943-041714

DRAFT

ARCHAEOLOGICAL INVENTORY SURVEY

KALANI HONUA RETREAT



KE'EKE'E AHUPUA'A, PUNA DISTRICT

ISLAND OF HAWAI'I

TMK: (3) 1-2-09:028, 029 AND 036

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MANAGEMENT SUMMARY

At the request of Mr. Richard Koob on behalf of Kalani Honua, Inc., Haun & Associates conducted an Archaeological Inventory Survey (AIS) of the 120.02 acre Kalani Honua Retreat located in Keʻekeʻe Ahupuaʻa, Puna District, Island of Hawaiʻi (TMK (3) 1-2-09:028, 029 and 036). Although previous archaeological surveys of the property were conducted, a recent Department of Land and Natural resources-State Historic preservation Division (DLNR-SHPD) site visit identified previously undocumented features and recommended that an updated AIS be conducted for Parcel 29. It was further recommended that Parcels 28 and 36 also be included in the AIS.

Archaeological surveys of the property have identified a total of 20 sites with 608 features. The 20 sites consist of 11 single feature sites and 9 feature complexes. Formal feature types include 449 mounds, 54 modified outcrops, 24 platforms, 21 walls, 18 enclosures, 17 terraces, 6 walkways, 5 modified depressions, 3 lava tubes, 3 modified gullies, 3 soil swales, 2 pits, 1 C-shape, 1 U-shape and 1 lava blister. Feature function includes agriculture (558 features), burial (25), permanent habitation (10), temporary habitation (5), animal husbandry/agriculture (5), ceremonial (3), school (1) and livestock control (1). Three sites and 72 features of a fourth site could not be relocated and likely were destroyed because they were situated in areas that are developed.

All of the sites are assessed as significant for their information content. An historic cemetery and the site of the former Kamaʻili School are additionally assessed as significant as excellent site type examples. Three of the sites are also assessed as significant for their cultural value to the Hawaiian people. These consist of the cemetery, a named *heiau* (Puʻulena Heiau), and a newly discovered burial site. These sites are recommended for preservation. The cemetery and the *heiau* already have DLNR-SHPD accepted preservation plans. The specific plan for the preservation and maintenance of the newly discovered burial would be detailed in a Burial Treatment Plan prepared for DLNR-SHPD and the Hawaii Island Burial Council (HIBC) review and approval. Measures to protect the former Kamaʻili School would be described in a Site Preservation Plan prepared for DLNR-SHPD review and approval.

One site, a wall along the seaward boundary of the project area is adequately documented and no further work or preservation is recommended. The 12 remaining sites retain the potential to yield information important for understanding prehistoric and early historic land use. These sites could be mitigated through data recovery; however, the landowner has agreed to preserve 11 of these sites and the majority of the 12th site in 11 preserves. The preservation treatment of these sites would be detailed in the Site Preservation Plan mentioned above.

These preservation areas include the four sites recommended for preservation above, the 11 sites that the landowner has agreed to preserve, and 260 (53%) of the 486 agricultural features of the Site 30037 complex. The remaining 226 agricultural features of Site 30037 are situated outside the boundaries of the preservation areas and are recommended for no further work. The preservation areas will be are surrounded by 20 foot buffers and in aggregate will encompass 63,888 sq meters or 15.79 acres (13.1 %) of the retreat's property.

***Cover photo: Site 21143, Feature A heiau,* view to south**

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INTRODUCTION

At the request of Mr. Richard Koob on behalf of Kalani Honua, Inc., Haun & Associates conducted an Archaeological Inventory Survey (AIS) of the 120.02 acre Kalani Honua Retreat located in Keʻekeʻe Ahupuaʻa, Puna District, Island of Hawaiʻi (TMK (3) 1-2-09:028, 029 and 036 – **Figures 1** and **2**). The objective of the AIS was to satisfy current historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawaii Administrative Rules, Title 13, DLNR, Subtitle 13, Chapters 276 and 284, State Historic Preservation Rules (DLNR 2003).

TMK: (3) 1-2-09:029 was previously surveyed by Latinis *et al.* (1997); however, during an April 30, 2013 site visit by DLNR-SHPD staff archaeologist Sean Nāleimaile and Burial Sites Specialist Kauanoe Hoʻomanawanui numerous undocumented mounds and a modified lava outcrop were identified in parcel 029. The Division subsequently recommended that an updated AIS be conducted of Parcel 29 based on the site visit. It was further recommended that Parcels 28 and 36 be included in the AIS. These recommendations were transmitted in a May 7, 2013 letter from Archaeology Branch Chief Theresa Donham to Mr. Richard Koob (Log No. 2013.2880, Doc. No. 1305SN01; **Appendix A**).

The AIS fieldwork was conducted by a crew of two to five archaeologists between November 22 and January 10, 2014, under the direction of Haun & Associates Principal Archaeologist Dr. Alan Haun. The field work portion of the project required 62 person days to complete. This report presents the project scope of work, field methods, background information, survey findings, and site significance assessments with treatment recommendations.

Scope of Work

Based on DLNR-SHPD rules for inventory surveys the following specific tasks were determined to constitute an appropriate scope of work for the project:

1. Conduct background review and research of existing archaeological and historical documentary literature relating to the project area and its immediate vicinity--including examination of Land Commission Awards, *ahupuaʻa* records, historic maps, archival materials, archaeological reports, and other historical sources;
2. Conduct 100% pedestrian survey coverage of the project area;
3. Conduct detailed recording of all potentially significant sites including scale plan drawings, written descriptions, and photographs, as appropriate;
4. Conduct limited subsurface testing (manual excavation) at selected sites as necessary to determine feature function;
5. Analyze background research and field data; and
6. Prepare and submit Final Report.

Project Area Description

The project area is an irregularly-shaped parcel located in coastal Keʻekeʻe between approximately 40 ft and 160 ft elevation. The project area includes the 19.0 acre Parcel 28, the 94.69 acre Parcel 29 and the 6.33 acre Parcel 36 (see **Figure 2**). Parcels 37, 38 and 42 separate the main portion of the project area from a narrow access easement situated along the northeast side.



Figure 1. Portion of 1994 USGS 7.5' Pahoa South Quadrangle showing project area

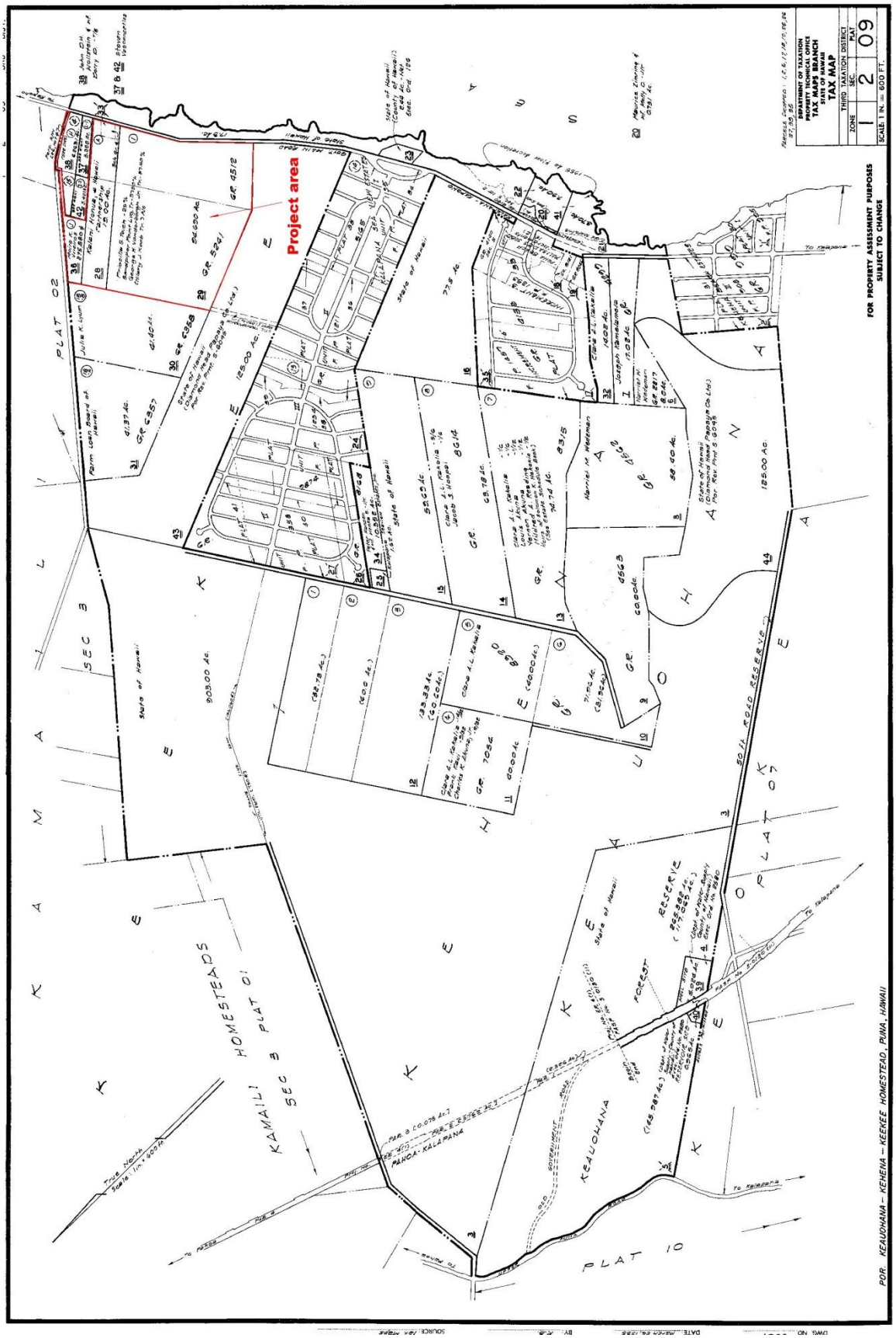


Figure 2. Tax Map Key 1-2-09 showing project area

Large portions of the project area are occup[ied by the Kalani Honua retreat buildings and infrastructure. **Figure 3** depicts the locations of the various retreat buildings and faciltiies. **Figure 4** is a Google Earth aerial photograph of the project area taken on January 1, 2014. This photograph depicts the extent of the retreat and areas where the forest vegetation has been cleared.

Figure 5 complies the landuse information from **Figures 3** and **4** with observations made during the field work. This figure shows the extent of cleared areas and the locations of existing structures, roads, and infrastructure facilites. **Figure 5** indicates that approximately 57% (68.2 acres) of the project area has been altered by the construction and use of the retreat. The remaining 43% (51.8 acres) appears to be undeveloped land.

The project area terrain slopes gently in a southeasterly direction towards to the ocean. There are two soil types in the project area (**Figure 6**). The majority of the area (92.4-acres, 77%) is a'a lava and the remainder (27.6-acres, 23%) is Malama extremely stony muck (3-15% slopes; Sato *et al.* 1973:34). A'a lava has "practically no soil covering and is bare of vegetation, except for lichens, ferns and a few small ohia trees" (*ibid.* :34). According to Sato *et al. (*1973), this soil type is classified as suitable only for watershed and not for cultivation .

The Malama extremely stony muck soil characterized by 3 inch layer of very dark brown extremely stony muck over fragmented a'a lava (*ibid.* 1973:37). This soil type has a rapid permeability, a slow runoff and a slight erozion hazard and is classified as suitable for woodlands, pasture and orchards.

There are two lava flows in the project area. The **Figure 1** USGS quadrangle map depicts a finger of a 1955 lava flow in the southwest corner of the project area. A 2001 Geologic Map of the Island of Hawaii (**Figure 7**) indicates that there are two lava flows in the project area (Wolfe and Morris 2001:Sheet 2). The majority of the area (89%, 106.8 acres) is a lava flow derived from Kiluaea Volcano 400-750 years ago (*ibid* 2001:10). The remaining 11% (13.2 acres) roughly corresponds to the 1955 flow depicted on **Figure 1**. Although Wolf and Morris classify this area as a Kiluaea flow dating to 750-1500 years ago, inspection of this area during the present project reveals that it is a bare lava flow that likely corresponds to the recent 1955 flow (**Figure 8**).

A variety of plant species were identified throughout the project area. Large portions of the area are dominated by strawberry guava (*Psidium cattleianum*). Dense *hala* (*Pandanus tectorius*) groves are also present. Other species consist of banyan (*Ficus benghalensis*), century plant (*Agave americana*), Christmas berry (*Schinus terebinthifolius*), coconut palm (*Cocos nucifera*), java plum (*Syzygium cumini*), kamani (*Calophyllum inophyllum*) *laua'e* fern, mango (*Mangifera indica*), monkeypod (*Pithecellobium saman*), *noni* (*Morinda citrifolia*) *ohia* (*Metrosideros polymorpha*), *ti* (*Cordyline fruticosa*) and trumpet tree (*Cecropia obtusifolia*). Examples of the project area vegetation are presented in **Figures 9** and **10**.

Methods

The project area was examined by a 100% pedestrian survey with the surveyors spaced 7-10 m apart. Ground surface visibility throughout the parcel was fair to good. The identified sites were subjected to detailed recording consisting of mapping, preparing standardized site and feature forms, and photographic documentation. Archaeological features were flagged with pink and blue flagging tape and their locations geo-referenced with the assistance of a Garmin Global Positioning System (GPS) Model 60-series device using the NAD 83 datum. The accuracy of the GPS device for a single point is +/- 3–5 meters. This accuracy is increased to approximately 2–3 meters by recording multiple geo-reference points, including property corners and overlying the plotted points on a scaled map using AutoCAD software.

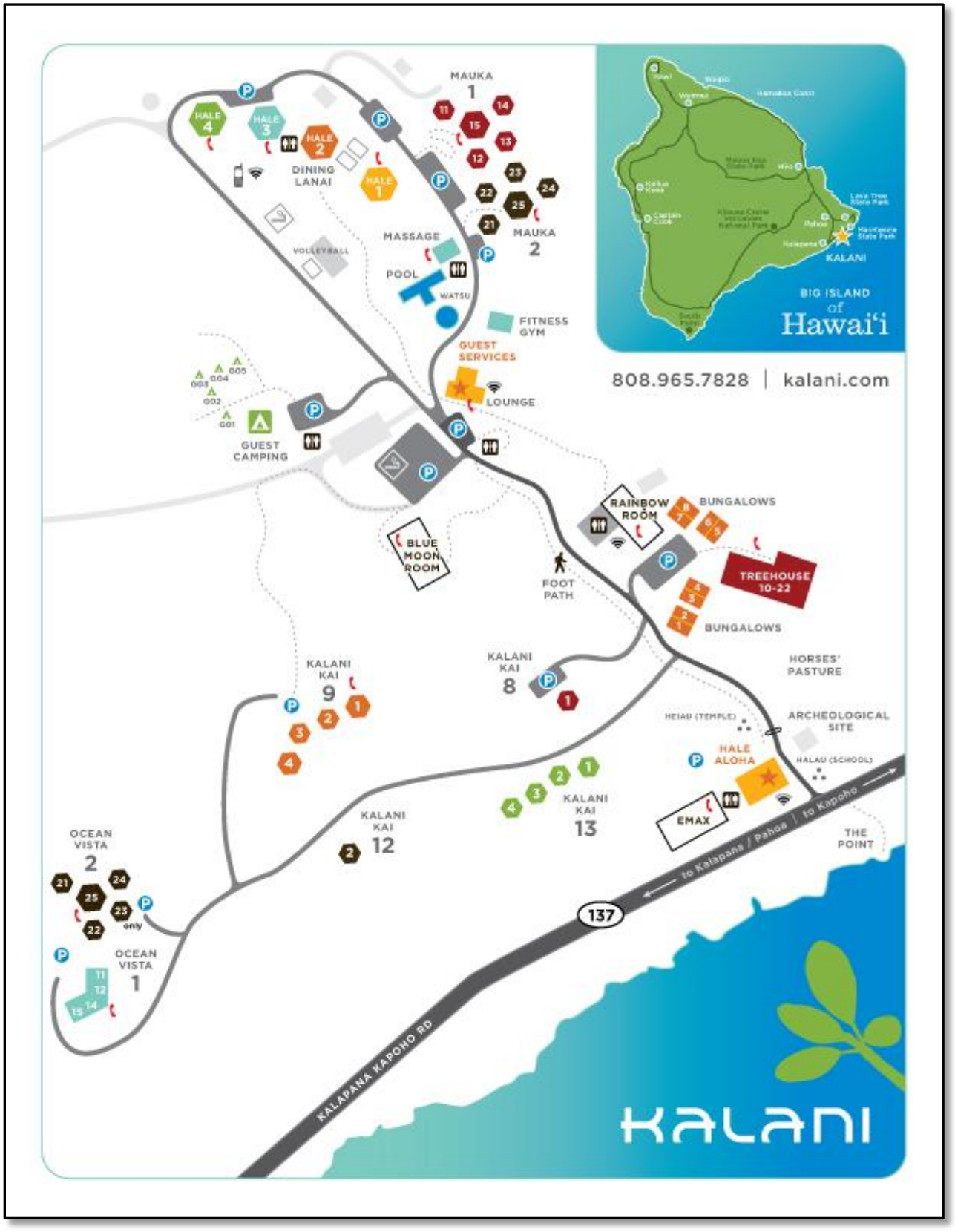


Figure 3. Map of Kalani Honua Retreat



Figure 4. Aerial view of project area (from Google Earth)

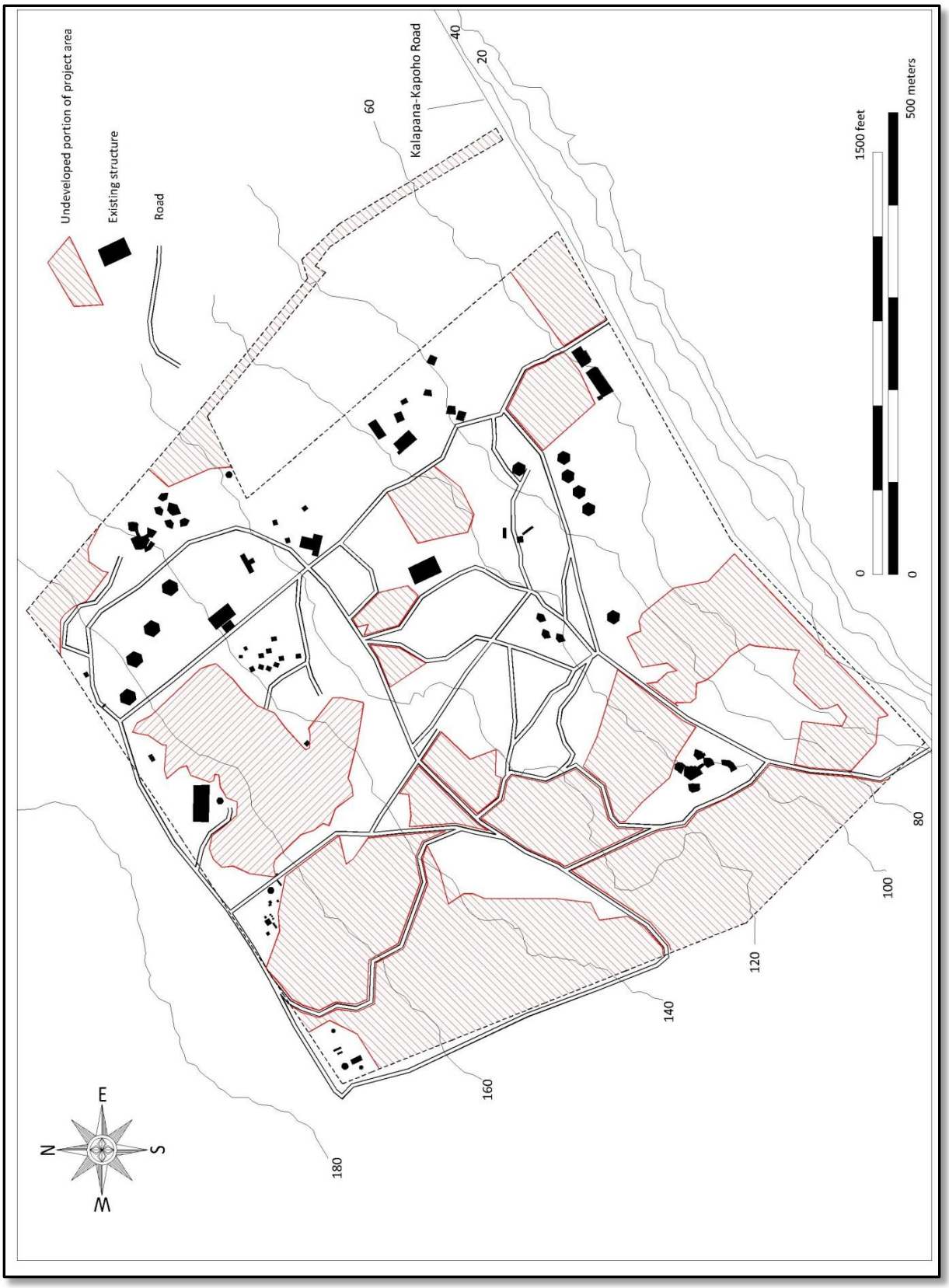


Figure 5. Extent of disturbance within project area

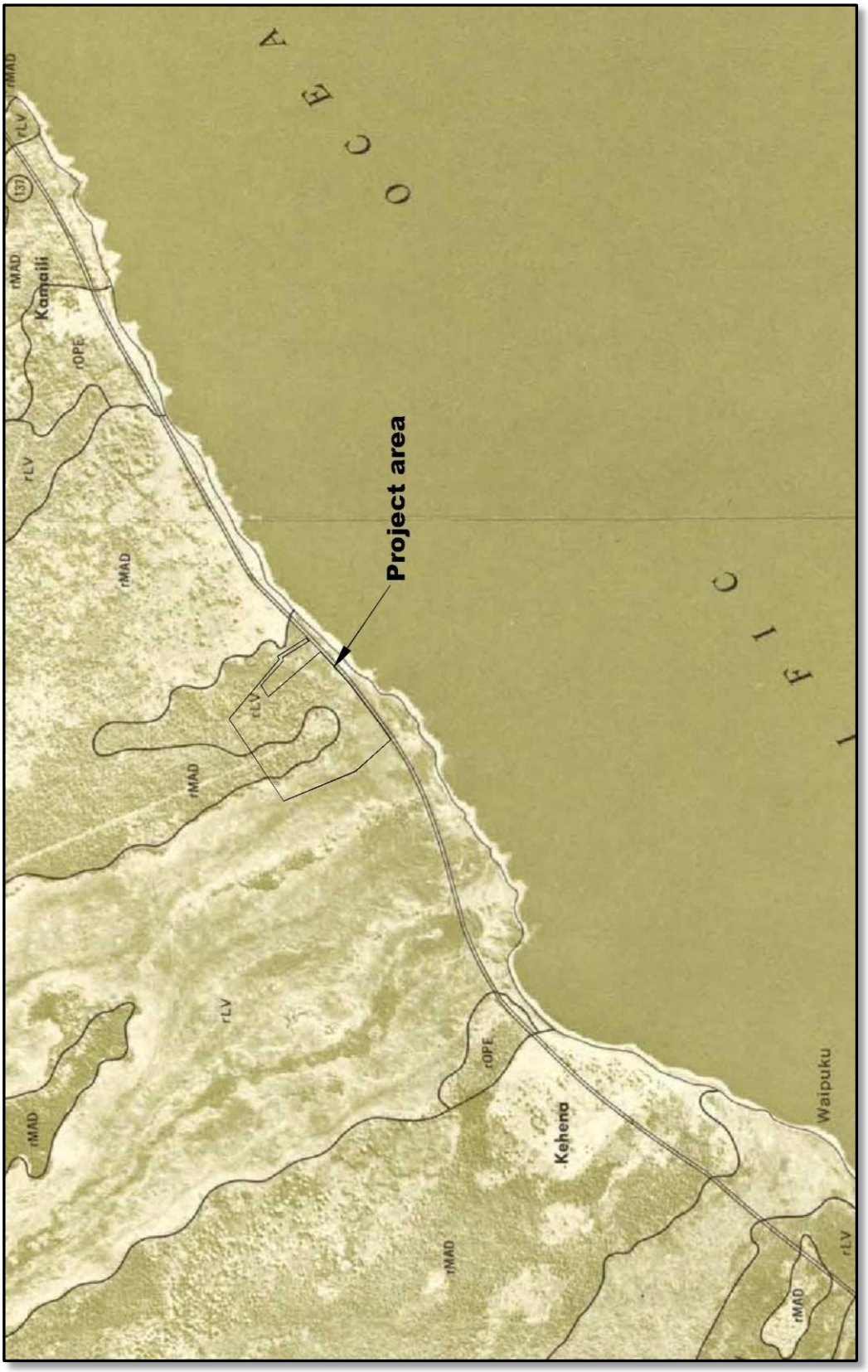


Figure 6. Soils within project area (from Sato *et al.* 1973:Sheet 147)

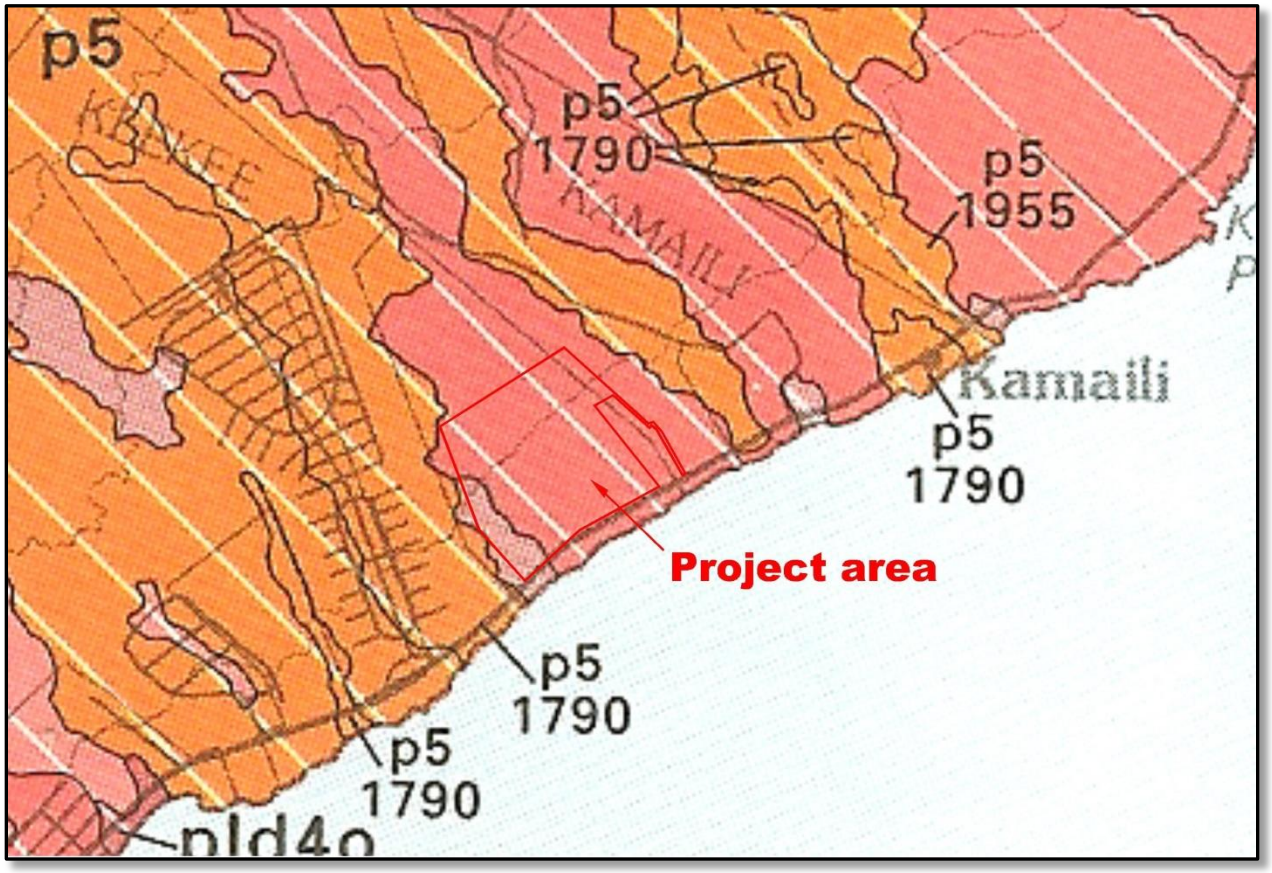


Figure 7. Lava flows within project area (from Wolfe and Morris 2001:Sheet2)



Figure 8. Lava flow within project area, view to east



Figure 9. Project area vegetation, view to north



Figure 10. Project area vegetation, view to north

Subsurface testing was conducted in 13 features, yielding a total of 8.08 sq meters of excavation. The test excavations were conducted at six permanent habitation features, one burial feature, one temporary habitation feature and six agricultural features (Site 30037, Features NW, NX, QR, RA and RK).

The test units were excavated in arbitrary levels within stratigraphic layers and were terminated either on bedrock or upon the identification of human remains. Standardized excavation records were prepared after the completion of each stratigraphic layer. The soil removed during excavation was screened through ¼ "mesh. Portable remains collected were placed in paper bags labeled with the appropriate provenience information. Charcoal samples were deposited in aluminum foil pouches and placed in properly labeled paper bags. Following the excavation, a section drawing depicting the stratigraphy was prepared and post-excavation photographs were taken. Recovered cultural remains were transported to Haun & Associates' office for analysis.

Human remains were identified during subsurface testing at Site 30025, a lava blister. Upon identification of the human remains, the excavation was terminated and the unit was backfilled.

The laboratory methods included qualitative and quantitative analysis of recovered artifacts and food remains. Artifacts were analyzed to determine morphological type, condition, degree of completion and material. Standard typological classifications were used for all artifacts. Food remains were identified to the family level, or to the genus and species level when possible. Quantitative analysis included determining total weight and total number of fragments (TNF) per taxon.

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Historical Documentary Research

The project area is situated in the *ahupua'a* of Ke'eke'e in Puna District (**Figure 11**). There is little mention of Ke'eke'e in Hawaiian traditional and legendary accounts. Crozier and Barrere (1971) note that in Puna few pre-missionary traditions and legends survived because of intensive mission work by Reverend Titus Coan between 1835 and the 1870s. Emory *et al*. (1959) suggest that Puna's traditional history is difficult to follow because of the dominating influence of the ruling families in the neighboring districts of Hilo and Ka'u. Handy and Handy (1972:542) state that Hawaiian traditions suggest that Puna "was once Hawaii's richest agricultural region and that it is only in relatively recent time that volcanic eruption has destroyed much of its best land".

According to Kamakau (1961), Hua'a was the chief of Puna when it was seized by 'Umi-a-Liloa, unifying his control over the Island of Hawai'i. Hua'a was killed during a battle with one of 'Umi's warrior sons, Pi'i-mai-wa'a, at Kuolo in Kea'au. Kalani`opu`u unified his control over Hawaii Island when he gained control of Ka'u and Puna following Alapa'i's defeat in a battle at Mahinaakaka. During Kalani`opu`u's rule, the Puna chief, I-maka-koloa, attempted a rebellion and seized the valuable products of the district including *'o'o* and *mamo* bird features, hogs, fine mats made from pandanus blossoms and from young pandanus leaves, gray tapa cloth, and tapa cloth made from *mamaki* bark.

Following the death of Kalani`opu`u, in 1782, a dispute over ascendancy ensued culminating in the battle of Moku'ohai (Kamakau 1961, Kuykendall 1938). Following the battle, control over the island was divided between Keoua Ku'ahulu'ula, who held Ka'u and a portion of Puna; Keawema'uhili, who controlled the remainder of Puna, Hilo, and southern Hamakua; and Kamehameha, who controlled northern Hamakua, Kohala, and Kona. A feud between Keoua and Keawema'uhili in 1785 resulted in Keawema'uhili's death and the expansion of Keoua's

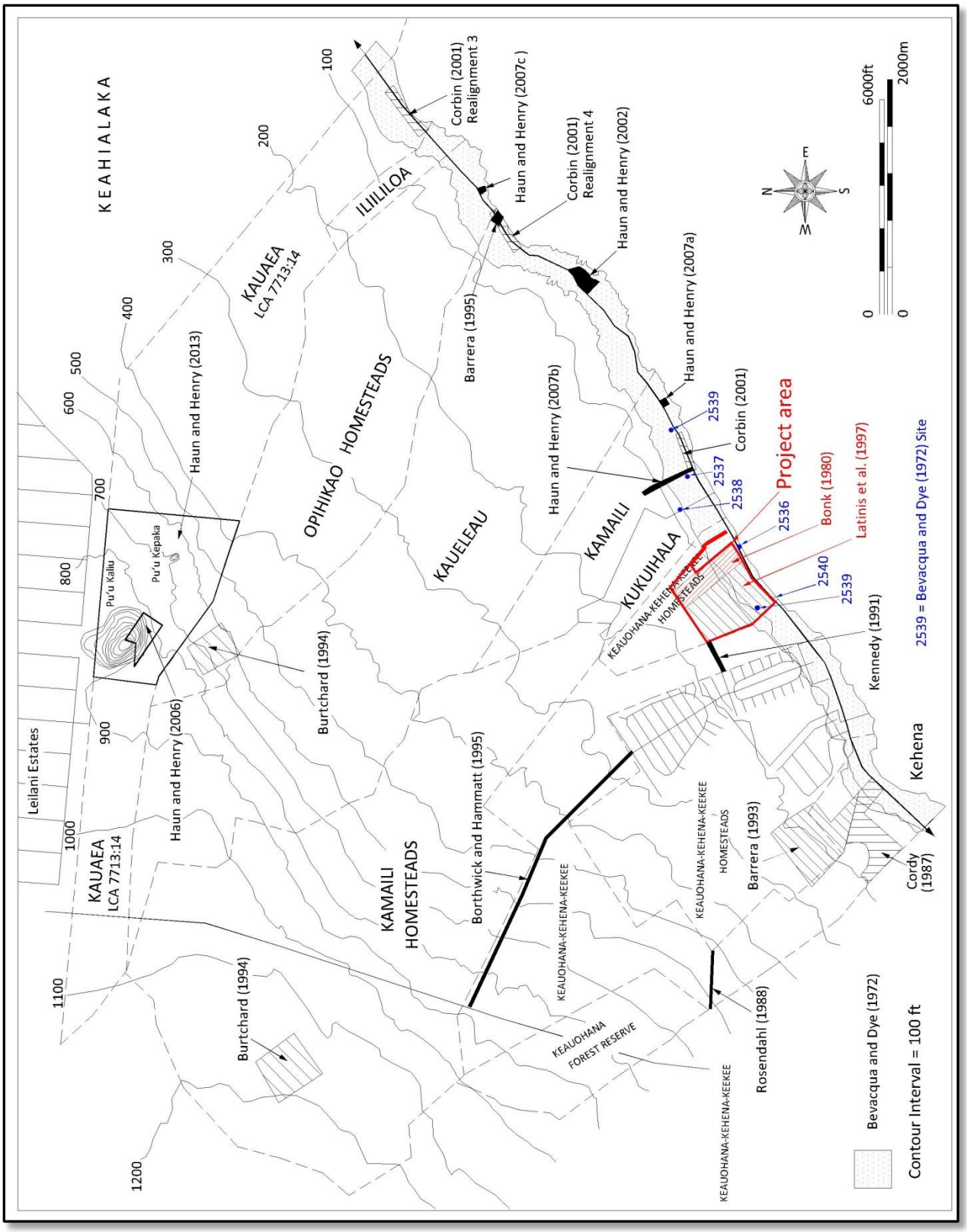


Figure 11. Ahupua'a boundaries and previous archaeological work

territory, including the unification of Puna. The island was finally re-unified in 1791 when Kamehameha killed Keoua at Kawaihae.

Early historic accounts document that Puna was well populated and intensively cultivated. The earliest observation of the Puna area was made in 1779 by sailors on Captain Cook's ship Resolution. According to Lt. King:

> The East part of Opoona (Puna) is flat, covered with Coco nut tree, and the land far back is of a moderate height. As well as we could judge this is a very fine part of the island, perhaps the best.
>
> On the SW extremity of Opoona the hills rise abruptly from the Sea side, leaving but a narrow border, and although the sides of the hills have a fine verdure, yet they do not seem cultivated and when we sailed pretty near and along this end of Opoona, we did not observe that it was equally populous with the eastern parts (Beaglehole 1967:606).

In 1823, Ellis (1963) traveled along the coast to Kaimu, where he reported a sandy beach and village with an estimated 725 occupants. At Kaimu, there were plantations and groves of coconuts and *kou*. Ellis estimated that the population of Kaimu and nearby villages was approximately 2,000. Ellis described a village at Kamaili surrounded by plantations where they were given taro and potatoes. Other crops noted by Ellis in Puna included bananas and sugar cane.

The following summarizes Burtchard (1994) discussion of Puna's later history. Prior to the 1870s, foreign influence in Puna primarily was limited to missionaries. In the late 1870s, Robert Rycroft moved to Pohoiki and built a home, wharf, sawmill, jail and courthouse. He later began growing coffee in the area and built a coffee mill. In the mid-1880s, the government began selling land in Puna for homesteads. Most of the homestead land was acquired for coffee cultivation in the 1890s.

In the 1840s, a political act of the Hawaiian Kingdom government would forever change the land tenure system in Hawai`i and have far-reaching effects on its people. The historic land transformation process was an evolution of concepts brought about by fear, growing concerns of takeovers, and western influence regarding land possession. King Kamehameha III, in his mid-thirties, was persuaded by his *kuhina nui* and other advisors to take a course that would assure personal rights to land. One-third of all lands in the kingdom would be retained by the king; another one-third would go to *ali'i* as designated by the king; and the last one-third would be set aside for the *maka`ainana* or the people who looked after the land. In 1846, King Kamehameha III appointed a Board of Commissioners, commonly known as the Land Commissioners, to "confirm or reject all claims to land arising previously to the 10th day of December, AD 1845." Notices were frequently posted in *The Polynesian* (Moffat and Kirkpatrick 1995).; however, the legislature did not acknowledge this act until June 7, 1848 (Chinen 1958:16; Moffat and Kirkpatrick 1995:48-49) and the act is known today as *The Great Māhele*. In 1850, the Kingdom government passed laws allowing foreigners to purchase fee simple lands (Speakman 2001:91).

A review of the Waihona 'Aina (2000) Mahele Database; which is a compilation of data from the Indices of Awards (Indices 1929), Native Register (NR n.d.), Native Testimony (NT n.d.), Foreign Register (FR n.d.) and Foreign Testimony (FT n.d.); indicates that there are no Land Commission Award (LCA) were awarded in Ke'eke'e.

In the late 1840s, the population of Puna and Hilo was reduced by epidemics that killed more than 1,000 people (Bevacqua and Dye 1972:34). Following the *Māhele,* the population continued to decline. During Chester Lyman's visit to the area in 1871 he noted "…there are but a few people in this region…miserably poor and for some time past have been almost in a state of famine" (Lyman 1924:103).

Latinis *et al*. (1997) summarize the decline in population in Puna and in Keʻekeʻe specifically:

> In the Tax Assessment books for the District of Puna for 1859-1883, a small and steadily declining population was recorded in Keʻekeʻe. In 1859, six tenant taxpayers are listed for the *ahupuaʻa.* If we take Ellis' estimation of each household consisting of five people (1917:91), the population of Keʻekeʻe would have been approximately 30 individuals, a great decrease since the time of his visit in 1823. By 1863, the number of taxpayers had declined to three, and again declined to two by 1869. In 1875 there was only one tenant still paying tax, and by 1876, Kaleopaa and Pukue, both of whom had paid tax in Keʻekeʻe in 1869, had moved to Kamaili. After 1878 there were no taxpayers listed in Keʻekeʻe. This shift in population during the late 1800's was accompanied by the gradual emergence of ranching, coffee and sugarcane into the economy of Puna (1997:16).

Handy and Handy (1972) citing oral historical sources, indicate that homesteading was established as early as 1902 in the *ahupuaʻa* of Keʻekeʻe, Kaueleau, Kamaili, Kehena, and Keauohana. Dry land taro was grown throughout the inland portions of these *ahupuaʻa*. A particular taro cultivation method, *pu-hala,* is described for the area from Kalapana to Kamaili. The method involved excavating a hole in aʻa lava in a pandanus grove. The hole was then filled with weeds, which were allowed to rot for six weeks or more. A taro cutting (*huli*) was wrapped in pandanus leaves and planted in the hole. After the cutting produced three or four leaves, the pandanus branches were cut to provide sunlight and the taro plant was covered with pandanus leaves. After the pandanus leaves were sufficiently dry, the leaves were burned reducing them ash that provided nourishment to the taro plant, which grew tall enough to hide a man beneath the leaves.

Figure 12 is a portion of Loebenstein's 1895 Hawaii Government Survey map of Puna from Pohoiki to Kehena. This map depicts a network of transportation routes that extended through this portion of Puna. Three of the routes were labeled as roads by Loebenstein and the remainder depicted as trails. The three roads consist of the Government Road that parallels the shoreline along the seaward side of the project area, Puna Road located in Kaiahiku and Keahialaka Ahupuaʻa, and Rycroft's Road in Pohoiki.

The main transportation routes were the Government Road following the coast and the Kehena Trail, located further inland paralleling the shoreline. A series of inland-seaward trails and roads connect the main transportation routes, providing access from mountain communities to the sea. Several of the trails are listed as ancient in origin including the Kipapaia Trail in Kamaili, and the Kauaea Trail located in Kauaea Ahupuaʻa. **Figure 12** also depicts a school house within the project area, along the inland side of the Government Road. An "ancient cemetery" is situated along the western boundary of the project area.

The Olaʻa Sugar Company was founded in 1899 by B.F. Dillingham, Lorrin A. Thurston, Alfred W. Carter, Samuel M. Damon, and Wm. H. Shipman. The plantation was to become one of the largest in the state. According to the Hawaii Sugarcane Plantation Archives:

> With a $5,000,000 investment, the promoters purchased 16,000 acres in fee simple land and nearly 7,000 acres in long leasehold from W.H. Shipman. They also purchased 90% of the stock in the adjacent Puna Plantation, adding another 11,000 acres to the holdings. Olaʻa Sugar Company began as one of Hawaii's largest sugar plantations with much of its acreage covered in trees.
>
> The task of setting up the plantation was enormous. Before 1900, coffee was the chief agricultural crop in the area. Over 6,000 acres of coffee trees were owned by approximately 200 independent coffee planters and 6 incorporated companies. The coffee trees were uprooted to make way for cane. Ohia forests had to be cleared, field rock piled, land plowed by mules or dug up by hand with a pick, quarters for laborers and staff had to be built, the mill constructed, and the first cane planted.

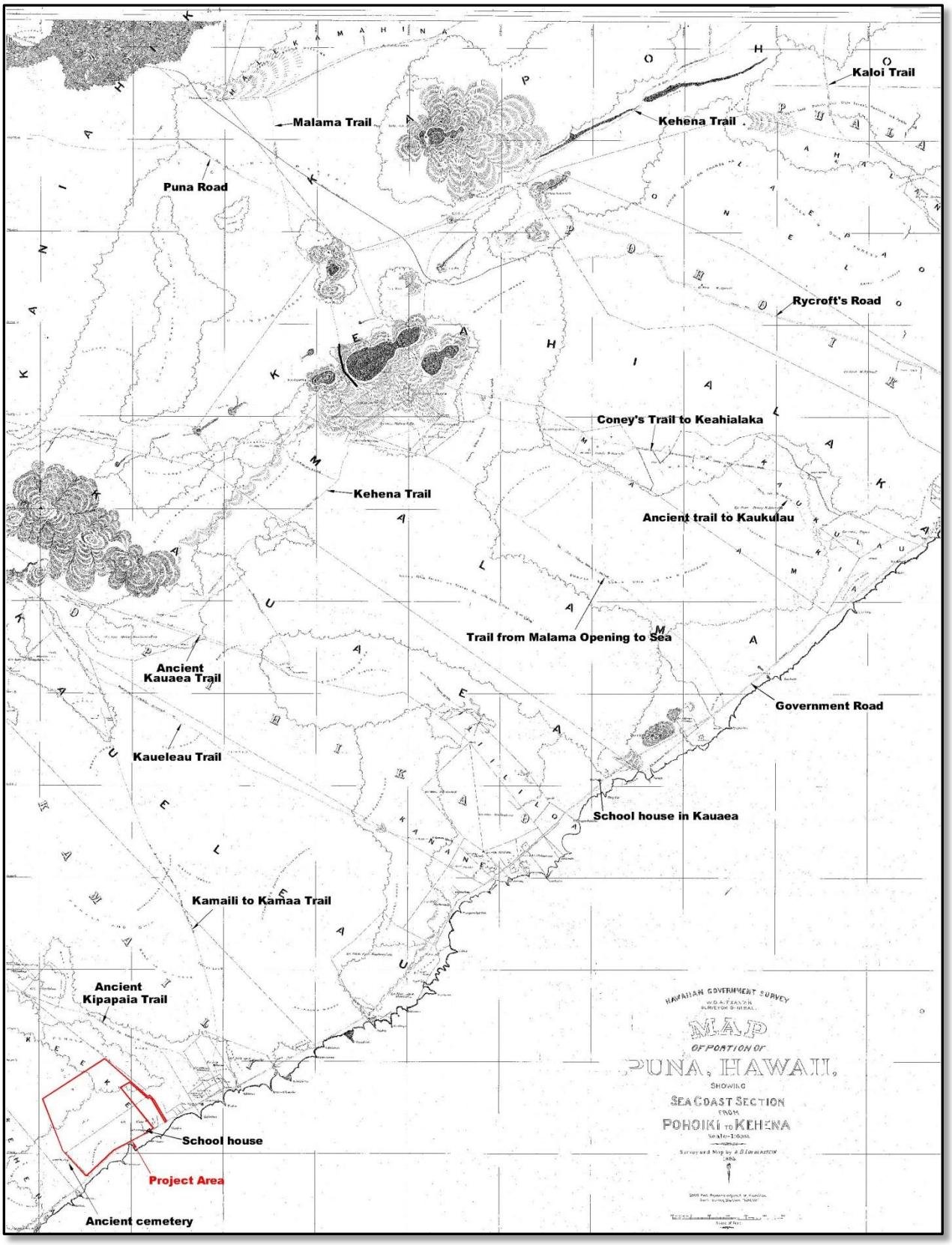


Figure 12. Portion of Loebenstein's 1895 Map of Puna showing project area

> The cane was transported to the mill by fluming and by railroad. Although Ola'a Sugar Company had 72 miles of flumes, it had no dependable water source for their operation. The railroad was relied upon for delivery of 60% of the cane. In addition to its own standard gauge 35 miles of railway track, the company ran cars over the Consolidated Railway tracks to bring its cane in from more distant fields. The history of Ola'a Sugar Company is closely connected with the southern branches of the Hawaii Consolidated Railway Co. because they were interdependent from the start. The cane fields were in four widely separated areas cut off from each other by stretches of barren lava. The railroad was therefore vital to the plantation, which in turn helped support the railroad. When a tidal wave on April 1, 1946 destroyed much of the Hawaii Consolidated Railway Company's tracks, it ceased operations. The plantation was then forced to convert to trucks in order to transport sugar and molasses to the Hilo wharf.
>
> Fortunately, under the management of Wm. L.S. Williams, a major road-building program had been started in 1939 for the purpose of eliminating the portable track. He started the plantation on its way to modernization by laying a network of 500 miles of roads for hauling cane. Since 1948, all the cane hauling has been by truck (Hawaii Sugarcane Plantation Archives).

By the end of the 1940s, Ola'a Sugar Company was deeply in debt, owing American Factors, Ltd (AMFAC) $2,000,000. The debt was the result of insect epidemics, volcanic eruptions and drop in sugar prices. By 1953, the company was $4,100,000 in debt and in 1959 it was decided that the plantation would sell some of its 35,700-acres to offset the debt. In 1960, the company changed its name to the Puna Sugar Company, primarily because it was thought a name change would give the company a new start. Apparently this strategy worked because in 1963 the company had its best year ever with a 36% increase in profits. The company was debt free for the first time in its history by 1966, and in 1969 the Puna Sugar Company was purchased outright by AMFAC. The company closed in 1982 following cancelation of government subsidies and tax breaks and the introduction of high fructose corn syrup, a cheap low-cost substitute for sugar.

Figure 13 is a portion of Walter E. Wall's 1915 Hawaii Territory Survey Map of Puna Homestead Subdivisions and Government Tracts. This map indicates that the school present on the 1895 Loebenstein map (see **Figure 12**) was still present in 1915. This map also indicates that the northern portion of the project area was comprised of Grant 5241, that according to the Waihona 'Aina (2000) Mahele Database was awarded to Oliver K. Kaleopaa. The seaward portion, including the school, was awarded to Miss Kane as Grant 4512.

Figure 14 is a portion of the 1922 Territory of Hawaii U.S. Geological Survey Pahoa Quadrangle showing the project area. This map does not show the school depicted in the project area in 1895 and 1915 (see **Figures 12** and **13**) indicating it is was likely abandoned between 1915 and 1922. **Figure 15** is portion of Wall's 1927 Hawaii Territory Survey Map of Puna, Keauohana and Malama-Iki Forest Reserves. The school is also not present on this map.

Figure 16 is a portion of an aerial photograph taken of the project area on February 6, 1965 by the U.S. Geological Survey and obtained from the University of Hawaii at Manoa online library (http://magis.manoa.hawaii.edu). This map depicts no obvious development with the project area. There is a diagonal road or cleared swath that extends through the seaward portion of the project area in a northeast by southwest direction.

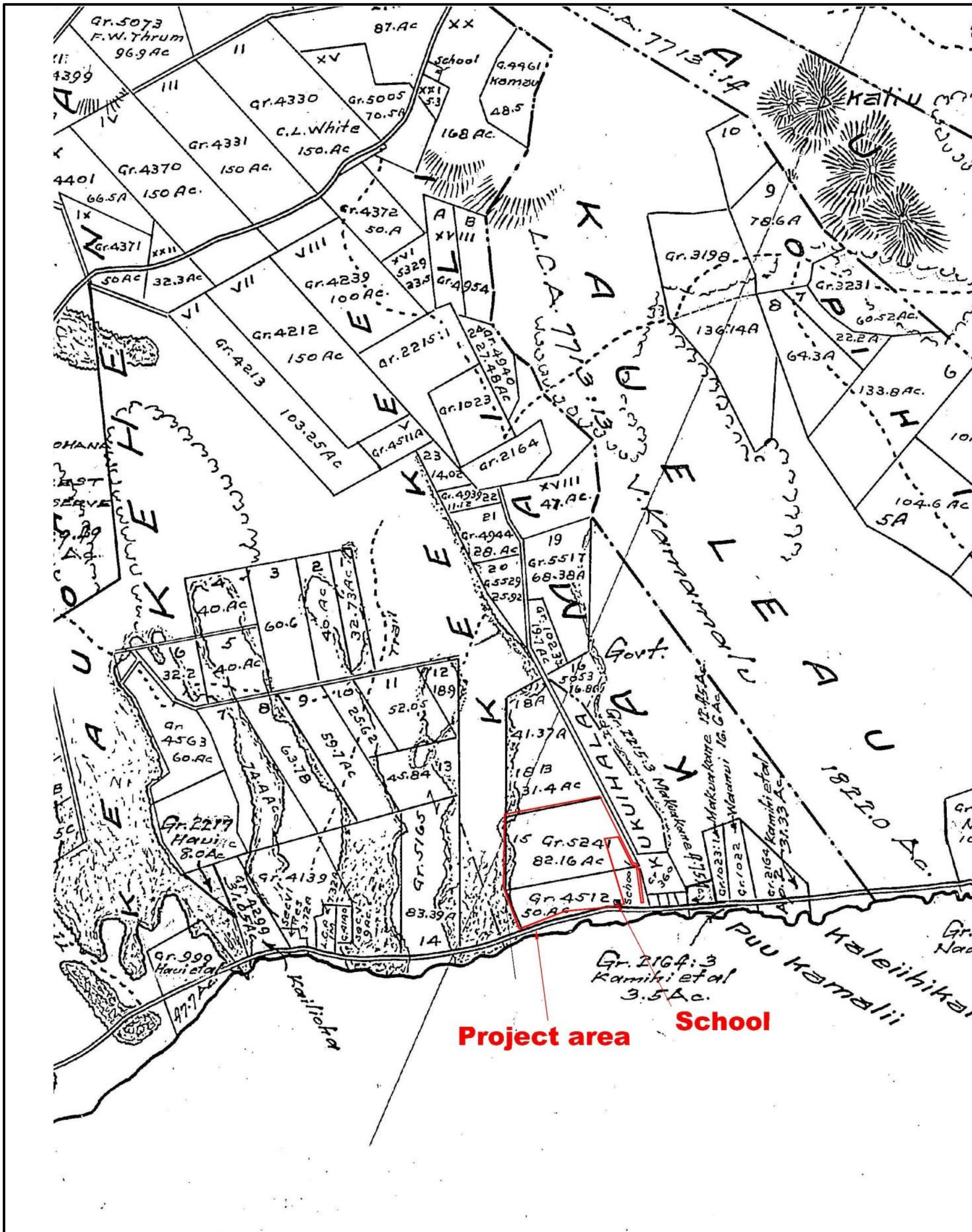


Figure 13. Portion of Wall's 1915 Territory of Hawaii Map of Puna Homesteads Subdivisions

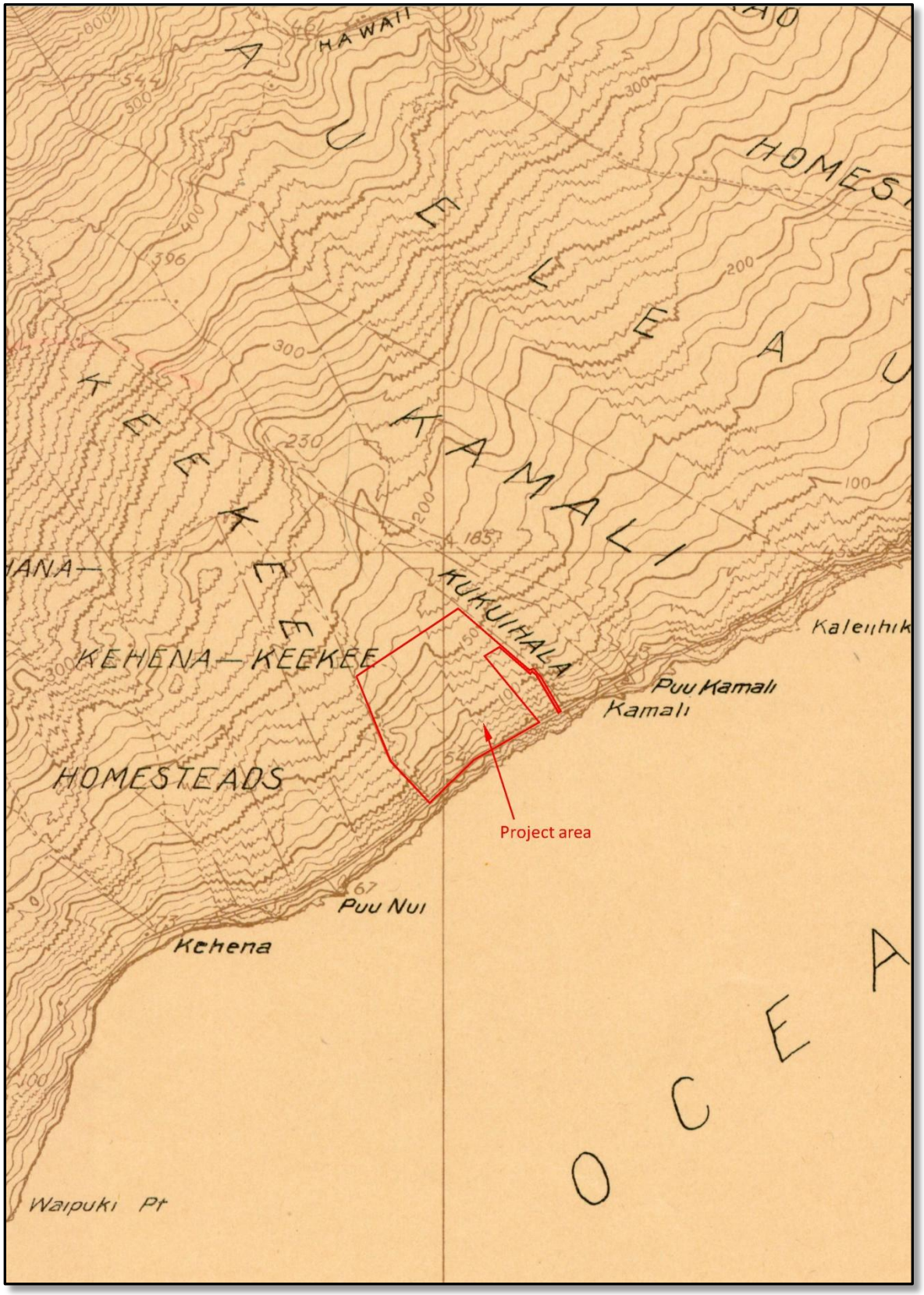


Figure 14. Portion of 1922 Territory of Hawaii U.S. Geologic Survey Map Pahoa Quadrangle

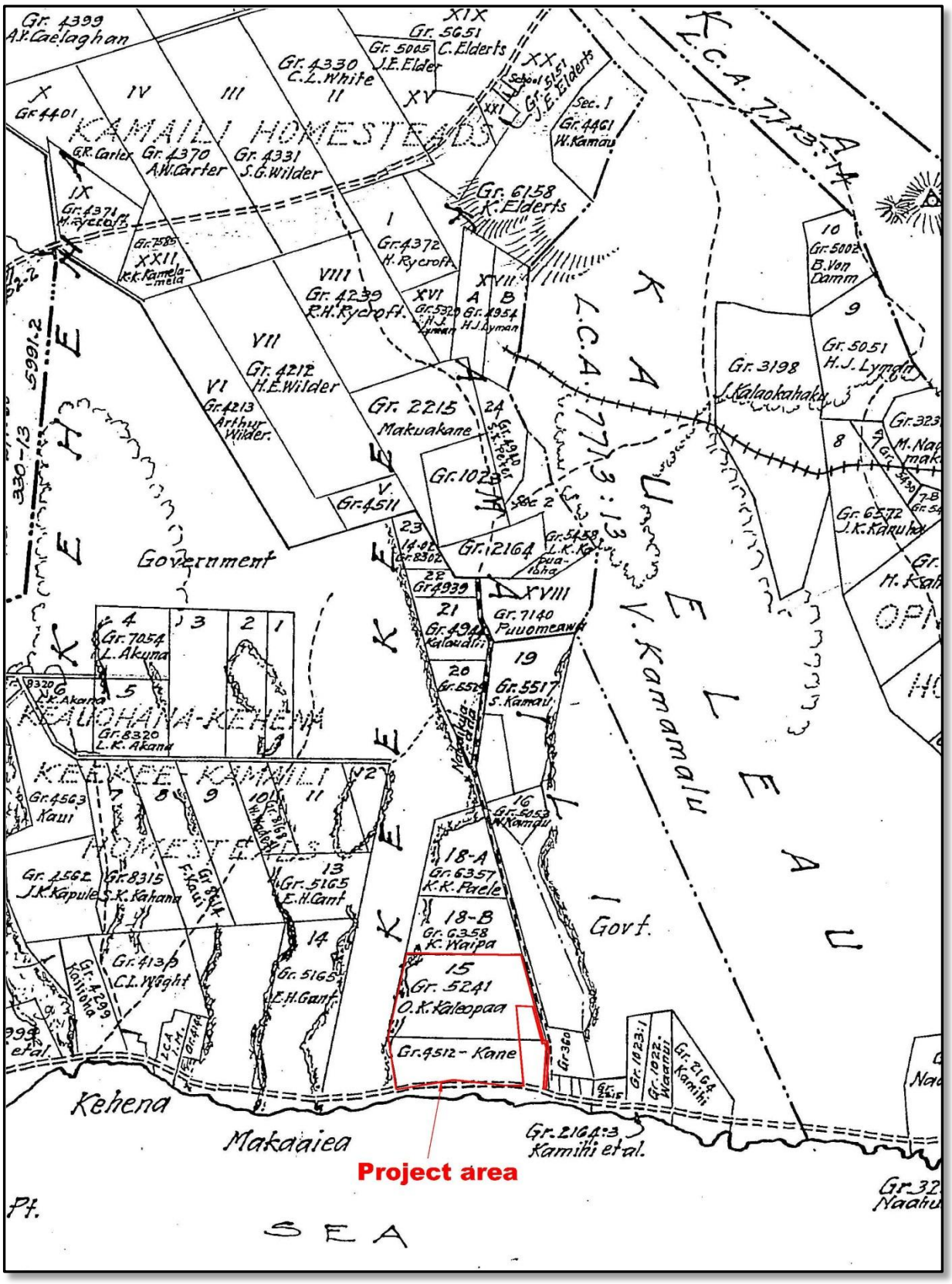


Figure 15. Portion of Wall's 1927 Hawaii Territory Survey Map of Puna, Keauohana and Malama-Iki Forest Reserves

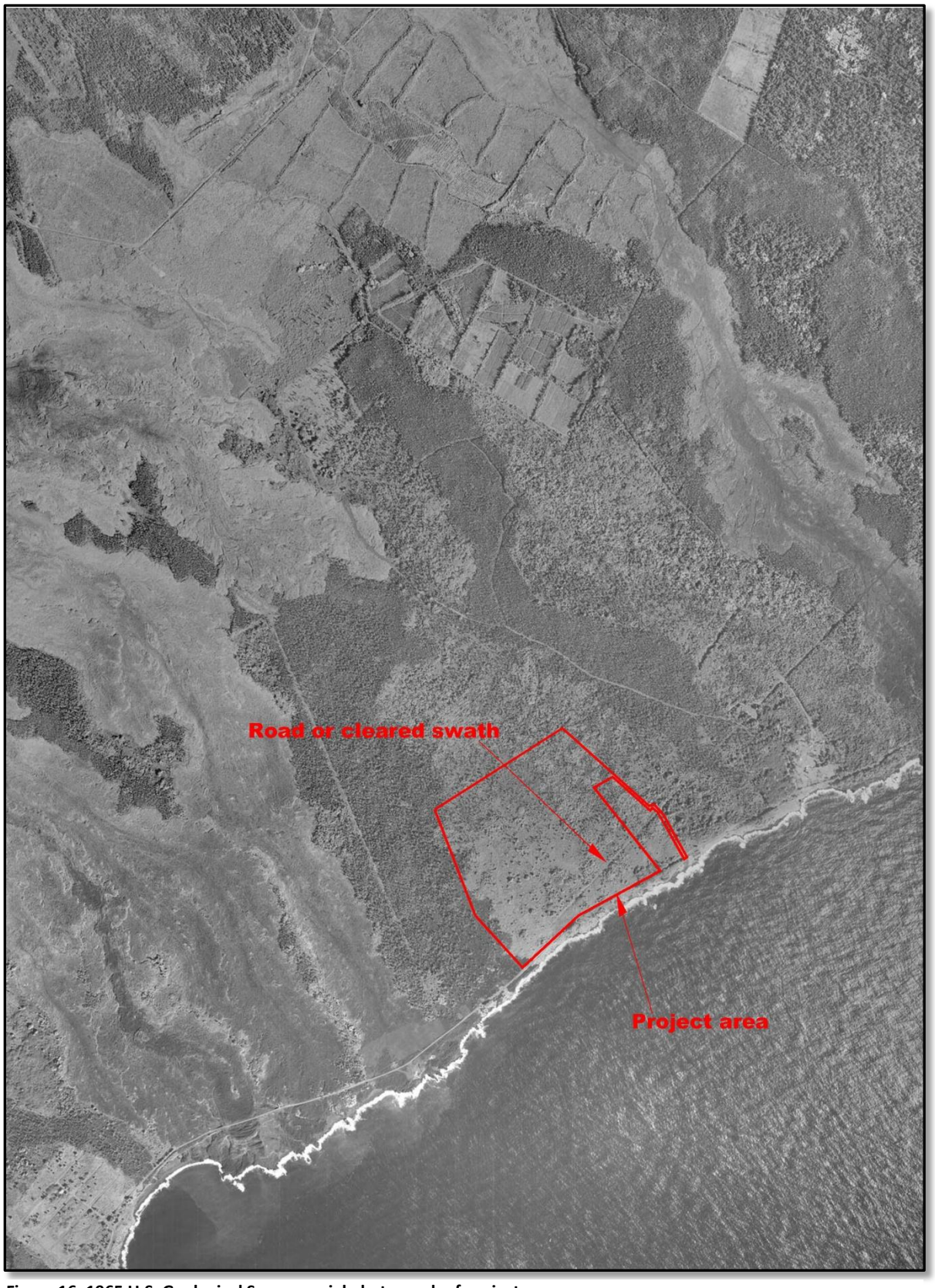


Figure 16. 1965 U.S. Geological Survey aerial photograph of project area

Previous Archaeological Work

A search of the DLNR-SHPD archaeological report database and other sources identified 16 archaeological projects between Kauaea and Kehena. **Figure 11** shows the project locations and **Table 1** summarizes the projects. Not included in the figure or table are the studies by Stokes (Stokes and Dye 1991), which focused on major sites, primarily *heiau* throughout Hawaii Island and a survey of east Hawaii by Hudson (1932).

Stokes (Stokes and Dye 1991), relying in part on the earlier observations of Thrum, reported fourteen *heiau* in Puna of which three were destroyed at the time of Stokes fieldwork in 1906 (**Figure 17**). Several of the *heiau* were reported to be agricultural temples. Hudson (1932) reported 32 sites along the coast between Kapoho and Kaimu including the Hilo-Puna Trail, habitation platforms and enclosures, water sources (cave and well), windbreak shelters, and four *heiau*: Mahina'akaka Heiau at Keahialaka, Kalepa at Kalepa Point, "Old" Wahaula Heiau at Kamaili, and Kumakaula at Kaimu.

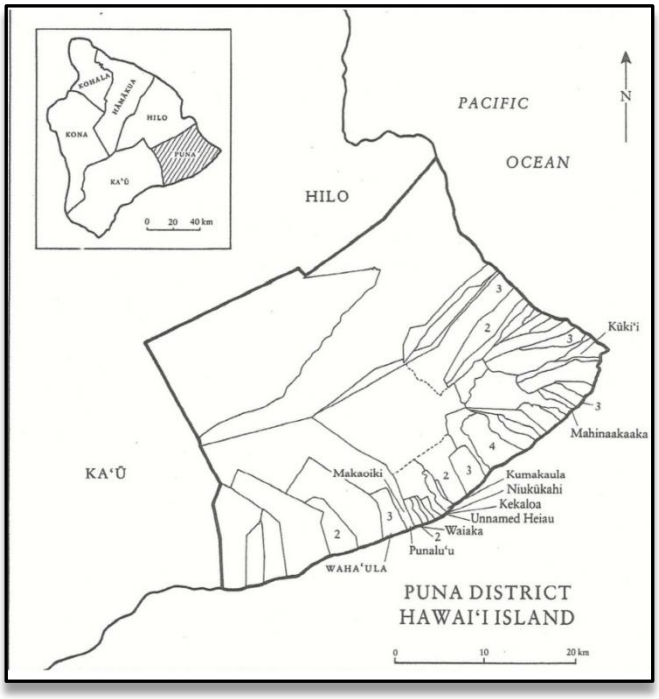


Figure 17. Heiau in the Puna District (from Stokes and Dye 1991:137)

Hudson (1932) indicates that a named *heiau* (Pu'ulena) is present in the project area. According to Hudson, Pu'ulena Heiau was located in coastal Ke'eke'e, "100 feet north of the road in a palm grove by an abandoned school house" (1932:387). Hudson suggests that the *heiau* was a small family shrine. This site (Site 21149) was relocated during the project and is discussed in detail in the Findings section.

The surveys in **Table 1** cover more than 950 acres of Puna between sea level and 1,540 ft elevation. Cultural remains identified by the surveys consist of 119 sites with nearly 949 features. To aid in reconstructing settlement patterns, features were quantified by probable age and function, and the studies are ordered by elevation. Traditional Hawaiian features are categorized as habitation, agricultural, burial (including possible burials), ritual, and trail. Features not assignable to these categories were categorized as miscellaneous. Traditional sites in this category include petroglyphs, *holua* slides, water sources, and *ahu*. Density values are given for sites, features, and for habitation and agricultural features.

Table 1. Previous archaeological work

Author	Land	Study Type*	Elevation	Acreage	No. of sites	Sites/ acre	No. of Feas.	Feas/ acre	Hab Feas	Hab Feas/ acre	Ag Feas	Ag Feas/ acre	Burial Feas	Ritual Feas	Trail	Misc	Historic Feas	Comment
Haun and Henry (2007c)	Opihikao	IN	10-25	1	2	2.00	2	2.00									2	
Corbin (2001)	Kamaili, Kauaea, Kaueleau	IN	20-40	5.3	1	0.19	40	7.55			40	7.55	1					
Bevaqua and Dye (1972)	Kapoho-Kalapana	RN	20-40	151	48	0.32	426	2.82	61	0.40	many		156	3	5	188	7	Feature totals estimated, most not quantified in report; misc. incl. 165 petroglyphs
Haun and Henry (2007a)	Kamaili	IN	20-38	1	*		*											* = Identified portion of trail initially identified by Bevaqua and Dye (1972)
Haun and Henry (2007b)	Kamaili	IN	30-115	4.274	5	1.17	10	2.34									10	
Barrera (1995)	Kaueleau	DR	35-40	3	3	1.00	9	3.00	2	0.67							7	
Haun and Henry (2002, 2013)	Kaueleau	IN	80-100	309	6	0.02	10	0.03							1		9	
Cordy (1987)	Keauohana	RN	80-250	39	15	0.38	92	2.36		0.00	20	0.51	63		4		5	
Latinis, Moore and Kennedy (1997)	Keekee	IN	100-300	94	6	0.06	128	1.36	3	0.03	88	0.94	24	3	4	2	4	
Barrera (1993)	Keauohana	RN	120-300	66	1	0.02	167	2.53	5	0.08	150	2.27	3				9	
Kennedy (1991)	Keekee	IN	170	0.91	0	0.00												
Borthwick and Hammatt (1995)	Kamaili, Keekee, Kehena, Keauohana	AS	280-860	9.99	0													
MLK Rosendahl (1988)	Keauohana and Kehena	FI	540-620	1.7	0													
Burtchard (1994)	various	RN	650-1200	247	34	0.14	65	0.26	5	0.02	16	0.06	22	1	5	8	11	
Haun and Henry (2006)	Kauaea	AS	780-1050	15	0													
Bonk (1989, 1990)	Kaimu, Makuu, Kaohe, Kehena, Kaapahu and Mamaili	RN/ MON	1480-1540	10	0													
Total/Average				**958.17**	**119**	**0.48**	**949**	**2.43**	**76**	**0.20**	**314**	**2.27**	**269**	**7**	**19**	**198**	**64**	

IN = Inventory Survey, RN = Reconnaissance Survey, DR = Data Recovery, AS = Archaeological Assessment

Overall, the studies have identified more than 76 habitation features, 314 agricultural features, 269 burials, 7 ritual features, and 19 trails. The large number of burials includes several historic cemeteries. Other historic features were not segregated by function. The majority of the historic features are walls and roads. None of the studies processed radiocarbon dates.

A 15-acre portion of the present 309-acre project area was previously examined by Haun and Henry (2006). The majority of the Haun and Henry (2006) study area (c. 95%) was comprised of the cinder quarry area, with a narrow (10-30 m wide) disturbed vegetated band present around the southwest and west sides. No sites or features were present.

McEldowney (1979) primarily used historic documentary evidence to develop a land use and settlement pattern model for the windward Hilo area that is probably applicable to most of Puna. The model consists of five elevation-defined zones: Coastal Settlement, Upland Agricultural, Lower Forest, Rainforest, and Sub-Alpine or Montane. The Coastal Settlement Zone extended approximately 0.5 miles inland from the shoreline between sea level and 50 ft elevation. The zone was the most densely populated with both permanent and temporary habitations, high status chiefly residences, and *heiau*. Settlements were concentrated at Hilo Bay and sheltered bays and coves. Also present were fishponds and gardens where breadfruit, coconut, *kukui*, banana, *wauke*, sugar cane, sweet potato, and wet and dryland taro were cultivated. The ocean provided fish and other marine resources.

The Upland Agricultural Zone was situated between approximately 50 ft and 1,500 ft elevation. Settlement in the zone consisted of scattered residences among economically beneficial trees and agricultural plots of dryland taro and bananas. Lava tubes were utilized for shelter. A pattern of shifting cultivation is believed to have converted the original forest cover to parkland of grass and scattered groves of trees. Wetland cultivation of taro occurred along streams.

The Lower Forest Zone ranged from 1,500 ft to 2,500 ft elevation. Timber and other forest resources such as medicinal plants, *olona*, and birds were gathered from the zone. Site types consisted of temporary habitations, trials, shrines, and minor agricultural features in forest clearings and along streams. Sites in the Rainforest Zone (2,500-5,000 ft elevation) and Subalpine or Montane Zone (5,000-9,000 ft) were limited to trails and associated temporary habitations. These zones were used for intra-island travel and gathering of valued resources including hardwoods, birds, and stone for tool making.

Previous Archaeological Work within the Project Area

Several archaeological investigations have been conducted within the project area. The earliest study was conducted by Bevacqua and Dye (1972) in conjunction with the construction of the Kapoho-Kalapana Highway. This reconnaissance survey documented one site within the boundaries of the present project (Site 2539) and five additional sites in the immediate vicinity (Sites 2535-2538 and 2540). The location of these six sites is presented on **Figure 11**.

Site 2539 is a cemetery located in the southwestern corner of the project area. This site contains 23 burial mostly rectangular-shaped platforms built on an a‘a lava flow. This site was subsequently documented by Latinis *et al.* (1997) and was observed during the present project. This site is discussed in detail below in the Findings section.

Of the five remaining sites near the project area, two are located just seaward of the parcel, south of the Kalapana-Kapoho Road (Sites 2536 and 2540). Site 2536 is a platform, wall, L-shape and enclosure situated along the coastal cliffs. Site 2540 is the Kehena Beach Trail; a steppingstone trail that extends along the Puna coast. According to Bevacqua and Dye, “…in several places it has been obliterated by recent lava flows” (1972:22).

The three remaining sites are located approximately 350 to 1,000 meters northeast of the project area. Site 2535 is a trail that originates at the Site 2540 Kehena Beach Trail and extends inland a distance of 115 meters. Site 2537 is

a complex of enclosures located inland of the Kalapana-Kapoho Road. This site was interpreted as a series of recently built stone cattle pens. Site 2538 is a complex of 25 burial platforms situated 175 meters inland of the Kalapana-Kapoho Road. Bevacqua and Dye (1972:21) postulate that the site may predate European contact with a subsequent historic use.

Bonk (1980) conducted a "walk-through" survey of TMK: (3) 1-2-09:028 (see **Figure 2** and **11**). At the time of this study, this portion of the project area had been significantly disturbed. According to Bonk:

> The natural vegetation cover consists of a fairly heavy growth of pandanus, some *ohia* and mixed trees, with ferns doing very well on the ground in the shape provided by the upper growth. Nevertheless little remains of this natural ground cover for most of the area has been bulldozed, thereby resulting in a drastic altering of the flora (1980:3).

Bonk identified five areas within this 19.0 acre portion of the project area (1980:3). An incomplete map depicting these areas is presented in **Figure 18**. Area I is situated in the inland end of this parcel. According to Bonk, this area had been cleared several years before his study for a papaya grove, although no remnants of this grove were present at the time of his study. Bonk noted an open, level ground surface with scattered *ohia* and mango trees, with a low cover of weeds and grass. This area contained a water reservoir and an earthen mound for dancing, along with four large dormitories that were under construction.

Area II is located seaward of Area I. According to Bonk, this area contained a dense growth of pandanus and guava, on a rocky a'a lava flow. Ferns and scattered *ohia* and *ti* were also present. Bonk's map of the area (see **Figure 18**) depicts two buildings labeled "Faculty", a bath, a workshop and a generator within Area II.

Area III is located south of Area II. This area is described by Bonk as follows:

> Many fruit trees have been planted in a bulldozed area (III) north of the present house and where a pool, library, office and sports area are planned. This area has or will hold citrus, macadamia, avocado (sp.), banana, and other trees. Small plots that were not cleared hold mango trees, sometimes with vines and clumps of ginger beneath. One such small noncleared area east of the present house showed a small, low pile of stones, approximately 5 to 6 feet long, 3 ½ to 4 feet wide and 2 feet high. It is too roughly thrown up to be more than the result of clearing for horticultural purposes (1980:4).

Area IV was grass covered pasture with scattered *ohia,* pandanus, mango, banana and *ti.* A low stone wall extends into the parcel on the eastern side (see **Figure 16**). The wall averaged 3 feet wide and 2 feet high.

Area V represents the seaward-most portion of Bonk's survey area. This area was the least disturbed, and "lacks major land displacement through bulldozing" (1980:4). According to Bonk:

> It holds some natural forest cover along with coconut, *kamani, noni,* and other more recently propagated plant material…Some of these plantings undoubtedly remain from the former occupation of part of this area as a school site. Walls, flat waterworn stones, as well as the above mentioned plants will attest to the cultural use of the area.

In 1996, Archaeological Consultants of the Pacific, Inc, (Latinis *et al.* 1997) conducted an archaeological inventory survey of TMK: (3) 1-2-09:029, a 94.69-acre portion of the project area (see **Figure 2**). This survey identified six sites, including the Site 2539 cemetery previously noted by Bevacqua and Dye (1972) and five newly identified sites

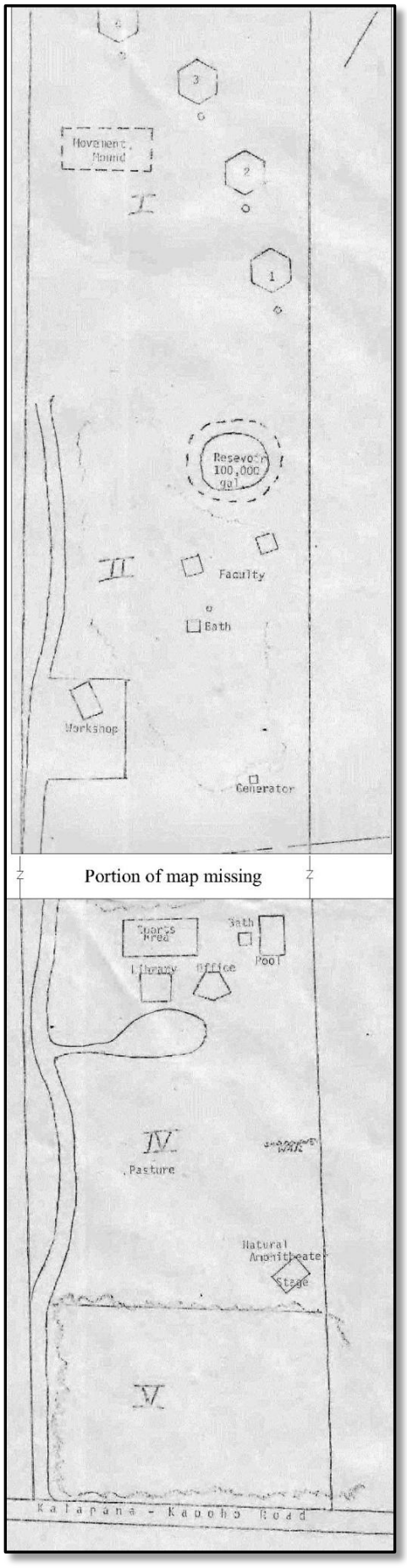


Figure 18. Bonk (1980) map of TMK: (3) 1-2-09:028

(**Figure 19**). The five new sites consist of an agricultural complex (Site 21139), three sites interpreted as animal husbandry/agricultural cattle pens (Sites 21140, 21141 and 21142), and a *heiau* (Site 21143). Of the six sites, three sites have been destroyed (Sites 21140, 21141 and 21142). These sites are discussed in the Findings section of this report.

A Site Preservation Plan was prepared for Site 21143 by Koob (1999; **Appendix B**). This plan proposed that a 10 meter wide buffer surround the site. The plan was found to be acceptable by DLNR-SHPD in 2000 (Log No: 24539, Doc. No. 9912PM02; see **Appendix A**).

A Burial Treatment Plan was also prepared for the Site 2539 burial complex by Koob (1999; see **Appendix B**). This plan proposed a 50 ft wide buffer zone be established around the site. Additionally the plan proposed that the portion of the project area containing Site 2539 will be, "deeded without cost to the Kanakaʻole Foundation, as this organization is understood to represent the ancestors, and is commitment to the care and curatorship of the cemetery". This plan was found to be acceptable by DLNR-SHPD (Log No: 21902, Doc. No. 9806KM10; **Appendix C**).

A data recovery plan was subsequently prepared for the Latinis *et al.* (1997) project area (Moore and Kennedy 1998). This plan proposed detailed mapping of the Site 21140, 21141 and 21142 enclosures, and of portions of the Site 21139 agricultural complex. It also proposed dismantling the enclosures and selected features of Site 21139. The Moore and Kennedy (1998) plan was submitted to DLNR-SHPD for review; however, the plan was not finalized and was not implemented (see **Appendix A**).

An inventory survey of an easement associated with the Kalani Honua Retreat was conducted in 1990 by Archaeological Consultants of the Pacific, Inc, (Kennedy 1991). This easement was 800 ft long by 50 ft wide (0.91-acres) and extended between the eastern side of the Kalapana Seaview Estates subdivision, northeast to the northwestern corner of the present project. The ground surface throughout this easement consisted of rocky aʻa lava. No sites or features were present.

Consultation

On January 29, 2014, Haun & Associates Project Supervisor Shawn Fackler contacted lifelong Puna resident, Emily Naeole. She is 56 years old and has lived in Opihikao her entire life. Ms Naeole's father was from Kalapana and her mother from Opihikao, where Ms. Naeole was raised. Kalani Honua is approximately half-way between the two communities and according to Ms. Naeole, "is a very spiritual place and has important Hawaiian sites". She also said that the known cemetery (Site 2539) ancestrally belongs to the Kanakaʻole ʻohana, and is cared for by the Edith Kanakaʻole Foundation.

On January 31, Haun & Associates contacted Kuma Hula and Executive Director of the Edith Kanakaʻole Foundation, Kekuhi Kanae Kanahele Kealiikanakaoleo Haililani by e-mail. In her response, Kekuhi emphasized the cultural significant of the Site 2539 cemetery and indicated that she has visited the *heiau* (Site 21143, Puʻulena Heiau) to do ceremonies. She also stated that the deities Lono and Kanaloa are associated with the site. When asked if she knew of any other consultant sources with knowledge of the cemetery and project area, Kekuhi stated, "We do not know any other *kupuna* in the area who are still alive. The closest living family would be in Opihikao and perhaps associated with the church".

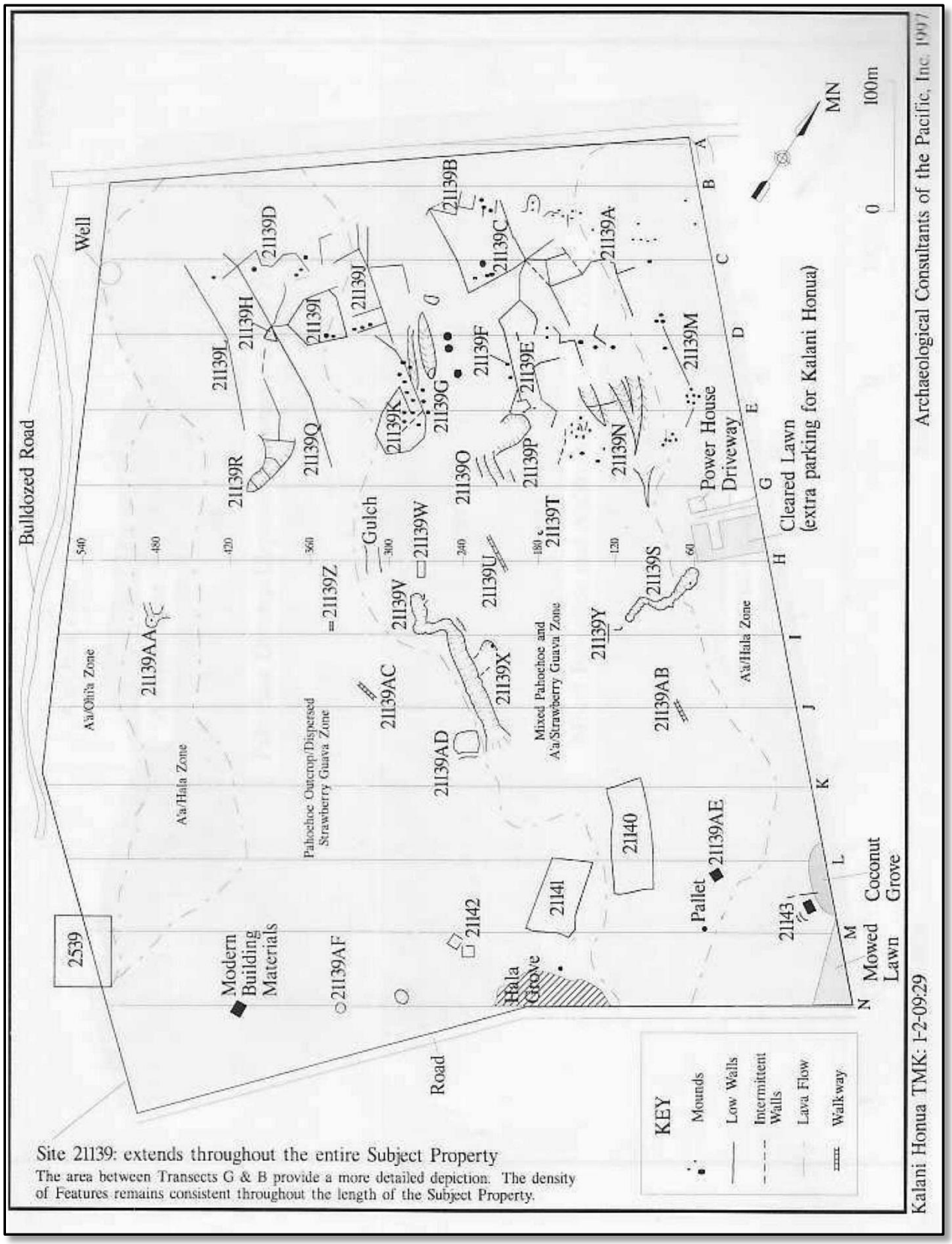


Figure 19. Latinis *et al.* (1997:35) site location map

Project Expectations

Traditional Hawaiian, prehistoric to early historic use of the project area would be evidenced by habitation sites, ceremonial structures, and the remnants of agricultural activity based on historic documentary research and previous archaeological work, the. The lower extents of the project area are situated within McEldowney's (1979) Coastal Settlement Zone; an area characterized by both permanent and temporary habitations, high status chiefly residences, and *heiau*. The remainder of the parcel is situated in the lower portions of the Upland Agricultural Zone. This area would likely contain agricultural features and lava tubes used for temporary habitation and burial. The previous work within the project area has documented many of these site types.

The remains of historic sites are likely to be encountered. An historic cemetery has been documented in the western portion of the project area and several large enclosures were recorded that were interpreted as cattle pens. Historic maps of the area indicate that an historic school was once present in the parcel. Additional historic sites could consist of roads, cattle walls and fences, railroad lines, historic houses and sites associated with ranching and sugarcane cultivation.

FINDINGS

Archaeological surveys of the project area have identified 20 sites with 608 features (**Table 2**). Seventy-seven previously identified features were not relocated and were likely destroyed prior to the present project because the features were situated in areas of the retreat that are developed. The destroyed features include Site 21140, Site 21141, Site 21142, and portions of Site 21139. There are 108 features of Site 21139 that were situated in undeveloped areas of the retreat, but could not be correlated the features identified during the current survey because of insufficient documentation during the prior Latinis et al. (1997) survey.

The 20 sites documented in the project area consist of 11 single feature sites and 9 complexes of features with from 2 to 486 features (**Figure 20**). The complexes include four sites with 2 features, three with 3 features, 1 with 24 features, 1 with 72 features and 1 with 486 features. The 608 features consist of 449 mounds, 54 modified outcrops, 24 platforms, 21 walls, 18 enclosures, 17 terraces, 6 walkways, 5 modified depressions, 3 lava tubes, 3 modified gullies, 3 soil swales, 2 pits, 1 C-shape, 1 U-shape and 1 lava blister. Feature function includes agriculture (558 features), burial (25), permanent habitation (10), temporary habitation (5), animal husbandry/agriculture (5), ceremonial (3), school (1) and livestock control (1).

Subsurface testing was conducted in 13 features, yielding a total of 8.08 sq meters of excavation (**Table 3**). The test excavations were conducted at six permanent habitation features (Sites 21139, Feature AF, 30028, Feature A, 30029, 30031, 30033, Feature B and 30033, Feature C), one burial feature (Site 30025), one temporary habitation feature (Site 30030) and six agricultural features (Site 30037, Features NW, NX, QR, RA and RK). The results of these excavations are incorporated into the following site descriptions.

Site 2539 is an historic cemetery located in the southwestern portion of the project area. The majority of this site is situated outside the project area to the southwest, in the adjacent Parcel 43. This site was initially documented by Bevacqua and Dye (1972:40) and subsequently documented by Latinis *et al*. (1997:66). The site is a complex of 24 platforms located in an area 67.5 meters long (northwest by southeast) and 53 meters wide. The extent of the sites documented by Latinis et al. (1997) is depicted in **Figure 21**. According to Latinis *et al*.:

> The cemetery is…located on the southwestern portion of the subject property between 300-600 ft from the coastline and approximately 75-200 ft from the western border of the subject property on the A.D 1790 lava flow. The lava flow at this location is entirely composed of undulating black a'a boulders, cobbles and pebbles. This lava flow has formed a bluff where the cemetery is located which provides a rather commanding view of the coastal area below (1997:67).

Figure 12 in the Historic Documentary Research section is a portion of Loebenstein's 1895 map of the Puna. This map depicts Site 2539 as an "ancient cemetery" located along the project area boundary. As discussed in the Consultation section of this report, the cemetery is for Kanaka'ole ohana and is cared for by the Edith Kanaka'ole Foundation. The site is unaltered and in fair condition. It was assessed as significant by Latinis *et al.* for its information content, as an excellent example of a site, and for its cultural value to the Hawaiian people (1997:88). A preservation plan was prepared for this burial complex by Koob (1999) that proposed a 50 ft wide buffer be established around the portion of the site within the project area (see **Appendix B**). This plan was accepted by DLNR-SHPD (Log No: 21902, Doc. No. 9806KM10; see **Appendix C**).

Site 21139 is a complex of agricultural features previously documented by Latinis *et al.* (1997). This survey identified numerous agricultural features that were subsumed under 32 feature designations of the 21139 complex (Features A-AF; see **Figure 19**); however, no quantitative listing of the features is provided in the survey report. Based on the limited information presented, it is estimated that the 32 feature designations include at least 179 individual features (**Table 4**) including mounds (76+), wall (63+), pit (14+), walkway (6), modified dep0ression

Table 2. Summary of Sites

SIHP Site Number	Temp. Field Number	Site Type	Site Function	No. of Features	TMK Parcel (3) 2-1-09:	Age	Feature Type																Function								
							Mound	Modified outcrop	Platform	Wall	Enclosure	Terrace	Walkway	Modified depression	Lava Tube	Modified gully	Swale	Pit	C-shape	U-shape	Lava blister	Manuport	Agriculture	Burial	Permanent Habitation	Temporary Habitation	Animal husbandry/ Agriculture	Ceremonial	School	Livestock control
2539	-	Complex	Burial	24	29	Historic			24															24							
21139 (destroyed)	-	Complex	Agriculture	72	29	Prehistoric	30	4		15	3	3	6	4	1	3		2	1				72							
21139 (could not correlate - not included in feature totals below)	-	Complex	Agriculture	108	29	Prehistoric	46			48						1		12				1	108							
21139 - AF (relocated)	194.2	Enclosure	Permanent Habitation	1	29	Prehistoric					1														1					
21140 (Destroyed)	-	Enclosure	Animal husbandry/ Agriculture	1	29						1																1			
21141 (Destroyed)	-	Complex	Animal husbandry/ Agriculture	2	29	Historic					2																2			
21142 (Destroyed)	-	Complex	Animal husbandry/ Agriculture	2	29	Prehistoric					2																2			
21143	184	Complex	Ceremonial	3	29	Prehistoric				1	1	1																3		
30024	138.1	Enclosure	Temporary Habitation	1	29	Prehistoric					1															1				
30025	134.2	Lava blister	Burial	1	29	Prehistoric															1			1						
30026	81.2	Complex	Permanent Habitation	2	29	Prehistoric				1	1														2					
30027	42.1	Enclosure	Temporary Habitation	1	29	Prehistoric					1															1				
30028	72	Complex	Permanent Habitation	2	29	Prehistoric					2														2					
30029	127.1	Enclosure	Permanent Habitation	1	29	Prehistoric					1														1					
30030	172.2	Modified outcrop	Temporary Habitation	1	29	Prehistoric		1																		1				
30031	198.1	Modified outcrop	Permanent Habitation	1	29	Prehistoric		1																	1					
30032	176.1	Lava Tube	Temporary Habitation	1	29	Prehistoric									1											1				
30033	179, 186	Complex	Permanent Habitation	3	29	Prehistoric					1	1								1					3					
30034	213	Lava Tube	Temporary Habitation	1	28	Prehistoric									1											1				
30035	201	Wall	Livestock control	1	28, 29,36	Historic				1																				1
30036	212	Enclosure	School	1	28	Historic					1																		1	
30037	Numerous	Complex	Agriculture	486	28, 29, 36	Prehistoric	419	48		3		12		1			3						486							
Features identified in project area				**608**	**Feature Totals**		**449**	**54**	**24**	**21**	**18**	**17**	**6**	**5**	**3**	**3**	**3**	**2**	**1**	**1**	**1**	**0**	**558**	**25**	**10**	**5**	**5**	**3**	**1**	**1**

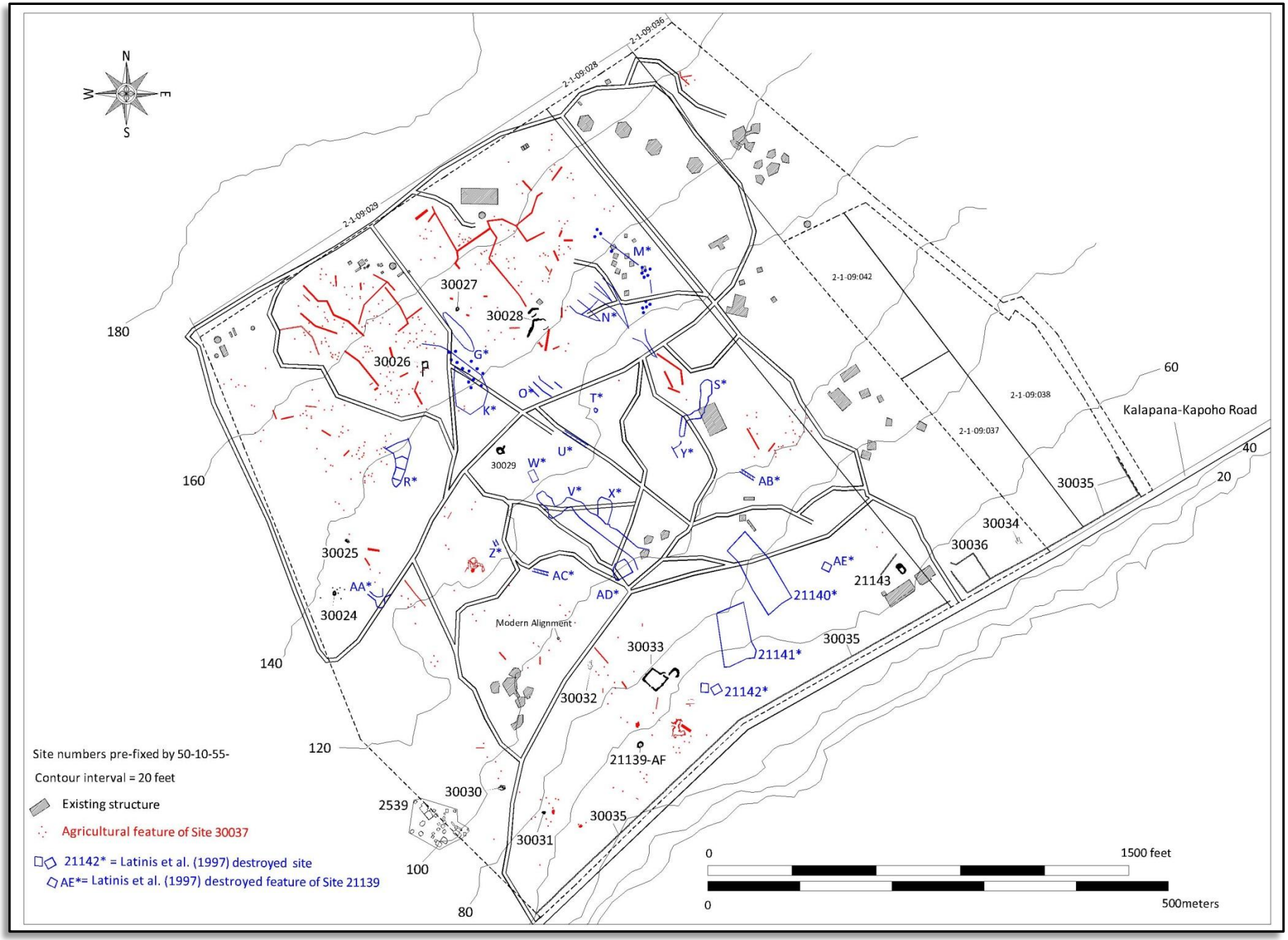


Figure 20. Site location map

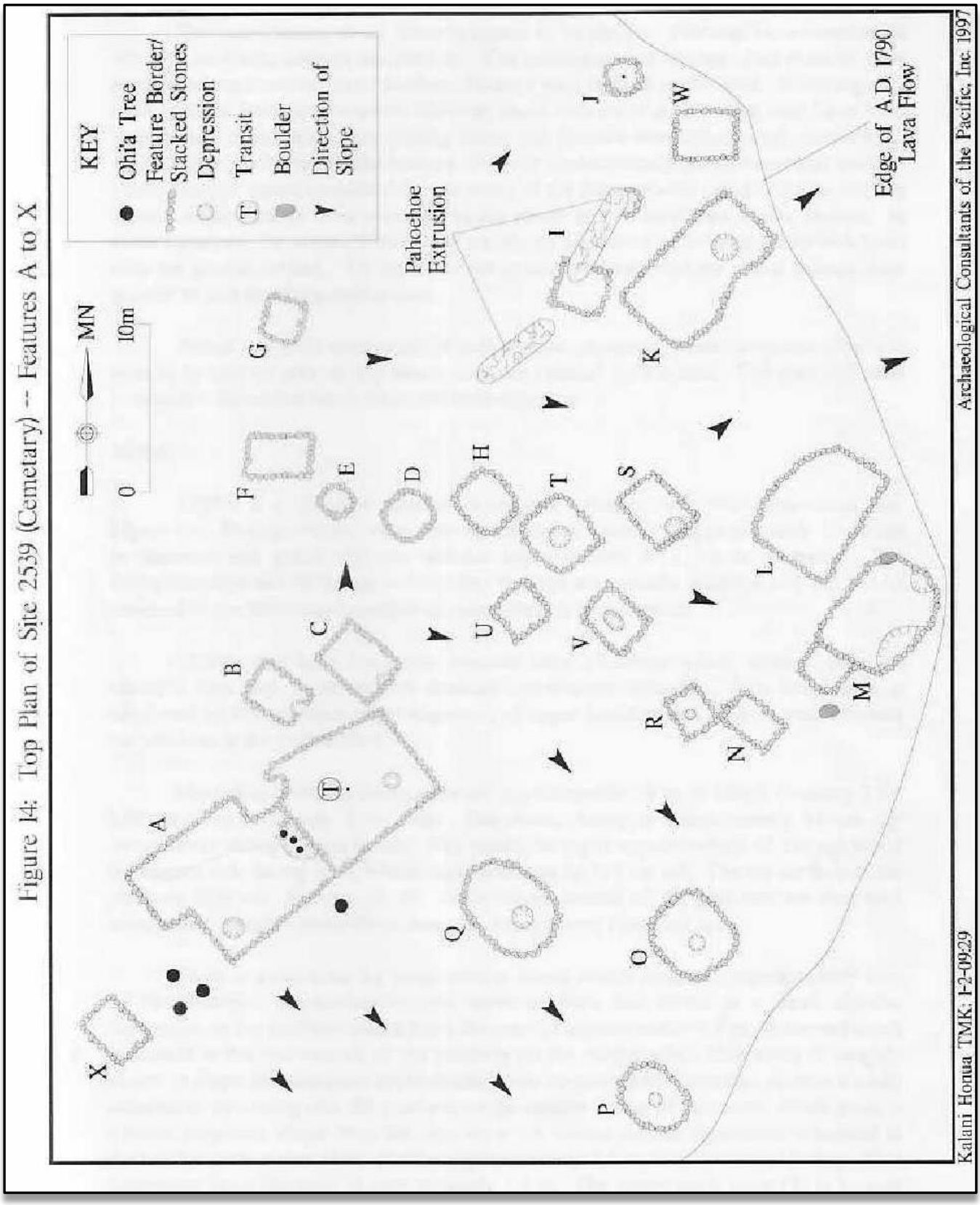


Figure 21. Map of Site 2539 from Latinis *et al.* (1997:68)

Table 3. Summary of test units

Test Unit No.	Site/Feature	Formal Type	Function	Unit Size (m)	Unit Area (sq m)	Remains present
1	30031	Modified outcrop	Permanent Habitation	1.0 x 1.2	1.20	Cultural remains present
2	Site 30037, Feature RK	Modified outcrop	Agriculture	1.0 x 1.0	1.00	No cultural remains
3	Site 30037, Feature RA	Modified outcrop	Agriculture	1.0 x 1.0	1.00	No cultural remains
4	Site 30037, Feature QR	Terrace	Agriculture	0.5 x 0.5	0.25	No cultural remains
5	30033, Feature B	Terrace	Permanent Habitation	0.5 x 0.5	0.25	Cultural remains present
6	30033, Feature C	U-shape	Permanent Habitation	0.5 x 0.5	0.25	Cultural remains present
7	30029	Enclosure	Permanent Habitation	0.5 x 0.5	0.25	Cultural remains present
8	Site 30037, Feature NW	Modified outcrop	Agriculture	2.0 x 1.0	2.00	No cultural remains
9	Site 30037, Feature NX	Swale	Agriculture	0.5 x 0.5	0.25	Cultural remains present
10	30028, Feature A	Terrace	Permanent Habitation	0.5 x 0.5	0.25	Cultural remains present
11	30030	Modified outcrop	Temporary habitation	0.65-1.3 x 0.9	0.97	Cultural remains present
12	30025	Lava Blister	Burial	0.4 x 0.4	0.16	Human remains
13	21139, Feature AF	Enclosure	Permanent Habitation	0.5 x 0.5	0.25	Cultural remains present
				Total	**8.08**	

Table 4. Summary of Latinis et al. (1997) agricultural features of Site 21139

Feature Designation	Status of feature	Mound	Wall	Pit	Walkway	Modified depresion	Modified gully	Modified outcrop	Enclosure	Terrace	C-shape	Lava tube (cave)	Manuport
A	Could not correlate	18+	7+										
B	Could not correlate		7+	2+									
C	Could not correlate		7+	2+									
D	Could not correlate	5+	4+										
E	Could not correlate	21+	5+	2+									
F	Could not correlate												1
G	Destroyed	3+					1	1					
H	Could not correlate		4+	2+									
I	Could not correlate	2+	3+	2+									
J	Could not correlate		9+	2+									
K	Destroyed	10	1										
L	Could not correlate		1										
M	Destroyed	15+	2										
N	Destroyed						1						
O	Destroyed		5	2+									
P	Could not correlate						1						
Q	Could not correlate		1										
R	Destroyed	2+	6				1	2+					
S	Destroyed					2							
T	Destroyed										1		
U	Destroyed				1								
V	Destroyed					1							
W	Destroyed								1				
X	Destroyed											1	
Y	Destroyed		1										
Z	Destroyed				1								
AA	Destroyed					1				1			
AB	Destroyed				1								
AC	Destroyed				1								
AD	Destroyed				2			1	1	1			
AE	Destroyed									1			
AF	Relocated								1				
	Total	**76+**	**63+**	**14+**	**6**	**4**	**4**	**4+**	**3**	**3**	**1**	**1**	**1**

(4), modified gully (4), modified outcrop (4+), enclosure (3), terrace (3), C-shape (1), lava tube (1), and manuports (1). Of the 32 feature designations assigned by Latinis *et al*. (1997), 19 features (Features G, K, M, N, O, R-Z and AA-AE) were not relocated and were likely destroyed prior to the present project because the features were situated in areas of the retreat that are developed today. The 19 feature designations include at least 72 individual features. The reported locations of these destroyed features is depicted on **Figure 20.**

Of the remaining Site 21139 feature designations, 12 could not be positively correlated with the features identified during the present survey because of limited descriptive information and/or insufficient location data in the *Latinis et al.* (1997) report. These feature designations are A-F, H-J, L, P and Q. The feature designations include a estimated minimum of 108 individual features situated in undeveloped portions of the retreat. All of these features were likely recorded as components of the Site 30037 agricultural complex described below. This complex includes 486 agricultural individual features scattered throughout the undisturbed portions of the project area.

Only one (**Feature AF**) of the 32 feature designations reported by Latinis *et al.* (1997) was positively relocated during the present project. The feature is an enclosure located in the southwestern corner of the project area at approximately 56 ft elevation. The site is located on a low rise above a gentle slope to the east. The enclosure is oval in shape and is 7.1 meters long (northeast by southwest) by 5.8 meters wide with no entrance (**Figure 22**). The walls range in width from 0.65 to 1.75 meters and in height from 0.5 to 1.0 meters. Portions of the interior southwest and southeast sides are constructed of stacked and faced cobbles and boulders. The remaining sides of the structure have collapsed.

The interior of the enclosure is a level soil-covered surface. A plastic grow bag is present on the surface. A 0.5 by 0.5 meter test unit (TU-13) was excavated in the central portion of the enclosure, revealing a single soil layer over bedrock. Layer I is a 0.08 to 0.27 meter thick very dark gray (10YR 3/1) silt loam with 10% pebble and gravel inclusions. Cultural remains from Layer I consist of 7 fragments of volcanic glass, 10 basalt flakes, 1 basalt adze flake, 1 unidentified marine shell fragment, a fragment of worked bone, and two fragments of burned *kukui* nutshells.

The documentation of Feature AF during the present project indicates that it should be reclassified as a permanent habitation. Permanent habitation features are defined as the primary dwelling structures at a permanent habitation site based on a criteria developed by Cordy (1981:66-82). In his model, Cordy presents the following attributes for permanent habitation sites and features: (a) external area greater than 16.0 to 19.0 sq m; (b) substantial construction (i.e. faced walls, paving); (c) presence of special purpose structures (small structures for work and storage); and (d) location (permanent housing clustered primarily along the shoreline or at the mouth of and on the sides of valleys). Other attributes used in this study as evidence of substantial construction include architectural features such as cupboards, constructed doorways and steps, and internal subdivision into rooms. Large enclosures surrounding permanent habitation yards sites are termed ancillary features, functioning to define the limits of enclosed yards.

It is likely that the Site 21139, Feature AF enclosure functioned as the foundation for a roofed structure based on its formal type, substantial construction (faced sides) and large area (41.1 sq meters). This feature is unaltered and in fair condition. It is assessed as significant for its information content.

Sites 21140, 21141 and 21142 consist of large enclosures located in the seaward portion of the project area that were previously identified by Latinis *et al.* (1997). These sites have subsequently been destroyed by development activity. Site 21142 was a complex of two adjacent enclosures and Sites 21140 and 21141 were large single features sites. The former extent of these sites is depicted in **Figure 20.** No detailed plan maps are available for these sites, although they are described by Latinis *et al.* as follows:

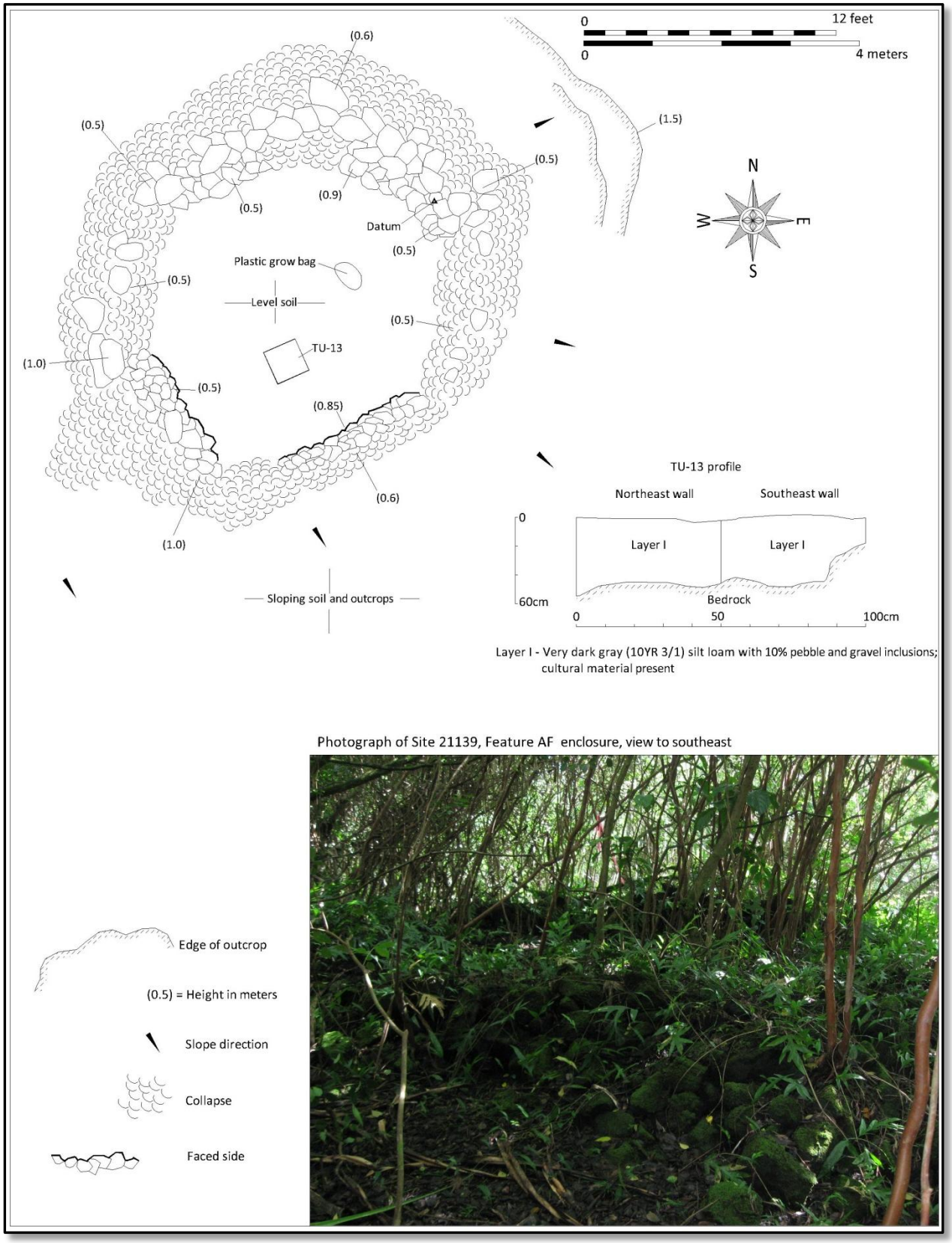


Figure 22. Site 21139, Feature AF plan map, photograph and profile of TU-13

Site 21140

> This feature consists of a relatively large enclosure constructed out of bifaced core-filled walls…The facings of the walls are well built from angular basalt stones 25 to 75 cm in diameter stacked in 5 to 6 courses standing 100 to 120 cm agl [above ground level]. The core of the walls are filled with smaller pieces of angular basalt a'a measuring 5 to 15 cm in diameter. In some places the wall is more deteriorated and no longer appears bifaced while in some spots the bottom of the wall appears to be roughly stacked rubble and the upper 60 cm is bifaced.
>
> Differences in the wall's morphology appear to be related to topography and deterioration. The feature measures approximately 90 m in length and 30 m in width enclosing an around of around 2700 square meters. Mounds and pits are present both within and without the enclosure. It is likely that the function was related to animal husbandry and/or agriculture. The size and constructional morphology of the walls suggest that this feature may having been constructed during the historic period and related to animal husbandry (e.g. cattle ranching; *ibid*. 1997:60).

Site 21141

> This feature consists of a rectangular enclosure with one wall which is bifaced and core-filled and the other three consisting of stacked alignments of stone…The walls are constructed of angular basalt stones 25 to 75 cm in diameter. The eastern wall is bifaced and core-filled standing between 80 and 120 cm agl and measuring approximately 75 cm thick. The remaining three walls are more simple in construction consisting of stacked alignments of stone standing between 30 and 70 cm agl and measuring approximately 75 cm thick. The enclosure measures approximately 60 m long and 30 m wide. Vegetation is relatively sparse within the enclosure and there are several mounds scattered about the interior. The size and constructional morphology of the walls suggest that this feature may having been constructed during the historic period and related to animal husbandry (e.g. cattle ranching; *ibid*. 1997:60-61).

Site 21142

> This feature consists of a pair of adjacent enclosures. The walls of these enclosures are bifaced and core-filled being constructed of angular basalt stones measuring 30 and 60 cm in diameter. The walls measure between 60 and 120 cm in width and stand 150 cm agl. Each enclosure is roughly square measuring approximately 10 m on a side. Each enclosure also has a small entrance, one opening towards the north while second opens towards the east so that the two are adjacent to each other and are oriented towards one another. These enclosures are believed to be small livestock holding pens constructed and utilized in the historic period (*ibid*. 1997:61).

All three sites were interpreted to be cattle pens; however, it is possible that they are early historic residential yards within which one or more dwellings and associated gardens were present like Site 30033 discussed below. These sites were assessed as significant for their information content by Latinis *et al.* (1997:88) and were recommended for additional work (*ibid:*87); however, in a July 17, 1998 letter from DLNR-SHPD to the landowner, no further work was recommended for the three sites (see **Appendix C**). Despite this recommendation, a data recovery plan was subsequently prepared for Sites 21139-21142 (Moore and Kennedy 1998). This plan was submitted to DLNR-SHPD for review; but the plan was not finalized or implemented (see **Appendix A**).

Site 21143 is a complex of three features located in the south-central portion of the project area. This site was initially identified by Latinis *et al*. (1997:61) as a paved platform (Feature A), a terrace (Feature B) and a wall (Feature C). The site is depicted in **Figure 23**. The site is described by Latinis *et al*. (1997) as follows:

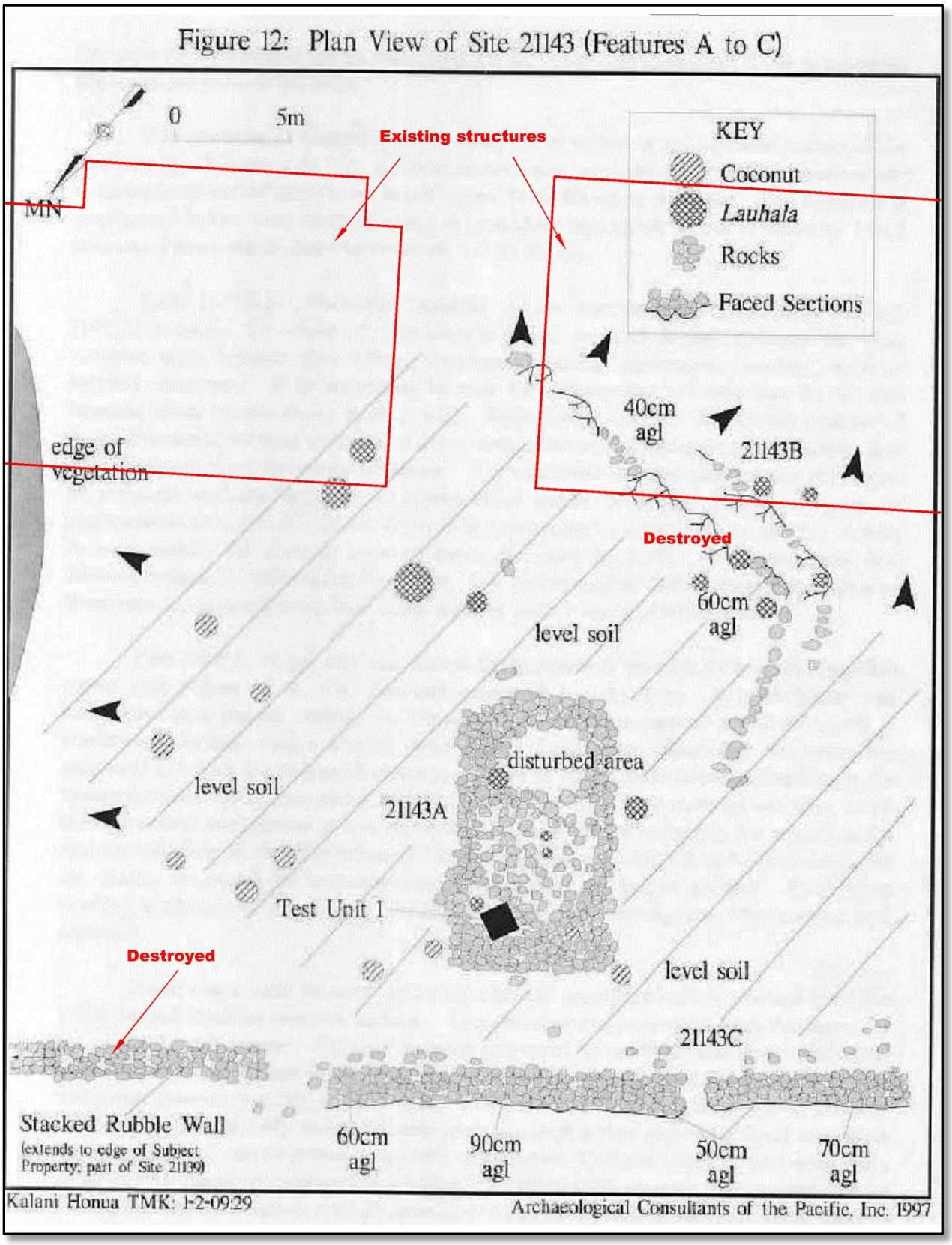


Figure 23. Site 21143 plan map (modified from Latinis *et al.* 1997:62)

> The platform is constructed of angular basalt stones 25 to 75 cm in diameter and is paved with waterworn basalt stones 50 to 80 cm in diameter. It measures 12.5 m in length by 7.5 m in width and stands between 40 and 40 agl. The structure is in a deteriorated condition with stones and rubble exposed through the former paving and fallen edges. The *makai* end of the platform is extremely disturbed.
>
> The platform is situated in a level soil area which is bounded by a faced, core-filled wall {Feature C) on its *mauka* side and soil backed terracing [Feature B] on its *makai* side. The faced, core-filled wall is approximately 5 m *mauka* of the platform. The wall has two segments separated by a gap that may have functioned as an entrance way. It is constructed out of angular basalt stones 30 to 60 cm in diameter and is nicely faced on its *mauka* side while sloping to the ground on its *makai* side. The wall extends 15.5 m from its northeastern end until reaching the gap, which measures approximately 1 m wide. The structure then continues for an additional 8.5 m. The wall measures 75 cm wide at the top and 1.5 m wide at the base.
>
> The terracing is located approximately 10 m *makai* of the southern corner of the platform. It incorporates small, exposed outcrops of *pahoehoe* and is constructed out of waterworn basalt stones 50 to 80 cm in diameter. The terracing is constructed in two tiers, each of which is backed by thin layers of soil retained by 1 to 2 courses of stone which stand between 40 and 60 cm agl (1997:61-63).

Latinis *et al.* (1997:63) excavated a 1.0 by 1.0 meter test unit in the northeastern portion of the Feature A platform (**Figure 24**). This excavation consisted of the removal of 0.55 meters of structural fill, 0.4 meters of structural fill mixed with detritus, over 0.17 meters of fill without detritus. Marine shell, slate, glazed ceramics, a rubber fragment and charcoal were recovered from upper 0.25 meters of the structural fill mixed with detritus portion of the unit.

Site 21143 corresponds to Pu‘ulena Heiau, that was noted by Hudson in coastal Ke‘eke‘e. Hudson describes the site as follows:

> Thrum (65-c, p. 40) says there was a heiau named Puulena at Keekee but he was unable to get any information about it. The site, as pointed out to me, is 100 feet north of the road in a palm grove by an abandoned school house. Here there is a small rough mound of aa about 5 feet in diameter which is said to have been the heiau. The site may have been a small family shrine.
>
> Between this spot and the road in the middle of an overgrown trail is a water-worn boulder 18 inches in diameter. The center has been hollowed out in a cup-shaped depression 4 inches across and about 3 inches deep. A small platform of flat beach stones is built around the boulder (1932:387).

Site 21143 was examined during the present project (see **Figure 24**). The Feature A platform was found to be in about the same condition it was during the Latinis *et al.* (1997) study. A portion of the Feature A platform, paved with waterworn stones is depicted on the cover of this report. The Feature B terracing has been destroyed, likely by the construction of two adjacent structures (see **Figure 23**). The northeast end of the Feature C wall has also been destroyed, likely by construction activities in the area.

The waterworn boulder and small paved platform noted by Hudson (1932) were not identified during the present project and were probably destroyed. As Hudson indicates this feature was originally located halfway between the road and the main heiau, potentially located in the vicinity of the adjacent buildings.

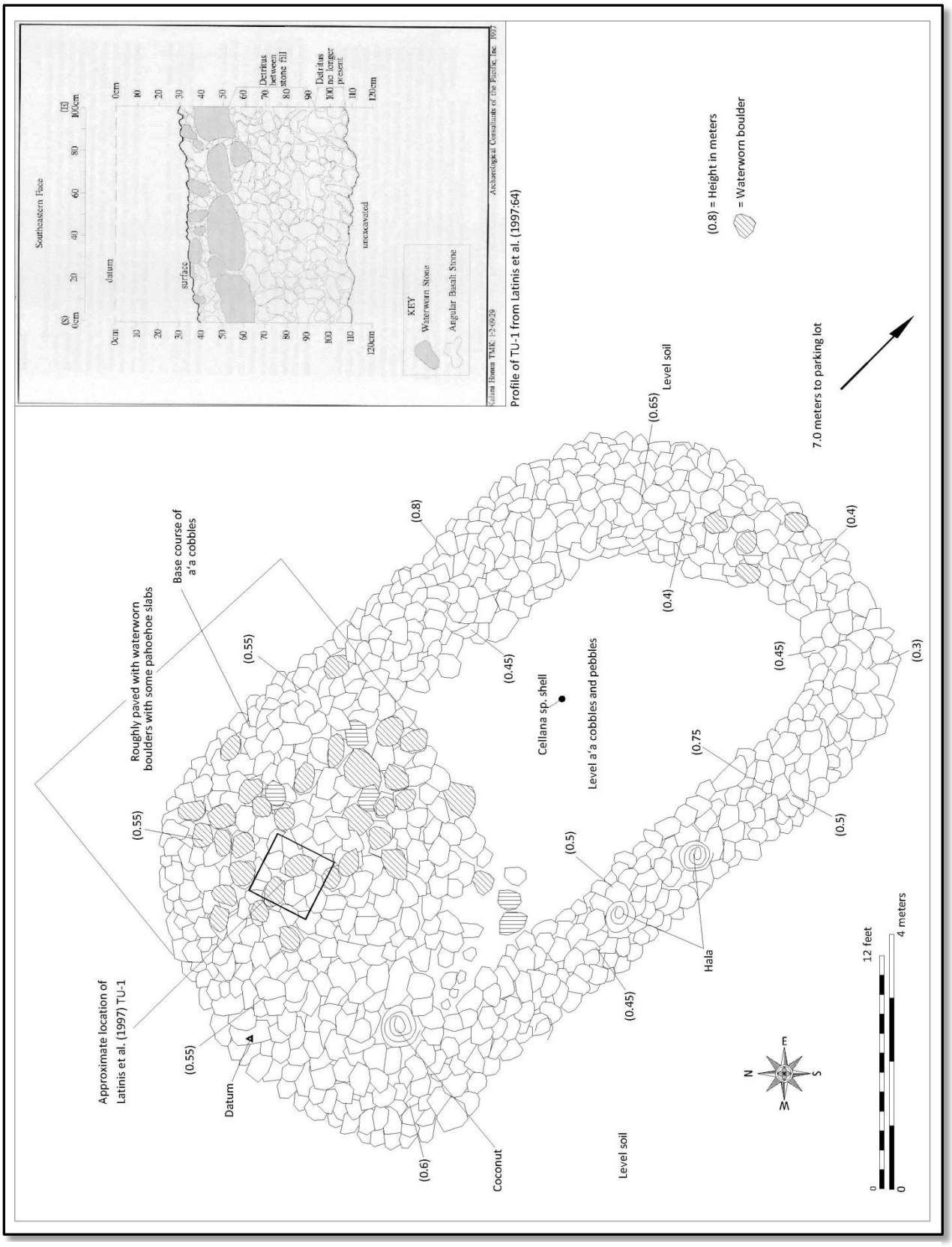


Figure 24. Plan Map of Site 21143 and profile of TU-1 from Latinis *et al.* (1997)

Site 21143 was interpreted as a *heiau* by Latinis *et al*. (1997:63). It was assessed as significant for its information content and for its cultural value to the Hawaiian people (1997:88), and was recommended for preservation (1997:86). A preservation plan, proposing a 10 meter wide buffer zone, was subsequently prepared for Site 21143 by Koob (1999; see **Appendix B**). This plan was found to be acceptable by DLNR-SHPD in 2000 (Log No: 24539, Doc. No. 9912PM02; see **Appendix A**).

Site 30024 is a C-shaped enclosure located near the western project area boundary at approximately 138 ft elevation. The enclosure is 5.1 meter long (north-south) and 3.6 meter wide, with a 0.7 meter wide opening along the western wall (**Figure 25)**. The walls of the structure are constructed of piled cobbles and boulders that are 0.95 to 1.8 meters thick and 0.1 to 0.7 meters in height. The interior of the enclosure is level soil with no cultural remains present. Seven features of the Site 30037 agricultural complex are located around the Site 30024 enclosure (Features CA through CG).

Site 30024 is interpreted as a temporary habitation site. As defined by Cordy (1981), temporary habitations are (a) less than 16 sq m in external area, (b) insubstantial constructions, (c) contain numerous features of internal stratification (multiple firepits), and (d) have few or no associated structures. These habitations probably are characterized by occupations of short-term to recurrent duration. Though larger than typical temporary habitations (18.3 sq meters), Site 30024 likely functioned in this capacity based on its formal type and insubstantial construction. The site is unaltered and in poor condition. It is assessed as significant for its information content.

Site 30025 is a lava blister located in the southwestern portion of the project area at approximately 138 ft elevation. The terrain in the area is soil and outcrops that slope gently to the southeast. The entrance to the blister is a vertical hole in a surface pahoehoe outcrop that is 0.8 meters long (northeast by southwest) and 0.45 m wide (**Figure 26**). The outcrop is irregularly shaped and is 3.0 meters long (northwest by southeast), 2.1 m wide and 0.3 to 0.5 m in height above the surrounding ground surface. Subangular basalt cobbles and boulders have been piled around the sides of the outcrop. A small waterworn basalt cobble is present on the surface of the outcrop to the northeast of the blister entrance.

The vertical entrance into the blister drops 0.7 meters onto the soil-covered floor of the interior The blister is oval in shape and is 1.95 meters long (northwest by southeast), 1.15 meters wide and 0.6 meters in height. Two small unidentified bone fragments are present on the surface of the blister floor along the south side. A 0.4 by 0.4 meter test unit (TU-12) was excavated into the center of the blister floor (see **Figure 26**). This excavation revealed a layer of dark grayish brown (10YR 4/2) silt loam with 20% gravel and pebble inclusions (Layer I). An intact human tibia was noted within this deposit at 0.05 meters below the surface. The excavation of the unit was terminated when the human remains were identified and the unit was carefully backfilled.

Site 30025 is interpreted as a burial site based on the presence of the human remains within TU-12. The site is unaltered and in good condition. It is assessed as significant for its information content and cultural value to the Hawaiian people because the remains are of probable Hawaiian ancestry based upon the burial context.

Site 30026 consists of an enclosure (Feature A) and a wall (Feature B) located in the northwestern portion of the project area at approximately 145 ft elevation. The site is located in a dense *hala* grove with the terrain sloping gently to the southeast. There are numerous agricultural features of the Site 30037 complex surrounding the site.

The Feature A enclosure is rectangular in shape and is 7.7 meters long (north-south) by 6.3 meters wide with no apparent entrance into the interior (**Figure 27**). The walls are collapsed and comprised of linear piles of cobble and boulder rubble that are 0.8 to 1.4 meters wide and 0.2 to 0.7 meters in height. The interior of the enclosure is level soil with dense *hala*. No cultural remains are visible.

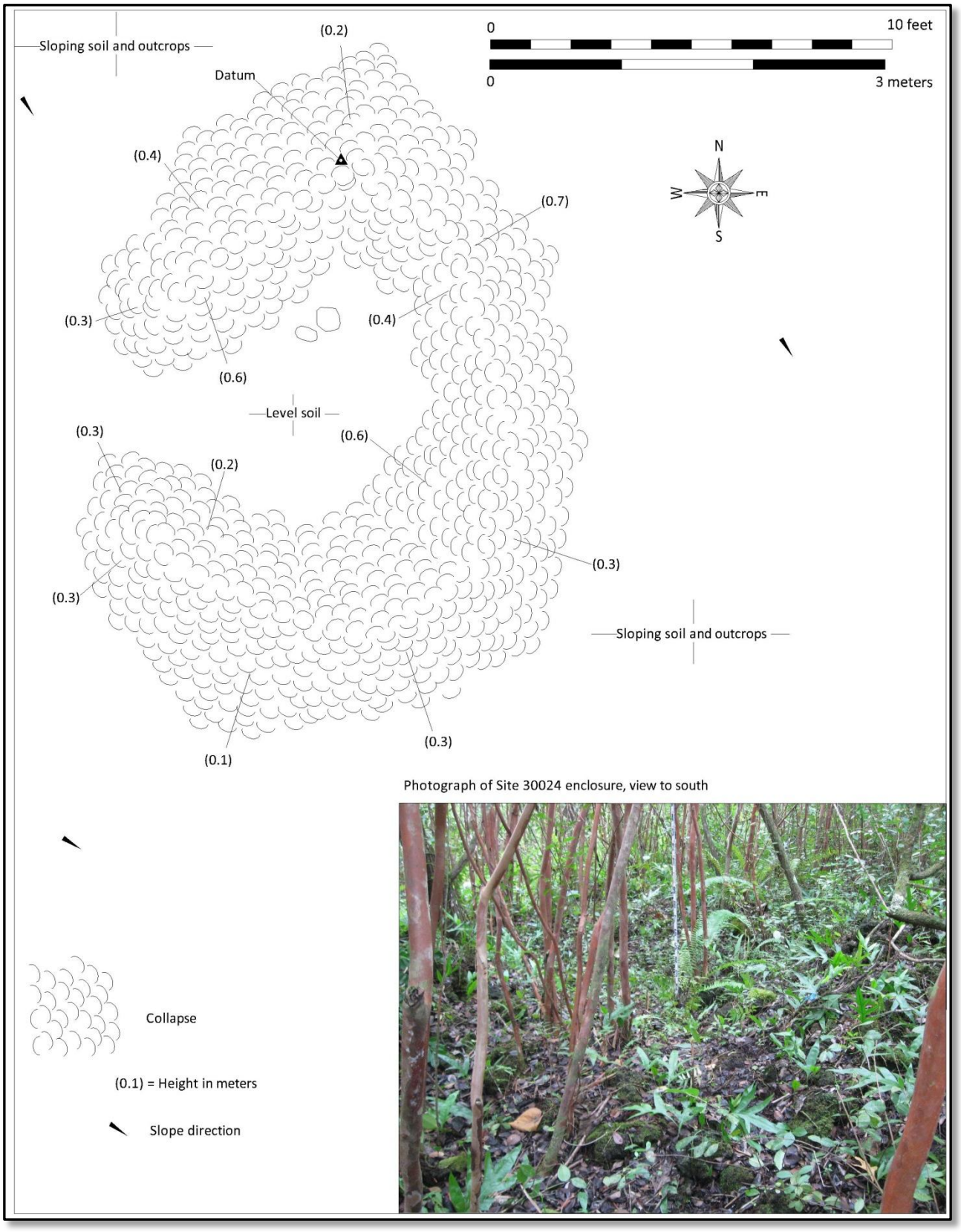


Figure 25. Site 30024 plan map and photograph

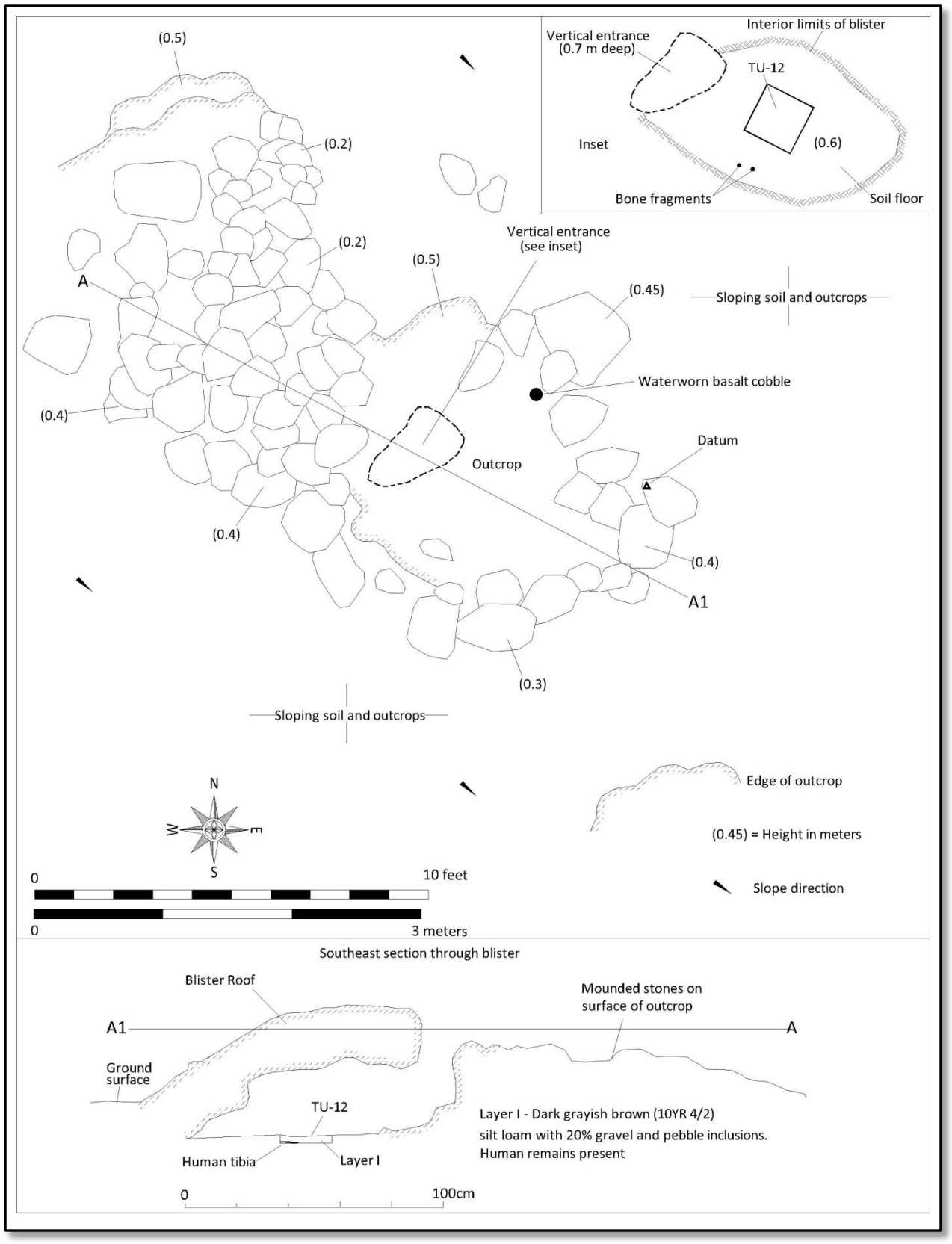


Figure 26. Site 30025 plan map and profile of TU-12

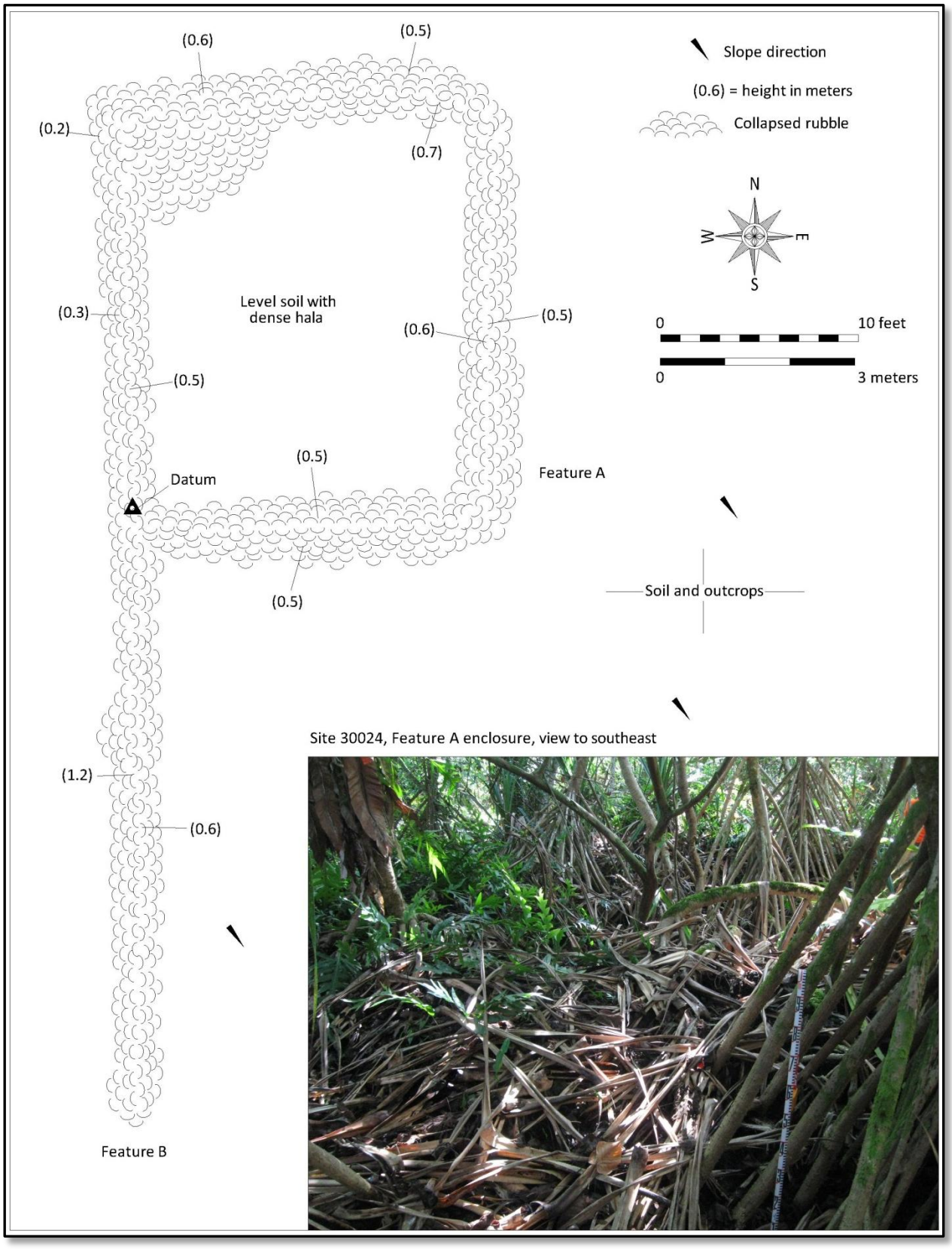


Figure 27. Site 30026 plan map and photograph

The Feature B wall extends 8.7 meters to the south of the southwestern corner of Feature A. The wall is 0.6 to 1.0 meter in width and 0.6 to 1.2 meters in height. This feature is also collapsed cobble and boulder rubble. No cultural remains are present.

Site 30026 is interpreted as a possible permanent habitation site, with the Feature A enclosure functioning as the foundation for a roofed structure. This is based on its formal type and area 48.5 sq meters. The Feature B wall potentially served to delineate the boundaries of an associated activity area. The site is unaltered and in poor condition. It is assessed as significant for its information content.

Site 30027 is an oval-shaped enclosure located in the north-central portion of the project area at approximately 153 ft elevation. The site is located east of a small rise in an area of soil and outcrops that slope gently to the east. The structure is 4.1 meters in length (north-south) and 3.5 meters wide with no apparent entrance into the interior (**Figure 28**). The enclosure wall is constructed of piled cobbles and boulders and is 0.4 to 1.1 meters wide and 0.2 to 0.6 meters in height. The southwestern side of the enclosure is comprised of sloping rubble that angles into the interior. The interior of the enclosure is a level soil-covered surface. No cultural remains are present inside the structure, although a waterworn basalt cobble is located outside the enclosure to the south.

Site 30027 is interpreted as a temporary habitation structure. This is based on its formal type, insubstantial construction and small area (14.3 sq m). The site is unaltered and in fair condition. It is assessed as significant for its information content.

Site 30028 consists of two terraces located in the north-central portion of the project area at approximately 142 to 145 ft elevation. The site encompasses an area 31.0 meters long (north-south) and 20.0 meters wide. The terrain consists of soil and outcrops that slope to the southeast (**Figure 29**). A modern trail is located adjacent to the site to the north.

The Feature A terrace is located at the north end of the site. It is 12.0 meters long (east-west) and 9.3 meters wide, bordered on the south by a terrace wall and on the north by a low wall. The terrace wall is built of stacked cobbles and boulders, measuring 6.5 meters long and 0.8 to1.3 meters wide. The wall is 0.6 to 0.8 m in height on the southern, downslope side and 0.1 to 0.25 meters high on the northern, upslope side. There is a level soil area on the north side of the terrace wall. No cultural remains are present on the surface of the feature.

A 0.5 by 0.5 meter test unit (TU-10) was excavated into the soil surface of the terrace revealing a single soil layer over bedrock (see F**igure 29**). Layer I consists of 0.32 to 0.4 meters of a very dark grayish brown (10YR 3/2) silt loam with 75% pebble and gravel inclusions. Cultural remains from Layer I consist of five fragments of volcanic glass including a core and utilized flakes. These cultural remains are described in detail in **Appendix D**.

A piled cobble and boulder wall extends along the northern side of the level soil area. This wall is slightly curved and is 12.2 meters long (east-west), 1.8 to 2.2 meters wide and 0.25 to 0.5 meters in height.

The Feature B terrace is located adjacent to Feature A to the south. The feature is irregularly-shaped and is 23.0 meters long (northeast by southwest) and 15.9 meters wide. The downslope side is bordered by a low bedrock outcrop and sloping soil. The upslope side is bordered by a sloping wall that is 0.9 to 2.5 meters wide. This wall is 0.8 to 1.1 meters high on the downslope side and 0.1 to 0.3 meters on the upslope side. The surface of the Feature B terrace is level soil with no cultural remains.

Site 30028 is interpreted as a probable permanent habitation complex. The Feature A terrace may have served as the foundation for a roofed structure based on its formal type and area (111.6 sq meters). Feature B is interpreted as a possible activity area based on its formal type and proximity to Feature A. The site is unaltered and in poor to fair condition. It is assessed as significant for its information content.

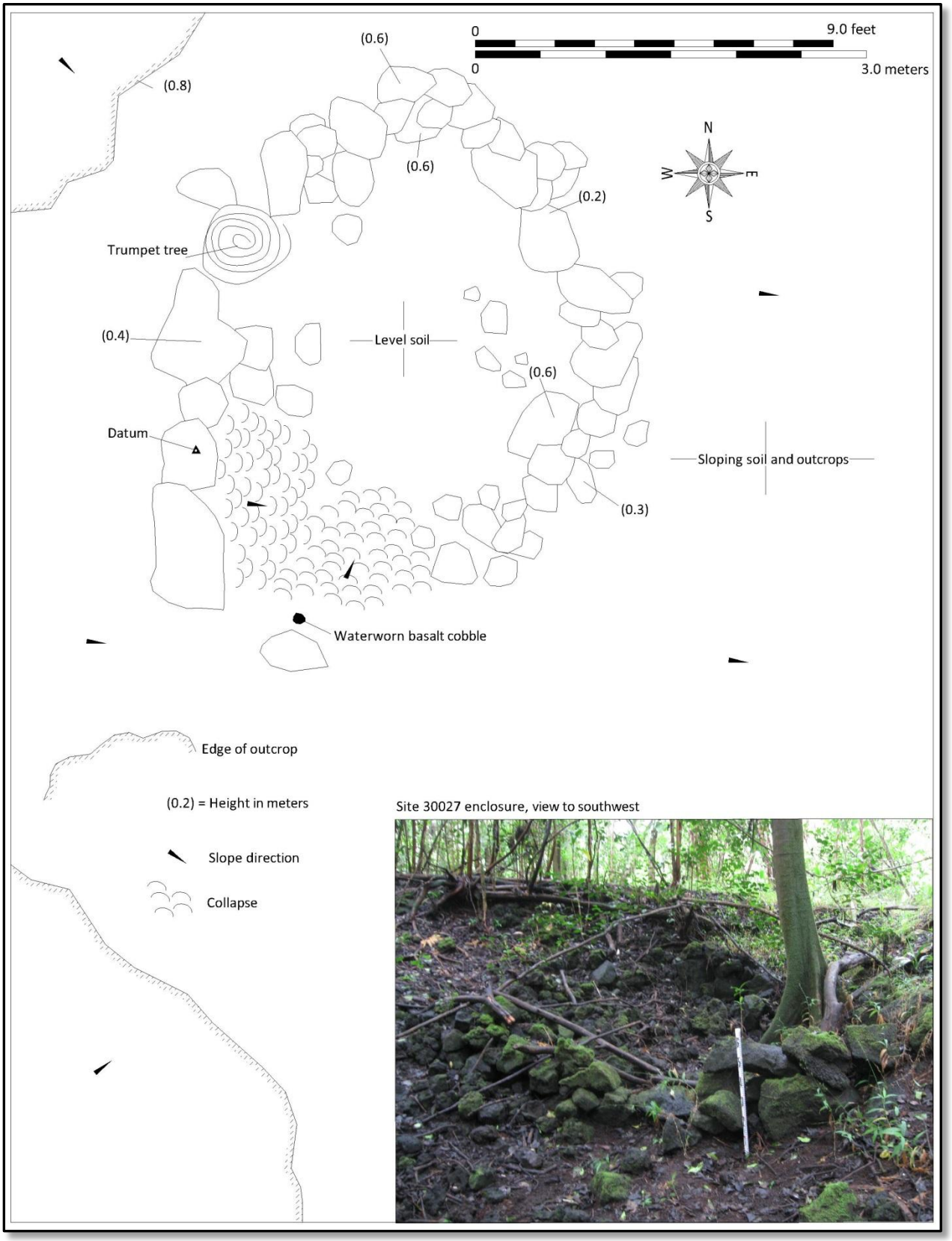


Figure 28. Site 30027 plan map and photograph

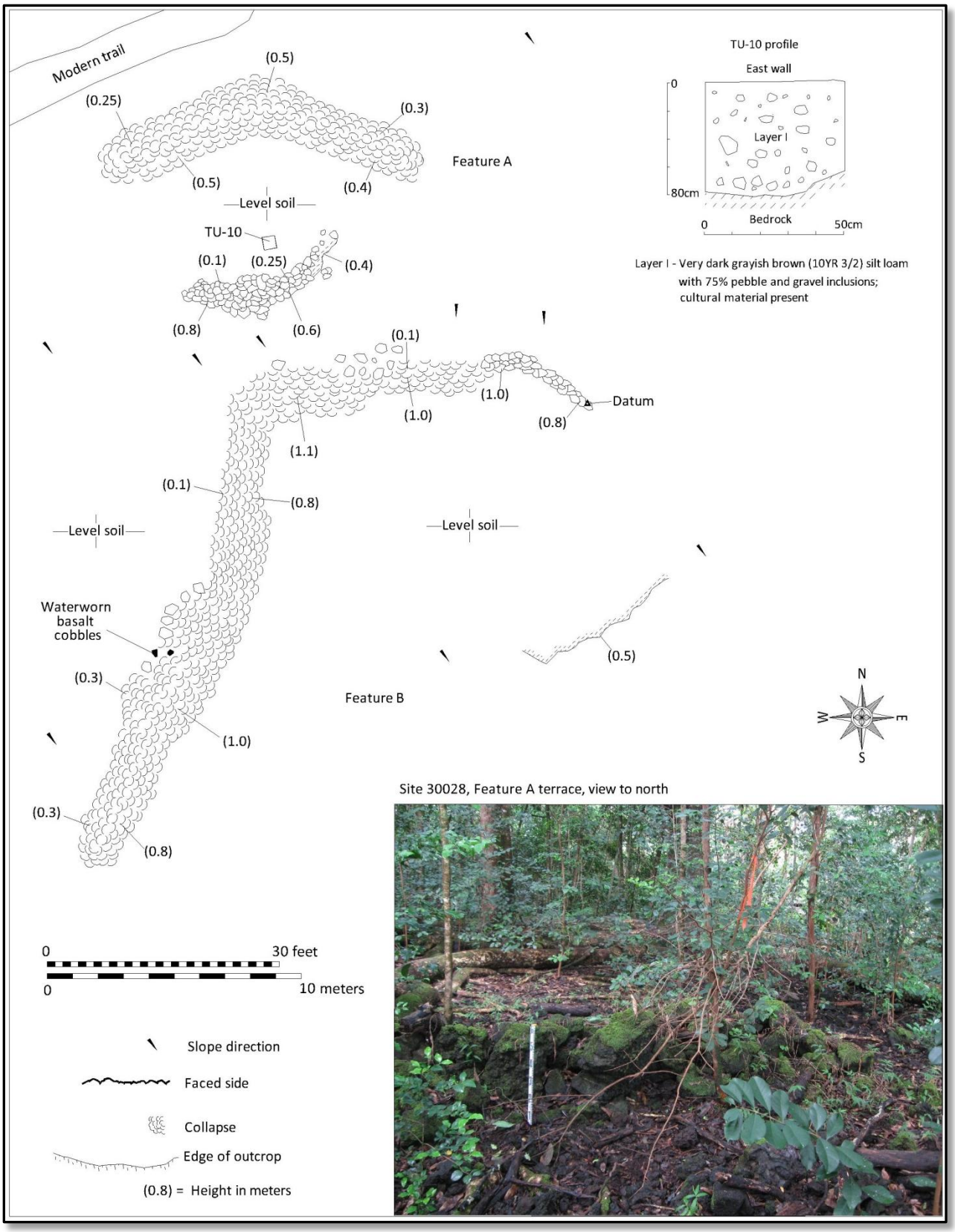


Figure 29. Site 30028 plan map and photograph and profile of TU-10

Site 30029 is an enclosure located in the central portion of the project area at approximately 130 ft elevation. The enclosure is situated on a gradual southeast slope, 7.0 m south of a dirt road. The enclosure is roughly rectangular in shape and is 8.1 meters long (northwest by southeast) and 7.2 meters wide with no apparent entrance (**Figure 30**). The walls are collapsed and comprised of piled cobbles and boulders. The walls are 1.2 to 2.9 meters wide and 0.2 to 0.7 meters in height. The interior of the enclosure is level soil with no cultural remains present. A linear piled cobble and boulder wall extends off the northeast side of the enclosure. It is 4.4 meters long (north-northeast by south-southwest), 1.0 to 1.8 meters wide and 0.3 to 0.6 meters in height.

A 0.5 by 0.5 meter test unit (TU-7) was excavated into the center of the enclosure, revealing a single soil layer over bedrock (see **Figure 30**). Layer I consists of 0.23 to 0.28 meters of a dark grayish brown (10YR 4/2) silt loam with 50% gravel and pebbles inclusions. Cultural remains from Layer I consist of a fragment of burned *kukui* nutshell and 3 fragments of volcanic glass.

Although lacking substantial construction, Site 30029 is interpreted as the possible foundation for a permanent habitation roofed structure based on its formal type, large area (58.3 sq meters) and cultural remains. The site is unaltered and in poor to fair condition. It is assessed as significant for its information content.

Site 30030 is a modified outcrop located in the southwestern portion of the project area at approximately 95 ft elevation. The site is situated to the east of the Site 2539 burial complex and to the west of a dirt road. The site consists of a large pahoehoe outcrop that is 6.5 meters long (east-northeast by west-southwest), 5.2 meters wide and 0.7 to 1.9 meters in height (**Figure 31**). The outcrop has been modified by placing stones along the north, south and southeast sides of the outcrop. The stones along the south and southeast sides are piled and roughly stacked cobbles and boulders in an area 3.9 meters long (northeast by southwest) and 0.4 to 0.65 meters wide. This modification is 0.9 meters in height above the surrounding ground surface and 0.25 to 0.3 m in height above the surface of the outcrop. A waterworn basalt cobble is present along the eastern side of this modified area.

The northern side of the outcrop is more substantially constructed. Cobbles and small boulders have been stacked on and adjacent to the outcrop in an area 1.3 meters long (east-west) and 0.9 meters wide (**Figure 32**). The north side is stacked and faced (1.4 meters in height) and the eastern side abuts a raised section of the outcrop. The surface of this modified area is irregular and uneven with no cultural remains.

This northern area was excavated as TU-11 (see **Figures 31** and **32**). This excavation revealed from 0.6 to 1.4 m of loosely packed pahoehoe cobbles and small boulders, over the underlying surface of the outcrop. Cultural remains from this layer consist of a fragment of *Drupa ricina* marine shell and a scoriaceous lava abrader. The tool is abraded on the anterior and posterior surfaces with roughly shaped sides.

Site 30030 is interpreted as a possible temporary habitation site. This is based on its formal type and presence of the cultural remains in TU-11. The site is unaltered and in fair condition.

Site 30031 is a modified outcrop located in the southwestern portion of the project area at approximately 75 ft elevation. The structure is roughly oval in shape and is 4.2 meters long (west-northwest by east-northeast) and 1.9 to 3.7 meters wide, built on a low bedrock outcrop (**Figure 33**). The sides are built of stacked cobbles and small boulders, ranging in height from 0.5 to 1.0 meter with facing present on the east-southeast side. The top of the site is relatively level. No cultural remains are present on the surface of the site.

A gap was visible through the rocks along the south side of the feature. A 1.0 by 1.2 meters test unit (TU-1) was excavated along the south side of the site in this area. The excavation revealed a stone architectural layer (Layer I), a soil layer below Layer I on top of the outcrop (Layer II) and a small lava blister with a soil deposit within it (Layer III – **Figure 34**).

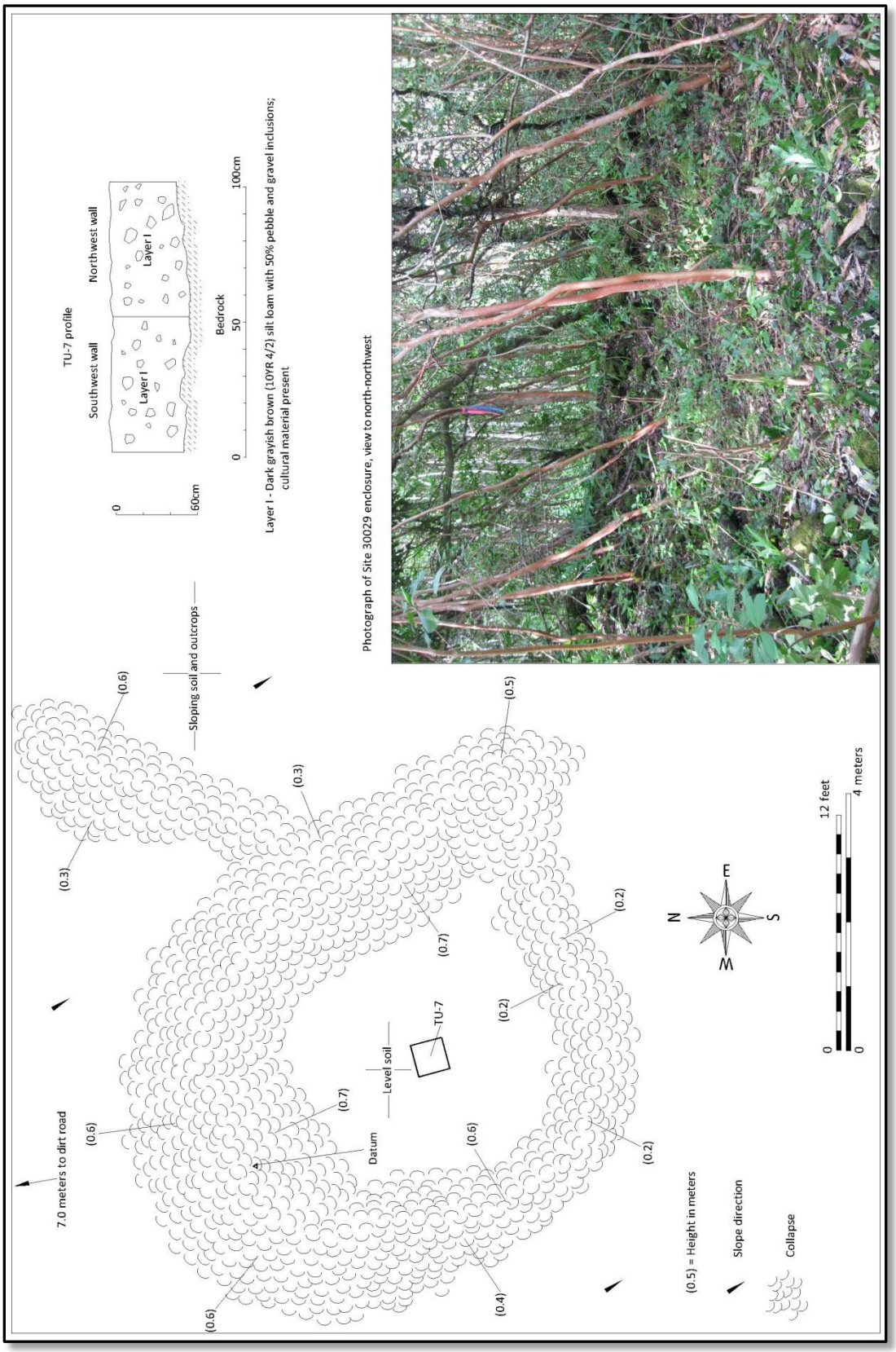


Figure 30. Site 30029 plan map and photograph and profile of TU-7

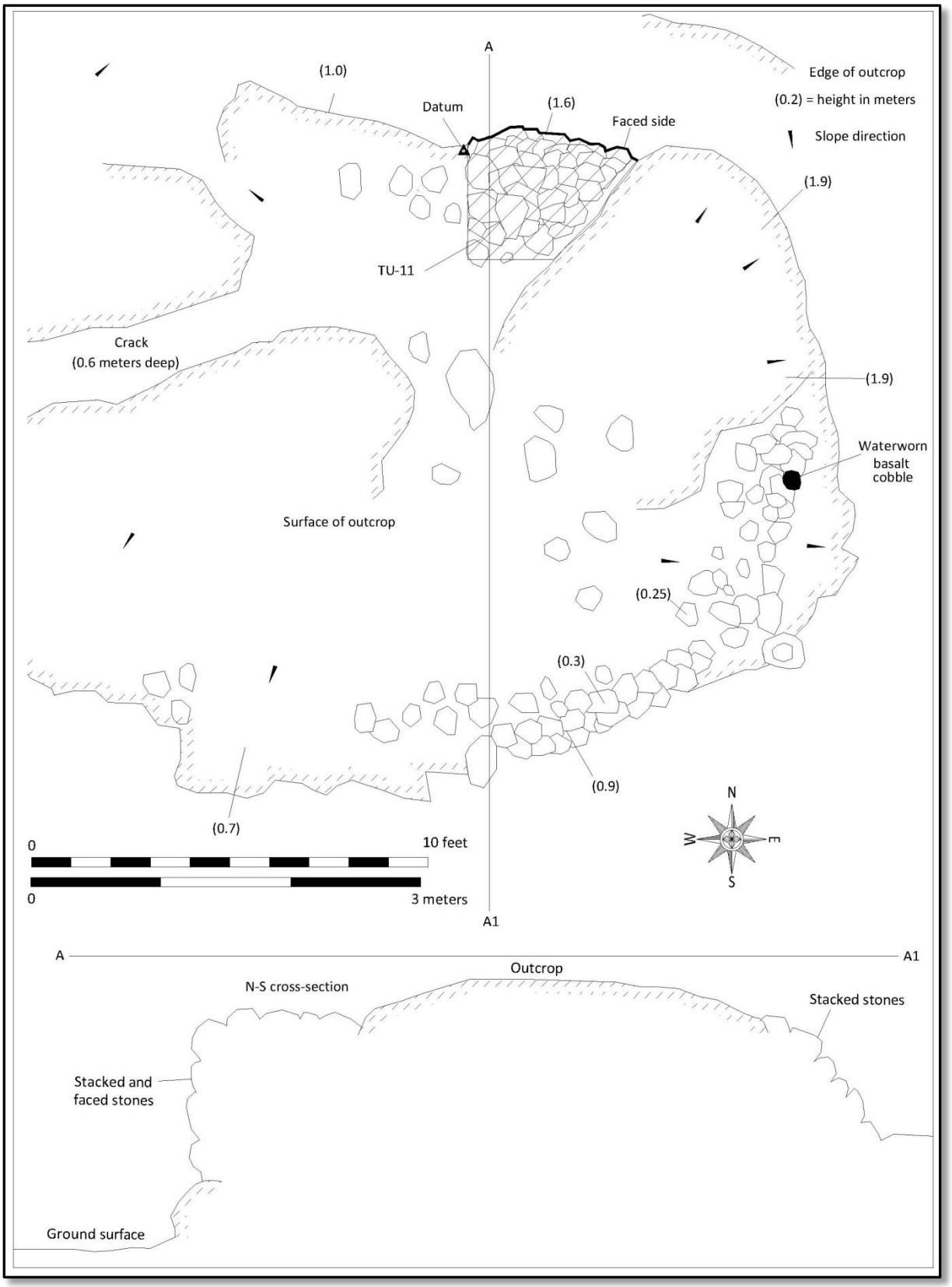
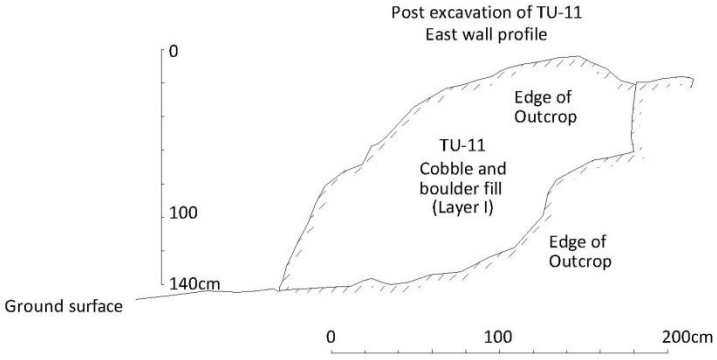


Figure 31. Site 30030 plan map and section drawing



Site 30030 modified outcrop, view to southwest



Layer I - Architectural layer of cobbles and boulders, cultural remains present

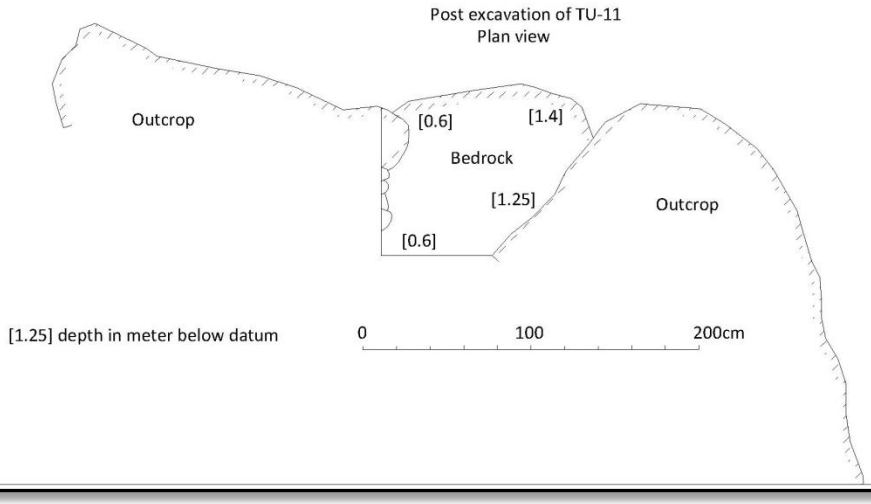


Figure 32. Site 30030 photograph and profile of TU-11

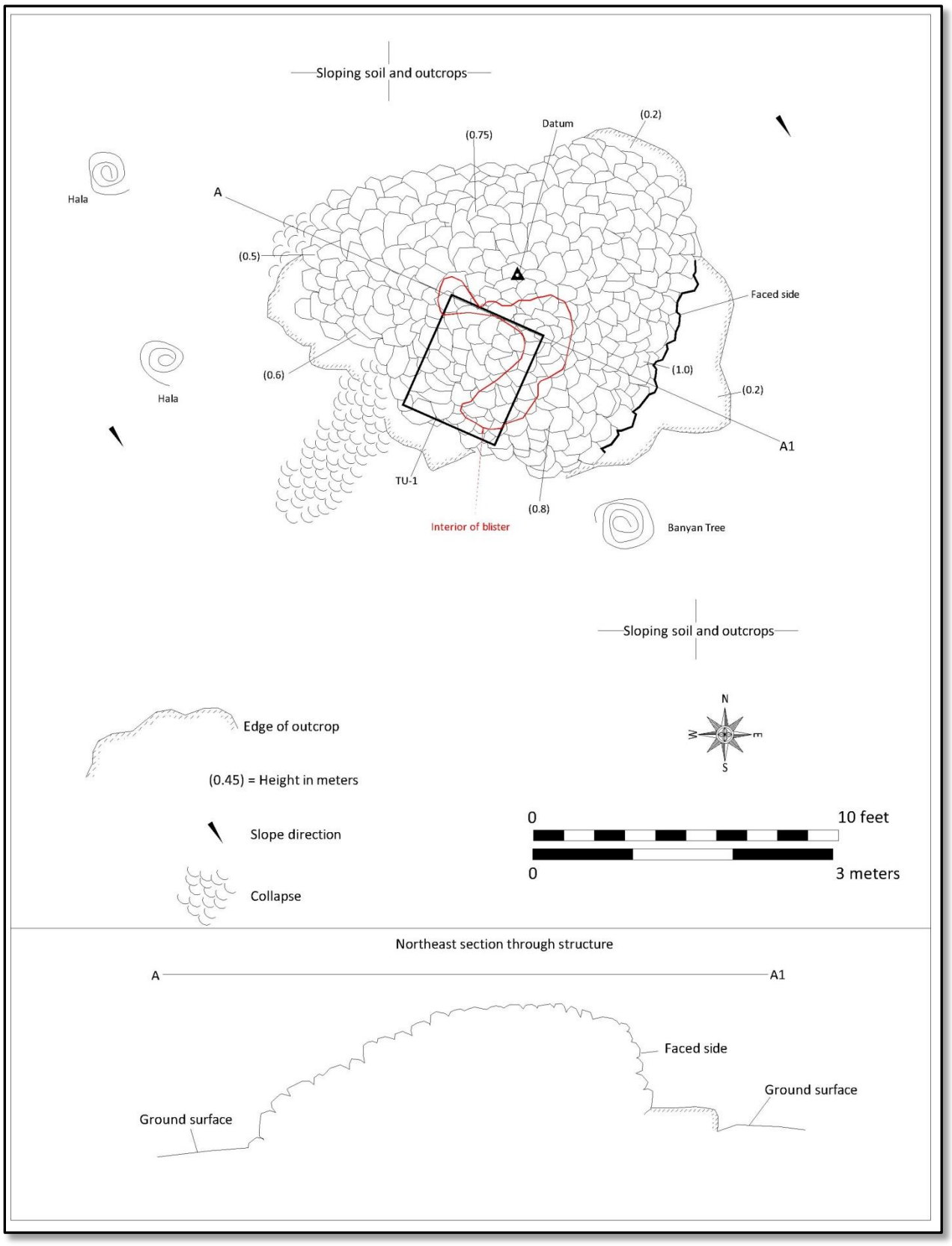
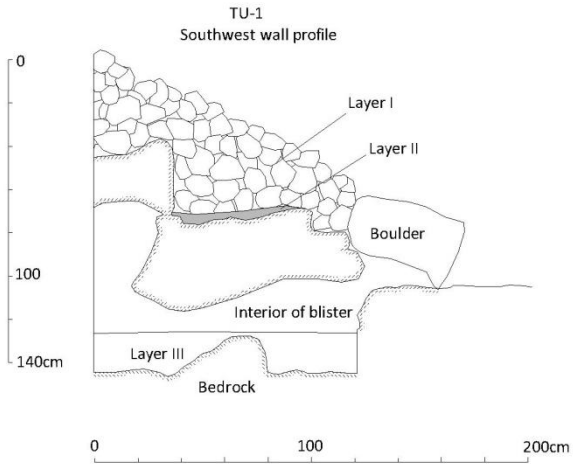


Figure 33. Site 30031 plan map and section drawing



Photograph of Site 30031 modified outcrop, view to northwest



Layer I - Architectural layer of cobbles and boulders, no cultural remains

Layer II - Brown (10YR 4/3) silt loam with 30% pebble and cobble inclusions; cultural remains present

Layer III - Brown (10YR 4/3) silt with 10% pebble inclusions; cultural remains present

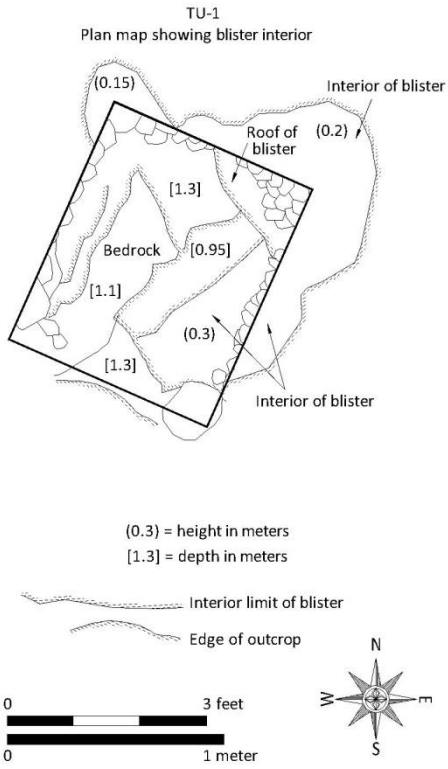


Figure 34. Site 30031 photograph and profile of TU-1

Layer I consists of 0.26 to 0.55 meters of loosely packed cobbles and boulders with no cultural remains present. A large boulder is present at the southern end of the unit. Layer II consists of a small pocket of a brown (10YR 4/3) silt loam with 30% pebble and cobble inclusions. This deposit is 0.03 to 0.05 meters in thickness. Cultural remains in Layer II consist of five *Cellana* sp. shell fragments.

A small, low irregular-shaped lava blister was encountered behind the boulder (see **Figure 34**). The blister measures 1.5 meters (north-south) by 1.35 meters (east-west). It is 0.1 to 0.6 meters wide and from 0.15 to 0.2 meters in height. No cultural remains are present on the surface of the blister.

TU-6 was continued into the soil floor of the blister. Layer III consists of 0.01 to 0.19 meters of brown (10YR 4/3) silt with 10% pebble inclusions, overlying bedrock. Cultural remains from Layer III consist of seven *Cellana* sp. marine shell fragments and one fragment of unidentified marine shell.

Site 30031 is interpreted as the possible foundation for a permanent habitation roofed structure based primarily on the size of the structure (15.5 sq meters) and on the presence of the cultural remains from TU-1. The site is unaltered and in fair condition. It is assessed as significant for its information content.

Site 30032 is a lava tube located in the southwestern portion of the project area at approximately 110 ft elevation. The entrance to the tube is through an oval-shaped vertical entrance that is 2.8 meters long (north-south), 1.3 meters wide and 1.3 meters in depth below the surrounding ground surface (**Figure 35**). Boulders are located beneath the dripline along the eastern side of the entrance.

The main portion of the tube is roughly oval-shaped and is 8.1 meters long (north-south) and from 1.7 to 3.2 meters wide. The ceiling heights in this chamber range from 0.4 to 1.1 meters and the floor is level dark brown to black silt loam. A circular rock ring is situated adjacent to the entrance to the west, measuring 0.65 to 0.7 meters in diameter. There are numerous *opihi* shells (*Cellana* sp.) scattered throughout the chamber with one fragment of a Trident shell (*Charonia tritonis*) located to the north of the rock ring.

A linear chamber extends to the north from the northeast side of the main chamber. This passage is 3.6 meters long (north-south) and 0.9 to 1.7 meters. The floor is silt loam and the ceiling heights range from 0.3 to 0.9 meters. Scattered cobbles and several *opihi* (*Cellana* sp.) shells are present on the floor at the southern end. A second small passage is located along the east side of the entrance, behind the boulders. This chamber is accessed from a narrow passage at the south end. This chamber is 2.7 meters long (north-south), 1.1 meters wide and 0.7 m in height. The floor is level soil with no cultural remains present.

Site 30032 is interpreted as a temporary habitation shelter. This interpretation is based on its formal type and presence of cultural materials within the interior. The site is unaltered and in good condition. It is assessed as significant for its information content.

Site 30033 consists of two enclosures (Features A and C) and a terrace (Feature C) located in the southwestern portion of the project area between approximately 65 ft and 80 ft elevation. The site encompasses an area 42.0 meters long (northeast by southwest) and 26.0 meters wide, in an area of soil and outcrops that slopes gently to the southeast (**Figure 36**).

The Feature A enclosure is rectangular and is 21.5 meters long (northwest by southeast) by 17.5 to 19.0 meters wide. The walls of the enclosure are built of stacked cobbles and small boulders that are 0.8 to 1.3 meters wide and 0.6 to 1.3 meters in height. Large portions of the enclosure wall have collapsed although intact faced sections are present along the southeast and northeast sides. An intact section of the Feature A wall is shown in **Figure 37**. There is a 2.1 meter wide entrance along the northeastern side that is bordered along the north side by a stacked

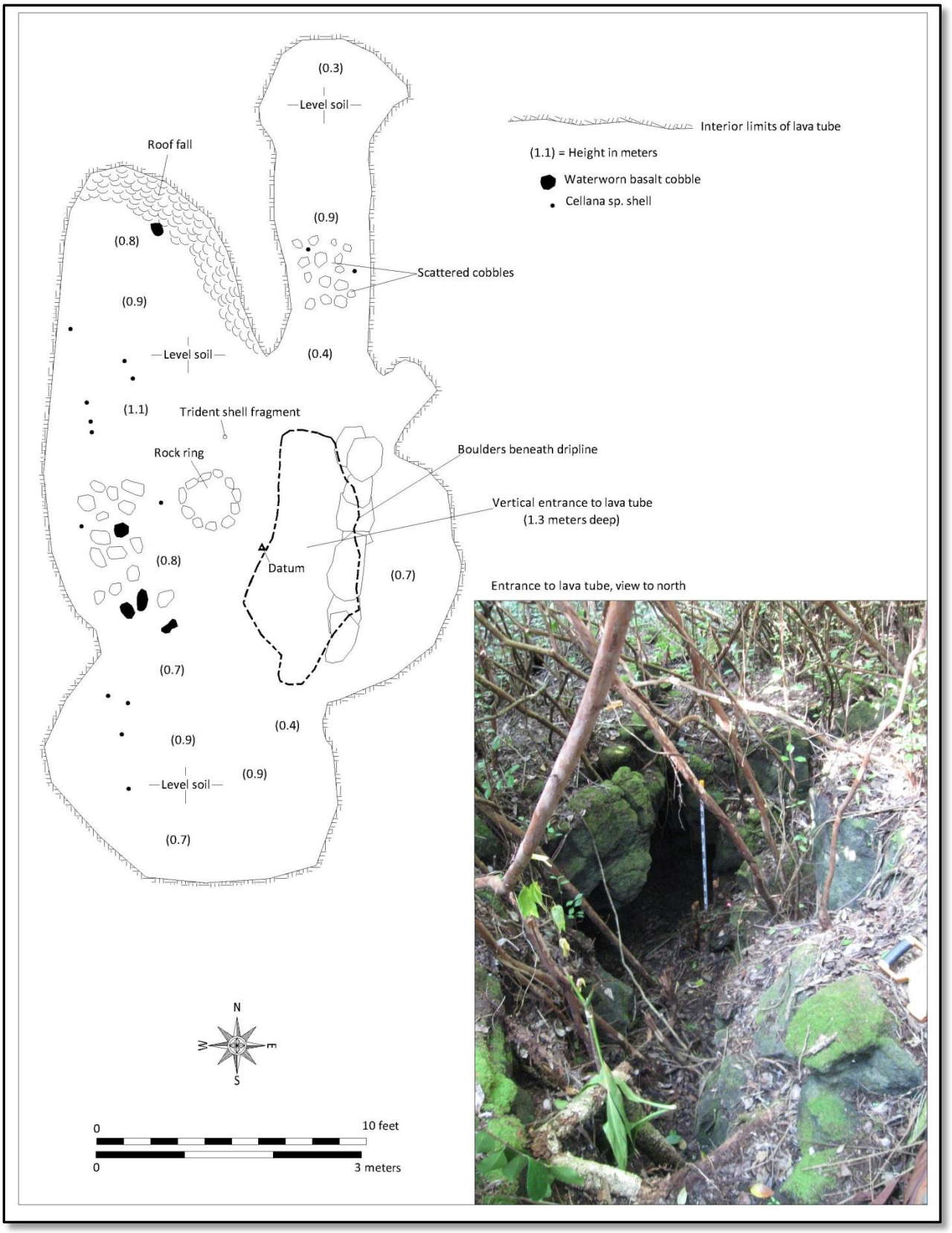


Figure 35. Site 30032 plan map and photograph

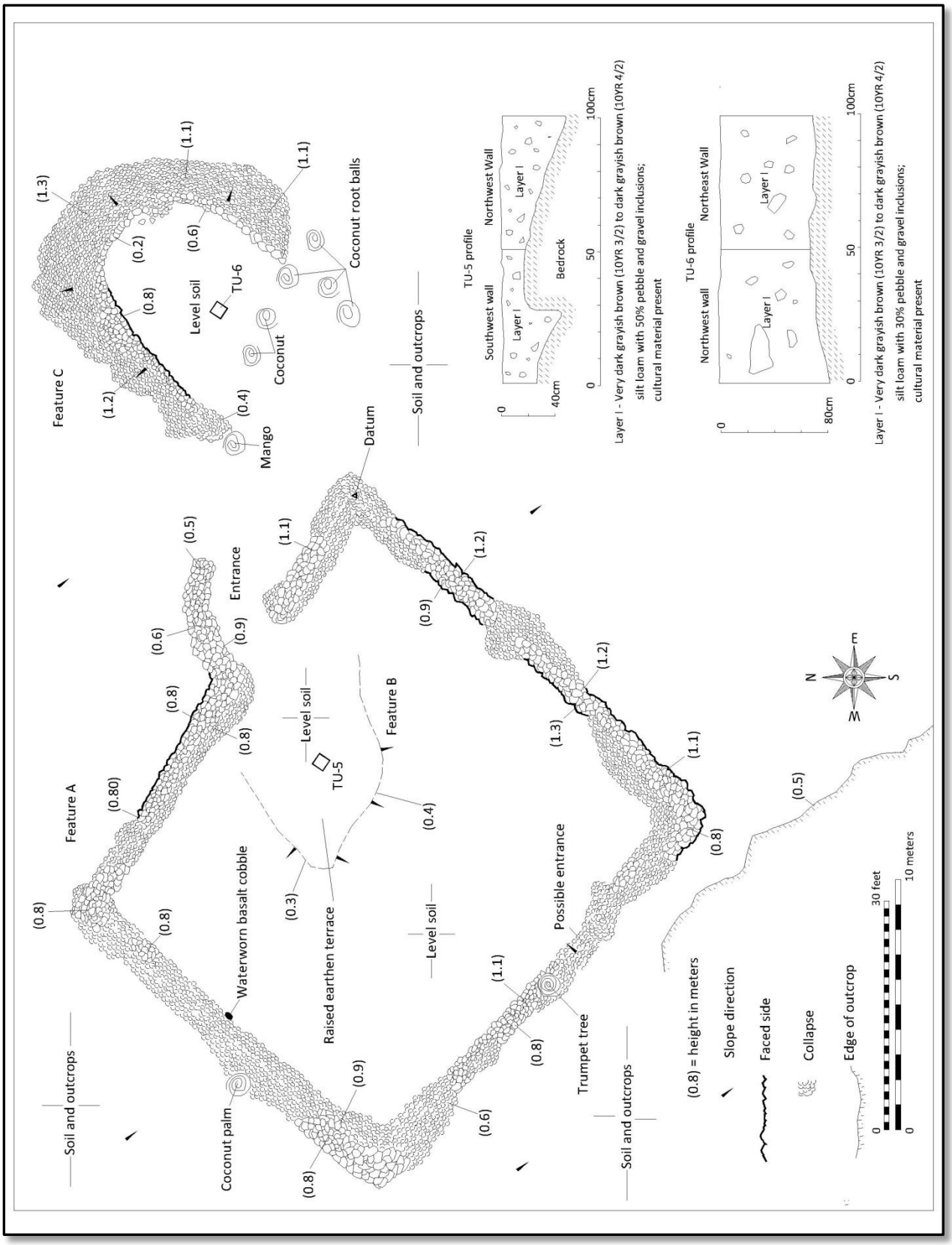


Figure 36. Site 30033 plan map and profiles of TU-5 and TU-6



Figure 37. Site 30033, Feature A enclosure wall, view to southeast



Figure 38. Site 30033, Feature C enclosure wall, view to north-northwest

stone wall. The wall bordering the entrance is 4.5 meters long, 0.8 to 1.3 meters wide and 0.5 to 0.9 meters in height.

The interior of the Feature A enclosure is level soil with no cultural remains present. A raised earthen terrace (Feature B) is situated within the enclosure in the northwestern portion. The Feature B terrace is 5.4 to 6.6 meters long (northwest by southeast), 4.6 meters wide and 0.3 to 0.4 meters in height on the south and west sides. The surface of this terrace is level soil with no cultural remains present.

A 0.5 by 0.5 meter test unit (TU-5) was excavated into the soil surface of Feature B, revealing a single soil layer over bedrock (see **Figure 36**). Layer I consists of 0.07 to 0.24 meters of a very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2) silt loam with 50% pebble and gravel inclusions. Cultural remains from Layer I consist of two fragments of volcanic glass debitage.

Feature C is a U-shaped enclosure located 4.5 meters to the north of the northeast corner of Feature A. The enclosure is 10.3 meters long and 7.0 to 9.6 meters wide, open to the south-southwest. The walls of the enclosure are generally collapsed although an intact stacked and faced section is present along the interior northwest side. A section of the Feature C wall is presented in **Figure 38**. The walls range in thickness from 1.0 to 2.8 meters and in height from 0.2 to 1.3 meters. The interior of the enclosure is level soil with no cultural remains.

A 0.5 by 0.5 meter test unit (TU-6) was excavated within the Feature C enclosure, revealing a single soil layer over bedrock (see **Figure 36**). Layer I consists of 0.32 to 0.40 meters of a very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2) silt loam with 30% pebble and gravel inclusions. Cultural remains from TU-6 consist of a fragment of *Cypraea* sp. marine shell, 3 burned *kukui* nutshells fragments, 50 fragments of charcoal, 1 fishbone, a fragment of basalt flake debitage and 16 pieces of volcanic glass including two cores, utilized flakes, and debitage.

Site 30033 is interpreted as a permanent habitation complex. The large Feature A enclosure functioned as a yard based on its formal type, substantial construction and area (408.5 square meters). The Feature B terrace and the Feature C enclosures likely functioned as the foundations for a roofed structures based on formal type, the substantial construction at Feature C and area (Feature B = 30.3 sq meters, Feature C = 98.8 sq meters). The site is in fair condition and is assessed as significant for its information content.

Site 30034 is a lava tube located in the southeastern portion of the project area at approximately 50 ft elevation. The entrance to the tube is through a horizontal opening on the north side of a natural depression that is 1.4 meters in depth below the surrounding ground surface (**Figure 39**). The entrance is 5.4 meters wide (east-west) and 0.45 to 0.75 meters in height. There is a stacked cobble and boulder cairn located just outside the dripline that is 0.58 meters long, 0.45 meters wide and 0.55 meters in height. Two boulders are located adjacent to the cairn to the east.

The entrance opens onto an irregularly shaped chamber that is 8.6 meters long (north-south) and 1.35 to 5.4 meters wide with ceiling heights that range from 0.1 to 0.6 meters. The floor is divided by two raised shelves, each of which averages 0.5 meters in height. The floor is covered in a dark silt loam soil. Several scattered *Cellana* sp. shells and a waterworn basalt pebble are present on the main tube floor. Scattered cobbles are present on the first raised shelf, along with three waterworn basalt pebbles. No other cultural remains are present within the tube. Site 30034 is interpreted as a temporary habitation shelter. This is based on its formal type and the presence of cultural remains. The site is unaltered and in fair to good condition. It is assessed as significant for its information content.

Site 30035 is a stone wall that extends along the southern project area boundary, paralleling the inland side of the Kalapana-Kapoho Road. The extent of the wall is depicted on **Figure 20**. The wall originates at the southwestern corner of the project area at approximately 60 ft elevation. It extends in a roughly northeasterly

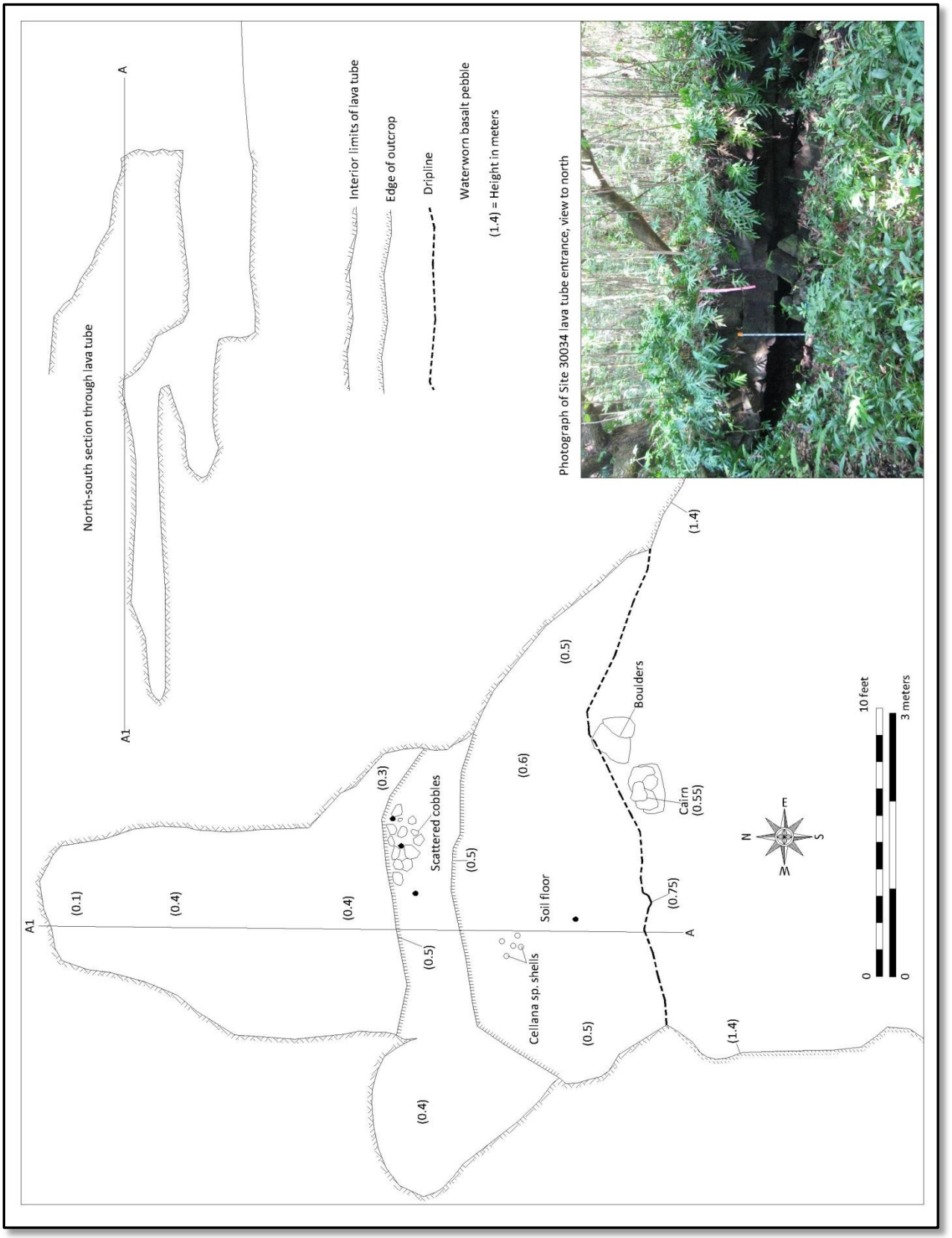


Figure 39. Site 30034 plan map photograph and section drawing

direction for 565 meters where it has been truncated by the main road leading into the Kalani Honua Retreat. The wall continues on the eastern side of the road for 213 meters to the southwestern corner of the narrow strip portion of the project area at approximately 42 ft elevation. The western end of this section forms the seaward side of the Site 30036 enclosure (discussed below – see **Figure 41**). A 115 meter long section of this wall is located outside the project area along the southern side of TMK: (3) 1-2-09:037 and 038.

The wall angles to the north-northwest, extending along the western side of the narrow strip portion of the project area. It extends in this direction for 48.0 meters where it terminates at approximately 50 ft elevation. The wall is built of stacked and faced a'a and pahoehoe cobbles and boulders with a core-filled cobble interior. A section of the wall is depicted in **Figure 40.** It ranges in thickness from 0.7 to 0.8 meters and in height from 0.6 to 1.2 meters. No cultural remains are present.



Figure 40. Site 30035 wall, view to south

Site 30035 is interpreted as a livestock control feature, likely built to restrict the movement of cattle. This is based on its height and method of construction. The wall is altered and in fair to good condition. It is assessed as significant for its information content.

Site 30036 is a roughly square enclosure located in the southeastern portion of the project area at approximately 50 ft elevation. The site is situated inland of the Kalapana-Kapoho Road and is bordered along the western side by the main road into the Kalani Honua Retreat (**Figure 41**). The enclosure is 30.8 meters long (north-northwest by south-southeast) and 27.1 to 30.0 meters wide. There are two entrances; one located along the southeastern side (1.8 meters wide) and one at the northwest corner (8.5 meters wide). The northwestern entrance had a low wall (0.4 meters) along the northeast side.

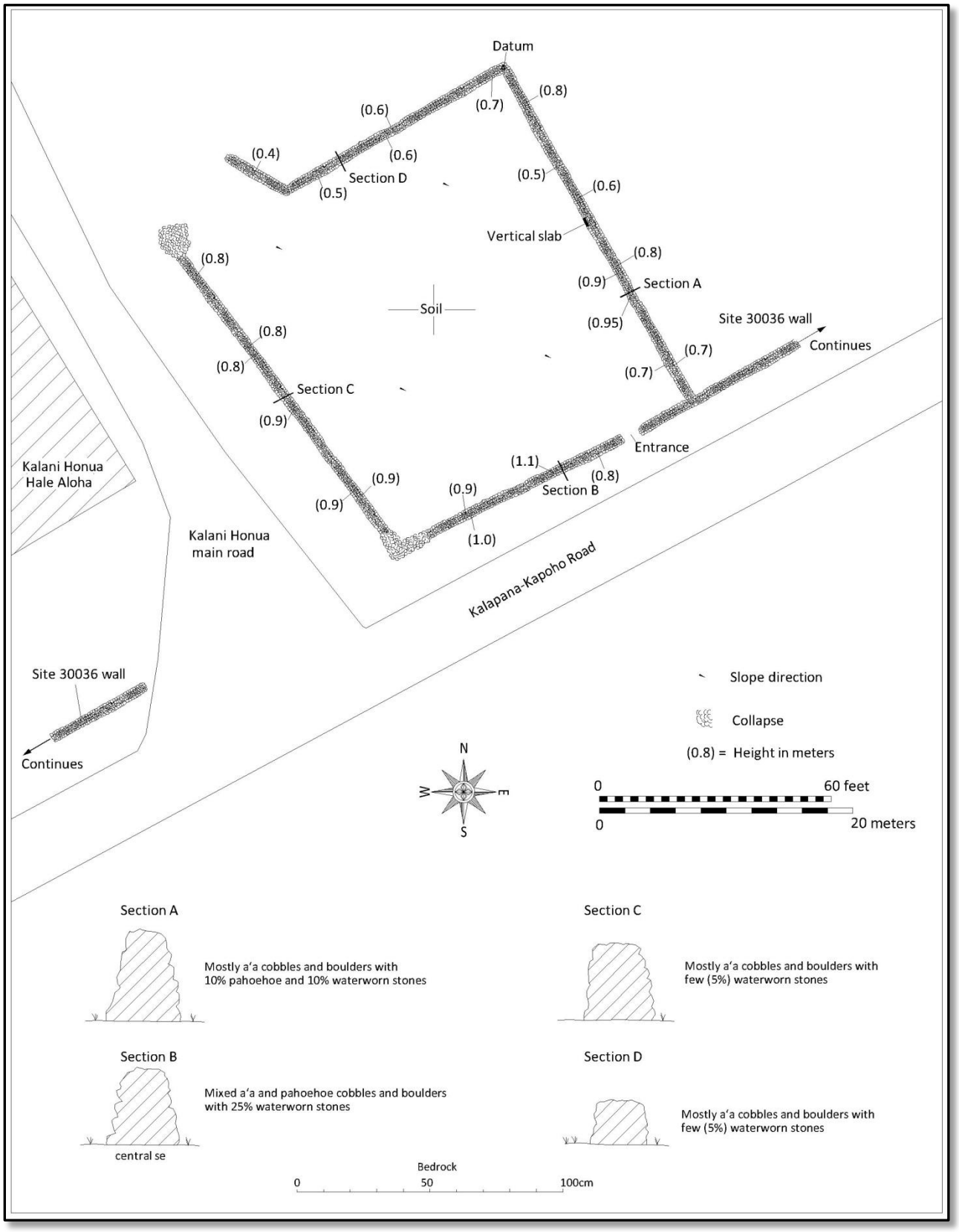


Figure 41. Site 30036 plan map and section drawings

The walls of the enclosure are stacked cobbles and small boulders with vertical slabs incorporated into the wall faces. The materials used in the wall construction vary (see **Figure 41**). The northeast wall is constructed predominately of a‘a cobbles and boulders with approximately 10% pahoehoe and 10% waterworn stones present. The southeast wall is made of a mixture of a‘a and pahoehoe cobbles and small boulders with approximately 25% waterworn stones present. The southwest and northwestern walls are constructed of a‘a cobbles and boulders with a few (5%) waterworn stones present. The walls range in thickness at the base from 0.7 to 0.9 meters and at the top from 0.45 to 0.55 meters. The height of the walls ranges from 0.4 meters along the inland side to more than a meter in height along the seaward side. Photographs of the enclosure walls are depicted in **Figure 42**.

The interior of the enclosure is a soil-covered surface that slopes gently to the southeast. The vegetation within the interior is comprised of *kamani* and mango trees with dense *laua‘e* ferns and vines. There is a sign placed on a mango tree that describes the site as the location of the Kama‘ili School (see **Figure 42**). According to this sign, Puna resident and founding board member of the Kalani Honua, Kini Pe‘a’s mother was the last teacher at the school, that reportedly was in use until 1900. No remnants of the school building remain within the enclosure.

The school site is depicted on Loebenstein’s 1895 map of Puna (see **Figure 12**) and on Wall’s 1915 of the area (see **Figure 13**). The school is not present on the 1922 USGS quadrangle of the area (see **Figure 14**). This indicates that the school potentially existed as late as 1915 but was abandoned by 1922.

Site 30036 is interpreted as a boundary wall that once surrounded an historic school site. This is based on its formal type and historical research. The site is unaltered and in fair condition. It is assessed as significant for its information content and because it is excellent site type example.

Site 30037 is a complex of 486 agricultural features that are scattered throughout the project area. As discussed above, many of these features are probable components of the Site 21139 agricultural complex previously documented by Latinis *et al*. (1997); however, all except one feature could not be correlated with features identified during the present project because the prior reporting lacked sufficient data on individual features. The 486 features consist of 419 mounds, 48 modified outcrops, 12 terraces, 3 soil swales, 3 walls, 1 alignment and 1 modified depression (**Appendix E**). The extent of the Site 30037 features is depicted on **Figure 20** and in **Figure 43.**

Clearing piles

The majority of the features (96%) consist of 419 mounds and 48 modified outcrops. These features range in length from 0.8 to 85.5 meters (average 5.13 meters), in width from 0.6 to 3.8 meters (average 1.51 meters) and in height from 0.2 to 1.5 meters (average 0.76 meters). The features that are 6 meters or longer in length (83) are all linear, curvilinear or L-shaped. Excluding these long features, the clearing piles range in length from 0.8 to 5.8 meters, with an average length of 2.3 meters. The majority of the features are interpreted as clearing features that were likely created by consolidating stones cleared from soil areas during planting. The longer linear mounds potentially served to delineate the boundaries of agricultural fields.

The clearing piles consist of 268 that are oval in shape, 106 linear, 72 circular, 17 irregularly shaped, 2 L-shaped and 1 that is curvilinear. The majority of the clearing piles (n=420 or 90%) are constructed of piled cobbles and boulders. The remainder are built of piled pebbles, cobbles and boulders (12), stacked and piled cobbles and boulders (33) and stacked and faced cobbles and boulders (1). **Figures 44** and **45** depict examples of linear features within the project area and **Figures 46** and **47** illustrate the smaller clearing piles.

Several of the better built clearing piles were subjected to subsurface testing during the project to verify their functions. These consist of Features NW, RA and RK. The results of these excavations are presented below.



Figure 42. Site 30036 photographs

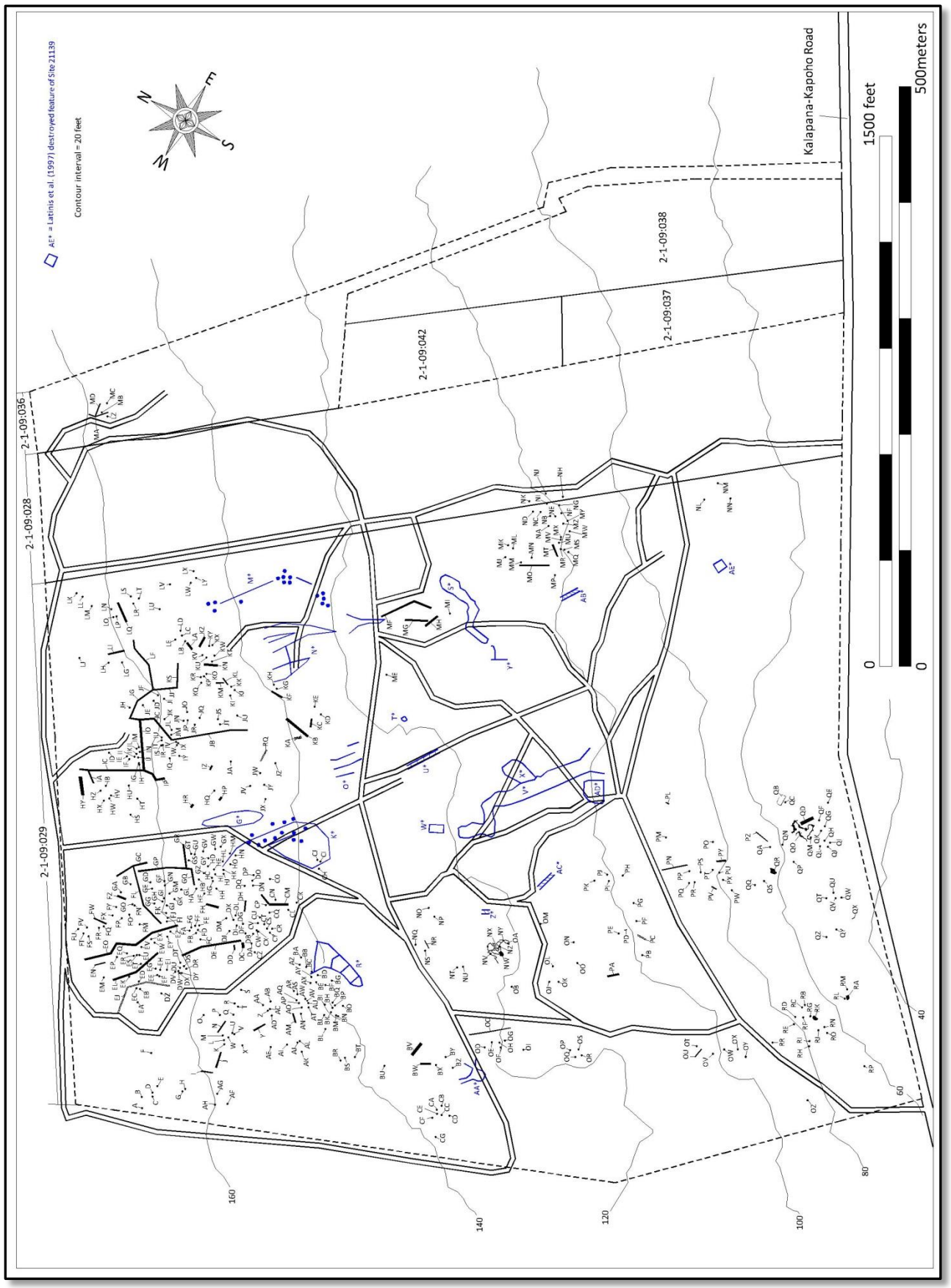


Figure 43. Distribution of Site 30037 agricultural features



Figure 44. Site 30037, Feature FU linear mound, view to north-northwest



Figure 45. Site 30037, Feature LM linear mound, view to southwest



Figure 46. Site 30037, Feature HQ mound, view to west-northwest



Figure 47. Site 30037, Feature JE mound, view to southwest

Feature NW is a modified outcrop built against the southern side of a raised bedrock outcrop in the southwestern portion of the project area at approximately 122 ft elevation. Several additional agricultural features are located in close proximity to Feature NW, consisting of four modified outcrops (Features NV, NY, NZ and OA,) and a soil swale (Feature NX – **Figure 48**). Feature NW is oval-shaped and is 4.0 meters long (north-northeast by south-southwest) and from 2.15 to 3.4 meters wide. The sides are constructed of roughly stacked and piled cobbles and small boulders and are 0.5 to 0.8 meters in height above the surrounding ground surface. The surface slopes gently to the south (**Figure 49**).

A 2.0 by 1.0 m test unit (TU-8) was excavated into the northern portion of Feature NW, revealing a single layer over bedrock (see **Figure 49**). Layer I consists of 0.1 to 0.55 meters of loosely packed cobbles and small boulders with no cultural remains. A small void is present in the center of the unit, beneath the Layer I stones. The opening to this void is 0.35 meters long and 0.3 meters wide. This void drops 0.47 meters to bedrock. No cultural remains are present within the void.

Feature RA is An oval-shaped modified outcrop located in the southwestern portion of the project area at approximately 55 ft elevation. The feature is built on top of a raised outcrop that is 1.0 to 1.6 meters in height (**Figure 50**). Feature RA is 3.9 meters long (northeast by southwest) and 2.5 meters wide with the sides ranging in height from 0.1 to 1.2 meters. The northeast and northwest sides are built of stacked cobbles and boulders with facing present along the northwest side. The southwest side has collapsed and the southeast side abuts the edge of the outcrop. The surface is relatively, but unpaved (**Figure 51**). No cultural remains are present.

A 1.0 by 1.0 meter test unit (TU-3) was excavated in the center of the feature revealing two layers over bedrock (see **Figure 51**). Layer I consists of 0.3 to 0.78 meters of tightly packed cobbles and small boulders with no cultural remains present. A pocket of Layer II soil is present in the western portion of the unit. Layer II consists of 0.22 to 0.37 meters of brown (10YR 4/3) to dark grayish brown (10YR 4/2) silt loam with 30% pebble and cobble inclusions. No cultural remains are present.

Feature RK is an oval-shaped modified outcrop located in the southwestern portion of the project area at approximately 70 ft elevation. The feature is built on top of a raised outcrop that is 1.1 meters in height (**Figure 52**). Feature RK is 4.7 meters long (north by south) and 2.7 meters with the sides ranging in height from 0.7 to 1.2 meters. The sides are built of stacked cobbles and boulders with several vertical boulders present along the western side. The surface is relatively, but unpaved (**Figure 53**). No cultural remains are present.

A 1.0 by 1.0 meter test unit (TU-2) was excavated in the northern portion of feature revealing two layers over bedrock (see **Figure 53)**. Layer I consists of 0.54 to 0.90 meters of tightly packed cobbles and small boulders, with no cultural remains present. Layer II consists of pockets of soil present in the south and western portions of the unit. This deposit is 0.01 to 0.04 meters of brown (10YR 4/3) to dark grayish brown (10YR 4/2) silt loam with 30% pebble and cobble inclusions. No cultural remains are present.

Terraces

The survey identified 12 agricultural terraces within the Site 30037 complex. The majority of these features are linear in shape and functioned to retain level soil areas on their upslope sides (n-11). The remaining feature (Feature QR) is oval in shape and potentially served as a planting feature. The terraces range in length from 2.5 to 13.1 meters (average 5.46 meters), 0.7 to 3.9 meters wide (1.6 meters average), with retaining walls that range in height from 0.5 to 1.1 meters (average 0.69 meters). Seven of the features are constructed of piled cobbles and boulders, two are comprised of aligned cobbles and boulders and three are built of roughly stacked and piled cobbles and boulders. No cultural remains are present on the surface of any of the terraces. Examples of the Site 30037 terraces are presented in **Figures 54** and **55**.

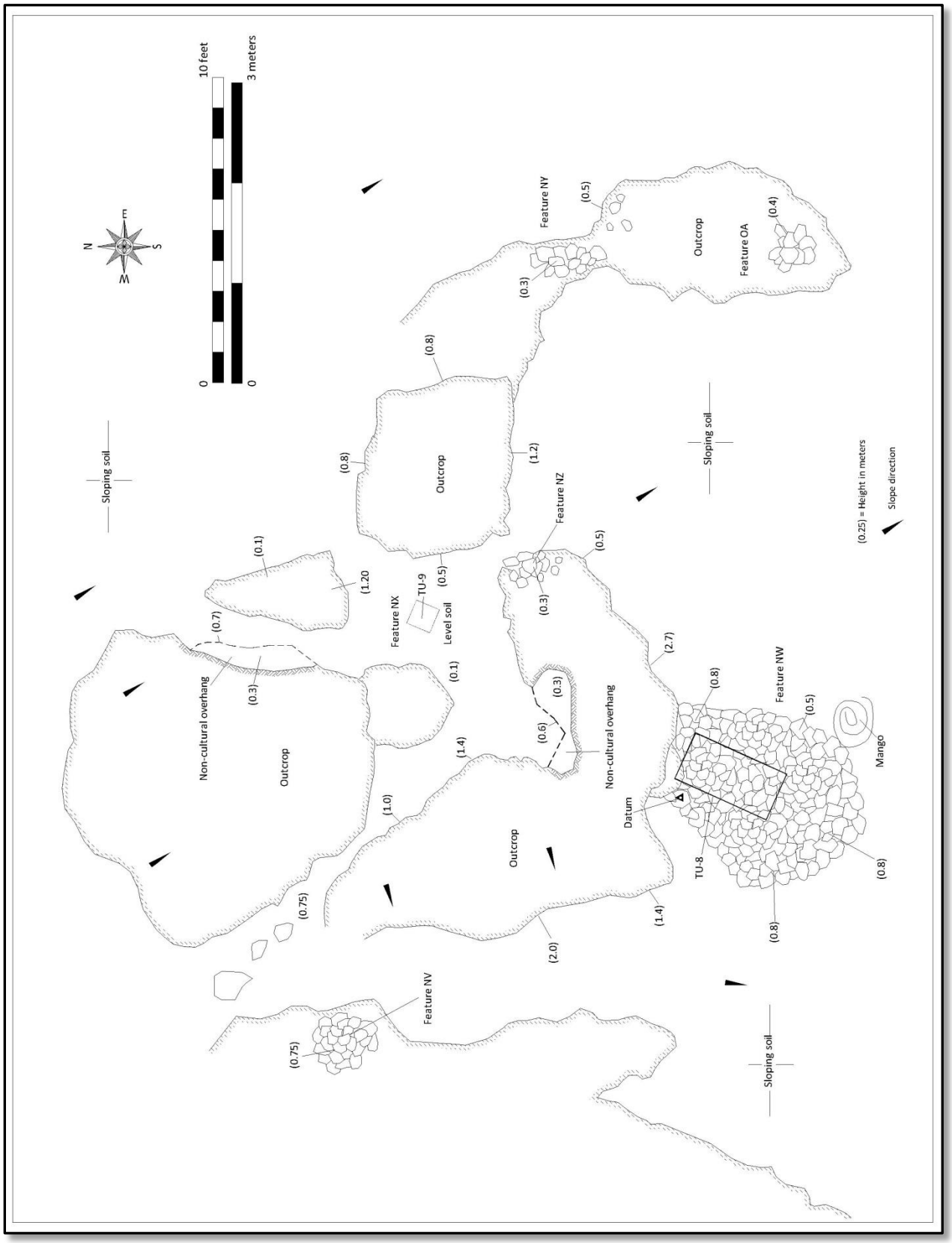


Figure 48. Site 30037, plan map of Features NV, NW, NX, NY, NZ and OA



Photograph of Feature NW modified outcrop, view to west

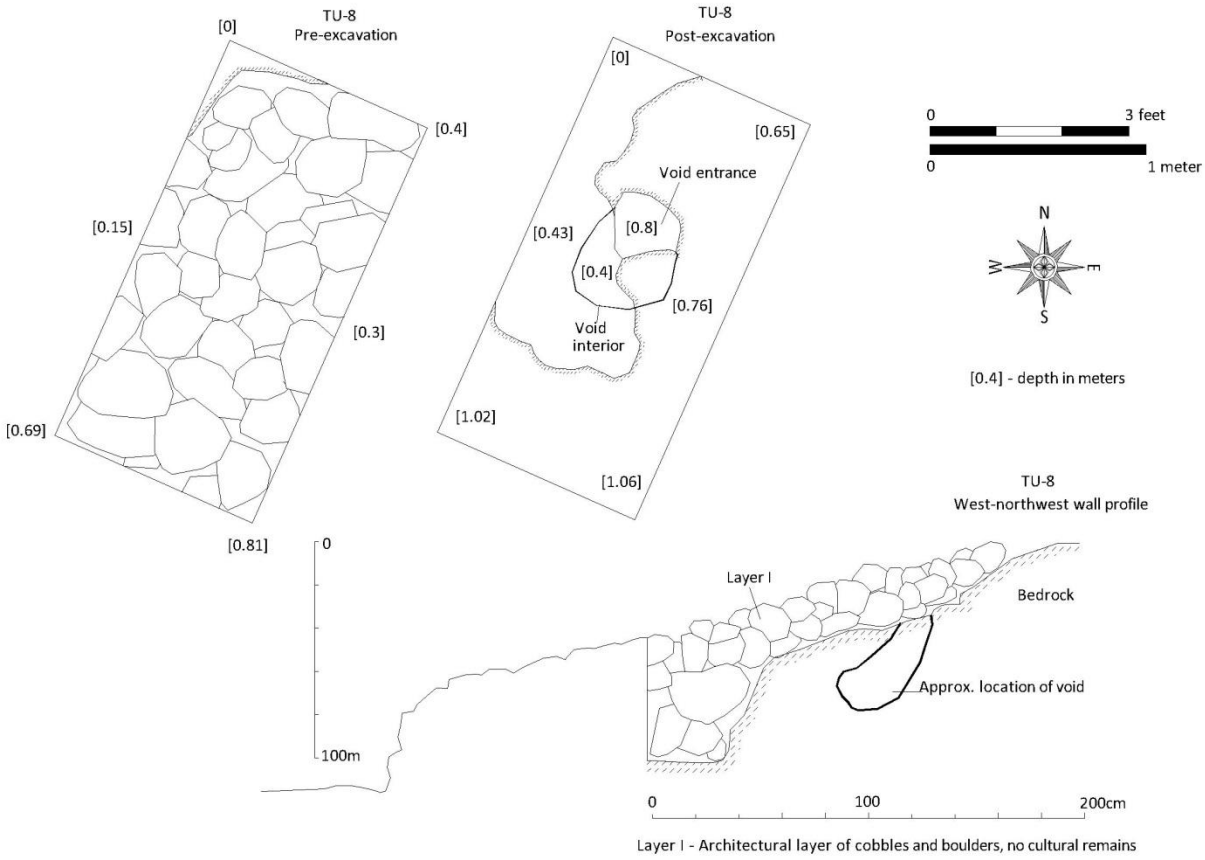


Figure 49. Site 30037, Feature NW photograph and plans and profile of TU-8

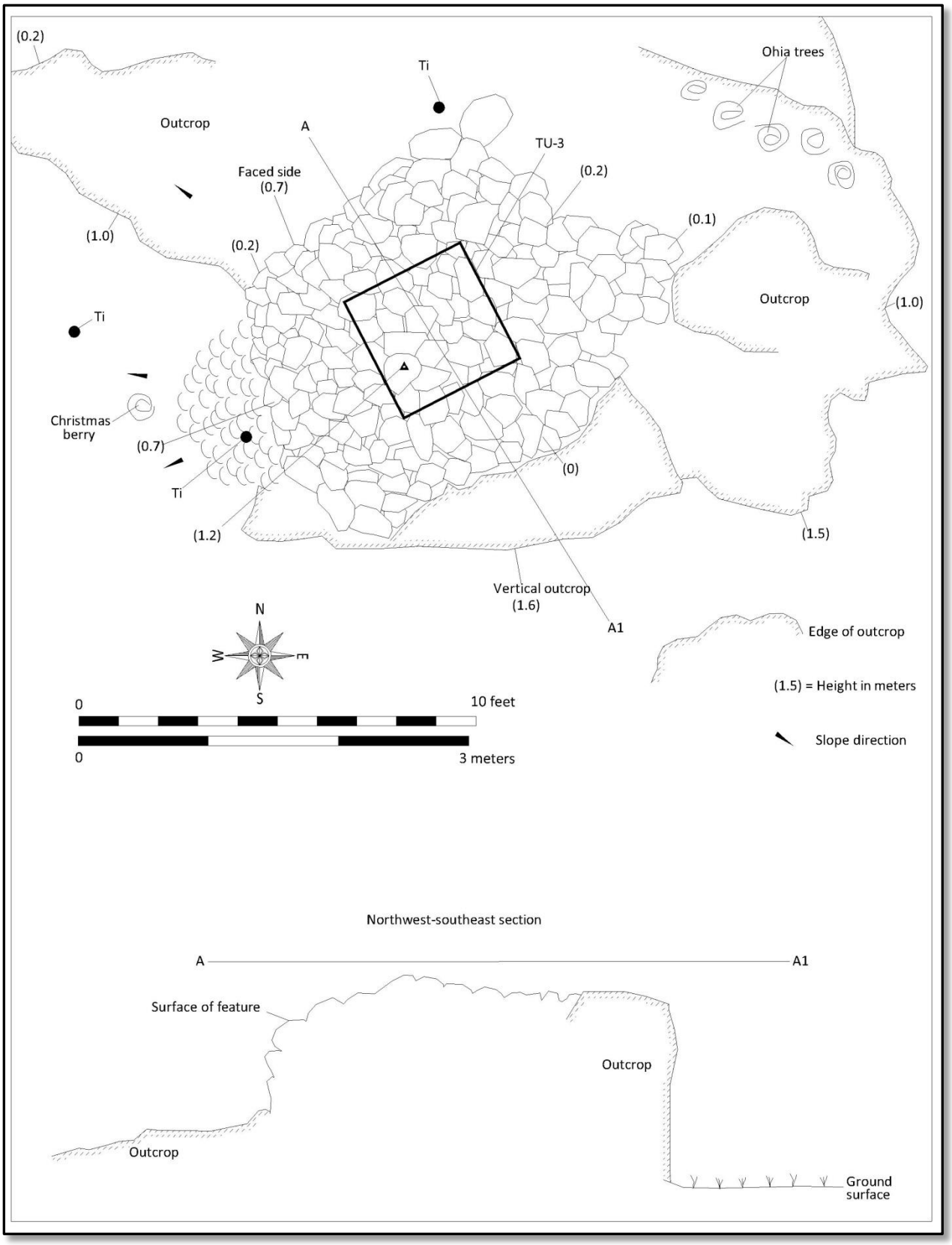
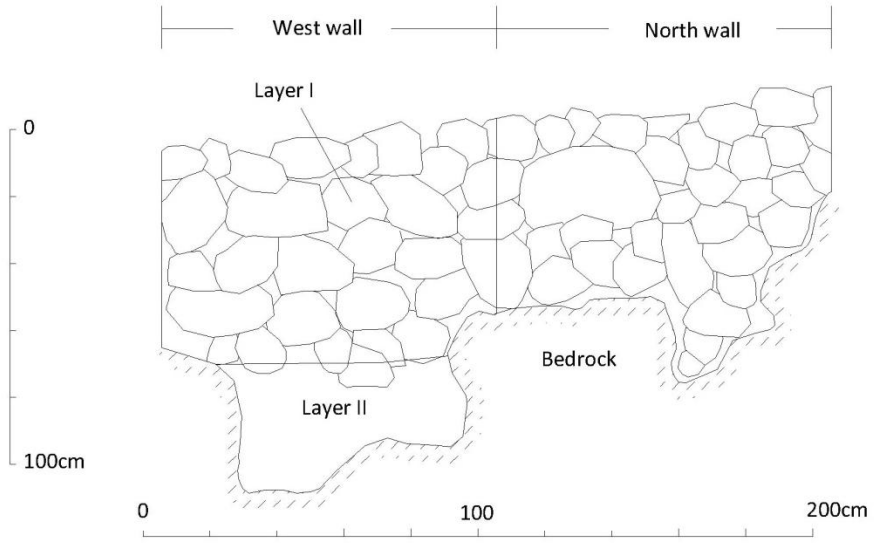


Figure 50. Site 30037, Feature RA plan map and section drawing



TU-3 profiles

TU-3 profiles



Layer I - Architectural layer of cobbles and boulders, no cultural remains

Layer II - Brown (10YR 4/3) to dark grayish brown (10YR 4/2) silt loam with 30% cobble and pebble inclusions; no cultural remains

Figure 51. Site 30037, Feature RA photograph and profile of TU-3

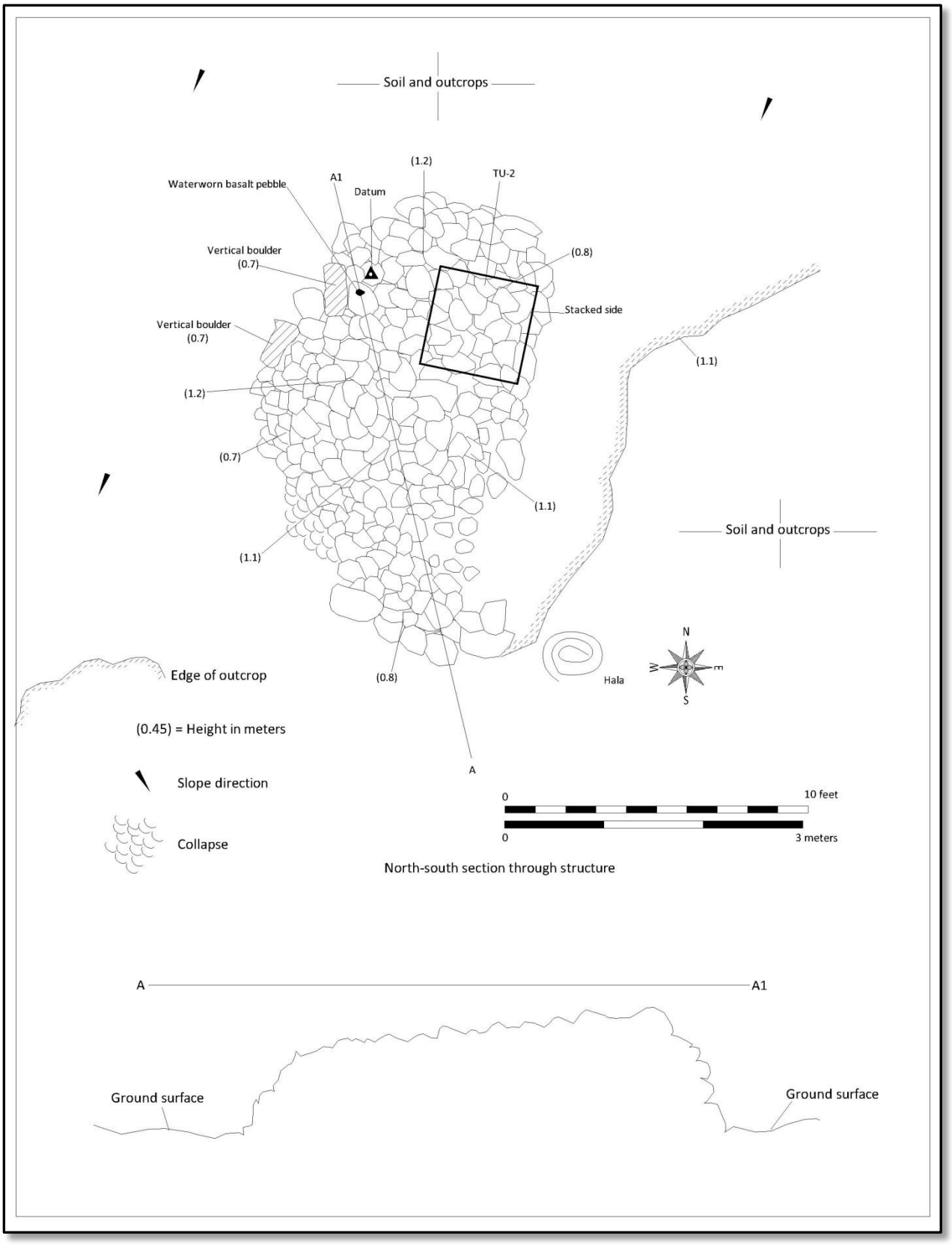
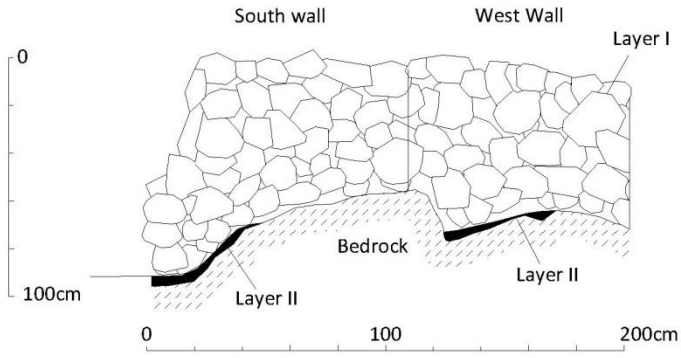


Figure 52. Site 30037, Feature RK plan map and section drawing



Feature RK modified outcrop, view to southeast

TU-2 profile



Layer I - Architectural layer of cobbles and boulders; no cultural remains

Layer II - Brown (10YR 4/3) to dark grayish brown (10YR 4/2) silt loam with 30% pebble and gravel inclusions; no cultural remains

Figure 53. Site 30037, Feature RK photograph and profile of TU-2



Figure 54. Site 30037, Feature HP terrace, view to west-northwest



Figure 55. Site 30037, Feature IZ terrace, view to east

The oval-shaped **Feature QR** terrace was subjected to subsurface testing to verify its function. The terrace is located in the southwestern portion of the project area at approximately 62 ft elevation. It measures 5.7 meters long (north-south) and from 3.6 to 3.9 meters wide, built adjacent to a sloping bedrock outcrop (**Figure 56**). The south, east and west sides of the feature are comprised of stacked and piled cobbles and boulders and are 0.3 to 0.6 meters in height.

The surface of the northern portion of the terrace slopes to the south with an area of level soil located in the approximate center. This soil area is 1.3 meters long (east-west) and 1.0 meters side. No cultural remains are present. A 0.5 by 0.5 meter test unit (TU-4) was excavated within the soil area, revealing a single soil layer over bedrock (see **Figure 56**). Layer I consists of 0.18 to 0.22 meters of very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2) silt loam with 30% pebble and gravel inclusions. No cultural remains were present in Layer I.

Soil Swales

There are three soil swales within the project area (Features NX, QB and QO). These features consist of level soil areas from which surface stones appear to have been removed for planting. **Feature NX** is located in the west-central portion of the project area at approximately 122 ft elevation. The swale is located between several raised bedrock outcrops and measures 7.0 meters long (northeast by southwest) and 3.0 to 6.0 meters wide (**see Figure 48**). There are two low non-cultural overhangs along the outcrops on the west and south sides of the swale. The Feature NV, NW, NY, NZ and OA modified outcrops are located to the south, east and west of the swale. The surface of Feature NX is level soil with no cultural remains present.

A 0.5 by 0.5 meter test unit (TU-9) was excavated into the soil surface of the swale, revealing a single soil layer over bedrock (**Figure 57**). Layer I consists of 0.34 to 0.45 of very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2) silt loam with 25% pebble and cobble inclusions. A single volcanic glass flake was present in Layer I.

Feature QO is situated in the southwestern portion of the project area, 20 meters to the southwest of Feature QB. This swale is irregularly shaped and is 16.0 meters long (north-south) and 4.0 to 13.5 meters wide (**Figure 58**). The sides of the feature are bordered by raised bedrock outcrops that are 1.0 to 1.3 meters in height. Cobbles and boulders, likely cleared from the soil surface have been piled along the edges of the outcrops along the east, west and southeast sides. No cultural remains are present.

Feature QB is located in the southwestern portion of the project area at approximately 57 ft elevation. The swale is oval-shaped and measures 9.0 meters long by 5.0 meters wide and is bordered by bedrock outcrops along the sides (**Figure 59**). The Feature QC modified outcrop is located along the south side of the swale. No cultural remains are present at the feature.

Walls

There are three agricultural walls in the Site 30037 complex (Features EJ, PC and RQ. These features are linear piles of cobbles and small boulders that potentially functioned to delineate the boundaries of agricultural fields. No cultural remains are present at any of the walls.

Feature EJ is located in the northwestern portion of the project area at approximately 162 to 165 ft elevation. It is L-shaped with an overall length of 62.5 meters long. It is constructed of stacked and piled cobbles and boulders and averages 1.5 meters wide by 0.7 meters in height. A section of the wall is depicted in **Figure 60**.

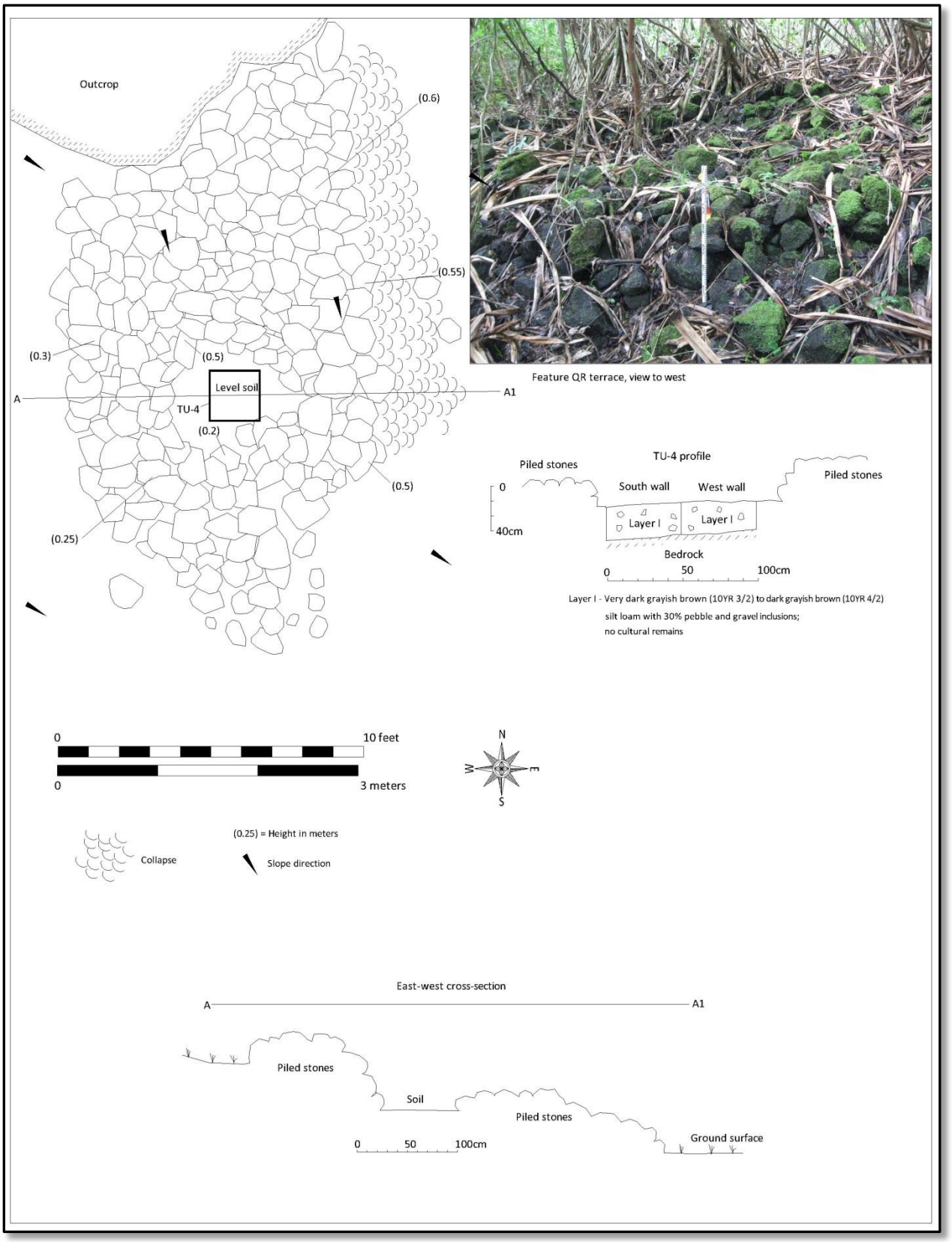
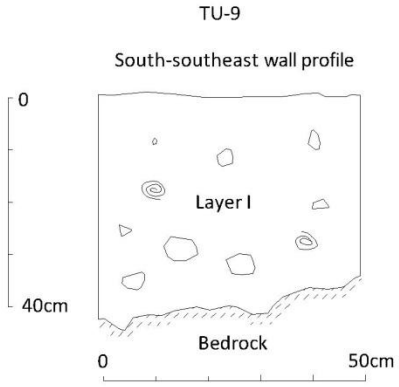


Figure 56. Site 30037, Feature QR plan map, photograph and profile of TU-4



Photograph of Feature NX soil swale, view to south-southwest



Layer I - Very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2)
silt loam with 25% cobble and pebble inclusions;
cultural remains present

Figure 57. Site 30037, Feature NX soil swale photograph and profile of TU-9

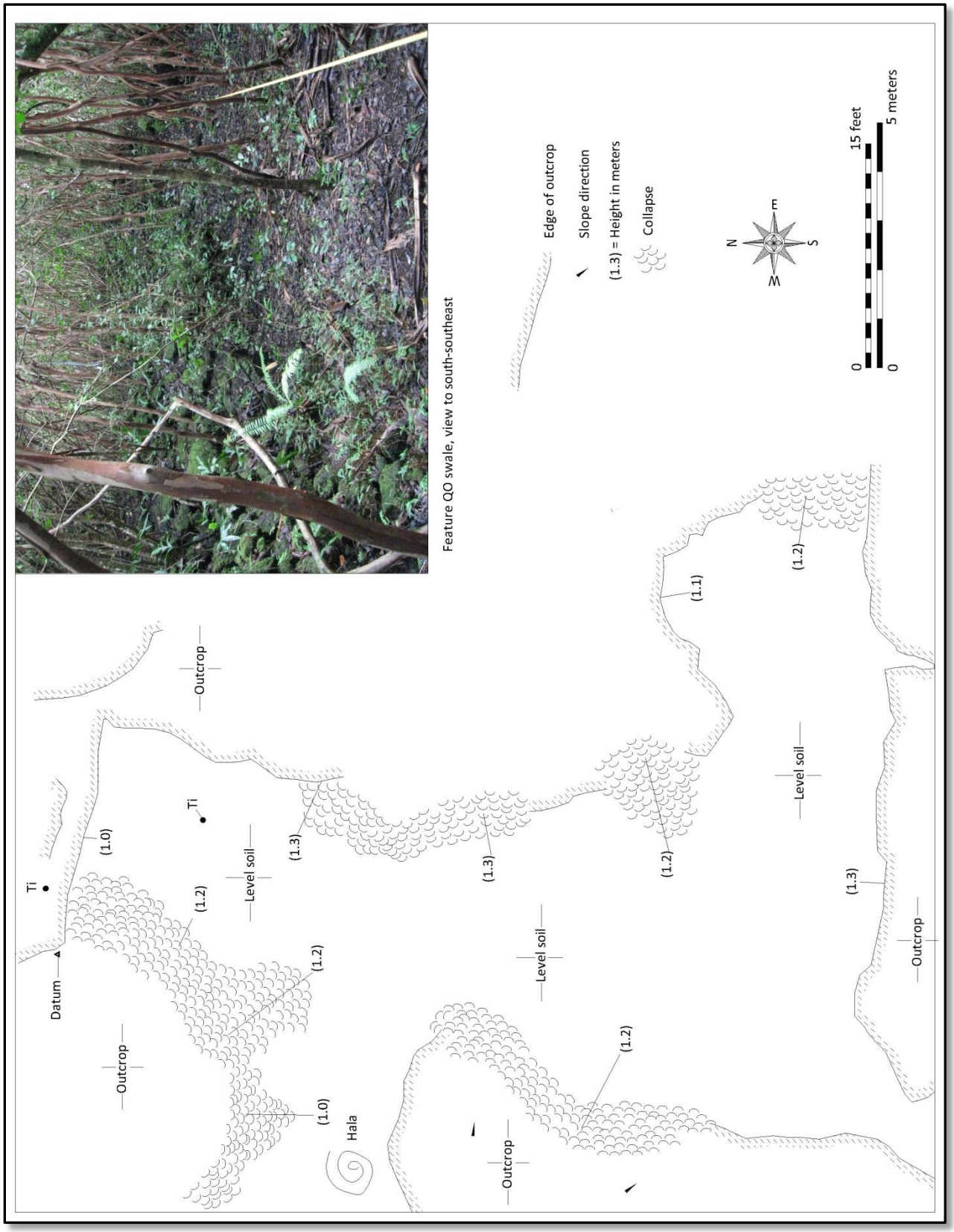


Figure 58. Site 30037, Feature QO soil swale, plan map and photograph



Figure 59. Site 30037, Feature QB soil swale, view to southwest



Figure 60. Site 30037, Feature EJ wall, view to southwest

The **Feature PC** wall is located in the southwestern portion of the project area at approximately 98 ft elevation. The wall is linear and is 6.5 meters long (north-south), 1.1 meters wide and 0.7 to 0.9 meters in height. It is built of stacked and piled cobbles and boulders (**Figure 61**).

Feature RQ is situated in the north-central portion of the project area at approximately 144 ft elevation. This wall is 11.2 meters long (east-west), 1.2 meters wide and 0.6 to 0.8 meters in height (**Figure 62**). The wall is constructed of stacked and piled cobbles and boulders.

Modified depression

One modified depression is in the Site 30037 complex. **Feature KA** is a linear modified depression located in the north-central portion of the project area at approximately 139 ft elevation. The depression is 5.7 meters long (northwest by southeast), 0.95 to 1.45 meters wide and from 0.2 to 0.55 m in depth below the ground surface (**Figure 63)**. The interior floor of the depression is comprised of a silt loam soil that slopes slightly to the southeast. There are several irregular piles of cobbles and small boulders located within and adjacent to the depression. No cultural remains are present.

Modern site

The survey of the project area identified a small oval-shaped alignment located in the southwestern portion of the project area at approximately 98 ft elevation. This alignment is located in an area of level soil, adjacent to an agricultural mound of the Site 30037 complex (Feature PG). The alignment (H&A Temporary Site T-166) is 2.6 meters long (north-northwest) and 1.8 to 2.5 meters wide, comprised of cobbles and small boulders (**Figure 64**).

A test unit was planned for the alignment. However, approximately 0.05 meters into this excavation, a modern plastic tarp was encountered. Due to this obvious disturbance, the excavation was terminated. The presence of this tarp suggests that the alignment is a modern feature that may have served as a camping area.



Figure 61. 30037, Feature PC wall, view to north



Figure 62. Site 30037, Feature RQ wall, view to north

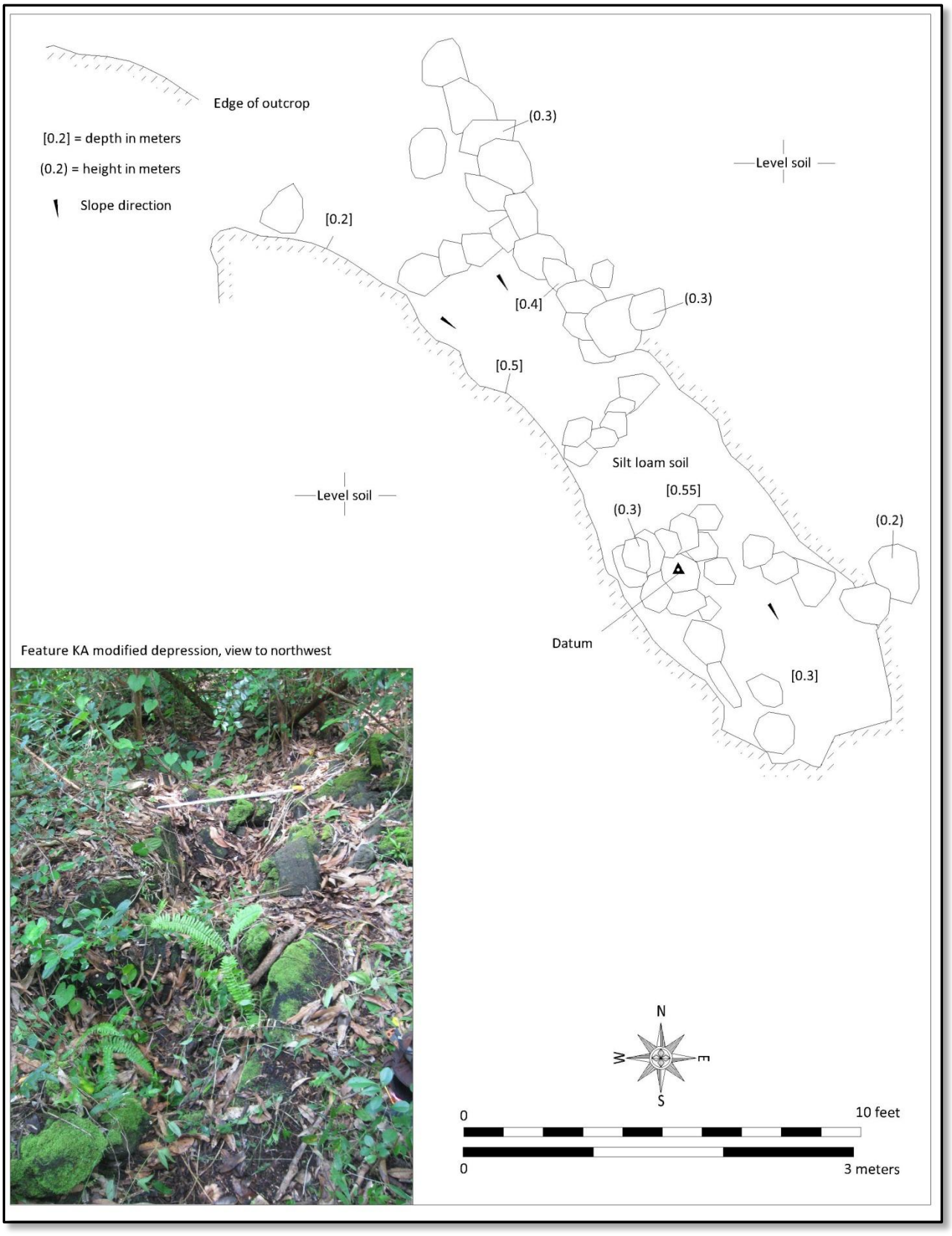


Figure 63. Site 30037, Feature KA modified depression plan map and photograph

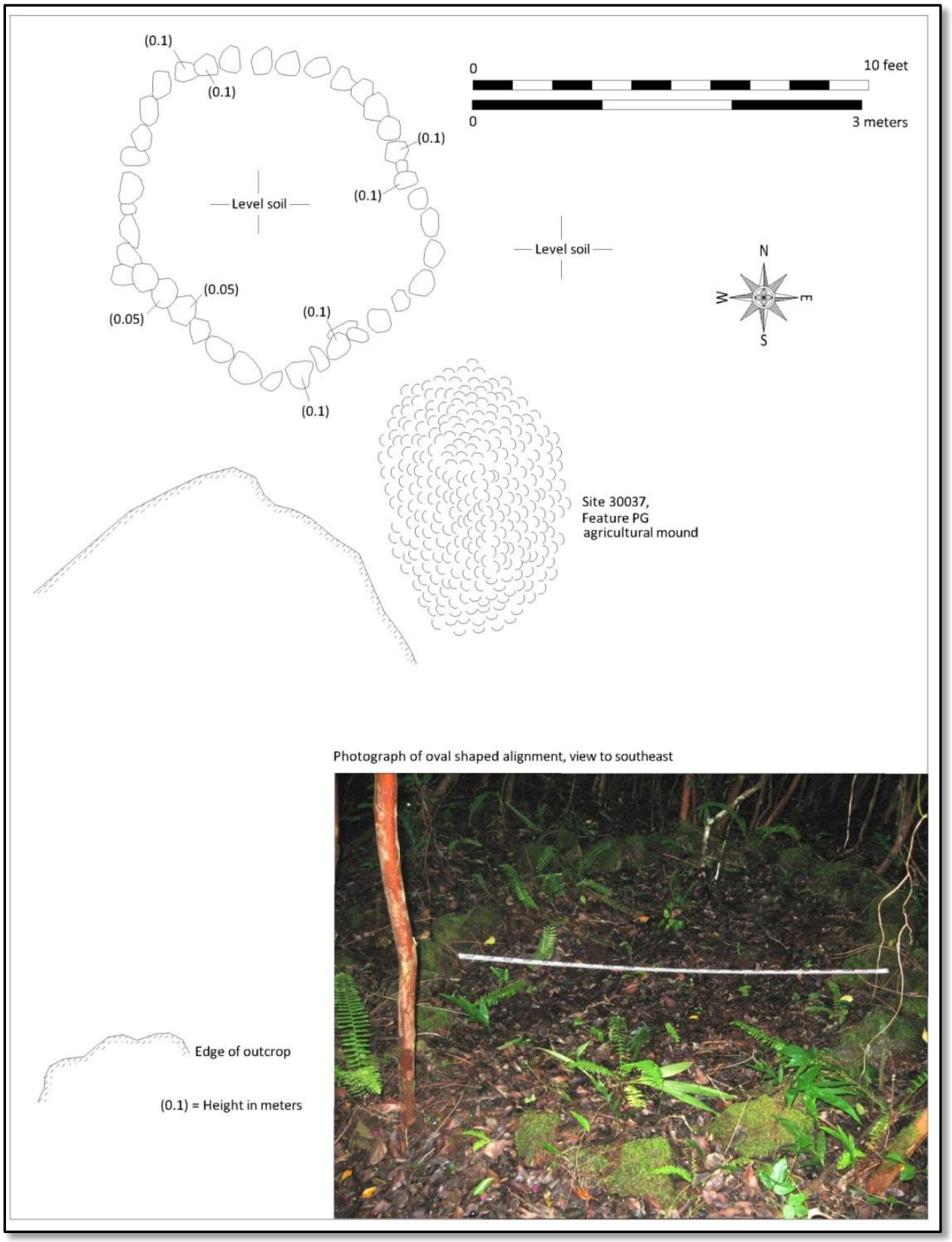


Figure 64. Modern site plan map and photograph

CONCLUSION

Discussion

Large portions of the project area have been impacted by the development of the Kalani Honua Retreat. Despite these impacts, the survey identified numerous sites and features that contribute to the understanding of traditional Hawaiian utilization of the area. Prior studies documented six sites with an estimated 210 features. The present project identified 17 sites and more than 530 features. Of the estimated 210 previously recorded features, 77 were destroyed prior to the present project.

The majority of the project area is located in McEldowney's (1979) Coastal Settlement Zone. All of the habitation sites in the project area are situated within 0.5 miles from the shoreline, with the more substantially constructed habitations (Sites 21139-AF and 30033) located in the seaward portion of the project area below the 80 ft elevation. The Site 21143 *heiau* (Pu'ulena Heiau) and Site 2539 cemetery are also situated in this seaward area.

The survey documented extensive agricultural use of the project area, with 486 agricultural features recorded. The inland portion of the project area is located within McEldowney's Upland Agricultural Zone which is typified by scattered residences among economically beneficial trees and agricultural plots of dryland taro and bananas. The majority of the 486 agricultural features (n=339 or 70%) are located in this inland portion of the project area above 140 ft elevation.

Evidence of this dryland agricultural system includes a series of linear mounds, modified outcrops, terraces and walls that form a series of enclosures that likely represent formal fields (**Figure 65**). These features comprise 25 possible fields that encompass 19,648 sq meters or 4.85 acres of the 120.01 acre project area (4% - **Table 5**). These fields range in area from 38 to 3,949 sq meters with an average area of 845 sq meters. The fields range in acreage from 0.1 to 0.98 acres with an average of 0.21 acres. The majority of the fields (n=22) are located in the inland portion of the project area above 140 ft elevation.

The historic use of the project area has also been documented. Previous work by Latinis et al. (1997) recorded three large enclosures that were interpreted as possible cattle pens. Alternatively, it is possible that these sites are early historic residential yards within which one or more dwellings and associated gardens were present like Site 30033. A stone wall bordering the Kalapana-Kapoho Road was documented during the present project that likely served to restrict the movement of cattle. An enclosure that surrounds the former Kama'ili School (Site 30036) was also recorded.

Significance Assessments

Pursuant to DLNR (2003) Chapter 275-6 (d), the initial significance assessments provided herein are not final until concurrence from the DLNR has been obtained. Sites identified and relocated during the survey are assessed for significance based on the criteria outlined in the Rules Governing Procedures for Historic Preservation Review (DLNR 2003, Chapter 275). According to these rules, a site must possess integrity of location, design, setting, materials, workmanship, feeling, and association and shall meet one or more of the following criteria:

1. Criterion "a". Be associated with events that have made an important contribution to the broad patterns of our history;
2. Criterion "b". Be associated with the lives of persons important in our past;
3. Criterion "c". Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;



Figure 65. Agricultural fields in the project area

Table 5. Agricultural fields in the project area

Field no.	Area (sq m)	Acres	Features/Sites bordering fields			
			Mauka	Makai	Kalapana	Kapoho
1	248	0.06	-	J	I	-
2	865	0.21	DD	DC	-	DE
3	48	0.01	DC, DH	-	-	CM
4	1471	0.36	-	DH	DE	FH
5	804	0.20	-	-	EJ	EL
6	907	0.22	-	-	EL	EO
7	92	0.02	-	-	EN	EO
8	1862	0.46	-	FL	EO	FW, FZ
9	1866	0.46	FL	GQ	EO	GP
10	466	0.12	-	FL	FZ	GC
11	505	0.12	FL	GR	GP	-
12	168	0.04	HY	IA	IC	-
13	1419	0.35	-	IO	IC	JC
14	1055	0.26	IO	-	IP	JC
15	3949	0.98	JG	KL	JB, JC	JG, JJ
16	200	0.05	-	-	KN	KZ
17	778	0.19	LF	KS	JJ	-
18	1240	0.31	-	LF	JG	LI
19	533	0.13	-	LQ	LI	-
20	77	0.02	-	KZ	LA	-
21	177	0.04	-	KC	KB	-
22	529	0.13	-	MH	MG	MF
23	298	0.07	-	MT	MO	-
24	38	0.01	-	MD	MA	-
25	54	0.01	MD	-	MA	-
26	190	0.05	AA*	AA*	-	-
27	345	0.09	R*	R*	R*	R*
28	144	0.04	R*	R*	R*	R*
29	123	0.03	R*	R*	R*	R*
30	52	0.01	R*	R*	R*	R*
31	1863	0.46	K*	K*	K*	K*
32	472	0.12	G*	G*	G*	G*
33	156	0.04	-	-	O*	O*
34	184	0.05	-	-	O*	O*
35	134	0.03	-	-	O*	O*
36	85	0.02	W*	W*	W*	W*
37	241	0.06		V*		
38	1833	0.45	V*		V*	V*
39	377	0.09	X*	V*	X*	X*
40	307	0.08	AD*	AD*	AD*	AD*
41	1972	0.49	21141*	21141*	21141*	21141*
42	2587	0.64	21140*	21140*	21140*	21140*
43	69	0.02	AE*	AE*	AE*	AE*
44	39	0.01	-	Y*	Y*	Y*
45	61	0.02	Y*	-	Y*	-
46	563	0.14	S*	S*	S*	S*
47	187	0.05	-	N*	N*	N*
48	178	0.04	-	N*	N*	N*
49	95	0.02	N*	N*	N*	N*
50	567	0.14	N*	-	N*	N*
51	205	0.05	-	N*	N*	N*
52	260	0.06	-	N*	N*	N*
53	76	0.02	-	N*	N*	N*
54	394	0.10	-	N*	N*	N*
Total	**33407**	**8.25**				

AA* - Destroyed feature/site

4. Criterion "d". Have yielded, or is likely to yield, information important for research on prehistory or history; and
5. Criterion "e". Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts--these associations being important to the group's history and cultural identity.

Based on the above criteria, all of the sites within the project are assessed as significant for their information content (**Table 6**). The Site 2539 cemetery and the site of the site of the former Kama'ili School (Site 30036) are additionally assessed as significant as excellent site type examples. Three of the sites are also assessed as significant for their cultural value to the Hawaiian people. These consist of the Site 2539 cemetery, the Site 21143 *heiau* and the Site 30025 burial site.

Treatment Recommendations

As discussed, three of the sites previously documented in the project area have been destroyed and require no further work or preservation (Sites 21140, 21141 and 21142 – see **Table 6**). A wall (Site 30035) is adequately documented and no further work or preservation is recommended. Four of the sites in the project area are, or have been recommended for preservation (Sites 2539, 21143, 30025 and 30036). The Site 2539 cemetery and the Site 21143 *heiau* already have DLNR-SHPD accepted preservation plans in place (see **Appendix B**). The specific plan for the preservation and maintenance of the Site 30025 burial would be detailed in a Burial Treatment Plan prepared for DLNR-SHPD and the Hawaii Island Burial Council (HIBC) review and approval. Measures to protect the former Kama'ili School site (Site 30036) would be described in a Site Preservation Plan prepared for DLNR-SHPD review and approval.

The 12 remaining sites retain the potential to yield information important for understanding prehistoric and early historic land use. These sites could be mitigated through data recovery; however, the landowner has agreed to preserve 11 of these sites (Sites 21139-AF, 30024 and 30026-30034) and the majority of the 12th site (Site 30037) in eleven preserves. The preservation of these sites would be described in the Site Preservation Plan mentioned above.

Figure 66 depicts the location of 11 proposed preservation areas. These preservation areas include the four sites recommended for preservation above (Sites 2539, 21143, 30025 and 30036), the 11 sites that the landowner has agreed to preserve (Sites 21139-AF, 30024 and 30026-30034), and 260 (53%) of the 486 agricultural features of the Site 30037 complex. The remaining 226 agricultural features of Site 30037 are situated outside the boundaries of the preservation areas and are recommended for no further work. The 11 preservation areas on **Figure 66** are surrounded by 20 foot buffers and encompass 63,888 sq meters or 15.79 acres (13.1 %) of the retreat's property.

Table 6. Significance Assessments and Treatment Recommendations

SIHP Site Number	Site Type	Site Function	Significance Criteria	Treatment Recommendation
2539	Complex	Burial	C, D, E	Preservation (DLNR-SHPD approved Burial Treatment Plan in place)
21139 - AF (relocated)	Enclosure	Permanent Habitation	D	Preservation
21140 (Destroyed)	Enclosure	Animal husbandry/ Agriculture	D	No further work
21141 (Destroyed)	Complex	Animal husbandry/ Agriculture	D	No further work
21142 (Destroyed)	Complex	Animal husbandry/ Agriculture	D	No further work
21143	Complex	Ceremonial	D, E	Preservation (DLNR-SHPD approved Preservation Plan in place)
30024	Enclosure	Temporary Habitation	D	Preservation
30025	Lava blister	Burial	D, E	Preservation
30026	Complex	Permanent Habitation	D	Preservation
30027	Enclosure	Temporary Habitation	D	Preservation
30028	Complex	Permanent Habitation	D	Preservation
30029	Enclosure	Permanent Habitation	D	Preservation
30030	Modified outcrop	Temporary Habitation	D	Preservation
30031	Modified outcrop	Permanent Habitation	D	Preservation
30032	Lava Tube	Temporary Habitation	D	Preservation
30033	Complex	Permanent Habitation	D	Preservation
30034	Lava Tube	Temporary Habitation	D	Preservation
30035	Wall	Livestock control	D	No further work
30036	Enclosure	School	C, D	Preservation
30037	Complex	Agriculture	D	Preservation (260)/ No further work (226)

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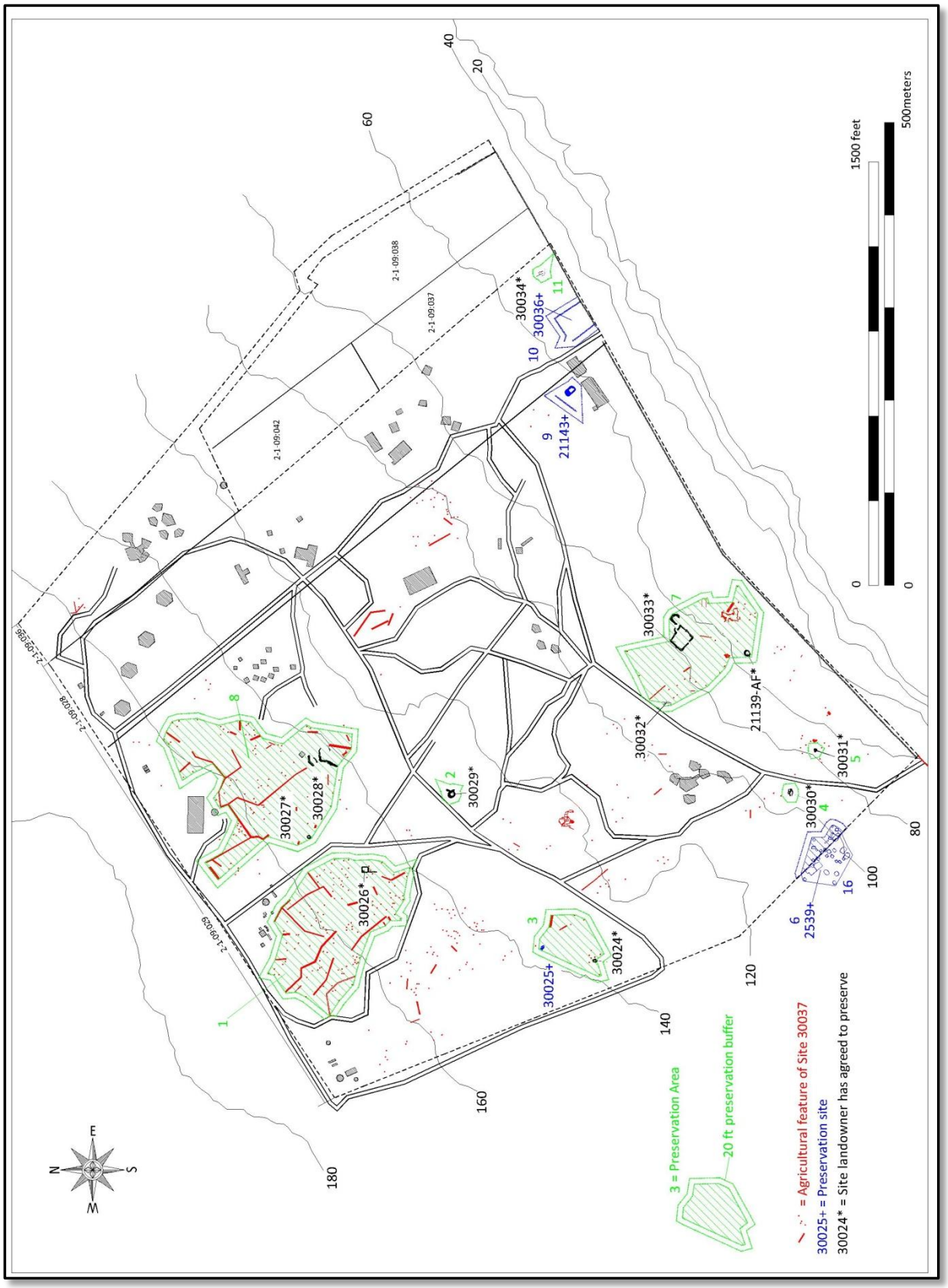


Figure 66. Location of proposed preservation areas

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APPENDIX A - May 7, 2013 DLNR-SHPD letter

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

HISTORIC PRESERVATION DIVISION
DEPARTMENT OF LAND AND NATURAL RESOURCES

601 Kamokila Boulevard, Suite 555
Kapolei, HI 96806

May 7, 2013

Mr. Richard Koob
12-2850 Kalapana-Kapoho Road
Pāhoa, Hawai'i
Hilo, HI 96778

LOG NO: 2013.2880
DOC NO: 1305SN01
Archaeology
Culture and History

Dear Mr. Koob

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
Hawai'i County Special Management Area and Use Permit for Kalani Educational Retreat
Ke'eke'e Ahupua'a, Puna District, Island of Hawai'i
TMK: (3) 1-2-009:028, 029 and 036

Thank you for the opportunity to review your special use permit application and special management area permit that was received by our office on April 10, 2013. The application indicates the aforementioned TMK parcels, which total 120 acres, will be included in a 30 year plan to augment Kalani's existing programs that include education, employment, recreation, safety, supplies and services. According to your application, these plans correlate to an increase in area population as well as growing student-faculty-staff participation in activities. The proposed plans will be implemented in 3 phases over the course of a 30 year period that would double Kalani's programs and facilities.

On April 30, 2013 SHPD archaeologist Sean Nāleimaile and Burial Sites Specialist Kauanoe Ho'omanawanui conducted a site visit to evaluate current impacts and the potential for proposed plans to impact historic properties within the project area. A general site visit was conducted with the guidance of Founder, Richard Koob and Executive Director LJ Bates. Areas where proposed construction activities were identified, the "probable" Heiau (SIHP Site 21143), and the burial site (SIHP Site 2539) were identified. In addition, the old Kama'ili school site was visited, now called the hālau. The latter is located on Parcel 028.

Our record indicate that an archaeological inventory was conducted for Parcel 029 (Latinis and Kennedy 1997) and it was approved by our office (*Log No 20100 Doc No 9709PM06*). The letter also recommended that data recovery be conducted at four agricultural sites determined to be significant under Criterion "d" (SIHP Sites 21139, 21140, 21141, and 21142. A data recovery plan was submitted to our office in 1998; however, our records indicate that this plan was not finalized and there has not been a subsequent report documenting the findings from this plan (Log No 20930, Doc No 9801PM15).

The proposed preservation plan for the Heiau (SIHP Site 21143) was found to be acceptable in 2000 (Log No 24539 Doc No 9912PM02 January 2000). Proposed and accepted preservation measures included a 10 meter wide buffer zone, as demarcated by a qualified archaeologist, to be marked on the ground and on a map of the site (Log No 23898, Doc No 9908PM03). It was also indicated that the visual integrity of the site be maintained and that the coconut grove be kept. During the site visit a small circular enclosure, identified as a mulch pit, had been recently constructed well within the agreed upon buffer zone. Although it seems relatively unobtrusive to the Heiau, we recommend that it be moved outside the buffer zone.

During the April 30, 2013 site visit, SHPD staff observed a modified lava outcrop and possible stacked mounds. It was also stated by A Kalani staff member stated that this site was avoided when bulldozing the existing road, and he felt the site continued to the SE of the outcropping. It is unclear in the Kennedy 1997 report if this area was surveyed. These features are located in the vicinity of the burial site (SIHP 2539), and it is not clear whether they might be associated.

Kennedy 1997 suggests that the Kama'ili School site may have been located on Parcel 028, but was unable to verify its location through document research and historical maps. During the site visit you indicated that you have spoken with Kini Pe'a whose mother was a teacher at the school and confirmed that the school was located on Parcel 028

Based on current information and findings during the SHP site visit, we recommend that an updated archaeological inventory survey (AIS) be conducted by a qualified archaeologist (Secretary of the Interior's Professional Qualification Standards) on Parcel 029 to document the sites on the parcel not recorded by Kennedy. It is also recommended that the AIS include Parcels 028 and 036 to identify and document historic properties on these parcels. SHPD would like to continue to work with Mr. Koob to finalize the conveyance of the burial site, that is partially on Parcel 029, to the Edith Kanaka'ole Foundation for stewardship.

We commend the owners, staff, and volunteers for the years of community engagement and their commitment to preserving the historic properties already identified on the properties. It seems that Kalani is striving to be good stewards of the land and it historic properties. A thorough documentation of the proposed areas should be a part of the proposed 30 year plan for Kalani. We look forward to the opportunity to review the AIS report prior to commenting further on the aforementioned permits.

Please contact Sean Nāleimaile at (808) 933-7651 or Sean.P.Naleimaile@Hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,



Theresa K. Donham
Archaeology Branch Chief

APPENDIX B - Preservation Plans for Site 2539 and 21143

KALANI HONUA
Oceanside Retreat
Institute for Culture and Wellness
RR 2 Box 4500
Pahoa, Hawai'i 96778
PHONE (daily 8am-8pm Hawaii time):
(808) 965-7828 (business) or
(800) 800-6886 (registration)
FAX (808) 965-0527
Internet Web views of colorful Kalani:
www.kalani.com
E-MAIL: kalani@kalani.com
Member: Hawaii Visitors Bureau and Hawaii Ecotourism Association;
Hawaii Travel Agent Lic. 4095

Founded in 1980 by
Richard Koob and Earnest Morgan

Administration
Judy Aiona, Accounting
Howell Geib, Personnel
Miles Kajiyama, Grounds
Georgette Lei Kyser, Cafe/Gift Shop
Mick Ruzich , Housekeeping
Kathleen Kramer, Food Services

Richard Koob, Executive Director

Board of Directors
Delton Johnson
Mark Kadota
Richard Koob
Paul Rambo
Ehulani Stephany
Toni Thomson

National Advisory Board
Gar Chiang
Michael Craft
Jean Erdman
Stanislav Grof
Alaine Haubert
Paul Horn
Pir Vilayat Inayat Khan
Hilary Mayall Jetty
Cleo Parker Robinson
Brother David Steindl-Rast
George Thomas
Joyce and Barry Vissell
Rusl Walker
Ralph White

Regional Advisory Ohana
Christina Mauliola Cook
Agnes Cope
Rev. George DeCosta
Lorn Douglas
Everett "Sonny" Kinney
Lynne Minton
Trina Nahm-Mijo, PhD.
Halifu Osumare
Rev. Joseph Priestley
Frances Sherrard
Nina Shipman
Vivienne & Ron Tooman
John Wollstein, Ph.D.

Kalani Honua, Inc.,
is a not-for-profit, tax exempt,
educational organization.

March 17, 1999

Don Hibbard, Administrator
State Historic Preservation Division
33 South King St., 6th Floor
Honolulu, HI 96813



Smooth beach stones at Lono Heiau site (#21143). Signage (below).



Aloha Mr. Hibbard,
This is in reply to your letter of December 3, 1998, in which you made recommendations for changes. Your recommendations have been incorporated into the following revised plan.

HEIAU PRESERVATION PLAN
RE: Heiau located within TMK (3) 1-2-09:29, owned by Koob Family Partnership

1. An important historical site, a "probable" Lono Heiau, has been determined to be present and significant on the above property. The site has been designated as #21143 in "An Archaeological Inventory Survey Including Subsurface Testing for a Portion of the Ahupua'a of Ke'eke'e Located at TMK:1-2-09:29 (The Kalani Kai Subdivision), Puna District, Island of Hawai'i, August 1996," prepared by Archaeological Consultants of the Pacific, Inc., Joseph Kennedy, M.A., Senior Archaeologist. Attached are pages 61-66, which describe site #21143. Also attached are maps (pages 4, 5, 6 and 35) indicating the location of the site.

2. Agreement that the heiau site be preserved in place was the unanimous decision of the owners of parcel TMK (3) 1-2-09:29, represented by owner-partner Richard Koob. Leaders in preservation from the State of Hawaii's Department of Land & Natural Resources, and Archaeological Consultants of the Pacific, Inc., have expressed appreciation for our preservation intents. Property owners agreed, at a meeting held August 14, 1998, in New York City at the offices of Koob & Magoolaghan, Attorneys at Law, that " the ancestral, cultural and spiritual heritage of the Kalani Kai property is an important feature valued by both current and future owners. Preservation of the two identified important site areas (heiau and burial cluster) is assured by implemented preservation plans, by covenants and restrictions, and by the fact that present and future stewards of the land are aligned with the cultural and educational purpose of the adjoining property, Kalani Honua Institute for Culture and Wellness." In fact the Preservation Plan for the burial site (#2539) has been commended and approved. (A copy of the DLNR acceptance letter is attached.).

3. To further alleviate concerns of the families involved, and to further preservation interests of the Koob Family Partnership, and the educational purpose of Kalani Honua, an Institute for Culture and Wellness (on adjacent parcel TMK (3) 1-2-09:28), directed by Richard Koob, this Preservation Plan calls for the following:

(A) A 10 meter wide buffer zone will protect the heiau site from the remainder of Kalani Kai (TMK (3) 1-2-09:29) which is slated for subdivision into 3 acre agricultural-zoned parcels. This buffer zone will be left in a cared for, yet natural condition.

(B) In addition to the preserved heiau site and its protective buffer zone, the visual and historical integrity of the site will be maintained and enhanced by the controlled usage of the surrounding area. The coconut grove adjacent to the heiau (see attached page 35, "Site Location Map") will be preserved and the (Kalani Honua initiated) walk path along the Kalani Honua - Kalani Kai boundary (from approximate points "M" to "H" on the map) will continue to be used and maintained as a natural, low impact, traditional means to visit the heiau (as well as the preserved old Kama'ili school site at the front of the Kalani Honua property). Note photos of path, palm grove, and heiau site. No cutting, filling, subdivision construction or other altercation or activity will be undertaken which would damage the heiau or reduce its visual integrity.

BURIAL PRESERVATION PLAN

RE: Burial sites located primarily within State owned parcel TMK (3) 1-2-09:43 and a portion within Koob Trust owned parcel TMK (3) 1-2-09:29.

1. An important historical site, a cemetery, has been determined to be present and significant on the above properties. The site has been designated as #2539 in "An Archaeological Inventory Survey Including Subsurface Testing for a Portion of the Ahupua'a of Ke'eke'e Located at TMK:1-2-09:29 (The Kalani Kai Subdivision), Puna District, Island of Hawai'i, August 1996," prepared by Archaeological Consultants of the Pacific, Inc., Joseph Kennedy, M.A., Senior Archaeologist. Attached are pages 66-75, which describe site #2539. Also attached are maps (pages 4, 5, 6 and 28) indicating the location of the site.

2. Agreement that the cemetery site be preserved in place was that unanimous decision of the Hawai'i Island Burial Council and Richard Koob, representative of parcel TMK (3) 1-2-09:29 owner Koob Trust. This decision was agreed upon December 18, 1997, at the Hawai'i Island Burial Council Meeting.

3. To further alleviate concerns of the families involved, and to further preservation interests of the Koob Trust, and the educational purpose of Kalani Honua, an Institute for Culture and Wellness (on adjacent parcel TMK (3) 1-2-09:28), directed by Richard Koob, this Preservation Plan calls for the following.

(A) A 50 ft. wide buffer zone will protect the burial site from the remainder of Kalani Kai (TMK (3) 1-2-09:29) which is slated for subdivision into 3 acre agricultural-zoned parcels. This buffer zone will be left in its present natural condition.

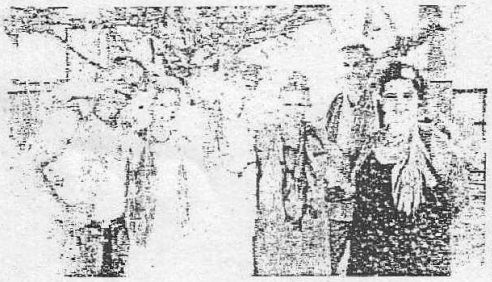
(B) As interim protection, Richard Koob, Dottie Kealoha Kyser, and other Kalani Honua staff and community members have agreed to be watchful, and report any suspicious activity, or trespassing on the burial site area, to Ulu Gardner and Burial Council officials. It is deemed that fencing, flagging, and posting are not suitable means of protection because they draw attention by obstructing the natural flow of the landscape, thereby alerting potential vandals or poachers. When time comes for the surveying of subdivision lots and creation of the final subdivision plan, the 50' buffer will be identified and marked for preservation, so that no altercation takes place within the buffer and burial areas.

(C) To facilitate long term preservation of the burial site, Koob Trust will, upon completion of subdivision plans and surveys, deed in full that portion of TMK (3) 1-2-09:29 which contains the burial site #2539. The property will be deeded without cost to the Kanakaole Foundation, as this organization is understood to represent the ancestors interred, and is committed to the care and curatorship of the cemetery.

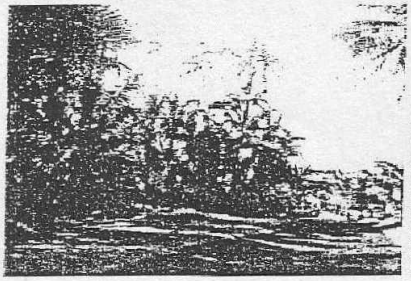
Respectfully submitted,

Richard Koob
Koob Trust; Kalani Honua, Inc., RR2 Box 4500, Pahoa, Hawai'i 96778 808-965-7828

Attachments: *An Archaeological Inventory Survey Including Subsurface Testing for a Portion of the Ahupua'a of Ke'eke'e Located at TMK:1-2-09:29 (The Kalani Kai Subdivision), Puna District, Island of Hawai'i, August 1996* prepared by Archaeological Consultants of the Pacific, Inc., Joseph Kennedy, M.A., Senior Archaeologist. Pages 66-75, which describe site #2539. Pages 4, 5, 6 and 28, maps indicating the location of the site.



Richard Koob, left, and Lanakila Brandt, center, following a re-consecration ceremony, June 13, 1998 at the Lono Heiau site (#21143).



Heiau site is to the left of foot path, palm grove and Kalani Honua entrance road.



Foot path provides visitor access to heiau site.

(C) Kalani Honua recognizes the important heritage *mana* and educational importance of this heiau and incorporates visitations to the site in an study program of the area's history, flora, and fauna. This practice of reverence and understanding will continue, as it is entirely conducive to the educational mission of Kalani Honua. Additionally, a self-guided walk tour, following a map provided by Kalani Honua, which identifies plants and heritage sites, will continue to be available to visitors, free of charge, during Kalani Honua office hours. (Open hours are likely to continue as they have been for years -- 8 a.m. to 8 p.m., every day). Kalani Honua's maintenance department, headed since the beginning of facility construction in 1980 by native Hawaiian, Alu Like-trained, Miles Kajiyama, preserves an attractive landscape throughout, and removes trash on an at-least-weekly basis from the entire facility. This practice will continue, as it has for the past 25 years. (As an unofficial adoptee of several miles of the "Red Road" Kalani Honua also helps keeps several State and County areas clean.)

(D) DLNR "Historic Preservation" rules, Chapter 6E, will be abided by, as they apply to the preservation of this heiau site. Particularly, per section 6E-10, the landowner will notify the DLNR before commencing any construction, alteration, disposition or improvement on any nature which will affect this heiau site, apart from ordinary maintenance and repair that does not involve a change in design, material, or outer appearance or change in those characteristics which may qualify the historic property for entry onto the Hawaii register of historic places.

(E) As interim protection, Richard Koob, Dottie Kealoha Kyser, and other Kalani Honua staff and community members have agreed to be watchful. When time comes for the surveying of subdivision lots and creation of the final subdivision plan, the 10 meter buffer will be identified and marked for preservation, so that no altercation takes place within the buffer and heiau areas.

(F) On Saturday, June 13, 1998, the heiau was re-consecrated by kumu-kahuna Lanakila Brandt, director of Hale O Lono halau in Kealakekua. This ceremony was attended by halau members, Kalani Honua staff, board members and visitors. The consecration assures that the sacred importance of the site will be preserved and furthered in the hearts and minds of people who cherish this aina, now and generations hereafter.
Please expedite with recommendations or approval as soon as possible.

Respectfully submitted,

Richard Koob
Koob Family Partnership; Kalani Honua, Inc.,
RR2 Box 4500, Pahoa, Hawai'i 96778 808-965-7828

Attachments:

An Archaeological Inventory Survey Including Subsurface Testing for a Portion of the Ahupua'a of Ke'eke'e Located at TMK: 1-2-09:29 (The Kalani Kai Subdivision), Puna District, Island of Hawai'i, August 1996 prepared by Archaeological Consultants of the Pacific, Inc., Joseph Kennedy, M.A., Senior Archaeologist. Pages 61-66, which describe site #21143 and pages 4, 5, 6, and 35, indicating the location of the site.

DLNR approval letter for Burial Site Preservation Plan.

#

APPENDIX C - July 17, 1998 DLNR-SHPD letter

Appendix C

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

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STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

July 17, 1998

LOG NO: 21902
DOC NO: 9807KM10

Mr. Richard Koob
Director
Kalani Honua Oceanside Retreat
Institute for Culture and Wellness
RR 2 Box 4500
Pahoa, Hawai'i 96778

Re: Acceptance of Preservation Plan for Koob Trust Property, Kalani Kai Subdivision, Ke'eke'e, Puna, Island of Hawaii TMK: (3) 1-2-09:29

Dear Mr. Koob:

Thank you for your extreme patience regarding the approval of your preservation plan for the burial sites on the aforementioned property. This partnership between private landowners, the State of Hawaii and Native Hawaiians is a unique opportunity to create precedent for handling future treatment of family associated burial areas affected by development. Unfortunately, such a novel approach on behalf of the State of Hawaii has created a somewhat lengthy process and it is our hope to expedite your portion of the preservation plan so as not to adversely affect your time schedules.

The preservation plan for burial site #2539 is acceptable. The Hawaii Island Burial Council determined to preserve these burial sites in place at their meeting of December 18, 1997. The 50 foot construction and permanent buffer zone you propose is adequate in light of the proposed development around the area.

Your proposal to deed the burial portion of TMK: (3) 1-2-09:29 to the Kanaka'ole Foundation is also quite acceptable as a long term perpetual preservation plan for the site.

The Department of Land and Natural Resources is in the process of approving a curatorship agreement with the Kanaka'ole Foundation for the portion of the burial site which is now owned by the State of Hawaii.

Finally, several recommendations are made by ACP, Inc. in regards to cultural resource management of archaeological resources located on the subject property (refer to Table 3).

1) It is recommended that the *heiau* (Site 21143) be preserved. This will require a Preservations Plan, and the execution of this plan which will also need to meet Federal, State and Local policies.

2) It is recommended that the cemetery (Site 2539) be preserved. This will require a Burial Treatment Plan according to Federal, State and Local policies.

3) Some additional archaeological investigations will be necessary concerning the Lower Puna Field System (Site 21139) and the archaeological features characterizing this field system. This should be detailed in a Data Recovery Plan. The extent and nature of future archaeological investigations concerning archaeological features located on the subject property and relating to the Lower Puna Field System will be dependent on the nature of the research questions and approaches presented in the Data Recovery Plan. However, an adequate sample of the Lower Puna Field System has been collected on the subject property such that a future Data Recovery Plan need not be overly demanding.

4) Finally, it is recommended that no further work is necessary for the historic enclosures (Sites 21140-21142) as these archaeological features have been adequately mapped and assessed.

APPENDIX D - Summary of recovered cultural remains

Acc. No	Site	Test Unit	Layer-Level	Depth	Specimen	Material	Type	TNF*	Weight (grams)	Size Range **	Length mm	Width mm	Thickness mm	Additional Information	Excavator	Date	Field no.
1.001	30031	1	II-13	58-125 cm bd	Patellidae *Cellana* sp.	Gastropod		5	0.6						MD	12/30/2013	198.1
2.001	30031	1	III-14	130-140 cm bd	Patellidae *Cellana* sp.	Gastropod		6	2.0						MD	12/31/2013	198.1
2.002	30031	1	III-14	130-140 cm bd	Indeterminate Marine Shell	Gastropod		1	1.7						MD	12/31/2013	198.1
3.001	30031	1	III-15	140-150 cm bd	Patellidae *Cellana* sp.	Gastropod		1	1.6						MD, TG	1/8/2014	198.1
4.001	30033-A	5	I-2	10-20 cm bs	Secondary Flake	Volcanic Glass	Debitage	1	0.4	M					MD, TG	1/6/2014	179
4.002	30033-A	5	I-2	10-20 cm bs	Tertiary Flake	Volcanic Glass	Debitage	1	0.8	M					MD, TG	1/6/2014	179
5.001	30033-C	6	I-1	0-10 cm bs	Core	Volcanic Glass	Debitage	1	19.9	L	33.8	26.7	20.0	multidirectional	MD, TG	1/6/2014	186
5.002	30033-C	6	I-1	0-10 cm bs	Core	Volcanic Glass	Debitage	1	16.9	L	27.0	26.7	24.9	multidirectional	MD, TG	1/6/2014	186
5.003	30033-C	6	I-1	0-10 cm bs	Utilized Tertiary Flake	Volcanic Glass	Expedient Tool	1	2.3	L	23.4	12.9	9.5	bilateral use wear	MD, TG	1/6/2014	186
5.004	30033-C	6	I-1	0-10 cm bs	Utilized Secondary Flake	Volcanic Glass	Expedient Tool	1	0.9	M	16.5	12.9	4.6	unilateral use wear	MD, TG	1/6/2014	186
5.005	30033-C	6	I-1	0-10 cm bs	Tertiary Flake	Volcanic Glass	Debitage	1	2.0	L	21.5	13.0	7.2		MD, TG	1/6/2014	186
5.006	30033-C	6	I-1	0-10 cm bs	Secondary Flake	Volcanic Glass	Debitage	1	0.4	M					MD, TG	1/6/2014	186
5.007	30033-C	6	I-1	0-10 cm bs	Tertiary Flake	Volcanic Glass	Debitage	3	1.3	M					MD, TG	1/6/2014	186
6.004	30033-C	6	I-2	10-20 cm bs	*Aleurites moluccana*	Nutshell		2	0.3					burned	MD, TG	1/6/2014	186
8.002	30033-C	6	I-4	30-41 cm bs	*Aleurites moluccana*	Nutshell		1	0.1					burned	MD, TG	1/6/2014	186
6.005	30033-C	6	I-2	10-20 cm bs	Charred Wood	Charcoal		24	4.6						MD, TG	1/6/2014	186
7.004	30033-C	6	I-3	20-30 cm bs	Charred Wood	Charcoal		20	7.2						MD, TG	1/6/2014	186
8.003	30033-C	6	I-4	30-41 cm bs	Charred Wood	Charcoal		6	1.2						MD, TG	1/6/2014	186
8.001	30033-C	6	I-4	30-41 cm bs	Core	Volcanic Glass	Debitage	1	7.6	L	25.3	22.8	12.9	multidirectional	MD, TG	1/6/2014	186
5.008	30033-C	6	I-1	0-10 cm bs	Cypraeidae *Cypraea* sp.	Gastropod		1	3.3					*Cypraea maculifera* or *Cypraea mauritiana*	MD, TG	1/6/2014	186
6.003	30033-C	6	I-2	10-20 cm bs	Scaridae	Bone	Parrotfish Family	1	0.3					pharyngeal plate	MD, TG	1/6/2014	186
6.001	30033-C	6	I-2	10-20 cm bs	Secondary Flake	Volcanic Glass	Debitage	1	0.6	M					MD, TG	1/6/2014	186
7.002	30033-C	6	I-3	20-30 cm bs	Secondary Flake	Volcanic Glass	Debitage	1	1.5	L	24.0	12.5	5.8		MD, TG	1/6/2014	186
7.003	30033-C	6	I-3	20-30 cm bs	Secondary Flake	Volcanic Glass	Debitage	3	2.0	M					MD, TG	1/6/2014	186
6.002	30033-C	6	I-2	10-20 cm bs	Tertiary Flake	Volcanic Glass	Debitage	1	0.2	M					MD, TG	1/6/2014	186
7.001	30033-C	6	I-3	20-30 cm bs	Tertiary Flake	Basalt	Debitage	1	0.2	M					MD, TG	1/6/2014	186
9.001	30029	7	I-1	0-10 cm bs	Secondary Flake	Volcanic Glass	Debitage	1	2.9	L	23.6	19.0	6.0		MD, TG	1/6/2014	127
9.002	30029	7	I-1	0-10 cm bs	Primary Flake	Volcanic Glass	Debitage	1	0.9	M					MD, TG	1/6/2014	127
10.001	30029	7	I-2	10-20 cm bs	Tertiary Flake	Volcanic Glass	Debitage	1	< 0.1	S					MD, TG	1/6/2014	127
10.002	30029	7	I-2	10-20 cm bs	*Aleurites moluccana*	Nutshell		1	0.1					burned	MD, TG	1/6/2014	127
11.001	30037-NX	9	I-2	10-20 cm bs	Secondary Flake	Volcanic Glass	Debitage	1	0.4	M					MD, TG	1/7/2014	151
12.001	30028	10	I-1	0-10 cm bs	Core	Volcanic Glass	Debitage	1	4.5	L	20.5	17.0	14.2	multidirectional	MD, TG	1/7/2014	72.3
12.002	30028	10	I-1	0-10 cm bs	Utilized Tertiary Flake	Volcanic Glass	Expedient Tool	1	0.4	M	15.8	10.8	2.6	unilateral use wear	MD, TG	1/7/2014	72.3
12.003	30028	10	I-1	0-10 cm bs	Tertiary Flake	Volcanic Glass	Debitage	1	0.4	M					MD, TG	1/7/2014	72.3
13.001	30028	10	I-2	10-20 cm bs	Utilized Primary Flake	Volcanic Glass	Expedient Tool	1	1.3	M	18.0	13.1	5.8	unilateral use wear	MD, TG	1/7/2014	72.3
14.001	30028	10	I-3	20-30 cm bs	Tertiary Flake	Volcanic Glass	Debitage	1	0.3	M					MD, TG	1/7/2014	72.3
15.001	30030	11	I-1	54 cm bd	VOID									discarded	MD, TG	1/8/2014	172.2
16.001	30030	11	I-1	87 cm bd	Thaididae *Drupa ricina*	Gastropod		1	8.3						MD, TG	1/8/2014	172.2
17.001	30030	11	II-2	45-150 cm bd	Scoriaceous Lava Abrader	Basalt	Informal Tool	1	10.9		59.6	25.8	11.3	abraded on both anterior and posterior surfaces with side roughly shaped; fragment	MD, TG	1/8/2014	172.2
18.001	21139-AF	13	I-1	0-10 cm bs	Tertiary Flake	Volcanic Glass	Debitage	1	1.7	L	24.1	12.7	5.3		MD, TG	1/8/2014	194.2
18.002	21139-AF	13	I-1	0-10 cm bs	Secondary Flake	Volcanic Glass	Debitage	1	0.4	M					MD, TG	1/9/2014	194.2
19.001	21139-AF	13	I-2	10-20 cm bs	Tertiary Flake	Basalt	Debitage	1	7.0	L	43.4	21.9	7.1		MD, TG	1/9/2014	194.2
19.002	21139-AF	13	I-2	10-20 cm bs	Tertiary Flake	Basalt	Debitage	1	4.2	L	40.1	21.4	6.2		MD, TG	1/9/2014	194.2
19.003	21139-AF	13	I-2	10-20 cm bs	Tertiary Flake	Basalt	Debitage	1	2.4	L	27.0	12.4	7.8		MD, TG	1/9/2014	194.2
19.004	21139-AF	13	I-2	10-20 cm bs	Tertiary Flake	Basalt	Debitage	2	1.5	M					MD, TG	1/9/2014	194.2
19.005	21139-AF	13	I-2	10-20 cm bs	Utilized Secondary Flake	Volcanic Glass	Expedient Tool	1	1.1	M	15.9	12.3	5.8	unilateral use wear	MD, TG	1/9/2014	194.2
19.006	21139-AF	13	I-2	10-20 cm bs	Utilized Tertiary Flake	Volcanic Glass	Expedient Tool	1	0.6	M	14.6	12.6	3.7	bilateral use wear	MD, TG	1/9/2014	194.2
19.007	21139-AF	13	I-2	10-20 cm bs	Indeterminate Marine Shell	Gastropod		1	0.1						MD, TG	1/9/2014	194.2
20.001	21139-AF	13	I-3	20-30 cm bs	Worked Bone	Bone	Manufacturing Debris	1	0.7		13.6	13.6	3.1	polished square tab with beveled edges; fishhook blank	MD, TG	1/9/2014	194.2
20.002	21139-AF	13	I-3	20-30 cm bs	Adze Flake	Basalt	Formal Tool	1	1.1	M	14.8	11.7	6.3	1 polished facet	MD, TG	1/9/2014	194.2
20.003	21139-AF	13	I-3	20-30 cm bs	Tertiary Flake	Basalt	Debitage	5	4.6	M					MD, TG	1/9/2014	194.2
20.004	21139-AF	13	I-3	20-30 cm bs	Core	Volcanic Glass	Debitage	1	1.3	M	12.5	13.1	6.2	multidirectional	MD, TG	1/9/2014	194.2
20.005	21139-AF	13	I-3	20-30 cm bs	Tertiary Flake	Volcanic Glass	Debitage	2	0.8	M					MD, TG	1/9/2014	194.2
20.006	21139-AF	13	I-3	20-30 cm bs	Tertiary Flake	Volcanic Glass	Debitage	1	0.2	S					MD, TG	1/9/2014	194.2
20.007	21139-AF	13	I-3	20-30 cm bs	*Aleurites moluccana*	Nutshell		2	0.3					burned	MD, TG	1/9/2014	194.2

** TNF = total number of fragments*

***Size Range - S = less than 10 mm, M = 10-12 mm, L = greater than 20 mm.*

APPENDIX E - Summary of Site 30037 agricultural features

Feature	Type	Length (m)	Width (m)	Height (m)	Shape	Easting	Northing	Construction	Field Number
A	Mound	1.80	1.20	0.70	Oval	298564	2147070	Piled cobbles and boulders	18.2
B	Mound	1.80	1.50	0.90	Oval	298572	2147075	Piled cobbles and boulders	18.3
C	Mound	1.50	1.00	0.60	Oval	298577	2147067	Piled cobbles and boulders	18.1
D	Mound	1.50	1.45	0.70	Circular	298580	2147069	Piled cobbles and boulders	20.1
E	Mound	2.00	1.00	0.70	Oval	298587	2147068	Piled cobbles and boulders	20.2
F	Mound	2.00	1.50	0.80	Oval	298609	2147087	Piled cobbles and boulders	23.1
G	Mound	1.00	1.00	0.50	Circular	298594	2147047	Piled cobbles and boulders	19.2
H	Mound	1.50	1.00	0.50	Oval	298597	2147046	Piled cobbles and boulders	19.1
I	Mound	10.70	1.50	0.70	Linear	298617	2147042	Piled cobbles and boulders	98.1
J	Mound	14.30	1.50	0.50	Linear	298626	2147032	Piled cobbles and boulders	98.2
K	Mound	1.50	1.00	0.60	Oval	298647	2147036	Piled cobbles and boulders	98.3
L	Mound	1.10	1.10	0.50	Circular	298650	2147038	Piled cobbles and boulders	97.4
M	Mound	1.50	1.00	0.60	Oval	298653	2147041	Piled cobbles and boulders	97.5
N	Mound	12.00	1.20	0.60	Linear	298665	2147045	Piled cobbles and boulders	95.2
O	Mound	6.00	2.00	0.80	Linear	298660	2147064	Piled pebble, cobbles and boulders	93.1
P	Mound	4.00	1.50	0.80	Oval	298667	2147052	Piled cobbles and boulders	95.1
Q	Mound	1.80	1.50	0.70	Oval	298673	2147042	Piled cobbles and boulders	92.4
R	Mound	1.05	1.20	0.60	Oval	298682	2147046	Piled cobbles and boulders	92.1
S	Mound	1.00	1.00	0.50	Circular	298695	2147047	Piled cobbles and boulders	92.3
T	Mound	1.00	0.80	0.50	Oval	2986841	214742	Piled cobbles and boulders	92.2
U	Mound	1.50	0.80	0.50	Oval	298659	2147035	Piled cobbles and boulders	97.1
V	Mound	0.80	0.80	0.40	Circular	298659	2147033	Piled cobbles and boulders	97.2
W	Mound	1.00	0.80	0.50	Oval	298654	2147036	Piled cobbles and boulders	97.3
X	Mound	1.00	0.80	0.60	Oval	298654	2147022	Piled cobbles and boulders	100.1
Y	Mound	11.60	1.50	0.70	Linear	298680	2147014	Piled cobbles and boulders	96.1
Z	Mound	1.50	0.80	0.50	Oval	298691	2147018	Piled cobbles and boulders	94.2
AA	Mound	1.50	1.00	0.70	Oval	298693	2147024	Piled cobbles and boulders	94.1
AB	Mound	1.50	1.00	0.40	Oval	298699	2147020	Piled cobbles and boulders	109.1
AC	Mound	1.20	0.80	0.50	Oval	298693	2147017	Piled cobbles and boulders	94.3
AD	Mound	1.50	1.00	0.60	Oval	298689	2147013	Piled cobbles and boulders	94.4
AE	Mound	2.00	1.00	1.00	Oval	298665	2147000	Piled cobbles and boulders	106.2
AF	Mound	1.50	1.50	0.80	Circular	298604	2147008	Piled cobbles and boulders	101.3
AG	Mound	1.20	1.00	0.60	Oval	298607	2147020	Piled cobbles and boulders	101.1
AH	Mound	1.00	0.80	0.50	Oval	298598	2147017	Piled cobbles and boulders	101.2
AI	Mound	2.50	2.00	1.20	Oval	298674	2146989	Piled cobbles and boulders	106.1
AJ	Mound	1.50	1.00	0.70	Oval	298680	2146982	Piled cobbles and boulders	105.3
AK	Mound	3.00	3.00	1.00	Circular	298675	2146975	Piled cobbles and boulders	105.1
AL	Mound	1.00	1.00	0.80	Circular	298682	2146981	Piled cobbles and boulders	105.2
AM	Mound	8.50	1.50	0.80	Linear	298700	2146998	Piled cobbles and boulders	108.1
AN	Mound	2.50	1.50	1.00	Oval	298703	2146992	Piled cobbles and boulders	108.2
AO	Mound	1.50	0.80	0.80	Irregular	298708	2146994	Piled cobbles and boulders	110.5
AP	Mound	1.00	1.00	0.70	Circular	298710	2146998	Piled cobbles and boulders	110.4
AQ	Mound	2.00	0.80	0.60	Irregular	298711	2147001	Piled cobbles and boulders	110.2
AR	Mound	1.20	1.20	0.80	Circular	298717	2147007	Piled cobbles and boulders	113.1
AS	Mound	2.20	2.00	0.90	Oval	298713	2147003	Piled cobbles and boulders	110.1
AT	Mound	1.50	1.00	0.70	Oval	298711	2146989	Piled cobbles and boulders	110.6
AU	Mound	1.00	1.00	0.80	Circular	298714	2146991	Piled cobbles and boulders	110.8
AV	Mound	1.80	1.80	0.20	Circular	298716	2146995	Piled cobbles and boulders	110.7
AW	Mound	2.00	2.00	1.20	Circular	298716	2146995	Piled cobbles and boulders	110.3
AX	Mound	1.00	1.00	0.50	Circular	298730	2146998	Piled cobbles and boulders	111.2
AY	Mound	2.50	1.50	0.80	Oval	298735	2147000	Piled cobbles and boulders	114.5
AZ	Mound	3.00	2.00	1.00	Oval	298739	2147014	Piled cobbles and boulders	114.1
BA	Mound	5.00	1.00	0.60	Linear	298745	2147016	Piled pebble, cobbles and boulders	114.2
BB	Mound	2.50	2.50	0.90	Circular	298740	2147008	Piled cobbles and boulders	114.3
BC	Mound	1.50	1.50	0.80	Circular	298739	2147002	Piled cobbles and boulders	114.4
BD	Mound	2.50	1.80	1.00	Oval	298739	2146996	Piled cobbles and boulders	111.1
BE	Mound	2.00	2.00	0.80	Circular	298733	2146994	Piled cobbles and boulders	114.6
BF	Mound	2.00	1.50	0.60	Oval	298735	2146986	Piled cobbles and boulders	112.2
BG	Mound	5.50	1.50	0.70	Linear	298741	2146983	Piled cobbles and boulders	112.1
BH	Mound	1.25	1.25	0.70	Circular	298725	2146973	Piled cobbles and boulders	107.8
BI	Mound	3.00	1.50	1.00	Oval	298720	2146978	Piled cobbles and boulders	107.5
BJ	Mound	2.50	1.50	0.90	Oval	298712	2146974	Piled cobbles and boulders	107.1
BK	Mound	2.50	2.00	1.20	Oval	298717	2146970	Piled cobbles and boulders	107.4

APPENDIX E - Summary of Site 30037 agricultural features (cont.)

Feature	Type	Length (m)	Width (m)	Height (m)	Shape	Easting	Northing	Construction	Field Number
BL	Mound	2.00	1.00	0.80	Oval	298702	2146967	Piled cobbles and boulders	107.2
BM	Mound	2.50	2.40	1.10	Circular	298717	2146965	Piled cobbles and boulders	107.3
BN	Mound	1.00	0.80	0.60	Oval	298717	2146964	Piled cobbles and boulders	107.10
BO	Mound	6.50	1.50	0.70	Linear	298727	2146964	Piled cobbles and boulders	107.7
BP	Mound	2.00	2.00	0.70	Circular	298724	2146970	Piled cobbles and boulders	107.6
BQ	Mound	2.50	1.00	0.80	Oval	298721	2146971	Piled cobbles and boulders	107.9
BR	Mound	1.00	1.00	0.50	Circular	298685	2146942	Piled cobbles and boulders	104.3
BS	Mound	1.50	0.80	0.60	Oval	298689	2146940	Piled cobbles and boulders	104.1
BT	Mound	2.50	1.00	0.60	Oval	298694	2146933	Piled cobbles and boulders	104.2
BU	Mound	1.50	1.00	0.70	Oval	298700	2146907	Piled cobbles and boulders	134.1
BV	Mound	13.10	2.50	0.80	Linear	298720	2146891	Piled cobbles and boulders	135.1
BW	Mound	9.40	1.50	0.70	Linear	298717	2146881	Piled cobbles and boulders	137.1
BX	Mound	2.50	1.50	1.00	Oval	298723	2146869	Piled cobbles and boulders	136.1
BY	Mound	3.00	1.00	0.60	Linear	298733	2146865	Piled cobbles and boulders	136.3
BZ	Mound	2.50	2.50	1.00	Circular	298728	2146855	Piled cobbles and boulders	136.2
CA	Mound	1.50	0.80	0.50	Oval	298690	2146849	Piled cobbles and boulders	138.3
CB	Mound	3.00	1.50	0.70	Irregular	298695	2146847	Piled cobbles and boulders	138.5
CC	Mound	2.50	1.20	0.60	Oval	298688	2146843	Piled cobbles and boulders	138.4
CD	Mound	1.00	1.00	0.47	Circular	298691	2146837	Piled cobbles and boulders	138.6
CE	Mound	1.50	1.00	0.60	Oval	298687	2146847	Piled cobbles and boulders	138.2
CF	Mound	0.80	0.80	0.50	Circular	298682	2146849	Piled cobbles and boulders	138.7
CG	Mound	1.50	1.20	0.60	Oval	298669	2146838	Piled cobbles and boulders	138.8
CH	Mound	1.40	1.20	0.70	Oval	298819	2147041	Piled cobbles and boulders	117.1
CI	Mound	3.50	1.80	0.70	Oval	298825	2147043	Piled cobbles and boulders	117.3
CJ	Mound	3.00	2.20	0.80	Oval	298825	2147046	Piled cobbles and boulders	117.2
CK	Mound	3.30	2.40	1.40	Oval	298784	2147043	Piled cobbles and boulders	116.2
CL	Mound	1.50	1.20	0.50	Oval	298775	2147046	Piled cobbles and boulders	116.3
CM	Mound	27.70	2.00	0.60	L-shaped	298775	2147073	Piled cobbles and boulders	83.1/ 116.1
CN	Mound	2.05	2.00	1.20	Circular	298777	2147060	Piled cobbles and boulders	116.4
CO	Mound	3.50	1.20	1.00	Linear	298790	2147073	Piled cobbles and boulders	81.1
CP	Mound	4.00	1.00	0.60	Linear	298769	2147065	Piled cobbles and boulders	85.4
CQ	Mound	1.80	1.00	0.50	Oval	298765	2147059	Piled cobbles and boulders	85.3
CR	Mound	1.50	1.50	0.60	Circular	298754	2147050	Piled cobbles and boulders	85.5
CS	Mound	2.20	1.50	0.50	Oval	298752	2147054	Piled cobbles and boulders	89.2
CT	Mound	1.80	1.20	0.60	Oval	298754	2147058	Piled cobbles and boulders	85.2
CU	Mound	2.70	1.80	0.70	Irregular	298757	2147064	Piled cobbles and boulders	85.1
CV	Mound	1.50	1.20	0.50	Oval	298752	2147063	Piled cobbles and boulders	85.7
CW	Mound	2.20	1.20	0.60	Oval	298746	2147061	Piled cobbles and boulders	88.3
CX	Mound	1.40	1.40	0.50	Circular	298746	2147060	Piled cobbles and boulders	85.6
CY	Mound	4.00	2.20	1.00	Irregular	298750	2147050	Piled cobbles and boulders	89.1
CZ	Mound	2.00	0.90	0.50	Irregular	298729	2147053	Piled cobbles and boulders	90.1
DA	Mound	2.50	2.00	1.30	Oval	298734	2147059	Piled cobbles and boulders	90.2
DB	Mound	4.20	1.80	0.70	Oval	298742	2147062	Piled cobbles and boulders	88.1
DC	Terrace	4.80	2.20	1.10	Linear	298730	2147065	Piled cobbles and boulders	90.3
DD	Terrace	4.00	1.20	0.70	Linear	298724	2147070	Piled cobbles and boulders	90.4
DE	Mound	53.00	1.80	0.75	Linear	298732	2147068	Piled cobbles and boulders	87.1
DF	Mound	1.20	1.00	0.60	Oval	298739	2147068	Piled cobbles and boulders	88.2
DG	Mound	5.20	1.20	0.60	Linear	298745	2147074	Piled cobbles and boulders	86.1
DH	Mound	8.20	1.50	0.60	Linear	298764	2147082	Piled cobbles and boulders	82.1
DI	Mound	4.00	1.50	0.50	Linear	298741	2147078	Piled cobbles and boulders	86.2
DJ	Mound	2.50	1.60	0.60	Oval	298734	2147081	Piled cobbles and boulders	86.5
DK	Mound	1.80	1.50	0.60	Oval	298744	2147083	Piled cobbles and boulders	86.4
DL	Mound	7.20	1.40	0.70	Linear	298748	2147083	Piled cobbles and boulders	86.3
DM	Mound	1.40	1.00	0.50	Oval	298742	2147089	Piled cobbles and boulders	84.3
DN	Mound	3.50	1.00	0.90	Linear	298778	2147083	Piled cobbles and boulders	80.2
DO	Mound	1.50	1.50	0.90	Circular	298781	2147089	Piled cobbles and boulders	81.3
DP	Mound	1.50	1.50	0.90	Circular	298786	2147087	Piled cobbles and boulders	80.1
DQ	Mound	3.00	2.00	0.70	Oval	298774	2147089	Piled cobbles and boulders	81.4
DR	Mound	2.50	2.00	0.60	Oval	298687	2147097	Piled cobbles and boulders	26.7
DS	Mound	2.50	1.50	0.60	Oval	298688	2147108	Piled cobbles and boulders	26.5
DT	Mound	3.00	1.50	0.60	Oval	298689	2147104	Piled cobbles and boulders	26.4
DU	Mound	2.80	1.50	0.50	Oval	298685	2147102	Piled cobbles and boulders	26.3
DV	Mound	1.20	1.00	0.50	Oval	298680	2147104	Piled cobbles and boulders	26.1

APPENDIX E - Summary of Site 30037 agricultural features (cont.)

Feature	Type	Length (m)	Width (m)	Height (m)	Shape	Easting	Northing	Construction	Field Number
DW	Mound	3.00	1.80	0.70	Oval	298682	2147102	Piled cobbles and boulders	26.6
DX	Mound	2.50	1.50	0.60	Oval	298681	2147100	Piled cobbles and boulders	26.2
DY	Mound	2.80	2.00	0.60	Oval	298682	2147099	Piled cobbles and boulders	26.8
DZ	Mound	2.00	2.00	0.90	Circular	298658	2147105	Piled cobbles and boulders	25.3
EA	Mound	7.00	1.50	0.70	Linear	298641	2147119	Piled cobbles and boulders	25.4
EB	Mound	1.50	1.00	0.40	Oval	298652	2147123	Piled cobbles and boulders	25.1
EC	Mound	1.00	0.80	0.40	Oval	298651	2147126	Piled cobbles and boulders	25.2
ED	Mound	2.00	1.50	0.70	Oval	298657	2147127	Piled cobbles and boulders	28.2
EE	Mound	2.50	1.70	0.70	Oval	298670	2147116	Piled cobbles and boulders	27.2
EF	Mound	2.20	1.20	0.70	Oval	298670	2147114	Piled cobbles and boulders	27.1
EG	Mound	2.40	2.70	0.70	Circular	298674	2147120	Piled cobbles and boulders	27.3
EH	Mound	4.00	1.80	0.60	Irregular	298675	2147116	Piled cobbles and boulders	27.4
EI	Mound	2.00	2.00	0.70	Circular	298678	2147111	Piled cobbles and boulders	27.5
EJ	Wall	62.50	1.50	0.70	L-shaped	298624	2147129	Stacked and piled cobbles and boulders	17.1
EK	Mound	3.00	1.50	0.60	Oval	298657	2147137	Piled cobbles and boulders	28.1
EL	Mound	45.50	1.70	0.70	Linear	298647	2147147	Piled cobbles and boulders	28.3
EM	Mound	2.50	1.50	0.80	Oval	298645	2147155	Piled cobbles and boulders	16.1
EN	Mound	9.90	1.00	0.70	Linear	298650	2147167	Piled cobbles and boulders	15.1
EO	Mound	85.50	2.00	1.20	Curvilinear	298650	2147177	Piled pebble, cobbles and boulders	14.1
EP	Mound	2.00	1.50	1.00	Oval	298666	2147154	Piled cobbles and boulders	14.2
EQ	Mound	2.00	1.00	0.60	Oval	298673	2147148	Piled cobbles and boulders	30.4
ER	Mound	3.50	1.15	0.80	Linear	298674	2147142	Piled cobbles and boulders	30.3
ES	Mound	2.00	1.80	0.90	Oval	298676	2147140	Piled cobbles and boulders	30.2
ET	Mound	1.50	1.00	0.60	Oval	298671	2147133	Piled cobbles and boulders	30.1
EU	Mound	1.50	1.50	0.40	Circular	298677	2147138	Piled cobbles and boulders	30.5
EV	Mound	2.00	1.20	0.60	Oval	298684	2147140	Piled cobbles and boulders	30.6
EW	Mound	1.00	0.80	0.50	Oval	298693	2147132	Piled cobbles and boulders	29.1
EX	Mound	1.00	1.00	0.60	Circular	298694	2147136	Piled cobbles and boulders	30.7
EY	Mound	2.50	2.00	0.90	Oval	298703	2147125	Piled cobbles and boulders	29.2
EZ	Mound	1.00	1.00	0.50	Circular	298708	2147125	Piled cobbles and boulders	29.3
FA	Mound	1.20	1.00	0.50	Oval	298717	2147111	Piled cobbles and boulders	87.5
FB	Mound	1.80	1.20	0.80	Irregular	298718	2147105	Piled cobbles and boulders	87.8
FC	Mound	1.50	1.00	0.40	Oval	298715	2147099	Piled cobbles and boulders	87.2
FD	Mound	1.50	1.00	0.50	Oval	298721	2147105	Piled cobbles and boulders	87.6
FE	Mound	1.50	1.50	0.70	Circular	298725	2147106	Piled cobbles and boulders	87.7
FF	Mound	1.80	1.80	0.60	Circular	298723	2147109	Piled cobbles and boulders	87.3
FG	Mound	1.80	1.50	0.60	Oval	298720	2147111	Piled cobbles and boulders	87.4
FH	Mound	11.40	2.00	0.60	Linear	298744	2147110	Piled cobbles and boulders	84.1
FI	Mound	2.00	1.80	0.90	Oval	298714	2147132	Piled cobbles and boulders	34.1
FJ	Mound	1.20	0.80	0.40	Oval	298717	2147133	Piled cobbles and boulders	34.4
FK	Mound	2.50	2.00	0.80	Oval	298720	2147136	Piled cobbles and boulders	34.2
FL	Mound	55.40	1.50	0.90	Linear	298710	2147135	Stacked and piled cobbles and boulders	32.1
FM	Mound	1.50	1.20	0.60	Oval	298700	2147151	Piled cobbles and boulders	35.3
FN	Mound	2.50	2.50	1.20	Circular	298712	2147163	Piled cobbles and boulders	35.1
FO	Mound	2.80	2.50	1.20	Oval	298702	2147163	Piled cobbles and boulders	35.2
FP	Mound	4.00	1.80	0.60	Irregular	298697	2147167	Piled cobbles and boulders	33.1
FQ	Mound	2.00	2.00	1.10	Circular	298683	2147177	Piled cobbles and boulders	13.1
FR	Mound	2.50	2.00	1.20	Oval	298680	2147180	Piled cobbles and boulders	13.2
FS	Mound	1.80	1.80	1.30	Circular	298669	2147184	Piled cobbles and boulders	13.5
FT	Mound	2.00	1.00	0.60	Oval	298669	2147189	Piled cobbles and boulders	13.4
FU	Mound	7.00	1.50	1.40	Linear	298670	2147195	Piled cobbles and boulders	11.1
FV	Mound	1.45	1.50	1.20	Circular	298675	2147189	Piled cobbles and boulders	13.3
FW	Mound	12.10	1.50	0.90	Linear	298685	2147188	Piled cobbles and boulders	11.2
FX	Mound	2.50	2.00	0.90	Oval	298695	2147175	Piled cobbles and boulders	12.1
FY	Mound	2.50	1.75	1.00	Oval	298703	2147176	Piled cobbles and boulders	12.2
FZ	Mound	8.10	2.00	0.80	Linear	298712	2147180	Piled cobbles and boulders	36.1
GA	Mound	2.20	1.00	0.60	Oval	298716	2147179	Piled cobbles and boulders	39.1
GB	Mound	1.80	1.00	0.60	Oval	298729	2147175	Piled cobbles and boulders	41.1
GC	Mound	29.30	1.50	0.90	Linear	298726	2147189	Stacked and piled cobbles and boulders	40.2
GD	Mound	1.50	1.50	1.00	Circular	298736	2147161	Piled cobbles and boulders	37.7
GE	Mound	2.00	1.50	1.10	Oval	298732	2147157	Piled cobbles and boulders	37.8
GF	Mound	1.50	1.50	0.90	Circular	298743	2147151	Piled cobbles and boulders	37.5
GG	Mound	2.50	1.00	0.80	Oval	298722	2147149	Piled cobbles and boulders	37.10

APPENDIX E - Summary of Site 30037 agricultural features (cont.)

Feature	Type	Length (m)	Width (m)	Height (m)	Shape	Easting	Northing	Construction	Field Number
GH	Mound	3.50	2.50	1.30	Oval	298726	2147144	Stacked and piled cobbles and boulders	37.1
GI	Mound	1.50	1.00	0.70	Oval	298730	2147144	Piled cobbles and boulders	37.9
GJ	Mound	3.00	3.00	1.10	Circular	298726	2147139	Piled cobbles and boulders	34.3
GK	Mound	2.70	1.50	0.90	Oval	298734	2147136	Piled cobbles and boulders	37.2
GL	Mound	6.60	2.50	1.30	Linear	298744	2147135	Piled cobbles and boulders	37.4
GM	Mound	2.50	1.00	0.60	Oval	298736	2147142	Piled cobbles and boulders	37.3
GN	Mound	3.00	2.00	1.00	Oval	298740	2147149	Piled cobbles and boulders	37.6
GO	Mound	2.50	2.00	1.30	Oval	298712	2147164	Piled cobbles and boulders	38.1
GP	Mound	46.30	1.50	1.20	Linear	298739	2147175	Stacked and piled cobbles and boulders	40.1
GQ	Mound	14.00	1.50	0.80	Linear	298753	2147127	Stacked and piled cobbles and boulders	40.3
GR	Mound	21.40	1.50	0.80	Linear	298779	2147153	Stacked and piled cobbles and boulders	40.4
GS	Mound	2.50	1.00	0.70	Oval	298769	2147142	Piled cobbles and boulders	78.11
GT	Mound	2.00	1.80	0.70	Oval	298775	2147143	Piled cobbles and boulders	78.12
GU	Mound	2.50	1.50	0.80	Oval	298776	2147140	Piled cobbles and boulders	78.10
GV	Mound	1.50	1.00	0.80	Oval	298782	2147135	Piled cobbles and boulders	78.9
GW	Mound	1.00	0.80	0.60	Oval	298789	2147127	Piled cobbles and boulders	77.2
GX	Mound	2.50	2.00	0.70	Oval	298793	2147124	Piled cobbles and boulders	77.1
GY	Mound	1.20	1.00	0.70	Oval	298779	2147128	Piled cobbles and boulders	78.8
GZ	Mound	2.20	2.20	0.90	Circular	298766	2147125	Piled cobbles and boulders	78.1
HA	Mound	2.70	2.00	0.90	Oval	298751	2147124	Piled cobbles and boulders	78.5
HB	Mound	2.20	1.50	0.80	Oval	298759	2147126	Piled cobbles and boulders	78.2
HC	Mound	2.00	2.00	0.90	Circular	298766	2147117	Piled cobbles and boulders	78.3
HD	Mound	2.80	1.80	0.80	Oval	298773	2147125	Piled cobbles and boulders	78.6
HE	Mound	1.80	1.80	0.90	Circular	298773	2147119	Piled cobbles and boulders	78.7
HF	Mound	2.50	1.50	0.90	Oval	298751	2147116	Piled cobbles and boulders	78.4
HG	Mound	2.00	1.50	0.80	Oval	298764	2147115	Piled cobbles and boulders	79.6
HH	Mound	2.00	1.80	0.80	Oval	298760	2147109	Piled cobbles and boulders	79.7
HI	Mound	2.40	2.00	0.70	Oval	298770	2147116	Piled cobbles and boulders	79.5
HJ	Mound	2.50	2.50	0.60	Circular	298774	2147110	Piled cobbles and boulders	79.4
HK	Mound	1.50	1.00	0.70	Oval	298777	2147112	Piled cobbles and boulders	77.4
HL	Mound	1.10	1.10	0.50	Circular	298783	2147116	Piled cobbles and boulders	77.3
HM	Mound	2.50	2.50	1.00	Circular	298790	2147112	Piled cobbles and boulders	79.2
HN	Mound	1.20	1.00	0.70	Oval	298793	2147109	Piled cobbles and boulders	79.3
HO	Mound	3.00	1.50	1.00	Oval	298784	2147109	Piled cobbles and boulders	79.1
HP	Terrace	3.50	1.60	0.70	Linear	298829	2147145	Piled cobbles and boulders	42.2
HQ	Mound	2.50	1.00	0.60	Oval	298832	2147153	Piled cobbles and boulders	42.3
HR	Terrace	3.50	2.00	0.70	Linear	298811	2147163	Piled cobbles and boulders	43.1
HS	Mound	2.50	2.00	1.20	Oval	298778	2147205	Piled cobbles and boulders	10.1
HT	Mound	2.40	2.00	1.20	Oval	298793	2147207	Piled cobbles and boulders	10.2
HU	Mound	3.00	1.50	0.80	Oval	298799	2147219	Piled cobbles and boulders	46.4
HV	Mound	5.00	1.70	0.80	Linear	298784	2147228	Piled cobbles and boulders	8.3
HW	Mound	3.00	1.50	0.70	Oval	298781	2147228	Piled cobbles and boulders	8.1
HX	Mound	6.00	2.00	1.00	Linear	298777	2147231	Piled cobbles and boulders	9.1
HY	Mound	16.40	3.00	1.50	Linear	298785	2147259	Piled cobbles and boulders	7.1
HZ	Mound	7.00	1.50	0.90	Linear	298783	2147233	Piled cobbles and boulders	8.2
IA	Mound	11.70	1.50	0.60	Linear	298785	2147245	Piled cobbles and boulders	47.5
IB	Mound	3.00	2.00	1.00	Oval	298789	2147236	Piled cobbles and boulders	8.4
IC	Mound	55.10	1.50	0.70	Linear	298790	2147262	Piled cobbles and boulders	47.4
ID	Mound	2.50	2.00	0.90	Oval	298815	2147248	Piled cobbles and boulders	6.1
IE	Mound	1.20	1.00	0.70	Oval	298820	2147233	Piled cobbles and boulders	46.2
IF	Mound	2.50	1.50	0.80	Oval	298819	2147230	Piled cobbles and boulders	46.1
IG	Mound	2.00	1.00	0.70	Oval	298820	2147221	Piled cobbles and boulders	46.3
IH	Mound	3.00	2.00	0.90	Oval	298819	2147220	Piled cobbles and boulders	49.7
II	Mound	2.00	1.50	0.70	Oval	298823	2147227	Piled cobbles and boulders	49.3
IJ	Mound	1.50	1.00	0.70	Oval	298824	2147224	Piled cobbles and boulders	49.1
IK	Mound	3.00	2.50	1.30	Oval	298826	2147227	Piled cobbles and boulders	49.2
IL	Mound	3.50	2.00	1.50	Oval	298830	2147229	Piled cobbles and boulders	49.5
IM	Mound	1.50	1.00	0.80	Oval	298832	2147228	Piled cobbles and boulders	49.4
IN	Mound	2.00	1.50	0.70	Oval	298829	2147223	Piled cobbles and boulders	49.6
IO	Mound	43.00	1.50	0.65	Linear	298852	2147238	Piled cobbles and boulders	47.1
IP	Mound	20.30	1.50	0.70	Linear	298819	2147194	Piled cobbles and boulders	47.3
IQ	Mound	1.80	1.40	0.80	Oval	298837	2147200	Piled cobbles and boulders	48.1
IR	Mound	2.00	0.80	0.50	Oval	298844	2147211	Piled cobbles and boulders	51.11

APPENDIX E - Summary of Site 30037 agricultural features (cont.)

Feature	Type	Length (m)	Width (m)	Height (m)	Shape	Easting	Northing	Construction	Field Number
IS	Mound	1.50	1.00	0.50	Oval	298843	2147212	Piled cobbles and boulders	51.10
IT	Mound	3.00	1.20	0.90	Oval	298847	2147214	Piled cobbles and boulders	51.12
IU	Mound	3.50	1.70	0.80	Oval	298849	2147215	Piled cobbles and boulders	51.5
IV	Mound	1.00	0.80	0.70	Oval	298853	2147203	Piled cobbles and boulders	51.6
IW	Mound	1.20	0.70	0.60	Oval	298851	2147201	Piled cobbles and boulders	51.8
IX	Mound	1.40	0.60	0.60	Oval	298853	2147201	Piled cobbles and boulders	51.9
IY	Mound	1.20	1.00	0.60	Oval	298843	2147194	Piled cobbles and boulders	48.2
IZ	Terrace	4.00	1.70	0.50	Linear	298848	2147165	Aligned boulders and cobbles	45.1
JA	Mound	8.00	2.20	0.70	Linear	298861	2147153	Stacked and piled cobbles and boulders	71.1
JB	Mound	66.00	1.50	0.65	Linear	298851	2147207	Stacked and piled cobbles and boulders	70.1
JC	Mound	44.00	1.50	0.80	Linear	298860	2147229	Stacked and piled cobbles and boulders	50.1
JD	Mound	1.50	1.00	0.60	Oval	298873	2147237	Piled cobbles and boulders	54.3
JE	Mound	2.80	2.80	1.00	Circular	298865	2147243	Piled cobbles and boulders	54.2
JF	Mound	1.00	1.00	0.50	Circular	298879	2147236	Piled cobbles and boulders	54.4
JG	Mound	31.40	1.50	0.75	Linear	298850	2147247	Stacked and piled cobbles and boulders	54.1
JH	Mound	1.50	0.80	0.60	Oval	298850	2147259	Piled cobbles and boulders	51.7
JI	Mound	3.00	2.50	1.00	Oval	298879	2147230	Piled cobbles and boulders	54.5
JJ	Mound	20.10	1.70	0.50	Linear	298881	2147243	Stacked and piled cobbles and boulders	54.6
JK	Mound	2.50	1.00	0.60	Oval	298864	2147221	Piled cobbles and boulders	51.2
JL	Mound	1.70	1.00	0.70	Oval	298859	2147211	Piled cobbles and boulders	51.3
JM	Mound	4.00	1.50	0.80	Oval	298854	2147210	Piled cobbles and boulders	51.4
JN	Mound	1.00	0.80	0.50	Oval	298871	2147206	Piled cobbles and boulders	52.2
JO	Mound	2.00	1.00	0.50	Oval	298879	2147207	Piled cobbles and boulders	52.1
JP	Mound	6.50	1.20	0.50	Linear	298873	2147203	Piled cobbles and boulders	52.5
JQ	Mound	1.40	0.90	0.50	Oval	298880	2147195	Piled cobbles and boulders	52.4
JR	Mound	2.00	1.50	0.80	Oval	298873	2147196	Piled cobbles and boulders	52.3
JS	Mound	2.00	1.10	0.60	Oval	298887	2147181	Piled cobbles and boulders	68.1
JT	Mound	2.70	1.20	0.70	Oval	298884	2147177	Piled cobbles and boulders	69.2
JU	Mound	1.50	1.00	0.50	Oval	298898	2147168	Piled cobbles and boulders	69.1
JV	Mound	5.00	2.00	1.10	Oval	298851	2147128	Piled cobbles and boulders	75.1
JW	Mound	8.00	2.00	0.80	Linear	298865	2147126	Piled cobbles and boulders	74.1
JX	Mound	11.00	2.00	0.80	Linear	298848	2174111	Piled cobbles and boulders	75.2
JY	Mound	10.00	1.90	0.75	Linear	298858	2147118	Piled cobbles and boulders	75.3
JZ	Mound	6.00	2.20	0.90	Linear	298879	2147119	Piled cobbles and boulders	72.1
KA	Modified depression	5.70	1.45	-0.55	Linear	298908	2147112	Piled cobbles and boulders	118.1
KB	Mound	24.30	2.50	0.80	Linear	298917	2147130	Piled cobbles and boulders	119.1
KC	Mound	8.60	1.50	0.80	Linear	298928	2147111	Piled cobbles and boulders	119.2
KD	Mound	2.20	2.00	1.10	Oval	298935	2147106	Piled cobbles and boulders	120.1
KE	Mound	7.00	1.80	0.70	Linear	298938	2147114	Piled pebble, cobbles and boulders	120.2
KF	Mound	11.00	1.70	0.80	Linear	298931	2147153	Piled cobbles and boulders	121.3
KG	Mound	1.50	1.20	0.70	Oval	298935	2147150	Piled cobbles and boulders	121.1
KH	Mound	1.80	1.50	0.90	Oval	298937	2147154	Piled cobbles and boulders	121.2
KI	Mound	5.00	1.00	0.60	Linear	298910	2147182	Piled cobbles and boulders	67.1
KJ	Mound	1.00	1.00	0.60	Circular	298916	2147186	Piled cobbles and boulders	66.3
KK	Mound	1.50	1.50	0.70	Circular	298917	2147185	Piled cobbles and boulders	66.2
KL	Mound	8.00	1.00	0.70	Linear	298917	2147188	Piled cobbles and boulders	67.2
KM	Mound	7.20	1.20	0.80	Linear	298913	2147198	Piled cobbles and boulders	66.1
KN	Mound	12.00	2.00	1.10	Linear	298922	2147215	Stacked and piled cobbles and boulders	63.1
KO	Mound	2.50	2.00	0.90	Oval	298916	2147209	Piled cobbles and boulders	65.1
KP	Mound	3.00	1.20	0.80	Oval	298913	2147210	Piled cobbles and boulders	65.2
KQ	Mound	4.50	1.50	0.70	Linear	198907	2147209	Piled cobbles and boulders	65.4
KR	Mound	1.50	1.00	0.50	Oval	298911	2147212	Piled cobbles and boulders	65.3
KS	Mound	21.40	1.50	0.70	Linear	298893	2147225	Stacked and piled cobbles and boulders	54.7
KT	Mound	4.50	2.00	0.80	Oval	298925	2147209	Piled cobbles and boulders	63.2
KU	Mound	2.00	1.50	0.65	Oval	298928	2147216	Piled cobbles and boulders	63.3
KV	Mound	3.00	2.00	1.00	Oval	298928	2147220	Piled cobbles and boulders	62.1
KW	Mound	2.50	2.00	0.70	Oval	298933	2147211	Piled cobbles and boulders	63.4
KX	Mound	2.50	2.50	1.00	Circular	198940	2147217	Piled cobbles and boulders	63.5
KY	Mound	3.20	3.00	1.20	Circular	298938	2147219	Piled cobbles and boulders	62.2
KZ	Mound	10.10	2.00	1.00	Linear	298933	2147226	Piled cobbles and boulders	62.3
LA	Mound	7.60	2.00	0.90	Linear	298928	2147230	Piled cobbles and boulders	61.5
LB	Mound	1.20	1.00	0.60	Oval	298931	2147239	Piled cobbles and boulders	61.4
LC	Mound	1.50	0.80	0.50	Oval	298934	2147244	Piled cobbles and boulders	61.3

APPENDIX E - Summary of Site 30037 agricultural features (cont.)

Feature	Type	Length (m)	Width (m)	Height (m)	Shape	Easting	Northing	Construction	Field Number
LD	Mound	1.50	1.00	0.50	Oval	298937	2147247	Piled cobbles and boulders	61.2
LE	Mound	2.00	1.50	0.80	Oval	298928	2147247	Piled cobbles and boulders	61.1
LF	Mound	46.20	2.00	0.80	Linear	298898	2147256	Stacked and piled cobbles and boulders	54.8
LG	Mound	2.50	1.70	1.00	Oval	298888	2147277	Piled cobbles and boulders	55.2
LH	Mound	3.00	1.80	1.20	Oval	298882	2147287	Piled cobbles and boulders	55.3
LI	Mound	14.80	1.75	1.20	Linear	298898	2147280	Piled cobbles and boulders	55.1
LJ	Mound	2.00	1.70	0.70	Oval	298873	2147311	Piled cobbles and boulders	3.1
LK	Mound	1.50	1.20	1.00	Oval	298920	2147341	Piled cobbles and boulders	1.1
LL	Mound	2.50	1.10	0.90	Oval	298920	2147335	Piled cobbles and boulders	1.2
LM	Mound	1.00	0.90	0.60	Oval	298917	2147324	Piled cobbles and boulders	2.1
LN	Mound	2.20	1.50	1.20	Oval	298923	2147308	Piled cobbles and boulders	56.3
LO	Mound	4.10	2.50	0.80	Oval	298918	2147302	Piled cobbles and boulders	56.1
LP	Mound	2.20	2.00	0.95	Oval	298920	2147301	Piled cobbles and boulders	56.2
LQ	Mound	18.60	1.90	1.10	Linear	298920	2147291	Piled cobbles and boulders	57.1
LR	Mound	1.75	1.50	0.80	Oval	298937	2147294	Piled cobbles and boulders	57.2
LS	Mound	3.70	1.60	0.90	Oval	298941	2147294	Piled cobbles and boulders	57.4
LT	Mound	2.10	1.00	1.00	Oval	298943	2147292	Piled cobbles and boulders	57.3
LU	Mound	2.20	1.10	1.10	Oval	298944	2147272	Stacked and piled cobbles and boulders	58.1
LV	Mound	7.50	1.20	0.80	Linear	298967	2147275	Piled cobbles and boulders	59.1
LW	Mound	1.80	1.70	0.90	Circular	298977	2147260	Piled cobbles and boulders	60.1
LX	Mound	2.50	1.50	0.80	Oval	298987	2147263	Piled cobbles and boulders	60.3
LY	Mound	1.20	1.10	1.00	Circular	298983	2147258	Piled cobbles and boulders	60.2
LZ	Mound	1.50	1.50	0.50	Circular	299067	2147396	Piled cobbles and boulders	214.4
MA	Mound	17.20	1.00	0.70	Linear	299059	2147409	Piled cobbles and boulders	214.1
MB	Mound	1.00	1.00	0.60	Circular	299066	2147400	Piled cobbles and boulders	214.5
MC	Mound	2.00	1.50	0.50	Oval	299075	2147400	Piled cobbles and boulders	214.3
MD	Mound	12.10	1.00	0.90	Linear	299060	2147403	Piled cobbles and boulders	214.2
ME	Mound	1.80	1.00	0.60	Oval	298993	2147074	Piled cobbles and boulders	126.1
MF	Mound	47.50	1.80	0.90	L-shaped	299062	2147069	Piled cobbles and boulders	122.1
MG	Mound	20.10	1.80	1.00	Linear	299059	2147061	Piled cobbles and boulders	123.1
MH	Mound	13.90	1.80	1.00	Linear	299059	2147061	Piled cobbles and boulders	124.1
MI	Mound	7.00	1.80	1.00	Linear	299066	2147053	Piled cobbles and boulders	155.1
MJ	Mound	1.00	0.80	0.40	Oval	299132	2147036	Piled cobbles and boulders	158.3
MK	Mound	1.00	1.00	0.40	Circular	299142	2147039	Piled cobbles and boulders	158.2
ML	Mound	1.50	1.00	0.50	Oval	299142	2147034	Piled cobbles and boulders	158.1
MM	Mound	1.80	1.20	0.60	Oval	299135	2147022	Piled cobbles and boulders	160.3
MN	Mound	1.50	1.00	0.70	Oval	299143	2147016	Piled cobbles and boulders	160.2
MO	Mound	26.40	1.50	0.80	Linear	299132	2147022	Piled cobbles and boulders	160.1
MP	Mound	5.50	1.00	0.80	Linear	299140	2146991	Piled cobbles and boulders	162.1
MQ	Mound	3.00	1.50	0.70	Oval	299163	2146991	Piled cobbles and boulders	161.3
MR	Mound	1.80	1.00	0.50	Oval	299162	2146998	Piled cobbles and boulders	161.4
MS	Mound	2.80	2.00	0.80	Oval	299163	2146995	Piled cobbles and boulders	161.2
MT	Mound	11.40	1.50	0.70	Linear	299162	2147006	Piled cobbles and boulders	161.5
MU	Mound	1.30	1.25	0.50	Circular	299166	2147002	Piled cobbles and boulders	161.6
MV	Mound	2.50	2.50	0.70	Circular	299169	2147002	Piled cobbles and boulders	161.1
MW	Mound	2.00	1.00	0.60	Oval	299179	2146999	Piled cobbles and boulders	161.8
MX	Mound	1.50	1.50	0.50	Circular	299171	2147003	Piled cobbles and boulders	161.7
MY	Mound	2.50	1.50	0.80	Oval	299186	2147005	Piled cobbles and boulders	156.9
MZ	Mound	2.50	1.50	0.70	Oval	299182	2147007	Piled cobbles and boulders	156.8
NA	Mound	1.50	1.20	0.60	Oval	299174	2147017	Piled cobbles and boulders	156.7
NB	Mound	2.00	1.00	0.60	Oval	299182	2147020	Piled cobbles and boulders	156.5
NC	Mound	2.50	1.00	0.50	Oval	299181	2147029	Piled cobbles and boulders	159.1
ND	Mound	1.50	1.50	0.50	Circular	299178	2147035	Piled cobbles and boulders	156.3
NE	Mound	1.00	1.00	0.60	Circular	298184	2147016	Piled cobbles and boulders	156.6
NF	Mound	2.80	1.50	0.70	Oval	299189	2147013	Piled cobbles and boulders	156.10
NG	Mound	2.00	1.50	0.70	Oval	299194	2147018	Piled cobbles and boulders	157.2
NH	Mound	2.00	1.20	0.50	Oval	299202	2147019	Piled cobbles and boulders	157.1
NI	Mound	0.90	0.90	0.50	Circular	299190	2147028	Piled cobbles and boulders	156.2
NJ	Mound	6.00	1.00	0.60	Linear	299197	2147033	Piled pebble, cobbles and boulders	156.1
NK	Mound	1.50	1.00	0.50	Oval	299184	2147042	Piled cobbles and boulders	156.4
NL	Mound	1.80	1.50	0.70	Oval	299261	2146912	Piled cobbles and boulders	183.1
NM	Mound	4.50	1.50	0.50	Linear	299279	2146909	Piled cobbles and boulders	183.2
NN	Mound	3.20	0.70	0.50	Linear	299273	2146893	Stacked and piled cobbles and boulders	185.1

APPENDIX E - Summary of Site 30037 agricultural features (cont.)

Feature	Type	Length (m)	Width (m)	Height (m)	Shape	Easting	Northing	Construction	Field Number
NO	Modified outcrop	2.60	1.20	0.60	Linear	298837	2146942	Piled cobbles and boulders	130.1
NP	Modified outcrop	3.70	1.50	0.60	Oval	298833	2146934	Piled cobbles and boulders	131.1
NQ	Modified outcrop	2.20	1.50	0.70	Oval	298804	2146936	Piled cobbles and boulders	129.1
NR	Terrace	8.00	0.80	0.50	Linear	298811	2146931	Aligned boulders and cobbles	132.2
NS	Mound	2.90	1.90	0.60	Oval	298808	2146926	Piled cobbles and boulders	132.1
NT	Mound	1.00	0.80	0.50	Oval	298805	2146895	Piled cobbles and boulders	133.2
NU	Mound	5.00	1.50	0.60	Linear	298808	2146891	Piled cobbles and boulders	133.1
NV	Modified outcrop	1.40	1.20	0.75	Oval	298832	2146872	Piled cobbles and boulders	151.1
NW	Modified outcrop	4.00	3.70	0.80	Oval	298828	2146868	Stacked and piled cobbles and boulders	151.2
NX	Swale	6.25	3.80	0.00	Irregular	298837	2146874	Level soil interior	151.4
NY	Modified outcrop	1.50	0.60	0.30	Irregular	298845	2146872	Piled cobbles and boulders	153.2
NZ	Modified outcrop	1.10	0.60	0.30	Irregular	298838	2146872	Piled cobbles and boulders	151.3
OA	Modified outcrop	1.00	0.80	0.40	Oval	298846	2146866	Piled cobbles and boulders	153.1
OB	Modified outcrop	3.00	2.50	1.00	Oval	298814	2146846	Piled cobbles and boulders	146.1
OC	Mound	26.20	1.00	0.60	Linear	298783	2146829	Piled pebble, cobbles and boulders	144.1
OD	Mound	2.50	1.00	0.60	Oval	298757	2146840	Piled cobbles and boulders	143.2
OE	Mound	1.50	1.00	0.50	Oval	298764	2146837	Piled cobbles and boulders	143.1
OF	Mound	1.20	1.00	0.50	Oval	298764	2146828	Piled cobbles and boulders	143.5
OG	Mound	1.00	1.00	0.50	Circular	298771	2146828	Piled cobbles and boulders	143.4
OH	Mound	2.00	1.50	0.60	Oval	298767	2146831	Piled cobbles and boulders	143.3
OI	Mound	6.50	1.50	0.60	Linear	298772	2146810	Piled pebble, cobbles and boulders	142.1
OJ	Modified outcrop	2.50	1.45	0.60	Oval	298834	2146820	Piled cobbles and boulders	148.2
OK	Modified outcrop	2.50	1.50	1.20	Oval	298838	2146813	Piled cobbles and boulders	148.1
OL	Modified outcrop	4.00	3.50	1.10	Oval	298847	2146824	Stacked and piled cobbles and boulders	150.2
OM	Modified outcrop	6.00	1.20	1.30	Linear	298873	2146852	Piled cobbles and boulders	154.1
ON	Mound	7.00	1.50	0.60	Linear	298874	2146819	Piled pebble, cobbles and boulders	152.1
OO	Modified outcrop	3.50	2.00	1.10	Oval	298860	2146807	Piled cobbles and boulders	150.1
OP	Mound	1.80	1.00	0.60	Oval	298792	2146775	Piled cobbles and boulders	141.3
OQ	Mound	2.20	2.20	0.70	Circular	298789	2146768	Piled cobbles and boulders	141.4
OR	Mound	2.00	1.20	0.60	Oval	298793	2146764	Piled cobbles and boulders	141.1
OS	Mound	1.00	1.00	0.50	Circular	298796	2146769	Piled cobbles and boulders	141.2
OT	Modified outcrop	1.80	1.50	0.80	Oval	298846	2146680	Stacked and piled cobbles and boulders	174.2
OU	Mound	9.00	1.00	0.60	Linear	298838	2146675	Piled cobbles and boulders	174.1
OV	Modified outcrop	3.00	1.30	0.70	Oval	298850	2146665	Stacked and piled cobbles and boulders	174.3
OW	Mound	5.50	1.00	0.60	Linear	298859	2146660	Piled pebble, cobbles and boulders	173.2
OX	Mound	2.50	0.80	0.60	Linear	298865	2146650	Piled cobbles and boulders	173.1
OY	Mound	4.00	0.80	0.50	Linear	298862	2146642	Piled cobbles and boulders	172.1
OZ	Modified outcrop	4.50	2.50	0.70	Oval	298857	2146576	Piled cobbles and boulders	200.1
PA	Mound	10.60	1.50	0.70	Linear	298870	2146771	Piled cobbles and boulders	170.1
PB	Modified outcrop	4.50	1.50	1.30	Linear	298894	2146762	Piled cobbles and boulders	171.1
PC	Wall	6.50	1.10	0.90	Linear	198907	2146770	Stacked and piled cobbles and boulders	169.1
PD	Terrace	2.50	0.80	0.50	Linear	198906	2146785	Piled cobbles and boulders	168.2
PE	Modified outcrop	3.60	2.40	0.80	Oval	298900	2146789	Piled cobbles and boulders	168.1
PF	Modified outcrop	3.50	1.50	0.80	Linear	298917	2146781	Stacked and piled cobbles and boulders	167.1
PG	Mound	2.30	1.50	0.50	Oval	298928	2146792	Piled cobbles and boulders	166.2
PH	Mound	4.00	1.20	0.50	Linear	298945	2146811	Piled cobbles and boulders	165.1
PI	Mound	1.80	1.50	0.80	Oval	298935	2146819	Piled cobbles and boulders	164.2
PJ	Mound	2.00	1.50	1.10	Oval	298939	2146823	Piled cobbles and boulders	164.1
PK	Mound	2.00	0.40	0.30	Linear	298929	2146830	Aligned boulders	163.1
PL	Terrace	3.30	1.00	0.80	Linear	298018	2146808	Piled cobbles and boulders	182.1
PM	Mound	3.70	2.50	1.50	Oval	298992	2146795	Piled cobbles and boulders	181.1
PN	Mound	22.60	1.20	0.80	Linear	298981	2146767	Stacked and piled cobbles and boulders	178.1
PO	Mound	6.00	1.50	1.20	Linear	299009	2146758	Piled cobbles and boulders	180.1
PP	Modified outcrop	3.00	1.50	0.70	Oval	298977	2146763	Stacked and piled cobbles and boulders	178.2
PQ	Modified outcrop	4.00	3.50	1.30	Irregular	298968	2146758	Piled cobbles and boulders	176.2
PR	Mound	7.00	1.50	0.80	Linear	298971	2146754	Piled cobbles and boulders	176.3
PS	Modified outcrop	1.80	1.00	0.80	Irregular	298981	2146754	Stacked and piled cobbles and boulders	177.6
PT	Modified outcrop	1.50	1.50	0.50	Circular	298988	2146746	Piled cobbles and boulders	177.5
PU	Modified outcrop	3.20	1.80	0.70	Oval	298989	2146740	Piled cobbles and boulders	177.3
PV	Terrace	5.50	1.00	0.80	Linear	298975	2146737	Stacked and piled cobbles and boulders	177.1
PW	Modified outcrop	4.30	2.60	0.90	Irregular	298981	2146723	Piled cobbles and boulders	175.1

APPENDIX E - Summary of Site 30037 agricultural features (cont.)

Feature	Type	Length (m)	Width (m)	Height (m)	Shape	Easting	Northing	Construction	Field Number
PX	Mound	3.00	2.30	0.70	Oval	298985	2146734	Stacked and piled cobbles and boulders	177.2
PY	Mound	8.60	1.50	0.70	Linear	298996	2146747	Piled cobbles and boulders	177.4
PZ	Terrace	13.10	0.90	0.50	Linear	299033	2146717	Piled cobbles and boulders	191.1
QA	Modified outcrop	3.90	1.70	0.90	Oval	299030	2146713	Piled cobbles and boulders	193.2
QB	Swale	9.00	3.00	0.00	Irregular	299070	2146725	Level soil surface	188.2
QC	Modified outcrop	7.00	1.50	1.00	Linear	299070	2146721	Piled cobbles and boulders	188.1
QD	Modified outcrop	12.30	3.00	1.10	Linear	299058	2146699	Piled cobbles and boulders	190.1
QE	Mound	5.00	1.50	0.80	Linear	299088	2146689	Piled cobbles and boulders	211.1
QF	Mound	5.50	1.60	1.10	Linear	290071	2146688	Piled pebble, cobbles and boulders	192.1
QG	Mound	1.50	1.00	0.50	Oval	299069	2146681	Piled cobbles and boulders	192.3
QH	Mound	2.80	1.60	0.70	Oval	299058	2146675	Piled cobbles and boulders	210.3
QI	Mound	2.50	1.30	0.50	Oval	299059	2146670	Piled cobbles and boulders	210.4
QJ	Mound	3.60	2.40	0.70	Oval	299055	2146670	Piled cobbles and boulders	210.1
QK	Mound	2.00	2.00	1.00	Circular	299064	2146682	Piled cobbles and boulders	192.2
QL	Mound	2.50	1.50	0.80	Oval	299052	2146676	Piled cobbles and boulders	210.2
QM	Modified outcrop	3.00	1.50	0.90	Oval	299062	2146691	Piled cobbles and boulders	192.4
QN	Modified outcrop	6.00	1.30	0.70	Linear	299037	2146705	Piled cobbles and boulders	193.1
QO	Swale	16.80	13.30	0.00	Irregular	299055	2146706	Level soil interior	189.1
QP	Modified outcrop	3.30	1.90	0.90	Oval	299029	2146689	Piled cobbles and boulders	194.1
QQ	Modified outcrop	2.70	1.70	1.00	Oval	298995	2146708	Piled cobbles and boulders	195.1
QR	Terrace	5.70	3.90	0.60	Oval	299008	2146698	Stacked and piled cobbles and boulders	196.1
QS	Mound	2.50	1.80	1.10	Oval	298971	2146623	Piled cobbles and boulders	205.1
QT	Modified outcrop	6.00	1.50	0.90	Linear	299016	2146649	Piled pebble, cobbles and boulders	208.1
QU	Mound	2.60	1.50	0.70	Oval	299023	2146646	Piled cobbles and boulders	209.2
QV	Modified outcrop	2.30	1.80	0.90	Oval	299020	2146642	Piled cobbles and boulders	209.3
QW	Modified outcrop	4.00	3.80	0.40	Irregular	299023	2146638	Piled cobbles and boulders	209.1
QX	Terrace	2.90	0.70	0.60	Linear	299013	2146620	Stacked and piled cobbles and boulders	207.1
QY	Mound	6.00	1.50	0.70	Linear	298997	2146628	Piled cobbles and boulders	206.1
QZ	Modified outcrop	2.70	1.50	1.10	Oval	298987	2146632	Piled cobbles and boulders	206.2
RA	Modified outcrop	3.90	2.50	0.70	Oval	298951	2146590	Stacked and faced cobbles and boulders	204.3
RB	Mound	2.40	1.50	0.70	Oval	298927	2146619	Stacked and piled cobbles and boulders	197.5
RC	Modified outcrop	2.50	2.00	0.70	Oval	298924	2146620	Stacked and piled cobbles and boulders	197.4
RD	Mound	1.10	0.80	0.50	Oval	298914	2146621	Piled cobbles and boulders	197.2
RE	Modified outcrop	1.80	1.20	0.70	Oval	298908	2146619	Stacked and piled cobbles and boulders	197.3
RF	Mound	6.60	1.80	0.70	Linear	298917	2146615	Piled pebble, cobbles and boulders	197.1
RG	Modified outcrop	2.50	2.00	1.00	Oval	298921	2146610	Stacked and piled cobbles and boulders	197.6
RH	Modified outcrop	3.90	2.00	1.00	Oval	298898	2146598	Stacked and piled cobbles and boulders	198.2
RI	Mound	5.80	2.00	1.20	Irregular	298902	2146600	Piled cobbles and boulders	199.1
RJ	Mound	2.50	2.00	1.20	Oval	298914	2146598	Piled cobbles and boulders	197.8
RK	Modified outcrop	4.70	2.70	1.10	Oval	298921	2146607	Stacked and piled cobbles and boulders	197.7
RL	Modified outcrop	3.80	2.50	1.30	Oval	298949	2146592	Stacked and piled cobbles and boulders	204.2
RM	Mound	2.40	2.20	1.20	Oval	298957	2146594	Piled cobbles and boulders	204.1
RN	Modified outcrop	3.60	2.50	1.00	Oval	298919	2146595	Stacked and piled cobbles and boulders	203.1
RO	Modified outcrop	3.00	1.80	1.00	Oval	298905	2146590	Piled cobbles and boulders	203.2
RP	Modified outcrop	3.40	1.45	0.90	Linear	298907	2146548	Piled cobbles and boulders	202.1
RQ	Wall	11.20	1.20	0.80	Linear	298885	2147131	Stacked and piled cobbles and boulders	72.2
RR	Modified outcrop	3.50	2.00	1.00	Irregular	298862	2146627	Piled cobbles and boulders	172.2