation within the Project Area

Thirteen (13) habitation sites (representing 86.7% of the total habitation sites) in the project area are interpreted as temporary in usage, and two (2) sites are interpreted as permanent habitation. Table 10 below lists the criteria that distinguish the sites as temporary vs. permanent in use (permanent habitation sites are in bold). Of the temporary habitation sites, two contain constructed surface features, and three consist solely of a tumulus with minor modification and midden on top (no constructed surface features). All other temporary habitation sites consist of lava tube shelters with some minor construction, clearing, midden, and/or artifacts. Both of the permanent habitation sites consist of formally constructed surface features.

6.2.6.1 Size

With the exclusion of non-constructed floor areas (lava tubes, blisters and rock shelters), the temporary habitation structures of the sites measure an average of 13 m², in a range from 2 m² to 24 m². All but one of these structures measure under or equal to 20 m²; Feature B of site -26430 measures 24 m^2, as it is a long terrace with a small living space above it.

6.2.6.2 Architectural Type and Internal Features

The structures represented in the non-lava tube temporary habitation sites include several architectural ("formal") types. Six of the nine surface temporary habitation features are modified tumuli or modified outcrops. Two temporary habitation features are terraces, and one is a small informal platform. All temporary habitation sites (including lava tubes) consist of fairly minor construction and rough leveling/clearing of surfaces. Site -26425 and site -26430 are slightly more formal in construction (more formally paved surfaces, some faced construction, a stone

hearth), but the features are widespread and none suggest a high level of energy investment. Both of these sites are interpreted as temporary habitation in relation to nearby agricultural areas.

Permanent habitation sites consist of one formal enclosure and one formal platform. Both structures contain multiple internal divisions and small tiers, as well as formally paved areas, and both have construction reaching a height of one meter or greater.

Table 10. Characteristics of Temporary Habitation and Permanent Habitation Sites and Features (permanent habitation sites in bold)

Site Number/ Feature	Formal Type	Floor Size (m^2)	Substantiveness	Internal Features	Other Functional Associations
26421	Lava Tube	N/A	Minor construction & clearing in tube	-	Water collection
26425A	Lava Tube	N/A	Minor construction & clearing in tube	-	Burial, far opposite end of tube
26425B	Modified Outcrop	9	Unifaced edge	-	Agriculture
26425C	Terrace	10	Leveled surface	Stone hearth	Agriculture
26428	**Platform**	**40**	**Formal paving, formal facing**	**Tiers/internal alignments**	**-**
26430A	Modified Tumulus	16	Paved	-	Agriculture
26430B	Terrace	24	Mounded, informal facing	-	Agriculture
26430C	Platform	2	Mounded, informal facing	-	Agriculture
26430D	Modified Tumulus	8	Paved	-	Agriculture
26434	Lava Tube	N/A	Minor construction & clearing in tube	-	-
26438	Lava Tube	N/A	Minor construction & clearing in tube	-	Burial, far opposite end of tube
26439	Lava Tube	N/A	Formal constructed area in tube & clearing	-	-
26440	Lava Tube	N/A	Minor clearing in tube	-	Associated with probable burial
26443	**Enclosure**	**100**	**Formally faced walls, paving**	**Tiers/internal alignments**	**-**

Site Number/ Feature	Formal Type	Floor Size (m^2)	Substantiveness	Internal Features	Other Functional Associations
26445	Modified Tumulus	20	Cleared	-	-
26446	Lava Tube	N/A	Minor construction & clearing in tube	-	-
26447	Lava Tube	N/A	Minor construction & clearing in tube	-	-
26448	Modified Tumulus	18	Cleared	-	-
26449	Lava Tube	N/A	Minor clearing in tube	-	-
26451	Modified Tumulus	N/A	Cleared	-	-

6.2.6.3 Single versus Multiple Components

The non-lava tube temporary habitation sites are comprised of 3 single-component sites and 2 multiple-structure sites. The multiple-structure sites (-26425 and -26430) contain non-habitation components (agriculture and/or burial). The two permanent habitation sites both contain only a single structure (one is an enclosure and one is a platform), but both structures contain multiple internal divisions (e.g., site -26443 is a series of adjacent enclosures on top of a single tumulus).

6.2.6.4 Distribution of Habitation Sites

The majority of the temporary habitation sites within the project area are located on the *pāhoehoe* flow on the east and southeast side of the project area. Both permanent habitation sites are located on or near the edge of the large *‘a‘ā* flow that dominates the project area. In terms of elevation, all of the habitation sites are located above approximately 500 ft a.m.s.l., and generally the sites are scattered across the eastern portion of the project area. It is notable that nearly all non-lava tube habitation features are located on a naturally elevated area (either tumuli, outcrops, or *‘a‘ā* edge).

6.2.7 Markers

There are various uses for markers, and they can vary considerably in form. Markers were used to identify survey points, as noted in Emerson’s field books. Fishing locations were marked by placing cairns so that when viewed from the ocean, they pointed towards a good fish or shellfish location. Cairns also likely marked other important locations, such as trails.

Two sites within the project area are considered to function primarily as markers, and one site functions in part as a marker. Sites -26436 and -26437 both contain cairns associated with animal husbandry, and are located near one another. These two cairns straddle a barbed wire fence.

Site -26426 is an historic datum which at one time had a tall wooden pole standing to mark the location, and may be related to the *ahupua‘a* wall (site 50-10-27-26414) that it is nearly adjacent to. The historic datum is located on a high tumulus and has an engraved “9” in sand-tempered cement as well as the “X” that marks the datum. No historic reference to this datum was found.

Another type of marker used in the project area occurs in lava tubes, most often associated with water collection. Site -26421, -26431, and -26452 all contain small rock piles inside the lava tube that appear to mark entrance/exit areas or give direction as to which tube should be followed.

Finally, trails often are marked in some way, sometimes with cairns (i.e., site -26415). Another type of marker used consistently for trails within the project area are marine aggregates, which are slabs of compressed sand and shell that occur naturally near the ocean, and which have been transported *mauka*, apparently to help delineate trails (see sites -26418, -26422, and -26433). Presumably the white of the slabs marked the trail well, even at night; it should be noted that at present these slabs are usually faded to grey due to long exposure.

6.2.8 Quarrying

One site in the project area (site -26429) appears to have been utilized as a quarry area for slabs, probably for use in a major nearby slab trail (site -26418). Mining activities do not appear to have been extensive, but the presence of a modified water-worn stone (large hammer-stone or possible "*ʻāina* basher"; see Results of Laboratory Analysis below) suggests recurrent use of the site. This type of "*ʻāina* basher" (fairly heavy water-worn stone) was likely used for a variety of functions, such as agriculture and construction of trails, in addition to lithic procurement; several other large (but unmodified) water-worn stones were found in the project area (see Table 8 above).

6.2.9 Transportation (Trails)

Seven trails were encountered during the inventory survey, one of which is associated with a larger site (Feature A of site -26435) and six of which are the single feature of a site (-26371, -26415, -26418, -26419, -26422, -26433). Five of the trails within the project area appear to be pre-contact in nature, while two (including site -26435 Feature A and site -26371) appear to be historic. Russell A. Apple (1965) provides classifications ("Types A through D") of Hawaiian trails based on architectural design, location and orientation. As a result of these classifications, it can be suggested what method of transportation (i.e. foot, horse or wheeled vehicle) was facilitated by the trail and thus during what time period the trail was in use. While Apple's typology has been critiqued in more recent years (see Mills 2002), the general categories are useful for discussion purposes.

Apple defines "Type A" trails as being pre-contact and early historic (prior to abolishment of the *kapu* system) "single-file foot trails" that follow the configuration of the shoreline and extend between the coast and upland localities (Apple 1965: Appendix 2). "Type A" trails were designed in accordance to the *kapu* system, for example: trails would not cross *ahupuaʻa* boundaries because the *kapu* system prohibited residents to go beyond their *ahupuaʻa* boundaries (but see also discussion in Mills 2002). Only one trail (encircling the perimeter of each island) crossed *ahupuaʻa* boundaries. This trail was used during the Makahiki festival for tax collection purposes (Apple 1965:25). Type AB trials are described as Type A trails modified with curb stones or slightly widened to accommodate horses. Type B trails were historically built trails made for travel with horses, usually located further inland to allow for straight line travel (not along immediate coastline). These would likely incorporate curbing and causeways (curbing most often consists of rocks placed along the trail edge to define its edges, and causeways are areas where a natural depression in the lava flow is built up to create a level surface with the rest of the trail). Type C and D trails are wider and straighter to accommodate two horses or wheeled vehicles, respectively. The trails within the project area all fall within the Type A, AB, and B classifications.

Two of the trails in the project area (-26418 and -26419) are solely stepping-stone trails and are considered to be Apple's Type A. These trails are usually less than a meter wide and would accommodate single-file foot travel. Site -26418 is an extremely formal stepping-stone trail (which also includes formal causeways), while -26419 is only a remnant *pāhoehoe* slab trail. One of the trails (site -26415) is a crushed *ʻaʻā* trail with cairns marking it. The relatively narrow size

of site -26415 suggests that it is pre-contact in nature even though it is not a stepping stone trail; it is wide enough only for single-file foot travel (consistent with Apple's Type A).

Three of the trails (-26422, -26433, and -26435A) incorporate both a crushed *‘a‘ā* technique of trail building as well as *pāhoehoe* slabs, and are generally about one meter wide. The variation in construction within the same trail (i.e., *pāhoehoe* slabs in addition to crushed *‘a‘ā* and curbing/causeways), suggests continued use of a single pathway over long periods of time, with an adjustment in the type of construction based on changing needs (i.e., the introduction of pack animals, carts, etc.), consistent with Apple's Type AB. It is notable that several of the above-mentioned trails incorporate marine aggregate (cemented sand) markers alongside the trail.

One trail (site -26371) is constructed using a crushed *‘a‘ā* technique and consistently utilizes formal curbing and causeways. The trail is associated with historic animal husbandry and is likely historic, consistent with Apple's Type B. The trail is over one meter wide and was likely constructed to accommodate travel by horse related to historic animal husbandry. Historic maps were searched for possible depictions of this trail, but no historic trails were found that match this route well. It is notable that the Emerson map (RM 1280; see Figure 8 in Section 3 of this report) shows a trail traversing over a distinct protrusion of the *‘a‘ā* flow that actually matches the shape of the same *‘a‘ā* flow within the current project area (the trail running *mauka-makai* from Kaloko fishpond). While Figure 8 clearly shows the trail on RM 1280 being outside the project area boundaries, this may be due to the inaccuracy of the orginal sketch. Overall, however, the fact that site -26371 does not currently appear to lead to a known destination (i.e., Kohanaiki Homesteads area) as the trail on RM 1280 does, suggests that these are not the same trail, and it is concluded that site -26371 is not present on any known historic map.

Especially of interest in the project area is the intersection of several trails near the modern Hina-Lani Street. This intersection (with the historic trail site -26371 overlapping the pre-contact style -26418 *pāhoehoe* slab trail) suggests recurrent use of this area, and the intersection is significant in that it clearly demonstrates the changing needs for trail use through time.

All of the identified sections of the trails in the project area cross over *‘a‘ā* lava terrain and are believed to be associated with localized travel over the large *‘a‘ā* flow that dominates the project area, as well as accessing project area-specific sites and/or features (i.e. agriculture, animal husbandry and habitation areas). The large number of trails within the project area reveal that the residents of Kaloko (both pre- and post-contact) had a significant network of travel routes that provided access to resources and exchange of resources over the *‘a‘ā*. The presence of several different types of trails as well as intersecting/overlapping trails suggests use of this area over various periods of time.

6.2.10 Water Collection

Six of the seventeen lava tubes in the project area were used in whole or in part for water collection (state sites -26420, -26421, -26431, -26439, -26441 and -26452). Two of these sites primarily function as temporary habitation, and one site (-26452) is also associated with several burials (all of these burials are located outside of the project area). Generally water catchment features consist of small to medium sized cobbles placed in rough circles or stacked against outcrops in tubes to create a stable area for some sort of container (gourds or carved wood) (Figure 161 and Figure 162). Two sites in the project area (site -26431 and -26452) have more

formal water collection features (Figure 163), which are often rectangular in shape and larger than the less obvious informal water catchments. Both of these sites have formally modified entrances which appear to constrict the tube entrances (probably for moisture retention) as well as making movement through the tube easier.

The story of Ko‘amokumokuohe‘eia and historic newspaper articles translated by Kepa Maly (see above Mythological and Traditional Accounts) suggest that water collection was very important in the Kekaha region, and the two formal water collection sites mentioned above appear to fit very closely with the type of activity described in these accounts. Differences in the size and formality of water collection features may be attributable to varying sizes of containers used, i.e., gourds versus carved trees.

Water catchment features within the project area are usually found in moist lava tubes (high humidity) that have water dripping from the ceiling, but are generally not found in lava tubes with excessively stale air (see site descriptions for -26420 and -26421). In more intensive water collection lava tubes, there is often charcoal associated with water collection features, which can sometimes be identified as charred *kukui* nut; the *kukui* nuts (also known as candle nut) were almost certainly used as a light source during collection of water vessels. Other associated features include small cairns in the lava tube, which appear to direct a person to tube exits.

Figure 161. Example of informal water catchment features, with rocks placed in rough circles

Figure 162. Example of informal water catchment features, with small circle of placed rocks in foreground, as well as several placed rocks on shelf at left and in background (1 m scale)

Figure 163. Example of formal water catchment features, with fairly large rectangular/oval rock circles on lava tube floor; also note visible charcoal concentrations (2 m scale)

6.3 Site Distribution

The distribution of sites, like the types and functions, correlate closely with expectations for the lower portion of the Upland Zone. The rough *‘a‘ā* that covers a large portion of the project area is largely devoid of sites; the majority of sites in this area are trails for traversing the *‘a‘ā*. Other sites types that tend to occur on the *‘a‘ā* are animal husbandry walls and concentrations of agricultural mounds on older (*mauka*) *‘a‘ā* flows. Two of the six confirmed burials within the project area are located on the *‘a‘ā*, both in small lava tubes on top of tumuli; one of these is nearly adjacent to a major trail. The other four confirmed burials and two probable burials are located within the *pāhoehoe* area, and all but one probable burial (site -26453) are inside lava tubes. Overall, concentrations of sites and features tend to occur on the *pāhoehoe* rather than the *‘a‘ā*, frequently at the end of trails that traverse the *‘a‘ā*. Especially notable is the location of a ceremonial enclosure (site -26424) very near the end of a long formal *pāhoehoe* slab trail (site -26418), and several larger sites just beyond this on the *pāhoehoe*.

As stated above, there is a clear preference of *pāhoehoe* terrain over *‘a‘ā* terrain in terms of site location. None of the habitation sites are located in the central area of the large *‘a‘ā* flow that dominates the project area, although a few are located either at the edge of the *‘a‘ā* flow (i.e., -26428), or on older eroding *‘a‘ā* flows in the far *mauka* end of the project area (i.e., -26443). Most habitation sites are located in relatively level areas of *pāhoehoe*, often inside lava tubes with entrances located on level *pāhoehoe*. All agricultural features are located either on *pāhoehoe* or on older *‘a‘ā* flows at the edge of the *pāhoehoe*/*‘a‘ā* boundary; the older eroded *‘a‘ā* flows apparently serve as excellent areas for planting mounds.

Nearly all sites are located in the eastern (*mauka*) portion of the project area, with sites also being higher in concentration near the south and far eastern borders of the project area. Within the east half of the project area, habitation and burial site location are apparently more dependent on the choice of a natural geological feature (i.e., lava tube or tumulus) for utilization than an elevational range variant specific to the project area. The most commonly utilized geological features are *pāhoehoe* tumuli and lava tubes. The advantage for habitation appears to be, in part, the raised or uplifted nature of the tumuli providing for better air circulation and view plane, while lava tubes provide protected shaded areas and the potential for water collection. The advantage for burials is that tumuli and lava tubes often have existing openings and protected areas that are relatively easy to conceal or seal once the human remains have been deposited.

6.4 Conclusions

In conclusion, the site/feature types and functions correlate with the anticipated finds for the region and zone within which the project area lies. Most habitation sites have been interpreted as temporary in nature, with two permanent habitation sites present in the *mauka* half of the project area. Burials, trails, and agricultural mound complexes are documented site types within the Intermediate and Upland Zone of the Kekaha region and are present within the project area. However, two sites within the project area, the impressive *pāhoehoe* slab trail (site -26418) and the ceremonial structure (site -26424) at its terminus, are perhaps more formal than sites typical of this area.

The majority of sites in the project area are presumed to be pre-contact, but there is a fair amount of historic and modern animal husbandry as well. Based on historic information, grazing by goats and cattle was the main form of land use during the historic to modern era, and the historic stone walls encountered in the project area were apparently for this purpose, in conjunction with modern barbed-wire fencing. Historic *mauka/makai* transportation through the *mauka* end of the project area was apparently facilitated by a horse trail (site -26371) that leads directly to a major historic animal husbandry wall. Extensive bulldozing within the project area, which impacts portions of nearly the entire *pāhoehoe* area, is likely associated with historic/modern animal husbandry, and has almost undoubtedly impacted pre-contact sites.

Section 7 Significance Assessments

7.1 Significance Assessments

A total of forty-one sites of varied archaeological significance are present in the project area. Individual site significance and recommended treatment are specified in Table 11. Sites were evaluated for significance according to the broad criteria established for the National and State Registers. The five criteria are:

A Site reflects major trends or events in the history of the state or nation.

B Site is associated with the lives of persons significant in our past.

C Site is an excellent example of a site type.

D Site may be likely to yield information important in prehistory or history.

E Site has cultural significance; probable religious structures (shrines, *heiau*) and/or burials present.

Of the total forty-one sites within the project area, thirty-one sites (75.6%) are considered solely to yield information important to prehistory and history (Criterion D). A total of ten sites within the project area meet multiple significance criteria, including the following: eight sites yield information important to prehistory and history (Criterion D) in combination with cultural significance due to burials or probable burials present (Criterion E); one site meets the multiple criterion of an excellent example of a site type (Criterion C) and likely to yield information important in prehistory or history (Criterion D); and one site meets the multiple criterion of an excellent example of a site type (Criterion C), likely to yield information important in prehistory or history (Criterion D), and cultural significance due to a probable religious structures present (Criterion E). It is notable that site -26452 falls under Criterion E because the lava tube is currently the sole access to several confirmed burials, all of which are located well outside the bounds of the project area.

Significance criterion C - "site is an excellent example of a site type" is assigned to two sites in the project area (sites -26418 and -26424). These sites represent the best examples of structural and functional archaeological components within the project area (site -26418 represents an excellent example of a *pāhoehoe* slab trail, and Site -26424 represents the best example of an intact ceremonial structure). These sites were also the most excellent structural sites (i.e. best condition and architecture) within the project area.

Significance criterion D - "site may be likely to yield information important in prehistory and history" is assigned to all 41 sites in the project area. All of these sites provide important information to the settlement patterns and livelihood of the Kaloko residents (by the site’s plotted location, and structural and functional nature), and some of these sites may provide more detailed archaeological data through future excavations or other additional documentation.

Significance criterion E - "site has cultural significance; probable religious structures...and burials" - is given to nine sites in the project area. These sites include all of the confirmed and probable burials encountered and one probable religious structure within the project area.

Table 11. Significance Assessments and Mitigation Recommendations of Historic Properties within Project Area

SIHP # 50-10-27-/ 50-10-28-	Feature	Site Type	Function	Significance	Age	Mitigation Recommendation
26371	-	Trail	Transportation	D	Historic	Preserve
26414	-	Wall	Animal Husbandry	D	Historic	Preserve
26415	-	Trail	Transportation	D	Pre-contact	No Further Work
26416	A	Lava tube	Burial	D, E	Pre-contact	Preserve
	B	Mod. Depression	Activity Area	D, E	Pre-contact	Preserve
26417	A	Mound	Agriculture	D	Pre-contact	No Further Work
	B	Mound	Agriculture	D	Pre-contact	No Further Work
	C	Mound	Agriculture	D	Pre-contact	No Further Work
	D	Mound	Agriculture	D	Pre-contact	No Further Work
	E	Other (clearing)	Agriculture	D	Pre-contact	No Further Work
	F	Other (clearing)	Agriculture	D	Pre-contact	No Further Work
26418	-	Trail	Transportation	C, D	Pre-contact	Preserve
26419	-	Trail	Transportation	D	Pre-contact	No Further Work
26420	-	Lava tube	Activity Area	D	Pre-contact	No Further Work
26421	-	Lava tube	Temporary Habitation	D	Pre-contact	No Further Work
26422	-	Trail	Transportation	D	Pre-contact	No Further Work
26423	A	Lava tube	Burial	D, E	Pre-contact	Preserve
	B	Mod. Tumulus	Activity Area	D, E	Pre-contact	Preserve
26424	-	Enclosure	Ceremonial	C, D, E	Pre-contact	Preserve
26425	A	Lava tube	Temporary Habitation	D, E	Pre-contact	Data Recovery
	B	Mod. Tumulus	Temporary Habitation	D, E	Pre-contact	Data Recovery
	C	Terrace	Temporary Habitation	D, E	Pre-contact	Data Recovery
	D	Lava tube	Burial	D, E	Pre-contact	Preserve
26426	-	Mod. Tumulus	Marker	D	Historic	No Further Work
26427	-	Lava tube	Burial	D, E	Pre-contact	Preserve
26428	-	Platform	Permanent Habitation	D	Pre-contact	Data Recovery
26429	-	Mod. Tumulus	Activity Area	D	Pre-contact	No Further Work

SIHP # 50-10-27-/ 50-10-28-	Feature	Site Type	Function	Significance	Age	Mitigation Recommendation
26430	A	Mod. Tumulus	Temporary Habitation	D	Pre-contact	Data Recovery
	B	Terrace	Temporary Habitation	D	Pre-contact	Data Recovery
	C	Platform	Temporary Habitation	D	Pre-contact	No Further Work
	D	Mod. Tumulus	Temporary Habitation	D	Pre-contact	No Further Work
26431	A	Lava tube	Activity Area	D	Pre-contact	Data Recovery
	B	Complex	Agriculture	D	Pre-contact	No Further Work
26432	-	Wall	Animal Husbandry	D	Historic	No Further Work
26433	-	Trail	Transportation	D	Pre-contact	No Further Work
26434	-	Lava tube	Temporary Habitation	D	Pre-contact	Data Recovery
26435	-	Wall	Animal Husbandry	D	Historic	No Further Work
	A	Trail	Transportation	D	Historic	No Further Work
	B	Complex	Animal Husbandry	D	Historic	No Further Work
26436	A	Wall	Animal Husbandry	D	Historic	No Further Work
	B	Cairn	Marker	D	Historic	No Further Work
26437	-	Cairn	Marker	D	Historic	No Further Work
26438	-	Lava tube	Burial	D, E	Pre-contact	Preserve/Data Recovery
26439	-	Lava tube	Temporary Habitation	D	Pre-contact	Data Recovery
26440*	A	Terrace	Temporary Habitation	D, E	Pre-contact	Preserve
	B	Lava tube	Burial	D, E	Pre-contact	Preserve
26441	-	Lava tube	Activity Area	D	Pre-contact	No Further Work
26442	-	Wall	Animal Husbandry	D	Historic	No Further Work
26443	-	Enclosure	Permanent Habitation	D	Pre-contact	Preserve
26444	-	Wall	Animal Husbandry	D	Historic	No Further Work
26445	-	Mod. Tumulus	Temporary Habitation	D	Pre-contact	Data Recovery
26446	-	Lava tube	Temporary Habitation	D	Pre-contact	Data Recovery
26447	-	Lava tube	Temporary Habitation	D	Pre-contact	No Further Work
26448	-	Mod. Tumulus	Temporary Habitation	D	Pre-contact	No Further Work
26449	-	Lava tube	Temporary Habitation	D	Pre-contact	Data Recovery

SIHP # 50-10-27-/ 50-10-28-	Feature	Site Type	Function	Significance	Age	Mitigation Recommendation
26450	-	Wall	Animal Husbandry	D	Historic	No Further Work
26451	-	Mod. Tumulus	Temporary Habitation	D	Pre-contact	No Further Work
26452	-	Lava tube	Activity Area and Burial	D, E	Pre-contact	Preserve/Data Recovery
26453*	A	Platform	Permanent Habitation	D, E	Pre-contact	Preserve
	B	Platform	Permanent Habitation	D, E	Pre-contact	Preserve
	C	Platform	Permanent Habitation	D, E	Pre-contact	Preserve

* Site is a probable burial

Section 8 Project Effect and Mitigation Recommendations

8.1 Project Effect

The proposed project will affect historic properties recommended eligible to the Hawai‘i Register. CSH’s project specific effect recommendation is “effect, with agreed upon mitigation measures.”

8.2 Mitigation Recommendations

It is recommended that of the forty-one (41) sites in the project area, a total of eleven (11) sites be subjected to a program of data recovery to address scientific and informational concerns and a total of thirteen (13) sites be preserved (Figure 164, Table 12, Table 13). Three (3) sites are recommended for both data recovery and preservation.

The remaining twenty (20) sites are not recommended to undergo further research, because it has been determined that these sites lack cultural or scientific significance beyond the documentation and plotting of location completed during the inventory survey. These sites are classified under Criterion D significance only and are generally characterized by sites in poor structural condition, or sites such as minimally modified lava tubes, trail remnants, agricultural features, or animal husbandry walls that lack excavation potential. Thus, the sites which are not recommended for further archaeological research are now no longer considered significant.

As mentioned above, three sites (-26425, -26438, and -26452) are recommended for both preservation and data recovery. Both sites -26430 and -26431 have features recommended for no further work as well as data recovery.

8.2.1 Data Recovery

A total of eleven (11) sites are slated for data recovery in whole or in part. Table 12 lists these sites and briefly discusses data recovery potential. These sites should be subjected to further documentation and, if feasible, excavation to address scientific and information interests. Data recovery should proceed in accordance with a data recovery plan that is to be submitted to DLNR State Historic Preservation Division for review and approval.

The sites selected for data recovery include a variety of site and function types attributable to traditional Hawaiian use. Functional types include habitation (temporary and permanent) and activity areas (water collection in lava tubes). Three of these sites are associated with burials (-26425, -26438, and -26452), but the burial is located in a separate area of the lava tube.

Data Recovery - Potential Research Topics

(1) Chronology of traditional Hawaiian settlement and land use in Kaloko *ahupua‘a* and expansion into the intermediate and upland zone. External correlations: compare with other Hawaii Islands or Kona-specific "cultural sequence" models (e.g., Schilt 1984; Kirch 1985; and Cordy et al. 1991).

(2) Function analysis of site/feature types and relationship of feature components in sites, with a focus on temporary habitation research and the utilization of lava tubes for

water collection. External correlation: compare with other temporary habitation models (e.g. Cordy et al. 1991; Mitchell and Kolb 1992; and Hammatt et al. 1995).

(3) Socio-political rank of Kaloko and Kohanaiki occupants in the intermediate and upland zone. Hypothesis could be based on size, nature and architecture of the sites, and type of material remains. External correlations: compare with Dr. Ross Cordy's model of social rank determinants in coastal Kaloko and Honokōhau I and II *ahupua‘a*.

8.2.2 Site Preservation

There are a total of thirteen (13) sites in the project area that are recommended for preservation in whole or in part. Table 13 lists these sites and gives brief comments about preservation recommendations. Eight (8) of these sites are recommended for preservation based on the presence of a burial (confirmed or probable) and/or association with a burial (including site -26452 burials that are outside the project area, but are presently accessible only via an entrance within the project area; this site is also considered for preservation as an excellent site type displaying a variety of formal and informal water collection features and modifications). Two (2) of the preserve sites are major intact trail systems (site -26371 and -26418) that run for over 500 meters each. The site -26371 trail (which is in poor condition in some places) is recommended for preservation only in part, with the section that intersects site -26418 of particular interest for preservation (see Figure 164). Site -26418 is largely in very good condition and is recommended for preservation with certain breaches allowable in the course of the preservation of the trail. One (1) preserve site is a formal enclosure that is likely ceremonial in function (probable *heiau*), and is spatially associated with site -26418. One (1) preserve site is a series of formal enclosures on top of a high tumulus that is a good example of permanent habitation. Finally, one (1) preserve site is the *ahupua‘a* wall that runs *mauka*/*makai* between Kaloko and Honokōhau *ahupua‘a* on the south edge of the project area, and is recommended for preservation with breaches allowable.

8.3 Disposition of Materials

The complete collection of artifacts associated with this archaeological inventory survey was collected from private lands; accordingly, this material belongs to the landowner. The artifacts associated with this archaeological inventory survey will be temporarily housed at a CSH storage facility. CSH will make arrangements with the landowner regarding the disposition of the project’s collection. Should the landowner request archiving of material, then the archive location will be determined in consultation with SHPD.

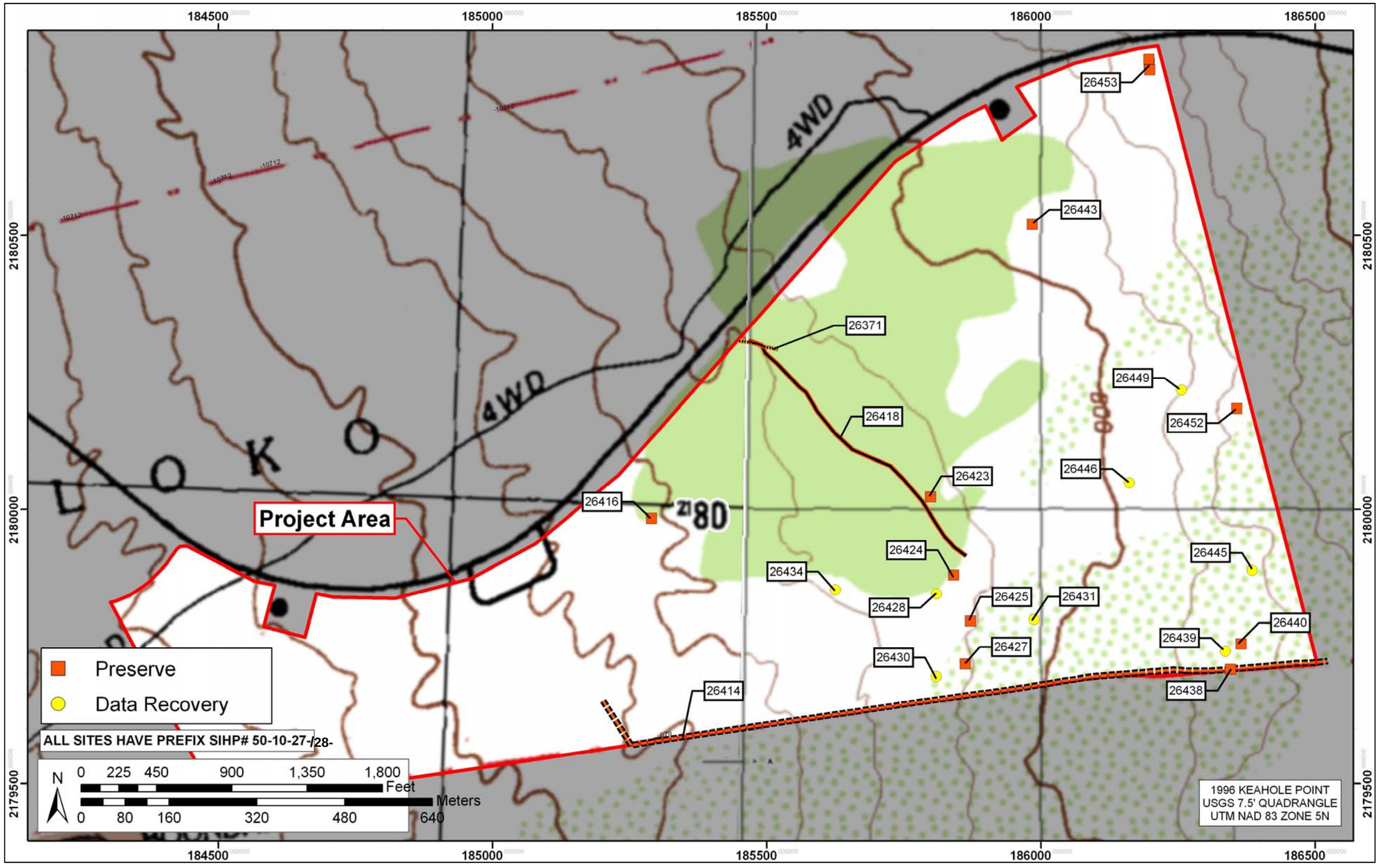

Figure 164. Project Area Data Recovery and Preservation Map, USGS 7.5 Minute Series Topographic Map, Keahole Point and Kailua Quadrangles (1996), showing the locations of historic properties recommended for data recovery and preservation

Table 12. Historic Properties Recommended for Data Recovery

SIHP# 50-10-28	Feature	Site Type	Function	Significance	Age	Comments
26425	A	Lava tube	Temporary Habitation	D, E	Pre-Contact	Lava tube contains soil deposit and midden, charcoal, artifacts
	B	Modified outcrop	Temporary Habitation	D, E	Pre-Contact	Habitation area on tumulus, some excavation potential
	C	Terrace	Temporary Habitation	D, E	Pre-Contact	Habitation terrace with constructed stone hearth, good excavation potential
26428	-	Platform	Permanent Habitation	D	Pre-Contact	Habitation platform with excavation potential for midden/charcoal recovery
26430	A	Modified tumulus	Temporary Habitation	D	Pre-Contact	Modified tumulus with excavation potential for midden/charcoal recovery
	B	Terrace	Temporary Habitation	D	Pre-Contact	Terrace with some excavation potential
26431	A	Lava tube	Activity Area	D	Pre-Contact	Data recovery should focus on dating water collection features
26434	-	Lava tube	Temporary Habitation	D	Pre-Contact	Small shelter with fair amount of midden and fairly deep soil deposit
26438	-	Lava tube	Burial/Temp. Habitation	D, E	Pre-Contact	Tube 2 has soil and midden/charcoal (Tube 1 is listed for preservation)
26439	-	Lava tube	Temporary Habitation	D	Pre-Contact	Lava tube habitation area with midden and fairly deep ashy soil deposit
26445	-	Modified outcrop	Temporary Habitation	D	Pre-Contact	Modified tumulus with excavation potential for midden/charcoal recovery
26446	-	Lava tube	Temporary Habitation	D	Pre-Contact	Small shelter with large amount of midden and fairly deep soil deposit
26449	-	Lava tube	Temporary Habitation	D	Pre-Contact	Small shelter with some midden (including fish bone) and ashy soil
26452	-	Lava tube	Activity Area/ Burial	D, E	Pre-Contact	Collection of charcoal associated with formal water collection, collection of midden and avifaunal material

Table 13. Historic Properties Recommended for Preservation

SIHP # 50-10-27/ 50-10-28-	Feature	Site Type	Function	Significance	Age	Comments
26371	-	Trail	Transportation	D	Historic	Major historic trail
26414	-	Wall	Animal Husbandry	D	Historic	Long, intact wall; preserve with breaches allowable
26416	A	Lava Tube	Burial	D, E	Pre-Contact	Lava tube contains CSH Burial 3
	B	Modified Depression	Activity Area	D, E	Pre-Contact	Associated with CSH Burial 3
26418	-	Trail	Transportation	C, D	Pre-Contact	Major pre-contact *pāhoehoe* slab trail that runs over 600 meters
26423	A	Lava tube	Burial	D, E	Pre-Contact	Lava tube contains CSH Burial 56
	B	Modified Outcrop	Activity Area	D, E	Pre-Contact	Associated with CSH Burial 56
26424	-	Enclosure	Ceremonial	C, D, E	Pre-Contact	Formal enclosure with placed coral head inside, probable *heiau*
26425	D	Lava Tube	Burial	D, E	Pre-Contact	Lava tube contains CSH Burial 58
26427	-	Lava Tube	Burial	D, E	Pre-Contact	Lava tube contains CSH Burial 57
26438	-	Lava Tube	Burial/Temp. Habitation	D, E	Pre-Contact	Tube 1 contains CSH Burial 64
26440	A	Terrace	Temporary Habitation	D, E	Pre-Contact	Associated with probable burial
	B	Lava Tube	Burial	D, E	Pre-Contact	Probable burial in constructed area
26443	-	Enclosure	Permanent Habitation	D	Pre-Contact	Series of formal enclosures on tumulus
26452	-	Lava Tube	Activity Area/ Burial	D, E	Pre-Contact	Major water collection tube, continues to resources outside present project area
26453	A	Platform	Burial	D, E	Pre-Contact	Large probable burial platform
	B	Platform	Burial	D, E	Pre-Contact	Platform remnant, probable burial
	C	Platform	Burial	D, E	Pre-Contact	Large probable burial platform

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