



APPENDIX E
Archaeological Inventory Survey
(Part 1)



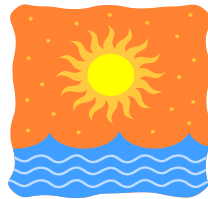
**DRAFT ARCHAEOLOGICAL INVENTORY SURVEY REPORT
FOR SEVERAL PARCELS OF LAND SITUATED WITHIN
WAIKAPŪ AHUPUA`A; WAILUKU DISTRICT
PŪ`ALI KOMOHANA MOKU**

**LOCATED AT TMK: [2] 3-6-002:003; 3-6-004:003, 006; and 3-6-
005:007;**

ISLAND OF MAUI

FOR: Waikapū Partners LLC.,

**BY: Diane Guerriero (B.A.), Andre`e Conley-Kapoi (M.A.), Lisa J. Rotunno-Hazuka (B.A.)
and Jeffrey Pantaleo (MA)**



SEPTEMBER 2013

***ARCHAEOLOGICAL SERVICES HAWAII, LLC.,
POB 1015; PU`UNENE, HI
96784-1015***

“Protecting, Preserving, Interpreting the Past, While Planning the Future”

EXECUTIVE SUMMARY

Under contract to Waikapū Partners, LLC, ASH, Archaeological Services Hawaii, LLC, of Makawao, conducted an archaeological inventory survey (AIS) of several parcels (TMK's 3-6-002:003; 3-6-004:003, 006; and 3-6-005:007) comprising approximately 503-acres. The project area is situated in the upper Waikapū *ahupua`a*, Traditional *Moku Pū`ali* Komohana, Wailuku District, Island of Maui. Waikapū Partners landholdings total 1576-acres; however only 503-acres will be improved and the remaining land will continue in sugarcane and or small scale agriculture. The current investigation was conducted to determine presence/absence, extent, and significance of historic properties within the project area and to formulate future mitigation measures for these remains within the subject area.

The proposed development plan consists of single and multi-family residential units, open space, commercial and civic properties with open space. The project area was divided into five zones based primarily on the TMK's. From *mauka* to *makai* the zones are as follows: Parcel 3 Mauka, constitutes the *mauka* section of TMK 3-6-004:003; Parcel 3 Waena is the middle and remaining section of TMK 3-6-004:003; Parcel 6 is TMK 3-6-004:006; Parcel 7 is the current Maui Tropical Plantation landholdings 3-6-004:007 and Parcel 3 Makai is within TMK 3-6-002:003.

The current undertaking consisted of a pedestrian survey and subsurface exploration through the execution of 150 backhoe test trenches within the five aforementioned zones. Four historic properties designated Sites 50-50-04-7881-7884 (formerly TS1, 3-5) comprised of 19 subcomponent features were newly recorded with the majority related to sugarcane cultivation. One historic property, Site 5197 Waihe`e Ditch is extant within the central portion of the project area and was also recorded. Site 7881 Features 1-18 consists of concrete lined ditches, sluice gates, dirt culverts with concrete lined headwalls. 7882 (TS3) is a disturbed, historic L-shaped retaining wall. Site 7883 (TS3) comprises a World War II bunker and Site 7884 Features 1- 3 (TS 2 and 5) are secondarily deposited historic materials recorded at three localities within the project area. The subsurface testing program constituted 150 backhoe trenches which were primarily negative for cultural remains.

Sites 50-50-04-7881-7884 are assessed a significance of Criterion D, as they have yielded, or have the potential to yield significant information pertaining to the history of the area. Site 7883, the World War II bunker is also significant under Criterion C, as a distinct method or style of construction during a certain era.

Based on the proposed development plan, the historic scatters (Site 7884 Features 2-3) within Parcels 6 and 7 will be adversely affected during development and portions of Waihe`e Ditch (Site 5197) will be

covered. These historic properties have been adequately documented and require no further work besides construction monitoring. Within Parcel 3 Mauka, Sites 7881 (agricultural waterways, sluice gates, reservoirs), 7882 (L-shaped retaining wall) and 7883 (WWII bunker) have also been documented at the inventory level and may be removed if warranted; however archaeological monitoring is recommended. Additionally, if the WWII bunker (Site 7883) can't be incorporated into the development scheme, a memorial plaque documenting this historic site should be erected.

Archaeological monitoring of Parcel 3 Mauka and Waena is primarily recommended for those areas which contain former LCA's and Grants, as well as extant historic properties; however spot monitoring inspections of other localities not expressed above may also be instituted. Parcels 6 and 7 contain numerous LCA's and Grants; thus monitoring will initially be full time until the nature of the subsurface conditions in relationship to the proposed ground-altering activities is determined. Similarly for Parcel 3 Makai, monitoring will initially be full-time; yet it is envisioned that the primary focus will be along the eastern and western perimeters which are close to Waiale and Waiko Roads, areas known to contain sand dune burials. Prior to the commencement of construction, an Archaeological Monitoring Plan (AMP) detailing the localities to undergo monitoring procedures will be prepared and submitted to SHPD for review and approval.

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INTRODUCTION

At the request of Mr. Michael Summers for client, Waikapū Partners, LLC, ASH, Archaeological Services Hawaii, LLC, of Wailuku, conducted an archaeological inventory survey (AIS) within several parcels (TMK's 3-6-002:003; 3-6-004:003, 006; and 3-6-005:007) consisting of approximately 503-acres situated in the upper Waikapū *ahupua`a*, Pū`ali Komohana Traditional *Moku*, Wailuku District, Island of Maui (Figures 1-7). Waikapū Partners landholdings total 1576 acres; however only 503-acres will be improved and the remaining will continue in sugarcane and or small scale agriculture. The current investigation was conducted to determine presence/absence, extent, and significance of historic properties within the project area and to formulate future mitigation measures for these remains and the project area.

The proposed improvements will be a combination of single and multi-family residential units, commercial and civic properties. Agriculturally classified lands will be rezoned to urban and rural and developed creating a "complete country community" within approximately 503-acres (see Figure 7). Although the majority of the project area has undergone compounded surficial disturbances from commercial and small scale agricultural and animal husbandry pursuits (see Figure 5) providing little evidence of surface historic properties, the area was intensively settled from the pre-Contact period through the historic era as evidenced by numerous *kuleana* lands (Land Commission Awards-LCA), several large lot grants, coupled with archival research and prior archaeological studies of the area (see Figures 2-4). Due to the expansive alterations across the subject area, the AIS procedures consisted of a pedestrian survey and subsurface investigations through mechanical excavations.

The pedestrian survey noted four historic properties designated Sites 50-50-04-7881-7884 (formerly TS1 -5) comprised of 19 subcomponent features with the majority of the features related to sugarcane cultivation (Figure 8). Site 7881 Features 1-18 consists of concrete lined ditches, sluice gates, dirt culverts with concrete lined headwalls. 7882 (TS3) is an historic L-shaped retaining wall. Site 7883 (TS4) the World War II bunker and Site 7884 Features 1- 3 (TS 2 and 5) are secondarily deposited historic materials recorded at three localities within the project area. The subsurface testing program constituted 150 backhoe trenches which were primarily negative for cultural remains.

PROJECT AREA

The project area is located on the northwestern alluvial slopes of the West Maui Mountains in Waikapū *ahupua`a* (Figure 1). It is comprised of approximately 520-acres within four separate TMK's 3-6-002:003; 3-6-004:003, 006; and 3-6-005:007. The subject area straddles Honoa`pi`ilani Highway in the area of the Maui Tropical Plantation, south of Waikapū Town proper (see Figures 2-7). It is bounded by Waikapū Stream to the north, portions of the Sandalwood Golf Course, an old rock Quarry (designated as

“Pit” on TMK) and sugarcane fields to the south, sugarcane fields to the east, and a reservoir and the West Maui Forest Reserve to the west. The project area slopes drastically from west to east ranging in elevation from 1080 ft. amsl to 230 ft. amsl. It contains two extant ditches, Waikapū Ditch South, which runs west to east along the northern boundary, and Waihe`e Ditch (Site 50-50-04-5197), which runs north to south and bounds the east side of Parcel 6 within the central portion of the parcel. Also noted on several maps is the Everett Ditch which extends from the upper valley similar and parallel to Waikapū Ditch South, but it eventually curves to the north following along the base of Wailuku Heights Subdivision. The presence of a southern leg (Waikapū Ditch South) implies that a Waikapū Ditch North would have been present; however no such ditch has been observed. Interestingly, if a northern leg was present, it would have likely followed the path of Everett Ditch.

Although the project area extends all the way to the southern edge of the stream, the development will remain at least 100 ft. from the stream, such that the cane access road which parallels the stream, as well as the steep to moderate slopes down to the stream’s edge will not be encroached upon by development. This 100 ft. buffer zone was mandated in 1992 by the State Land Use District Boundary Review for Maui, Molokai, Lanai, Honolulu where a 100-ft corridor on both sides of Waikapū Stream was placed into a Conservation District (Office of State Planning: 31).

For the purposes of discussion and testing, the subject project area has been divided into five distinct zones, all of which correspond to the four respective TMK number, with the exception of TMK 3-6-004:003 which was subdivided into two areas. These five zones consist of Parcel 3 Mauka and Parcel 3 Waena within TMK 3-6-004:003, Parcel 3 Makai at TMK 3-6-002:003, Parcel 6 is within TMK 3-6-005:006 and Parcel 7, which constitutes the Maui Tropical Plantation area at TMK 3-6-005:007. These zones are further discussed below and shown on Figures 1, 2, 6 and 7.

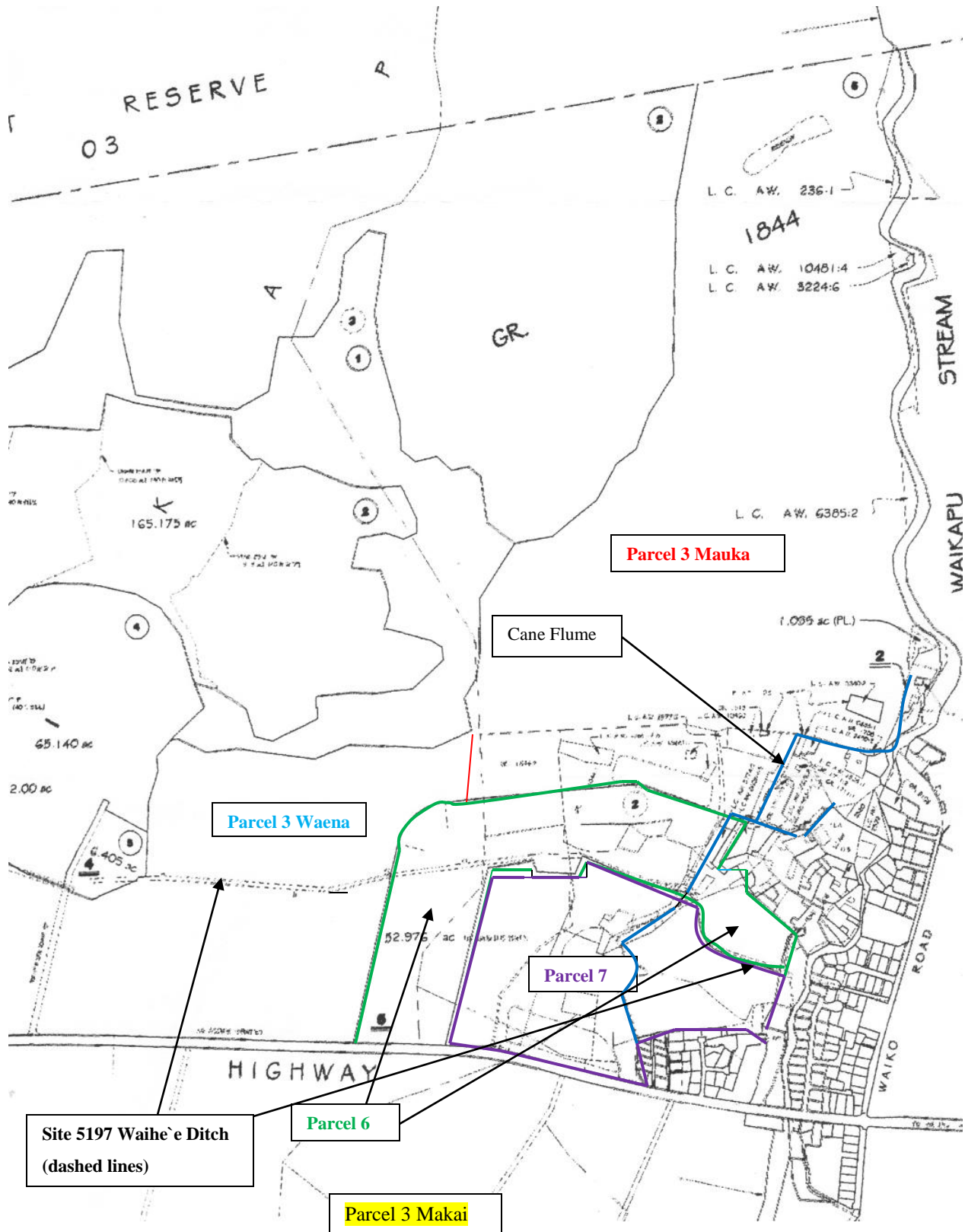


Figure 2. Tax Map Key 3-6-004 Showing Location of Project Areas-Parcel 3 Mauka and Parcel 3 Waena (TMK 3-6-004: 003), Parcel 6 (TMK 3-6-004: 006), Parcel 7 (different TMK 3-6-005:007), Parcel 3 Makai and Cane Flumes and Possible former Water source (Blue) (Also note LCA's and Grants outlined in background)

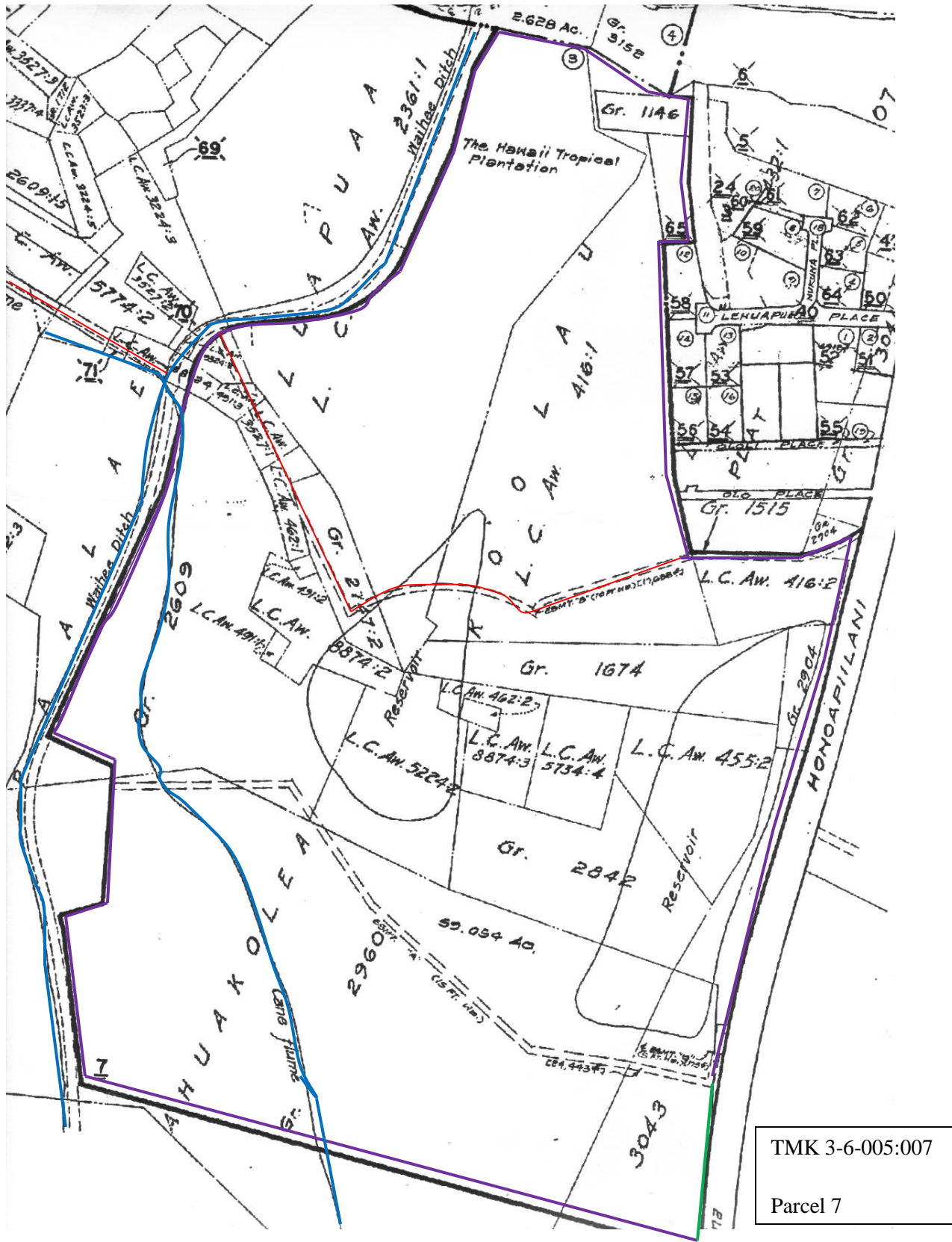


Figure 3. Enlarged Parcel 7 (Purple) Showing Grants, LCA's, Existing Water (Blue) and Possible Water Sources (Red)

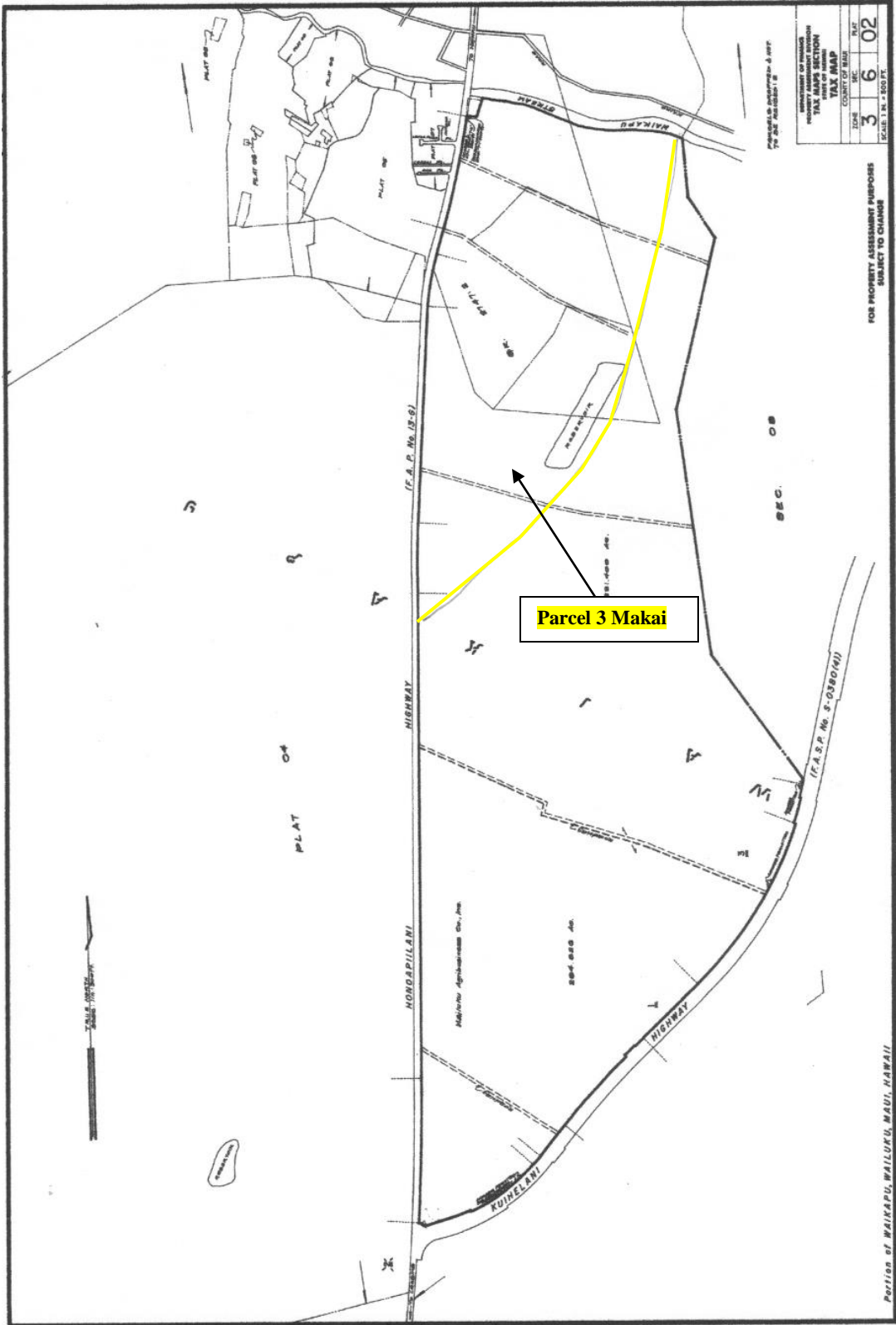


Figure 4. Location of Parcel 3 Makai Project Area within Tax Map Key 3-6-002:003 (pors)

Parcel 3 Mauka

Parcel 3 Mauka is the northern portion of TMK 3-6-004:003 and comprises approximately 180 acres that defines the northwestern portion of the project area. It is bounded on the north by Waikapū Stream and Waikapū Ditch South, as well as a rural residential area on the northeast. To the west is a densely wooded ridge and reservoir; to the south the ridge continues as well as portions of Waikapū Sandalwood Golf Course and fallow sugarcane fields of Parcel 3 Waena and to the east are sugarcane fields of Parcel 6. Parcel 3 Mauka is currently utilized as pastureland, but was formerly fallow sugarcane. Approximately 75 acres of the 180 are slated for commercial, single and multi-family residential and civic uses (schools and parks) (Figure 4). The remaining acreage will be utilized for agriculture, retention basins, hiking trails and open space.

Parcel 3 Waena

Parcel 3 Waena is the southern portion of TMK 3-6-004:003 and comprises approximately 70-acres located west and adjacent to Honoa`piilani Highway (RT.30), southeast and adjacent to Parcel 6 with the golf course bounding the west and the former rock pit on the south. Site 5197 (Waihe`e Ditch) bisects the parcel north/south (see Figures 1, 2, 6 and 7). Parcel 3 Waena is currently utilized as active sugarcane, pastureland and small scale agriculture. The entire parcel will be developed with large rural lots on 59-acres and open space and agriculture on approximately 12-acres.

Parcel 3 Makai

Parcel 3 Makai is a portion of TMK 3-6-002:003 and comprises approximately 250 acres that are bounded on the west by Honoa`piilani Highway, Waikapū Stream and Waiko Road on the north, and the remaining portions of this parcel (TMK 3-6-002:003). Parcel 3 Makai is cultivated in active sugarcane and is slated for commercial and civic (schools and parks) development along with single-family and multi-family residential use (see Figures 1, 4, 6 and 7).

Parcel 6

Parcel 6 is an L-shaped parcel designated TMK3-6-005:006 and consists of 52.976 acres that is bounded by Parcel 3 Mauka and Parcel 3Waena to the west, Parcel 3 Waena to the south, a portion of Site 5197 (Waihe`e Ditch) and Parcel 7 to the east and rural development to the north. The northern third of Parcel 6 is currently utilized as pastureland was formerly fallow sugarcane; the central portion is in small scale agriculture for vegetables and fruit trees, and the southern third is active sugarcane.

Parcel 7

Parcel 7 is within the central portion of the overall project area and consists of the 59.054 acres which constitutes TMK 3-6-005:007 and the Maui Tropical Plantation. This parcel is enclosed by Waihe`e Ditch

to the west; Honoa`piilani Highway and residential development to the east; existing rural and residential lots to the north and Parcel 6 to the south (see Figures 1, 2, 6 and 7). Parcel 7 will be improved with commercial, multi-family and single-family units, parks and open space.

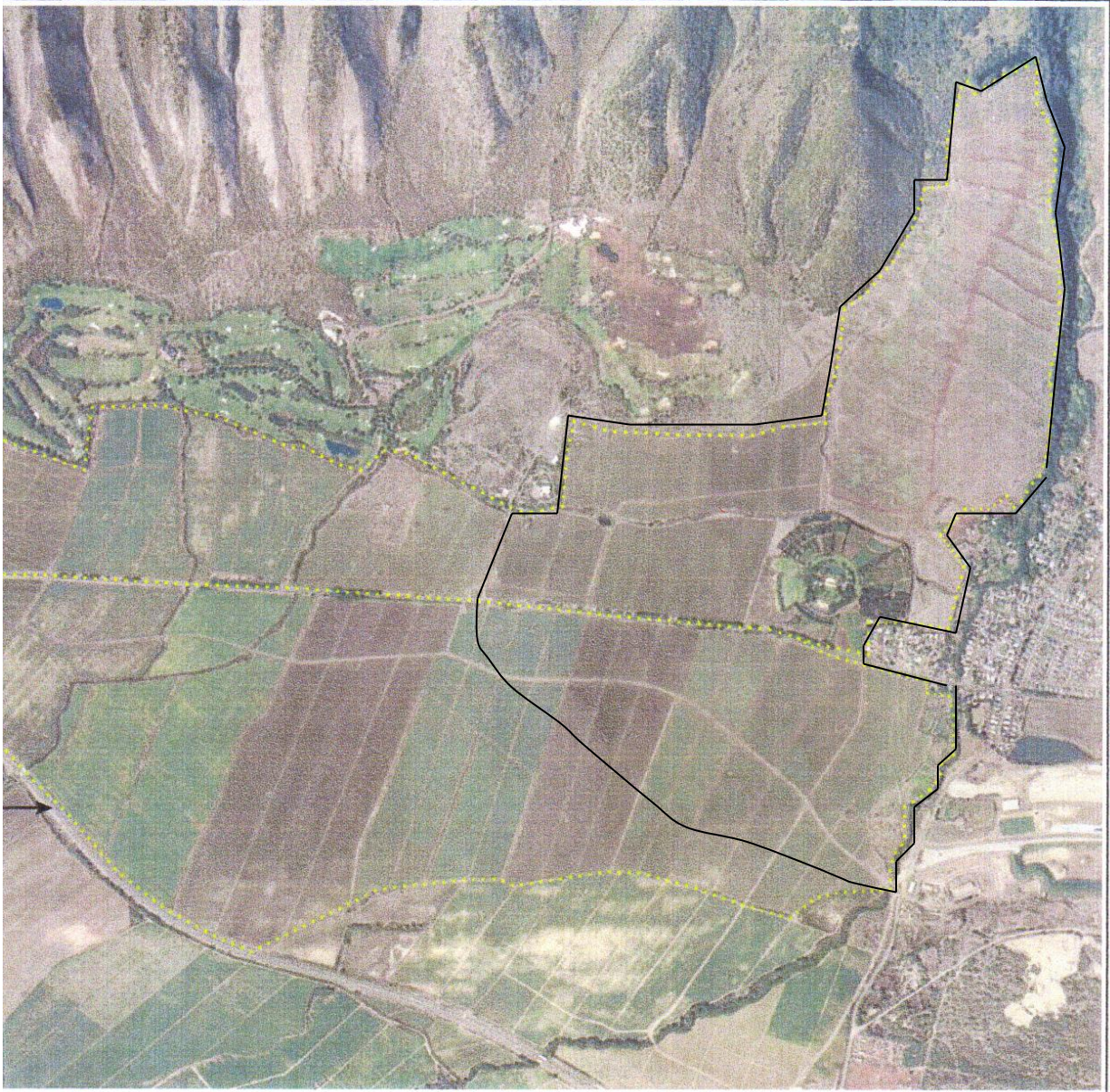


Figure 5. Location of Project Area on Aerial Photograph

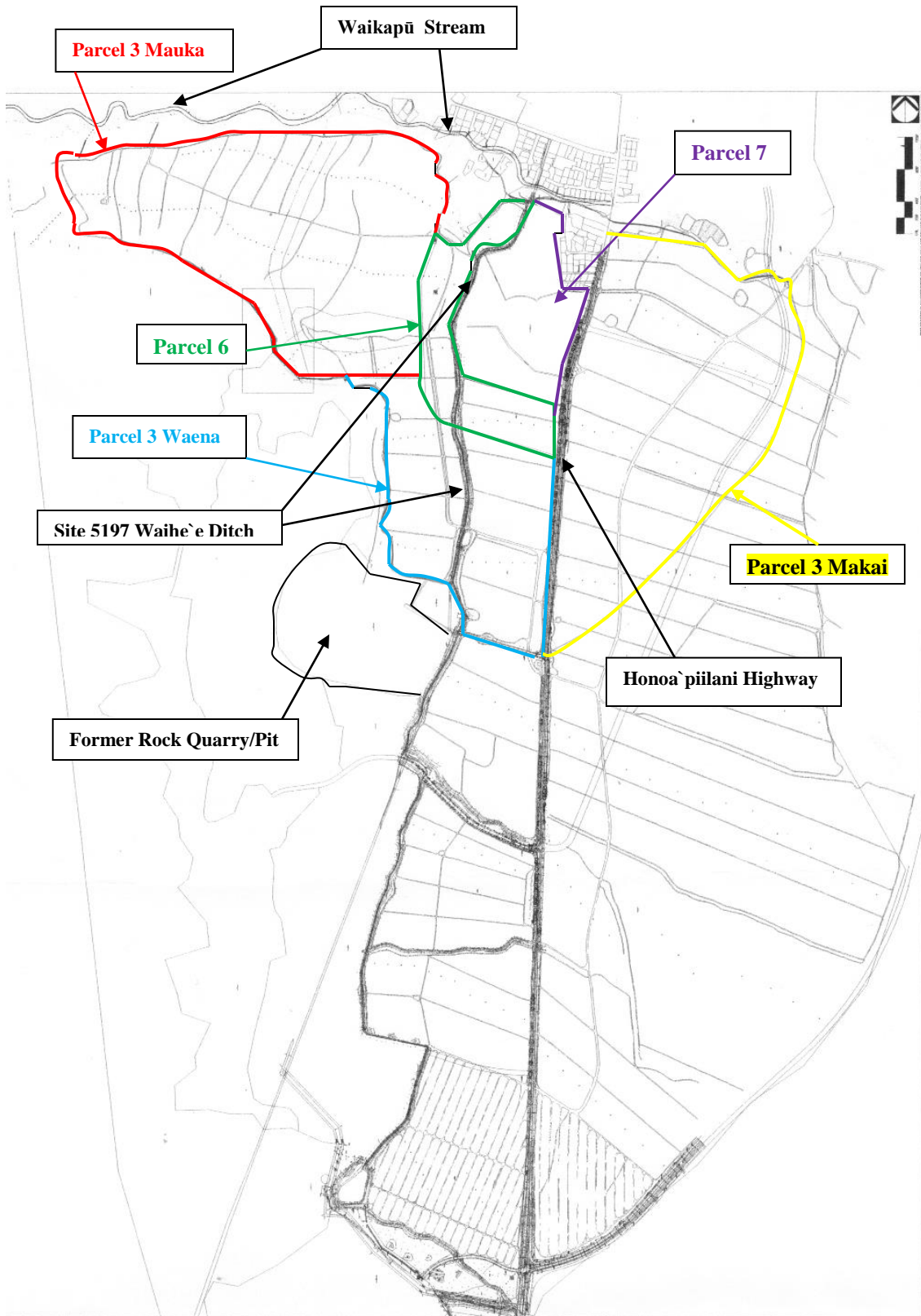


Figure 6. Location of Project Area on Topographic Map of Waikapū Partners Landholdings (also shown are cane field roads)

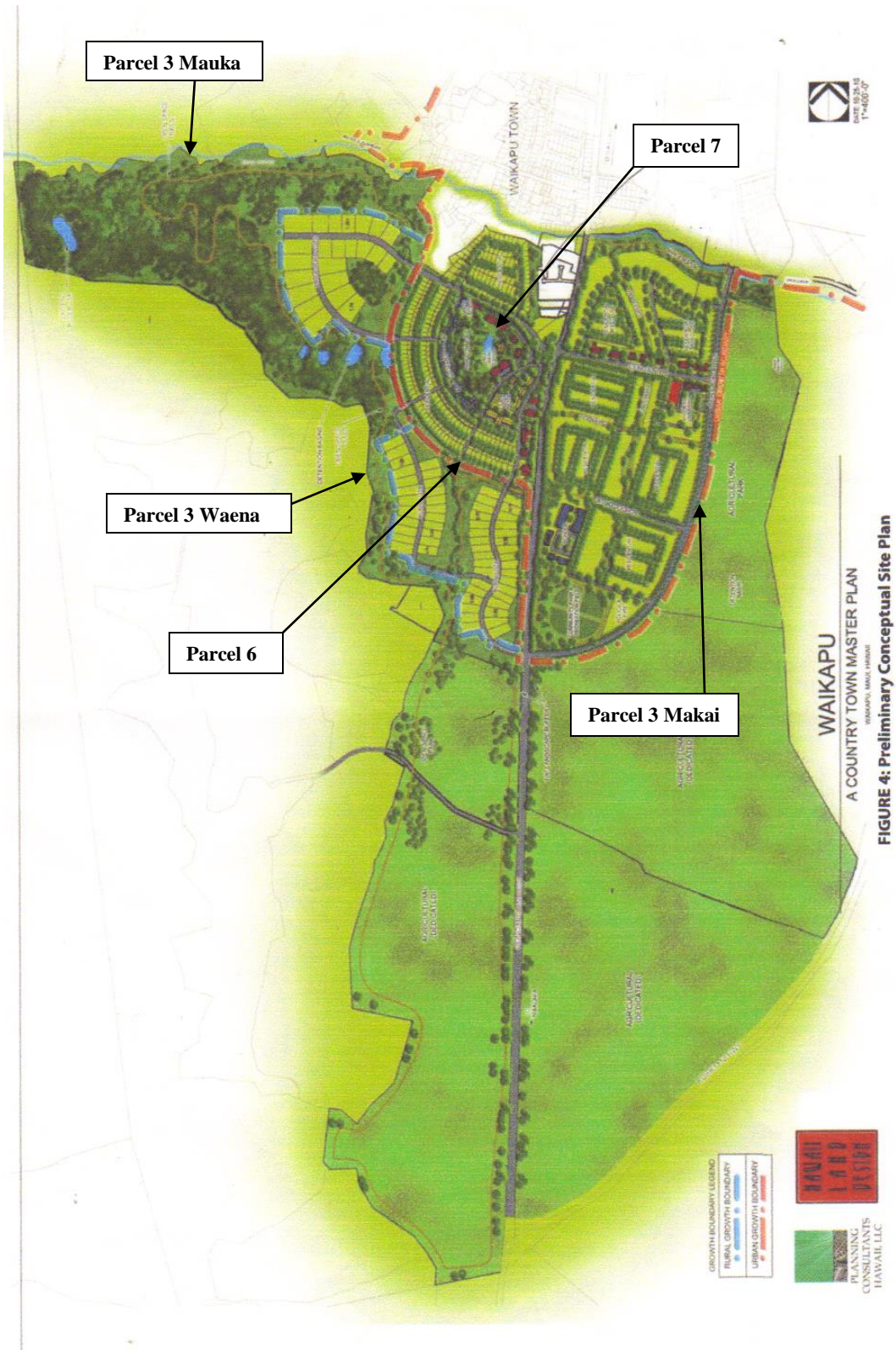


Figure 7. Waikapū County Town Conceptual Development Map

ENVIRONMENT

The project area is situated on the slopes of the West Maui Mountains and the extreme northwestern periphery of the isthmus of Maui. The terrain slopes severely in the western portion (Parcel 3 Mauka) and gradually tapers to a gentle slope and flat terrain along the eastern edge. It has been artificially altered by sugarcane cultivation, animal husbandry practices and commercial development. Through these grading activities, the subject parcel contains clearing push piles, and series of alternating berms and flat terraced areas.

Elevation for Parcel 3 Mauka ranges from approximately 1100 ft. above mean sea level (amsl) to 355 ft. amsl; Parcel 3 Waena ranges from approximately 600 ft. amsl to 360 ft. amsl; Parcel 6 from about 440 ft. amsl to 400 ft. amsl; Parcel 7 ranges from approximately 400 ft. amsl to 360 ft. amsl and Parcel 3 Makai from 360 ft. amsl to 230 ft. amsl.

Soils include Iao clay (IcB), 3-7% slopes, Wailuku silty clay (WvB), 3-7% slopes, Wailuku silty clay (WvC), 7-15% slopes, Pulehu cobbly silt loam (PrA) 3 to 7% slopes, Pulehu cobbly clay loam (PtB) 0 to 3% slopes and Pulehu silt loam (PpB) are all present in the project area and consist soils that were developed in alluvium derived from basic igneous rock and are well-drained soils on smooth alluvial fans and valley fill. For Iao Series soils permeability is moderately slow, runoff is medium, and the erosion hazard is slight to moderate. This soil is for sugarcane and home sites (Foot et al. 1972). For Wailuku Series the substratum is gravelly and cobbly alluvium. Permeability is moderate, runoff is slow to medium, and the erosion hazard is slight to moderate. Parcel 3 Mauka is located at the highest elevation and comprised of Wailuku soils (WvC), Parcel 3 Waena, Parcels 6 and 7 and portions of Parcel 3 Makai are made up of Iao soils (IcB). The lower portion of Parcel 3 Makai contains the Pulehu series.

Vegetation in Parcel 3 Mauka, Parcel 3 Makai, Parcel 6 and Parcel 7 consists almost entirely of alien invasive species typical of previously disturbed areas and fallow sugarcane fields. The vegetation in Parcel 3 Mauka was previously identified by Allison Chun Ph.D., during a previous investigation and her findings were as follows:

vegetation includes, “sparse clumpy alien grassland, such as giant guinea grass or (*Panicum mazimum*), natal redtop or (*Rhynchyletrum repens*), sourgrass or (*Digitaria insularis*), and numerous other noxious weedy invasive species, including castor bean (*Ricinis communis*), spiny amaranth (*Amaranthus spinosus*), apple of Peru (*Nicandra physaliodes*), coat buttons (*Tridax procumbens*), cherry tomato (*Leonotis nepetifolia*), bitter gourd (*Mormordica charantis*), rattlepod (*Crotalaria pallida*), lion’s ear (*Leonotis nepetifolia*), cow pea (*Macroptillion lathyroides*), partridge pea (*Chamaechrysta nitcitans*), hairy horsetail (*Conyza bonariensis*), telegraph weed (*Heterotheca grandiflora*), beggarweed (*Desmodium tortuosum*) and beggars tick (*Bidens pilosa*), sow

thistle (*Sonchus oleraceus*), flora's paintbrush (*Emilia fosbergii*), verbena (*Verbena litoralis*), swollen finger grass (*Chloris barbata*), balloon plant (*Asclepias physocarpa*), koa haole (*Leucaena leucocephala*), and indigo (*Indigofera suffruticosa*). The weedy native 'uhaloa (*Waltheria indica*) is also present. This assemblage is indicative of a highly disturbed ecosystem and typical of recently grubbed areas. The northern boundary along the top of Waikapū Stream has a more forested ecosystem that includes eucalyptus (*Eucalyptus spp.*), Christmas berry trees (*Schinus terebinthifolius*), guava (*Psidium guajva*), abutilon (*Abutilon grandifolium*), ironwood trees (*Casuarina spp.*) and morning glory (*Ipomoea spp.*).

Vegetation in Parcel 3 Makai predominately consists of active sugarcane cultivation by Hawaii Commercial and Sugar (HC&S), along the periphery of the cane, the access roads and corridors the vegetation consists almost entirely of alien invasive species, a few scattered Kiawe (*Prosopis sp.*), and koa-haole (*Leucaena glauca*) trees were identified.

Rainfall for lower portions of the project area including Parcel 3 Waena, Parcel 3 Makai, Parcels 6 and 7 would be similar to Waikapū Town which is approximately 20 inches (500 mm). For Parcel 3 Mauka located in the upper portion near the valley would be higher but not as heavy as in the upper valley which is close to 354 inches (9000 mm) (Creed Vol. I 1993:8).

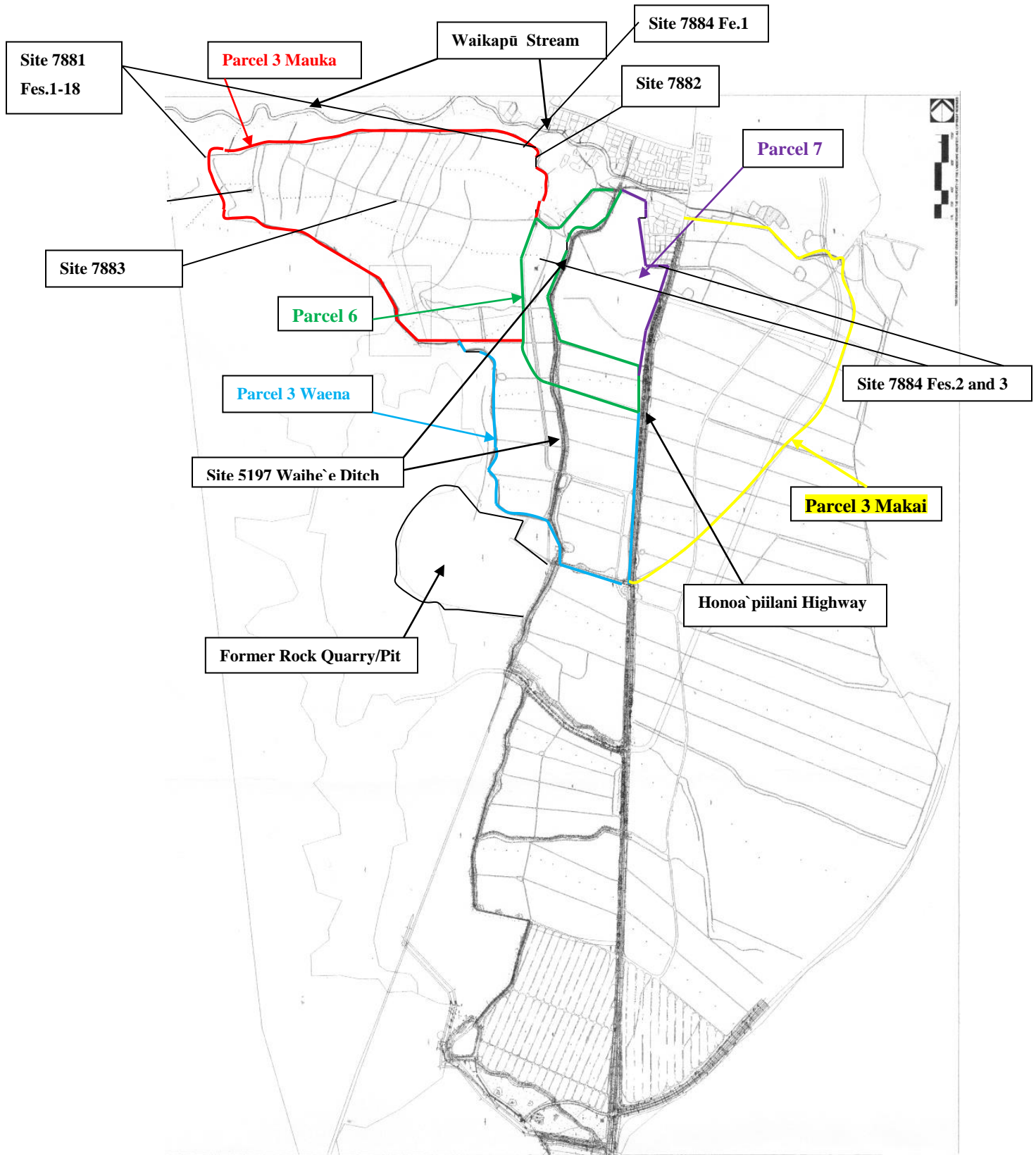


Figure 8. Location of Historic Properties within Project Area

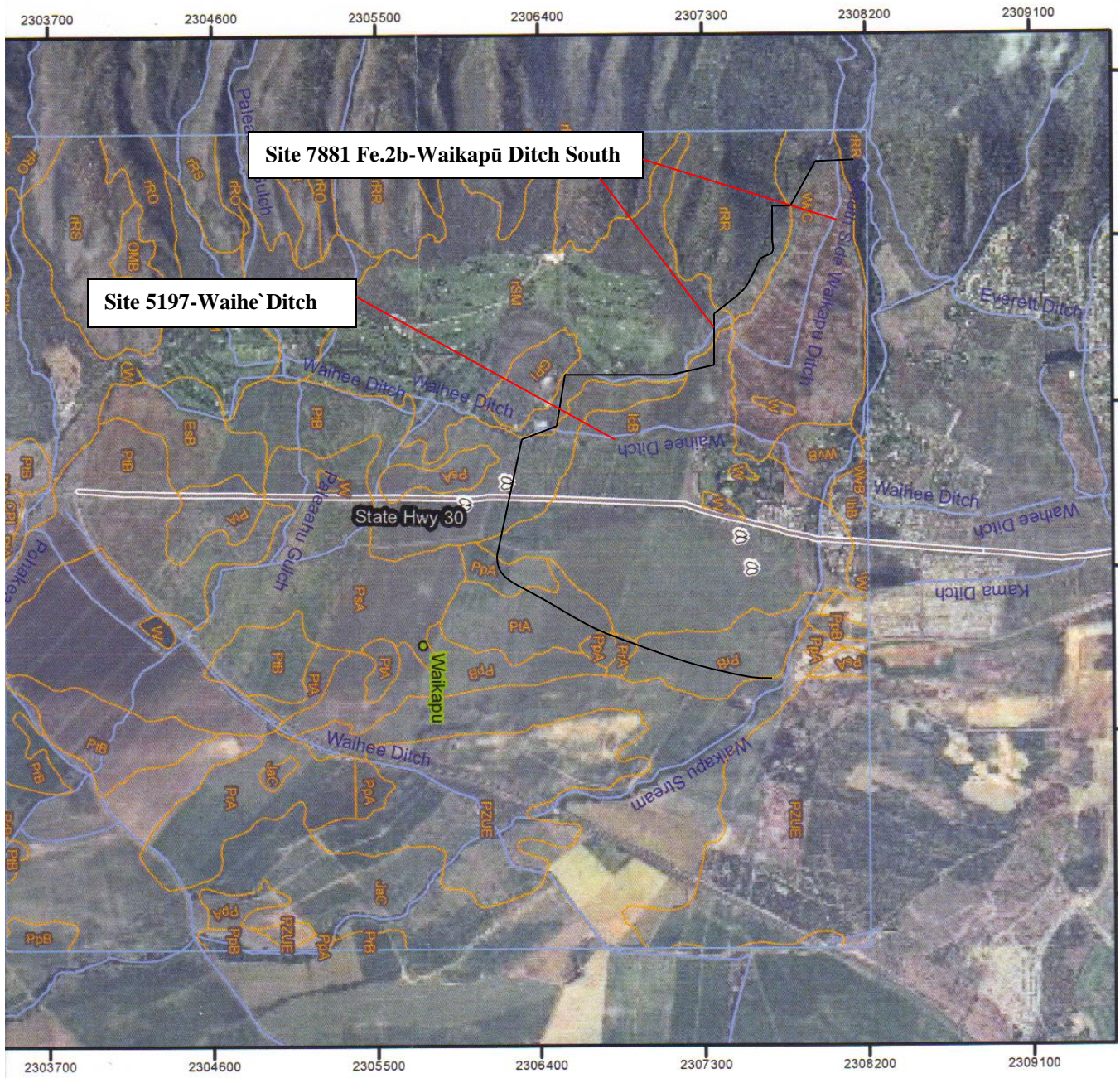


Figure 9. United States Department of Agriculture Soils Map with Project Area denoted in black

TRADITIONAL AND HISTORICAL BACKGROUND

An in depth historical document research is presented by Victoria Creed in *Settlement Pattern for Waikapū* (Creed 1993). The landowners' commissioned Ms. Jill Engledow to write *The History of Waikapū* as a supporting document and it is presented in Appendix A. An inventory survey, data recovery procedures and limited historical documentary research was performed for the then proposed Waikapū Golf Course. The reader is referred to these earlier reports for additional detailed information pertaining to the history of the area.

Mythological and Traditional Accounts

The Hawaiian creation chant (*Kumulipo*) describes Maui as a direct ancestor of the Hawaiian people and a descendant of Wakea on the Ulu line (Beckwith 1970:226). The island of Maui was named for the demi-god Maui, a well-known trickster hero throughout Polynesia. A synopsis of the ruling class in Hawai`i is provided below. According to oral traditions, Halo was one of the first chiefs of Maui who ruled the Wailuku District. By A.D. 1500 East Maui was ruled by a line of independent *Ali`i Nui*. Other lines of chiefly hierarchies emerged at this time, resulting in a rise in conflicts and competition. By A.D. 1600, Maui was unified by the Wailuku chief Pi`ilani (Fornander 1880:87). During the eighteenth century, the *mo`i* (a rank of chief) Kekaulike undertook raids against Hawai`i Island. Following the annexation of Hana and Kipahulu Districts to Kamehameha I, Kahekili II first recaptured Hana and Kipahulu from Kamehameha I and then conquered O`ahu and Molokai. Kaua`i was also annexed through marriage (Pantaleo 2001).

Customarily on Maui, land divisions into *moku* (districts), *ahupua`a* (sub-districts), and *`ili* (smaller divisions) were said to have taken place “under a *kahuna* (priest) named Kalaihaohi`a (Hew the bark of the *ohia* tree) each ruled over by an agent appointed by the landlord of the next larger division, and the whole under the control of the ruling chief over the whole island” (Beckwith: 1970:383). Fornander suggests that this would have occurred at the end of the 15th century or at the beginning of the 16th century (Fornander 1916/17, Vol. 6:248).

According to Sterling, “The system of land tenure which prevailed in ancient times was radically changed in the reign of Kamehameha III by the Mahele of 1848, yet the boundaries of the ancient subdivisions of land remain unchanged to the present day. This applies particularly to the *ahupua`a* which has been termed the unit of land in Hawai`i”. And these boundaries were said have been established approximately 20 generations back in Hawaiian tradition or 500 years ago according to Stokes' basis of chronology (Sterling 1998:3). This typology of land division (the *ahupua`a*) allowed the Native Hawaiian populace

access to various ecosystems and resources from *mauka* to *makai* which were essential for traditional living.

Kirch proposed that the populace on Maui was traditionally centered at Lahaina and Wailuku (1985). As such, so was the political power. The current district (*moku*) of Wailuku is comprised of the following *ahupua`a*: Wai`ehu, Waihe`e, Waikapū, and Wailuku (Figure 10). This region has also been referred to poetically as NāWai`ehā (four waters) (Pukui and Elbert 1986: 377). According to Sterling, Waikapū originally belonged to no district:

On Maui the lands of Waikapū and Wailuku appropriated almost the whole of the isthmus, belonged to no district and in the *Mahele* were said to be in Na Poko (Sterling 1998:63). Sterling further states that the *ahupua`a* of Waihe`e and Waiehu were independent of any *moku* but listed in the Book of the Mahele as being in Pū`ali Komohana.

There seems to be a discrepancy between Waikapū and Wailuku not belonging to any traditional district or *moku*. As exemplified on Figure 11, Wai`ehu, Waihe`e, Waikapū, and Wailuku appear to be situated within Pū`ali Komohana *moku* whose boundaries follow the modern District of Wailuku shown on Figure 10 (Kame`eleihiwa 1992: 241).

Wailuku was the center of political and military power on Maui during the seventeenth and eighteenth centuries. Legendary battles were fought in Wailuku, including battles involving Kihapi`ilani, son of Pi`ilani, and Kalani`opu. The battle referred to as the Kalae`ili`ili Battle (1765), consisted of a revolt based upon what was perceived as an unfair distribution of resources by Chief Ke`eaumoku and other Molokai chiefs from the Waihe`e River Valley and the offshore marine resources. The Maui populace thought that these resources should provide ample food for them and they were being treated unfairly. Eventually, the Molokai chiefs were driven out of Waihe`e. Another war fought in Kaupō was called the Battle of Kaleoka`ilio where Kalaniōpu`u was at Hāna and sent his warriors to Kaupō (part of Hāna District) to slaughter and plunder the people residing there. When King Kahekili heard of this mistreatment, he sent his warriors to Kaupō and the fighting commenced. Eventually, the Hawai`i warriors were severely defeated and the war was called the Battle of Kaleoka`ilio where the bodies of Hawai`i warriors were heaped up like kukui branches before the Maui warriors. Kalaniōpu`u and his remaining warriors fled to Hawai`i Island where they prepared again for war against Kahekili. In 1776, Kalaniōpu`u returned again to war against Maui landing at Keone`ō`io at Honua`ula, Mākena and Kīhei, the first battle began at Mā`alae where the Hawai`i warriors held strong against the Maui warriors. Both

Hawai`i and Maui warriors fled and prepared for war again the next day. On this day, the battle was fought further inland along the lower sand dunes of Wailuku at Kakanilua. It was at this place that Kahekili, with the help of Oahu warriors fought valiantly against the Hawai`i warriors and the Hawai`i warriors were being slaughtered and a few retreated to Kalepolepo where Kalaniōpu`u and his wife, Kalola was waiting. Kalaniōpu`u was told how badly they were being defeated, and Kalaniōpu`u turned to his wife, who also happened to be the sister to Kahekili, and said we need to end this war. Kalaniōpu`u and Kalola decided that Kiwalo, their son should go to his Uncle Kahekili to ask for forgiveness and stop the fighting. Kahekili agreed to end the fighting and Maui was victorious again. The slaughter of Hawai`i Island at the lower sandhills of Wailuku was called the Battle of Kakanilua.

The land that encompasses the Wailuku District was extremely fertile with an abundance of water; thus, enabling large scale cultivation of *kalo* (taro). Handy provides a post-Contact description of the agricultural activities in the Wai`ehu area and suggests that the “old” (possibly pre-Contact) taro terraces have been destroyed:

...the area from Waihe`e to Wailuku Valley was the largest continuous area of wet taro cultivation in the islands...in the early days the terraces were nearly continuous in a belt between the sand dunes and the present irrigation ditch....This is the second valley of the famous Na Wai Eha of western Maui, and it is watered by twin streams. The canfields now extend throughout this region, continuously from Waihe`e on the lower slopes; but above Waiehu and Puakala from the upper roads following the irrigation ditches well toward the upper limits of the cane, a few old plantations still persist. Some are used for raising wet taro, some for truck gardening. However, except for these few patches the old terraces of the upper slopes are entirely ploughed under [Handy and Handy 1940 (revised 1991):496, 497].

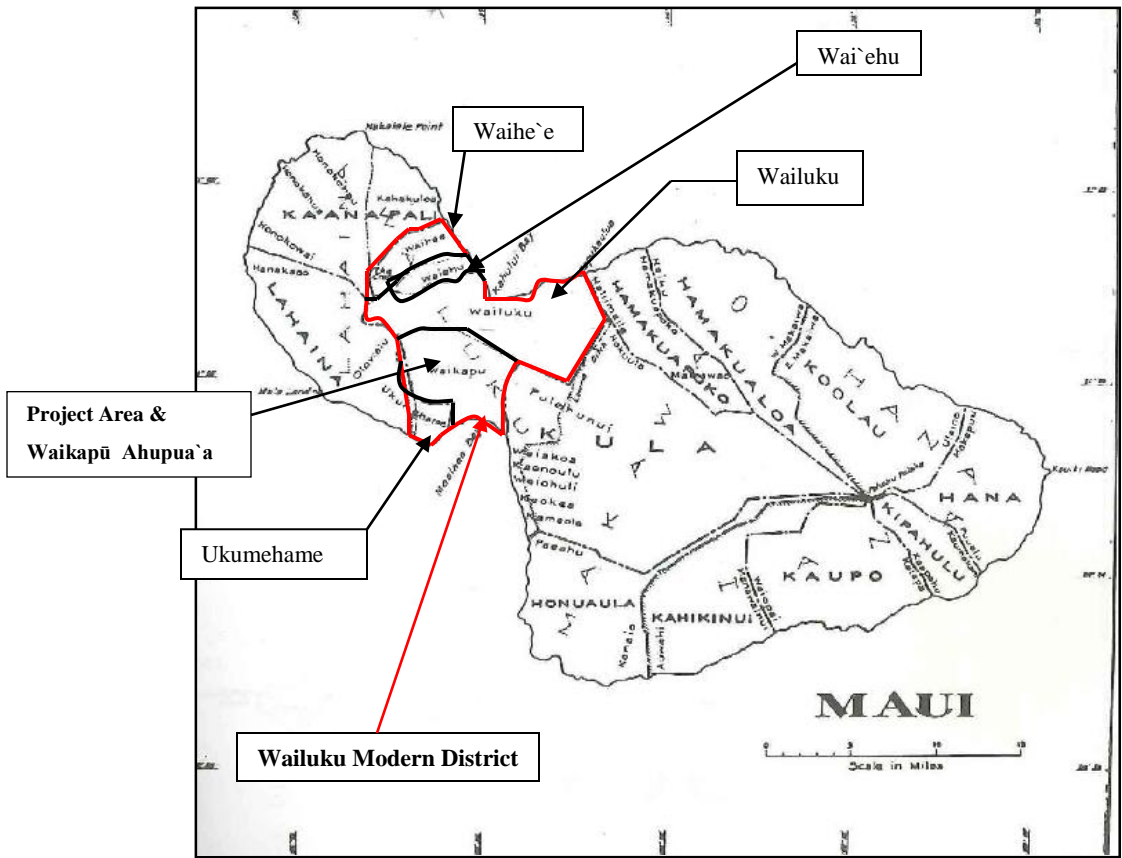


Figure 10. Map Illustrating Project Area, Wailuku District and Ahupua`a Boundaries from John Wesley's *A Gazetteer of Territory of Hawai'i* (1935)

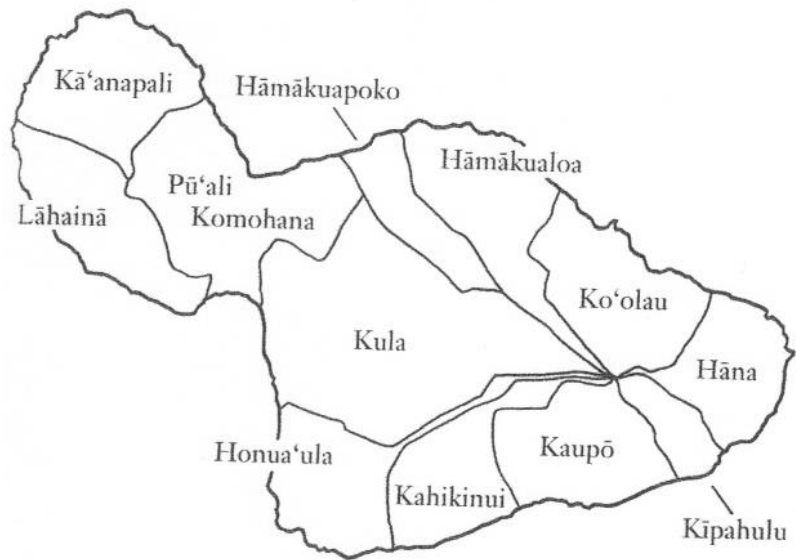


Figure 11. Map of Maui Island Showing Traditional Moku (Districts) from Kame`lehiwa (1992)

Early Historic Period

In reference to the Hawaiian Monarchy, at the time of European contact in A.D. 1778, Maui was united under a single political polity under the rule of *mo`i* Kahekili. By A.D. 1795, Kahekili ruled all of the islands apart from Hawai`i Island. Kamehameha I, *mo`i* of Hawai`i Island, attacked Maui, Molokai, and O`ahu islands. Keli`imaika, brother of Kamehameha I of Hawai`i Island, unsuccessfully attempted to retake Hana and Kipahulu. In 1790, Kamehameha I overpowered Kalanikupule's forces at the Battle of `Iao Valley on Maui. Kalanikupule's ultimate defeat at the Battle of Nu`uanu on O`ahu ascertained Kamehameha I as absolute ruler of the islands, with the exception of Kaua`i. Kamehameha the Great's favorite wife, Hana-born Ka`ahumanu, served as his counselor (Pantaleo 2001).

After the death of Kamehameha I in 1819, Ka`ahumanu declared herself *kuhinau* (premier) sharing of regal authority with the new young King Liholiho (Kamehameha II). It is suggested that she confronted the new king and implied that it was his father's wishes for her to share rulership of the land. From the time of Liholiho's departure for England in 1823, until Ka`ahumanu's death in 1832, she virtually ruled the kingdom. It was during the aforementioned time frame that the strength of the ancient *kapu*(prohibition) system began to fail. Ka`ahumanu, who disagreed with the restrictions of traditional *kapu* system, persuaded Liholiho to abolish it. "The train of circumstances leading up to the final act of abolition of the *kapu* and the old religious system cannot easily be traced in detail. . .Some authorities state that immediately after the installation of Liholiho as king, Ka`ahumanu proposed to him that the *kapu* be disregarded and she announced her own intention to disregard them" (Kuykendall 1938:66-67). With the overthrow of the *kapu* system she was free to exercise her political authority but this prohibition inadvertently cleared the way for the Christian missionaries in 1820. With the emergence of Christianity, the *heiau* (religious structures) associated with the native religious practices were destroyed and abandoned.

In reference to the island of Maui, Ke`eaumoku, brother of Kamehameha I's wives Kaheihei`maile and Ka`ahumanu, presided over the island until his death in 1824. Ke`eaumoku was succeeded by the sister of Chief (Governor) Boki, Wahinepi`o. Hoapili succeeded Wahinepi`o and ruled Maui between 1826 until 1840, and was followed by Keoniana (John Young II). Lahaina, located in West Maui, was the center of power in the Hawaiian Kingdom. Kamehameha III (Kauikeaouli), the last son of Kamehameha I, rose to the throne when he was ten years old - due to the death of his older brother. During his younger years, Ka`ahumanu continued to govern with the assistance of a council of chiefly advisors.

Kamehameha III reigned from 1825 to 1854, the longest period of power in the history of Hawai`i.

During this period, he resided in Lahaina from 1837 to 1845 (Pantaleo 2001).

In 1778, with the appearance of Captain James Cook in Kahului Bay on Maui, the post-contact documentation of the indigenous populace on Maui began. A comprehensive account of history of the Hawaiian Kingdom commencing from contact (1778) is provided in Kuykendall (1938). There were additional voyagers to Hawai'i subsequent to the arrival of Cook - including La Perouse and Vancouver. By the early 1800s, whaling ships, merchants, and missionaries had arrived. The arrival of foreigners severely impacted the demographics of the Hawaiian people and caused a significant depopulation of the native people due to the introduction of Western diseases, in combination with the populace beginning to cluster around growing port towns. According to Kuykendall (1938:336), an early estimate of the population (made by missionaries) in 1823 was 142,050 and decreased to 86,593 by 1850. In 1832, the population of Waihe'e/Wai'ehu region was reported by the missionaries as 827, or approximately twenty percent of the populace in the *Na Wai Eha* District.

Historic Background Mid-1800 to Late-1800

In 1845, land reform legislation, which eventually developed into 'The Great Māhele', was introduced. During the *Māhele* in 1848, crown lands were divided between the Government, Royalty, and commoners (Figure 12). The Board of Commissioners to Quiet Land Titles received applications for land claims. When a land claim was validated, a Land Claim Award (LCA) was awarded. Following payment of this claim, a Royal Patent (R.P.) was issued. The Great Māhele initiated extreme social, economic, and political changes within the traditional Hawaiian culture on all the islands. The Māhele resulted in the division of lands according to a system of private ownership based on Western legal concepts. In the first phase of this process, Kamehameha III subdivided his lands among the highest *ali'i* (royalty) *konohiki* (chiefs), and some favored *haole* (foreigners). This process of redistribution severed the political and social relationships of the traditional system of land use (Moffatt and Fitzpatrick 1995:11). Following this change, *maka'āinana* (commoners) were then permitted to pursue legal title and ownership to land they had cultivated and inhabited, in addition to pursue purchase of other government lands. At the end of the Māhele, naturalized foreign citizens were given the right to purchase land in Hawai'i. The ultimate result of this decision placed more land in the hands of non-Hawaiians than native Hawaiians between the years of 1850 and 1865 (Moffatt and Fitzpatrick 1995:51).

In 1848, there were approximately 88,000 Hawaiians, but only 14,195 applications were made...of the 14,195 *kuleana* claims, only 8,421 were actually awarded. The *Maka'āinana* received less than 1% of the land. Countless Native Hawaiians lost their land use rights as a result of the Great Mahele of 1848, with the establishment of a system of private land ownership. Many landless Native Hawaiians signed on as laborers in the

emerging sugar industry, which began on Maui in the 1820s. Within a short time, large tracts of land were turned over to commercial agriculture, primarily sugarcane cultivation (Kame`eleihiwa 1992:295). In many cases, the purchases or leases to non-Hawaiians included entire `ili or ahupua`a.

As of 1893, a Hawaiian Government Survey indicated that less than one percent of the total land in the Hawaiian Kingdom had been awarded as *kuleana* land (Moffatt and Fitzpatrick 1995:50-51) (see also Kame`eleihiwa 1992). Changes instigated during the Māhele had a significant impact across the Hawaiian Islands. As previously mentioned, the ‘Great Māhele’ of 1848, brought with it an official change in the organization of land possession and significant changes for the people in Hawai`i. The most noteworthy aspect would be that the people could now own land fee simple, and the *maka`āinana* had the prospect to obtain land.

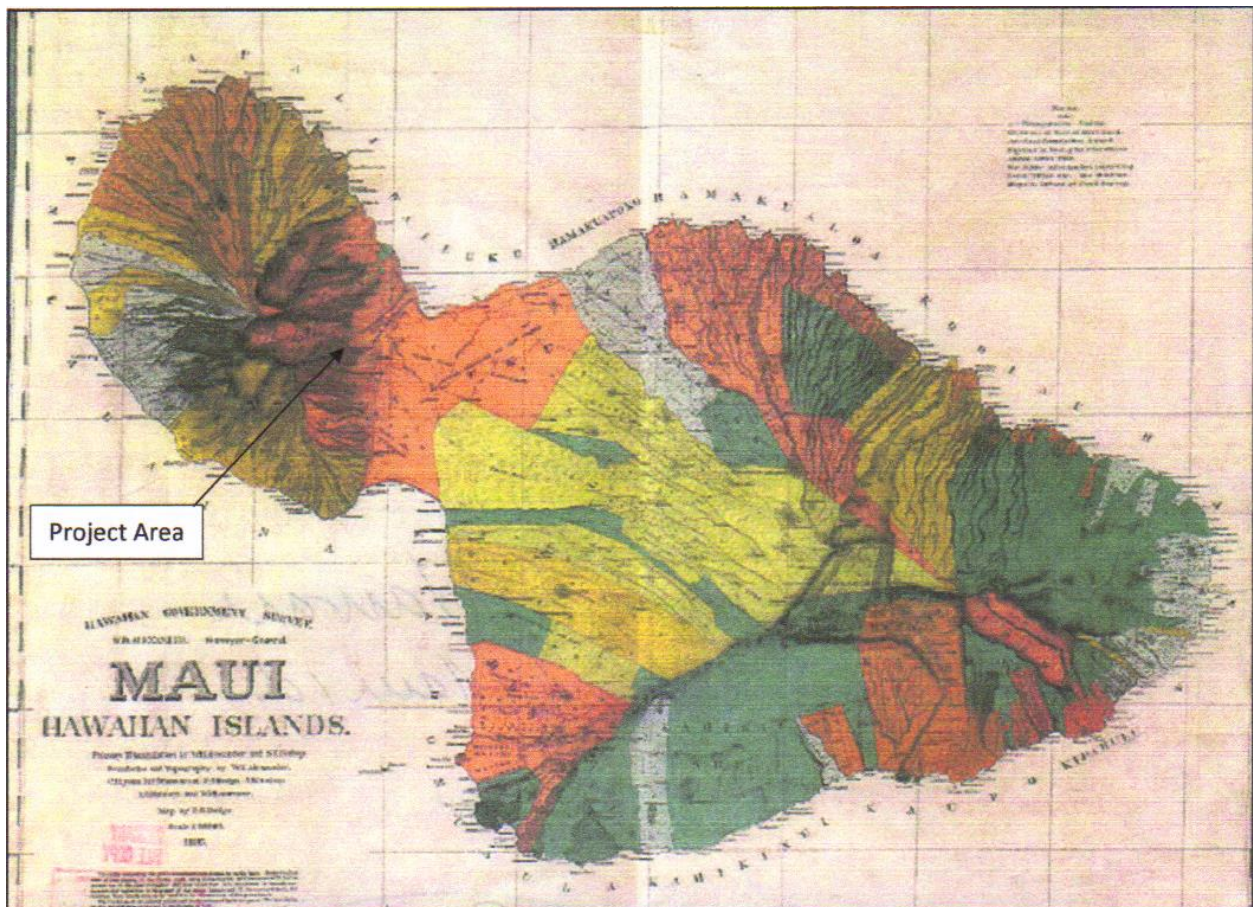


Figure 12. Dodge, F. S. and John M. Donn (1906) Hawaiian Government Survey Map of Maui

In the course of land distribution associated with the *Māhele*, frequent claims were granted along the streams for small plots of taro (*kalo*) cultivation. For example, Figures 2, 3, 14 and 15 shows narrow bands of LCA awards that ran thru the 'ili of Olohe, Pikoku, Luapuaa, Kamauhali, Punia, Kaapala/Keopala, Paalae, Ahuakolea, and Koolau. This current flume and possible former 'auwai (ditch) may have emptied into a pond that reportedly was located south of the 'ili Luapuaa and presently located within the Maui Tropical Plantation, Parcel 7 (see Figure 3 and not two reservoirs on map).

PRIOR LAND USE

The Waikapū Stream supported major irrigation systems with numerous pondfields (*lo'i*) and irrigation canals/ditches ('auwai), as well as agricultural crops and animal husbandry practices evidenced by LCA testimony during the Mahele and early map documentation (Figure 13). Subsequently, by the late-1800s the Waikapū Stream utilizing the same 'auwai irrigation systems contributed to sugarcane cultivation that expanded far beyond the valley. According to Creed,

The Waikapū stream ran thru the center of a huge *lo'i* 925+ acre field complex. From the stream in the upper part of the valley, one 'auwai (ditch) historically named Everett ran thru the *mauka* periphery of the Waikapū village on the north towards Wailuku [see Figure 1]. And another 'auwai (ditch) named Waikapū South [see Figures 1 and 9] ran east from the upper valley stream towards Ma'alaea thru the 'ili of Pikoku, Punia, and Kalaupelu and probably extended *makai* at some earlier time and then rejoined the stream. Supporting evidence for this hypothesis is Monsarrat's 1882 map shows a late 19th century sugarcane ditch (the Waihe'e Ditch) dissects this area and LCA 411 in Kaumuilio (below the government road) to Poonui complains that his water had been cut off by the foreigners but remedies were then made so he could continue his cultivation. There may be other 'auwai as well, such as the area below the Ohia Stream 'auwai in the upper valley where the configuration of a narrow band of awards runs almost perpendicular through the middle of the *lo'i* fields of Ohia, Palama and Loaloa. This narrow band may define another ditch system although the map does not show one (Creed 1993:77).

As previously discussed in the Project Area description section, based on a review of Figures 1 and 9, the Waikapū Ditch South extends from the upper valley towards the project area in an east/west direction. It appears to cut through and/or bisect Parcel 3 Mauka and then makes a 90 degree angle proceeding in a south direction towards the golf course and follows the golf course along its eastern boundary. There does not appear to be a Waikapū Ditch North but along the north side of Waikapū Stream also extending from the upper valley is Everett Ditch which runs roughly east/west and the begins to curve north below Wailuku Heights subdivision. Waihe'e Ditch is also present within the project area running north south bounding Parcels 6 and 7. During the course of the current survey, several sections of ditches were noted along the northern side of the project area and are further discussed in the results section.

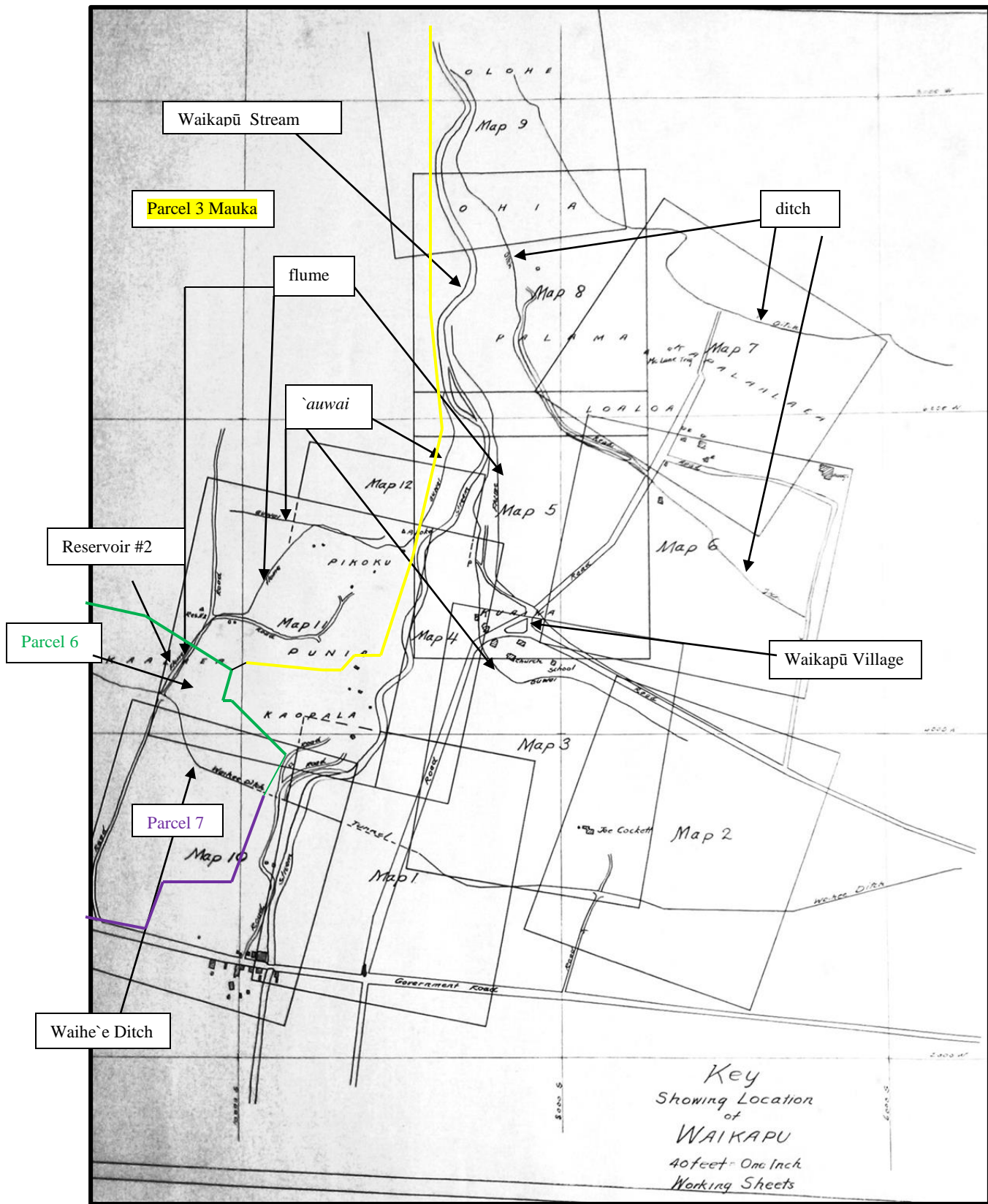


Figure 13. Map of Upper Waikapū Showing 'ili, 'Auwai , Flumes, Ditches, Structures and Reservoir #2

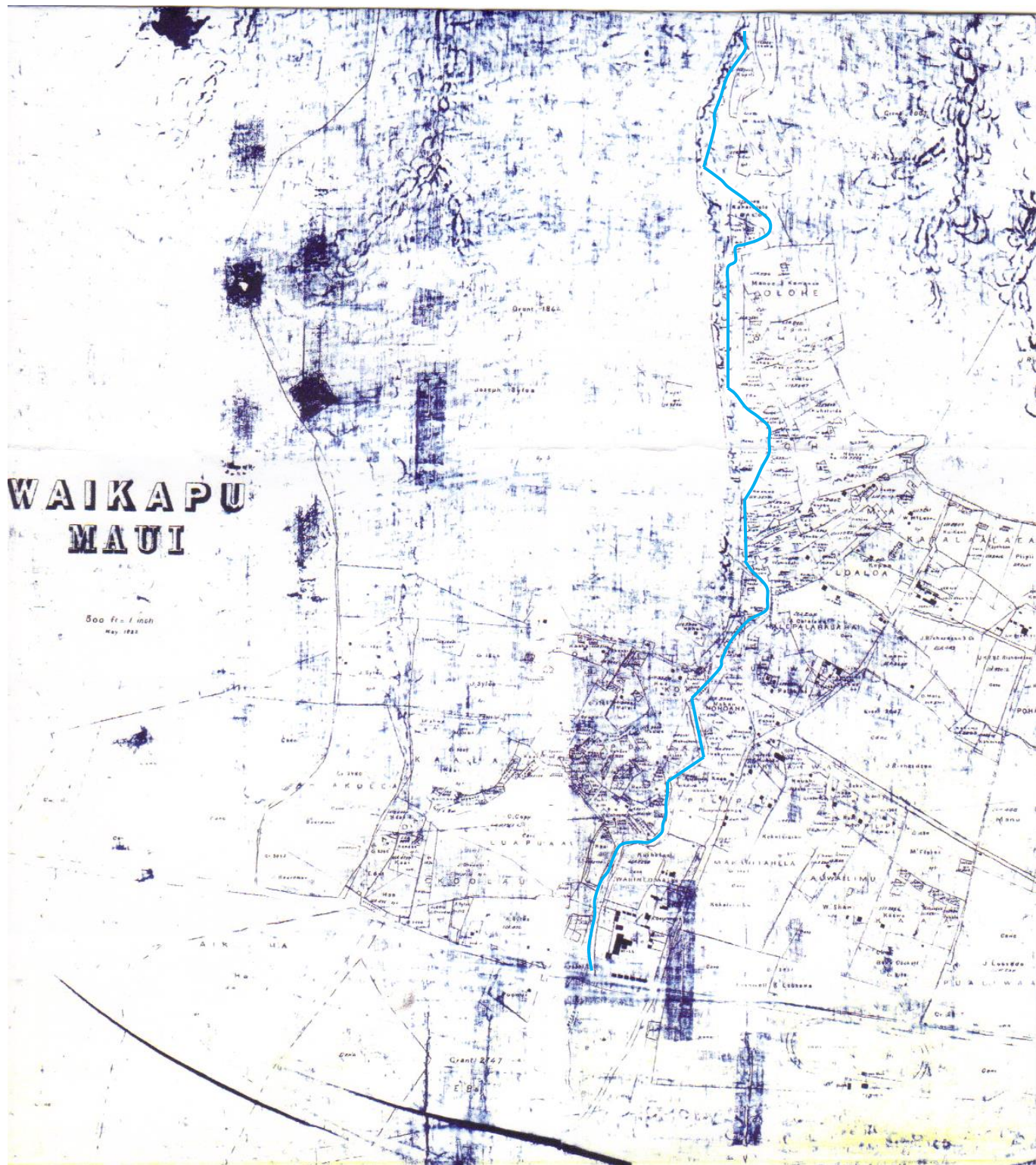


Figure 14. Copy of Monsarrat Map of 1882

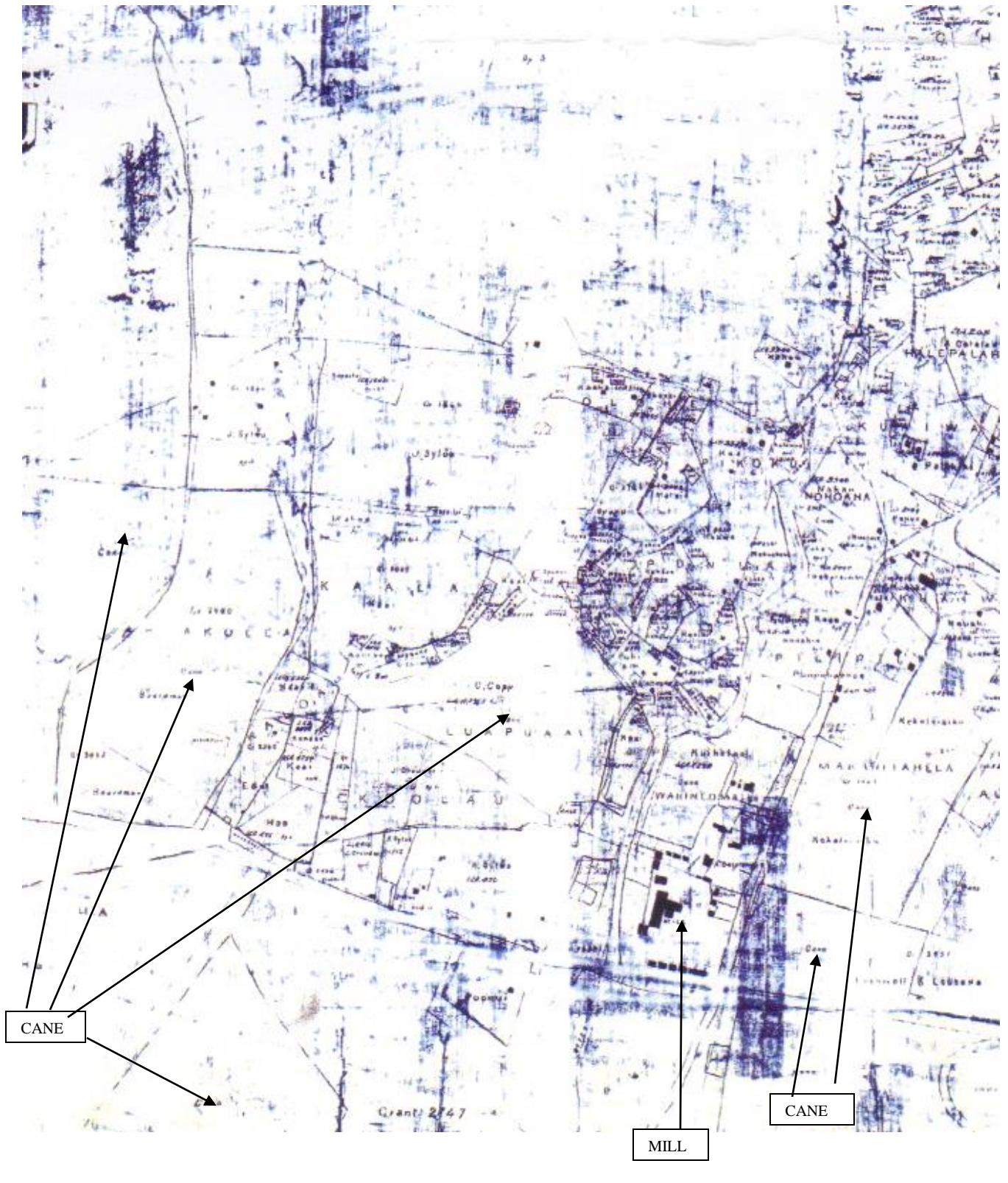


Figure 15. Enlarged Portion of Monsarrats' Map (1882) Showing LCA's and Areas with Cane in Upper Waikapū

LAND TENURE

The entire Waikapū *ahupua`a* is comprised of 15,684 acres, where 121 claims were heard for Waikapū during the Mahele of 1845 (Creed 1993). Of these claims, 100 or 82% were awarded. Of these awards, the claimants listed in descending order the following land usage, *lo`i*, *kula*, house lot, salt, *wauke*, Hala, unspecified, potato, pig, sugar, fish, banana and a bull pen. Based on Creeds analysis, *lo`i* constituted the vast majority with 50%, *kula* 2.1%, house lots (1.8%) and the remaining less than 0.5%.

For the subject project area, an analysis of the land tenure for the five specific project areas was conducted and this assessment also assisted in the placement of back trenches for subsurface testing. The analysis is as follows:

In Parcel 3 Mauka, a total of twenty-eight (28) LCA's and seven (7) Grants were identified (Tables I-III). Of the LCA claims, the majority were for *lo`i* (n=21), *kula* (n=11), house lots (n=5) and *hala* (n=5). For the seven grants, only two had land use which was for sugarcane at Grant 1844 Apana 1 and 2. Note that these aforementioned counts are based on the presence or mention of the specific land use, not the actual number of times the item was present within the parcel; hence if the testimony stated four *hala* trees, *hala* was documented as one.

In Parcel 3 Waena no LCA or Grants were documented.

In Parcel 6, a total of nineteen (19) LCA's and one (1) Grants were identified within this section (see Tables IV-VI). For the nineteen *Kuleana* claims, two had no information, *lo`i* were represented by 16, *kula* (n=7), house lots (n=3) and one no information. The Grant (GR 3152) was to Cornwell but no land use information was available.

In Parcel 7, there were eleven (11) Land Commission Awards and 8 Grants. For the *Kuleana* claims there were *lo`i* (n=7), house lots (n=6), *kula* (n=2), sugarcane (n=1) and *auwai* (n=1). Of the eight Grants, only 2 had information which consisted of sugarcane (Tables VII-VIII).

In Parcel 3 Makai no Land Commission Awards were claimed and a total of one (1) Grant was identified within this section and consisted of a reservoir and sugarcane (Table IX).

Table I. Summary of Land Commission Awards within Parcel 3 Mauka

LCA Parcel 3 Mauka	Hala	Lei Hala	House lot	Kula	Mo'o Kula	Taro Lo'i	Wauke	Taro Pauku
Charles Copp 236:1 Luapuaa and Kaluapuaa				2			1	
Ehunui 2499:3 Pikoku	1	4				7		
Makuakane 2522:1 Punia				1				
Makuakane 2522:2 Pikoku						3		
Makuakane 2522:3 Waikalulu				1				
Hakiki 2577:2 Olohe			1			7		
Hakiki 2577:3 Olohe			1			2		
Poepoe 2609:1 Kaalaea								1
Poepoe 2609:2 Olohe						2		
Poepoe 2609:3 Pikohu						1		
Poepoe 2609:4 Maalaea			2 in Maalaea					
Poepoe 2609:5 Kaalaea					1			
Makaio (Mataio) 3020:2 Kamaukalii /Kamauhali				1		6		
Kualaia 3110:3M Pikooku				1		4		
Kualaia 3110:3M:2 Ohia						2		

Table II. Continuation of Summary of Land Commission Awards within Parcel 3 Mauka

LCA Parcel 3 Mauka	Hala	Lauhala	House lot	Kula	Mo'o Kula	Potato Mo'o	Taro Lo'i	Taro Pauku
Nahanua 3340:2 Nohoana, Aweoweo luna		2			1		8	
Opunia 3224:6 Kaopala			1					
Koa 3528:2 Pikoku							4	
Kaai 5774:2 Luapuaa							6	
Kamakaipoa 6385:1 Pikoku (2.11acres)							6	
Kamakaipoa 6385:2 Kaloapelu Apana 2	1			1	2		5	
Kamakaipoa 6385:2 Kamauhalii (1.94 acres)	1							
Kamakaipoa 6385:2 Maluapuaa						2	3	
Napailoi 10481:2 Waihalulu			1	1				
Napailoi 10481:3 Waihalulu				1			8	
Napailoi 10481:4 Kaopala								1
Nalei 10460:1 Olohe							2	
Nalei:2 10460 Luapuaa							26	1

(Source: Creed 1993)

Table III. Summary of Grants within Parcel 3 Mauka

Grant Parcel 3 Mauka	Date	Issued to	Land Use
1513			
1704			
1706			
1711:1			
1844:1 Apana 1	Also extends down to Parcel 6	Joseph Sylva	Sugarcane
1844:2	Also extends down to Parcel 6	Joseph Sylva	Sugarcane
3527:2			

(Source: Creed 1993)

Table IV. Summary of Land Commission Awards within Parcel 6

RP	LCA	House lot	Kula	Mo'o Kula	Mo'o of Kalo	Taro Lo'i	Taro pauku	Ponds / Pools / Depressions
	Kaoahaliu 2361:1							
	Poepoe 2609:1 Kaalaea						1	
	Poepoe 2609:2 Olohe					2		
	Poepoe 2609:3 Pikohu					1		
	Poepoe 2609:4 Maalaea	2 in Maalaea						
	Poepoe 2609:5 Kaalaea		1 potato					
	Opunui 3224:3 Kaloaloo						1	
	Opunui 3224:5 Kaloaloo		1					
	Naanaa 3337:4 Kaalaea					6		
3156	Kamohai 3527:1 Kaalaeapelu		1				1	
3156	Kamohai 3527:2 Kaalaea			1		3		
	Kamohai 3527:3 Kaalaea			1		6		
	Kekua 5551:1 Kainauhali					15		1
	Kekua 5551:2 Kaalaea					2		
4014	Kaai 5774:2 Luapuaa					6		

Table V. Continued Summary of Land Commission Awards within Parcel 6

LCA	Kalo	House lot	Kula	Ponds / Pools / Depressions	Mo'o of Kalo	Taro Lo'i	Taro pauku
Mahoe 10160:1 Ahuakolea 1.99 Ac.		1	1			1	
Napaeloi 10481:1 Paalae	1	1	1			31	1
Wahinealii 11022:3 Palama					1		
9524:2							

Table VI. Summary of Grant within Parcel 6

Grant	Date	Issued to	Land Use
Grant 3152	1878	Spreckles	Sugarcane and Reservoir

(Source: Creed 1993)

Table VII. Summary of Land Commission Awards within Parcel 7

RP	LCA	'Auwai	House lot	Mo'o Kula	Taro Lo'i	Taro pauku	Sugarcane / Ko
41	John Crowder 416:1 (7ac&1ac) Koolau	1	1				
41	John Crowder 416:2 (8.9ac) Aikanaka		1				
324	Haa 455:2 Kaaikanaka /Aikanaka? (35ac)		1				1
	Mahuka 462:1 Kaopala		1	1	6		
	Mahuka 462:2 Kaloapelu		1	1	10		
3139	Haawahine 491:1 Koloapelu / Kaleapelo / Kaloapelu?				4		
	Haawahine 491:2 Koloapelu/ Kaleapelo / Kaloapelu?				1		
	Haawahine 491:3 Koloapelu/ Kaleapelo/ Kaloapelu?				2		
	5224:2						
8874	Kanaeae 8874:2 Kaloapelu		1			1	
	Kanaeae 8874:3 Kaloapelu					1	
	Kaula LCA 5734:4	This is a claim for Waikele, Island of Oahu (TMK 3-6-05) 122					

Table VIII. Summary of Grants within Parcel 7

Grant	Date	Issued to	Land Use
1146			
1674			
2842			
2904			
2609			
2747:2		Eugene Bal	Reservoir and Sugarcane
2960		Boardman	Sugarcane
3043		Boardman	Sugarcane

(Source: Creed 1993)

Table IX. Summary of Grants within Parcel 3 Makai

Grant Parcel 3 Makai	Date	Issued to	Land Use
2747:2		Eugene Bal	Reservoir and Sugarcane

(Source: Creed 1993)

As exemplified in the land use tables and Figures 14 and 15, other post-Contact land use consisted of the commercial production of sugarcane. The earliest commercial sugar production on Maui Island began in Wailuku in 1823 when Hungtai Sugar Works was founded by Chinese merchants. Wailuku Sugar Company was started in November of 1862 by James Robinson and Company, Thomas Cumming, J. Fuller, and C. Brewer and Company. In 1865, C. Brewer and company acquired controlling interest, with Robinson and Company and Cumming as the minority stockholders. In 1894, the Waihe`e Sugar Company and the Waikapū Sugar Company were bought out by the Wailuku Sugar Company. To assist in the infrastructure of sugarcane production, railroad construction was initiated in 1895. At this same time, political and economic issues surrounding water-rights emerged to the forefront (Donham 1989:15). In the 1980's, the Wailuku Sugar Company converted to the Wailuku Agribusiness in order to diversify agricultural production.

PREVIOUS ARCHAEOLOGY

The early archaeological studies conducted on Maui consisted of recording *heiau* (religious structures) sites along the coastline. These studies were carried out by Thomas G. Thrum in 1909, followed by J. F. G. Stokes in 1916, and in 1920 by Kenneth P. Emory. An island-wide archaeological survey was

executed in 1928 by Winslow Metcalf Walker (Figures 16 and Table X). During this archaeological investigation, the previously recorded sites of Thrum, Stokes, and Emory were revisited and new sites were recorded to produce the first island wide survey (1931). Walker's survey primarily focused on sites portraying substantial construction. Thrum recorded four *heiau* in the Waikapū *ahupua`a*, two in the village and two at or near the shore. It appears that he only saw portions of the larger one located in the village (Creed 1993).

Reaching the Wailuku section little that is new was gathered of a definite character, and much of what I have from early history is unknown to the old residents. Two heiaus were reported at Waikapū, formerly, one below the road abreast of T. Everett's, of large size, and one below the Catholic church, a small structure working probably in conjunction with the larger one. Portions of the large one was said to be still seen, but the small one was destroyed. The names of these were forgotten. Unfortunately no evidence was found in confirmation with this report nor anyone who had knowledge thereof. The same relates to an alleged heiau, each, formerly at Puuhele, at Maalaea, at Kihei and at Kalepolepo, of small size, and a larger one at Kulaihakoko, but no one else seems to have heard of them (Thrum 1909-1918:59).

According to Walker, an unnamed *heiau* and petroglyphs are located "a quarter mile from the village of Mā`alaea at the base of the foothills of the West Maui mountains" (Walker, 1931:43, 58-60, and 201-206). Creed suggests that it is not possible to infer the location of Walker's "ancient village". There appears to be confusion if he is referring to the location of the historic wharf and associated structures in Mā`alaea or to the area of the "house and shelter site" currently documented as State Site numbers 50-50-09-1441 and 1287 (Creed 1993:26).

Research indicates previously documented archaeological sites in the Mā`alaea Bay environs. These sites include Site 1169 (now including former Site 1199) consisting of sixty petroglyphs on eleven boulders located inland and northwest of the harbor, Site 1440 (now including Site 1286) comprised of a *piko* stone and a grinding stone located on the lawn of Buzz's Wharf (Figure 17). Site 1287 is documented as the Mā`alaea complex that extends from Mā`alaea to McGregor Point (same area that Walker describes shelters being located). Site 1441 contains three C-shapes and appears to be located within Site 1287 (Moore and Kennedy 1994:8 and 9).

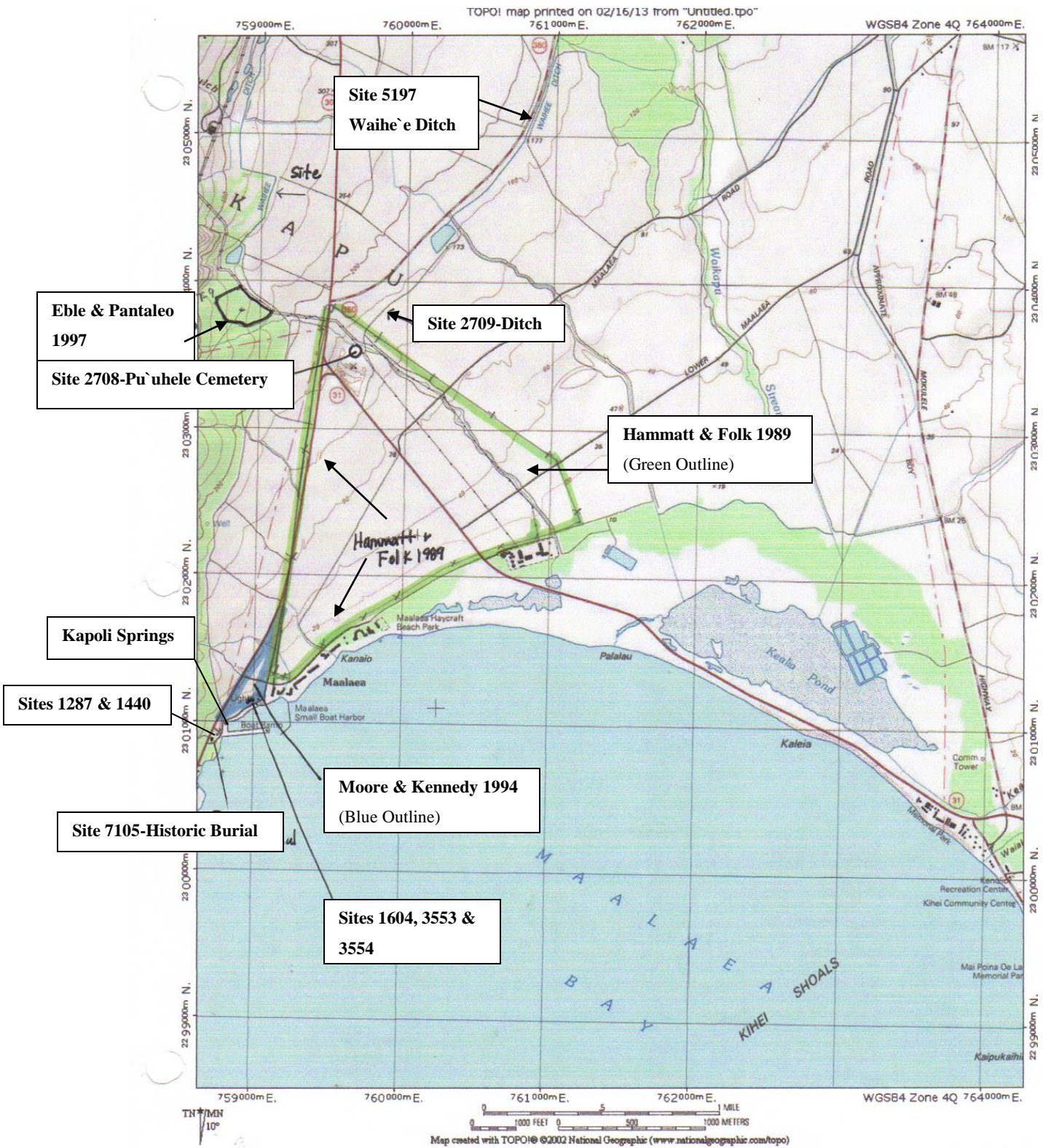


Figure 17. USGS Map Showing Location of Previous Archaeological Investigations and Historic Properties in Waikapū ahupua`a

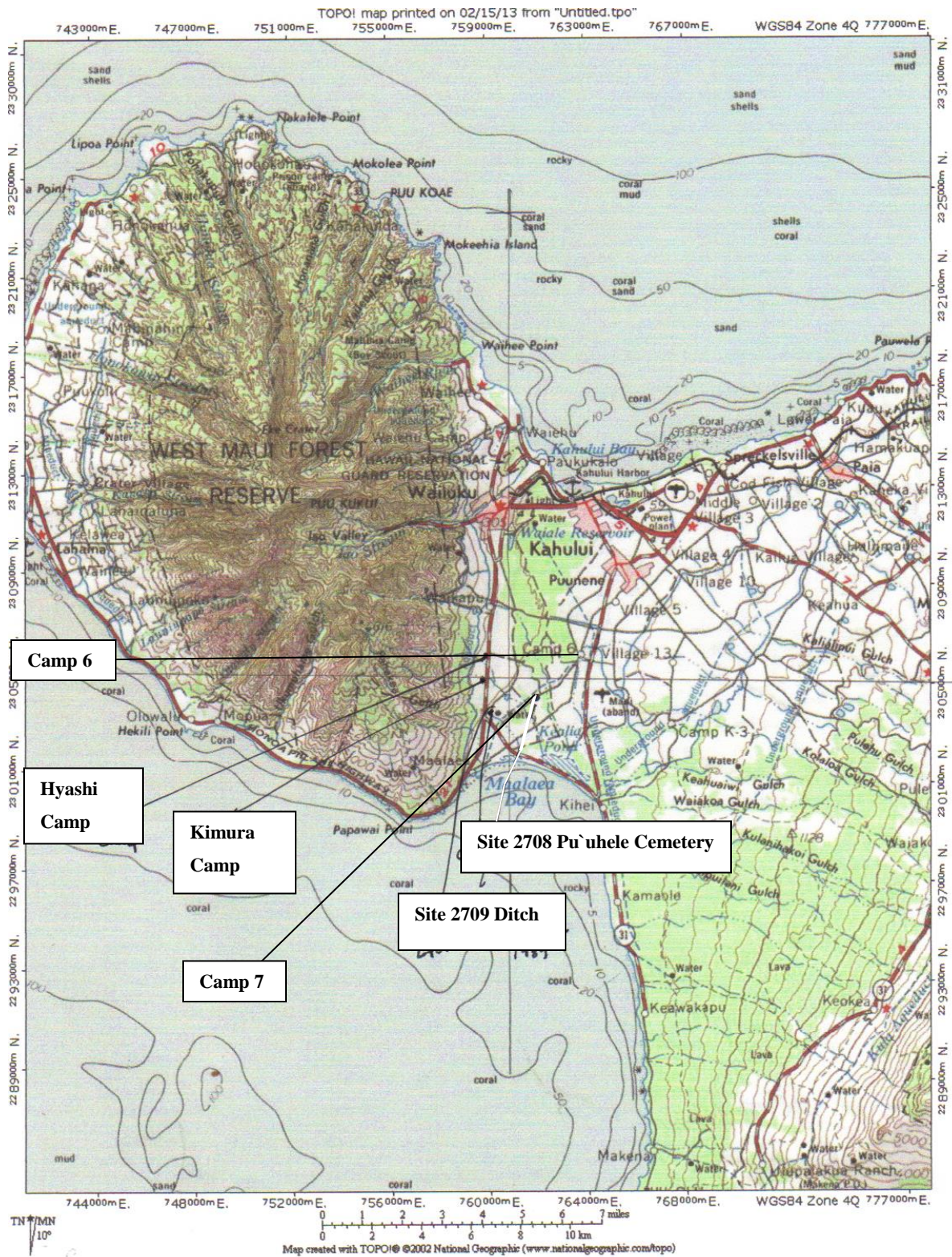


Figure 18. USGS Map Showing Location of Former Plantation Camps Properties in Waikapū Ahupua'a

Archaeological Research Conducted in the Environs of the Project Area

Since these earlier studies, numerous archaeological studies have been conducted in the Waikapū and Wailuku *ahupua`a*. The majority of the studies have been implemented based on requirements set forth in the laws pertaining to the environmental impact of proposed development. A significant portion of development has occurred in areas of fallow pineapple and sugarcane. The impact of commercial agriculture on archaeological sites located in non-sand substrates located below 500 feet amsl appears to be severe and has resulted in the complete destruction of a significant portion of pre-contact sites. In areas that contain a sand matrix, intact, previously disturbed and isolated human remains have been documented. Pre-contact site components appear to have been less impacted by intensive agricultural in areas located above 500 feet amsl. Post-contact sites in the region are typically associated with agricultural activities [clearing mounds, water diversion structures (flumes and ditches), habitation, roads, and railroads] and ranching activities (walls).

Cultural Surveys Hawai`i conducted a 600 acre archaeological survey near Mā`alaea that resulted in the documentation of a historic plantation ditch (50-50-09-2709) and a post-contact cemetery (50-50-09-2708) Hammatt and Folk (1989). The plantation ditch was documented on 1900's plantation maps and referred to as Reservoir No. 13 (Figure 16). The cemetery at Pu`uhele contained at least seven burials with tombstones, two possible rock mound burials, and a single niche burial (Creed 1993:27).

In 1989 and 1991, PHRI completed a six hundred acre archaeological inventory survey within the Waikapū Mauka Partners Golf Resort. Haun's initial inventory survey (1989) suggested that the archaeological sites below the 500 feet amsl had been obliterated by intensive cultivation of sugarcane and pineapple (Figures 19 and 20). There were, however, pre-contact intact sites located above the 500 feet amsl. Nine archaeological sites consisting of more than 46 features were documented. Haun concluded from excavation results that the majority of the archaeological features were agricultural (clearing mounds, terraces, cleared areas, walls, excavated depressions, and modified outcrops). In addition to the agricultural features, temporary habitation features (C-shapes and enclosures) were also present. During the data recovery component of the research, permanent habitation sites were also documented and exhibited complex architectural designs (Brisbin, Haun, and Jensen 1991:28 and 32). This region appears to have been utilized primarily for dryland agricultural activities with minimal associated habitation and occasional ranching activities. Radiocarbon dates ranged from the early 1500's through the historic era.

An inventory survey was conducted by Archaeological Consultants of Hawai'i (ACH) on a parcel of land located directly to the west (*mauka*) of the site complexes recorded by Haun (1989) and Brisbin *et al.* (1991). During the inventory survey, eleven site complexes were recorded that contained seventy-four related features and sub-features, in addition to seven additional single feature sites. Site complexes contained a variety of features: agricultural, habitation (both temporary and permanent), religious, and burials (Kennedy 1992). As previously noted, these archaeological sites appear to be a continuation of sites identified to the east. Radiocarbon dates ranged from A.D. 1040 through 1950.

Two separate archaeological inventory surveys were conducted by Archaeological Consultants of Hawai'i for the proposed Waikapū Mauka water tank location in 1991 (see Figures 17 and 18). During the initial survey and subsurface testing for the water tank and access road, a residential complex with two associated agricultural features was documented. The revised water tank location boundaries partially overlapped the initial delineated boundaries. In conclusion, five features were documented within the boundaries of the two proposed water tank locations. Three features were documented in the first survey and two were documented during the second survey. Site 2904 contains three features: Feature-A (a habitation enclosure and a C-shape), Feature-B (two agricultural terraces and four clearing mounds), and Feature-C (an agricultural terrace). Subsurface testing within Feature-A produced a single piece of marine midden, *Kukui* shell, coral, and charcoal (Kennedy and Maigret 1991).

Archaeological Consultants of Hawai'i performed an archaeological inventory survey for the Maui Ocean Center located in Mā`alaea (Moore and Kennedy 1994). The surface survey identified one site of historic significance, the Mā`alaea Ebisu Jinja (State Site 50-50-09-1604). During the sub-surface testing, twenty-five backhoe trenches were excavated and human burials were encountered and designated State Site 50-50-09-3553 and 3554 (Figure 17).

Aki Sinoto Consulting conducted an archaeological inventory survey consisting of thirteen backhoe trenches in a parcel which included the proposed Coral Wireless Waiko Baseyard location (Titchnel 1995). No cultural remains were encountered; however, due to the possibility of encountering human remains in the sand substrate monitoring was recommended for any future ground disturbing activities.

Garcia and Associates conducted an archaeological inventory survey of fifteen acres for a proposed base course production and composting facility located north of Pōhākea Gulch (Eble and Pantaleo 1997) (see Figures 17 and 20). The survey resulted in the identification of a single structural component. A historic wall segment that incorporated a wooden post and wire fencing material was documented and was

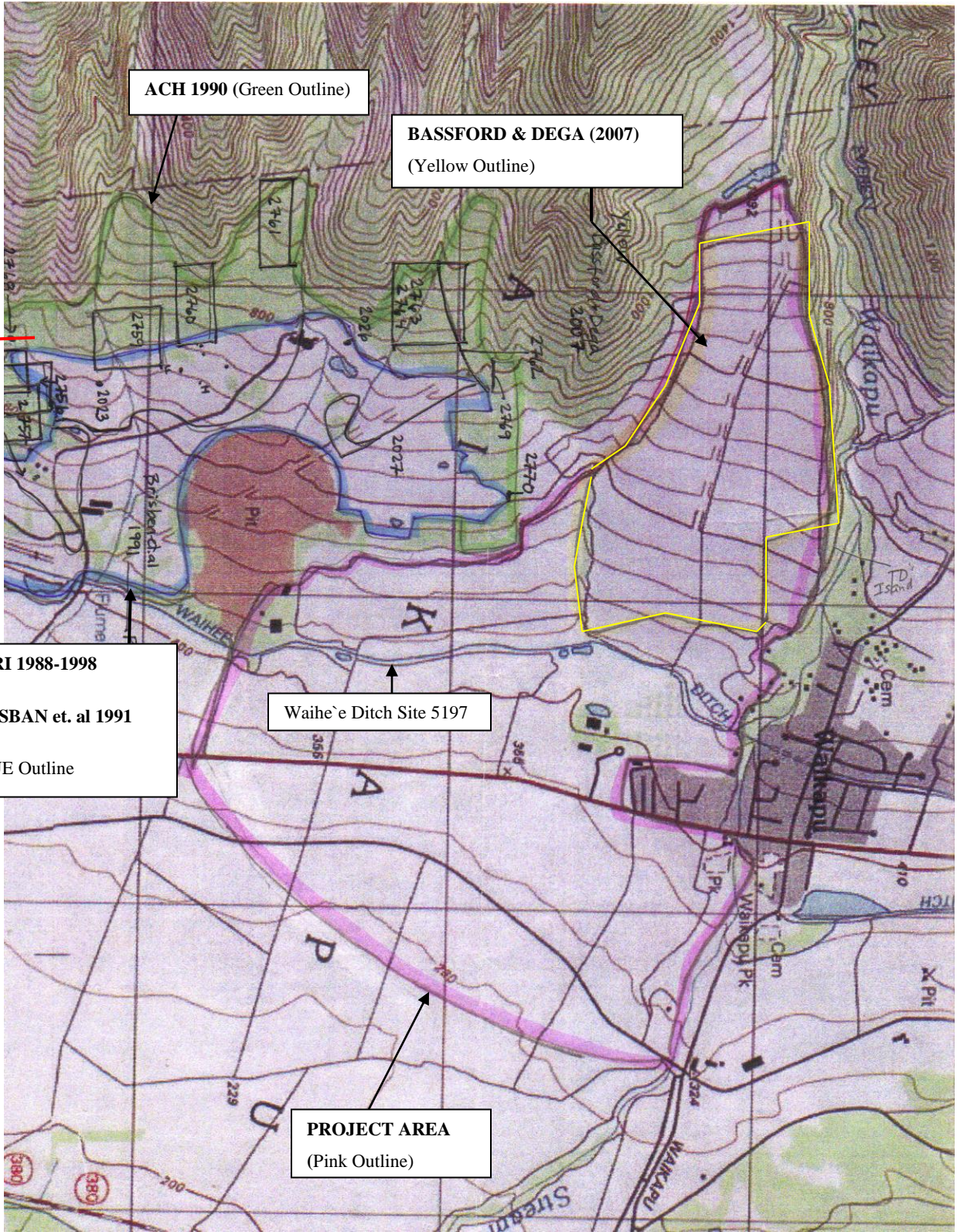


Figure 19. USGS Map Showing Location of Previous Archaeological Investigations in Upper Waikapū

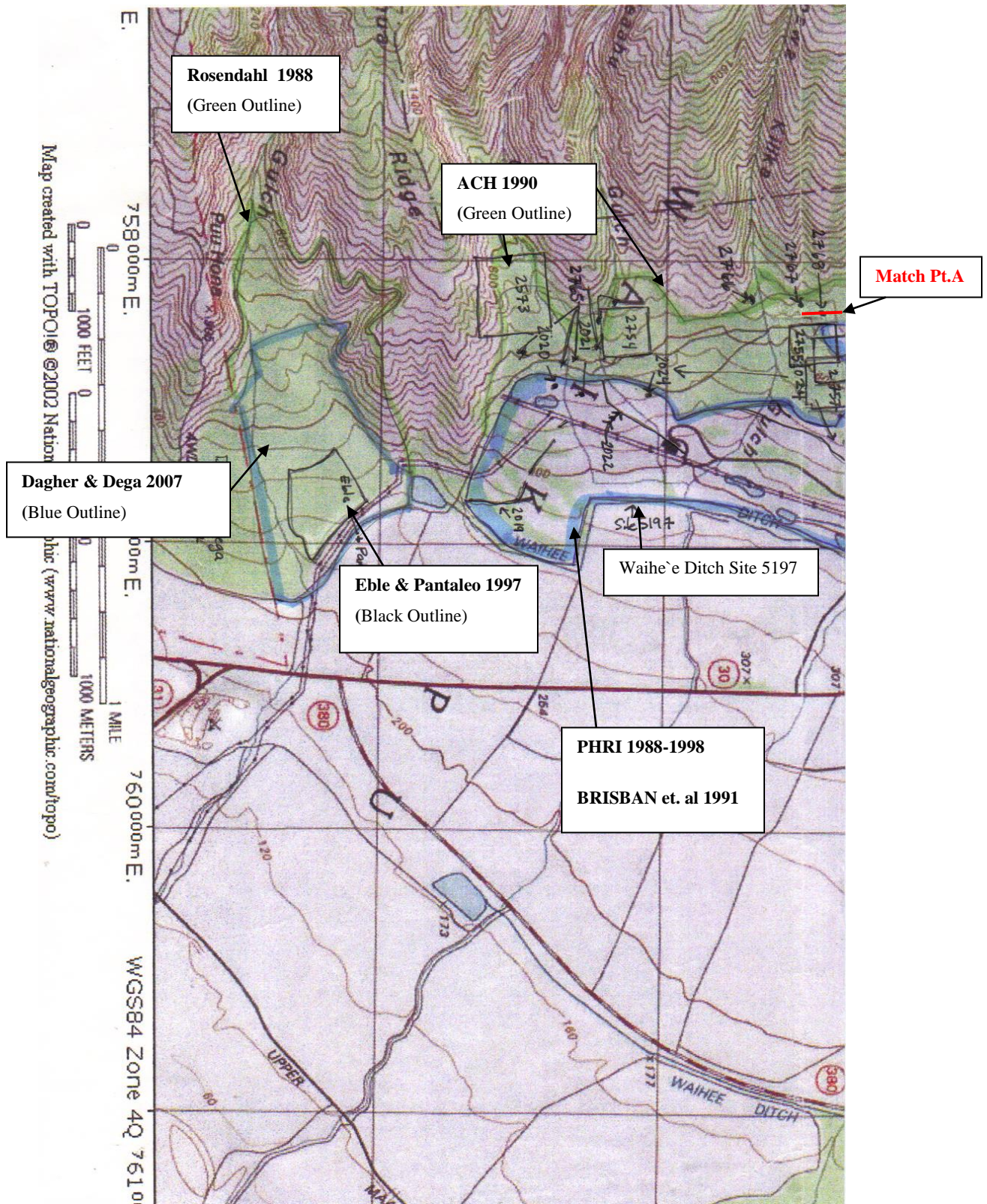


Figure 20. USGS Map Showing Location of Previous Archaeological Investigations in Upper Waikapū

possibly associated with Site 50-50-09-6062 or -6063 originally documented by PHRI in 1988 (Eble and Pantaleo 1997:9).

An archaeological inventory survey was conducted by Scientific Consultant Services for five lots and a proposed road corridor in the Kehalani Mauka Subdivision (Dega 2003). There were three archaeological sites encountered: the Hopoi Reservoir (50-50-04-5473), the Kama Ditch (50-50-04-5474), and an isolated find basalt adze (50-50-04-5478). Subsurface testing consisted of eighteen trenches that were culturally sterile. A later inventory survey was conducted in the same Kehalani Mauka property and addressed lots not studied during the initial study. This later research documented six additional archaeological sites that consisted of several plantation clearing mounds (50-50-04-5492), a historic surface scatter (50-50-04-5491), a roadway (50-50-04-5489), previously recorded Waihe`e Ditch (50-50-04-5197), and a series of lesser ditches (50-50-04-5490 and -5493) (Dega 2004).

Scientific Consultants Services conducted an archaeological assessment in the Kehalani lands east of the Honoapi`ilani Highway. Subsurface testing resulted in recent agricultural debris located in Stratum II (Monaham 2003). There were no significant findings reported during this study.

Archaeological monitoring was implemented for the Kehalani Subdivision and off-site improvements along the Waiale Road by Scientific Consultant Services (Morawski, Shefcheck, and Dega 2006). Five sites were recorded and consisted of a historic road bed (50-50-04-5963), a sugarcane flume (50-50-04-5964), an *in situ* burial (50-50-04-5680), and two areas of isolated human remains (50-50-04-5965 and -5966). Remains associated with the isolated finds were encountered in a previously disturbed soil matrix that was most likely associated with the initial construction of the Waiale Road.

A 60-acre archaeological inventory survey was conducted by Scientific Consultant Services for the proposed Pōhākea Rock Quarry expansion project (Dagher and Dega 2007). This survey resulted in the re-identification and documenting six sites previously recorded by Paul H. Rosendahl, Inc. (PHRI) in 1988. During the preliminary survey, these sites were only designated temporary site numbers. The present study assigned State Inventory of Historic Properties (SIHP) numbers 50-50-09-6061 through -6065. One of the previously identified sites T-9 was reevaluated during the 2007 study and was determined to be a natural unmodified boulder field. The other sites were all documented as historic ranching sites and complexes based on context and construction (Dagher and Dega, 2007:ii). During the 2007 survey, two additional sites were documented. An enclosure (50-50-09-6066) and a modified outcrop (50-50-09-6067) which were both presumed to be associated with historic ranching activities

based on context and lack of traditional artifacts. This study resulted in the documentation of seven sites (five from initial study and two from later survey) containing twenty-three features.

In 2008 T.S. Dye and Colleagues, Archaeologist, Inc. conducted a historic properties assessment for the proposed Coral Wireless Waiko Baseyard cellular site. The objective of this archaeological investigation was to evaluate if the new antenna and equipment would have a negative effect on documented historic properties. The report concludes that due to significant ground altering activities previously conducted within the immediate APE and no historic properties documented in the proposed footprint that there will be no visual effect on historic properties. The report does recommend monitoring of any subsurface excavation during construction due to the possibility of encountering human remains in the sand substrate.

Previous Archaeological Research Conducted Within the Boundaries of the Project Area

An archaeological assessment was conducted on a 208 acre parcel of land by Scientific Consultant Services (Bassford and Dega, 2007). This parcel of land is located within the current project area's boundaries of Parcel 3 Mauka (Figures 19, 21 and Table X). A pedestrian survey only resulted in the documentation of modern commercial agricultural debris and no historically significant sites, features, or artifacts. Subsurface testing consisted of thirty-one backhoe trenches that were evenly distributed throughout project area. Trenching activity yielded no significant finds as well. Due to the negative findings, the archaeological inventory survey was reclassified as an archaeological assessment.

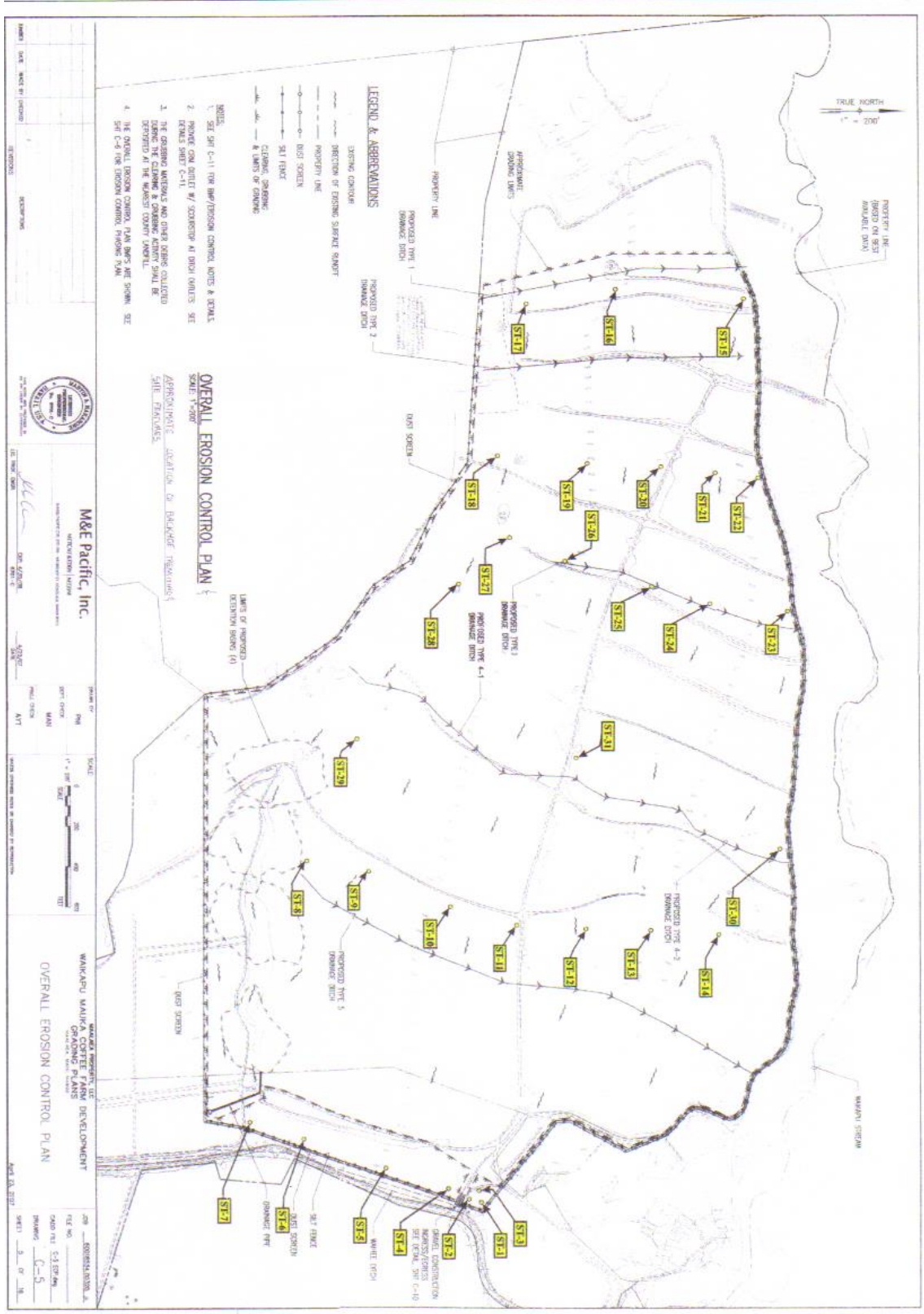


Figure 21. Plan View Map of SCS Project Area Showing Trench Locations ST1-31 within Current Parcel 3 Mauka and Parcel 6

Table X. Previous Archaeological Studies Conducted in the Waikapū Ahupua`a

<u>DATE</u>	<u>AUTHOR/COMPANY</u>	<u>LOCATION</u>	<u>NATURE OF STUDY</u>	<u>FINDINGS</u>
1909	Thrum	Maui Island	Coastal <i>heiau</i> survey	Study involved recording <i>heiau</i> (religious structures) sites along the coastline. Thrum recorded four <i>heiau</i> in the Waikapū Ahupua`a, two in the village and two at or near the shore.
1916	Stokes	Maui Island	<i>Heiau</i> survey	Added <i>heiau</i> sites to Thrum's list
1920	Emory	Maui Island	<i>Heiau</i> survey	Added <i>heiau</i> sites to Thrum's list
1928 1931	Walker	Maui Island	Reconnaissance Survey	Revisited previously documented sites and recorded new sites (with substantial construction) to produce an island wide survey. In reference to Waikapū, Walker notes an unnamed <i>heiau</i> and petroglyphs located "a quarter-mile from the village of Mā`alaea at the base of the foothills of the West Maui mountains" (Walker 1931:43, 58-60 and 201-206).
1989	Hammatt and Folk (Cultural Surveys Hawai`i)	Waikapū Ahupua`a (near Ma`alaea)	A 600 acre archaeological inventory survey	Two sites [historic plantation ditch (50-50-09-2709) and a post-contact cemetery (50-50-09-2708)]
1989/ 1991	Haun (1989)/Brisbin, Haun, and Jensen (1991) (PHRI)	Waikapū Mauka Partners Golf Resort	A 600 acre archaeological inventory survey	Nine sites with more than 46 features were documented and consisted of: agricultural features (clearing mounds, terraces, cleared areas, walls, excavated depressions, and modified outcrops) temporary habitation features (C-shapes and enclosures) and permanent habitation
1991	Kennedy and Maigret (Archaeological Consultants of Hawai`i)	Waikapū Mauka water tank location	Two separate archaeological inventory surveys	Site 2904, Feature-A (a habitation enclosure and a C-shape), Feature-B (two agricultural terraces and four clearing mounds), and Feature-C (an agricultural terrace).
1989 rev. 1992	Kennedy (Archaeological Consultants of Hawai`i)	Waikapū Ahupua`a in a parcel of land located directly to the west of the site complexes recorded by Haun (1989) and Brisbin <i>et al.</i> (1991).	An archaeological inventory survey	Eleven sites comprised of seventy-four features and sub-features, in addition to seven additional single feature sites. Features consisted of: agricultural, habitation, religious, and burials Radiocarbon dates ranged from A.D. 1040 through 1950.
1994	Moore and Kennedy (Archaeological Consultants of Hawai`i)	Waikapū Ahupua`a Maui Ocean Center located in Ma`alaea	An archaeological inventory survey	The surface survey identified one site of historic significance, the Mā`alaea Ebisu Jinja (State Site 50-50-09-1604). During the sub-surface testing, twenty-five backhoe trenches were excavated and human burials were encountered (State Site 50-50-09-3553 and -3554).
1995	Titchnel (Aki Sinoto Consulting)	Waikapū Ahupua`a Waiko Baseyard	An archaeological inventory survey	Subsurface testing of thirteen backhoe trenches in a parcel which included the proposed Coral Wireless location resulted in negative findings
1997	Eble and Pantaleo (Garcia and Associates)	Waikapū Ahupua`a north of Pōhākea Gulch	An archaeological inventory survey of fifteen acres	The survey resulted in the identification of a historic wall segment that was possibly associated with Site 50-50-09-6062 or -6063 originally documented by PHRI in 1988

2003	Dega (Scientific Consultant Services)	Waikapū <i>Ahupua`a</i> in the Kehalani Mauka Subdivision	An archaeological inventory survey was conducted for five lots and a proposed road corridor	There were three archaeological sites encountered: the Hopoi Reservoir (50-50-04-5473), the Kama Ditch (50-50-04-5474), and an isolated find basalt adze (50-50-04-5478). Subsurface testing consisted of eighteen trenches that were culturally sterile.
2004	Dega (Scientific Consultant Services)	Waikapū <i>Ahupua`a</i> in the Kehalani Mauka Subdivision	An archaeological inventory survey was conducted in the lots not studied during the initial study.	This later research documented six additional archaeological sites that consisted of several plantation clearing mounds (50-50-04-5492), a historic surface scatter (50-50-04-5491), a roadway (50-50-04-5489), previously recorded Waihe`e Ditch (50-50-04-5197), and a series of lesser ditches (50-50-04-5490 and -5493)
2003	Monoham (Scientific Consultant Services)	Waikapū <i>Ahupua`a</i> in the Kahalani lands east of the Honoapi`ilani Highway	Archaeological assessment	Subsurface testing resulted in recent agricultural debris located in Stratum II--There were no significant findings reported during this study.
2004 and 2006	Rotunno-Hazuka and Pantaleo (Archaeological Services Hawai`i)	Waikapū <i>Ahupua`a</i> in the WaikoBaseyard	Prepared two monitoring plans for the construction of the WaikoBaseyard and a warehouse and associated utilities.	No surface or sub-surface cultural deposits were encountered during ground altering activities.
2006	Morawski, Shefcheck, and Dega (Scientific Consultant Services)	Waikapū <i>Ahupua`a</i> in the Kehalani Subdivision along the Waiale Road	Archaeological monitoring	Five sites were recorded and consisted of a historic road bed (50-50-04-5963), a sugarcane flume (50-50-04-5964), an in situ burial (50-50-04-5680), and two areas of isolated human remains (50-50-04-5965 and -5966).
2007	Bassford and Dega (Scientific Consultant Services)	Waikapū <i>Ahupua`a</i> (located within boundaries of current study)	208 acre parcel archaeological inventory survey	Surface and subsurface (thirty-one backhoe trenches) study yielded no significant findings
2007	Dagher and Dega (Scientific Consultant Services)	Waikapū <i>Ahupua`a</i>	A 60 acre archaeological inventory survey for the proposed Pohakea Rock Quarry expansion	This survey resulted in the re-identification and documenting six sites previously recorded by Paul H. Rosendahl, Inc. (PHRI) in 1988. During the preliminary survey, these sites were only designated temporary site numbers. The present study assigned State Inventory of Historic Properties (SIHP) numbers 50-50-09-6061 through -6065. One of the previously identified sites determined to be natural. The other sites were all documented as historic ranching. Two additional sites were documented [an enclosure (50-50-09-6066) and a modified outcrop (50-50-09-6067)] presumed to be associated with historic ranching activities.
2008	T.S. Dye and Colleagues, Archaeologist	Waikapū <i>Ahupua`a</i> in the WaikoBaseyard	Evaluate if the new antenna and equipment would have a negative effect on documented historic properties	No negative effect

SETTLEMENT PATTERNS

The current project area is situated along the foothills of the West Maui Mountains in Waikapū *ahupua`a*. Previous archaeological investigations, coupled with the history of the area focusing on previous land use, topographic features and ethno-historic accounts, can be used to develop a general predictive model for traditional Hawaiian settlement and subsistence patterns for this project area. The general region, including and encompassing the current project area, is referred to and appears to have been part of a large wetland taro production:

...Spreading north and South from the base of Waikapū to a considerable distance below the valley are the vestiges of extensive wet-taro plantings, now almost obliterated by sugar-cane cultivation; a few here and there are preserved in plantation camps and under house and garden sites along the roads. Among these gardens there were, in 1934, a few patches of dry Japanese taro. Far on the north side, just above the main road and at least half a mile below the entrance to the canyon, an extensive truck garden on old terrace ground showed the large area and the distance below and away from the valley that was anciently developed in terraced taro culture. On the south side there are likewise several sizable kuleanas where, in 1934, old terraces were used for truck gardening. In the largest of these a few old patches were flooded and planted with Hawaiian taro, and there was some dry Japanese taro. Several terraces were used as ponds planted with lotus for their edible seed. There were probably once a few small terraces on the narrow level strip of the valley bottom in the lower canyon... (Handy and Handy 1972:497).

A hypothetical model for traditional Hawaiian settlement was developed by Kirch (1985) and Cordy (1978). According to this postulation, the project area would have been an ideal setting for early Hawaiian permanent habitation. Utilizing dates from other Hawaiian Islands, Cordy postulated that initial pre-Contact settlement in lower valleys and coastal regions occurred from 300 to 600 A.D. and by 1000 A.D. fishponds, protected bays, and religious structures.

The subject area contains a dominant waterway, Waikapū Stream with rich alluvial soils. Traditionally, this stream would have been utilized to create extensive irrigation systems containing numerous pondfields with associated *`auwai*. This stream not only supported the main dietary staple, *lo`i kalo*, but also *mai`a* (bananas), *`uala* (sweet potatoes), *kī* (ti) and trees such as *niu* (coconuts), *wauke* (paper mulberry) and *lau hala*, but was also the freshwater source for the Kealia Ponds. Habitation and religious structures, along with agricultural sites would have been distributed near the *lo`i* patch and down by the shore for marine exploitation, fish pond maintenance and the collection of salt at the salt pans of Mā`alaea and/or Kealia. Historically, the water source would have been important for some of the same reasons but habitation structures would also have been established around towns, railroads and plantation camps. By

reviewing old maps and the Mahele record, the historic settlement patterns can easily be discerned. Conversely, through these archival records and archaeological investigations, the traditional settlement patterns can merely be inferred.

SITE EXPECTABILITY

Based on the aforementioned background information and settlement patterns, the type of sites and/or features that may be encountered within the project area would be associated with traditional and historic habitation, as well as agricultural and animal husbandry sites. Due to the extensive grading activities associated with sugarcane cultivation and the construction of the Maui Tropical Plantation commercial buildings, no surface structural remains associated with the pre-Contact and post Contact eras are anticipated; however features associated with sugarcane cultivation are likely. Remnant subsurface historic properties may include rock alignments, buried cultural deposits, pits and human burials. The likelihood of encountering these subsurface features throughout will be dependent upon the depth of the sugarcane till zone.

METHODS AND PROCEDURES

Archaeological procedures were conducted intermittently from February through June 2013 by supervisor Ms. Diane Guerriero (B.A.) and archaeological personnel Ms. Rochelle Barretto. Overall direction and coordination was performed by Ms. Lisa Rotunno-Hazuka (B.A.) and the Principal Investigator was Mr. Jeffrey Pantaleo (M.A.).

DOCUMENT REVIEW

Document review included examination of archival sources, historic maps, previous archaeological reports from the SHPD and ASH libraries, historic photographs, the Waihona `Āina online data base and multiple online sources. These references were accessed in order to formulate a predictive model of the types of historic properties that may be encountered in the area, and to ascertain the most productive placement of test trenching.

FIELD METHODOLOGY

The perimeter of the project area was established by comparing current landmarks (streets, access cane field roads, structures, fence lines and water ways), the natural topography and information provided on the TMK map, U.S.G.S., topographic maps and aerial photos. Once the boundaries of each respective parcel were determined, a systematic pedestrian survey was performed in areas that were open and devoid of tall, dense sugarcane. For these open areas, transects were spaced ten meters apart, and for sections with dense, tall sugarcane, the pedestrian survey was only feasible through the cane haul roads. The cane

haul roads were traversed and gaps in the sugarcane were accessed through these roads. As potential historic properties were identified, they were marked with flagging tape and assigned a temporary site number. Once the pedestrian survey was completed, the sites and/or features were recorded by producing scaled plan view drawings utilizing tape and compass, photographs and feature description forms. All features and trenches were located with a hand held GPS.

All backhoe test trench excavations were monitored and recorded by archaeological personnel. Placement of the backhoe trenches was determined utilizing the following protocol. All areas proposed for development within the five subject parcels shall be investigated. The testing method employed was systematic random sampling where the areas to be analyzed are chosen at random with a subsequent pre-determined strategy (Hester et. al. 2009). "Use of this sample technique guarantees more uniform coverage of an area than would likely occur with simple random sampling" (Hester et. al. 2009:29). It allows the investigator to obtain information about the subsurface conditions across a project area that aide in determining future excavation strategies for the project area. All LCA's and Grants if accessible within these areas would be tested in particular those containing house lots. Lastly, testing would be initiated outside the LCA's and Grants to obtain representative sampling of these localities.

The backhoe test trenches were number sequentially per project area moving *mauka* to *makai*. Parcel 3 Mauka were labeled TR's 400-415, Parcel 3 Waena contained TR's 1-27 and 01-015, Parcel 6 was TR's 200-225, Parcel 7 trenches were designated TR's 300-324 and Parcel 3 Makai TR's 100-141. Recording of the trenches consisted of photographs and a stratigraphic profile of a representative column for each trench. Stratigraphic profiles were drawn to scale with soil color and texture recorded utilizing the Munsell color system. During the course of this project, all accepted standard archaeological procedures and practices were followed.

LAB WORK

All soil samples were processed by being accessioned and soil color and texture were recorded utilizing the Munsell color system. All artifacts underwent initial processing through accessioning, sorting, and cleaning. Then following any other pertinent procedures the artifacts were analyzed, catalogued, and photographed. All soil samples, recovered artifacts as well as field notes, maps, and photographs generated in connection with the current project are curated at Archaeological Services Hawaii, LLC, in Wailuku and Makawao Maui.

RESULTS

During the course of the current fieldwork a total of four (4) historic properties designated Sites 50-50-04-7881-7884 (TS 1, 3-5) with eighteen (19) associated features identified during the pedestrian survey in Parcel 3 Mauka and Parcel 3 Waena, one known site, Waihe`e Ditch Site 5197 was present between Parcels 6 and 7 (see Figure 8). Identified sites and features included water catchment, sluice gates, water diversion ditches, a remnant retaining wall, World War II bunker and secondarily deposited historic materials. Most of these features were associated with previous and current sugarcane cultivation and various other agricultural endeavors. Site 7881 Features 1-18 consists of concrete lined ditches, sluice gates, dirt culverts with concrete lined headwalls. 7882 (TS3) is an historic L-shaped retaining wall. Site 7883 (TS3) comprises a World War II structure and Site 7884 (TS 2 and 5) are secondarily deposited historic materials recorded at three localities within the project area. The scatters were designated Site 7884 Features 1- 3. Additionally, several low rock agricultural clearing mounds (TS21- 25) and a historic concrete slab (TS4) were documented in Parcel 3 Mauka and Parcel 3 Waena; however these features did not meet any significance criteria evaluation.

Since the majority of the property has been graded and or is currently cultivated, a total of 150 backhoe trenches were executed within the five zones with nominal findings in Parcel 6 TR 218; Parcel 7 TR's 323 and 324.

SITE 50-50-04-7881 (TS 1)

Site 7881 Features 1-18 are located along the northern boundary of Parcel 3 Mauka and consists of a series of ditches and associated sluice gates (water diversion and overflow) and reservoir (Figures 22 and 23). The vegetation in this area along the northwestern upper slope of Waikapū Valley and Stream is forested with trees that include eucalyptus (*Eucalyptus spp.*), Christmas berry trees (*Schinus terebinthifolius*), guava (*Psidium guajva*), abutilon (*Abutilon grandifolium*), ironwood trees (*Casuarina spp.*), morning glory (*Ipomoea spp.*) and various grasses. Features of this site are either located outside the project area limits, or outside the area of potential effect but have been recorded due to the close proximity to the project area.

Site 7881 Feature 1

Feature 1 is one of two ditches that originates and or intersects from the Waikapū Ditch South in the upper Waikapū Valley (Figures 22-23). The total length of the Waikapū Ditch South from the origin of the water source in the upper valley to Feature 3-reservoir is approximately 1.6 km (1 mile) long. Waikapū Ditch South in the upper valley is an open earthen canal and at the point that it becomes improved and concrete lined, it is designated as Feature 1 (Figures 24 and 25). This improved portion

(Feature 1) flows in a west/southeast direction (J-shaped) down slope towards the reservoir (Feature 3) for a length of 21.2 meters at an elevation of approximately 1017 AMSL. Feature 1 is concrete reinforced along the base of the banks and measures 21.2 m long by 1.6 m wide by 1.0 deep with exterior concrete bank heights of 0.30 m on the west and 1.2 m on the east. The service trail/access road which bounds the project area to the north and is parallel to Waikapū Stream on the north bisects Feature 1 at 15.7 m just before it curves to the south and empties into Feature 3 (reservoir) (Figure 26). The bridge measures 5.3 m in width east/west by 2.44 m in length northeast/southwest with an interior height of 0.30 m and exterior height of 0.55 m. Southeast of this service trail road bridge are three water diversion features (Features 4-6) or sluice gates, which intersect with Feature 1 and are discussed in detail below. Feature 4 is located 2.3 m southeast of the bridge, Feature 4a and Feature 5 are 4.1 m and Feature 6 is 7.7 m southeast of the bridge. Features 5 and 6 are abandoned and no longer divert water; however Features 4 and 4a re-channelize a portion of Feature 1 water east to another *auwai* designated Feature 2 (see Figure 25). Feature 2 flows east, parallel along the southside of the dirt access trail bounding Parcel 3 Mauka, and Feature 1 continues south emptying into the Feature 3 reservoir (see Figure 23 below).

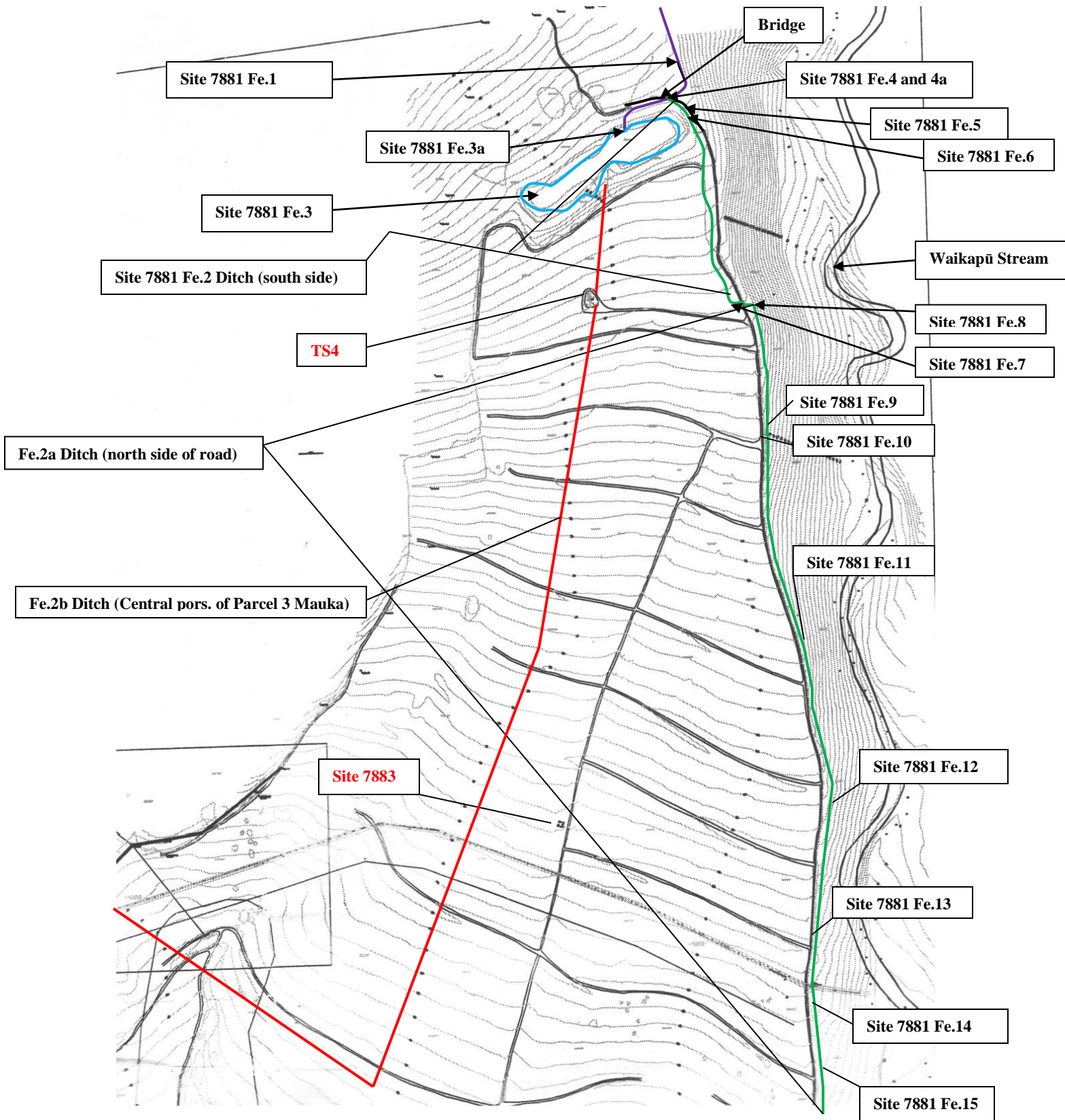


Figure 22. Plan View Map of a portion of Parcel 3 Mauka Showing Location of 7881 Features 1-15 and Site 7883 Features 2 and 3

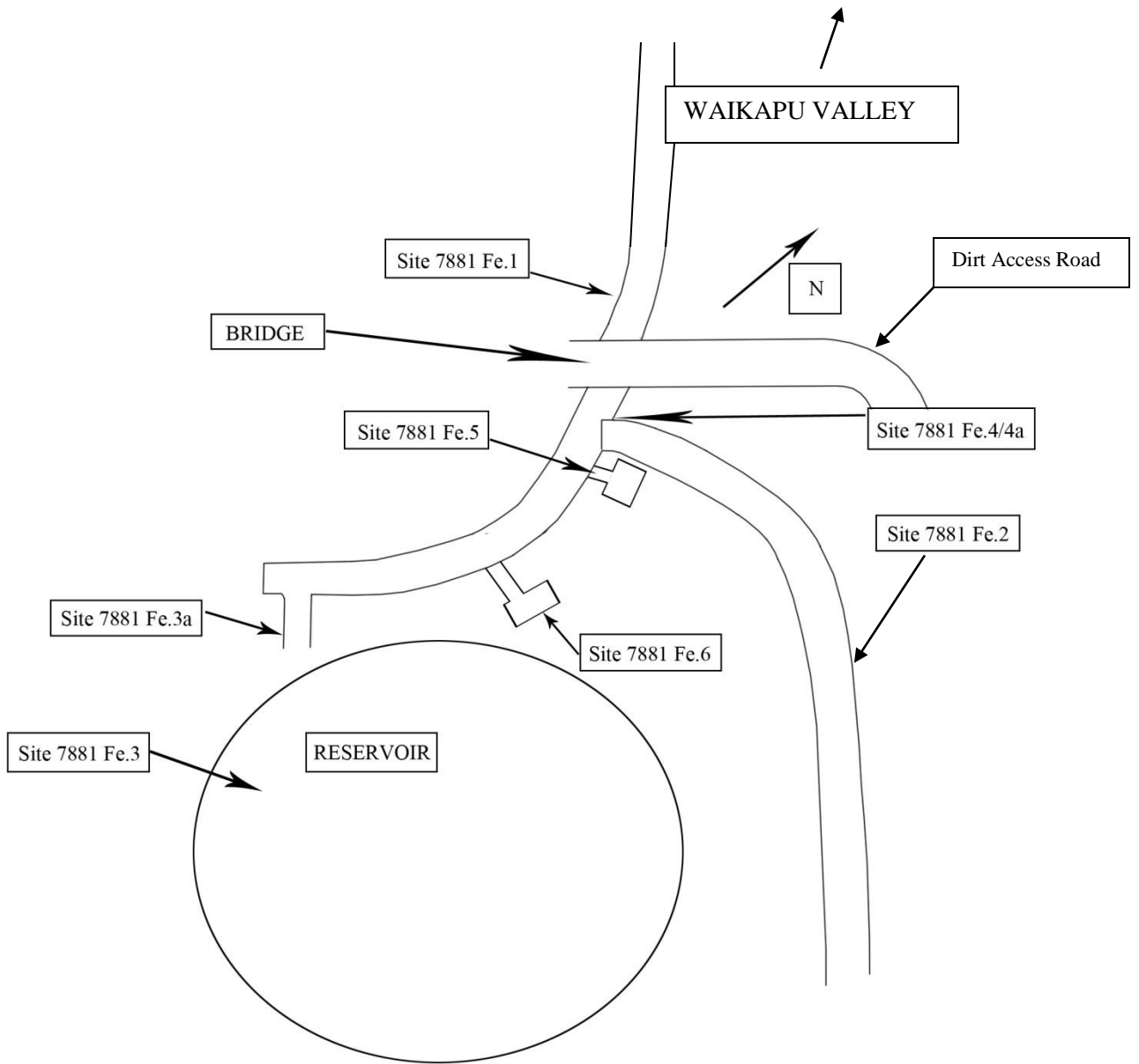


Figure 23. Plan View Map Showing Relationship of Site 7881 Features 1-6



Figure 24. Site 7881 Feature 1 (TS1), View to Northwest towards Upper Valley



Figure 25. Site 7881 Feature 1, View to North with Feature 6 on Right



Figure 26. Site 7881 Feature 1 (TS1) Emptying into Reservoir (Feature 3) thru modernized Chute (Feature 3a) (View to South)

Site 7881 Feature 2

Feature 2 is the second ditch fed from Feature 1 by sluice gate (Feature 4) and water chute (Feature 4a). Feature 2 travels east, parallel to and along the south side of the service trail access road. This ditch appears to be much older and in a dilapidated condition when compared with Feature 1. It is narrower, approximately 0.65 m in width, and comprised primarily of earthen banks with sporadic concrete and mortared rock lining along portions of the banks with concrete partially lining the base of the ditch (Figures 27-28). Feature 2 averages 0.60 m deep and continues for an approximate 214.0 m along the south side of the dirt access road, where it enters another diversion feature, Feature 7 (see Figure 28).



Figure 27. Site 7881 Feature 2 Ditch with Feature 5 in the foreground right (View to West)



Note incised concrete for former rails and associated sluice gates

Feature 7

Figure 28. 7881 Feature 2 Ditch at juncture with Feature 7 diversion feature in foreground (View to West)

Site 7881 Feature 3

Feature 3 is the reservoir that is located just outside of the project area at the top (western) edge of Parcel 3 Mauka at an elevation of 1017 AMSL (see Figures 22 and 30). Feature 1, the improved portion of Waikapū Ditch South empties into the reservoir on the west (see Figure 26). The water source originates from the upper the Waikapū Valley and flows through various `auwai and sluice gates to provide water to the agricultural endeavors below.



Figure 29. Site 7881 Feature 3 Reservoir, View to South

Site 7881 Feature 3a

Feature 3a is modernized chute that empties directly into (Feature 3) Reservoir from Feature 1 (see Figure 23). This feature utilizes wooden sluice gates with metal chains and locks, reinforced fiberglass chute walls with an 8-inch PVC piping that funnels the ditch (Feature 1) water into the reservoir.



Figure 30. Overview Photograph of Feature 1 (Left) and Feature 3a (Right)

Site 7881 Feature 4

Feature 4 is the water diversion feature which feeds Feature 2 ditch. It is a modern wooden sluice gate located along the northeast side of Feature 1 approximately 2.3 m northeast from the bridge (see Figures 22, 23 and 31). Feature 4 is secured into position with chains and a key lock and allows water to flow east through Feature 4a water chute and Feature 2 ditch. Feature 4a is situated along the north side of abandoned water diversion feature (Feature 5) and is further discussed below.



Figure 31. Photograph of Site 7881 Features 1 and 2 ditches and diversion structures Features 4, 4a and 5 (View to South)

Site 7881 Feature 4a

Feature 4a is the water chute associated with Feature 4 sluice gate. It is located 1.8 m at 36° NE of Feature 4. It consists of a concrete intake chute and a concrete “box shape” out take chute which formerly connected with the well containment box of Feature 5. The first intake chute connects with Feature 1 ditch on the west (see Figure 31) and measure 1.2 m E/W by 1.2 m N/S, with an interior height of 1.35 m N/S and an exterior height of 1.1 to 1.2 m that connects to a “box like” cement capped water well containment box that measures 1.35 N/S by 1.25 m E/W and connects with another off take chute on the east that measures 1.3 m E/W by 1.2 m N/S, with an interior height of 1.0 m N/S and an exterior height of 1.2 m (Figure 32). The out take chute on the east presumably emptied into the reservoir at an earlier time or another ditch for sugarcane irrigation.



Figure 32. Photograph of Site 7881 Features 4, 4a and 5 Water Diversion Features (Bottom)



Figure 33. Site 7881 Feature 1 (ditch), Feature 5 (Water Containment Feature) and Feature 4 (Sluice Gate) (View to North)



Figure 34. Site 7881 Feature 2 ditch Flowing East from Feature 4a with Portion of Feature 5 bottom right (View to East)

Site 7881 Feature 5

Feature 5 is an abandoned water diversion and containment feature situated along the southeast side of Feature 4a and exemplified in Figures 31 through 33. It is 4.1 m southeast of the bridge and adjacent to Feature 4a. It is a formed concrete rectangular structure with the containment well feature abutting Feature 1 channel which measures 1.20 m long by 1.2 m wide by 1.0 m high on the interior and 1.1 to 1.2 m on the exterior. The concrete top or lid measures 1.35 m long by 1.25 m wide by 1.2 m high. If operational, Feature 5 would have diverted water into Feature 2, the down slope eastern channel.

Site 7881 Feature 6

Feature 6 is the last abandoned water diversion feature also situated along the east side of Feature 1. It is an L-shaped structure similar to the other water features made of formed concrete which contains large aggregate gravel inclusions (Figures 35 and 36). The intake and out take walls range from 0.96 to 1.2 m long by 0.62 m to 1.1 m wide by 1.0 m to 1.4 m high with a concrete cap measuring 0.90 m long (north/south) by 0.80 wide m wide and 1.1 m high. Incised into the concrete out take walls are metal railroad rails in which the sluice gate could slide up and down along the rails to control the flow of water. The embedded rails were observed within several sluice gate or water diversion features in the area. Feature 6 would have diverted water east into another *`auwai* (ditch) that flowed further down slope to irrigate sugarcane.



Figure 35. Photograph of Site 7881 Feature 6 foreground with Feature 1 ditch background (View to North)



Figure 36. Photograph of Site 7881 Feature 1-Ditch (left) and Feature 6-Water Diversion (right) (View to North)

Site 7881 Feature 7

Feature 7 is one of two sluice gates associated with Feature 2 ditch. It is located 214 m east of the juncture from Features 2 and 4 (sluice gate). Feature 7 has concrete lined walls with two chutes, one is open and water flows under the service road to Feature 8 on the north side of the service access road. The other chute is closed with a metal sluice gate and appears to have been closed for some time (Figure 37).