

Figure 195. Site 28497 Plan Map



Figure 196. Site 28497, Feature A, Basalt Adze

Feature D is an oval-shaped enclosure that is bordered by Feature A to the west, by Feature C to the north, by Feature E to the east and by Feature F to the south. It is 9.1 m long (east-west) and 4.0 m wide, with a 1.5 m wide opening in the northern side. The feature is mostly comprised of the sides of the adjacent features, although a stacked and piled cobble and small boulder wall (1.3 m wide and 0.3 m high) is present along the north side and a raised bedrock outcrop with cobbles piled against it is situated along the south side. The interior is a level with soil no cultural remains present.

Feature E is a rectangular platform located adjacent to Feature D to the east. It is 6.1 m long (north-south) and 3.8 m wide with stacked cobble and small boulder sides that are 0.3 to 0.5 m in height. The northern and eastern walls are collapsed, probably the result of stone removal to construct the adjacent Site 28486, Feature A enclosure. The western side is faced and the surface is a level cobble and pebble pavement. There is a stacked mound at the south end of the platform that is 1.6 m long (east-west), 1.3 m wide and 0.1 to 0.4 m in height above the main surface of the feature. The north side of the mound is faced. No cultural remains were present on the surface of Feature E.

Feature F is rectangular enclosure located adjacent to Feature D to the south. Feature G (discussed below) abuts Feature F to the west. The enclosure is 5.7 m long (north-south) and 5.0 m wide with walls built of stacked and piled cobbles and small boulders, with an outcrop forming the northeast side and south sides. The walls are 0.8 to 1.5 m wide and 0.3 to 0.7 m. The exterior west wall is faced. The interior is level soil with no cultural remains present.

Feature G is terrace constructed against the east corner of Feature A at the south end. It is bordered by Feature D to the north and by Feature F to the east and is 4.1 m long (east-west) and 2.7 m wide. Stacked cobble and small boulder retaining walls (0.3 m high) extend along the north and south side, with the southern side having collapsed outward. The surface of the feature is a level cobble and pebble pavement with no cultural remains present.

Feature H is a large rectangular enclosure located at the southern end of the site, bordered by Feature B to the north, Feature G to the northeast and by Feature F to the east. Feature I abuts the southeast end of Feature H. It is 15.2 m long (north-south) and 13.0 m wide with a 3.0 m wide gap along the east side at the south end that may represent an entrance. The walls are constructed of stacked and piled cobbles and small boulders and are 0.9 to 2.2 m thick and 0.15 to 1.5 m in height. Two vertical slabs set on edge are incorporated into the north side of the south wall and

portions of the north, east and south sides are faced. The interior is level soil in the western portion with uneven outcrops in the eastern portion. No cultural remains were present.

Feature I is a roughly triangular-shaped terrace located that adjoins the southeast corner of Feature H. It is 6.6 m long (north-northeast by south-southwest) and 4.0 m wide and is bordered by outcrops along the northeast and south sides. There is a stacked and faced cobble and small boulder retaining wall that is 0.65 to 1.1 m thick, 0.55 to 0.75 m high on the exterior side and 0.1 m high on the interior side. The surface of the feature is a level soil with no cultural remains present.

Feature J is a rectangular-shaped pavement that is bordered along the north, east and west sides by a bedrock outcrop. The feature is located 9.0 m north of the Feature E platform and is situated along the north side of the Site 26909, Feature 343 wall that extends through the site. The pavement is 4.3 m long (east-west) and 2.8 m wide. The south side is level with the sloping terrain and the surface is a level cobble and pebble pavement. No cultural remains were present.

Feature K is a terrace built against the eastern side of a bedrock outcrop to the northeast of Feature J. It is rectangular in shape and 6.5 m long (north-northwest by south-southeast) by 4.8 m wide with stacked and piled cobble and small boulder retaining walls along the north and east sides, and along the northern end of the west side (0.2 to 1.0 m in height). The south side is bordered by aligned boulders (0.3 to 0.6 m high). The surface consists of a level cobble and pebble pavement with no cultural remains present.

Feature L is in oval-shaped enclosure located adjacent to Feature J to the northwest. It is 4.7 m long (north-south) and 2.6 m wide with no entrance. It is formed by raised outcrops along the north, south and east sides and by a stacked and faced cobble and small boulder wall along the west side. The wall is 0.8 to 1.2 m wide and 0.2 to 0.45 m in height. There is a vertical slab along the eastern outcrop. The interior is level soil with no cultural remains present.

Feature M is a rectangular-shaped terrace located adjacent to Feature L to the north, built on outcrops along the south, east and portions of the west side. It is 5.3 m long (north-south) and 3.5 m wide with a stacked and partially faced retaining wall along the north and west sides that is 0.3 m in height. The surface is a level cobble and pebble pavement with no cultural remains present. There is a shallow depression on the surface in the northwestern corner.

Feature N is an enclosure situated adjacent to Feature M to the east. It is rectangular-shaped and is 4.3 m long (north-south) and 3.5 m wide with no entrance. The walls are constructed of stacked and piled cobbles and small boulders and are 0.8 to 1.5 m thick and 0.3 to 0.5 m high. The interior is level soil with no cultural remains present.

Feature O is a well-built platform located to the north of Feature M. The main portion of the structure is roughly square-shaped, measuring 6.4 to 6.7 m long (east-west) and 5.4 to 6.2 m wide. The sides are constructed of stacked and faced cobbles and small boulders and are 0.25 to 0.65 m in height. Vertical basalt slabs set on edge are incorporated into the platform's north, east and west sides. There is collapse present at the northwest and southeast corners.

The platform has two tiers. The lower tier is the western half of the structure that has a level cobble and pebble paved surface. There are fragments of waterworn basalt and coral located on the surface of this tier. There is a void, possible posthole, amid the paving in the approximate center that is 0.5 m deep.

The upper tier is the eastern half of the platform and is 0.3 to 0.35 m in height above the surface of the lower tier. The surface of this tier is relatively level but unpaved cobbles and small boulders with no cultural remains present. There are two possible crypts located in the northern portion of the tier. These consist of rectangular pits that are 1.0 m long and 0.8 m wide. There are voids beneath stones that cover the possible crypts.

There is a narrow lower step or tier that extends along the north side of the main platform. This is 0.45 to 1.35 m wide and 0.3 m in height above the surrounding ground surface. The surface of the tier is uneven cobbles and small boulders and is 0.2 m below the lower tier of the main platform and 0.4 m below the upper tier. This tier and the eastern half of the main platform may represent later additions to the western half of the platform based on architectural characteristics.

Feature P is an oval-shaped mound located adjacent to Feature K to the northeast. It is 3.7 m long (north-northwest by south-southeast), 2.7 m wide and 0.4 to 0.5 m in height. Feature Q is a mound situated adjacent to Feature P to the east. It is rectangular-shaped and is 3.4 m long (north-northwest by south-southeast) and 2.7 m wide. Both mounds are built of stacked cobbles and small boulders with uneven surfaces and no cultural remains.

Site 28497 is interpreted as a complex of permanent habitation structures likely associated with the nearby Site 28491 ceremonial complex. Features A, E, I, K, M and O likely served as house foundations based on area (Feature A = 37.5 sq m, Feature E = 23.1 sq m, Feature I = 256.4 sq m, Feature K = 31.2 sq m, Feature M = 18.1 sq m, Feature O = 41.5 sq m) and substantial construction. Features D, F, L and N are interpreted as activity areas and Feature B likely served as an activity area of *lanai* associated with Feature A. The large Feature H enclosure is interpreted as a yard and the Feature P and Q mounds as site furniture.

Features E, I, M and O are also interpreted as possible burials; however, no subsurface testing was conducted because the site is situated in a planned preserve. The site may represent one very large or two adjacent high status residential complexes based on the large number of foundations and activity areas. The site is unaltered and in fair condition. It is assessed as significant for information content and for its cultural value.

State No.: 28498 (T-355)

Site Type: Complex (2)

Functional Interpretation: Permanent Habitation

Topography: Southwest facing slope with soil and exposed outcrops

Elevation: 316 ft

Coordinates: E=186585, N=2175707

Vegetation: *Haole koa* and fountain grass

Probable Age: Prehistoric

Overall Dimensions: 9.4 m long by 7.0 m wide

Condition: Fair

Integrity: Unaltered

Description: Site 28498 is a complex composed of two features clustered on and around a pahoehoe outcrop in the southwest corner of the project area. The site is paved terrace (Feature A) and a wall (Feature B) located in an area 9.4 m long by 7.0 m wide (*Figure 197*).

Feature A is an L-shaped terrace constructed on a pahoehoe outcrop, delineated on the north, south and east sides by a retaining wall. The wall is constructed primarily of stacked and piled pahoehoe boulders and cobbles. The retaining wall varies in height from 0.3 m on the south to 0.75 m on the east. The northwest corner, most of the north side and a portion of the east side are faced. The terrace surface is roughly paved with boulders and cobbles, forming a level surface with the top of the retaining wall and the outcrop that forms the southwest corner of the feature. Including the level outcrop, the terrace covers an area 4.7 m long (W-E) by 3.8 m wide, encompassing 17.9 sq m. A pahoehoe slab capped cupboard is present in the northwest corner of the terrace, which was tested to determine its function.

TU-61, a 1.0 by 1.0 m test unit, was excavated in the approximate center of the slab-capped surface of the terrace (see *Figure 197*). Excavation began by removing the surface slabs and exposing the east side of a slab-lined cupboard (Layer I) in the west half of the test unit. The cupboard is designated as Horizontal Feature-1. HF-1 is partially lined on the east side by two pahoehoe slabs and exploits a depression in the underlying bedrock. The southern extent of the cupboard is defined by the raised edge of the underlying bedrock. The north and west sides of the cupboard extend beyond the test unit boundaries. The cupboard fill consists of 8 cm of very dark brown (10YR 2/2) silt containing 30% cobble and pebble inclusions. Cultural material recovered from Layer II was restricted to 2 fragments of charred wood (0.3g). Architectural fill (Layer I) from the east half of the unit was determined to overlie bedrock and did not contain any cultural material.

Feature B is a low free-standing wall constructed 0.3 to 0.8 m east of the northeast end of the Feature A terrace. The wall is constructed on piled pahoehoe boulders and cobbles, 3.1 m long by 1.0-1.2 m wide and to a maximum height of 0.7 m. A vertical pahoehoe slab set on edge forms the northwest corner of the wall. A void at the west-central base of the wall suggested the potential to obscure a lava blister. The feature was tested to determine its function.

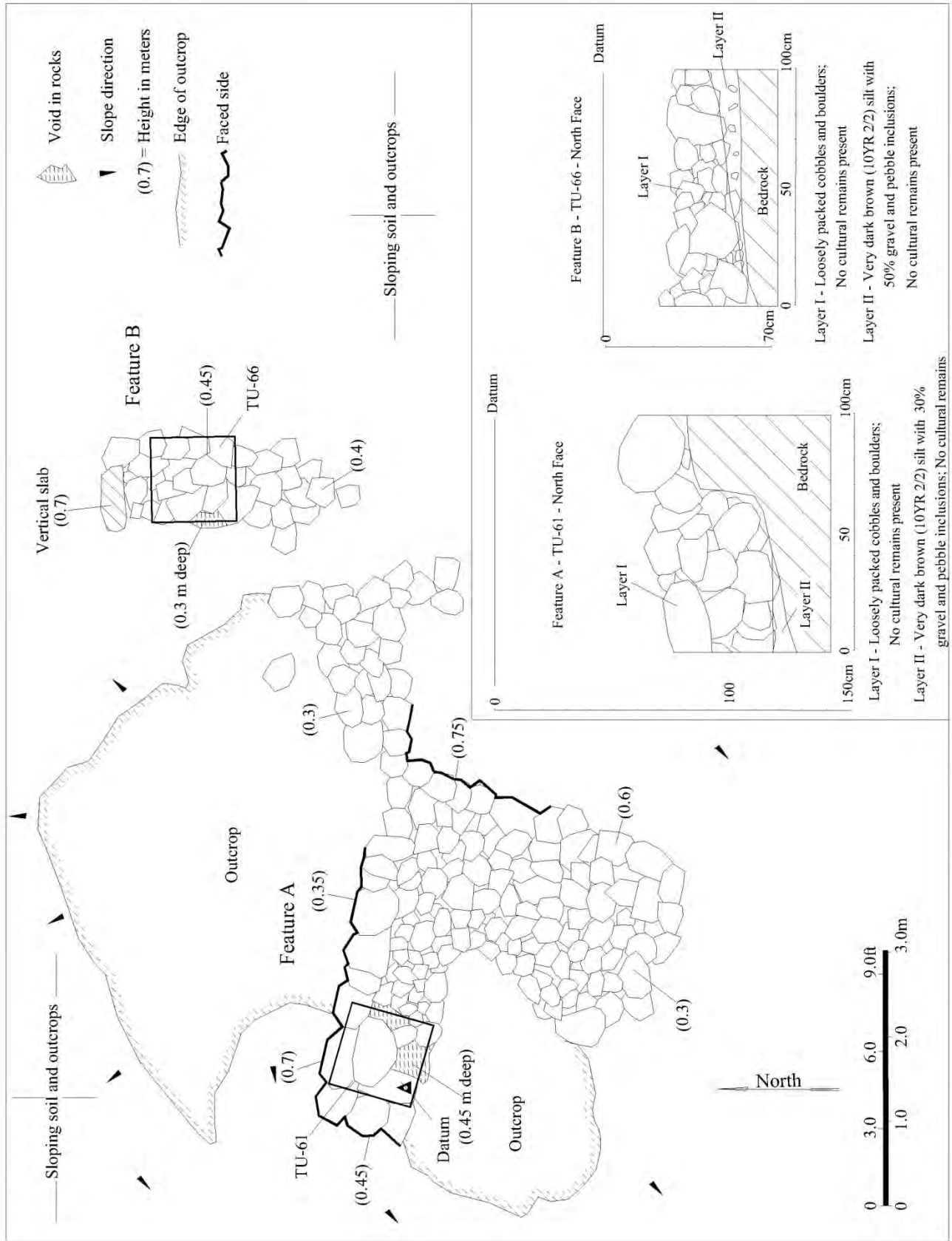


Figure 197. Site 28498 Plan Map and Profiles of TUs 61 and 66

The results of the testing determined that no blister underlies the wall, and that the void consists of a narrow crack in the bedrock. The wall might have been originally attached to the outcrop less than a meter to the west.

TU-66, a 1.0 by 1.0 m test unit, was excavated over the central portion of the wall, over the void exposed at the base (see *Figure 197*). Layer I consists of the wall fill, composed of piled boulders, cobbles and pebbles to a depth of c. 30 cm. Some of the basal rocks of Layer I are directly on bedrock, but generally, wall fill overlies a shallow soil deposit. Layer II consists of very dark brown (10YR 2/2) silt containing 30% cobble and pebble inclusions accumulated to a variable depth of 1-10 cm over bedrock. No cultural material was recovered from Layer I or Layer II.

Site 28498 is interpreted as a permanent habitation complex. The Feature A terrace is interpreted as the foundation of a roofed habitation structure based on its formal type, substantial construction (faced walls, paved surface and internal storage space) and area (17.9 sq m). The Feature B wall defines exterior space and is interpreted as an activity area. The site is unaltered, in good condition and is assessed significant for its information content.

State No.: 28499 (T-410, 414, 421)

Site Type: Complex (6)

Functional Interpretation: Permanent Habitation

Topography Soil and outcrops sloping to west-southwest

Elevation: 312-319 ft

Coordinates: - E=186563, N=2175658

Vegetation: Christmas berry, *haole koa*, *alahe'e*, grasses

Probable Age: Prehistoric

Overall Dimensions: 31.8 m by 16.7 m

Condition: Fair

Integrity: Unaltered

Description: Site 28499 is a complex of six features located in the southwestern portion of the project area in an area of sloping soil and outcrops. The features are comprised of two platforms (Features A and E), a C-shape (Feature B), a wall (Feature C) and two terraces (Features D and F) located in an area 31.8 m long (northwest by southeast) and 16.7 m wide. The distribution of the features is depicted in *Figure 198*.

Feature A is a rectangular-shaped platform built on top of a low bedrock outcrop in the central portion of the site. It is 3.95 m long (east-northeast by west-southwest) and 3.2 m wide with sides built of stacked cobbles and small boulders. The sides range in height from 0.3 to 0.5 m with a faced section present along the northern side. The surface is a level cobble and pebble pavement with a low bedrock outcrop extending through the center. No cultural remains were present.

Feature B is a C-shaped enclosure built against the northern side of an outcrop 2.3 m north of Feature A. The enclosure is 4.6 m long (north-northwest by south-southeast) and 3.1 m wide, open to the west. The walls are built of stacked and piled cobbles and small boulders and are 0.75 to 1.6 m thick and 0.35 to 0.75 m in height. The interior north wall is faced with collapse present along the exterior sides and along the east and south interior sides. The interior surface of the enclosure is level soil with no cultural remains present.

Feature C is a linear wall located 3.0 m southwest of Feature A, built partially on a raised bedrock outcrop. The wall is 6.4 m long (north-northwest by south-southeast) and 2.0 to 3.1 m thick. It is constructed of stacked and piled cobbles and small boulders and is 0.35 to 0.6 m in height. The north, east and south sides have collapsed outward. The surface of the wall is uneven and irregular and no cultural remains were present.

Feature D is a terrace located adjacent to Feature A to the northeast. The terrace is roughly rectangular in shape and is 3.7 to 6.1 m long (east-northeast by west-southwest) by 3.75 m wide. There is a stacked and piled cobble and small boulder retaining wall extending along the northwest and west sides, with the south and east sides bordered by low (0.2 m) bedrock outcrops. The retaining wall is 0.3 to 0.5 m in height on the exterior side and is level with the soil surface of the terrace on the interior side. No cultural remains were present.

Feature E is a platform situated 8.9 m to the southeast of Feature A, built partially on a low bedrock outcrop. The platform is rectangular in shape and is 4.65 m long (north-northwest by south-southeast) and 3.9 m wide. The

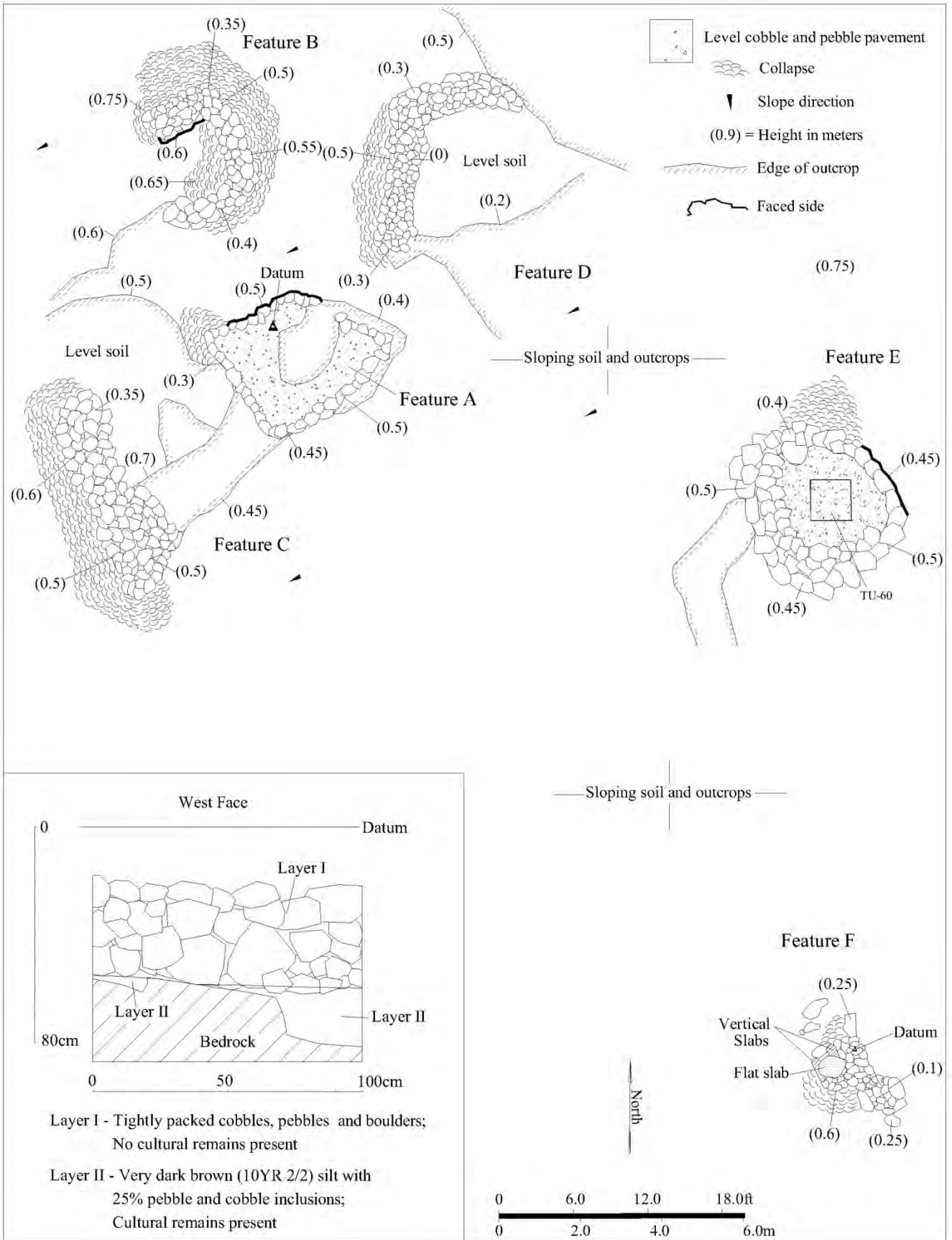


Figure 198. Site 28499 Plan Map and TU-60 West Face Profile

platform sides are built of stacked cobbles and small boulders and are 0.4 to 0.5 m in height. The northeastern side of the structure is faced and the northern corner has collapsed outward. The surface of the platform consists of a level cobble and pebble pavement with no cultural remains present.

A 1.0 by 1.0 m test unit (TU-60) was excavated into the center of the platform revealing two layers over bedrock (see *Figure 198*). Layer I consists of 0.33 to 0.43 m of tightly packed cobbles, pebbles and small boulders with no cultural remains present. Bedrock was encountered below Layer I in the center of the unit, with pockets of Layer II soil around the perimeter. Layer II is a 0.03 to 0.21 m thick deposit of very dark brown (10YR 2/2) silt with 25% gravel and pebble inclusions. Cultural remains from Layer II consisted of five waterworn *Porites* sp. coral pebble manuports (4.9g), marine gastropod shells (1 *Cypraea* sp. 0.3g; 4 Thaididae 3.7g) and a fragment of charcoal (0.1g).

Feature F is a small terrace located 10.5 m south of Feature E. It is roughly oval-shaped and is 2.75 m long (northwest by southeast) and 1.75 m wide, with a stacked and piled cobbles and small boulder retaining wall extending along the southwest and south sides (0.25 to 0.65 m in height). The eastern side of the terrace is relatively level with the sloping terrain and the surface is irregular and uneven. There are two vertical slabs set on edge in the north side of the feature, with a flat slab placed over them. This creates a small cupboard that is 0.7 m long, 0.35 m wide and 0.3 m in height. No cultural remains were present within the cupboard or on the feature.

Site 28499 is interpreted as a complex of permanent habitation structures. Features D and E likely served as the foundations for roofed structures based on formal type, the substantial construction noted at Feature E (faced side, paved surface) and area (Feature D = 22.8 sq m, Feature E = 18.1 sq m). The Feature A platform may have served as the foundation for a special purpose structure based on its substantial construction (faced side, paved surface) and small area (12.6 sq m). The Feature C C-shape and the Feature C wall may have served to delineate the boundary of associated activity areas. Feature F appears to have been used for storage based on the presence of the cupboard. The site is unaltered and in fair condition. It is assessed as significant for its information content.

State No.: 28500 (T-840, T-846)

Site Type: Complex (4)

Functional Interpretation: Permanent Habitation

Topography: Weathered pahoehoe flow on gentle slope to west

Elevation: 323 ft

Coordinates: E=186583, N=2175626

Vegetation: *Haole koa*, *alahe'e*, various grasses

Probable Age: Prehistoric

Overall Dimensions: 20.0 m by 15.8 m

Condition: Fair

Integrity: Unaltered

Description: Site 28500 is a complex of four features clustered on and around pahoehoe outcrops located in the southwestern portion of the project area. The features are comprised of a paved platform (Feature A), a paved terrace (Feature B) and two formal mounds (Features C-D) situated in an area 20.0 m long (east-west) by 15.98 m wide (*Figure 199*).

Feature A is a roughly rectangular, partially paved platform that is 8.0 m long (W-E) by 4.0 m wide. The wall heights vary from 0.45 to 0.7 m. The perimeter is faced on the north and south sides. The wall on the east and west sides has largely collapsed, as have portions of the wall on the north and south sides. Stacked boulders and cobbles are still extant along all sides of the platform, except on the west (downslope) side. The platform surface is divided into roughly three equal areas. The west and east portions (each c. 3.0 m long by 2.5 m wide) are paved with boulders, cobbles and pebbles to create a level surface.

A cairn (0.85 m in diameter and 0.6 m tall) is constructed on the north-central surface of the pavement in the western third of the platform. The cairn is constructed of stacked and faced boulders and cobbles. Three pahoehoe slabs placed side-by-side on the west side of the cairn cap a slab-lined pit (HF-1) that is at least 1.1 m long by 0.5 m wide. This sub-feature was tested to determine its function (described below).

The east portion of the platform also contains two sub-features and the eastern two-thirds are paved, while the western one-third is exposed outcrop. A linear mound is constructed on the south-central surface of the eastern

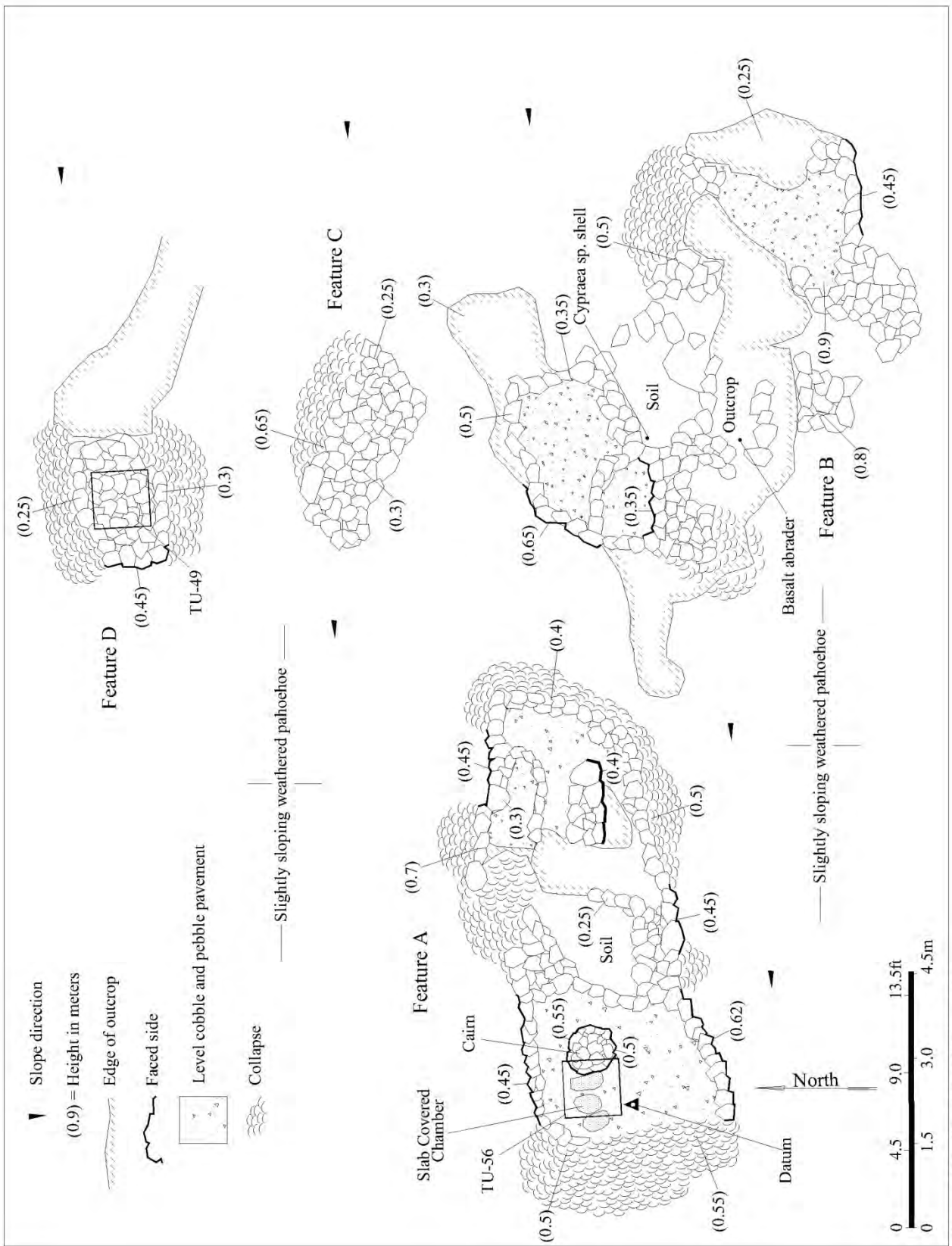


Figure 199. Site 28500 Plan Map

portion of the platform. The mound is 1.5 m long (W-E) by 0.6 m wide and varies in height from 0.3 to 0.42 m. A collapsed floor cupboard delineated by aligned boulders and cobbles is exposed along the north wall of the platform, parallel to the mound. The cupboard cavity is partially filled with collapsed paving material. The cupboard is c. 1.4 m long (W-E) by 0.4 m wide.

The center of the platform surface is compartmentalized by a low alignment of boulders and cobbles, c. 3.0 m long by 2.0 m wide and 0.25 m in height, which delineates a soil deposit. The central portion of the platform separates the east and west paved portions of the platform.

TU-56, a 1.0 by 1.0 m test unit, was excavated over the west end of the cairn and the east end of the slab-covered chamber on the west side of the Feature A platform (*Figure 200*). Excavation was initiated by removing the capstones of the HF-1 cupboard, revealing the east side of a slab-lined pit. Pit fill (Layer I) contained 44 cm of cobbles overlying a soil deposit (Layer II) accumulated on bedrock. No cultural material was recovered from Layer I. Layer II, underlying the pit fill in HF-1 consists of very dark grayish brown (10YR 3/2) silt with 40% boulder, cobble and pebble inclusions. Layer II contained marine gastropod shells (2 *Cypraea* sp. 1.1g; 1 *Drupa rubusidaeus* 2.5g), marine bivalve shells (1 *Isognomon californicum* 0.2g; 1 *Isognomon perna* 0.1g), 26 urchin exoskeleton fragments (2.6g), 1 urchin spine (0.1g), 1 parrotfish dentary fragment (0.2g), 3 indeterminate cranial and post-cranial fish bones (0.5g), 2 *Rattus exulans* bones and teeth (0.1g) and 33 fragments of charred wood (2.2g).

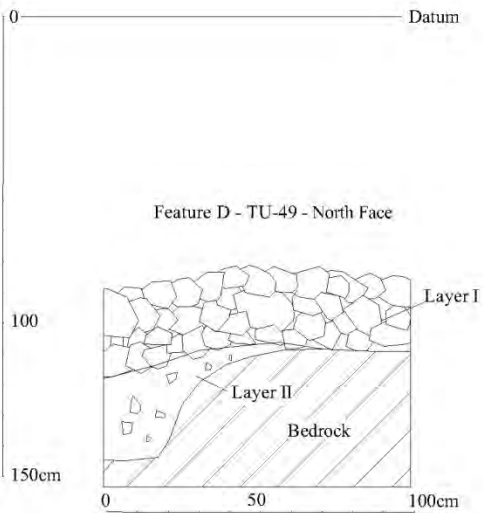
After excavating HF-1 to bedrock, the portion of the cairn within the unit was disassembled and the pavement fill was removed as Layer I. No cultural material was recovered from Layer I. Layer I in the rest of the unit varied in depth from 65 to 75 cm and overlies Layer II. Layer II consists of the same very dark grayish brown (10YR 3/2) silt with 40% boulder, cobble and pebble inclusions underlying HF-1. Cultural material recovered from Layer II consists of marine gastropod shells (2 *Conus* sp. 0.8g, 12 *Cypraea* sp. 10.0g; 5 *Nerita picea* 1.1g, 1 *Cellana* sp. 2.2g, 2 Thaididae 1.0g, 1 *Drupa morum* 4.1g), marine bivalve shells (2 *Isognomon californicum* 0.8g; 2 *Isognomon perna* 2.1g, 1 *Tellina* sp. 0.1g), 104 urchin fragments (8.8g), 1 urchin spine (0.1g), 6 crab carapace fragments (0.9g), 2 parrotfish dentary fragments (1.8g), 10 indeterminate cranial and post-cranial fish bones (1.9g), 4 *Rattus exulans* mandibles (0.4g) and 218 fragments of charred wood (16.0g). Layer II overlies bedrock to a maximum depth of 60 cm.

Feature B is an irregularly shaped terrace constructed on and around a pahoehoe outcrop to create a level surface over an area 8.8 m long (northwest-southeast) and 6.4 m wide (56.3 sq m). Portions of 2-4 courses of stacked and faced retaining walls are present along the northwest and southeast sides of the terrace, constructed of boulders and cobbles to a maximum height of 0.65 m. The northwest and southeast sides of the terrace are paved with boulders and cobbles. Surface areas in the northwest portion of the terrace are spatially segregated by irregularly shaped boulder alignments. The central portion of the terrace surface is the exposed surface of the weathered outcrop, where a *Cypraea* sp. shell and a basalt abrader fragment are exposed. Two mounds of piled cobbles intersect the south side of the terrace to create a rough C-shaped enclosure, using the outcrop as the back wall. The enclosure is open to the southwest and defines an interior space of slightly more than 1.0 sq m.

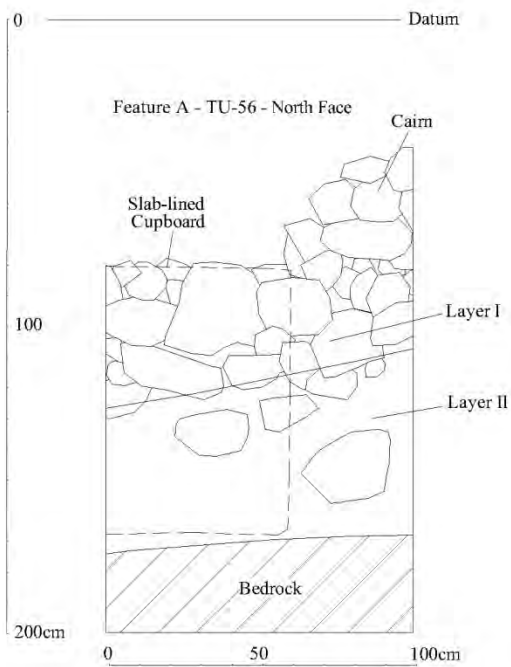
Feature C is a rectangular formal mound located on the north side of the Feature B terrace. The mound is 3.2 m long (northwest-southeast) and 1.5 m wide, and encompasses 4.8 sq m. The perimeter was originally constructed of stacked and faced boulders and cobbles, but has since largely collapsed. The maximum height of the mound is 0.62 m.

Feature D is a rectangular formal mound located on the north side of the Feature C mound and its east side is constructed against a pahoehoe outcrop. The mound is 2.3 m long (W-E) and 1.7 m wide, and encompasses 3.9 sq m. The perimeter was originally constructed of stacked and faced boulders and cobbles, but has since largely collapsed, except for the west side which is still preserved to a height of 0.45 m. A test unit was excavated in the mound to determine its function.

TU-49, a 1.0 by 1.0 m test unit, was excavated in the approximate center of the Feature D formal mound (see *Figure 200*). Excavation showed that the mound (Layer I) is composed of pahoehoe boulders, cobbles and pebbles to a maximum depth of 28 cm, overlying a soil deposit. Layer II consists of a maximum of 26 cm of dark brown (10YR 3/3) silt with 30% pebble and gravel inclusions, overlying bedrock. No cultural material was recovered from either Layer I or Layer II.



- Layer I - Tightly packed cobbles and boulders;
No cultural remains present
- Layer II - Dark brown (10YR 3/3) silt with 30%
gravel and pebble inclusions; No cultural remains



- Layer I - Tightly packed cobbles and boulders;
No cultural remains present
- Layer II - Very dark grayish brown (10YR 3/2) silt
with 40% gravel, pebble and cobble inclusions;
Cultural remains present

Figure 200. Site 28500, Profiles of TUs 49 and 56

Site 28500 is interpreted as a complex of permanent habitation structures. The Feature A platform and the Feature B terrace are interpreted as the foundations of roofed structures based on formal type, substantial construction (faced sides, paved surfaces) and area (A= 32.0 sq m; B= 56.3 sq m). The Feature C and D formal mounds potentially functioned as site furniture. The site is altered as a result of cattle grazing and is in fair to poor condition, but is assessed significant for its information content.

State No.: 28501 (T-856, T-857, T-859.1-4, T-859.10-11, T-862, T-863, T-866)

Site Type: Complex (13)

Functional Interpretation: Permanent Habitation, Transportation

Topography: Weathered pahoehoe flow on gentle slope to west

Elevation: 300-325 ft

Coordinates: Feature A - E=186624, N=2175613

Vegetation: *Haole koa*, *alahe'e*, various grasses

Probable Age: Prehistoric

Overall Dimensions: 37.0 m long (N-S) by 23.0 m wide (W-E)

Condition: Fair

Integrity: Unaltered

Description: Site 28501 is a complex composed of 13 features clustered on and around a pahoehoe flow in the southwestern portion of the project area. The features consist of nine paved terraces (Features A-F, H, I and L), two formal mounds (Features G and K), an enclosure (Feature J), and a steppingstone trail (Feature M – *Figure 201*). Three test units were excavated at the site to determine the functions of Features F, G and L. The complex covers 851.0 sq m. Waterworn basalt cobble fragments were the only cultural material observed in a surface context.

Feature A is a rectangular terrace constructed on a pahoehoe outcrop, delineated on the north and south sides by retaining walls. The walls are constructed of aligned boulders or two courses of stacked and faced pahoehoe slabs. The terrace surface is paved with boulders, cobbles and pebbles, with a concentration of boulders in the approximate center of the feature. Two waterworn basalt cobble fragments were observed on the terrace surface along the north-central and south-central sides of the terrace. The terrace is 0.3 to 0.7 m above the ground or outcrop surface on the west, north and south sides, and is flush with the outcrop on the east side. Portion of the northeast corner and west side have collapsed. The terrace is 5.8 m long (northeast by southwest) and varies in width from 3.5 to 4.0 m, covering an area of 21.75 sq m.

Feature B is an irregularly shaped rectangular terrace with retaining walls present on the south side and a collapsed retaining wall on the west side. The south retaining wall is constructed of a single course of aligned pahoehoe slabs set on edge to a height of 0.1 to 0.3 m. The construction method used along the west retaining wall is no longer possible to discern, but the terrace surface along the west side is 0.5 m above the adjacent ground surface. The paved terrace surface is flush with the pahoehoe flow on the east side and is 0.2 m higher than the ground surface on the north side. Paving consists of level pahoehoe cobbles and pebbles. The terrace is 9.0 m long (N-S) and varies in width from 1.5 to 3.0 m, covering a total area of c. 20.0 sq m.

Feature C is an irregularly-shaped but roughly rectilinear terrace constructed on and around a pahoehoe outcrop with an adjoining U-shaped enclosure incorporated into the east-central side. Retaining walls are present on the west and south sides, and wall segments are present on the north and east sides. The retaining wall is constructed of piled pahoehoe cobbles and boulders to a maximum height of 0.47 m. The northern two-thirds of the terrace surface is flush with the retaining wall and adjacent outcrop and is paved with pahoehoe cobbles and pebbles. The southern one-third of the terrace is capped by a soil deposit and enclosed by a stacked boulder and cobble wall 3 courses high. The interior walls defining the unpaved space are partially faced. The southern edge and southeast corner of the terrace could represent a separate building phase. The terrace is 9.6 m long (N-S) and varies in width from 1.5 to 4.0 m, covering a total area of c. 56.7 sq m. The U-shaped enclosure is constructed of stacked boulders and cobbles. The enclosure's floor surface is bare lava. The enclosure is 3.0 m long (N-S) and varies in width from 1.5 to 2.0 m wide, covering an area of 4.0 sq m.

Feature D is a small tiered terrace constructed on the sides of two separate pahoehoe outcrops to create two level areas of useable space. The lower terrace (D-1) is composed of a retaining wall on its north and west sides that has now mostly collapsed. Only one to two courses of stacked pahoehoe boulders and cobbles remain to a maximum height of 0.5 m. The northern portion of the retaining wall is faced. A pavement of cobbles and pebbles levels the



Figure 201. Site 28501 Plan Map

terrace surface along the northwest side to create a level surface with the exposed outcrop to the south and east. Feature D-1 is 4.0 m long (N-S) and varies in width from 1.0 to 2.8 m. The total area covered by the lower tier is c. 6.0 m. The upper tier (D-2) is bounded by a retaining wall on its north, south and west sides. The west side is in a state of partial collapse. It is constructed of stacked boulders and cobbles two or three courses high to a maximum height of 0.55 m above the lower tier. The north wall is faced as is the central portion of the west wall. The upper tier's surface is flush with the top of the retaining wall and is capped by a cobble and pebble pavement that creates a level surface with the adjacent outcrop. The pavement covers an area 2.5 m long by c. 1.25 m wide and extends the level surface of the upper outcrop an additional 3.1 sq m. The total area of the level space provided by the upper and lower surfaces is c. 18.0 sq m.

Feature E is terrace constructed around a pahoehoe outcrop to create a level surface using retaining a retaining wall to contain fill and paving over irregularities on the outcrop surface. A cattle trail has impacted the center of the terrace. The retaining wall defines the west side of the terrace and has mostly collapsed but up to two courses of stacked boulders and cobbles remain. The level pavement is composed of pahoehoe cobbles and pebbles, covering an area 2.3 m long (N-S) by 1.8 m wide on the west half. The extant portion of the east half consists of a cobble and pebble pavement to level the pahoehoe surface and covers an area 2.2 m long (W-E) by 2.0 m wide (N-S). The total estimated area encompassed by the terrace is c. 6.0 sq m.

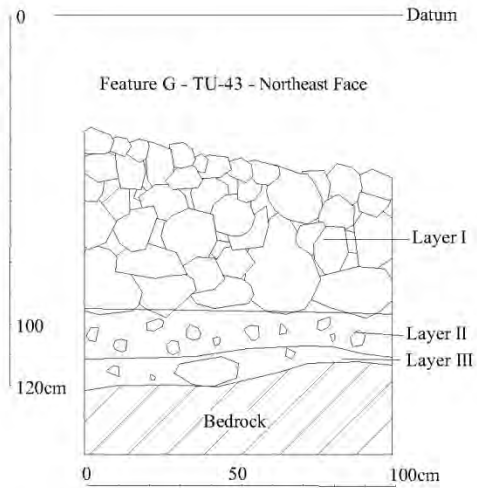
Feature F is a small well-built and well-paved terrace constructed between pahoehoe outcrops. The retaining wall is on the south side and consists of three courses of stacked and faced pahoehoe boulders to a maximum height of 0.6 m. Cobble and pebble paving caps the terrace surface and is flush with the top of the retaining wall on the south and the outcrop on the north. The terrace is 1.8 m long (W-E) by 1.5 m wide and the pavement covers an area of 2.16 sq m. A level area of shallow soil covers the outcrop south of the retaining wall in an area 2.5 m long by 2.0 m wide. The terrace was tested to determine its function.

TU-45, a 1.0 by 1.0 m test unit was excavated in the approximate center of the Feature F terrace (*Figure 202*). Excavation showed that the terrace retaining wall and architectural fill are constructed on the underlying bedrock and overlie a scant deposit of decaying organic debris and weathered a'a to a maximum depth of 30 cm. No cultural material was recovered from the Layer I architectural fill, but a *Porites* sp. coral pebble abraded (16.8g; Acc. 41.001) was recovered from the underlying Layer II deposit. The abraded is 44.6 mm long x 42.4 mm wide x 20.5 mm thick and is lightly abraded on one surface.

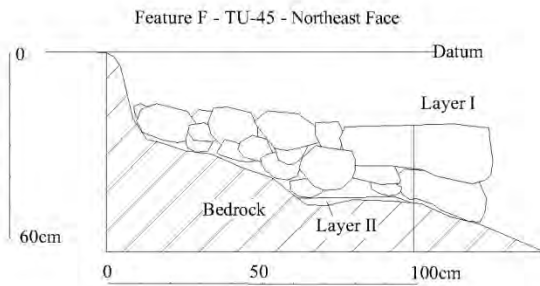
Feature G is a partially collapsed formal mound. The best preserved portions of the mound are on the north and west sides, which are faced. The east and south sides have mostly collapsed. The height of the northwest corner is 1.0 m and is constructed of 5 courses of stacked boulders and cobbles surrounding a central pavement of cobbles and pebbles. The mound covers an area 2.8 m long (W-E) by 1.6 m wide, encompassing c. 4.5 sq m. Feature G was tested and contained a diverse array of discarded tool fragments and subsistence debris.

TU- 43, a 1.0 by 1.0 m test unit was excavated in the approximate center of the Feature G formal mound (see *Figure 202*). Excavation showed that the mound (Layer I) is constructed on the surface of an underlying soil deposit (Layer II). Layer I fill consists of c. 60 cm of vesicular basalt boulders, cobbles and pebbles. A single waterworn basalt cobble manuport (171.0g) was recovered in a shallow subsurface context from Layer I.

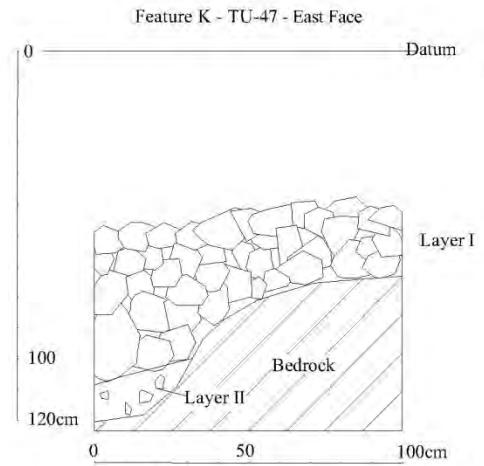
Layer II consists of c. 15 cm of very dark brown (10YR 2/2) silt with 45% cobble, pebble and gravel inclusions. Artifacts recovered from Layer II consist of a basalt adze fragment that retains a single polished facet and which might be a fragment of a piece recycled as a core (3.9g; 24 mm long x 15.4 mm wide x 11.5 mm thick; Acc. 38.001). In addition, several other artifacts were recovered from Layer II, including a small volcanic glass tertiary flake (0.1g; Acc. 38.002); a *Porites* sp. coral file midsection fragment (0.6g; 16.0 mm long x 10.8 mm wide x 6.5 mm thick; Acc. 38.003); two pencil urchin spine abraded fragments each exhibiting a single flat abraded facet (0.5g; 23.8 mm long x 8.1 mm wide x 6.1 mm thick; Acc. 38.004; and 0.1g; 7.9 mm long by 6.7 mm wide x 4.9 mm thick; Acc. 38.005); and a waterworn basalt pebble manuport (13.3g; Acc. 38.018). Subsistence debris from Layer II consists of marine gastropod shells (1 *Conus* sp. 0.3 g; 6 *Cypraea* sp. 10.0g; 6 Thaididae 3.6g), marine bivalve shells (4 *Isognomon perna* 0.4g), an indeterminate marine gastropod shell (< 0.1g), 6 waterworn marine gastropod shells (1.8g), 19 urchin exoskeleton fragments (2.1g), 2 burned pencil urchin spines (2.1g), 9 crab exoskeleton fragments (3.0g), 8 unburned *kukui* nutshells (5.3g), and 21 fragments of charred wood (0.8g). Layer II overlies Layer III.



- Layer I - Tightly packed cobbles and boulders;
Waterworn basalt cobble present
- Layer II - Very dark brown (10YR 2/2) silt with 40% gravel
and pebble inclusions; Cultural remains present
- Layer III - Dark yellowish brown (10YR 3/4) silt with
50% gravel, pebble and cobble inclusions;
Cultural remains present



- Layer I - Tightly packed cobbles and boulders;
No cultural remains
- Layer II - Very dark brown (10YR 2/2) silt with 30% gravel
and pebble inclusions; Cultural remains present



- Layer I - Tightly packed cobbles and boulders;
No cultural remains
- Layer II - Very dark brown (10YR 2/2) silt with 35%
gravel and pebble inclusions; No cultural remains

Figure 202. Site 28501, Profiles of TUs 43, 45 and 47

Layer III consists of 4-10 cm of dark yellowish brown (10YR 3/4) silt with 50% weathered a'a cobble, pebble and gravel inclusions. No artifacts were recovered from Layer III. Subsistence debris recovered from Layer III consists of marine gastropod shells (1 *Cypraea* sp. 0.1g; 2 Thaididae 0.1g), marine bivalve shells (2 *Isognomon perna* 0.4g), 2 indeterminate marine gastropod shells (0.7g), and 1 fragment of charred wood (0.1g). Layer III overlies bedrock.

Feature H is a small paved terrace constructed on the north side of a pahoehoe outcrop to create a level surface on the north side of Features F and G. The retaining wall has largely collapsed, but two to three courses remain to a height of 0.45 m. The pavement on the south side of the retaining wall fills a dip in the outcrop to form a level surface and covers an area of less than 1.0 sq m. The modifications represented by Feature H augment the usable level space for the special use Feature F terrace and Feature G formal mound to the south.

Feature I is a partially walled terrace. The retaining wall partially encloses a level soil deposit between it and an outcrop to the north and is bounded on the east by a pavement of boulders, cobbles and pebbles. The retaining wall is preserved to a maximum height of 0.75 m at the southwest corner and is constructed of piled boulders and cobbles. The north side of the wall has largely collapsed. The walled terrace is c. 6.5 m long (northwest by southeast) and 4.0 m wide, encompassing an area of 26.0 sq m.

Feature J is a small enclosure composed of stacked boulders and cobbles walls on the north and west, and which incorporates the raised sides of an outcrop on the south and east. The enclosure itself is constructed on a pahoehoe outcrop and covers an area 4.0 m long (W-E) by 2.0 m wide, although much of that area is covered by collapsed construction debris. A level soil deposit is exposed on the enclosure floor. No obvious access, other than from above is apparent and the enclosure is interpreted as a small animal pen associated with the permanent habitation complex.

Feature K is a collapsed terrace constructed against a raised outcrop along its south side. Remnants of stacked boulders and cobbles are still visible along the perimeter but most of the exterior has collapsed. The feature is paved with cobbles and pebbles and is 2.5 m long (W-E) by 1.0 m wide and varies in height from 0.35 to 0.6 m. Feature K was tested during the inventory survey but contained no cultural material.

TU-47, 1.0 by 1.0 m test unit was excavated in the approximate center of Feature K (see *Figure 202*). Excavation showed that the terrace (Layer I) is constructed partially on bedrock and partially on a deposit of decaying organic debris. The fill (Layer I) is composed predominantly of cobbles, but also contains boulders and pebbles to a maximum depth of 42 cm. Layer II is a very dark brown (10YR 2/2) silt with 35% weathered a'a pebble inclusions to a maximum depth of 12 cm. Layer II overlies bedrock. No cultural material was recovered from either Layer I or Layer II.

Feature L is a small terrace constructed on a pahoehoe outcrop. A retaining wall is present on the south and west sides, constructed of stacked and faced boulders and cobbles. The terrace surface is flush with the top of the retaining wall and is paved with cobbles and pebbles. The total area covered by the terrace is 2.4 sq m.

Feature M is a steppingstone trail that originates along the western side of Feature B. The trail has an overall length of 85.0 m and is mix of pahoehoe slabs (c. 80) and pahoehoe boulders. The overall extent of Feature M is depicted in *Figure 8b*. In places the trail is constructed of pahoehoe slabs set into the ground or set and held in place by pahoehoe boulders. Sections of the trail utilize flat and smooth pahoehoe outcrop in between actual constructed sections of the trail. The individual slabs range in length from 0.3 to 0.8 m and in width from 0.2 to 0.5 m. No cultural remains were found in association with the feature.

The western end of the trail is in poor condition and is a linear berm of cobbles and boulders with intermittent slabs. This seaward portion was recorded by Reeves et al. (2009:98) as an agricultural wall (Site 26859, Feature A – see *Figure 8*). It is described as collapsed and tumbled throughout the majority of its length, although core-filled remnants were present. The portion of the wall outside their project area was not examined by Reeves et al. (2009).

Site 28501 is interpreted as a permanent habitation complex with an associated trail (Feature M). Features A, B, C, D and I likely functioned as the foundations for roofed structures, based on formal type, substantial construction and area (Feature A = 21.75 sq m, Feature B = 20.0 sq m, Feature C = 56.7 sq m, Feature D = 18.0 sq m, Feature I = 26.0 sq m). The Feature J enclosure potentially served to define an activity area. The remaining features are

interpreted as special purpose structures due to their substantial construction and small areas. The Feature M trail is interpreted as a Type A steppingstones trail. The site is unaltered and in fair condition. It is assessed significant for its information content.

State No.: 28502 (T-874)

Site Type: Terrace

Functional Interpretation: Permanent Habitation

Topography Soil and outcrops sloping to west-southwest

Elevation: 330ft

Coordinates: E=186649, N=2175625

Vegetation: Christmas berry *haole koa*, *alahe'e*

Probable Age: Prehistoric

Overall Dimensions: 5.95 by 4.0 m

Condition: Fair

Integrity: Unaltered

Description: Site 28502 is a rectangular terrace built against the west and southwest side of a bedrock outcrop in the southwestern portion of the project area. The terrace is 5.95 m long (northwest by southeast) and 2.4 to 4.0 m wide, with a retaining wall extending along the northwest, southwest and southeast side (*Figure 203*). The northeast side is level with the surface of the adjacent outcrop. The sides range in height from 0.3 to 1.2 m. The northwest and southwest sides have collapse outward. The surface is a level cobble and pebble pavement.

There is a slightly lower tier present at the south end. The southwest side of this tier is faced and the surface is a level cobble and pebble pavement. No cultural remains were present on the surface of the site.

A 1.0 by 1.0 m test unit (TU-57) was excavated into the lower tier revealing two layers over bedrock (see *Figure 203*). Layer I consists of 0.15 to 0.24 m of tightly packed cobbles, pebbles and small boulders with no cultural remains present. Layer II is a 0.06 to 0.19 m thick deposit of very dark grayish brown (10YR 3/2) silt with 50% cobble, pebble and gravel inclusions. Cultural remains from Layer II consisted of a waterworn *Porites* sp. coral pebble manuport (10.0g) and an unburned *kukui* nutshell (1.9g).

Site 28502 is interpreted as the foundation for a permanent habitation roofed structure. This is based on its formal type, substantial construction (faced sides, paved surface) and area (23.8 sq m). The site is unaltered and in fair condition. It is assessed as significant for its information content.

State No.: 28503 (T-1006, 1007, T-1011, T-1012, T-1013, T-1014, T-1016, T-1019, T-1023)

Site Type: Complex

Functional Interpretation: Permanent Habitation

Topography: Pahoehoe flow on gentle slope to west

Elevation: 318-322 ft

Coordinates: E=186617, N=2175566

Vegetation: *Haole koa*, various grasses

Probable Age: Prehistoric

Overall Dimensions: 39.0 m by 20.1 m

Condition: Fair

Integrity: Unaltered

Description: Site 28503 is a complex of seven features located in the southwestern portion of the project area. The site consists of six enclosures (Features A-D, F and G) and a tiered terrace (Feature E) constructed in an area encompassing 39.0 m long by 20.1 m wide (*Figure 204*). The features are located on a pahoehoe flow and incorporate several outcrops.

Feature A is a rectilinear enclosure located at the northwest end of the site. The enclosure is 6.5 m long (W-E) by 6.0 m wide and is open to the southwest. Walls frame the southwest corner and the north and west sides. The walls are largely collapsed, but the exterior side of the west wall retains at least five courses of stacked and faced boulders and cobbles to a maximum height of 1.0 m. The walls and collapsed rubble enclose a roughly triangular floor encompassing c. 12 sq m. The floor consists of a level deposit of soil overlain in places by collapsed rubble. No cultural remains were present.

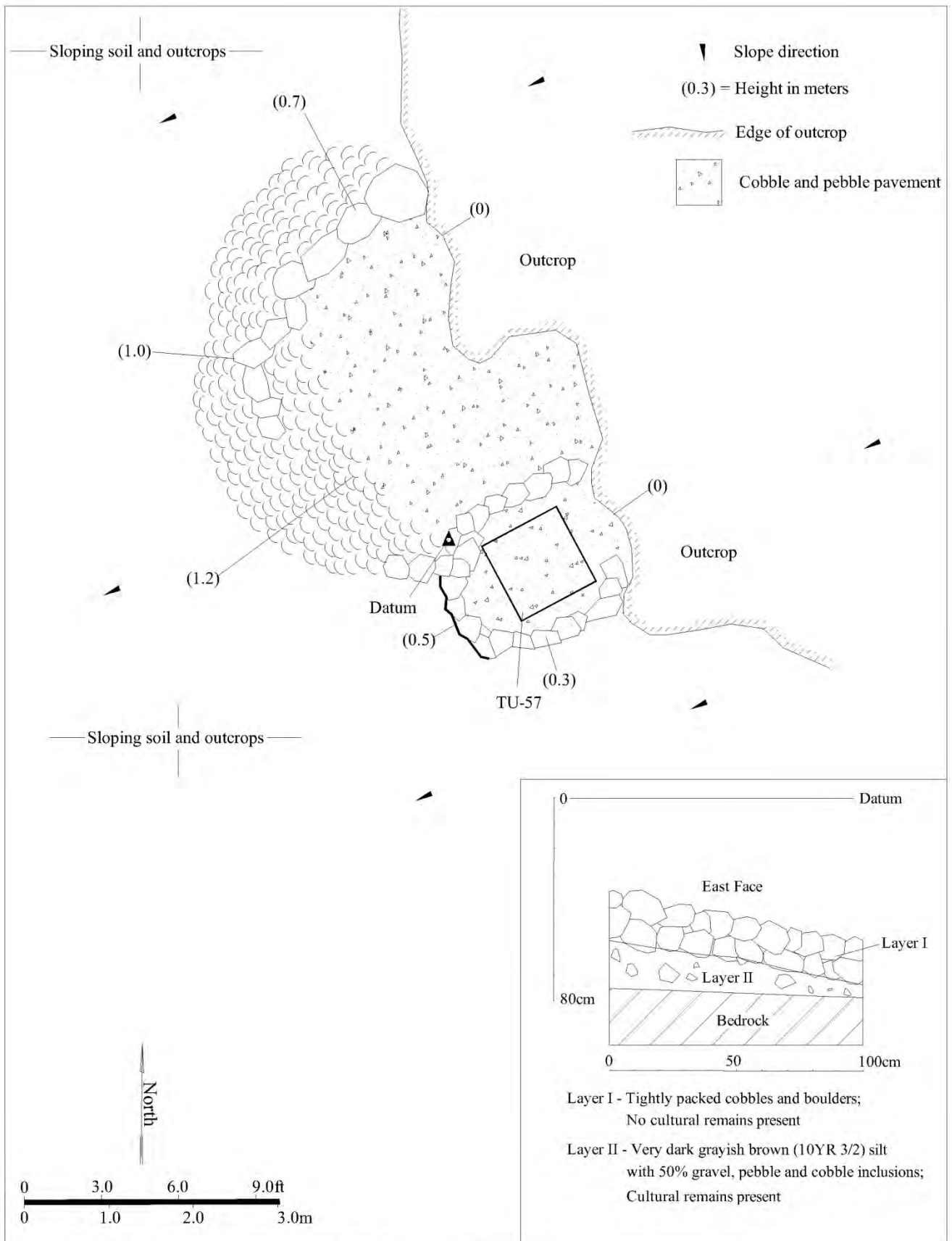


Figure 203. Site 28502 Plan Map and TU-57 East Face Profile

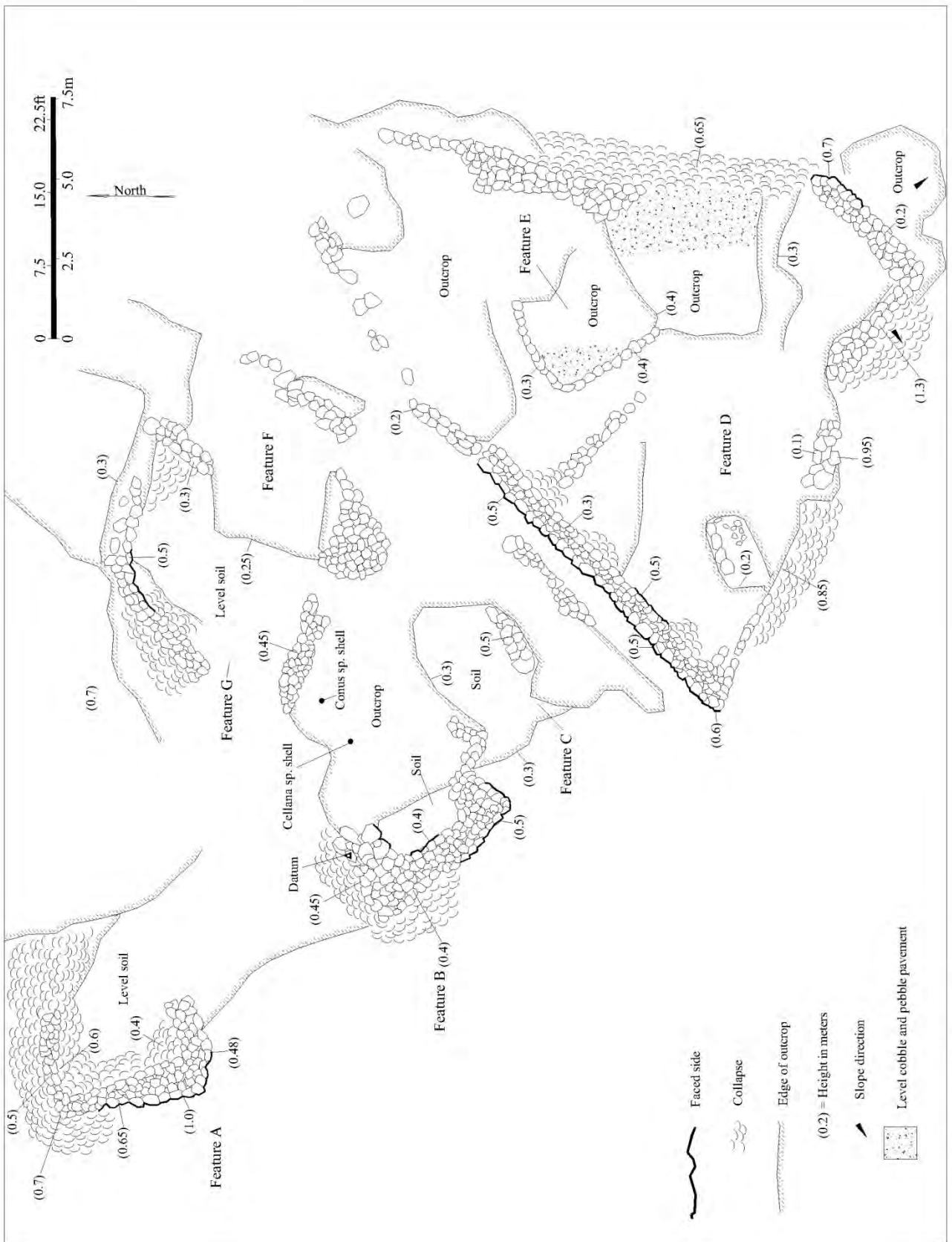


Figure 204. Site 28503 Plan Map

Feature B is an enclosure constructed against the northwest corner of a pahoehoe outcrop, enclosing an area 6.5 m long (northwest-southeast) by 3.8 m wide. The walls frame the north, west and south sides. The enclosure is open to the northeast. The wall framing the northwest corner has largely collapsed, but up to three courses of stacked and faced cobbles and boulders are still preserved to a height of 0.5 m at the southwest exterior corner and along the north and west sides of the interior. The floor surface enclosed by the north and south wall is a level soil deposit 2.3 m long by 1.2 m wide. A *Conus sp.* and a *Cellana sp.* shell were noted to the northeast of Feature B.

Feature C is a low natural enclosure bordered by outcrop on the northwest and by the south wall of the Feature B enclosure. The soil deposit is 5.0 m long by 2.0 m wide and fills an irregularity in the pahoehoe outcrop surface. Piled cobbles overlie the southern soil deposit along the south edge of the outcrop. No cultural remains were present.

Feature D is a large, roughly triangular enclosure constructed at the south end of the site. The northwest wall is composed of no more than two courses of stacked and faced boulders and cobbles, preserved to a maximum height of 0.5 m and is 20.0 m long. The southern edge of the enclosure conforms to the contours of the outcrop, which is framed by now collapsed cobbles and boulders of a wall that was 16.0 m long. The extreme southern end is preserved only to a height of 0.2 m. A waterworn boulder fragment is exposed on piled boulders along the south edge of the enclosure. The east wall is composed of two separate segments. The south segment is composed of stacked and faced boulders and cobbles to a height of 0.7 m. The north segment has largely collapsed but once formed a retaining wall for the adjacent Feature E terrace. The north segment of the east wall is 14.0 m long and the south segment is 4.0 m long. The enclosure encompasses an area of c. 170.0 sq m. The floor is bare lava, containing a depression 2.5 m long by 1.5 m wide by 0.2 m deep that is partially lined with boulders along its west side. The Feature E terrace is wholly within the Feature D enclosure.

Feature E is a terrace located in the east-central portion of the Feature D enclosure. The upper terrace is defined on the north and west sides by a cobble and boulder alignment that retains a partially paved section of outcrop. Modification is minimal and the retaining wall is no more than 0.3 m high. It encloses an area 4.0 m long (northwest-southeast) by 3.0 m wide (12.0 sq m). The lower tier is 0.4 m below the upper tier and also consists of a partially paved section of outcrop, bounded on the east side by a retaining wall formed by the Feature D east enclosure wall that has collapsed. The paved portion of the lower terrace is 4.5 m long (N-S) by 2.0 m wide. The paved sections of both the upper and lower tiers consist of a level surface of cobbles and pebbles. The lower tier is 4.5 m long by 4.0 m wide and encompasses 18.0 sq m. The total area encompassed by the tiered terrace is 30.0 sq m.

Feature F is an enclosure remnant located on the east side of the Feature G enclosure. Only two short sections of walls are extant. One is constructed on the south side of an outcrop and forms the south wall of the enclosure and the other is constructed on the west side of an outcrop and forms the east wall of the enclosure. The enclosure is open to the north and a gap between the walls provides access to the south. The floor is the bare lava of the outcrop. The enclosure covers an area c. 4.0 m long (N-S) by 3.0 m wide (12.0 sq m).

Feature G is an enclosure constructed around the northeast corner of the pahoehoe outcrop occupied by Feature B. The enclosure is composed of walls on the north and south side, and by the edge of the outcrop and a short wall segment on its east side. It is open to the west. The north wall is constructed on the outcrop surface, but has largely collapsed. Only two to three courses of stacked and roughly faced boulders and cobbles remain to a maximum height of 0.5 m. The walls frame a floor capped by a level soil deposit c. 19.0 sq m in extent.

Site 28503 is interpreted as a complex of permanent habitation structures. The enclosures represented by Features A, B, E and G are interpreted as the foundations of roofed residential structures based on their formal type, substantial construction (faced walls at Features A, B and G, paved surface at Feature E) and area (A= 39.0 sq m; B= 24.7 sq m; E= 30.0 sq m; G= 19.0 sq m). The large triangular enclosure represented by Feature D is interpreted as a yard enclosing a residential compound based on its formal type, substantial construction (faced walls) and area (170.0 sq m). The Feature C and F enclosures likely served as associated activity areas. The site is unaltered and in fair condition. It is assessed significant for its information content.

SUMMARY AND CONCLUSION

Summary

Agriculture

Agricultural features are the most common feature type within the project area. A total of 2,793 agricultural features were documented during the project. These consist of 67 features of nine sites recorded by Reeves et al. (2009; Sites 26852, 26858, 26859 and 26861-26866), one site previously identified by Donham (1990, Site 13395) and 2,725 features of the Site 26909 agricultural complex documented during the present project. The location of the Reeves et al. (2009) sites and Site 13395 are presented in *Figures 8a* and *8b*. The distribution of the Site 26909 features is presented in *Figure 46* (in pocket at end). The 2,793 agricultural features consist of 2,648 modified outcrops, 108 mounds 16 walls, 15 filled cracks, four platforms, a terrace and an enclosure.

These features are components of the Kona Field System, a vast agricultural area that was intensively cultivated and served as the resource base for the large number of chiefs and retainers that occupied the central Kona coast. The field system extends north to Kau Ahupua'a, south to Honaunau, and from the coastline to the forested slopes of Hualalai. The Kona Field System has been assigned SIHP Site 6601 (Newman 1970, Kelly 1983, Schilt 1984, Cordy 1995). The portion of the system in the project area was designated as Site 26909 for descriptive purposes.

As discussed in the Project Area Description section of this report, four soil types are present within the project area. These consist of pahoehoe lava, a'a lava, Kaimu extremely stony peat and Punaluu extremely rocky peat. The soil throughout more than half of the parcel is pahoehoe lava, occupying 156.9-acres or 57.68% of the total area. A'a lava comprises 62.9-acres or 23.13% of the area. Together these lava flows occupy over 80% of the project area. Kaimu extremely stony peat soil occupies 26.9-acres or 9.89% of the total area and Punaluu extremely rock peat occupies 25.3-acres or 9.30% of the area. *Figure 205* illustrates the distribution of the soil types within the project area, along with the 2,725 agricultural features of the Site 26909 complex.

Figure 205 presents the distribution of the Site 26909 agricultural features by elevation and soil type. *Table 9* presents the distribution of the agricultural features by elevation. As indicated in this table, the majority of the features are located within the 320-360 elevation band with 1,025 features or 27.6% of the total; however, the elevation zone of highest agricultural feature density is situated between 280 ft and 320 ft elevation, with a density of 14.07 features per acre.

Table 9. Distribution of Site 26909 Features by Elevation

Elevation	Acres	% of Project Area	No. of Agricultural Features	% of Agricultural Features	Agricultural features per acre
280-320	27.21	10.0	383	14.1	14.07
320-360	94.38	34.7	1025	37.6	10.86
360-400	60.67	22.3	491	18.0	8.09
400-440	45.57	16.7	398	14.6	8.73
440-480	25.46	9.4	291	10.7	11.43
480-520	14.64	5.4	135	5.0	9.22
520+	4.13	1.5	2	0.1	0.48
Total	272.06	100.0	2725	100.0	

Table 10 presents the distribution of the Site 26909 agricultural features by soils. Two-thirds of the features are located in areas of pahoehoe lava (n=1,815 or 66.6% of the total). The highest feature per acre density is located in the Punaluu extremely rock peat soil type with 23.94 features per acre (n=644 or 23.6% of total). This is followed by the pahoehoe lava, then the Kaimu extremely stony peat soil with 7.27 features per acre (184 features or 6.8%). The lowest feature density is found on a'a lava with 1.3 features per acre (n=82 or 3.0% of total).

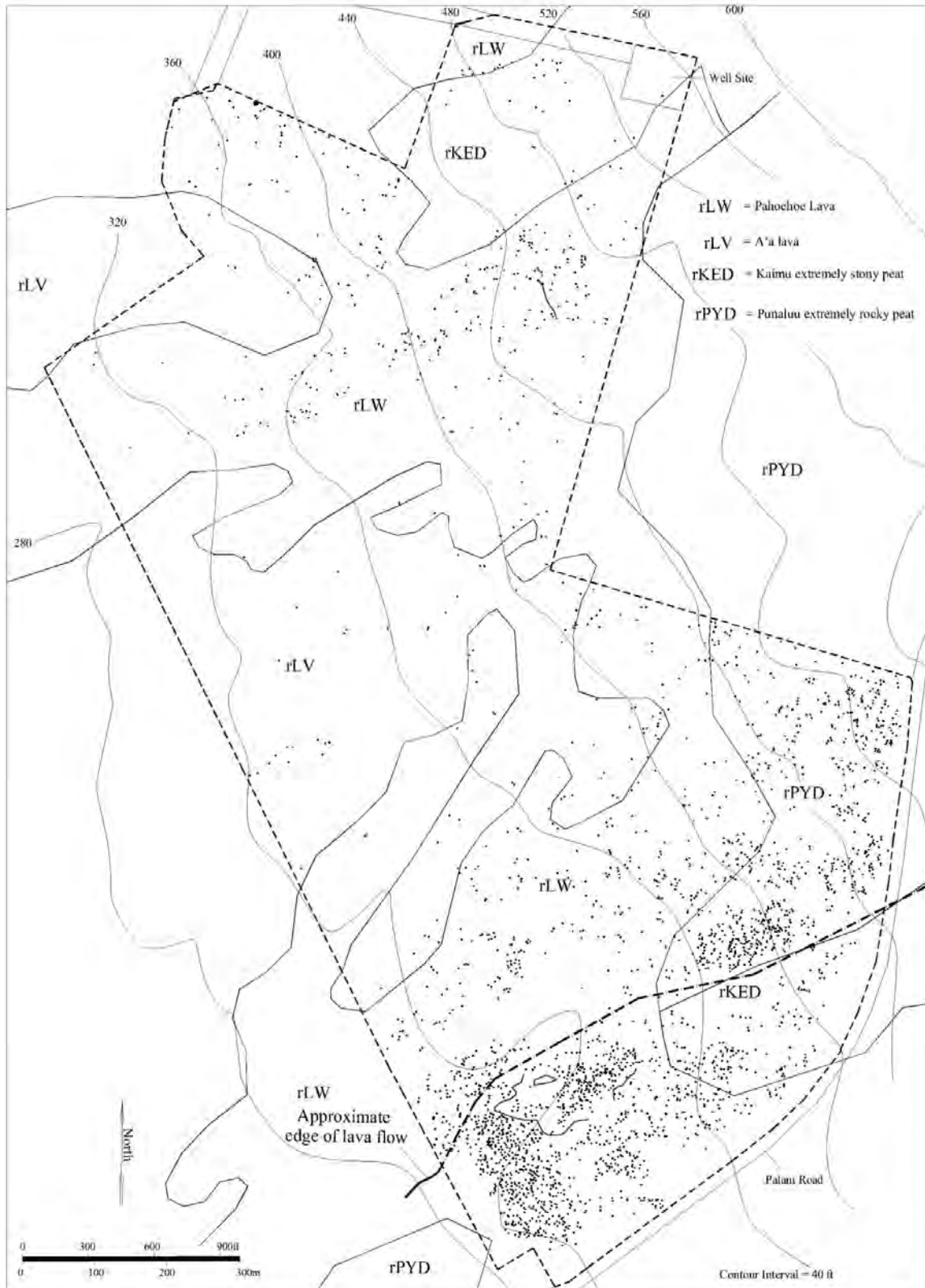


Figure 205. Distribution of Site 26909 Agricultural Features by Soil Type

Sato et al. define pahoehoe lava as dominated by a smooth surface with scattered hummocks and pressure domes (1973:34); however, shallow soil and abundant vegetation were observed during the survey fieldwork in areas classified as pahoehoe lava, primarily in the southern corner of the project area. It is likely that there is a mapping error in the soil type distribution because based upon these field observations, the distribution of habitation features (discussed below), and especially agricultural features, it is likely that the finger of Kaimu and Punaluu soils in the southeastern corner of the project area extends further seaward probably beyond the southwestern boundary of the project area.

Further support for this comes from the data on lava flow distribution. Reeves et al. (1990; see *Figure 7*) show the southern edge of a pahoehoe lava flow in the planned Ane Keohokalole Highway corridor that may represent the actual southern limit of the Sato et al. (1973) pahoehoe lava. This line, and data from current aerial photographs that show un-vegetated, exposed lava flows further inland of the line in the project area, were used to define a flow edge that is shown on *Figure 205*. This flow boundary likely represents a better approximation of the flow distribution in the southern end of the project area. The area south of this line likely is the extension of the finger of Punaluu and Kaimu soils. If this modification of the mapped soil type distribution is correct, then the majority of agricultural features and highest density would characterize these two soil types and not pahoehoe lava.

Table 10. Distribution of Site 26909 Features by Soil Type

Soil Type	Acres	% of Project Area	No. of Agricultural Features	% of Agricultural Features	Agricultural Features per acre
Pahoehoe Lava	156.90	57.7	1815	66.6	11.57
A'a Lava	62.90	23.1	82	3.0	1.30
Kaimu extremely stony peat	25.30	9.3	184	6.8	7.27
Punaluu extremely rocky peat	26.90	9.9	644	23.6	23.94
Total	272.06	100.0	2725	100.0	

Resource Procurement

The second most common functional type within the project area consists of pahoehoe excavations. The Site 26910 excavations are assigned a resource procurement function, possibly created to obtain vesicular lava for the manufacture of abraders. They are summarized in *Table 8* and their locations depicted in *Figure 80*. Pahoehoe excavations have been documented throughout western Hawaii Island and have been assigned a variety of functional interpretations. These interpretations include agriculture (Carter 1986, O'Hare and Goodfellow 1994, Hammatt et al. 1987, and Reinecke 1930), quarries for vesicular lava for making abraders (Donham 1987), quarries for fine-grained basalt (Haun and Henry 2002), and collecting of juvenile seabirds from nests in lava crevices (Nakamura et al. 1998). Nakamura et al. (1998) hypothesize that the excavated areas artificially enhanced natural nesting areas and increased the predictability of the birds as a food resource.

Dye (2002) recorded over 1,200 excavated pahoehoe pits at Manini'owali and Kuki'o 2 in North Kona. He convincingly argues that traditional Hawaiian cultivation in excavated pits was in a'a lava and concludes that agricultural use of the pits in his arid project area would have been too marginal to warrant the apparent intensive effort put into excavating the pits. Dye evaluated the hypothesis that the pits were used to obtain stone for construction and discounts it as a primary purpose for pahoehoe excavations. He also evaluated the hypothesis that the pits were used as nesting sites. This was confirmed for a very small number (19) of pits where gravel-size pieces of pumice that had been digested by sea birds were recovered. Radiocarbon dates on a sea bird bones from habitation sites in Dye's project area indicated that the birds were being used as food sometime in the A.D 1500-1600s.

Dye interpreted the presence of large waterworn cobble hammerstones, which are frequently associated with pahoehoe excavations and are found in temporary habitation sites, as indicating that pit excavation was a recurrent activity. Dye was not able to make a strong case for any specific dominant use for the pits with data limited to his project area, concluding that “the importance of the pits might not have been that any one function was particularly useful, but rather that they served a wide variety of functions - seabird nest, water catchment, sweet potato planter, construction material quarry, and others – which, in aggregate, improved the quality of life...” (2002:96).

The excavations in the project area features resemble those found in the extensive abrader quarrying and production sites documented at ‘Anaeho‘omalū where the entire process from raw material extraction to abrader shaping occurred in the same locale (Donham 1987, Donham and Jensen 1988, Welch 1989, Jensen 1989a-e, 2001, Burgett et al. 1999, Landrum et al. 2002, and Haun and Henry 2004); however, unlike the quarry and production sites at ‘Anaeho‘omalū no abraded surfaces, which were used to shape the abraders, were identified. This suggests that either the manufacturing activity occurred elsewhere, or the excavations are the result of prospecting activity that did not yield suitable material.

Table 11 presents a summary of the distribution of the pahoehoe excavations by elevation and Figure 206 depicts the location of the features, along with elevation and soils as indicated in this table, the highest density of features is between 440 and 480 ft (2.12 features per acre), with the lowest density located below 320 ft (0.18 features per acre). Pahoehoe excavation density increases with elevation above the 320 ft elevation and continues to increase until 480 ft. The density begins to drop above this elevation. There are no pahoehoe excavations located above 520 ft.

Table 11. Distribution of Pahoehoe Excavations by Elevation

Elevation	Acres	% of Project Area	No. of Pahoehoe Excavations	% of Pahoehoe Excavations	Pahoehoe Excavations per acre
280-320	27.21	10.00	5	2.6	0.18
320-360	94.38	34.69	51	26.0	0.54
360-400	60.67	22.30	40	20.4	0.66
400-440	45.57	16.75	34	17.3	0.75
440-480	25.46	9.36	54	27.6	2.12
480-520	14.64	5.38	12	6.1	0.82
520+	4.13	1.52	0	0.0	0.00
Total	272.06	100.00	196	100.0	

Table 12 summarizes the distribution of the pahoehoe excavations by soil type. The majority of the pahoehoe excavations (69.9%) are located within the pahoehoe lava (n=137); however, the highest per acre feature density is within the Punaluu extremely rocky peat soil (0.97 features per acre, n=26 or 13.3%). The next highest density is within the pahoehoe lava type with the 137 pahoehoe excavations or 0.87 features per acre. This is followed by the Kaimu extremely stony peat soil with 12 excavations (6.1%) or 0.47 features per acre and a‘a lava with 21 excavations (10.7%) or 0.33 features per acre.

As discussed in the Project Area Description section of this report, the Punaluu soil type formed on pahoehoe lava and this type is characterized by rock outcrops occupying 40-50% of the surface (Sato et al. 1973:48). Although not noted by Sato et al. (1973), the presence of pahoehoe excavations in the Kaimu soil also indicates surface pahoehoe outcrops are present within this soil type that formed on a‘a lava. The presence of pahoehoe excavations with the a‘a lava is attributed to isolated pockets of pahoehoe lava within these areas.



Figure 206. Distribution of Pahoe Excavations by Soil Type

Table 12. Distribution of Pahoehoe Excavations by Soil Type

Soil Type	Acres	% of Project Area	No. of Pahoehoe Excavations	% of Pahoehoe Excavations	Pahoehoe Excavations per acre
Pahoehoe Lava	156.90	57.67	137	69.9	0.87
A'a Lava	62.90	23.12	21	10.7	0.33
Kaimu extremely stony peat	25.30	9.30	12	6.1	0.47
Punaluu extremely rocky peat	26.90	9.89	26	13.3	0.97
Total	272.06	100.00	196	100.0	

Permanent Habitation

The survey identified 48 permanent habitation sites with 177 features. Permanent habitation features comprise only 5.3% of the total features identified within the project area; however when the numerous agricultural and resource procurement features are excluded, the 177 permanent habitations comprise 53% of the total. *Table 13* lists the permanent habitation features and summarizes the attributes utilized to interpret the features using Cordy's (1981) model. Eighteen sites contain a single permanent habitation feature, six sites consist of two features, eight have three features, eight four features, one has five features, two have six features, one has seven features, two have 12 features, one has 17 features and one has 25 features. Of the 177 permanent habitation features one is assigned a burial function (Site 13441-P4) and 16 are assigned possible burial functions (Sites 13398-A, 13413, 13465-C, 13471-E, 28405, 28415-A, -B and -C, 28483-C, 28488-A and -C, 28494-B and 28497-E, -I, -M and -O). Three of the 48 permanent habitation sites have associated trail segments (Sites 28456, 28460 and 28501).

Eighty-five of the features represent the foundations for a roofed structure with the remaining 92 features consisting of ancillary features. The main permanent habitation residential structures (excluding special purposes structures) range in area from 14.0 to 156.0 sq m with an average area of 31.9 sq m. The majority of the foundation features (n=76, 89%) are less than 50.0 sq m in area with an average 25.4 sq m, which is probably the average area of a typical residential structure. One of the large foundations (Site 13441-A) is interpreted as a possible men's house with an area of 92.4 sq m. The two largest structures in this category (Site 28491-B and -C) have areas of 102.6 sq m and 156.0 sq m, respectively; however, these area values are inflated due to the collapsed nature of the structures.

The 92 permanent ancillary features consist of 16 structures that defined the perimeter of a yard, 22 special purpose structures, 30 activity areas (including 2 *lanais*), 7 sleeping or storage features, 6 storage features and 11 features interpreted as site furniture. Morphologically, the permanent habitation features consist of 68 terraces, 49 enclosures, 24 platforms, 7 lava tubes, 7 mounds, 6 pavements, 6 walls, 3 lava blisters, 3 modified outcrops, 2 walled terraces, 1 cupboard and 1 filled crack.

The majority of the 48 permanent habitation sites are situated in the seaward portion of the project area below the 400 ft elevation (32- 67% - *Figure 207*). Of these 32 sites, 22 sites with 86 features are clustered in the southwestern corner of the parcel. These consist of Sites 13398, 13400, 13413, 28480, 28481, 28483, 28485-28488, 28490, 28491, 28493, 28494 and 28496-28503. Of the 16 sites located above 400 ft, nine are located in the southeastern portion of the parcel and seven are in the northeastern portion.

In addition to the southwestern site cluster, there are two clusters of permanent habitations within the project area. The first is located in the southeastern portion of the parcel, centered around the Site 13462 site complex. There are 12 sites 43 features with a 200.0 m radius of this area, including Sites 13462, 13465, 28460-28463, 28465, 28467, 28469, 28471, 28473 and 28477.

The second cluster is located in the northeastern portion of the project area centered on the Site 13441 complex. There are seven sites and 41 features in this area consisting of Sites 13441, 28405, 28408, 28414, 28415,

Table 13. Permanent Habitations

Site	Feature	Formal Type	Shape	Substantial Construction	Area (sq m)	Elevation (ft)	Comments
13398	A	Platform	Rectangular	Faced sides, paved surface	15.50	345	Foundation for roofed structure (may also represent Burial feature)
13398	B	Modified Outcrop	Oval	None	3.60	345	Site furniture
13400	-	Enclosure	Rectangular	Faced sides	812.00	345-350	Ancillary Feature - Yard
13413	-	Platform	Square	Faced sides, paved surface	21.70	335	Foundation for roofed structure (may also represent Burial feature)
13441	A	Platform	Rectangular	Faced sides	92.40	482	Possible Men's house
13441	B1	Terrace	Rectangular	Paved surface	19.80	483	Foundation for roofed structure
13441	B2	Pavement	Rectangular	Paved surface	26.80	483	Foundation for roofed structure
13441	C	Platform	Rectangular	Paved surface	18.70	485	Foundation for roofed structure
13441	D	Platform	Rectangular	Faced sides	35.10	487	Foundation for roofed structure
13441	E1	Terrace	Linear	None	50.00	492	Activity Area
13441	E2	Terrace	Linear	None	32.00	492	Activity Area
13441	E3	Terrace	Linear	None	40.40	492	Activity Area
13441	E4	Pavement	Rectangular	Paved surface	140.00	492	Activity Area
13441	F	Terrace	Rectangular	Faced sides	203.00	495	Activity Area
13441	G	Terrace	Rectangular	Faced sides	9.50	494	Site furniture
13441	H	Terrace	Rectangular	Faced sides	14.00	491	Special purpose structure
13441	I	Wall	Linear	Vertical slabs	32.0 m long	489	Activity Area
13441	J	Platform	Rectangular	Paved surface	35.60	489	Foundation for roofed structure
13441	K	Platform	Rectangular	Faced sides	24.60	488	Foundation for roofed structure
13441	L	Enclosure	U-shaped	Faced sides	343.20	487	Ancillary Feature - Yard
13441	M	Mound	Rectangular	None	10.90	489	Site furniture
13441	N	Platform	Rectangular	Faced sides	31.20	482	Foundation for roofed structure
13441	O	Platform	Rectangular	Faced sides, paved surface	26.50	481	Foundation for roofed structure
13441	P1	Lava Tube	Irregular	Pavement	204.80	510-525	Sleeping or storage
13441	P2	Lava Tube	Irregular	None	141.20	505-510	Sleeping or storage
13441	P3	Lava Tube	Irregular	Stacked wall	330.20	485-505	Sleeping or storage
13441	P4	Lava Tube	Irregular	None	258.50	462-485	Sleeping or storage (also Burial function)
13441	P5	Lava Tube	Irregular	None	1276.00	448-525	Sleeping or storage
13441	Q	Enclosure	Rectangular	Vertical slabs	6900.00	485-500	Ancillary Feature - Yard
13462	A	Enclosure	Oval	Faced sides	47.50	418	Foundation for roofed structure
13462	B	Enclosure	Oval	Faced sides	15.60	415	Foundation for roofed structure
13462	C	Enclosure	L-shaped	Faced sides	21.40	416	Foundation for roofed structure
13462	D	Enclosure	Square	Faced sides	1056.00	415-420	Ancillary Feature - Yard
13462	E	Enclosure	Oval	Faced sides	67.10	410	Foundation for roofed structure
13465	A	Platform	Rectangular	Faced sides, paved surface	21.00	400	Foundation for roofed structure
13465	B	Enclosure	Rectangular	Paved surface	62.50	392	Ancillary Feature - Yard
13465	C	Terrace	Rectangular	None	21.50	385	Foundation for roofed structure (may also represent Burial feature)
13471	B	Terrace	Rectangular	Paved surface	28.50	372	Foundation for roofed structure
13471	C	Lava Tube	Irregular	None	54.60	375	Sleeping or storage
13471	D	Lava Blister	Irregular	None	9.00	370	Storage
13471	E	Platform	Oval	Faced sides, paved surface	22.05	368	Foundation for roofed structure (may also represent Burial feature)
28405	-	Terrace	Rectangular	Faced sides, paved surface	21.30	471	Foundation for roofed structure (may also represent Burial feature)
28408	A	Terrace	Oval	Faced side	9.90	468	Special purpose structure
28408	B	Terrace	Rectangular	Faced sides, paved surface	15.00	470	Foundation for roofed structure
28408	C	Modified outcrop	Linear	None	4.10	477	Site furniture
28408	D	Platform	Rectangular	Faced sides, vertical slabs	10.20	480	Special purpose structure
28414	-	Terrace	Square	Paved surface	30.20	457	Foundation for roofed structure
28415	A	Platform	Rectangular	Paved surface	15.80	456	Foundation for roofed structure (may also represent Burial feature)
28415	B	Terrace	Rectangular	Paved surface	21.00	456	Foundation for roofed structure (may also represent Burial feature)
28415	C	Terrace	Rectangular	Paved surface	33.00	456	Foundation for roofed structure (may also represent Burial feature)
28420	A	Enclosure	Rectangular	Faced sides, paved surface	15.90	443	Foundation for roofed structure
28420	B	Mound	Oval	None	3.60	444	Site furniture
28420	C	Lava Tube	Irregular	Aligned boulders	49.00	446	Sleeping or storage
28422	A	Terrace	Rectangular	Paved surface, vertical slabs, cupboards	26.00	403	Foundation for roofed structure
28422	B	Enclosure	Rectangular	Faced sides	15.70	403	Foundation for roofed structure
28422	C	Platform	Rectangular	Paved surface	15.90	403	Foundation for roofed structure
28422	D	Terrace	Rectangular	None	29.50	403	Activity area
28424	-	Enclosure	Oval	Faced sides, vertical slabs	35.50	376	Foundation for roofed structure
28426	-	Walled terrace	Rectangular	Faced sides, paved surface	40.30	313	Foundation for roofed structure
28433	A	Terrace	Rectangular	Paved surface	14.60	363	Foundation for roofed structure
28433	B	Cupboard	Oval	None	1.10	363	Storage
28438	A	Enclosure	Rectangular	Faced sides, paved surface	235.70	342	Ancillary Feature - Yard
28438	B	Platform	Rectangular	Faced sides, paved surface	37.60	342	Foundation for roofed structure

Table 13. Permanent Habitations (cont.)

Site	Feature	Formal Type	Shape	Substantial Construction	Area (sq m)	Elevation (ft)	Comments
28442	A	Enclosure	Rectangular	Faced side	15.90	355	Foundation for roofed structure
28442	B	Pavement	Rectangular	Paved surface	3.60	353	Special purpose structure
28456	A	Terrace	L-shaped	Faced sides, paved surface	20.10	478	Foundation for roofed structure (associated trail feature - Feature B)
28460	A	Terrace	Rectangular	Paved surface	36.00	467	Foundation for roofed structure
28460	C	Enclosure	Rectangular	None	6.60	473	Activity Area
28460	D	Enclosure	Rectangular	Faced side	22.70	475	Activity Area
28460	E	Terrace	Rectangular	Faced sides, paved surface	27.50	470	Foundation for roofed structure
28460	F	Pavement	Rectangular	Paved surface	3.30	468	Special purpose structure
28460	G	Enclosure	L-shaped	Faced side	4.80	470	Activity Area
28460	H	Wall	Linear	None	7.3 m long	467	Activity Area
28460	I	Enclosure	Oval	None	8.75	465	Activity Area
28460	J	Terrace	Oval	Paved surface	7.10	462	Special purpose structure
28460	K	Terrace	Rectangular	None	8.00	460	Activity Area
28460	L	Wall	Linear	None	2.5 m long	462	Activity Area
28460	M	Terrace	Rectangular	Paved surface	20.70	463	Foundation for roofed structure
28461	A	Terrace	Rectangular	Faced sides, paved surface	14.40	433	Foundation for roofed structure
28461	B1	Terrace	L-shaped	Faced sides, paved surface	21.20	433	Foundation for roofed structure
28461	B2	Lava blister	Oval	None	21.00	433	Storage
28461	C	Pavement	Circular	Paved surface	10.80	433	Activity area
28461	D	Modified outcrop	Oval	None	2.50	433	Site furniture
28461	E	Terrace	U-shaped	Faced sides	14.00	433	Foundation for roofed structure
28462	A	Enclosure	Rectangular	Faced sides	39.90	430	Foundation for roofed structure
28462	B	Lava blister	Oval	None	2.10	430	Storage
28462	C	Filled Crack	Irregular	None	0.50	430	Storage
28463	-	Terrace	Rectangular	Faced sides, paved surface	31.80	414	Foundation for roofed structure
28465	-	Terrace	Rectangular	Faced sides, paved surface	22.30	420	Foundation for roofed structure
28467	A	Terrace	Rectangular	Faced sides, paved surface	23.00	430	Foundation for roofed structure
28467	B	Terrace	Rectangular	Faced sides, paved surface	16.00	430	Foundation for roofed structure
28467	C	Terrace	Rectangular	Paved surface	6.25	430	Special purpose structure
28467	D	Terrace	Oval	Paved surface	2.40	430	Special purpose structure
28469	-	Enclosure	Irregular	Paved surface	61.50	400	Foundation for roofed structure
28471	A	Enclosure	Rectangular	Faced sides	199.50	375	Ancillary Feature - Yard
28471	B	Enclosure	Rectangular	Faced sides	40.60	370	Foundation for roofed structure
28471	C	Platform	Oval	None	23.90	375	Foundation for roofed structure
28473	-	Enclosure	Oval	Faced sides, vertical slabs	34.30	415	Foundation for roofed structure
28477	-	Enclosure	Oval	Faced sides	17.50	400	Foundation for roofed structure
28480	A	Terrace	Rectangular	Faced sides, paved surface	16.40	345	Foundation for roofed structure
28480	B	Terrace	Rectangular	Paved surface	2.38	345	Special purpose structure
28481	-	Terrace	Rectangular	Faced sides, paved surface	19.00	359	Foundation for roofed structure
28483	A	Terrace	Rectangular	Faced sides	70.30	343	Foundation for roofed structure
28483	B	Enclosure	U-shaped	Faced side	12.20	343	Special purpose structure
28483	C	Terrace	Rectangular	Faced sides, paved surface	17.20	337	Foundation for roofed structure (may also represent Burial feature)
28485	-	Enclosure	Irregular	Faced sides	259.00	350	Ancillary Feature - Yard
28486	A	Enclosure	Square	Faced sides	12995.00	328-345	Ancillary Feature - Yard
28486	B	Enclosure	Rectangular	Faced sides	746.00	343-345	Ancillary Feature - Yard
28486	C	Wall	Linear	Faced sides	39.7 m long	330-335	Activity area
28486	D	Enclosure	Rectangular	Faced sides	856.00	335-341	Ancillary Feature - Yard
28487	-	Enclosure	Oval	None	49.90	342	Foundation for roofed structure
28488	A	Platform	Rectangular	Faced sides, paved surface	10.60	312	Special purpose structure (may also represent Burial feature)
28488	B	Terrace	Linear	Faced sides, paved surface	17.40	312	Foundation for roofed structure
28488	C	Terrace	Irregular	Faced sides, paved surface	13.90	312	Special purpose structure (may also represent Burial feature)
28488	D	Terrace	Irregular	Paved surface	6.60	312	Site furniture
28490	-	Enclosure	L-shaped	None	31.80	330	Foundation for roofed structure
28491	A3	Terrace	Rectangular	Paved surface	37.80	325	Foundation for roofed structure
28491	B	Platform	Rectangular	Paved surface	102.60	330	Foundation for roofed structure
28491	C	Terrace	Rectangular	Paved surface	156.00	335	Foundation for roofed structure
28493	A	Terrace	L-shaped	Paved surface	21.50	325	
28493	B	Enclosure	L-shaped	None	12.40	325	Activity area
28493	C	Enclosure	C-shaped	None	11.20	325	Activity area
28494	A	Enclosure	Irregular	None	68.00	325	Ancillary Feature - Yard
28494	B	Platform	Oval	Faced side, vertical slabs	15.60	325	Foundation for roofed structure (may also represent Burial feature)
28496	A	Terrace	Rectangular	Paved surface	40.80	310	Foundation for roofed structure
28496	B	Terrace	Rectangular	Faced sides	18.80	310	Activity area (possible lanai)
28496	C	Enclosure	Rectangular	Faced sides	178.70	312-314	Ancillary Feature - Yard
28496	D	Enclosure	Oval	Faced sides	349.10	316-318	Ancillary Feature - Yard
28497	A	Terrace	Rectangular	Faced sides, paved surface	37.50	325	Foundation for roofed structure
28497	B	Walled Terrace	L-shaped	Faced sides, paved surface	36.60	325	Activity area (possible lanai)

Table 13. Permanent Habitations (cont.)

Site	Feature	Formal Type	Shape	Substantial Construction	Area (sq m)	Elevation (ft)	Comments
28497	C	Terrace	Rectangular	Faced sides, paved surface	15.60	325	Special purpose structure
28497	D	Enclosure	Oval	Faced sides	36.40	325	Activity area
28497	E	Platform	Rectangular	Faced sides, paved surface	23.10	330	Foundation for roofed structure (may also represent Burial feature)
28497	F	Enclosure	Rectangular	Faced sides	28.50	325	Activity area
28497	G	Terrace	Rectangular	Paved surface	11.00	325	Special purpose structure
28497	H	Enclosure	Rectangular	Faced sides	197.60	325	Ancillary Feature - Yard
28497	I	Terrace	Rectangular	Faced sides	26.40	325	Foundation for roofed structure (may also represent Burial feature)
28497	J	Pavement	Rectangular	Paved surface	12.00	330	Special purpose structure
28497	K	Terrace	Rectangular	Paved surface	31.20	325	Foundation for roofed structure
28497	L	Enclosure	Oval	Faced sides	12.20	325	Activity area
28497	M	Terrace	Rectangular	Faced sides, paved surface	18.50	325	Foundation for roofed structure (may also represent Burial feature)
28497	N	Enclosure	Rectangular	None	15.00	330	Activity area
28497	O	Platform	Rectangular	Faced sides, paved surface	41.50	325	Foundation for roofed structure (may also represent Burial feature)
28497	P	Mound	Oval	None	9.90	330	Site furniture
28497	Q	Mound	Oval	None	6.80	330	Site furniture
28498	A	Terrace	L-shaped	Faced sides	17.90	316	Foundation for roofed structure
28498	B	Wall	Linear	Faced sides	3.1 m long	316	Activity area
28499	A	Platform	Rectangular	Faced sides, paved surface	12.60	313	Special purpose structure
28499	B	Enclosure	C-shaped	Faced side	14.20	313	Activity area
28499	C	Wall	Linear	None	6.4 m long	312	Activity area
28499	D	Terrace	Oval	None	22.80	315	Foundation for roofed structure
28499	E	Platform	Rectangular	Faced sides, paved surface	18.10	319	Foundation for roofed structure
28499	F	Terrace	Oval	Vertical and flat slabs	4.80	319	Storage
28500	A	Platform	Rectangular	Faced sides, paved surface	32.00	323	Foundation for roofed structure
28500	B	Terrace	Irregular	Faced sides, paved surface	56.30	323	Foundation for roofed structure
28500	C	Mound	Oval	None	4.80	323	Site furniture
28500	D	Mound	Rectangular	Faced sides	3.90	323	Site furniture
28501	A	Terrace	Rectangular	Faced sides, paved surface	21.75	325	Foundation for roofed structure
28501	B	Terrace	Rectangular	Paved surface	20.00	325	Foundation for roofed structure
28501	C	Terrace	Rectangular	Faced sides, paved surface	56.70	325	Foundation for roofed structure
28501	D	Terrace	Rectangular	Faced sides, paved surface	18.00	325	Foundation for roofed structure
28501	E	Terrace	Oval	Faced sides	6.00	325	Special purpose structure
28501	F	Terrace	Oval	Faced sides, paved surface	2.70	325	Special purpose structure
28501	G	Mound	Oval	Faced sides, paved surface	4.50	325	Special purpose structure
28501	H	Terrace	Linear	Faced sides, paved surface	1.00	325	Special purpose structure
28501	I	Terrace	Rectangular	Paved surface	26.00	325	Foundation for roofed structure
28501	J	Enclosure	Oval	None	8.00	325	Activity area
28501	K	Terrace	Oval	Faced sides, paved surface	1.25	325	Special purpose structure
28501	L	Terrace	Oval	Paved surface	2.40	325	Special purpose structure
28502	.	Terrace	Rectangular	Faced sides, paved surface	23.80	330	Foundation for roofed structure
28503	A	Enclosure	Rectangular	Faced sides	39.00	318	Foundation for roofed structure
28503	B	Enclosure	Rectangular	Faced sides	24.70	319	Foundation for roofed structure
28503	C	Enclosure	Oval	None	10.00	320	Activity area
28503	D	Enclosure	Rectangular	Faced sides, paved surface	170.00	320-322	Ancillary Feature - Yard
28503	E	Terrace	Rectangular	Faced sides	30.00	320	Foundation for roofed structure
28503	F	Enclosure	Rectangular	Faced sides	12.00	320	Activity area
28503	G	Enclosure	Rectangular	Faced sides	19.00	320	Foundation for roofed structure

28420 and 28422. The remaining seven permanent habitation sites are scattered throughout the project area (Sites 13471, 28424, 28426, 28433, 28438, 28442 and 28456).

The distribution of the soils within the project area appears to have a strong influence on the distribution of permanent habitation sites. As discussed in the Project Area Description section of this report, there are four soil types present within the project area. These consist of Pahoehoe lava, A'a lava, Kaimu extremely stony peat and Punaluu extremely rocky peat.

Figure 207 also depicts the distribution of soils within the project area. As indicated in this illustration, the majority of the sites are located in areas of pahoehoe lava. Thirty-five of the 48 sites (73% of total) located on pahoehoe lava. Of the 13 remaining sites seven are located on the Punaluu extremely rocky peat soil (15%), four are on the Kaimu extremely stony peat soil (8%), and one is on a'a lava (2%). The remaining site spans an area of both a'a and pahoehoe lava.

As discussed previously, the Kaimu and Punaluu soil types likely extend seaward of their mapped extent in the southwestern portion of the project area where the largest concentration of permanent habitation features is situated. The northeastern cluster of permanent habitation features is, as mentioned, centered on the Site 13441 complex. This site is situated adjacent to areas of Kaimu and Punaluu peat soil. The latter soil type actually may extend into the Site 13441 perimeter because its mapped distribution shows a finger that extends to the inland edge of the site. The location of this site obviously was also influenced by the lava tube system that lies beneath it and provided natural shelter, a water source, and a burial site for the occupants of the surface architectural features.

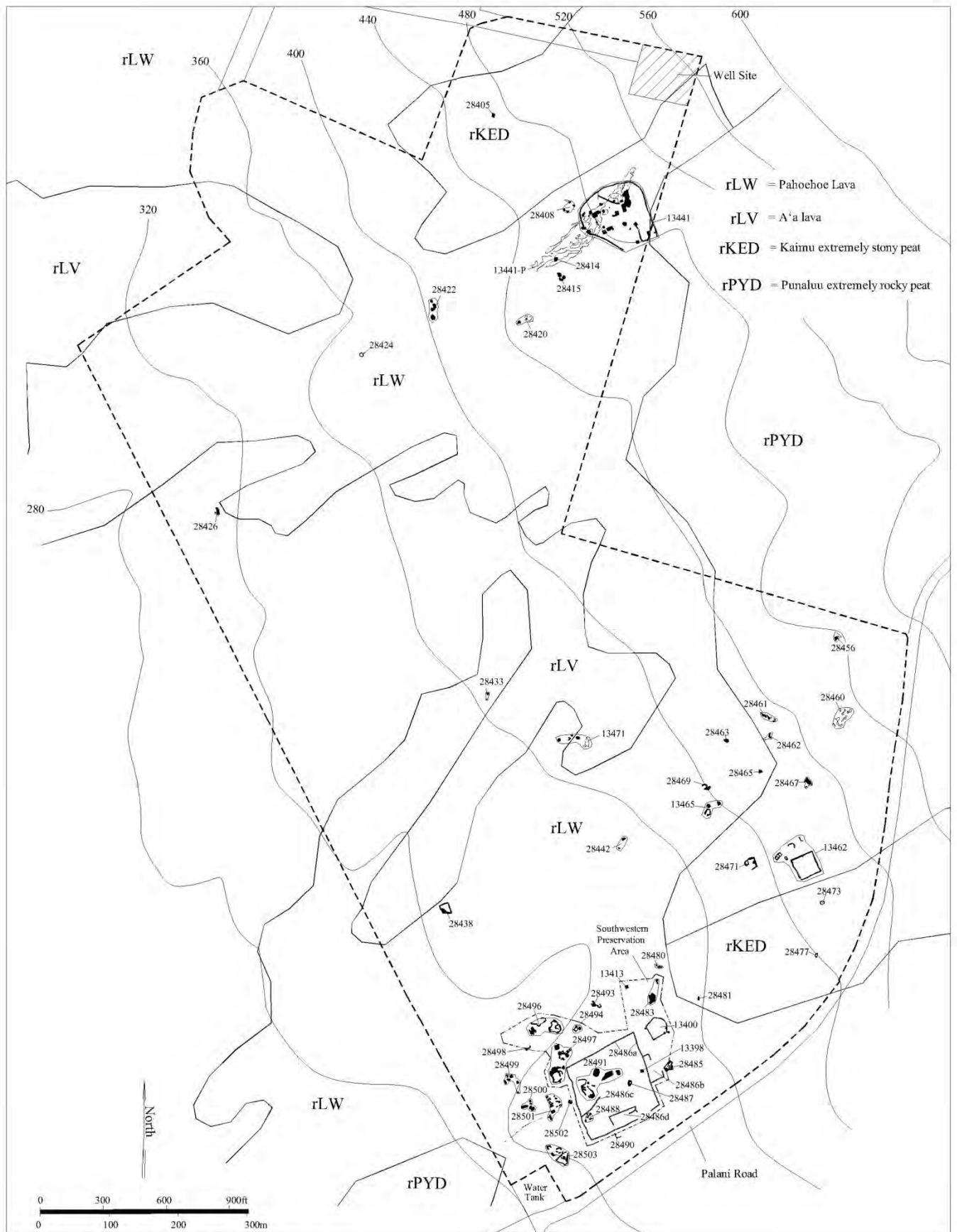


Figure 207. Permanent Habitations

Temporary Habitations

The survey identified 57 temporary habitation sites with 72 features. One temporary habitation terrace (Site 26830) was documented during the Cultural Surveys Hawaii, Inc. survey of the Ane Keohokalole Highway corridor (see Tulchin and Hammatt 2009). Temporary habitations are less than 16 sq m in area, exhibit insubstantial construction, contain numerous features of internal stratification and have few or no associated structures based on Cordy's (1981) definition. These habitations are generally characterized by short-term to recurrent occupation duration.

The 57 temporary habitation sites identified during the survey consist of 44 single features sites and 13 complexes of from two to five features. Six of the site complexes have two features (Sites 13459, 26897, 26900, 28425, 28439 and 28448), two have three features (Site 28451 and 28453) and one has five (Site 28444). Of the four remaining sites three have one temporary habitation feature with one or two associated cairns (Sites 28429 and 28464) or an associated petroglyph (Site 28430). The remaining site has two temporary habitation features and a trail segment (Site 28447).

The 72 temporary habitation features consist of 47 lava tubes, four lava blisters, 12 terraces, seven enclosures, one modified outcrop and one pavement. *Figure 208* shows the distribution of the temporary habitations and *Table 14* lists all features interpreted to have functioned as temporary habitations.

As indicated, the majority of the temporary habitations (71%) are natural formations such as lava tubes (47) or lava blisters (4) that functioned as shelters. Evidence of cultural activity consists of cultural material, including food remains and artifacts, and internal modifications. Cultural remains were documented in all of the features except one, Site 26907. Evidence for use of this site consists of evidence for clearing roof fall stones from the cave floor to create a level soil area. Cultural remains from the remaining features consist of marine shells, sea urchin body and spines, gourd fragments, burnt and unburned *kukui* nuts, waterworn coral and basalt, coral abraders and charcoal. Mammal bones from goats and pigs were noted in many of the lava tubes. Most were likely deposited naturally from animals that were either trapped in the caves or died in the shelter of the features. Human remains were identified in three of the temporary habitation lava tubes (Sites 13474, 26902 and 28444-A).

At least four of the lava tubes also functioned as water sources (Sites 26896, 26897, 26901 and 28430-A). These lava tubes contain rock rings that are interpreted as stands for gourds or other water collection vessels used to catch water dripping from the ceiling of the tubes. Gourd fragments were also noted in the Site 28444-A lava tube, suggesting a potential water source function.

The remaining 21 temporary habitation features are comprised of surface architectural structures. These consist of 12 terraces (Sites 26904, 228403, 28417, 28419, 28439-B, 28441, 28447-A, -B, 28451-A, -B, 28452 and 28468), seven enclosures (Sites 28413, 28459, 28466, 28474, 28475, 28478 and 28482), a pavement (Site 28428) and a modified outcrop (Site 13459-B). The majority of these features are characterized by areas that range from 2.7 to 14.4 sq m, with an average 8.9 sq m. Several of these are slightly larger than typical temporary habitation structures, with areas ranging from 17.3 to 26.6 sq m; however, these features are crudely built with no substantial construction.

The enclosures are typically oriented to block the prevailing trade winds. The enclosures, terraces and the pavement are interpreted as shelter foundations. A modified outcrop at Site 13459-B functioned to shelter the entrance to the Feature A lava tube. No cultural remains were noted on the surface of any of the 16 surface features; although subsurface testing in five features yielded marine shells and urchin body fragments (Sites 28417 and 28451-A), charcoal (28417, 28428 and 28451-A), crab shell fragments (28417 and 28428), *kukui* nut shells and volcanic glass (28417), a coral abraded (28447-A), a waterworn basalt pebble (26904) and waterworn coral (28451-A).

The majority (n=46, 810%) are located in the inland portion of the project area above the 360 ft elevation. Of the remaining 11 sites, eight are located in the southern half of the parcel, with only three located in the northern portion. As with the permanent habitation sites, the majority of the temporary habitations are situated in areas of pahoehoe lava (n=28, 49% - see *Figure 207*). This is followed by Punaluu extremely rock peat with 13 sites (23%) and Kaimu extremely stony peat with 10 sites (18%). The soil type containing the fewest temporary habitations is

Table 14. Temporary Habitation Sites

Site	Feature	Formal Type	Shape	Construction	Area (sq m)	Elevation (ft)	Comments
13459	A	Lava Blister	Oval	-	10.40	435	Cultural remains on floor
13459	B	Modified outcrop	Linear	Stacked cobbles and small boulders	2.1 m long	435	No cultural remains - Built to shelter entrance to Feature A
13474	-	Lava Tube	Linear	-	835.50	345-355	Cultural remains on floor. Human remains also present
26896	-	Lava Tube	Linear	Rock rings present	114.60	539	Cultural remains on floor
26897	A	Lava Tube	Irregular	-	467.70	520-528	Cultural remains on floor
26897	B	Lava Tube	Linear	-	121.60	503-520	Cultural remains on floor
26898	-	Lava Tube	Irregular	-	17.20	515-519	Cultural remains on floor
26899	-	Lava Tube	Irregular	-	734.00	495-515	Cultural remains on floor
26900	A	Lava Tube	Irregular	-	318.80	465-478	Cultural remains on floor
26900	B	Lava Tube	Linear	-	115.70	470-485	Cultural remains on floor
26901	-	Lava Tube	Irregular	Rock ring present	216.10	468-476	Cultural remains on floor
26902	-	Lava Tube	Irregular	-	990.00	435-460	Cultural remains on floor. Human remains also present
26903	-	Lava Tube	Linear	-	461.50	425-435	Cultural remains on floor
26904	-	Terrace	Rectangular	Roughly stacked and faced retaining wall with cobbled paved surface	12.40	341	Cultural remains in TU-2a
26905	-	Lava Blister	Oval	-	15.70	383	Cultural remains on floor
26907	-	Lava Blister	Oval	Roof fall stones removed from central floor	22.70	415	No cultural remains present
26908	-	Lava Tube	Linear	-	11.80	386-389	Cultural remains on floor
28399	-	Lava Tube	Linear	-	136.30	510-521	Cultural remains on floor
28403	-	Terrace	Rectangular	Faced sides, paved surface	11.80	525	No cultural remains present
28406	-	Lava Tube	Irregular	-	46.90	455	Cultural remains on floor
28407	-	Lava Tube	Linear	-	20.10	481-483	Cultural remains on floor
28413	-	Enclosure	Oval	Roughly stacked, piled and aligned cobbles and small boulders with one vertical slab	11.02	439	No cultural remains present
28416	-	Lava Tube	Irregular	-	46.30	460	Cultural remains on floor
28417	-	Terrace	Rectangular	Stacked cobbles and boulders with level unpaved surface	2.70	455	Cultural remains in TU-32
28418	-	Lava Tube	Linear	-	36.00	455	Cultural remains on floor
28419	-	Terrace	Oval	Aligned boulders with level unpaved surface	6.70	448	No cultural remains present
28421	-	Lava Tube	Oval	-	15.90	421	Cultural remains on floor
28425	A	Lava tube	Irregular	-	111.20	334-336	Cultural remains on floor
28425	B	Lava tube	Irregular	-	130.60	331-332	Cultural remains on floor
28427	-	Lava Tube	Irregular	-	48.70	318	Cultural remains on floor
28428	-	Pavement	Oval	Level cobbles and small boulders with flat slab	8.40	365	Cultural remains in TU-17
28429	B	Lava Tube	Irregular	-	33.70	410	Cultural remains on floor (Associated Cairn (Feature A))
28430	A	Lava Tube	Irregular	-	232.10	410-420	Cultural remains on floor (Associated Petroglyph (Feature B))
28431	-	Lava Tube	Irregular	-	12.50	400	Cultural remains on floor
28434	-	Lava Tube	Irregular	-	294.80	362-373	Cultural remains on floor
28436	-	Lava Tube	Irregular	-	18.80	340	Cultural remains on floor
28437	-	Lava Tube	Irregular	-	67.90	325	Cultural remains on floor
28439	A	Lava Tube	Oval	-	42.70	350	Cultural remains on floor
28439	B	Terrace	Rectangular	Stacked cobbles and small boulders with filled surface	5.04	350	No cultural remains present
28440	-	Lava Tube	Irregular	Slab and cobble pavement	44.40	356	Cultural remains on floor
28441	-	Terrace	Triangular	Stacked and faced cobbles and small boulders with roughly paved surface	10.50	352	No cultural remains present
28443	-	Lava Tube	Irregular	Small oval hearth	66.40	405	Cultural remains on floor
28444	A	Lava Tube	Irregular	Paved terrace	286.90	408-423	Cultural remains on floor. Human remains also present
28444	B	Lava Tube	Linear	Paved terrace	295.10	425-455	Cultural remains on floor
28444	C	Lava Tube	Irregular	-	36.60	465-470	Cultural remains on floor
28444	D	Lava Tube	Linear	-	19.60	470-475	Cultural remains on floor
28444	E	Lava Tube	Irregular	Aligned slabs	162.80	475-500	Cultural remains on floor
28445	-	Lava Tube	Rectangular	-	42.70	407	Cultural remains on floor
28447	A	Terrace	Oval	Paved surface	11.95	413	Cultural remains in TU-38
28447	B	Terrace	Oval	Paved surface	3.35	413	No cultural remains present
28448	A	Lava Tube	Irregular	-	34.30	490-496	Cultural remains on floor
28448	B	Lava Tube	Oval	-	19.60	498-500	Cultural remains on floor
28449	-	Lava Tube	Oval	-	18.30	460	Cultural remains on floor
28450	-	Lava Tube	Linear	-	36.90	472-480	Cultural remains on floor though none within project area
28451	A	Terrace	Irregular	Paved surface	15.05	451	Cultural remains in TU-70
28451	B	Terrace	Triangular	Paved surface	9.20	451	No cultural remains present
28451	C	Lava blister	Oval	None	0.24	451	Cultural remains on floor
28452	-	Terrace	Oval	Stacked and piled cobbles and small boulders	11.40	485	No cultural remains present

Table 14. Temporary Habitation Sites (cont.)

Site	Feature	Formal Type	Shape	Construction	Area (sq m)	Elevation (ft)	Comments
28453	A	Lava Tube	Linear	-	833.00	460-493	Cultural remains on floor
28453	B	Lava Tube	Linear	-	20.40	455	Cultural remains on floor
28453	C	Lava Tube	Linear	-	20.10	455	Cultural remains on floor
28454	-	Lava Tube	Linear	-	117.30	480-485	Cultural remains on floor
28459	-	Enclosure	C-shaped	Stacked and piled cobbles and small boulders	14.40	540	No cultural remains present
28464	A	Lava Tube	Irregular	-	69.80	420	Cultural remains on floor (2 associated cairns)
28466	-	Enclosure	Oval	Roughly stacked, piled and aligned cobbles and small boulders	24.10	429	No cultural remains present
28468	-	Terrace	Rectangular	Stacked and piled cobbles and small boulders with roughly paved surface	10.10	396	No cultural remains present
28470	-	Lava Tube	Linear	-	214.40	547	Cultural remains on floor
28474	-	Enclosure	Oval	Stacked and piled cobbles and small boulders	4.98	409	No cultural remains present
28475	-	Enclosure	Oval	Stacked and piled cobbles and small boulders	17.30	400	No cultural remains present
28478	-	Enclosure	L-shaped	Stacked and piled cobbles and small boulders	26.60	390	No cultural remains present
28482	-	Enclosure	Oval	Stacked and piled cobbles and small boulders	18.00	354	No cultural remains present
28495	-	Lava Tube	Irregular	-	126.20	326	Cultural remains on floor

a’ a lava (n=6 or 10%). One of the 57 temporary habitations is located within the Southwest Preservation Area (Site 28495).

Burials

Burials were identified in eight locations within the project area. These consists of one site (Site 26831) identified by Cultural Surveys Hawaii along the western project area boundary (see Tulchin and Hammatt 2009), and seven burial features identified during the present project (Sites 13441-P4, 13463-C, 13474, 26902, 26906 and 28400). The distribution of the burial features is presented in *Figure 209* and the features identified during the present study are summarized in *Table 15*.

Table 15. Summary of Burials and Possible Burials

Site	Feature	Formal Type	Area (sq m)	Shape	Elevation (ft)	Comments
13398	A	Platform	15.5	Rectangular	345	Possible burial structure located within Preservation Area (also assigned Permanent Habitation function)
13413	-	Platform	21.7	Square	335	Possible burial structure located within Preservation Area (also assigned Permanent Habitation function)
13441	P-4	Lava Tube	258.5	Irregular	462-485	2 Burials present within the tube
13441	P-5	Lava Tube	1276.0	Irregular	448-485	2 isolated human teeth present (Not a burial)
13463	C	Lava Tube	115.2	Irregular	495	1 Burial present with the tube
13465	C	Terrace	21.50	Rectangular	385	Possible Burial Feature based on DLNR-SHPD review (also assigned Permanent Habitation function)
13471	E	Platform	22.05	Oval	368	Possible Burial Feature based on DLNR-SHPD review (also assigned Permanent Habitation function)
13474	-	Lava Tube	835.5	Linear	345-355	12 Burials present within lava tube (also assigned Temporary Habitation function)
26902	-	Lava Tube	990.0	Irregular	435-460	3 Burials present within lava tube (also assigned Temporary Habitation function)
26906	-	Lava Tube	18.5	Oval	421	1 Burial present within the tube
28400	-	Lava Tube	20.9	Irregular	505	1 Burial present within the tube
28405	-	Terrace	21.30	Rectangular	471	Possible Burial Feature based on DLNR-SHPD review (also assigned Permanent Habitation function)
28415	A	Platform	15.80	Rectangular	456	Possible Burial Feature based on DLNR-SHPD review (also assigned Permanent Habitation function)
28415	B	Terrace	21.00	Rectangular	456	Possible Burial Feature based on DLNR-SHPD review (also assigned Permanent Habitation function)
28415	C	Terrace	33.00	Rectangular	456	Possible Burial Feature based on DLNR-SHPD review (also assigned Permanent Habitation function)
28444	A	Lava Tube	286.9	Irregular	408-423	1 Burial present within the tube (also assigned Temporary Habitation function)
28483	C	Terrace	17.2	Rectangular	337	Possible burial structure located within Preservation Area (also assigned Permanent Habitation function)
28484	-	Modified Outcrop	2.8	Oval	343	Possible burial structure located within Preservation Area
28488	A	Platform	10.6	Rectangular	312	Possible burial structure located within Preservation Area (also assigned Permanent Habitation function)
28488	C	Terrace	13.9	Irregular	312	Possible burial structure located within Preservation Area (also assigned Permanent Habitation function)
28489	A	Terrace	13.6	Rectangular	330	Possible burial structure located within Preservation Area
28489	B	Platform	4.2	Rectangular	330	Possible burial structure located within Preservation Area
28491	D	Terrace	10.8	Oval	338	Possible burial structure located within Preservation Area
28492	-	Modified Outcrop	12.9	Rectangular	330	Possible burial structure located within Preservation Area
28494	B	Platform	15.6	Oval	325	Possible burial structure located within Preservation Area (also assigned Permanent Habitation function)
28497	E	Platform	23.10	Rectangular	330	Possible burial structure located within Preservation Area (also assigned Permanent Habitation function)
28497	I	Terrace	26.40	Rectangular	325	Possible burial structure located within Preservation Area (also assigned Permanent Habitation function)
28497	M	Terrace	18.50	Rectangular	325	Possible burial structure located within Preservation Area (also assigned Permanent Habitation function)
28497	O	Platform	41.50	Rectangular	325	Possible burial structure located within Preservation Area (also assigned Permanent Habitation function)

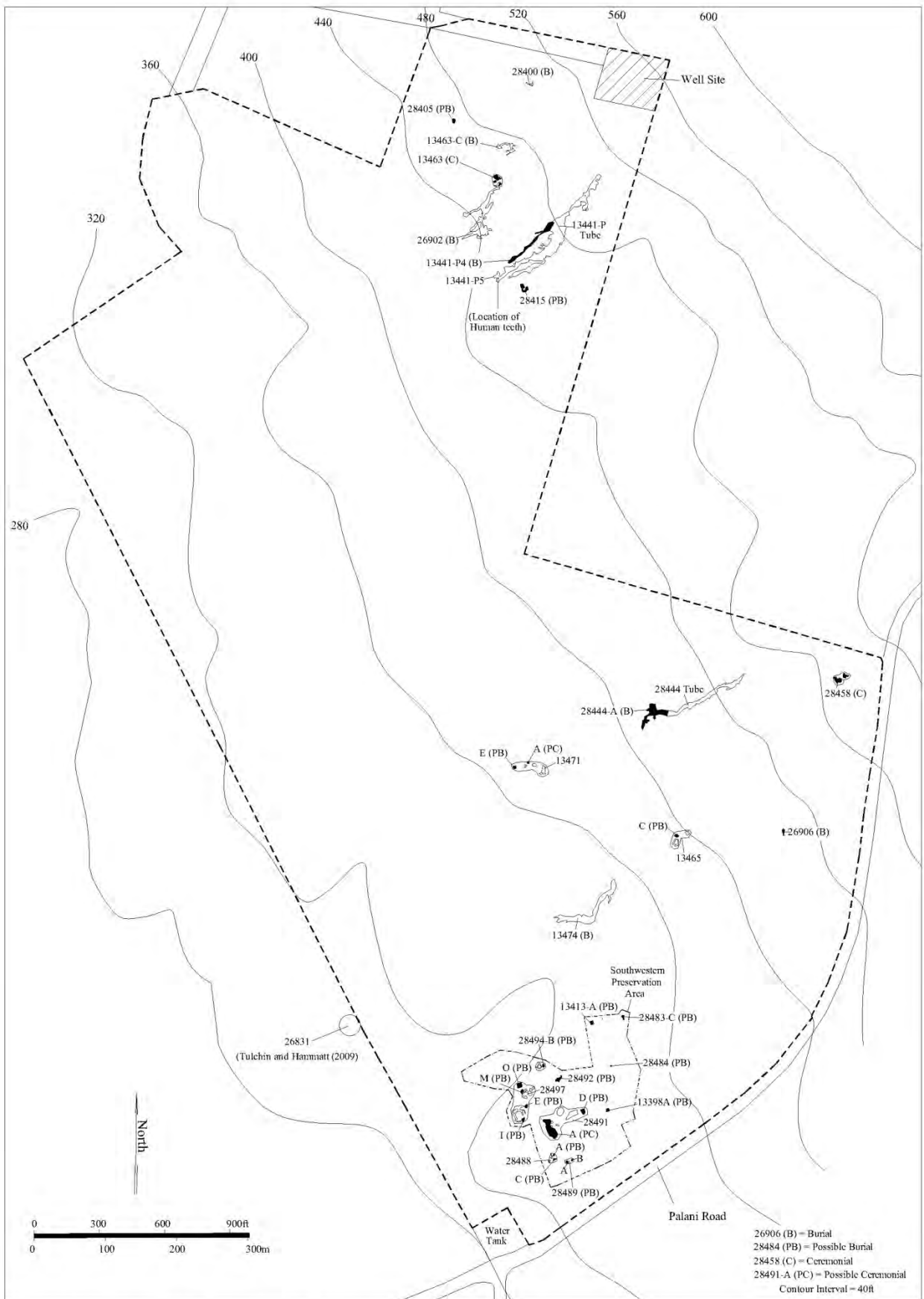


Figure 209. Burial and Ceremonial Sites

All of the confirmed burial features are lava tubes. Four of the tubes are located in the northeastern portion of the parcel (Sites 13441-P4, 13463-C, 26902 and 28400) and three are situated in the southern portion (13474, 26906 and 28444). Of the seven burial tubes, three functioned exclusively as burial chambers (Sites 13463-C, 26906 and 28400). The four remaining tubes contained evidence indicating that the caves also were used for habitation (Sites 13441-P4, 13474, 26902 and 28444-A).

Feature P5 of Site 13441 is a chamber within the large complex Feature P tube system. Two human incisors with no roots were noted at the southwestern end of this passage (see *Figure 22*). Feature P5 tube is not assigned a burial function because the area surrounding these teeth was carefully examined and no other human skeletal material is present.

Twenty-one additional features of 14 sites were assigned a possible burial function. Of these 21 features, 15 are situated within the planned Southwestern Preservation Area (see *Figure 209*). These consists of Features 13398-A, 13413, 28483-C, 28484, 28488-A and -C, 28489-A and -B, 28491-D, 28492, 28494-B and 28497-E, -I, -M and -O. As these sites/features are to be preserved, the presence of human remains was not verified but excavation. The six remaining possible burial features were assigned this function following the DLNR-SHPD review of the current report (Features 13465-C, 13471-E, 28405, and 28415-A, -B and -C). It was requested in this review (see **Appendix B**) that these features be classified as habitation/possible burial structures until such time that function can be verified by additional subsurface excavation.

The 21 possible burial features consist of ten terraces (Sites 13465-C, 28405, 28415-B and -C, 28483-C, 28488-C, 28489-A, 28491-D and 28497-I and M), nine platforms (Sites 13398-A, 13413, 13471-E, 28415-A, 28488-A, 28489-B, 28494-B and 28497-E and O), and two modified outcrops (Sites 28484 and 28492). These features were assigned a possible burial function largely based on architectural characteristics including possible crypt features and paved areas too small to be house floors.

Ceremonial Sites

Two ceremonial sites and two sites with possible ceremonial features were identified (see *Figure 209*). The two ceremonial sites consist of Sites 13463 and 28458. Site 13463 is a complex of six features located in the inland northeastern portion of the parcel. This site consists of a large walled platform (Feature A), a lava tube with a burial within it (Feature C), a trail segment (Feature D), a terrace (Feature E), a platform (Feature E) and two small enclosures (Features G and H – see *Figure 28*). The site is interpreted as a ceremonial complex with associated burial and transportation features. The Feature A walled platform is interpreted as a *heiau* or shrine based on its formal type, substantial construction (faced sides, paved surface, vertical slabs and the presence of the branch coral). The adjacent Feature G and H enclosures may have served to support idols.

The Site 28458 ceremonial complex is located in the southeastern corner of the project area and consists of large tiered terrace (Feature A), a pavement (Feature B) and a small terrace (Feature C – see *Figure 151*). The Feature A tiered terrace is interpreted as a *heiau* based on its formal type, tiers, pits (potentially for idols or offerings) and substantial construction. The structure appears to be unfinished based on the unpaved nature of the upper tier. Alternatively, this appearance could be attributable to stone removal; but this is deemed less likely because there are ample unused stones surrounding the feature. The Feature B pavement and Feature C small terrace are interpreted as ancillary special purpose features of the ceremonial site.

Site 13471 is a complex of five features located in the south-central portion of the project area. The site is comprised of a large upright slab (Feature A), a terrace (Feature B), a lava tube (Feature C), a lava blister (Feature D) and a platform (Feature E - see *Figure 31*). The site is interpreted as a complex of permanent habitation features, with Feature A assigned a possible ceremonial feature based on the upright stone.

Site 28491 is a complex of four features located in the southeastern portion of the project area. The features consist of Feature A, a very large, architecturally complex structure situated on the crest of a knoll, a platform (Feature B) and two terraces (Features C-D; see *Figure 189*). This site is interpreted as a complex of permanent habitation features with portions of the Feature A platform representing the remnants of a *heiau*. The area of the feature (243 sq m) and its substantial construction utilizing large boulder-size stones and large slabs set on edge likely indicates that its erection was a communal effort. The tiered nature of the platform surface, prominent

location overlooking the coast, and presence of branch coral (Feature A-4) also are potential indicators of a ritual function. Waterworn coral and basalt pebbles, both potential components of paving material imported from the coast, are present in the paved surfaces of the upper and lower Feature A-1 tiers. This material is a further indication of a substantial construction effort that is well beyond that typical of residential architecture in the vicinity.

Trails

Steppingstone trail segments were identified in 15 locations within the project area (*Figure 210*). These trails consist of eight single feature sites and seven features of site complexes (*Table 16*). These features are all interpreted as Type A single file foot trails as defined by Apple (1965). They are range in length from 3.05 to 85.0 m and contain from four to more than 80 flat pahoehoe slabs configured in linear alignments.

Table 16. Summary of Transportation Features

Site	Feature	Type	Length (m)	Width (m)	Elevation (ft)	Construction	Comment
13426	-	Road	128.00	3.00	310-435	Stacked and faced retaining wall with graded surface	Historic path of Palani Road
13450	A	Trail	18.50	0.54	512	17 aligned steppingstones	Type A Steppingstone Trail
13452	-	Cart Path	210.50	2.90	455-495	Stacked and faced retaining wall with paved surface	Type D Cart Path
13463	D	Trail	9.50	0.60	460	12 aligned steppingstones	Type A Steppingstone Trail (feature of ceremonial, burial)
28401	-	Trail	7.40	0.44	498	10 aligned steppingstones	Type A Steppingstone Trail
28402	-	Trail	12.20	0.71	486	27 aligned steppingstones	Type A Steppingstone Trail (associated with 28404)
26404	-	Trail	3.05	0.33	481	4 aligned steppingstones	Type A Steppingstone Trail (associated with 26402)
28409	-	Trail	23.40	0.98	445	21 aligned steppingstones	Type A Steppingstone Trail
28411	-	Trail	4.60	0.35	433	6 aligned steppingstones	Type A Steppingstone Trail - Site 28410 cairn may represent northern extent of trail
28412	A	Trail	21.30	0.66	425	20 aligned steppingstones	Type A Steppingstone Trail (2 associated cairns - Features B and C)
28432	-	Cart Path	150.00	3.80	350-375	Stacked and faced retaining wall with paved surface	Type D Cart Path
28435	-	Trail	31.30	0.83	308	58 aligned steppingstones	Type A Steppingstone Trail
28446	-	Trail	3.45	1.45	422	7 aligned steppingstones	Type A Steppingstone Trail
28447	C	Trail	5.10	1.50	410	18 aligned steppingstones	Type A Steppingstone Trail (feature of temporary habitation complex)
28455	-	Trail	4.90	0.40	488	8 aligned steppingstones	Type A Steppingstone Trail
28456	B	Trail	9.50	0.64	478	10 aligned steppingstones	Type A Steppingstone Trail (associated with Feature A permanent habitation terrace)
28460	B	Trail	8.00	0.75	468	24 aligned steppingstones	Type A Steppingstone Trail (feature of permanent habitation complex)
28501	M	Trail	85.00	1.00	300-325	80+ aligned steppingstones supported by boulders in places	Type A Steppingstone Trail (feature of permanent habitation complex)

The 15 trails are either intra-site features associated with permanent habitations (Sites 28456, 28460 and 28501), a temporary habitation (Site 28447) or a ceremonial site (Site 13463), or they are isolated features designed to cross areas of uneven lava. Two of the single feature trails may represent sections of one transportation route (Sites 28402 and 28404 – separated by 20 m gap); however the majority are not related and are not components of a larger transportation system.

Markers

Cairns were documented in 21 locations during the project (see *Figure 210*). Three of the cairns are single feature sites (Sites 28410, 28457 and 28472) and 18 are features of seven larger sites (*Table 17*). Most of the cairns are located in the southeastern portion of the project area and are features of one site (Site 28479). The remaining cairns have associated trails (Sites 13450 and 28412), lava tubes 28429 and 28464) or permanent habitation features (28462).

The majority of these features are oval in shape (n=17), three are circular and one is irregularly-shaped. The cairns range in length from 0.45 to 2.0m (average 1.18 m), in width from 0.3 to 1.9 m (average 0.97m) and in height from 0.3 to 0.95 m (average 0.66 m). Most of the cairns are built of stacked cobbles and small boulders (17). Six of these cairns have slabs placed on top. The remainder are comprised of stacked and piled cobbles (2), a stack of flat pahoehoe slabs (10) and a vertical slab supported at the base by other stones (1).

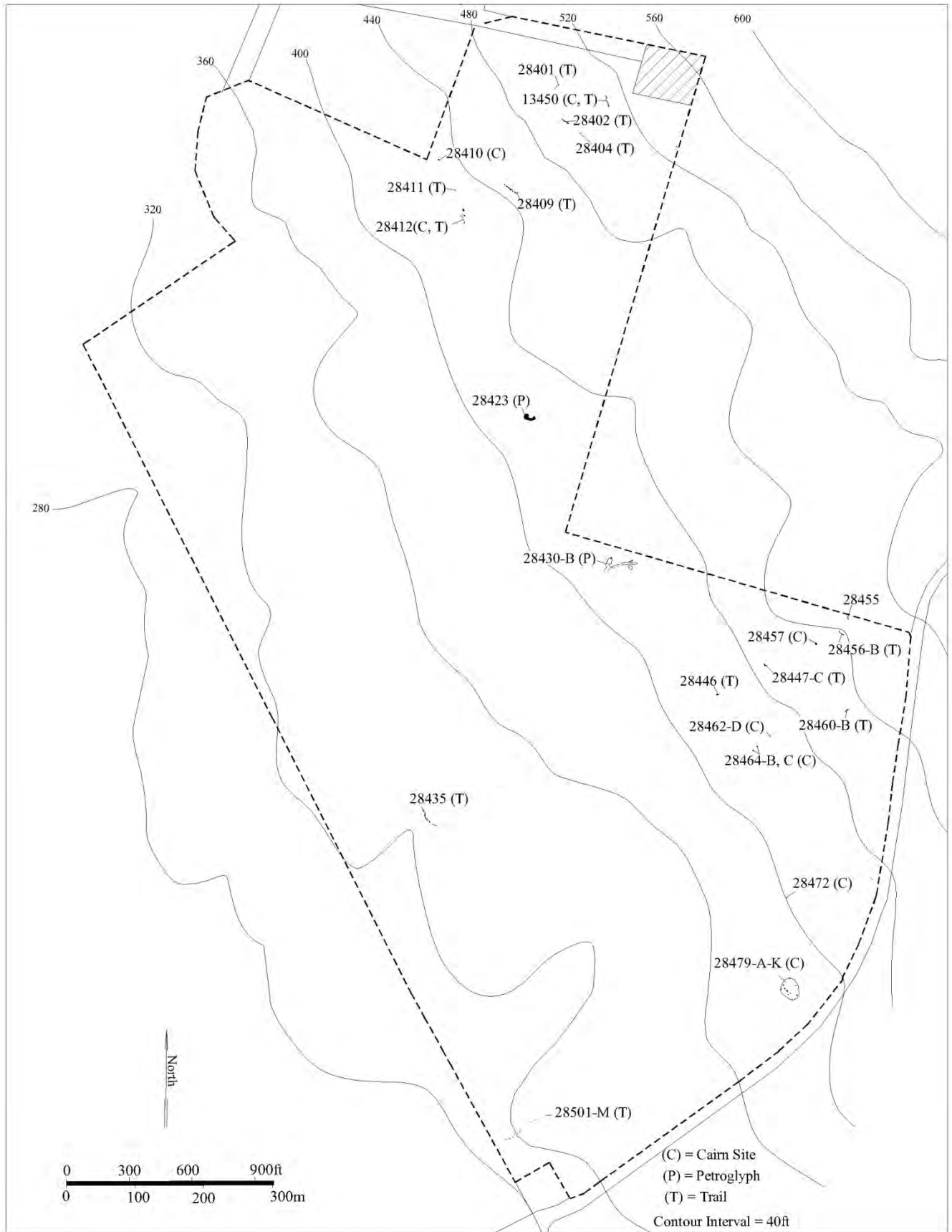


Figure 210. Distribution of Trails, Markers and Petroglyphs

Table 17. Cairns

Site	Feature	Shape	Construction	Length (m)	Width (m)	Height (m)	Elevation (ft)	Comments
13450	B	Circular	Stacked cobbles and small boulders	0.67	0.67	0.50	512	Associated Trail (Feature A)
28410	-	Oval	Stacked and piled cobbles	1.30	0.95	0.70	356	May be marking northern extension of Site 28411 Trail
28412	B	Oval	Stacked cobbles and small boulders	1.90	1.25	0.66	425	Associated Trail (Feature A)
28412	C	Circular	Stacked cobbles and small boulders	1.25	1.20	0.40	425	Associated Trail (Feature A)
28429	A	Oval	Stacked pahoehoe slabs	1.00	0.50	0.30	410	Associated lava tube (Feature B)
28457	-	Irregular	Vertical slab supported by cobbles	0.45	0.30	0.50	510	-
28462	D	Oval	Stacked cobbles and small boulders	1.00	0.85	0.85	430	Associated permanent habitation complex (Features A-C)
28464	B	Oval	Stacked cobbles and small boulders	1.90	1.40	0.65	420	Associated lava tube (Feature A)
28464	C	Oval	Stacked cobbles and small boulders	2.00	1.90	0.85	420	Associated lava tube (Feature A)
28472	-	Oval	Stacked and piled cobbles	1.80	1.40	0.60	401	-
28479	A	Oval	Stacked cobbles and small boulders with slab on top	0.80	0.60	0.66	387	-
28479	B	Oval	Stacked cobbles and small boulders	1.00	0.90	0.53	388	-
28479	C	Oval	Stacked cobbles and small boulders with slab on top	1.20	0.90	0.80	385	-
28479	D	Oval	Stacked cobbles and small boulders	1.50	1.20	0.90	385	-
28479	E	Oval	Stacked cobbles and small boulders with slab on top	1.00	0.90	0.70	385	-
28479	F	Circular	Stacked cobbles and small boulders	1.10	1.10	0.95	385	-
28479	G	Oval	Stacked cobbles and small boulders with slab on top	1.10	1.00	0.95	385	-
28479	H	Oval	Stacked cobbles and small boulders	0.90	0.80	0.55	385	-
28479	I	Oval	Stacked cobbles and small boulders with slab on top	0.70	0.60	0.50	385	-
28479	J	Oval	Stacked cobbles and small boulders with slab on top	0.80	0.70	0.60	385	-
28479	K	Oval	Stacked cobbles and small boulders	1.50	1.30	0.66	388	-

Petroglyphs

Two sites were identified in the project area that contain a total of 20 petroglyphs (see *Figure 210* and *Table 18*). These consist of Site 28423 located in the northeastern portion of the parcel and Site 28430 in the southeastern portion. Site 28423 is a complex of 19 petroglyphs located on a pahoehoe outcrop (see *Figure 110*). The petroglyphs consist of eight anthropomorphic images, one of which is possibly astride a horse, a turtle and a possible turtle, one ring, five *poho*, a possible crab claw sail, a U-shaped image and an oval image. Site 28430 consists of a lava tube (Feature A) and a petroglyph (Feature B). The petroglyph is situated on surface above the tube (see *Figure 118*) and consists of a single anthropomorphic image.

Table 18. Petroglyphs

Site	Feature	Type	Length (cm)	Width (cm)	Elevation
28423	A	Anthropomorphic image	28.0	28.0	420
28423	B	Turtle	49.0	22.0	420
28423	C	Ring	28.0	24.0	420
28423	D	Poho	7.0	6.5	420
28423	E	Poho	38.0	34.0	420
28423	F	Poho	7.3	7.2	420
28423	G	Possible anthropomorphic astride horse	29.5	24.7	420
28423	H	Possible Turtle	35.5	29.6	420
28423	I	Ring	14.0	10.7	420
28423	J	Anthropomorphic image	18.4	12.9	420
28423	K	Anthropomorphic image	25.6	19.4	420
28423	L	Anthropomorphic image	19.2	18.0	420
28423	M	Crab claw sail	19.5	12.3	420
28423	N	Poho	5.3	5.2	420
28423	O	Anthropomorphic image	42.8	28.5	420
28423	P	Anthropomorphic image	43.9	19.6	420
28423	Q	U-shape	14.6	14.2	420
28423	R	Anthropomorphic image	33.4	13.8	420
28423	S	Oval	41.5	31.1	420
28430	B	Anthropomorphic image	31.0	23.0	410

Historic Sites

Early historic occupation of the project area is evidenced by traditional Hawaiian permanent habitation sites that have yards enclosed by walls. These sites likely were occupied in the late 1700s to early 1800s when free-ranging cattle became a problem. Fifteen features at eleven sites are yards in which pole and thatched roofed structures once existed (see *Table 13*). Of these, eight features of five sites have walls that are 1.0 m in height or higher that are sufficient to prevent access by cattle (Sites 13441-L and -Q, 13462-D, 28486-A, -B and -D, 28496-D and 28497-H – see *Table 13* and *Figure 207*).

Additional historic sites within the project area consist of two ranch walls (Sites 5011 and 13436), sections of the old Palani Road (Site 13426), two discontinuous cart paths (Sites 13452 and 28432) and an historic house foundation (Site 28476 – see *Figures 8a* and *8b*). It is likely that the Site 28491 complex in the southwestern portion of the project area was historically modified. Feature A-3 at the site is probably a historic house foundation.

Discussion

Seven radiocarbon age determinations are reported by Donham (1990-2 dates) and Reeves et al. (2009-4 dates) for sites in the immediate vicinity of the project area. Donham (1990:32) dated two samples from Features P and O at Site 13441 in the northeastern portion of the project area. The sample from Feature P yielded two calibrated age ranges of A.D. 1523-1568 and 1630-1955. The sample from Feature O produced an age range of 1640-1955. Reeves et al. (2009) dated samples from three sites situated immediately seaward of the project area at the southern end Ane Keohokalole Highway corridor. These samples all yielded multiple potential calibrated age ranges. Collectively, the results span the early 1500s to mid-1900s. The age determination results indicate that traditional Hawaiian utilization of the project area began by the 1500s and continued into the historic period. Historic period use of the project area dating to 1800s is indicated by historic artifacts, and walled yards intended to keep free-ranging cattle out of garden plots and residential areas.

Evidence for use of much of the project area is very sparse in the central and northwestern portions of the project area. These areas are predominately pahoehoe and a'a lava flows with very little to no soil development. A few widely scattered habitation sites are present in the area along with very sparsely distributed pahoehoe excavations and agricultural mounds and modified outcrops.

Most of the archaeological sites are clustered in the northeast, southeast, and southern portions of the project area. Each cluster contains multiple permanent habitation sites, burials, ritual architecture, and one or more lava tubes that served as water sources and potentially refuge shelter. The densest cluster of 19 permanent habitation sites and hundreds of agricultural features is situated in the southern portion of the project area centered on the large Site 28486 enclosure (Cluster 1, *Figure 211*). The 1.3 hectare (3.2 acre) enclosure undoubtedly is historic in age based on its square shape, and on the construction (bi-faced and core-filled) and height (0.7 to 1.4 m) of the enclosing wall. The enclosure likely protected garden plots based on the large area enclosed. At least one feature, (Feature A3, Site 28491) within the enclosure was historically used as a residence. There are numerous permanent habitation features inside and surrounding the enclosure associated with hundreds of agricultural features. Agricultural and residential use of the area pre-dates the historic period based on evidence at several sites (28491, 28497) for dismantling of structures to obtain stone to construct the large enclosure.

Several sites consisting of smaller groups of habitation features within the large Cluster 1 likely represent traditional Hawaiian residential sites (*kauhale*: Sites 28488, 28491, 28497, 28499, 28500, 28501, 28503). The largest of these is Site 28497 potentially represents a high status residential compound based on the relatively large area of the site and the component residential features. A probable *heiau* (Feature A at Site 28491) is adjacent to the possible high status residence. More than a dozen possible burials associated with southern cluster. A lava tube that likely served as a water source based on the presence of gourd fragments is situated adjacent to the project area in the Ane Keohokalole Highway Corridor reported by Reeves et al. (2009; Site 13391). This cave has a chamber with a constricted opening that likely functioned as a refuge cave. A burial also is present in the cave.

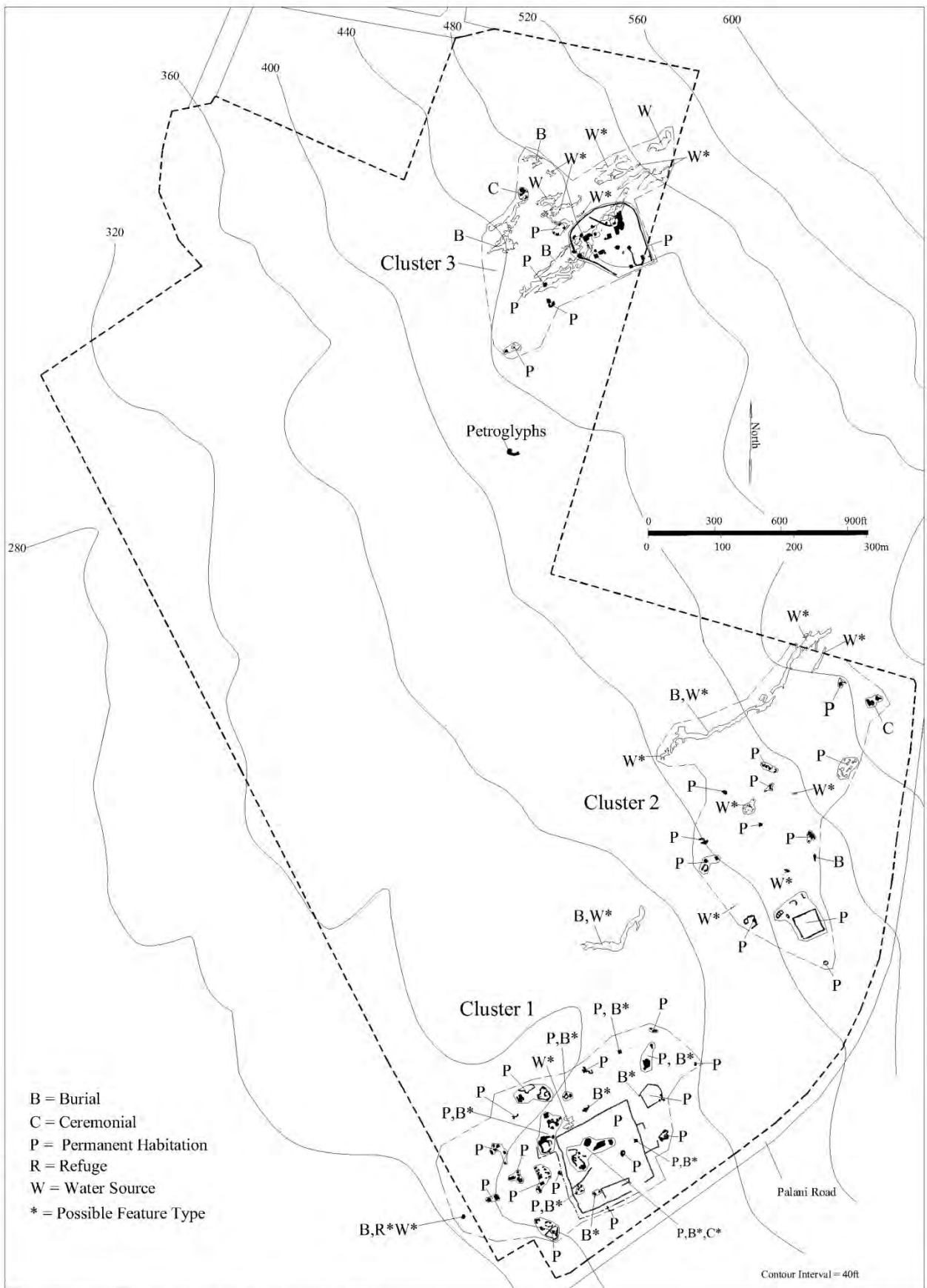


Figure 211. Distribution of Community Clusters

A second, more diffuse cluster (Cluster 2; see *Figure 211*), is situated in the southeastern portion of project area. This cluster includes twelve permanent habitation sites associated with the second densest area of agricultural features in the project area. The cluster includes one possible ritual feature, Site 28458, interpreted as a small, possibly unfinished *heiau*. An extensive lava tube system, Site 28444 forms the northwestern extent of the cluster. This cave system contains one burial and gourd fragments indicating that it likely served as a water source. Although there was no fortified entrance in this cave system, its extensive nature and multiple entrances indicate that it could have served a refuge function for residents in the vicinity. One other lava tube within the cluster contains a burial (Site 26906). The large rectangular enclosure at Site 13462 in the southern end of the cluster indicates that at least this site was occupied into the early historic period.

The largest burial concentration in the project area (minimum of 12 individuals) is contained within the Site 13474 lava tube. This site is situated intermediate between first and second clusters, potentially utilized by residents of either cluster for interment. Although no stone rings or gourd fragments were observed in the cave, it also may have served as a water source.

The third and smallest cluster (Cluster 3; see *Figure 211*) is situated in northeast corner of project area dominated by the Site 13441 complex with six permanent habitation sites. This large complex of residential architecture is enclosed by a wall that likely indicates that this traditional Hawaiian site was occupied into the early historic period. The surface architecture is underlain by an extensive lava tube system that contains two burials and evidence of water catchment (stone rings and gourd fragments). This tube system has one sealed chamber and one chamber with a partially restricted entry and could have served a refuge function. Site 13463 includes a small *heiau* or shrine within the cluster. Burials also are present in lava tubes at Site 13463 and at Site 26902. Site 13441 includes a minimum of eight residential structure foundations and a possible men's house. This is the highest number of such structures for a permanent habitation site in the project area and may indicate that the occupants were of high status. Agricultural features are present in the vicinity of Cluster 3, but are very sparse. The agricultural plots associated with this cluster may have been located inland of the complex in a large area of Punaluu soils (see *Figure 2*).

One notable site that is not associated with these clusters is the petroglyph field at Site 28423. This site is isolated in the east-central portion of the project area more than 150 m from the nearest habitation site. The site includes more than twenty petroglyphs including a variety of anthropomorphic figures. Several petroglyphs exhibit one or more episodes of modification.

Significance Assessment

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. The sites documented 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;
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.

Table 19 lists the significance assessments and recommended treatments for the 136 sites that were documented during the present project. The sites are all assessed as significant under Criterion "d". The sites have yielded information important for understanding prehistoric and historic land use in project area. Of the 136 sites, 23 are additionally assessed as significant under Criterion "e". This assessment is due to the presence of human remains of probable Hawaiian ancestry (Sites 13441, 13474, 26902, 26906, 28400 and 28444), because the site is interpreted as having a traditional Hawaiian ritual function (Site 28458), because of the presence of human remains and a ritual function (Site 13463) or because the sites are interpreted as containing possible burials. The 14 sites in this last category were not tested to confirm the presence of burials because they are either situated within the planned Southwestern Preservation Area (Sites 13398, 13413, 28483, 28484, 28488, 28489, 28491, 28492, 28494 and 28497) or because their interpretations were changed following the DLNR-SHPD review of the current report (Sites 13465, 13471, 28405 and 28415). This review requested that these four sites be re-classified as habitation/possible burials until such time that functions could be verified through additional excavation (see **Appendix B**). The remaining culturally significant site consists of a petroglyph field with 19 examples of Hawaii rock art (Site 28423). This site and Site 13441 are also assessed as significant under Criterion "c" as good site type examples.

Recommended Treatments

The mapping, written descriptions and photography at 22 sites adequately document them and no further work or preservation is recommended (see *Table 19*). These sites are comprised of livestock control walls (Sites 5011 and 13436), an historic road (Site 13426), two cart paths (Sites 13452 and 28432) three single feature cairns (Sites 28410, 28457 and 28472), a complex of cairns (Site 28479), a complex of pahoehoe excavations (Site 26910), an agricultural modified outcrop (Site 13395), eight steppingstone trail segments (Sites 28401, 28402, 28404, 28409, 28411, 28435, 28446 and 28455), two trails with associated cairns (Sites 13450 and 28412) and a portion of a lava tube that extends out the parcel with no cultural remains within the project area (Site 28450).

Twenty-four of the sites (or portions of them) are recommended for preservation (*Figure 212*). These consist of the Site 28458 ceremonial complex, the Site 13463 ceremonial site/burial site, the Site 28423 petroglyph field, and the entirety of three of burial lava tube sites (Sites 13474, 26906 and 28400). Fifteen of the sites are located within the boundaries of the Southwestern Preservation Area and are to be preserved (Sites 13398, 13400, 13413, 28483, 28484, 28486-28488, 28491-28492 and 28494-28498). The three remaining sites are recommended for partial preservation with the remaining portions recommended for data recovery (Sites 13441, 26902 and 28444).

Four additional sites (or portions of them) are also potentially recommended for preservation based on review comments from DLNR-SHPD. As discussed above, these consist of Site 13465, 13471, 28405 and 28415. Future excavations at these sites will determine the final significance assessment and treatments. The results of these excavations will be detailed in an addendum to this report.

Site 13441 is a complex of 25 features interpreted as a permanent habitation site with a burial function, located in the northeastern portion of the project area. Twenty-two of the features are located within the boundaries of an enclosure (Feature Q – see *Figure 18* and 22). These 22 features are to be preserved. Additionally, a chamber of a lava tube (Feature P-4) contains a burial and is to be preserved. The remaining two features are lava tube chambers (Feature P-1 and P-5) assigned permanent habitation functions. Two human teeth were noted at the southwest end of the Feature P-5 chamber although they do not represent a burial. Features P-1 P-4 and P-5 extend outside the boundary of Feature Q. The Feature P-1 and P-5 chambers are recommended for data recovery.

Site 26902 is a complex lava tube in the northeast portion of the parcel that is assigned a temporary habitation/burial function. The human remains are located in a passage in the south portion of the tube (see *Figure 39*). This portion of the site is to be preserved, with the remainder recommended for data recovery.

Site 28444 is a lava tube system in the southeastern portion of the project area. This tube has five discrete chambers, four of which are assigned temporary habitation functions (Features B-E – see *Figure 134*). The Feature

A chamber is located at the west end of the site and contains human remains. Feature A is recommended for preservation with Features B-E recommended for data recovery.

The portions of Sites 13441, 26902 and 28444 discussed above, along with the 86 remaining sites retain the potential to yield information important for understanding prehistoric and early historic land use. The 86 sites recommended for data recovery consist of 33 permanent habitations sites with 104 features, 51 temporary habitations with 65 features, one historic habitation terrace and an agricultural complex with 2,725 features.

Data recovery in the project area will focus on obtaining additional information through controlled excavation at surface structures and the collection of artifacts and charcoal samples from the surface of lava tubes. Donham (1990) proposed three areas of archaeological interpretation that were applicable to Keahuolu: (a) culture history, (b) settlement pattern analysis and (c) human ecology.

The development of a local cultural history or chronology for the Keahuolu area will be addressed through the collection and analysis of temporally diagnostic artifacts and the submission of charcoal samples for radiometric age determination. Settlement pattern analysis would focus on the examination of the interrelationship between the sites in terms of function. This can be addressed by characterizing variation in site activities through an examination of structural remains, artifacts, and food remains. Finally, aspects of human ecology specific to the project area could be addressed by examining the relationship between site/feature patterning and environmental variation in soil type, elevation, drainage, and other characteristics.

The plans for data recovery would be detailed in a Data Recovery Plan prepared for DLNR-SHPD review and approval. The specific plans for preservation and maintenance of the burial features 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 other non-burial sites recommended for preservation would be described in a Site Preservation Plan prepared for DLNR-SHPD review and approval.

Table 19. Site Significance and Recommended Treatment

SIHP Number	Type	Function	Significance Criteria	Recommended Treatment
5011	Wall	Livestock Control	D	NFW
13395	Modified Outcrop	Agriculture	D	NFW
13398	Complex (2)	Permanent Habitation, Possible Burial	D,E	PR
13400	Enclosure	Permanent Habitation	D	PR
13413	Complex (2)	Permanent Habitation, Possible Burial	D,E	PR
13426	Road	Transportation	D	NFW
13436	Wall	Livestock Control	D	NFW
13441	Complex (25)	Permanent Habitation, Burial	C, D, E	PR/DR
13450	Complex (2)	Transportation, Marker	D	NFW
13452	Cart Path	Transportation	D	NFW
13459	Complex (2)	Temporary Habitation	D	DR
13462	Complex (5)	Permanent Habitation	D	DR
13463	Complex (6)	Ceremonial, Burial, Transportation	D, E	PR
13465	Complex (3)	Permanent Habitation, Possible Burial	D, E*	PR*
13471	Complex (5)	Permanent Habitation, Possible Ceremonial, Possible Burial	D, E*	PR*
13474	Lava Tube	Temporary Habitation, Burial	D, E	PR
26896	Lava Tube	Temporary Habitation	D	DR
26897	Lava Tube	Temporary Habitation	D	DR
26898	Lava Tube	Temporary Habitation	D	DR
26899	Lava Tube	Temporary Habitation	D	DR
26900	Lava Tube	Temporary Habitation	D	DR
26901	Lava Tube	Temporary Habitation	D	DR
26902	Lava Tube	Temporary Habitation, Burial	D, E	PR/DR
26903	Lava Tube	Temporary Habitation	D	DR
26904	Terrace	Temporary Habitation	D	DR
26905	Lava Blister	Temporary Habitation	D	DR
26906	Lava Tube	Burial	D, E	PR
26907	Lava Blister	Temporary Habitation	D	DR
26908	Lava Tube	Temporary Habitation	D	DR
26909	Complex (2725)	Agriculture	D	DR
26910	Complex (196)	Resource Procurement	D	NFW
28399	Lava Tube	Temporary Habitation	D	DR
28400	Lava Tube	Burial	D, E	PR
28401	Trail	Transportation	D	NFW
28402	Trail	Transportation	D	NFW
28403	Terrace	Permanent Habitation	D	DR
28404	Trail	Transportation	D	NFW
28405	Terrace	Permanent Habitation, Possible Burial	D, E*	PR*
28406	Lava Tube	Temporary Habitation	D	DR
28407	Lava Tube	Temporary Habitation	D	DR
28408	Complex (4)	Permanent Habitation	D	DR
28409	Trail	Transportation	D	NFW
28410	Cairn	Marker	D	NFW
28411	Trail	Transportation	D	NFW
28412	Complex (3)	Transportation, Marker	D	NFW
28413	Enclosure	Temporary Habitation	D	DR
28414	Terrace	Permanent Habitation	D	DR
28415	Complex (3)	Permanent Habitation, Possible Burial	D, E*	PR*

Table 19. Site Significance and Recommended Treatment (cont.)

SIHP Number	Type	Function	Significance Criteria	Recommended Treatment
28416	Lava Tube	Temporary Habitation	D	DR
28417	Terrace	Temporary Habitation	D	DR
28418	Lava Tube	Temporary Habitation	D	DR
28419	Terrace	Temporary Habitation	D	DR
28420	Complex (3)	Permanent Habitation	D	DR
28421	Lava Tube	Temporary Habitation	D	DR
28422	Complex (4)	Permanent Habitation	D	DR
28423	Complex (19)	Rock art	C, D, E	PR
28424	Enclosure	Permanent Habitation	D	DR
28425	Complex (2)	Temporary Habitation	D	DR
28426	Walled Terrace	Permanent Habitation	D	DR
28427	Lava Tube	Temporary Habitation	D	DR
28428	Pavement	Temporary Habitation	D	DR
28429	Complex (2)	Temporary Habitation, Marker	D	DR
28430	Complex (2)	Temporary Habitation, Rock Art	D	DR
28431	Lava Tube	Temporary Habitation	D	DR
28432	Cart Path	Transportation	D	NFW
28433	Complex (2)	Permanent Habitation	D	DR
28434	Lava Tube	Temporary Habitation	D	DR
28435	Trail	Transportation	D	NFW
28436	Lava Tube	Temporary Habitation	D	DR
28437	Lava Tube	Temporary Habitation	D	DR
28438	Complex (2)	Permanent Habitation	D	DR
28439	Complex (2)	Temporary Habitation	D	DR
28440	Lava Tube	Temporary Habitation	D	DR
28441	Terrace	Temporary Habitation	D	DR
28442	Complex (2)	Permanent Habitation	D	DR
28443	Lava Tube	Temporary Habitation	D	DR
28444	Complex (5)	Temporary Habitation, Burial	D, E	PR/DR
28445	Lava Tube	Temporary Habitation	D	DR
28446	Trail	Transportation	D	NFW
28447	Complex (3)	Temporary Habitation,	D	DR
28448	Complex (2)	Temporary Habitation	D	DR
28449	Lava Tube	Temporary Habitation	D	DR
28450	Lava Tube	Temporary Habitation	D	NFW
28451	Complex (3)	Temporary Habitation	D	DR
28452	Terrace	Temporary Habitation	D	DR
28453	Complex (3)	Temporary Habitation	D	DR
28454	Lava Tube	Temporary Habitation	D	DR
28455	Trail	Transportation	D	NFW
28456	Complex (2)	Permanent Habitation, Transportation	D	DR
28457	Cairn	Marker	D	NFW
28458	Complex (3)	Ceremonial	D, E	PR
28459	C-shape	Temporary Habitation	D	DR
28460	Complex (13)	Permanent Habitation, Transportation	D	DR
28461	Complex (6)	Permanent Habitation	D	DR
28462	Complex (4)	Permanent Habitation, Marker	D	DR
28463	Terrace	Permanent Habitation	D	DR
28464	Complex (3)	Temporary Habitation, Marker	D	DR
28465	Terrace	Permanent Habitation	D	DR
28466	Enclosure	Temporary Habitation	D	DR
28467	Complex (4)	Permanent Habitation	D	DR

Table 19. Site Significance and Recommended Treatment (cont.)

SIHP Number	Type	Function	Significance Criteria	Recommended Treatment
28468	Terrace	Temporary Habitation	D	DR
28469	Enclosure	Permanent Habitation	D	DR
28470	Lava Tube	Temporary Habitation	D	DR
28471	Complex (3)	Permanent Habitation	D	DR
28472	Cairn	Marker	D	NFW
28473	Enclosure	Permanent Habitation	D	DR
28474	Enclosure	Temporary Habitation	D	DR
28475	Enclosure	Temporary Habitation	D	DR
28476	Terrace	Historic Habitation	D	DR
28477	Enclosure	Permanent Habitation	D	DR
28478	L-shape	Temporary Habitation	D	DR
28479	Complex (11)	Marker	D	NFW
28480	Complex (2)	Permanent Habitation	D	DR
28481	Terrace	Permanent Habitation	D	DR
28482	Enclosure	Temporary Habitation	D	DR
28483	Complex (3)	Permanent Habitation, Possible Burial	D, E	PR
28484	Modified Outcrop	Possible Burial	D, E	PR
28485	Enclosure	Permanent Habitation	D	DR
28486	Complex (4)	Permanent Habitation	D	PR
28487	Enclosure	Permanent Habitation	D	PR
28488	Complex (4)	Permanent Habitation, Possible Burial	D,E	PR
28489	Complex (2)	Possible Burial	D,E	PR
28490	L-shape	Permanent Habitation	D	DR
28491	Complex (4)	Permanent Habitation, Possible Ceremonial, Possible Burial	D, E	PR
28492	Modified Outcrop	Possible Burial	D, E	PR
28493	Complex (3)	Permanent Habitation	D	DR
28494	Complex (2)	Permanent Habitation, Possible Burial	D,E	PR
28495	Lava Tube	Temporary Habitation	D	PR
28496	Complex (4)	Permanent Habitation	D	PR
28497	Complex (17)	Permanent Habitation, Possible Burial	D,E	PR
28498	Complex (2)	Permanent Habitation	D	DR
28499	Complex (6)	Permanent Habitation	D	DR
28500	Complex (4)	Permanent Habitation	D	DR
28501	Complex (13)	Permanent Habitation, Transportation	D	DR
28502	Terrace	Permanent Habitation	D	DR
28503	Complex (7)	Permanent Habitation	D	DR

Significance Criteria - C = Good site type example, D = Important for information content, E = Cultural Value Treatments - DR = Data Recovery, PR = Preservation, NFW = No further Work

** = DLNR-SHPD review resulted in re-interpretation of site as possible burial pending additional testing*

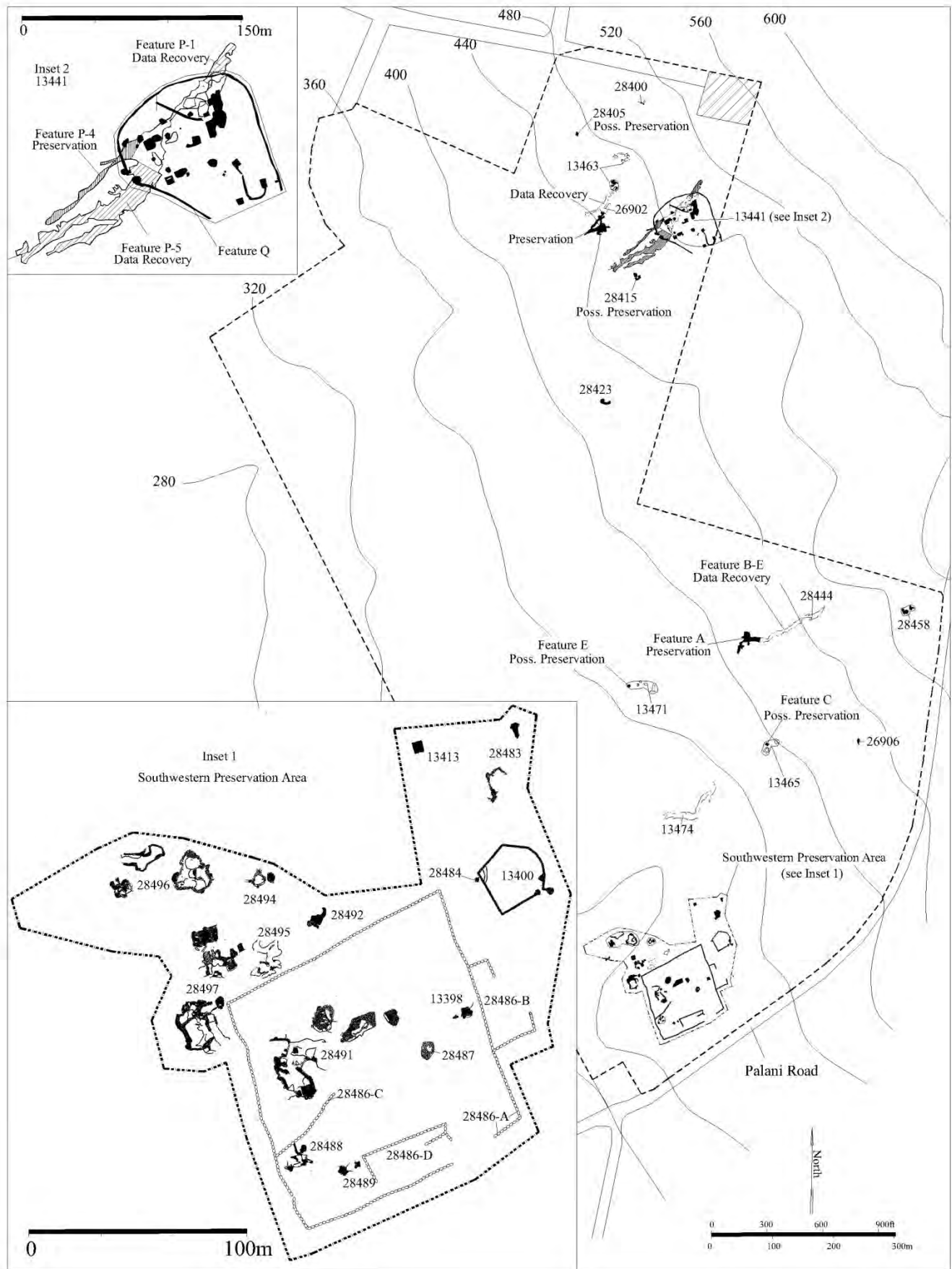


Figure 212. Location of Preservation Sites

References

- Apple, R.A.
1965 *Hawaiian Archaeology: Trails*. B.P. Bishop Museum Special Publication 53. Honolulu.
- Bennett
1930 *Kauai Archaeology. Papers of the Hawaiian Historical Society No. 17*. Honolulu: The Printshop Co., Ltd.
- Burgett, B., and P. Rosendahl
1992 Addendum Report: Archaeological Inventory Survey, Kealakehe Planned Community Project Area, Lands of Kealakehe and Keahuolu, North Kona District, Island of Hawaii (TMK: 7-4-08: 17, por. 12). PHRI, Hilo, Hi.
- Burgett, B., L. McGerty and R. Spear
1999 An Archaeological Inventory Survey of a 22.5-acre Parcel (Parcel K) in the Ahupua`a of Waikoloa, South Kohala District, Island of Hawaii (TMK: 6-8-22:01, 05). Scientific Consultant Services, Inc. report prepared for Mauna Lani Resort.
- Carter, L.
1986 An Archaeological Reconnaissance of the Makai Parcel of Kaupulehu Ahupua`a, North Kona, Hawaii Island. Prepared for Barnwell Industries, Inc., Honolulu.
- Corbin, A.B., and H. Wong-Smith
2007 Archaeological Survey and Cultural Impact Assessment in Support of an EIS for the Kona Non-Ceded Lands, Land of Keahuolu, North Kona District, Island of Hawai'i, TMK:30-7-4-21:020, Por.014, Por.021. Prepared for Belt Collins Hawaii, Ltd. and State of Hawaii.
- Cordy, R.H.
1981 *A Study of Prehistoric Social Change: The Development of Complex Societies in the Hawaiian Islands*. Academic Press. New York.
- 1995 Central Kona Archaeological Settlement Patterns. State Historic Preservation Division, DLNR, State of Hawai'i. Prepared for the Planning Department, County of Hawai'i.
- DNLR (Department of Land and Natural Resources
2003 Hawai'i Administrative Rules, Title 13, Department of Land and Natural Resources, Subtitle 13, State Historic Preservation Division Rules.
- Donham, T.K.
1987 Archaeological Reconnaissance Survey, Resort Expansion Area and Selected Undeveloped Resort Parcels, Waikoloa Beach Resort, Land of Waikoloa, South Kohala, Island of Hawaii. Prepared by Paul H. Rosendahl, Ph.D., Inc. for Transcontinental Development Company.
- 1990 Archaeological Inventory Survey, Queen Lili'uokalani Trust Property, Land of Keahuolu, North Kona District, Island of Hawaii. PHRI Report 596 prepared for Belt, Collins & Associates, Honolulu.
- Donham, T., and P. Jensen
1988 Archeological Data Recovery and Intensive Survey, Resort Expansions Area and Selected Undeveloped Resort Parcel, Waikoloa Beach Resort, Land of Waikoloa, South Kohala, Island of Hawaii. PHRI report 371 prepared for Belt, Collins & Associates.

- Dye, T.
2002 Archaeological Data Recovery in the Barren Zone, Manini'owali and Kuki'o 2nd Ahupua'a, Kona, Hawai'i. Prepared by T.S. Dye & Colleagues, Archaeologists, Inc. for W/B Manini'owali.
- Hammatt, H., D. Shideler and D. Borthwick
1987 Archaeological Survey and Test Excavations of a 15-acre Parcel, Kealakehe, Kona, Hawaii. Prepared for Mauna Lani Resort, Inc.
- Haun, A.
2009a Letter Report: Archaeological Field Inspection, Proposed Monitoring Well Site, Kamakana Villages at Keahuolu Project, Land of Keahuolu, North Kona District, Island of Hawaii (TMK: [3] 7-4-21:20). Prepared for Nancy McMahan, SHPH-DLNR.
2009b Letter Report: Site Documentation For Inadvertent Discovery of New Lava Tube Site Temp. No. 655-C-1, Well Site, Kamakana Villages at Keahuolu Project, Land of Keahuolu, North Kona District, Island of Hawaii (TMK: [3] 7-4-21:20). Prepared for Nancy McMahan, SHPH-DLNR.
- Haun, A. and D. Henry
2004 Archaeological Inventory Survey, TMK: 3-6-8-22:18 and 3-6-8-22: por 40. Lands of Waikoloa and Anaeho'omalu, South Kohala District, Island of Hawaii. Haun & Associates Report 364 prepared for Mr. Curt DeWeese, Honolulu.
- Holmes, T.
1981 *The Hawaiian Canoe*. Editions Limited, Honolulu.
- Jensen, P.
1989a Archaeological Inventory Survey, Waikoloa Beach Resort Parcels 20, 21, 22 and 23 and Strip between Parcel 23 and Kiholo-Puako Trail, Land of Waikoloa, South Kohala District, Island of Hawaii. PHRI report 512-061689 prepared for Transcontinental Development Company.
1989b Archaeological Inventory Survey, Undeveloped Portions of Lot 8 of File Plan 1562, Waikoloa Beach Resort, Land of Anaeho'omalu, South Kohala District, Island of Hawaii. PHRI report 594-041989 prepared for Royal Waikoloan Resort.
1989c Archaeological Inventory Survey, Undeveloped Portions of Lots 1-7 of File Plan 1562, and the Strip adjacent to the Kiholo-Puako Trail, Waikoloa Beach Resort, Lands of Anaeho'omalu and Waikoloa, South Kohala District, Island of Hawaii. PHRI report 454-006189 prepared for Transcontinental Development Company.
1989d Archaeological Inventory Survey, Mauna Lani Cove Project Area, Mauna Lani Resort, Lands of Kalahuipuaa and Waikoloa, South Kohala District, Island of Hawaii. PHRI report 588-060589 prepared for Belt, Collins & Associates.
1989e Archaeological Inventory Survey, Mauna Lani Resort New Golf Course, Lands of Kalahuipuaa and Waikoloa, South Kohala District, Island of Hawaii. PHRI report 496-120988 prepared for Mauna Lani Resort, Inc.
- 2001 Data Recovery at Site 21877, Development "Site L", Land of Waikoloa, South Kohala District, Island of Hawaii. PHRI report 2110-021501 prepared for Maryl Group, Inc.
- Juvik, S.P. and J.O. Juvik (editors)
1998 *Atlas of Hawaii*, Third Edition. Honolulu: University of Hawaii Press.

- Kelly, M.
1983 Na Mala O Kona: Gardens of Kona. A History of Land Use in Kona, Hawai'i. *Departmental Report Series 83-2*. Department of Anthropology, B.P. Bishop Museum, Honolulu. Prepared for the Department of Transportation, State of Hawai'i.
- Kirch, P.V.
1985 Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory. Honolulu: University of Hawaii Press.
- Kolb, M.
1991 Social Power, Chiefly Authority, and Ceremonial Architecture, in an Island Polity, Maui, Hawaii. Dissertation, University of California, Los Angeles. UMI Dissertation Services, Ann Arbor.
- Landrum, J., F. Reinman, A. Schilz, C. O'Hare, and A. Torres
2002 Archaeological Inventory Survey, Mauna Lani Resort, South Kohala, Hawaii Island, 688-acre Undesignated Portion and 20-acre Portion of Parcel "Y" (TMK: 6-8-22:32). AMEC Earth and Environmental, Inc. report prepared for Mauna Lani Service, Inc.
- Newman, T.S.
1970 Hawaiian Fishing and Farming on the Island of Hawai'i in A.D. 1778. Department of Land and Natural Resources, Division of State Parks.
- Nakamura, M., K. Sherry and L. Tamimi
1998 Foraging for Food? Prehistoric Pit Features at Pohakuloa, Hawaii. *Rapa Nui Journal*.
- O'Hare, C., and S.T. Goodfellow
1994 Phased Archaeological Mitigation Program, Kealakehe Planned Community, Phase II: Archaeological Data Recovery. Land of Kealakehe, North Kona District, Island of Hawaii.
- Reeves, R., P. Cleghorn, K. Mooney, E. Kahahane, and J. McIntosh
2009 Archaeological Inventory Survey of the Southern End of the Proposed Ane Keohokalole Highway and Archaeological Reconnaissance of the Queen Liliuokalani Trust Preserve Area, Keahuolu, North Kona, Hawaii (TMK: (3) 7-4-20:010). Pacific Legacy Inc. Report prepared for Queen Liliuokalani Trust, Honolulu, Hawaii.
- Reinecke, J.E.
1930 Survey of Sites on West Hawai'i. Ms. In Bishop Museum (1930).
- Sato, H.H., W. Ikeda, R. Paeth, R. Smythe, and M. Takehiro, Jr.
1973 *Soil Survey of the Island of Hawaii, State of Hawaii*. U.S. Department of Agriculture, Soil Conservation Service and University of Hawaii Agricultural Experiment Station. Washington, D.C.: Government Printing Office.
- Schilt, A.R.
1984 Subsistence and Conflict in Kona, Hawaii. An Archaeological Study of the Kuakini Highway Realignment Corridor. *Departmental Report Series 84-1*. Department of Anthropology, B.P. Bishop Museum, Honolulu. Prepared for Department of Transportation, State of Hawaii. Experiment Station, Washington, D.C.: Government Printing Office.
- Stokes and Dye
1991 Heiau of the Island of Hawai'i. *Bishop Museum Bulletin in Anthropology 2*. Bishop Museum Press, Honolulu.

- Valeri, V.
1985 *Kingship and Sacrifice. Ritual and Society in Ancient Hawaii*. Chicago and London: the University of Chicago Press.
- Tulchin, J. and H. Hammatt
2009 Archaeological Inventory Survey of an Approximately 2.3 km long Portion of the Proposed Ane Keohokalole Highway Project, Kealakehe and Keahuolu, North Kona District, Island of Hawaii (TMK: (3) 7-4-20: 006 por. & 007 por. & 10 por. & 022 por.; (3) 7-4-21: 03 por., 04 por & 020 por. Cultural Surveys Hawaii, Kailua Hawaii.
- Welch, D.
1989 Archaeological Mapping and Data Recovery at Mauna Lani Golf Course and Beach Park |Area, South Kohala, Hawaii. IARII report prepared for Mauna Lani Resort, Inc.
- Wolfe, E.W., and J. Morris
2001 Geologic Map of the Island of Hawaii. U.S. Department of the Interior, U.S. Geological Survey. Miscellaneous Investigations Series.

APPENDIX A
Summary of Site 26909 Mounds and Modified Outcrops

Appendix A. Site 26909 Mounds and Modified Outcrops

Feature	Formal Type	Length (m)	Width (m)	Height/Depth (m)	Area (sq m)	Volume (cu m)	Shape	Construction	Easting	Northing
12	Modified outcrop	5.50	3.80	1.50	20.90	31.35	Irregular	Piled cobbles and small boulders	187085	2176114
13	Mound	2.00	1.50	0.50	3.00	1.50	Irregular	Piled cobbles and small boulders	187074	2176112
14.1	Mound	2.10	1.30	0.50	2.73	1.37	Irregular	Piled cobbles and small boulders	187076	2176078
14.2	Mound	1.70	1.50	0.45	2.55	1.15	Irregular	Piled cobbles and small boulders	187074	2176075
14.3	Mound	1.40	1.20	0.55	1.68	0.92	Irregular	Piled cobbles and small boulders	187076	2176072
16	Mound	1.80	1.40	0.50	2.52	1.26	Irregular	Piled cobbles and small boulders	187058	2176097
18.1	Modified outcrop	4.00	1.60	0.70	6.40	4.48	Linear	Piled cobbles and small boulders	187060	2176067
18.2	Modified outcrop	2.40	1.30	0.60	3.12	1.87	Irregular	Piled cobbles and small boulders	187062	2176072
19	Modified outcrop	5.20	1.50	0.70	7.80	5.46	Linear	Piled cobbles and small boulders	187056	2176075
21.1	Mound	1.40	1.30	0.65	1.82	1.18	Irregular	Piled cobbles and small boulders	187030	2176061
21.2	Modified outcrop	2.20	1.90	0.80	4.18	3.34	Irregular	Piled cobbles and small boulders	187021	2176067
22.1	Mound	1.50	1.50	0.40	2.25	0.90	Irregular	Piled cobbles and small boulders	187035	2176060
23.1	Mound	2.00	2.00	0.40	4.00	1.60	Irregular	Piled cobbles and small boulders	187043	2176057
23.2	Mound	2.20	2.00	0.60	4.40	2.64	Irregular	Piled cobbles and small boulders	187045	2176053
24	Mound	2.00	2.00	0.65	4.00	2.60	Irregular	Piled cobbles and small boulders	187027	2176054
25.1	Modified outcrop	4.00	1.30	0.80	5.20	4.16	Linear	Piled cobbles and small boulders	187028	2176047
25.2	Mound	2.00	1.60	0.80	3.20	2.56	Irregular	Piled cobbles and small boulders	187032	2176044
25.3	Modified outcrop	1.40	1.00	0.45	1.40	0.63	Irregular	Piled cobbles and small boulders	187028	2176050
25.4	Modified outcrop	3.20	1.70	0.60	5.44	3.26	Irregular	Piled cobbles and small boulders	187021	2176051
26.1	Modified outcrop	3.70	1.40	0.55	5.18	2.85	Linear	Piled cobbles and small boulders	186996	2176077
26.2	Mound	2.00	2.00	0.70	4.00	2.80	Irregular	Piled cobbles and small boulders	186996	2176075
27	Modified outcrop	3.50	3.00	0.60	10.50	6.30	Irregular	Piled cobbles and small boulders	187018	2176057
28	Modified outcrop	2.00	1.90	0.65	3.80	2.47	Irregular	Piled cobbles and small boulders	187015	2176043
29	Modified outcrop	2.50	1.30	0.70	3.25	2.28	Irregular	Piled cobbles and small boulders	187009	2176048
30	Mound	3.30	3.00	0.65	9.90	6.44	Irregular	Piled cobbles and small boulders	186994	2176057
32.1	Mound	2.70	2.20	1.00	5.94	5.94	Irregular	Piled cobbles and small boulders	186982	2176044
33	Modified outcrop	3.30	3.00	0.75	9.90	7.43	Irregular	Piled cobbles and small boulders	186984	2176041
34	Mound	2.40	2.00	1.20	4.80	5.76	Irregular	Piled cobbles and small boulders	186975	2176049
37.1	Mound	2.20	1.40	0.60	3.08	1.85	Irregular	Piled cobbles and small boulders	186966	2176038
37.2	Mound	2.00	1.70	0.65	3.40	2.21	Irregular	Piled cobbles and small boulders	186972	2176036
37.3	Modified outcrop	2.60	1.80	1.00	4.68	4.68	Irregular	Piled cobbles and small boulders	186966	2176034
37.4	Mound	1.50	1.00	0.50	1.50	0.75	Irregular	Piled cobbles and small boulders	186965	2176044
37.5	Mound	1.50	1.20	0.50	1.80	0.90	Irregular	Piled cobbles and small boulders	186968	2176045
38.1	Mound	2.00	1.40	0.70	2.80	1.96	Irregular	Piled cobbles and small boulders	186961	2176047
38.2	Modified outcrop	3.50	1.70	0.60	5.95	3.57	Irregular	Piled cobbles and small boulders	186962	2176043
38.3	Modified outcrop	1.40	1.00	0.50	1.40	0.70	Irregular	Piled cobbles and small boulders	186956	2176047
38.4	Modified outcrop	1.60	1.30	0.55	2.08	1.14	Irregular	Piled cobbles and small boulders	186955	2176050
38.5	Modified outcrop	1.20	1.20	0.50	1.44	0.72	Irregular	Piled cobbles and small boulders	186952	2176057
38.6	Modified outcrop	1.80	1.10	0.70	1.98	1.39	Irregular	Piled cobbles and small boulders	186946	2176054
39	Modified outcrop	2.10	1.90	0.55	3.99	2.19	Irregular	Piled cobbles and small boulders	186959	2176056
40.1	Modified outcrop	6.00	5.00	1.50	30.00	45.00	Irregular	Piled cobbles and small boulders	186965	2176030
40.2	Modified outcrop	2.60	1.70	0.50	4.42	2.21	Irregular	Piled cobbles and small boulders	186959	2176034
40.3	Mound	2.40	1.20	0.85	2.88	2.45	Irregular	Piled cobbles and small boulders	186966	2176038
41.1	Modified outcrop	2.40	1.60	0.60	3.84	2.30	Irregular	Piled cobbles and small boulders	186972	2176031
41.2	Modified outcrop	1.00	0.70	0.65	0.70	0.46	Irregular	Piled cobbles and small boulders	186973	2176030
43.1	Mound	1.70	1.20	0.45	2.04	0.92	Irregular	Piled cobbles and small boulders	186952	2176047
43.2	Mound	2.30	1.20	0.50	2.76	1.38	Irregular	Piled cobbles and small boulders	186952	2176054
44	Modified outcrop	1.60	1.00	0.70	1.60	1.12	Irregular	Piled cobbles and small boulders	186975	2176020
45	Mound	2.50	2.00	0.70	5.00	3.50	Irregular	Piled cobbles and small boulders	186953	2176023
46.1	Modified outcrop	2.10	1.70	0.50	3.57	1.79	Irregular	Piled cobbles and small boulders	186950	2176024
46.2	Modified outcrop	2.90	1.30	0.45	3.77	1.70	Irregular	Piled cobbles and small boulders	186939	2176030
46.3	Mound	1.60	1.40	0.60	2.24	1.34	Irregular	Piled cobbles and small boulders	186942	2176028
47	Mound	2.00	1.70	0.40	3.40	1.36	Irregular	Piled cobbles and small boulders	186942	2176037
48.1	Modified outcrop	3.80	1.60	1.10	6.08	6.69	Irregular	Piled cobbles and small boulders	186937	2176029
48.2	Modified outcrop	3.00	1.50	0.60	4.50	2.70	Irregular	Piled cobbles and small boulders	186933	2176023
50	Modified outcrop	3.40	1.40	0.65	4.76	3.09	Irregular	Piled cobbles and small boulders	186925	2176031
51.1	Modified outcrop	1.70	1.60	1.20	2.72	3.26	Irregular	Piled cobbles and small boulders	186887	2175991
51.2	Modified outcrop	6.00	1.00	0.80	6.00	4.80	Linear	Piled cobbles and small boulders	186881	2175987
51.3	Modified outcrop	2.60	1.20	0.65	3.12	2.03	Irregular	Piled cobbles and small boulders	186884	2175997
53.1	Modified outcrop	1.50	1.30	0.45	1.95	0.88	Irregular	Piled cobbles and small boulders	186894	2175985
53.2	Modified outcrop	2.20	1.40	0.60	3.08	1.85	Irregular	Piled cobbles and small boulders	186889	2175983
54	Modified outcrop	2.80	2.00	0.75	5.60	4.20	Irregular	Piled cobbles and small boulders	186889	2175981
56	Mound	1.30	1.00	0.60	1.30	0.78	Irregular	Piled cobbles and small boulders	186858	2175990

Appendix A. Site 26909 Mounds and Modified Outcrops (cont.)

Feature	Formal Type	Length (m)	Width (m)	Height/Depth (m)	Area (sq m)	Volume (cu m)	Shape	Construction	Easting	Northing
59	Modified outcrop	2.00	1.20	0.75	2.40	1.80	Irregular	Piled cobbles and small boulders	186846	2175991
60	Modified outcrop	1.50	1.20	0.70	1.80	1.26	Irregular	Piled cobbles and small boulders	186842	2175993
61	Mound	1.00	1.00	0.55	1.00	0.55	Irregular	Piled cobbles and small boulders	186841	2175984
63	Modified outcrop	3.00	3.00	0.40	9.00	3.60	Irregular	Piled cobbles and small boulders	186829	2175964
64	Mound	1.70	1.60	0.40	2.72	1.09	Irregular	Piled cobbles and small boulders	186816	2175951
65	Modified outcrop	1.00	1.00	0.45	1.00	0.45	Irregular	Piled cobbles and small boulders	186793	2175976
66	Mound	3.20	2.00	0.55	6.40	3.52	Irregular	Piled cobbles and small boulders	186809	2175955
67	Modified outcrop	1.70	1.50	0.50	2.55	1.28	Irregular	Piled cobbles and small boulders	186790	2175950
68	Mound	1.20	1.00	0.55	1.20	0.66	Irregular	Piled cobbles and small boulders	186797	2175942
70	Mound	2.00	1.60	0.60	3.20	1.92	Irregular	Piled cobbles and small boulders	186732	2175935
72.1	Modified outcrop	2.30	2.10	0.40	4.83	1.93	Irregular	Piled cobbles and small boulders	186717	2175910
72.3	Mound	1.30	1.00	0.50	1.30	0.65	Irregular	Piled cobbles and small boulders	186681	2175886
79	Modified outcrop	2.20	1.40	0.85	3.08	2.62	Irregular	Piled cobbles and small boulders	186557	2175816
81.1	Modified outcrop	1.90	1.00	0.45	1.90	0.86	Irregular	Piled cobbles and small boulders	186514	2175784
81.2	Modified outcrop	2.50	1.00	0.70	2.50	1.75	Irregular	Piled cobbles and small boulders	186517	2175788
81.3	Modified outcrop	1.10	0.90	0.45	0.99	0.45	Irregular	Piled cobbles and small boulders	186516	2175782
82	Modified outcrop	2.30	2.10	0.30	4.83	1.45	Irregular	Piled cobbles and small boulders	186505	2175792
84.1	Modified outcrop	2.50	1.80	0.35	4.50	1.58	Irregular	Piled cobbles and small boulders	186454	2175802
84.2	Modified outcrop	2.10	2.10	0.50	4.41	2.21	Irregular	Piled cobbles and small boulders	186457	2175804
99	Modified outcrop	1.30	1.10	0.70	1.43	1.00	Irregular	Piled cobbles and small boulders	186589	2176424
101	Mound	1.00	1.00	0.70	1.00	0.70	Irregular	Piled cobbles and small boulders	186654	2176434
108	Modified outcrop	1.00	0.60	0.60	0.60	0.36	Irregular	Piled cobbles and small boulders	186752	2177035
117.1	Modified outcrop	1.60	0.90	0.30	1.44	0.43	Irregular	Piled cobbles and small boulders	186666	2176976
117.2	Mound	1.30	1.00	0.70	1.30	0.91	Irregular	Piled cobbles and small boulders	186668	2176990
119	Mound	1.65	1.40	0.88	2.31	2.03	Oval	Stacked and faced cobbles and small boulders	186679	2176956
121	Modified outcrop	5.00	1.20	0.40	6.00	2.40	Irregular	Piled cobbles and small boulders	186657	2176973
132	Modified outcrop	1.60	1.10	0.30	1.76	0.53	Irregular	Piled cobbles and small boulders	186589	2176931
139.1	Modified outcrop	2.50	2.50	0.20	6.25	1.25	Irregular	Piled cobbles and small boulders	186563	2176910
139.2	Modified outcrop	1.80	1.80	0.30	3.24	0.97	Irregular	Piled cobbles and small boulders	186567	2176911
140.2	Modified outcrop	1.80	1.00	0.35	1.80	0.63	Irregular	Piled cobbles and small boulders	186561	2176902
144	Modified outcrop	1.20	1.10	0.25	1.32	0.33	Irregular	Piled cobbles and small boulders	186425	2176825
146	Modified outcrop	1.00	1.00	0.35	1.00	0.35	Irregular	Piled cobbles and small boulders	186365	2176837
147	Modified outcrop	2.00	2.00	0.40	4.00	1.60	Irregular	Piled cobbles and small boulders	186365	2176810
148	Modified outcrop	2.00	2.00	0.55	4.00	2.20	Irregular	Piled cobbles and small boulders	186361	2176822
152	Modified outcrop	1.30	1.30	0.35	1.69	0.59	Irregular	Piled cobbles and small boulders	186214	2176740
157.1	Modified outcrop	2.00	1.00	0.60	2.00	1.20	Irregular	Piled cobbles and small boulders	186453	2175733
157.2	Modified outcrop	0.90	0.60	0.30	0.54	0.16	Irregular	Piled cobbles and small boulders	186455	2175738
157.3	Modified outcrop	1.30	1.00	0.30	1.30	0.39	Irregular	Piled boulders	186490	2175755
158.1	Modified outcrop	2.40	1.20	0.70	2.88	2.02	Irregular	Piled cobbles and small boulders	186477	2175717
158.2	Modified outcrop	2.00	0.80	0.65	1.60	1.04	Irregular	Piled cobbles and small boulders	186489	2175712
159.1	Modified outcrop	1.50	0.75	0.50	1.13	0.56	Irregular	Piled cobbles and small boulders	186465	2175763
160.1	Modified outcrop	1.20	1.00	0.45	1.20	0.54	Irregular	Piled boulders	186475	2175747
161.1	Modified outcrop	1.00	0.75	0.40	0.75	0.30	Irregular	Piled boulders	186482	2175747
162.1	Modified outcrop	4.50	1.25	0.25	5.63	1.41	Irregular	Piled boulders	186468	2175755
162.2	Modified outcrop	2.00	1.00	0.30	2.00	0.60	Irregular	Piled cobbles and small boulders	186464	2175754
162.3	Modified outcrop	1.50	1.00	0.25	1.50	0.38	Irregular	Piled cobbles and small boulders	186468	2175768
162.4	Modified outcrop	0.50	0.25	0.20	0.13	0.03	Irregular	Piled cobbles and small boulders	186498	2175774
163.1	Modified outcrop	1.50	1.20	0.50	1.80	0.90	Irregular	Piled cobbles and small boulders	186498	2175761
163.2	Modified outcrop	2.00	1.50	0.60	3.00	1.80	Irregular	Piled cobbles and small boulders	186503	2175764
163.3	Modified outcrop	1.50	1.00	0.50	1.50	0.75	Irregular	Piled cobbles and small boulders	186504	2175767
163.4	Modified outcrop	1.00	0.90	0.30	0.90	0.27	Irregular	Piled cobbles and small boulders	186508	2175772
164.1	Modified outcrop	1.20	1.00	0.40	1.20	0.48	Irregular	Piled cobbles and small boulders	186513	2175767
165.1	Modified outcrop	0.75	0.25	0.20	0.19	0.04	Irregular	Piled cobbles and small boulders	186575	2175754
165.2	Modified outcrop	0.20	0.10	0.15	0.02	0.00	Irregular	Piled cobbles and small boulders	186517	2175753
165.3	Modified outcrop	0.65	0.40	0.20	0.26	0.05	Irregular	Piled cobbles and small boulders	186533	2175757
166.1	Modified outcrop	1.00	0.30	0.20	0.30	0.06	Irregular	Piled cobbles and small boulders	186507	2175771
166.2	Modified outcrop	0.40	0.25	0.15	0.10	0.02	Irregular	Piled cobbles and small boulders	186507	2175776
167.1	Modified outcrop	1.40	1.00	0.60	1.40	0.84	Irregular	Piled cobbles and small boulders	186517	2175767
167.2	Modified outcrop	1.00	1.00	0.50	1.00	0.50	Irregular	Piled cobbles and small boulders	186520	2175767
167.3	Modified outcrop	1.60	1.20	0.40	1.92	0.77	Irregular	Piled cobbles and small boulders	186527	2175767
168.1	Modified outcrop	0.45	0.30	0.20	0.14	0.03	Irregular	Piled cobbles and small boulders	186527	2175775
169.1	Mound	1.50	1.50	0.50	2.25	1.13	Irregular	Piled cobbles and small boulders	186538	2175754
169.2	Modified outcrop	0.65	0.30	0.20	0.20	0.04	Irregular	Piled cobbles and small boulders	186482	2175732