

---

**Archaeological Inventory Survey Plan  
For Construction Phase I of the  
Honolulu High-Capacity Transit Corridor Project  
Station 392+00 (near East Kapolei Station) to Station  
776+00 (near Waimano Home Road),  
Honouliuli, Hō‘ae‘ae, Waikele, Waipi‘o, and Waiawa  
Ahupua‘a, ‘Ewa District, O‘ahu  
TMK: [1] 9-1, 9-4, 9-5, 9-6, 9-7 (Various Plats and Parcels)**

**Prepared for  
PB  
And the  
City & County of Honolulu**

**Hallett H. Hammatt, Ph.D.  
And  
David W. Shideler, M.A.**

**Cultural Surveys Hawai‘i, Inc.  
Kailua, Hawai‘i  
(Job Code: HONOULIULI 18)**

**March 2009**

---

O‘ahu Office  
P.O. Box 1114  
Kailua, Hawai‘i 96734  
Ph.: (808) 262-9972  
Fax: (808) 262-4950

[www.culturalsurveys.com](http://www.culturalsurveys.com)

Maui Office  
1993 Main St.  
Wailuku, Hawai‘i 96793  
Ph: (808) 242-9882  
Fax: (808) 244-1994

---

## Management Summary

Reference	Archaeological Inventory Survey Plan For Construction Phase I of the Honolulu High-Capacity Transit Corridor Project Station 392+00 (near East Kapolei Station) to Station 776+00 (near Waimano Home Road), Honouliuli, Hō'ae'ae, Waikele, Waipi'o, and Waiawa Ahupua'a, 'Ewa District, O'ahu TMK: [1] 9-1, 9-4, 9-5,9-6,9-7 (Various Plats and Parcels) (Hammatt & Shideler 2009)
Date	March 2009
Project Number (s)	Cultural Surveys Hawaii (CSH) Job Code HONOULIULI 18
Investigation Permit Number	The fieldwork for the planned archaeological inventory survey investigation will likely be carried out under 2008 archaeological permit # 08-14 issued to CSH by the Hawai'i State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR), per Hawai'i Administrative Rules (HAR) Chapter 13-282.
Project Location	The proposed Honolulu High-Capacity Transit Corridor extending from Station 392+00 (near East Kapolei Station) to Station 776+00 (near Waimano Home Road), South O'ahu
Land Jurisdiction	State, City & County of Honolulu and private
Agencies	Prepared for the review of the City & County of Honolulu and the State Historic Preservation Division
Project Description	The purpose of the Honolulu High-Capacity Transit Corridor Project is to provide high-capacity rapid transit in the highly congested east-west transportation corridor between Kapolei and UH Mānoa, as specified in the Oahu Regional Transportation Plan 2030. The project corridor for the first construction phase addressed in this plan extends for approximately 35,400 linear feet (10.789 km or 6.70 miles) and includes seven proposed stations (East Kapolei Station, University of Hawai'i (UH) West O'ahu Station, Ho'opili Station, West Loch Station, Waipahu Transit Center Station, Leeward Community College Station, and Pearl Highlands Station) as well as park-and-ride and maintenance facilities.
Project Acreage	The project area addressed in this study (Construction Phase 1 plus a little more on the Diamond Head side to the vicinity of Waimano Home Road) includes three major types of developments with subsurface impacts: 6 areas for park-and-ride facilities and maintenance facilities with a total area of approximately 117.5 acres, seven stations with a total area of approximately 2.1 acres and approximately 236 column foundations impacting a collective area of approximately 0.4 acres. The total area of potential subsurface impact addressed is thus estimated at 120.0 acres.

Area of Potential Effect (APE) and Survey Acreage	The project team understands the area of potential effect for project impacts to subsurface cultural deposits and/or human skeletal remains to be equal to the project acreage as discussed above (estimated at 120.0 acres) plus the area of any ancillary impacts – in particular impacts related to City and County utilities that will need to be re-located as a direct result of Construction Phase 1. The extent of this utility re-location impact is unclear at this time but is believed to be less than 10% of the area of direct project impact.
Historic Preservation Regulatory Context	This Archaeological Inventory Survey Plan was prepared in accordance with Hawaii Administrative Rules (HAR) 13-276 governing archaeological inventory surveys.

# Table of Contents

<b>Management Summary .....</b>	<b>i</b>
<b>Section 1 Introduction .....</b>	<b>1</b>
1.1 Project Background .....	1
1.2 Overview of Proposed Construction.....	1
1.2.1 Fixed Guideway and Stations .....	1
1.2.2 Support Facilities .....	2
1.2.3 Ancillary impacts.....	2
1.3 Environmental Setting for Construction Phase I .....	3
1.3.1 Natural Environment.....	3
1.3.2 Natural Environment for Construction Phase I West of Kunia Road .....	3
1.3.3 Natural Environment for Construction Phase I East of Kunia Road .....	5
1.3.4 Built Environment West of Kunia Road.....	8
1.3.5 Built Environment East of Kunia Road .....	8
<b>Section 2 Mythological and Traditional Accounts .....</b>	<b>9</b>
2.1 Honouliuli .....	9
2.1.1 Traditions of Hawaiian Gods and Demi-gods .....	9
2.1.2 The Naming of Honouliuli.....	9
2.1.3 Trails through Honouliuli .....	12
2.1.4 Pu‘uokapolei and the Plains of Kaupe‘a.....	13
2.1.5 The Caves of Honouliuli.....	17
2.1.6 Pearl Harbor (Pu‘uloa) and West Loch (Kaihuopala‘ai) .....	18
2.2 Hō‘ae‘ae, Waikele, Waipi‘o and Waiawa Place Names .....	27
2.2.1 Hō‘ae‘ae.....	27
2.2.2 Waikele .....	28
2.2.3 Waipi‘o .....	28
2.2.4 Waiawa .....	30
2.2.5 Legends of the Lowlands and Pearl Harbor.....	31
2.2.6 Legends of the Inland Plain called Keahumoa .....	34
2.2.7 Legends of the Uplands .....	37
2.2.8 Traditional Accounts of Pre-Contact and Early Post-Contact Hawaiian Battles .....	38
<b>Section 3 Background History .....</b>	<b>43</b>
3.1 ‘Ewa as a Political Center.....	43
3.2 Honouliuli .....	45
3.2.1 Early Post-Contact Period – Late Eighteenth to Mid-Nineteenth Centuries .....	45
3.2.2 Mid-Nineteenth Century and the Māhele .....	46
3.2.3 Late Nineteenth Century to Present .....	51
3.2.4 Residential and Commercial Development in Honouliuli .....	59
3.3 Central ‘Ewa – Hō‘ae‘ae, Waikele, Waipi‘o, and Waiawa .....	65
3.3.1 Pre-Contact and Early Post-Contact Agriculture and Habitation .....	65
3.3.2 Protestant Missionaries and Roman Catholic Priests.....	66
3.3.3 The Māhele .....	69
3.3.4 The Oahu Sugar Co. and the Waiahole Ditch System .....	86
3.3.5 Other Agricultural Enterprises.....	87

3.3.6 The Military in Central 'Ewa.....	89
3.3.7 From Rural Farms to Modern Urban Development.....	90
<b>Section 4 Previous Archaeological Research.....</b>	<b>96</b>
4.1 Previous Archaeological Investigations West of Kunia/Fort Weaver Roads .....	96
4.2 Previous Archaeological Investigations East of Kunia/Ft. Weaver Roads to Waimano Home Road .....	102
4.3 Background Summary and Predictive Model.....	105
4.3.1 Predictive Model West of Kunia Road.....	106
4.3.2 Predictive Model East of Kunia Road .....	106
<b>Section 5 Proposed Archaeological Inventory Survey Methods.....</b>	<b>107</b>
5.1 Field Methods .....	107
5.2 Ground Penetrating Radar (GPR) Methodology.....	107
5.2.1 Survey Methodology .....	107
5.2.2 Data Collection & Post-processing.....	108
5.3 Excavation Methods .....	108
5.4 Laboratory Methods.....	109
5.5 Descriptions of Sites .....	109
5.6 Reporting .....	109
5.7 Disposition of Finds and Documentary Data.....	110
<b>Section 6 Sampling Strategy.....</b>	<b>111</b>
6.1 Archaeologist Observation of Geotechnical Testing .....	111
6.2 Ground Penetrating Radar .....	111
6.3 Excavation Sampling Strategy.....	111
6.3.1 Excavation Sampling Strategy – Park-and-Ride and Maintenance Facilities.....	112
6.3.2 Excavation Sampling Strategy - Stations.....	113
6.3.3 Excavation Sampling Strategy – Column Foundation Locations .....	122
<b>Section 7 References Cited .....</b>	<b>144</b>

## List of Figures

Figure 1. Place Names of Honouliuli (baseline map 1998 U.S.G.S. map); the modern Farrington Highway and H-1 freeway generally follows the ancient cross- <i>ahupua‘a</i> trail .....	10
Figure 2. 1877 map of Waikele, Waip‘io, and Waiawa Ahupua‘a, with landmarks of Waipi‘o by J. F. Brown (Registered Map No. 499, Hawai‘i Land Survey Division).....	29
Figure 3. Trails in ‘Ewa map, drawn to Paul Rockwood (not to scale) to show O‘ahu trails ca. 1810, as described by John Papa ‘I‘i (1959:96).....	32
Figure 4. 1875 map of Honouliuli by W. D. Alexander, showing location of corridor in relation to the “Honouliuli Taro Lands” (Registered Map No. 405, Hawai‘i Land Survey Division) .....	49
Figure 5. Tracing of 1878 Map of Honouliuli Taro Lands (with LCA parcels) by M.D. Monsarrat (Registered Map No. 630, with added information from Land Court Application Map. No. 1069; Hawai‘i Land Survey Division).....	50
Figure 6. 1880s photograph of James Campbell’s residence on the ‘Ewa Plain (Hawaii State Archives).....	51
Figure 7. Photo entitled “Drilling artesian well at Ewa ca. 1890” (Wilcox 1996:18) .....	53
Figure 8. Fighting fires at West Loch on May 21, 1944, Signal Corps photo (NPS: USAR Collection).....	59
Figure 9. 1919 War Department fire control map, showing location of HHCTCP alignment .....	60
Figure 10. 1927 U. S. Geographic Survey map, showing location of HHCTCP alignment.....	61
Figure 11. 1943 War Department map, showing location of HHCTCP alignment.....	62
Figure 12. 1950 Army Mapping Service map, showing location of HHCTCP alignment.....	63
Figure 13. 1970 aerial photograph, showing location of HHCTCP alignment .....	64
Figure 14. 1851 sketch of Kahikuonālani Church on Haupū in ‘Ewa on the shores of Pearl Harbor in Waiawa (original sketch by Paul Emmert in Mission House Museum Library, Honolulu; reprinted in Gowans 1993:10) .....	69
Figure 15. 1905 map of Hō‘ae‘ae (portion), by M. D. Monsarrat, showing relationship of alignment and station to the irrigated taro lands of Hō‘ae‘ae (Map on file at Hawai‘i Land Survey Division, Honolulu); note location of Roman Catholic Church (St. Joseph’s) and school lot and the “Paiwa Church” in Waikele (upper right side of figure).....	71
Figure 16. 1875 map of Waikele by W. D. Alexander, showing <i>‘ili</i> near the HHCTCP alignment (Registered Map No. 120, Hawai‘i Land Survey Division) .....	74
Figure 17. 1889 map of Waikele, showing Land Commission Awards near the HHCTCP Alignment (Registered Map No. 1498, Hawai‘i Land Survey Division); note location of “Paiwa Church” .....	75
Figure 18. 1898 map of the Pouhala ‘Ili School Lot in Waikele Ahupua‘a, showing extent of Catholic Cemetery, which once extended <i>makai</i> almost to Farrington Highway and the HHCTCP Alignment (Registered Map No. 1950, Hawai‘i Land Survey Division).....	76
Figure 19. 1851 map of Waipi‘o by Rev. Artemas Bishop, showing lands of John Papa ‘I‘i near the HHCTCP alignment (Registered Map No. 107, Hawai‘i Land Survey Division).....	79
Figure 20. 1887 map of Waiawa, Mānana, and Waimano by Rev. Artimas Bishop, showing Land Commission Awards (Registered Map Mo. 1258, Hawai‘i Land Survey Division) ...	83
Figure 21. Undated photograph of the Waipahu Rice Field .....	87

Figure 22. 1919 War Department Fire Control map, showing HHCTCP alignment .....91

Figure 23. 1927 U.S Geographic Survey, showing HHCTCP alignment.....92

Figure 24. 1943 War Department map, showing HHCTCP alignment .....93

Figure 25. 1950 U.S. Geographic Survey map, showing HHCTCP alignment.....94

Figure 26. 1970 Aerial photograph of central Ewa, showing urban development around the  
HHCTCP Alignment.....95

Figure 27. Map showing location of previous archaeological studies near the east end of the  
transit corridor.....97

Figure 28. Farrington Highway portion of Construction Phase 1 depicting previous  
archaeological investigations and previously recorded archaeological resources .....103

Figure 29. East Kapolei Station proposed archaeological inventory survey sampling (one trench  
in west portion of station) .....116

Figure 30. UH West O‘ahu Station proposed archaeological inventory survey sampling (one  
trench in west portion of station) .....117

Figure 31. Ho‘opili Station proposed archaeological inventory survey sampling (one trench in  
west portion of station) .....118

Figure 32. West Loch Station proposed archaeological inventory survey sampling (13 proposed  
trench locations – constraints permitting).....119

Figure 33. Waipahu Transit Center Station proposed archaeological inventory survey sampling  
(11 proposed trench locations – constraints permitting).....120

Figure 34. Leeward Community College Station proposed archaeological inventory survey  
sampling (3 spaced trenches in northwest central portion of station).....121

Figure 35. Pearl Highlands Station and Park & Ride Facility proposed archaeological inventory  
survey sampling (11 proposed trench locations in park-and-ride, 7 column  
foundations in the immediate area are to be tested, and 2 additional test trenches are  
to be placed in the station area – constraints permitting).....123

Figure 36. Key to the following maps of column foundations recommended for testing in the  
western portion of Construction Phase 1 .....125

Figure 37. Key to the following maps of column foundations recommended for testing in the  
eastern portion of Construction Phase 1 .....126

Figure 38. Schematic Plan Construction Phase I Sheet RW001 extending from Station 385+07  
(Start Construction) to 411+00 including East Kapolei Station (see Figure 29) and an  
associated proposed 12-acre park-and-ride facility (at upper left) (proposed  
subsurface testing is one trench at the park-and-ride facility, one trench at the station  
and excavation of the column foundation at approximately 404+00) .....127

Figure 39. Schematic Plan Construction Phase I Sheet RW002 extending from Station 411+00 to  
435+00 (proposed subsurface testing is excavation of the column foundation at  
approximately 417+00).....128

Figure 40. Schematic Plan Construction Phase I Sheet RW003 extending from Station 435+00 to  
459+00, including U H West O‘ahu Station (see Figure 30), and two associated  
proposed 5-acre park-and-ride facilities (proposed subsurface testing is one trench at  
each of the two park-and-ride facilities, one trench at the station and excavation of the  
column foundation at approximately 451+00).....129

Figure 41. Schematic Plan Construction Phase I Sheet RW004 extending from Station 459+00 to 483+00 (proposed subsurface testing is excavation of the column foundation at approximately 470+50).....130

Figure 42. Schematic Plan Construction Phase I Sheet RW005 extending from Station 483+00 to 507+00 and including Ho‘opili Station (see Figure 31) (proposed subsurface testing includes one trench at the Ho‘opili Station and excavation of the column foundation at approximately 502+30).....131

Figure 43. Schematic Plan Construction Phase I Sheet RW006 extending from Station 507+00 to 531+00 and a western spur to a proposed 41-acre Maintenance and Storage Facility (proposed subsurface testing includes one trench at the proposed maintenance facility – to the northwest off map – and excavation of the column foundation at approximately 513+00).....132

Figure 44. Schematic Plan Construction Phase I Sheet RW007 extending from Station 531+00 to 555+00 (proposed areas for testing are 4 column foundations at approximately 535+00, 541+00, 543+00 and 547+50 – constraints permitting) .....133

Figure 45. Schematic Plan Construction Phase I Sheet RW008 extending from Station 555+00 to 581+00, and including West Loch Station (see Figure 32), (and proposed areas for testing are 2 column foundations within sheet at approximately 568+50 and 571+50 – constraints permitting) .....134

Figure 46. Schematic Plan Construction Phase I Sheet RW009 extending from Station 581+00 to 605+00 (proposed areas for testing are 2 column foundations within sheet at approximately 587+50 and 588 + 80 – constraints permitting).....135

Figure 47. Schematic Plan Construction Phase I Sheet RW010 extending from Station 605+00 to 630+00 (proposed areas for testing are 3 column foundations within sheet at approximately 615+20, 619+80 and 626+80 – constraints permitting).....136

Figure 48. Plan Construction Phase I Sheet RW011 extending from Station 630+00 to 655+00 and including the Waipahu Transit Center Station (see Figure 33) (proposed areas for testing are 5 column foundations within sheet at approximately 644+50, 645+70, 647+00, 649+50 and 652+50 – constraints permitting).....137

Figure 49. Plan Construction Phase I Sheet RW012 extending from Station 655+00 to 679+00 (proposed areas for testing are 2 column foundations at approximately 660+00 and 663+00).....138

Figure 50. Plan Construction Phase I Sheet RW013 extending from Station 679+00 to 705+00 and showing the northwest portion of a Proposed 43.3-acre Maintenance and Storage Facility (proposed area for testing is 1 column foundation at approximately 701+50)139

Figure 51. Plan Construction Phase I Sheet RW014 extending from Station 704+00 to 728+00 showing the northeast portion of a Proposed 43.3-acre Maintenance and Storage Facility and Leeward Community College Station (see Figure 34) (proposed area for testing is 1 column foundation to be located somewhat arbitrarily – not shown) .....140

Figure 52. Plan Construction Phase I Sheet RW015 extending from Station 728+00 to 748+00, showing a proposed 11-acre park-and- ride facility, and the Pearl Highlands Station (see Figure 35) (proposed area for testing is 7 column foundations at approximately 735+00, 736+50, 738+20, 739+50, 741+00, 742+00 and 743+30).....141

Figure 53. Plan Construction Phase I Sheet RW016 extending from Station 748+00 to 770+00  
(proposed area for testing is 1 column foundation just north of approximately  
765+00).....142

Figure 54. Plan Construction Phase I Sheet RW017 extending from Station 770+00 to 794+00  
(proposed area for testing is 1 column foundation at approximately 772+70).....143

## List of Tables

Table 1. Honouliuli Place Names .....11

Table 2. 72 Kuleana Awards in Honouliuli Ahupua‘a .....47

Table 3. Honouliuli Sub-area Land Commission Awards .....48

Table 4. Land Commission Awards in Hō‘ae‘ae Ahupua‘a .....70

Table 5. Land Commission Awards in Waikele .....72

Table 6. Land Commission Awards in Waipi‘o .....77

Table 7. *Kuleana* Awards in Waikele Ahupua‘a .....82

Table 8: Farrington Highway Sub-area Land Commission Awards.....84

Table 9. Data Collection Settings .....108

Table 10. Proposed Sampling Strategy at Park-and-Ride and Maintenance Facility Locations .112

Table 11. Proposed Sampling Strategy at Stations and Column Foundation Locations .....114

# Section 1 Introduction

---

## 1.1 Project Background

This Archaeological Inventory Survey Plan addresses the first construction phase of the Honolulu High-Capacity Transit Corridor Project Station 392+00 (near East Kapolei Station) to Station 746+00 (near Pearl Highland Station), Honouliuli, Hō'ae'ae, Waikele, Waipi'o, and Waiawa Ahupua'a, 'Ewa District, O'ahu TMK: [1] 9-1, 9-4, 9-5,9-6,9-7 (Various Plats and Parcels) (see Figures 36 & 37 for a key to the following Figures 38 -54 providing detailed depictions of the alignment and Figures 29 – 35 for details of the stations).

The project corridor for the first construction phase addressed in this plan extends for approximately 35,400 linear feet (10.789 km or 6.7 miles) and includes seven proposed stations (East Kapolei Station, University of Hawai'i (UH) West O'ahu Station, Ho'opili Station, West Loch Station, Waipahu Transit Center Station, Leeward Community College Station, and Pearl Highlands Station). In addition the present plan addresses the following:

- An 11.8 acre East Kapolei Station Park-and- Ride Facility located just southwest of the East Kapolei Station,
- Two proposed park-and-ride facilities of approximately 5-acres each located just east of the proposed UH West O'ahu Station,
- A proposed Maintenance and Storage Facility of approximately 12-acres located just northwest of the intersection of the project corridor's intersection with Farrington Highway,
- A proposed Maintenance and Storage Facility of approximately 43.3-acres located just southwest of the proposed Leeward Community College Station, and
- A proposed park-and-ride facility of approximately 11-acres located just west of the proposed Pearl Highlands Station

## 1.2 Overview of Proposed Construction

The exact design, process, method of construction and timeline continue to be refined. The following information is a synopsis from the Honolulu High-Capacity Transit Corridor Project Draft Environmental Impact Statement (Appendix C - Construction Process).

### 1.2.1 Fixed Guideway and Stations

As presently envisioned the project involves a fixed guideway and stations that would largely be aerial. The four main components of the fixed guideway system to be constructed include foundations, piers (support columns), superstructure (the elevated guideway structure), and stations. The subsurface impacts would be largely associated with the excavation of foundations for the support columns and stations. Typical pier spacing is understood to be approximately 150 feet (45.7 m) with shorter or longer spans used where needed. Dividing the indicated first construction phase project length (35,400 linear feet) by the indicated column spacing (1 every 150 feet) suggests something on the order of 236 support column foundation excavations.

However, it seems clear that certain additional excavations will be needed, such as in station areas for the support of platforms, mezzanines, elevators, escalators, stairs, roofing, architectural items, etc.

The preferred foundation excavation technology at the present is drilling with a large (6-foot to ten-foot) diameter auger. An advantage to this technology is that a minimal area needs to be disturbed and thus potential adverse impact to subsurface cultural resources can be minimized. A disadvantage is that the mitigation of impacts to cultural resources during the actual drilling is problematic. This difficulty of mitigation during construction would be heightened if stabilization of unstable ground is indicated (often involving jet grouting or other injection of cementitious material) and/or a slurry is used to counterbalance inward seepage of groundwater.

In addition to the drilling it is assumed that there will be at least some pile driving which can include a combination of striking the pile with a heavy weight, vibrating the pile or jacking the pile. It is assumed that in some cases the initial excavation for piles would also be by drilling.

In some cases it will almost certainly be the case that multiple smaller drilled or driven piles will be connected with pile caps or concrete foundations linking the tops of piles to pier foundations. While often the open excavation used for the pile caps is carried out after the piles are set present plans are for the open excavation for the pile caps to precede the setting of the piles. While the pile cap excavations are relatively shallow, they may well extend below the depth of potentially culture-bearing soils.

The depth of the excavations for foundations will likely be between 50 and 150 feet (no potentially culture bearing sediments are anticipated below 15 feet and in almost all cases would not be expected to extend below 5 feet).

### **1.2.2 Support Facilities**

As presently envisioned support facilities, including proposed future park-and-ride areas, proposed future maintenance and storage facility areas, and traction power substations, would be at grade. Although subsurface structural foundation work might be minimal some grading and excavation for amenities (office facilities, storage facilities, toilet facilities, lighting, landscaping, drainage, utility conduits, sidewalks, etc.) would be expected.

### **1.2.3 Ancillary impacts**

On projects of this scale, ancillary impacts can be significant and merit discussion.

Existing utilities that conflict with the project's construction would be relocated. The nature and extent of these utility relocations is not clear at this time. As the nature and extent of these utility relocations becomes clearer consultation with the State Historic Preservation Division is recommended. Appropriate mitigation might include incorporation of these relocations within a monitoring program.

It is understood that perhaps all of the foundation excavations will extend far below the water table potentially creating significant need for the management of displaced water and/or slurry. It is unclear at this time how this will be managed but we cannot rule out significant excavation for de-watering pits.

Multiple staging areas for construction equipment and stockpiling of construction material will be needed. While the use of proposed future park-and-ride areas and proposed future maintenance and storage facility areas for construction staging is planned additional construction staging areas will be needed.

## 1.3 Environmental Setting for Construction Phase I

### 1.3.1 Natural Environment

Because the first construction phase lies in two rather different geographic areas it is suggested to be appropriate to divide the discussion of the natural environment between the relatively inland southwestern Honouliuli lands that were, as a generalization, relatively barren and little used prior to being placed under sugar cane cultivation for a century and the lands on the margin of Pearl Harbor that were much more intensively used in traditional Hawaiian times and that have continued under fairly intensive habitation to the present time. A rather convenient and only slightly arbitrary division is Kunia Road (Station 570+00).

### 1.3.2 Natural Environment for Construction Phase I West of Kunia Road

The southwestern portion of the first construction phase extends through the 'Ewa Plain, seaward (*makai*) of the Wai'anae Mountain Range. The 'Ewa Plain is a Pleistocene (>38,000 years old) reef platform overlain by alluvium. The terrain consists of limestone and alluvial deposits, which overlie flows of the Wai'anae volcanic series (MacDonald et al. 1983:423). In pre-contact Hawai'i, the project area would have been covered by lowland dry shrub and grassland, but this area has been extensively disturbed and transformed by human activity; it is now dominated by a variety of exotic grasses, weeds, and shrubs.

Elevations within the sub-area vary between approximately 80 and 160 feet, and the area receives an average of 24 inches of rain annually (Giambelluca et al. 1986).

The only major streams running through this southwestern portion of the first construction phase is Honouliuli Stream.

According to USDA soil survey data (Foote et al. 1972), sediments in the southwestern portion of the first construction phase include: Kunia Silty Clay (KyA, KyC), Waipahu Silty Clay (WzA, WzB, WzC), Kawaihapai Clay Loam (KlA), and Honouliuli Clay (HxA, HxB) at various slopes.

The Kunia soil series is described (Foote et al. 1972) as follows:

This series consists of well-drained soils on upland terraces and fans on the island of Oahu. These soils developed in old alluvium. They are nearly level to moderately sloping. Elevations range from 700 to 1,000 feet. The mean annual rainfall amounts to 30 to 40 inches, most of which occurs from November to April. The mean annual soil temperature is 71° F. Kunia soils occur on the foot slopes of the Waianae Range, near Schofield Barracks. They are geographically associated with Kolekole, Lahaina, and Wahiawa soils.

These soils are used for sugarcane, pineapple, home sites, and military reservations. Most areas are cultivated, and the natural vegetation is not significant.

The Waipahu soil series is described (Foote et al. 1972) as follows:

This series consists of well-drained soils on marine terraces on the island of O'ahu. These soils developed in old alluvium derived from basic igneous rock. They are nearly level to moderately sloping. Elevations range from nearly sea level to 125 feet. Rainfall amounts to 25 to 35 inches annually; most of it occurs between November and April. The mean annual soil temperature is 75° F. Waipahu soils are geographically associated with Hanalei, Honouliuli, and Waialua soils.

The Kawaihapai soil series is described (Foote et al. 1972) as follows:

This series consists of well-drained soils in drainage ways and on alluvial fans on the coastal plains on the islands of O'ahu and Moloka'i. These soils formed in alluvium derived from basic igneous rock in humid uplands.

They are nearly level to moderately sloping. Elevations range from nearly sea level to 300 feet. The annual rainfall amounts to 30 to 50 inches. The mean annual soil temperature is 73° F. Kawaihapai soils are geographically associated with Haleiwa, Waialua, and Jaucas soils.

These soils are used for sugar cane, truck crops, and pasture. The natural vegetation consists of *kiawe*, *koa haole*, lantana, and bermudagrass.

The Honouliuli soil series is described (Foote et al. 1972) as follows:

This series consists of well-drained soils on coastal plains on the island of O'ahu in the 'Ewa area. These soils developed in alluvium derived from basic igneous material. They are nearly level and gently sloping. Elevations range from 15 to 125 feet. The annual rainfall amounts to 18 to 30 inches and occurs mainly between November and April. The mean annual soil temperature is 74° F. Honouliuli soils are geographically associated with 'Ewa, Lualualei, Mamala, and Waialua soils.

These soils are used for sugar cane, truck crops, orchards, and pasture. The natural vegetation consists of *kiawe*, *koa haole*, fingergrass, bristly foxtail, and bermudagrass.

The southwestern portion of the first construction phase extends through a number of cultivated fields that are currently producing crops. Natural vegetation elsewhere in the sub-area consists predominantly of introduced perennial grasses and weeds, along with *kiawe* (*Prosopis pallida*) and *koa haole* (*Leucaena leucocephala*).

### 1.3.3 Natural Environment for Construction Phase I East of Kunia Road

The eastern portion of the first construction phase (east of Kunia Road) is between 0.4 and 1.2 miles inland of the West and Middle Lochs of Pearl Harbor. Terrain is fairly level with elevations between 20 and 40 feet above sea level, rising to 100 to 200 feet above sea level toward the Koko Head end. The sub-area receives an average of 24 to 31 inches of annual rainfall (Giambelluca et al. 1986).

The largest stream intersecting the project alignment in this sub-area is Waikele Stream in Waikele Ahupua'a. The name Waikele means "muddy water" (Pukui et al. 1983) and this appellation likely refers to the two permanent streams, Waikakalaua Stream and Kīpapa Stream, which flow through the Schofield Plateau and converge with Waikele Stream. Waikakalaua Stream has tributaries in the Ko'olau and Wai'anae Ranges; Kīpapa Stream originates in the Ko'olau Range; and Waikele Stream originates in the Wai'anae Range. These streams drain a "large expanse of lateritic soils of fine particle size [and therefore] the water would have appeared muddy in prehistoric times even during periods of normal flow" (Hammatt and Borthwick 1988). The permanent streams form steep gulches that cut through layers of interbedded thick basalt flows and thinner layers of weathered alluvium, which consist of loosely consolidated saprolitic pebbles and cobbles with occasional boulders (Riford 1986). Within the gulches, the bottom-lands along the stream channels consist of deep, well-drained Haleiwa silty clay on nearly level slopes.

Four smaller, non-perennial streams intersect this sub-area: Hō'ae'ae Stream at the 'Ewa end, Kapakahi and Makalena Streams between West and Middle Lochs, and Waiawa Stream at the Koko Head end.

According to USDA soil survey data (Foote et al. 1972), sediments in the eastern portion of the first construction phase include: Waipahu Silty Clay (WzA, WzB, WzC), Fill Land, mixed (FL), Molokai Silty Clay Loam (MuC), Pearl Harbor Clay (Ph), Tropaquepts (TR) Kawaihapai Clay Loam (KIA), Honouliuli Clay (HxA), and Helemano silty clay (HLMG).

The Waipahu soil series is described (Foote et al. 1972) as follows:

This series consists of well-drained soils on marine terraces on the island of O'ahu. These soils developed in old alluvium derived from basic igneous rock. They are nearly level to moderately sloping. Elevations range from nearly sea level to 125 feet. Rainfall amounts to 25 to 35 inches annually; most of it occurs between November and April. The mean annual soil temperature is 75° F. Waipahu soils are geographically associated with Hanalei, Honouliuli, and Wai'alua soils.

Fill Land, mixed (FL) is described (Foote et al. 1972) as follows:

This land type occurs mostly near Pearl Harbor and in Honolulu, adjacent to the ocean. It consists of areas filled with material dredged from the ocean or hauled from nearby areas, garbage, and general material from other sources. Included in mapping were a few areas that have been excavated.

This land type is used for urban development including airports, housing areas, and industrial facilities. (Not in a capability classification).

The Molokai soil series is described (Foote et al. 1972) as follows:

This series consists of well-drained soils on uplands on the islands of Maui, Lanai, Molokai, and Oahu. These soils formed in material weathered from basic igneous rock. They are nearly level to moderately steep. Elevations range mainly from nearly sea level to 1,000 feet but are as much as 1,500 feet on Lanai. The annual rainfall amounts to 20 to 25 inches, most of which occurs between November and April. The summers are hot and dry. The mean annual soil temperature is 73° F. Molokai soils are geographically associated with Holomua, Keahua, Lahaina, and Uwala soils.

In this survey area a shallow variant of the Molokai series was mapped. This soil, Molokai silty clay loam, shallow variant, 15 to 25 percent slopes, severely eroded, is described in alphabetical order, along with other mapping units of this series.

These soils are used for sugarcane, pineapple, pasture, wildlife habitat, and home sites. The natural vegetation consists of *kiawe*, *'ilima*, *uhaloa*, feather fingergrass, and buffelgrass.

The Pearl Harbor soil series is described (Foote et al. 1972) as follows:

This series consists of very poorly drained soils on nearly level coastal plains on the island of Oahu. These soils developed in alluvium overlying organic material. Elevations range from nearly sea level to 5 feet. The annual rainfall amounts to 18 to 40 inches. The mean annual soil temperature is 74° F. Pearl Harbor soils are geographically associated with Hanalei, Kaloko, and Keaau soils.

These soils are used for taro, sugarcane, and pasture. The natural vegetation consists of cattails, mangrove trees, California grass, and sedges.

The Tropaquepts (TR) are described (Foote et al. 1972) as follows:

Tropaquepts (TR) are poorly drained soils that are periodically flooded by irrigation in order to grow crops that thrive in water. They occur as nearly level flood plains on the islands of Oahu and Maui. Elevations range from sea level to 200 feet. The annual rainfall amounts to 20 to 150 inches.

These soils have been flooded for varying lengths of time, and soil development differs in degree from place to place. Generally, the surface layer, about 10 inches thick, consists of dark-gray, soft, mucky silt loam. This layer overlies firm to compact silty clay loam, 5 to 10 inches thick, that is mottled with gray, yellow, and brown. The mottled layer overlies friable alluvium.

Tropaquepts are used for production of taro, rice, and watercress on flooded paddies. (Capability classification IVw, irrigated or non-irrigated)

The Kawaihapai soil series is described (Foote et al. 1972) as follows:

This series consists of well-drained soils in drainage ways and on alluvial fans on the coastal plains on the islands of O'ahu and Moloka'i. These soils formed in alluvium derived from basic igneous rock in humid uplands.

They are nearly level to moderately sloping. Elevations range from nearly sea level to 300 feet. The annual rainfall amounts to 30 to 50 inches. The mean annual soil temperature is 73° F. Kawaihapai soils are geographically associated with Haleiwa, Waialua, and Jaucas soils.

These soils are used for sugar cane, truck crops, and pasture. The natural vegetation consists of kiawe, koa haole, lantana, and bermudagrass.

The Honouliuli soil series is described (Foote et al. 1972) as follows:

This series consists of well-drained soils on coastal plains on the island of O'ahu in the 'Ewa area. These soils developed in alluvium derived from basic igneous material. They are nearly level and gently sloping. Elevations range from 15 to 125 feet. The annual rainfall amounts to 18 to 30 inches and occurs mainly between November and April. The mean annual soil temperature is 74° F. Honouliuli soils are geographically associated with 'Ewa, Lualualei, Mamala, and Waialua soils.

These soils are used for sugar cane, truck crops, orchards, and pasture. The natural vegetation consists of kiawe, koa haole, fingergrass, bristly foxtail, and bermudagrass.

The Helemano soil series is described (Foote et al. 1972) as follows:

This series consists of well-drained soils on alluvial fans and colluvial slopes on the sides of gulches. These soils are on the island of Oahu. They developed in alluvium and colluvium derived from basic igneous rock. They are steep to extremely steep. Elevations range from 500 to 1,200 feet. The annual rainfall dominantly amounts to 30 to 60 inches but ranges to 75 inches at the highest elevations. The mean annual soil temperature is 72° F. Helemano soils are geographically associated with Lahaina, Leilehua, Manana, Molokai, and Wahiawa soils.

These soils are used for pasture, woodland, and wildlife habitat. The natural vegetation consists of bermudagrass, Christmas berry, eucalyptus, Formosa koa, guava, Japanese tea, Java plum, and koa haole.

Vegetation in the sub-area consists primarily of grasses, shrubs, and introduced, non-native plants and trees used for landscaping and decoration.

### **1.3.4 Built Environment West of Kunia Road**

The southwestern lands of the first construction phase have been drastically altered by historic and modern land use including in particular intensive sugar cane cultivation and, along old Farrington Highway, some residential development. In the last few years the southwestern lands of the first construction phase have been drastically altered by the construction of the North-South Road project and related utility infrastructure development. Other than the massive North-South Road construction project the environment west of Kunia Road is still remarkably rural and is dominated by truck farming.

### **1.3.5 Built Environment East of Kunia Road**

The immediate vicinity of Kunia Road (and “new” Fort Weaver Road extending on to the south) marks a sea-change in the landscape as the project alignment transitions abruptly from a very rural landscape to the west to a very urban landscape to the east. Most of the landscape east of Kunia Road is marked by mixed retail use along Farrington Highway interspersed with residential developments. East of Kunia Road the transit corridor typically straddles the median of Farrington Highway. Between Leeward Community College and the proposed Pearl Highlands Station the project area crosses over the road cuts of the H-1 and Farrington Highway to continue east along the Kamehameha Highway alignment. The immediate vicinity of the proposed Pearl Highlands park-and-ride facility is an exception to the heavily built-up environment that characterizes the transit alignment east of Kunia Road in that the “banana patch” community retains a decidedly rural ambiance. Continuing east along Kamehameha Highway the alignment resumes mixed retail use interspersed with residential developments.

## Section 2 Mythological and Traditional Accounts

---

Because the first construction phase lies in two rather different geographic areas it is suggested to be appropriate to divide the discussion of cultural history between the western relatively inland lands of southwestern Honouliuli that were as a generalization, relatively barren and little used prior to being placed under sugar cane cultivation for a century and the eastern lands on the margin of Pearl Harbor that were much more intensively used in traditional Hawaiian times and that have continued under fairly intensive habitation to the present time. A rather convenient and only slightly arbitrary division is Kunia Road (Station 562+00).

### 2.1 Honouliuli

#### 2.1.1 Traditions of Hawaiian Gods and Demi-gods

The traditions of Honouliuli Ahupua'a have been compiled by several authors, in studies by Sterling and Summers (1978), Hammatt and Folk (1981), Kelly (1991), Charvet-Pond and Davis (1992), Maly (1992), and Tuggle and Tomonari-Tuggle (1997). Some of the traditional themes associated with this area include connections with *Kahiki*, the traditional homeland of Hawaiians in central Polynesia. There are several versions of the chief Kaha'i leaving from Kalaeloa for a trip to Kahiki; on his return to the Hawaiian Islands he brought back the first breadfruit (Kamakau 1991a:110) and planted it at Pu'uloa, near Pearl Harbor in 'Ewa (Beckwith 1940:97). Several stories associate places in Honouliuli to the gods Kāne and Kanaloa, with the Hawaiian pig god Kamapua'a and the Hina family, and with the sisters of Pele, the Hawaiian volcano goddess, all of whom have strong connections with Kahiki (Kamakau 1991a:111; Pukui et al. 1974:200). The collection of myths and traditions in this report section will focus on the central section of the *ahupua'a*, in those areas near the HHCPCT alignment and near the upper portion of Pearl Harbor. The locations of topographical and traditional places names for Honouliuli are illustrated in Figure 1.

#### 2.1.2 The Naming of Honouliuli

Honouliuli is the largest *ahupua'a* in the *moku* (district) of 'Ewa. One translation of the name for this district is given as "unequal" (*Saturday Press*, Aug. 11, 1883). Others translate the word as "strayed" and associate it with the legends of the gods, Kāne and Kanaloa.

When Kane and Kanaloa were surveying the islands they came to Oahu and when they reached Red Hill saw below them the broad plains of what is now Ewa. To mark boundaries of the land they would throw a stone and where the stone fell would be the boundary line. When they saw the beautiful land lying below them, it was their thought to include as much of the flat level land as possible. They hurled the stone as far as the Waianae range and it landed somewhere, in the Waimanalo section. When they went to find it, they could not locate the spot where it fell. So Ewa (strayed) became known by the name. The stone that strayed [Told to E.S. by Simeon Nawaa, March 22, 1954; cited in Sterling and Summers 1978:1].

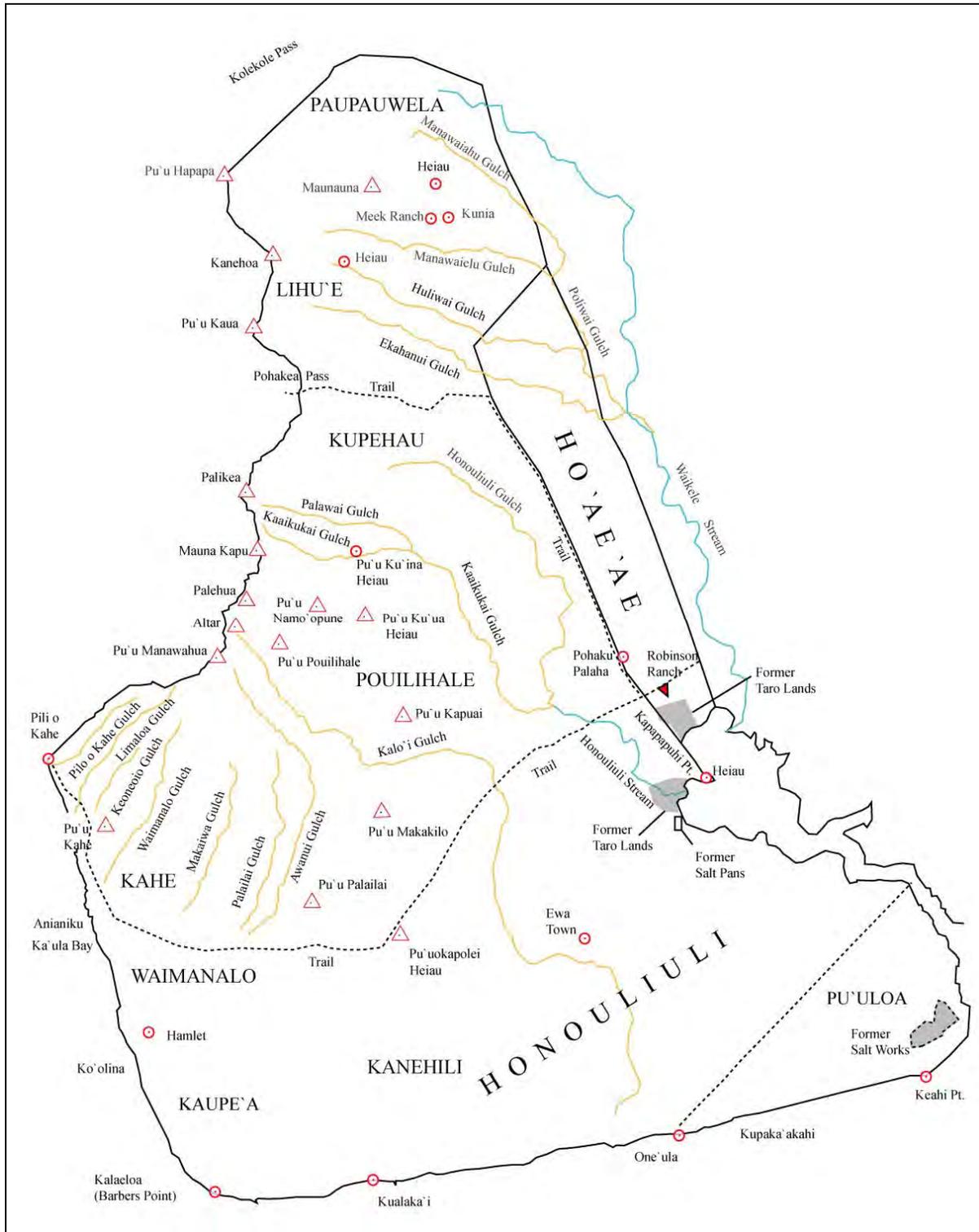


Figure 1. Place Names of Honouliuli (baseline map 1998 U.S.G.S. map); the modern Farrington Highway and H-1 freeway generally follows the ancient cross-*ahupua'a* trail

Honouliuli means “dark water,” “dark bay,” or “blue harbor” and was named for the waters of Pearl Harbor (Jarrett 1930:22), which marks the eastern boundary of the *ahupua'a*. The Hawaiians called Pearl Harbor, Pu'uloa (*lit.* long hill). Another explanation for the names comes from the “Legend of Lepeamoa,” the chicken-girl of Pālama. In this legend, Honouliuli is the name of the husband of the chiefess Kapālama and grandfather of Lepeamoa. The land district Honouliuli was named for the grandfather of Lepeamoa (Westervelt 1923:164-184).

It seems likely the boundaries of the western-most *ahupua'a* of 'Ewa were often contested with Wai'anae people. The 'Ewa people could cite divine sanction that the dividing point was between two hills at Pili o Kahe:

and Nānākuli ('Ewa and Wai'anae). The ancient Hawaiians said the hill on the 'Ewa side was the male and the hill on the Wai'anae side was female. The stone was found on the Waianae side hill and the place is known as Pili o Kahe (Pili=cling to, Kahe=flow). The name refers, therefore, to the female or Waianae side hill. And that is where the boundary between the two districts runs [Told to E.S. by Simeon Nawaa, March 22, 1954; cited in Sterling and Summers 1978:1].

Honouliuli has a number of topographic features, peaks, streams, gulches, coastal points, and a number of ancient villages, as shown on Figure 1. A list of the names shown on Figure 1 and their meaning is presented in Table 1. All place names meanings are from Pukui et al. (1974) *Place Names of Hawai'i*, unless otherwise noted

Table 1. Honouliuli Place Names

Place	Meaning
Akupu Spring	
Anianikū Cove	
Awanui Gulch	
'Ēkahanui Gulch	large bird's nest fern
Hāpapa, Pu'u	rock stratum hill; a shallow soil (Thrum 1922:643)
Honouliuli Stream/Gulch	dark bay; blue harbor (Thrum 1922:643)
Huliwai Gulch	
Ka'aikukui Gulch	the candlenut root
Ka'aumakua (peak)	the family god
Kahe Point	flow
Kahe, Pu'u	flow
Kaihuopala'ai (West Loch)	the nose of Pala'ai
Kalaeloa Point	the long point
Kalo'i Gulch	the taro patch
Kānehili Plain	
Kānehoa, Pu'u	named for native shrubs; Kāne's friend (Thrum 1922:643)
Kapapapuhi (Kapapuhi) Point	the numerous eels (Thrum 1922:645)
Kapolei, Pu'u o (hill, <i>heiau</i> )	beloved Kapo, a sister of Pele
Kapuai (peak)	footstep (Thrum 1922:645)

Place	Meaning
Kaua, Pu'u	war hill or fort hill
Kaula Bay	
Kaupe'a Plain	
Keon'ō'io Gulch	the sandy place with bone ('ō'io) fish
Kolekole Pass	raw, scarred:
Ko'olina (village)	
Kualaka'i (village)	Tethys sp.
Ku'ina, Pu'u - (peak; <i>heiau</i> )	
Kupaka'akahi (beach)	
Ku'ua, Pu'u (peak; <i>heiau</i> )	relinquished hill
Laulaunui Island	large leaf package
Limaloa Gulch	long arm
Makaīwa Gulch	mother of pearl eyes
Makakilo, Pu'u	observing eyes
Manawahua, Pu'u	great grief hill or nausea hill:202
Manawaiahu Gulch	
Manawaielu Gulch	
Maunakapu (peak)	sacred mountain
Maunauna (peak)	mountain sent on errands
Mo'opune, Pu'u	grandchild hill
One'ula (village)	red sand
Pālailai Gulch	young <i>lai</i> fish
Pālailai, Pu'u	young <i>lai</i> fish hill
Pālehua (peak)	<i>lehua</i> flower enclosure
Palikeya (peak)	white cliff:
Pili o Kahe Point	clinging to Kahe
Pōhākea Pass	white stone
Pōhaku Palaha	broad rock (Thrum 1922:666)
Poliwai Gulch	water bosom
Pouilihale, Pu'u	dark house hill
Wai'eli Gulch	dug water
Waimānalo Gulch	potable water:

### 2.1.3 Trails through Honouliuli

There were several pre-contact/early historic trails across 'Ewa, a cross-*ahupua'a* trail that crossed 'Ewa and connected Honolulu to Wai'anae, a *mauka-makai* trail that branched off from the first trail, and followed the boundary between Honouliuli and Hō'ae'ae to the Pōhākea Pass and to Wai'anae, and a second branching *mauka-makai* trail that generally followed the path of Waikele Stream in Waikele Ahupua'a. This trail eventually led through the Kolekole Pass to Wahiawā and to Waialua District on the windward side of the island.

Of the first *mauka-makai* trail, 'Ī'ī (1959:97) noted "From Kunia the trail went to the plain of Keahumoa, on to Maunauna, and along Paupauwela, which met with the trails from Wahiawā and Waialua." 'Ī'ī places the area called Kunia east of Pōhākea Pass in the *ahupua'a* of Honouliuli and Hō'ae'ae, *makai* of the modern town of Kunia, and places the plain of Keahumoa

between Kunia and Paupauwela, the most *mauka* portion of Honouliuli. The trail passed near the peak called Maunauna in upper Honouliuli.

The present HHCPCT alignment is often parallel or follows the cross-*ahupua'a* trail across the Honouliuli arid plain. To the east of Honouliuli, this trail was just *mauka* of the floodplains near Pearl Harbor, skirting the inland edges of the productive taro fields. The trail then dipped down toward the coast towards a prominent hill and landmark, Pu'uokapolei. The trail crossed into Wai'anae at the coast near Pili o Kahe, the stone that marked the boundary of the 'Ewa and Wai'anae districts (see Figure 1).

### 2.1.4 Pu'uokapolei and the Plains of Kaupe'a

Pu'uokapolei was the primary landmark for travelers on the cross-*ahupua'a* trail that ran from Pearl Harbor in the east to Wai'anae in the west ('Ī'ī 1959:27, 29; Nakuina 1992:54; E.M. Nakuina 1904, in Sterling and Summers 1978:34). The plain southwest of the hill was called Kaupe'a.

#### 2.1.4.1 Pu'uokapolei, Astronomical Marker and Heiau

*Pu'u* means hill and Kapolei means “beloved Kapo,” a reference to the sister of the Hawaiian volcano goddess, Pele. Samuel Kamakau (1976:14) says that ancient Hawaiians used Pu'uokapolei as an astronomical marker to designate the seasons.

. . . the O'ahu people who reckoned the time (*Oahu pō'e helu*) called the season Kau for the setting of the sun from Pu'uokapolei, a hill in Honouliuli, 'Ewa, to the opening of Mahinaona (*i ke kawaha o Mahinaona*). When the sun moved south from Pu'uokapolei—and during the season of the sun in the south—for the coming of coolness and for the sprouting of new buds on growing things—the season was called Ho'oilō [winter, rainy, season].

A *heiau* was once on Pu'uokapolei, but had been destroyed by the time of McAllister's (1933:108) survey of the island in the early 1930s. The hill was used as a point of solar reference or as a place for making astronomical observations (Fornander 1919, *A Lamentation for Kahahana*, Vol. VI, Part II:292). Pu'uokapolei may have been regarded as the gate of the setting sun, just as the eastern gate of Kumukahi in Puna is regarded as the rising sun; both places are associated with the Hawaiian goddess Kapo (Emerson 1993:41). This somewhat contradicts some Hawaiian cosmologies, in which Kū was the god of the rising sun, and Hina, the mother of Kamapua'a was associated with the setting sun. Fornander (1919, *A Lamentation for Kahahana*, Vol. VI, Part II:292) states that Pu'uokapolei may have been a jumping off place (also connected with the setting sun) and associated with the wandering souls who roamed the plains of Kaupe'a and Kānehili, *makai* of the hill.

#### 2.1.4.2 Pu'uokapolei and Kamapua'a

Pu'uokapolei was the home of Kamapua'a's grandmother, Kamaunuanoho, one of the three migrants from Kahiki that were ancestors to the people of O'ahu (Fornander 1919, *Legend of Kamapuaa*, Vol. V, Part II:318; Kahiolo 1978:81, 107). Kamapua'a, the Hawaiian pig god, once

lived in Kaluanui on the windward side of O'ahu, but he escaped to 'Ewa when he was pursued by the chief Olopana.

Kamapua'a subsequently conquered most of the island of O'ahu, and, installing his grandmother [Kamaunuanoho] as queen, took her to Pu'uokapolei, the lesser of the two hillocks forming the southeastern spur of the Wai'anae Mountain Range, and made her establish her court there. This was to compel the people who were to pay tribute to bring all the necessities of life from a distance, to show his absolute power over all [Nakuina 1904:50-51].

Emma Nakuina goes on to note: "A very short time ago [prior to 1904] the foundations of Kamaunuanoho's house could still be seen at Pu'uokapolei." Another account (*Ka Loea Kālai'āina* January 13, 1900, from Sterling and Summers 1978:34) speaks of Kekeleaiuku, the older brother of Kamapua'a, who also lived on Pu'uokapolei.

#### 2.1.4.3 Pu'uokapolei and the Plains of Kaupe'a and Kānehili

Hi'iaka sang this bitter chant addressed to Lohiau and Wahine-ōma'o, which uses the association of the Plains of Kaupe'a as a place for the wandering of lost souls:

*Ku'u aikana i ke awa lau o Pu'uloa,  
 Mai ke kula o Pe'e-kaua, ke noho oe,  
 E noho kaua e kui, e lei i ka pua o ke kauno'a,  
 I ka pua o ke akuli-kuli, o ka wili-wili;  
 O ka iho'na o Kau-pe'e i Kane-hili,  
 Ua hili au; akahi no ka hili o ka la pomaika'i;  
 E Lohiau ipo, e Wahine-oma'o,  
 Hoe 'a mai ka wa'a i a'e aku au.*

We meet at Ewa's leaf-shaped lagoon, friends;  
 Let us sit, if you will on this lea  
 And bedeck us with wreaths of Kauno'a,  
 Of *akuli-kuli* and *wili-wili*,  
 My soul went astray in this solitude;  
 It lost the track for once, in spite of luck,  
 As I came down the road to Kau-pe'a.  
 No nightmare dream was that which tricked my soul.  
 This way, dear friends; turn the canoe this way;  
 Paddle hither and let me embark  
 [Emerson 1993:162-163].

Several other Honouliuli places are mentioned in this chant, including Pe'e-kaua, which may be a variation of Kau-pe'e or Kaupe'a, and the plains of Kānehili, the last of which again refers to wandering, as the word *hili* means "to go astray" (Emerson 1993:162). In the chant, Hi'iaka is moving downhill from Kaupe'a, probably the plains adjacent to Pu'uokapolei, toward the coast, the plain of Kānehili.

#### 2.1.4.4 The Plains of Kaupe'a, Pu'uokapolei, and the Realm of Homeless Souls

There are several places on the 'Ewa coastal plain that are associated with *ao kuewa*, the realm of the homeless souls. Samuel Kamakau (1991b:47-49) explains the Hawaiian beliefs in the afterlife:

. . . There were three realms (*ao*) for the spirits of the dead. . . . There were, first, the realm of the homeless souls, the *ao kuewa*; second, the realm of the ancestral spirits, the *ao 'aumakua*; and third, the realm of Milu, *ke ao o Milu* . . .

The *ao kuewa*, the realm of homeless souls, was also called the *ao 'auwana*, the realm of wandering souls. When a man who had no rightful place in the *'aumakua* realm (*kanaka kuleana 'ole*) died, his soul would wander about and stray amongst the underbrush on the plain of Kama'oma'o on Maui, or in the *wiliwili* grove of Kaupe'a on Oahu. If his soul came to Leilono [in Hālawa, 'Ewa near Red Hill], there he would find the breadfruit tree of Leiwalo, *ka'ulu o Leiwalo*. If it was not found by an *'aumakua* soul who knew it (*i ma'a mau iaia*), or one who would help it, the soul would leap upon the decayed branch of the breadfruit tree and fall down into endless night, *the pō pau 'ole o Milu*. Or, a soul that had no rightful place in the *'aumakua* realm, or who had no relative or friend (*makamaka*) there who would watch out for it and welcome it, would slip over the flat lands like a wind, until it came to a leaping place of souls, a *leina a ka 'uhane*... [Kamakau 1991a:47].

On the plain of Kaupe'a beside Pu'uoloa [Pearl Harbor], wandering souls could go to catch moths (*pulelehua*) and spiders (*nanana*). However, wandering souls could not go far in the places mentioned earlier before they would be found catching spiders by *'aumakua* souls, and be helped to escape... [Kamakau 1991a:49].

The breadfruit tree Leilono was said to have been located on the 'Ewa-Kona border, above Āliamanu. In another section of his account of the dead, Kamakau (1991a:29) calls the plain of wandering souls the "plain at Pu'uokapolei."

There are many who have died and have returned to say that they had no claim to an *'aumakua* [realm] (*kuleana'ole*). These are the souls, it is said, who only wander upon the plain of Kama'oma'o on Maui or on the plain at Pu'uokapolei on Oahu. Spiders and moths are their food [Kamakau 1991b:29].

This association of Pu'uokapolei and Kānehili with wandering souls is also illustrated in a lament on the death of Kahahana, the paramount chief of O'ahu, who was killed by his foster father, the Maui chief Kahekili, after Kahahana became treacherous and killed the high priest Ka'opulupulu.

Go carefully lest you fall dead in the sun,     *E newa ai o hea make i ka la,*  
The god that dwells on Kapolei hill.     *Akua noho la i Puuokapolei.*  
The sun is wailing on account of the     *E hanehane mai ana ka la i na*

women of Kamao,	<i>wahine o Kamao,</i>
A hiding god, blossoming	<i>Akua pee,</i>
ohai of the banks,	<i>pua ohai o ke kaha,</i>
Contented among the stones-	<i>I walea wale i ke a-</i>
Among the breadfruit	<i>I ka ulu</i>
planted by Kahai.	<i>kanu a Kahai.</i>
Thou wast spoken of by the oo-	<i>Haina oe e ka oo-</i>
By the bird of Kanehili.	<i>E ka manu o Kanehili.</i>

[Fornander 1919, *A Lamentation for Kahahana*, Vol. VI, Part II:297]

Fornander provides some notes on this lament. The god dwelling at Kapolei is Kahahana, stating that this is where his soul has gone. Kamao is one of the names of the door to the underworld. This lament draws an association with wandering souls and the place where the first breadfruit tree was planted by Kaha'i at Pu'uoloa (Fornander 1919, *A Lamentation for Kahahana*, Vol. VI, Part II:304).

Pukui (1983:180) offers this Hawaiian saying, which places the wandering souls in a *wiliwili* grove at Kaupe'a.

*Ka wiliwili of Kaupe'a.*      The *wiliwili* grove of Kaupe'a.  
In 'Ewa, O'ahu. Said to be where homeless ghosts wander among the trees.

Beckwith (1940:154) has stressed that "the worst fate that could befall a soul was to be abandoned by its 'aumakua and left to stray, a wandering spirit (*kuewa*) in some barren and desolate place." These wandering spirits were often malicious, so the places where they wandered were avoided.

#### 2.1.4.5 *The Plain of Pukaua*

The Hawaiian language newspaper *Ka Loea Kālai'āina*, (January 13, 1900) relates that near Pu'uokapolei, on the plain of Pukaua, on the *mauka* side of the road, there was a large rock. This legend suggests that the plain around Pu'uokapolei was called Pukaua. The legend is as follows:

If a traveler should go by the government road to Waianae, after leaving the village of gold, Honouliuli, he will first come to the plain of Puu-ainako and when that is passed, Ke-one-ae. Then there is a straight climb up to Puu-o-Kapolei and there look seaward from the government road to a small hill, That is Puu-Kapolei. ...You go down some small inclines, then to a plain. This plain is Pukaua and on the mauka side of the road, you will see a large rock standing on the plain... There were two supernatural old women or rather peculiar women with strange powers and Puukaua belonged to them. While they were down fishing at Kualaka'i [near Barbers Point] in the evening, they caught these things, 'a'ama crabs, *pipipi* shellfish, and whatever they could get with their hands. As they were returning to the plain from the shore and thinking of getting home while it was yet dark, they failed for they met a one-eyed person [bad omen]. It became light as they came near to the plain, so that passing people were distinguishable. They were still below the road and became frightened lest they be seen by men. They began to

run - running, leaping, falling, sprawling, rising up and running on, without a thought of the 'a'ama crabs and seaweeds that dropped on the way, so long as they would reach the upper side of the road. They did not go far for by then it was broad daylight. One woman said to the other, "Let us hide lest people see us," and so they hid. Their bodies turned into stone and that is one of the famous things on this plain to this day, the stone body. This is the end of these strange women. When one visits the plain, it will do no harm to glance on the upper side of the road and see them standing on the plain [*Ka Loea Kālai'āina*, January 13, 1900, translation in Sterling and Summers 1978:39].

In another version of this story, the two women met Hi'iaka as she journeyed toward the 'Ewa coast. The women were *mo'o* (supernatural beings) and were afraid that Hi'iaka would kill them, so they changed into their lizard form. One of the lizards hid in a little space on a stone beside the coastal trail, and the other hid nearby (*Ka Hōkū o Hawai'i*, February 15, 1927, translated in Maly 1997:19). From that time on the stone was known as *pe'e-kāua*, meaning "we two hidden." Hi'iaka greeted the two women but did not harm them, and passed on.

When she reached Pu'uokapolei, she also greeted two old women who lived at an 'ohai grove on the hill. These women were named Pu'uokapolei and Nāwaineokama'oma'o (*Ka Hōkū o Hawai'i*, February 22, 1927, translated in Maly 1997:19). As she continued her travels, she looked to the ocean and saw the canoe carrying Lohi'au.

My man on the many harbored sea of Pu'uloa	<i>Ku'u kāne i ke awa lau o Pu'uloa</i>
As seen from the plain of Pe'ekāua	<i>Mai ke kula o Pe'ekāua ke noho</i>
Let us dwell upon the 'ōhai covered shore	<i>E noho kāua i ke kaha o ka 'ōhai</i>
Where the noni blossoms are twisted together	<i>I ka wiliwili i ka pua o ka lau noni</i>
Descending along Kānehili	<i>O ka ihona i Kānehili la</i>
I am winding along	<i>Ua hili ho'i au-e</i>

[*Ka Hōkū o Hawai'i*, February 22, 1927, translated in Maly 1997:20].

### 2.1.5 The Caves of Honouliuli

'Ewa was famous for the many limestone caves formed in the uplifted coral, called the "Ewa Karst." This Pleistocene limestone outcrop, where not covered by alluvium or stockpiled material, has characteristic dissolution "pit caves" (Myroie and Carew 1995), which are nearly universally, but erroneously, referred to as "sink holes" (Halliday 2005). These pit caves, or sinkholes, vary widely in areal extent and depth, with some of the more modest features comparable in volume to five-gallon buckets, while some of the larger features, although usually irregularly shaped, are several meters wide and several meters deep. In traditional Hawaiian times, the areas of exposed coral outcrop were undoubtedly more extensive.

Some of these caves, called *ka-lua-ōlohe* were inhabited by the *ōlohe*, a type of people that looked like other humans but had tails like dogs (Beckwith 1940:343). These people were skilled in wrestling and bone-breaking and often hid along narrow passes to rob travelers; they were also reputed to be cannibals. One famous cannibal king, Kaupe, lived in Līhu'e in upland Honouliuli, was an *ōlohe*.

The caves of Pu'uloa were sometimes also used as burial caves. In 1849, Keali'iahonui, son of Kua'i's last king, Kaumuali'i, died. He had once been married to the chiefess Kekau'ōnohi, who had stayed with him until 1849. She wanted to bury her ex-husband at sea.

It seems that by Kekauonohi's orders, the coffin containing her late husband's remains was removed to Puuloa, Ewa, with the view of having it afterwards taken out to sea and there sunk. It was temporarily deposited in a cavern in the coral limestone back of Puuloa, which has long been used for a burial place, and has lately been closed up [Alexander 1907:27].

After some initial objections by the niece of Keali'iahonui, the body was removed from the outer coffin, the rest was sunk, and the coffin was later buried somewhere in Pu'uloa.

## 2.1.6 Pearl Harbor (Pu'uloa) and West Loch (Kaihuopala'ai)

### 2.1.6.1 The "Silent Fish" of Pearl Harbor

Pearl Harbor was called Pu'uloa or *Keawalau-o-Pu'uloa*, "the many harbored-sea of Pu'uloa" (Pukui 1983:182) by the Hawaiians. An alternate name was Awawalei, or "garland (*lei*) of harbors" (Handy and Handy 1972:469). Pukui (1983:120) uses the name Awalau for Pearl Harbor, as in the saying "*Huhui na 'ōpua i Awalau*, The clouds met at Pearl Harbor. Said of the mating of two people." Emerson (1993:167) interpreted Awalau as "leaf-shaped lagoon."

Clark (1977:70) says that its English name came from the name Waimomi, or "water of the pearl," an alternate name for the Pearl River (Pearl Harbor). The harbor was named Pearl Harbor after the pearl oysters of the family Pteriidae (mainly *Pinctada radiata*), which were once abundant on the harbor reefs, but were later decimated by over-harvesting. This oyster was supposedly brought from Kahiki, the Hawaiian ancestral lands, by a *mo'o* (lizard or water spirit) named Kānekua'ana (Handy and Handy 1972:470).

Kānekua'ana was the *kia'i* (food guardian) for 'Ewa. When food was scarce, the descendants of Kua'ana built *waihau heiau* (a *heiau* for *mo'o*) for her and lit fires to plead for her blessings. For 'Ewa the chief *i'a* (marine food) blessing was the famous *pipi*, or pearl oyster. Samuel Kamakau describes the *pipi* of Honouliuli.

That was the oyster that came in from deep water to the mussel beds near shore, from the channel entrance of Pu'uloa to the rocks along the edges of the fishponds. They grew right on the *nahawe*le mussels and thus was this *i'a* obtained. Not six months after the *hau* branches [that placed a *kapu* on these waters until the *pipi* should come up] were set up, the *pipi* were found in abundance-enough for all 'Ewa-and fat with flesh. Within the oyster was a jewel (*daimana*) called a pearl (*mom*i), beautiful as the eyeball of a fish, white and shining; white as the cuttle fish, and shining with the colors of the rainbow-reds and yellow and blues, and some pinkish white, ranging in size from small to large. They were of great bargaining value (*he waiwai kumuku'ai nui*) in the ancient days, but were just "rubbish" (*'opala*) in 'Ewa [Kamakau 1991b:83].

This oyster, the *pipi*, was sometimes called “the silent fish,” or, *i‘a hamau leo o ‘Ewa*, ‘Ewa’s silent sea creature (Handy and Handy 1972:471), since the collectors were supposed to stay quiet while harvesting the shells, as in the sayings:

*Ka i‘a hāmau leo o ‘Ewa.*                      The fish of ‘Ewa that silences the voice.

The pearl oyster, which has to be gathered in silence [Pukui 1983:144].

*Haunāele ‘Ewa i ka Moa‘e.*                      ‘Ewa is disturbed by the Moa‘e wind.

Used about something disturbing, like a violent argument. When the people of ‘Ewa went to gather the *pipi* (pearl oyster), they did so in silence, for if they spoke, a Moa‘e breeze would suddenly blow across the water, rippling it, and the oysters would disappear [Pukui 1983:59].

*E hāmau o makani mai auane ‘i.*                      Hush, lest the wind rise.

Hold your silence or trouble will come to us. When the people went to gather pearl oysters at Pu‘uloa, they did so in silence, for they believed that if they spoke, a gust of wind would ripple the water and the oysters would vanish [Pukui 1983:34].

*Ka i‘a kuhi lima o ‘Ewa.*                      The gesturing fish of ‘Ewa.

The *pipi*, or pearl oyster. Fishermen did not speak when fishing for them but gestured to each other like deaf-mutes [Pukui 1983:148].

Sereno Bishop, an early resident of O‘ahu, wrote, of his time in the area around 1836, of the pearl oyster, the *pipi*, and another edible clam, identified by Margaret Titcomb (1979:351) as probably *Lioconcha heiroglyphica*.

The lochs or lagoons of Pearl River were not then as shoal as now. The subsequent occupation of the uplands by cattle denuded the country of herbage, and caused vast quantities of earth to be washed down by storms into the lagoons, shoaling the water for a long distance seaward. No doubt the area of deepwater and anchorage has been greatly diminished. In the thirties, the small oyster was quite abundant, and common on our table. Small pearls were frequently found in them. No doubt the copious inflow of fresh water favored their presence. I think they have become almost entirely extinct, drowned out by the mud. There was also at Pearl River a handsome speckled clam, of a delicate flavor which contained milk white pearls of exquisite luster and perfectly spherical. I think the clam is still found in the Ewa Lochs [Bishop 1901:87].

Older Hawaiians believed that the *pipi* disappeared around the time of the smallpox epidemic of 1850-1853, because Kāneka‘ana became displeased at the greed of some *konohiki* (overseer).

The people of the place believe that the lizard was angry because the *konohikis* imposed *kapus* [bans], were cross with the women and seized their catch of oysters. So this “fish” was removed to Tahiti and other lands. When it vanished a white, toothed thing grew everywhere in the sea, of ‘Ewa, which the natives of

‘Ewa had named the pahikaua (sword). It is sharp edged and had come from Kauai-helanai, according to this legend [Manu 1885, cited in Sterling and Summer 1978:50].

*Pahikaua* is the Hawaiian name for the mussel, *Brachidontes crebristriatus* (Mytilidae), which was also a popular clam eaten by the residents of Pearl Harbor.

A clarification of the story of Kānekua‘ana and the pearl oysters of Pearl Harbor is given, in which it seems an overseer had set a ban on the *pipi* for several months a year so that they could increase. A poor widow, a relation of the *mo‘o*, took some of the *pipi* and hid them in a basket. The *konoiki* found the hidden shells, and took them from her, emptying them back into the sea, which was proper. However, after this he followed the woman home and also demanded that she pay a stiff fine in cash, which she did not have. The *mo‘o* thought this was unjust and the next night she took possession of a neighbor who was a medium.

. . . After the overseer had gone back to Palea the lizard goddess possessed her aged keeper [a woman of Ewa] and said to those in the house, “I am taking the pipi back to Kahiki and they will not return until all the descendants of this man are dead. I go to sleep. Do not awaken my medium until she wakes of her own accord.” The command was obeyed and she slept four days and four nights before she awoke. During the time that she slept the pearl oysters vanished from the places where they were found in great numbers, as far as the shore. The few found today are merely nothing . . . [*Ka Loea Kālai‘āina*, June 3, 1899, translation in Sterling and Summers 1978:].

#### 2.1.6.2 *Ka‘ahupāhau, the Queen Shark of O‘ahu*

Pearl Harbor in legendary traditions is closely associated with shark ‘*aumakua*, guardian spirits for specific Hawaiian families or clans. Pukui (1943:56) and others (Sheldon 1883) claim that the sharks of Pearl Harbor were so tame that people used to ride on their backs, and that their human relatives would feed them with ‘*awa*. The most famous guardian shark was Ka‘ahupāhau, the queen shark of O‘ahu, who lived in Pu‘uloa, now called Pearl Harbor. Her name means “cloak well cared for” (Pukui 1943:56), or “well cared-for feather cloak”; the feather cloak was a symbol of royalty.

Ka‘ahupāhau and her brother, Kahi‘uka, had been born as humans and were turned into sharks (Mary Kawena Pukui, March 29, 1954, from Sterling and Summers 1978:56).

The mother, who was a chiefess, of Ka‘ahupāhau was gathering limu [seaweed] in the waters of Pearl Harbor when she had a miscarriage. Thinking the baby dead she left it in the water to be washed away. Later she went again to gather limu and was bitten by a shark. She went to a kahuna [priest] who told her that the shark was Ka‘ahupāhau who was her own daughter, the baby she thought was dead. The kahuna advised her to go to the place and build an ahu (heap) of hau a sort of landing from which she could feed the shark and care for it. It was from that time by command of the mother that all people of Ewa were to be always be protected from sharks whether in Pearl Harbor or outside [E.S. as told by Simeon Nawaa, Mar. 22, 1954, from Sterling and Summers 1978:56].

This explains the meaning of the shark's name Ka'ahupāhau, "the mound (*ahu*) of *hau*" (*Hibiscus tiliaceus*). The grandmother of Ka'ahupāhau and her brother, Koihala, lived in Honouliuli; one day she was making *lei* for her shark grandchildren. A young girl named Pāpio rudely begged for one of the *lei*, but Koihala refused. On her way to her favorite surfing spot at Keahi Point, Pāpio snatched up one of the *lei*, and laughingly went surfing. Koihala angrily told Ka'ahupāhau about the stolen *lei*, and the shark killed the girl, grabbing her from a rock in the sea where she was resting.

Ka'ahupāhau soon recovered from her anger and became very sorry. She declared that from hence forth all sharks in her domain should not destroy, but protect the people round about. As flowers were the cause of the trouble she forbade their being carried or worn on the water of Pu'uloa. From that time all the people of that locality and the sharks in the lochs were the best of friends . . . . [Pukui 1943:56].

In a second version of this story, the shark gods Kānehunamoku and Kamohoali'i were the ones that had placed a *kanawai* (decree) against the attack of men by all sharks around O'ahu. As the result of the attack of the chiefess Pāpio, Ka'ahupāhau was put on trial and tried at Uluka'a [the realm of the gods]. She escaped the punishment of death, but was placed in confinement.

After her confinement ended several years later Ka'ahupāhau was very weak. She went on a sightseeing trip, got into trouble, and was almost killed. But she received great help from Kupiapia and Laukahi'u, sons of Kuhaimoana, when their enemies were all slain the *kanawai* was firmly established. This law-that no shark must bite or attempt to eat a person in Oahu waters-is well known from Pu'uloa to the Ewa. Anyone who doubts my work must be a *malihini* [recent resident] there. Only in recent times have sharks been known to bite people in Oahu waters or to have devoured them; it was not so in old times [Kamakau 1991b:73].

This information on the protective nature of Ka'ahupāhau is somewhat contradicted by the writings of the Russian explorer Otto Von Kotzebue, who walked to Pearl Harbor in 1821, but was unable to actually sail on the waters. He was told that people were thrown into the water as sacrifices to the sharks; however, it is uncertain if the person who told him this was an actual resident of 'Ewa, who would know the real truth. Kotzebue's account is:

In the Pearl River there are sharks of remarkable size, and there have made on the banks an artificial pond of coral stones, in which a large shark is kept, to which, I was told, they often threw grown-up people, but more frequently children, as victims [Kotzebue 1821:338-348].

The protection of Ka'ahupāhau is emphasized in many other Hawaiian traditions. One time, a man-eating shark called Mikololou from the Ka'ū district of the island of Hawai'i, came visiting at Pearl Harbor with other sharks, some man-eating, some not. Mikololou remarked "What fine, fat crabs you have here," from which Ka'ahupāhau knew that some of the sharks were man-eaters, since sharks referred to fishermen as "fat crabs." She directed the fishermen to place a

barrier of nets across the entrance to the harbor, and when the sharks left her home, they could not get back out to the ocean.

The sharks of the lochs attacked the man-eaters from outside and beat them unmercifully. A shark from Ka'u, Hawaii, who was not a man-eater, threw his weight over the nets and pressed them down. His sons changed themselves into pao'o [blennies] fishes and leaped where the net was forced down, thus escaping from the place where the battle of shark was raging. Mikololou was caught fast in the nets and dragged ashore where his head was cut off and his body burned [Pukui 1943:56].

In another version of this story, Mikololou is accompanied to Pearl Harbor with his shark friends Kua, Keali'ikauaoka'u, Pākaiea, and Kalani; Mikololou was the only man-eater. To escape the nets:

Keali'ikauaoka'u changed himself into a pao'o fish, which lives among the rocks, and leapt out of the net. Kua changed into a lupe, as the spotted stingray is called, and weighted down the net on one side, helping his son Kalani and nephew Pākaiea, who were half human, to escape [Pukui and Green 1995:40].

Only Mikololou was caught in the nets, and his body was tossed on shore to rot, until only the tongue was left. In some versions of this story, the tongue immediately jumps into the water and then becomes a shark again (Pukui and Green 1995:41). In other versions (Pukui 1943:56), the tongue is eaten by a dog, which then jumps into the water, turns into a shark, and escapes. In both versions, Mikololou returns to Ka'u, never to bother Ka'ahupāhau again.

In one version (Webb 1923:307-308) version, Mikololou went back to his home island of Hawai'i and organized an army of sharks to return to Pearl Harbor, but he was again defeated by the fishermen of 'Ewa under the command of Ka'ahupāhau, who slaughtered so many of the sharks that from then on "the sea of Pu'uloa is safe and peaceful through her law that sharks shall not attack man. That is why these waters are safe for people to swim from shore to shore without fear" (Webb 1923:308). The watchful eye of Ka'ahupāhau led to these Hawaiian sayings:

<i>Alahula Pu'uloa, he alahela</i>	Everywhere in Pu'uloa is the trail
<i>na Ka'ahupāhau</i>	of Ka'ahupāhau

Said of a person who goes everywhere, looking, peering, seeing all, or of a person familiar with every nook and corner of a place. Ka'ahupāhau is the shark goddess of Pu'uloa (Pearl Harbor) who guarded the people from being molested by sharks. She moved about, constantly watching [Pukui 1983:14].

<i>Ho'ahewa na niuhi ia.</i>	The man-eating sharks blamed
<i>Ka'ahupāhau</i>	Ka'ahupāhau.

Evil-doers blame the person who safeguards the rights of others. Ka'ahupāhau was the guardian shark goddess of Pu'uloa (Pearl Harbor) who drove out or destroyed all the man-eating sharks [Pukui 1983:108].

*Mehameha wale no o Pu'uloa,  
i ka hele a Ka'ahupāhau.*

Pu'uloa became lonely when  
Ka'ahupāhau went away.

The home is lonely when a loved one has gone. Ka'ahupāhau, guardian shark of Pu'uloa (Pearl Harbor), was dearly loved by the people [Pukui 1983:234].

*Make o Mikololou a ola  
i ke ale lo*

Mikololou died and came to life again  
through his tongue.

Said of one who talks himself out of a predicament [Pukui 1983:229].

There were other guardian sharks in Pearl Harbor, including a brother of Ka'ahupāhau's named Kahi'ukā (the smiting tail), and a son named Kūpīpī (Pukui 1943:57), or, in some versions, twin sons, named Kūpīpī and Kūmaninini (Pukui and Green 1995:41). In one version of the Story of Pāpio, recounted above, it is said the Ka'ahupāhau later turned into a stone, although the people of Pu'uloa continued to feed her (Sterling and Summers 1978:56).

Kahi'ukā was the brother of Ka'ahupāhau. The name means "smiting tail." This shark was called by this name because it was his duty to warn the people of Ewa of the presence of strange and unfriendly sharks in these waters and he did so by nudging them or striking at them with his tail. When ever anyone was fishing and felt a nudge they would know it was Kahi'uka, warning them and they would leave the water immediately [E.S. as told by Simeon Nawaa, Mar. 22, 1954, from Sterling and Summers 1978:56].

There are two different accounts of the home of this shark brother. The above reference says that Kahi'ukā lived at the site of the old dry dock. Mary Pukui disagrees, and says the site of the old dry dock was the home of the son, not the brother of Ka'ahupāhau. Mary Pukui says Kahi'ukā lived in a cavern underwater off Moku'ume'ume (Ford Island) near Keanapua'a Point; he had a stone form in deep water some distance from the cave that could be seen from the surface (Mary Kawena Pukui, Mar. 29, 1954, from Sterling and Summers 1978:56). J. S. Emerson (1892:11) wrote in the late nineteenth century that Kahi'ukā's keeper, Kimona, would often find fish nets missing and knew that Kahi'ukā had carried them up shore to a place of safety. Pukui also relates that the shark was named "smiting tail" because one side was longer than the other, and the shark would use his tail to smite unfriendly sharks.

### 2.1.6.3 *Ka'ehu-iki-manō-o-Pu'uloa, the Little Yellow Shark*

One of the shark '*aumakua* associated with Pearl Harbor was the little yellow shark called Ka'ehu, who was born on the Big Island, but later traveled to O'ahu and settled at Pu'uloa. His ancestor was Kama'ili'ili, the Hawaiian shark god, brother of the Hawaiian volcano goddess, Pele. Ka'ehu was a guardian of the Hawaiian people and once saved several surf riders at Waikīkī from a man-eating shark called Pehu (Knudsen 1946:9-13; Westervelt 1963:55-58).

In Thrum's translation of this legend, the shark's name is Ka-ehu-iki-manō-o-Pu'uloa, meaning "the small, blonde shark of Pu'uloa." He was born in Puna, Hawai'i, but soon left on a tour of all of the islands, so that he could call and pay respects to all of the king-sharks of Hawai'i.

. . . Puuloa, Oahu, was the next objective. Reaching its entrance they visited the pit of Komoawa, where Kaahupahau's watcher lived. Here the young shark made himself known, as usual; the object of the journey, and the desire to meet the famous queen-shark protector of Oahu's water. . . . Welcome greetings were sent by the messenger, who was bid entertain the visitors in the outer cave, and on the morrow the party could come up the lochs to meet the queen. . . . The company then repaired to the royal cave at Honouliuli, where the visitors were supplied with soft coconut and *awa*, their home food and beverage [Thrum 1923:301-302].

The cave of Komoawa may be the Hawaiian words for "channel" or harbor" entrance (Pukui and Elbert 1986:164). In another version of this story, the shark watcher himself is named Komoawa and the cave that he lives in is called Kea'ali'i. Kea'ali'i guards the entrance to Pearl Harbor, while the home of Ka'ahupāhau is deeper into Honouliuli lagoon (Sheldon 1883).

In 1823, the missionary Hiram Bingham accompanied Liholiho (King Kamehameha II) and his company to the royal compound at Pu'uloa, where he was shown a cave that was home to a shark god.

I one day accompanied the king and others by boat to see the reputed habitation of an Hawaiian deity, on the bank of the lagoon of 'Ewa. It was a cavern or fissure in a rock, chiefly under water, where, as the traditions teach, and as some then affirmed, a god, once in human form, taking the form of a shark, had his subterraqueous abode. Sharks were regarded by the Hawaiians as gods capable of being influenced by prayers and sacrifices, either to kill those who hate and despise them, or to spare those who respect and worship them . . . [Bingham 1847:177].

Although Bingham stated in this year that no one any longer believed these stories, there were some who kept the beliefs of the guardian sharks alive. In 1912, dredging in Pearl Harbor was completed and a large dry-dock was completed, but collapsed the very next year. The native Hawaiians believed that the dock had collapsed because it had been built over the home of Kūpīpī the shark son of Ka'ahupāhau's, who lived in a cavern near the harbor entrance at Pu'uloa. "Angered by the violation of his home, the shark prince destroyed the imposing structure" (Clark 1977:69-70). The dock was rebuilt in the same year, but this time only after a blessing on the construction was made by Hawaiian traditional practitioners.

In other versions of this story, the name of the shark is interpreted as "the little ruddy shark" (Emerson n.d.), or the "little reddish-haired shark," named for the reddish (*'ehu*) hair of Ka'ehu. In this version, the cave of Ka'ehu is called Pānau, and the human mother and father of the little shark are Kapukapu and Holei of Pānau, in Puna, Hawai'i (Emory et al. 1959:63).

#### 2.1.6.4 *Kāne and Kanaloa and the Fish Ponds of West Loch*

According to an account in the Hawaiian newspaper *Ka Loea Kālai'āina* (June 10, 1899), several of the fishponds in the Pu'uloa area were made by the brother gods, Kāne and Kanaloa. A fisherman living in Pu'uloa, named Hanakahi, prayed to unknown gods, until one day two men came to his house. They revealed to him that they were the gods to whom he should pray. Kāne and Kanaloa then built fishponds at Ke'anapua'a, but were not satisfied. Then they built the

fishpond, Kepo'okala, but were still not satisfied. Finally they made the pond Kapākule, which they stocked with all manner of fish. They gifted all of these fishponds to Hanakahi and his descendants (Handy and Handy 1972:473; *Ka Loea Kālai'āina*, July 8, 1899).

According to Mary Pukui (1943:56-57), who visited Kapākule fishpond when she was young, the pond was built by the legendary little people of Hawai'i, the *menehune*, under the direction of the gods Kāne and Kanaloa. Pukui describes several unique aspects of this pond:

On the left side of the pond stood the stone called Hina, which represented a goddess of the sea by that by that name. Each time the sea ebbed, the rock became gradually visible, vanishing again under water at high tide. Ku, another stone on the right, was never seen above sea level. This stone represented Ku'ula, Red Ku, a god for fish and fishermen. From one side of the pond a long wall composed of driven stakes of hard wood, ran toward the island [Laulaunui] in the lochs. When the fish swam up the channel and then inside of this wall, they invariably found themselves in the pond. A short distance from the spot where the pond touched the shore was a small koa or altar composed of coral rock. It was here that the first fish caught in the pond was laid as an offering to the gods [Pukui 1943:56].

The fishpond contained many fish, especially the *akule* (scad fish, *Trachurops crumenophthalmus*), thus its name, “the enclosure for *akule* fish” (Pukui 1943:56-57). The pond was destroyed when the channel to Pearl Harbor was dredged in the early twentieth century. The caretaker of the pond took the stones Kū and Hina to a deep place in the ocean and sunk them so “none would harm or defile them.” Cobb (1903:733) says the pond was used to catch the larger *akule* (goggler), *opelu* (mackerel scad), *weke* (goat fish), *kawakawa* (bonito), and sharks. It was unusual for having walls made of coral. This contradicts much of the legendary material that says that sharks were not killed within Pearl Harbor; however, Kamakau does relate that Kekuamanoha and Kauhiwawaeono, two conspirators against Kamehameha I, lived at Pu'uloa. The chief Kauhiwawaeono was known to murder people and use their bodies as shark bait (Kamakau 1992:182, 232).

Samuel Kamakau adds more information on the pond Kapākule, and a second one called Kepo'okala.

At Pu'uloa on Oahu were two unusual ponds [fish traps]—Kapakule and Kepoolala. Kapakule was the better one. The rocks of its walls, *kuapa*, could be seen protruding at high tide, but the interlocking stone walls (*pae niho pohaku*) of the other pond were still under water at high tide. . . . It [Kapakule] was said to have been built by the 'e'epa people [mysterious people] at the command of Kane ma . . .

This is how the fish entered the pond. At high tide many fish would go past the *mauka* side of the pond, and when they returned they would become frightened by the projecting shadows of the trunks, and would go into the opening. The fish that went along the edge of the sand reached the seaward wall, then turned back toward the middle and entered the *anapuna* (the arched portion of the trap) A man ran out and placed a “cut-off” seine net (*'omuku lau*) in the opening, and the fish shoved and crowded into it. The fish that were caught in the net were dumped out,

and those not caught in the net were attacked with sharp sticks and tossed out, or were seized by those who were strong [Kamakau 1976:88].

#### 2.1.6.5 *The Story of Kaihuopala'ai*

In the Legend of Maikohā (Fornander 1919, *Legend of Maikoha*, Vol. V, Part II:270-271), a sister of Maikohā, a deified hairy man who became the god of *tapa* makers, named Kaihuopala'ai, journeys to O'ahu:

*'Ike aku la o Kaihuopala'ai i ka maikai o Kapapaapūhi, he kāne e noho ana ma Honouliuli ma 'Ewa. Moe iho la lāua, a noho iho la o Kaihuopala'ai i laila a hiki i kēia lā. 'Oia kēlā loko kai e ho'opuni ia nei i ka 'anae, nona nā i'a he nui loa, a hiki i kēia kākau ana.*

Kaihuopala'ai saw a goodly man by the name of Kapapaapūhi who was living at Honouliuli, 'Ewa; she fell in love with him and they were united, so Kaihuopala'ai has remained in 'Ewa to this day. She was changed into that fishpond in which mullet are kept and fattened, and that fish pond is used for that purpose to this day [Fornander 1919, *Legend of Maikoha*, Vol. V, Part II:270].

The name of Maikohā's sister, Kaihuopala'ai, which means "the nose of Pala'ai" (Pukui et al. 1974:68) is also the name the Hawaiians used for the west loch of Pearl Harbor, adjacent to the current study area. McAllister recorded that other Hawaiians say there never was a fishpond by that name. Beckwith (1918) says that Kaihuopala'ai changed into the fishpond near the place called Kapapaapūhi, which means "the eel flats." This is identified on old maps as the peninsula that juts into the west side of West Loch (sometimes spelled Kapapa'apūhi); early Hawaiian settlement was focused on this area.

There is also a famous *pōhaku*, or rock, associated with the traveling mullet of Pearl Harbor.

. . . I . . . asked the person sitting on my left, "What place is this?" Answer – "This is Pearl City." It was here that mullets were bred in the ancient times and that flat stone there was called Mullet Rock or Pōhaku Anae. It lies near the beach by Ewa mill [*Ka Nūpepa Kū'oko'a*, Oct. 2, 1908, from Sterling and Summers 1978:53].

#### 2.1.6.6 *The Traveling Mullet of Honouliuli*

The story of Kaihuopala'ai, or Ihuopala'ai, is also associated with the tradition of the *anae-holo*, the traveling mullet of Pearl Harbor (Nakuina 1998:270-272):

The home of the *'anae-holo* is at Honouliuli, Pearl Harbor, at a place called Ihuopala'ai. They make periodical journeys around to the opposite side of the island, starting from Pu'uloa and going to windward, passing successively Kumumanu, Kalihi, Kou, Kālia, Waikīkī, Ka'alāwai, and so on, around to the Ko'olau side, ending at Lā'ie, and then returning by the same course to their starting point [Nakuina 1998:271].

In Nakuina's account, Ihupala'ai is a male who possesses a Kū'ula or fish god that supplied the large mullet known as *anae*. His sister lived in Lā'ie, and there came a time when there were no fish to be had. She sent her husband to visit Ihupala'ai, who was kind enough to send the fish following his brother-in-law on his trip back to Lā'ie.

This story is associated with a proverb or poetical saying identified with Honouliuli:

The fish fetched by the wind.

*Ka i'a hali a ka makani*

The '*anaeholo*, a fish that travels from Honouliuli, where it breeds, to Kaipāpa'u, on the windward side of O'ahu. It then turns about and returns to its original home. It is driven closer to shore when the wind is strong [Pukui 1983:145].

Pukui et al. (1974:68) give the name of the husband in this story as Lā'ie and the name of the wife as Pala'ai, which ties into the name of the west loch of Pearl Harbor, called Kaihu o Pala'ai, "the nose of Pala'ai." Another version has a woman named Awawalei (an alternate version for the name of Pearl Harbor), who had a brother named Laniloa (the point on Lā'ie at which the mullet stops its migration and makes its way back to Pearl Harbor), and another brother (a mullet) who lived with an eel named Papapūhi, which relates to the name of the fishpond in the tale called Kapapūhi (*Ka Loea Kālai'āina*, Oct. 21, 1899).

## 2.2 Hō'ae'ae, Waikele, Waipi'o and Waiawa Place Names

Place names or *wahi pana* ("legendary place" Pukui and Elbert 1986: 376) are an integral part of Hawaiian culture. "In Hawaiian culture, if a particular spot is given a name, it is because an event occurred there which has meaning for the people of that time (McGuire 2000:23)." The *wahi pana* were then passed on through language and the oral tradition, thus preserving the unique significance of the place. Hawaiians named all sorts of objects and places, points of interest which may have gone unnoticed by persons of other cultural backgrounds. Hawaiians named taro patches, rocks and trees that represented deities and ancestors, sites of houses and *heiau* (places of worship), canoe landings, fishing stations in the sea, resting places in the forests, and the tiniest spots where miraculous or interesting events are believed to have taken place. (Pukui et al. 1974:x).

*Place Names of Hawai'i* (Pukui et al. 1974) was used as the primary source for all place name translations. In some cases, where there were no known translations, a literal translation of the place name was made using the *Hawaiian Dictionary* (Pukui and Elbert 1986) or from another source. The intent of the author is to merely present the available information and let the reader come to his own conclusions.

### 2.2.1 Hō'ae'ae

Hō'ae'ae is bound by the on the *makai* side by the north shore of Pearl Harbor's West Loch, by a trail running along the eastern edge of Honouliuli Gulch on the west side, and by the western side of Waikele Gulch and a trail on the east side (see Figure 1). The *mauka* edge does not extend to the Ko'olau Mountains, but is "cut off" by Honouliuli to the west and Waikele to the east. There are references to a Hō'ae'ae Stream in traditional literature. Pre-contact and early post-contact agriculture focused on the spring-fed floodplains adjacent to West Loch. Hō'ae'ae

means “to make soft or fine” according to *Place Names of Hawai'i* (Pukui et al. 1974:47). Pukui et al. do not explain why the *ahupua'a* is called this name, but do mention that there was a famous *pōhaku* (stone) called Pōhaku-Pili on the boundary between Hō‘ae‘ae and Waikele. Another source (Thrum 1922:632) says Hō‘ae‘ae s means “to pulverize.”

### 2.2.2 Waikele

The next *ahupua'a* to the east is Waikele, which extends from the north and eastern shore of West Loch to a boundary point between the District of Wahiawā and the *ahupua'a* of Waipi'o on the *mauka* side (Figure 2). It is at this boundary point that Sterling and Summers (1978:137), believe was the *former* location of a famous *pōhaku* called O‘ahunui, a stone shaped like the island of O‘ahu. Waikele is watered by Waikele Stream; the ridge on the east side of the stream marks the boundary with Waipi'o. In upper Waikele, the stream is fed by two tributary streams, from the west Wai‘eli (possibly “dug water”) and from the east Waikakalaua (“water [rough] in rain”). Waikele means “muddy water,” probably a reference to this long stream. There were other names for the lower part of the stream, shown as Kapakahi (“crooked”) Stream on some maps, and referred to as Poniohua (possibly, “anointed on the night of Hua; Thrum 1922:667) Stream in some legends (Mauricio 1997:9).

The most famous location in Waikele is Waipahu Spring (“bursting water”); the waters of this spring were used to irrigate many of the ancient taro patches on the Waikele flood plain and later the rice and sugar cane crops. As a town and sugar mill expanded around it, the entire *makai* area of Hō‘ae‘ae and Waikele became known as Waipahu, and the older names were no longer used.

A resident clarified this change in names:

. . . “Waipahu” . . . is not a tract of land, but only a spring located in Waikele. The Oahu Railway Company is the culprit responsible for misuse and confusion, when it built its station at Kaohai and called [it] “Waipahu Station” The Oahu [Sugar Plantation] Mill is situated on the plateau of “Keonekuilimalaulaoewa” (the arm-in-arm-plateau of ewa), Waikele [Simeon Nawaa, in *Honolulu Star Bulletin* Oct. 16, 1956, cited in Sterling and Summers 1978:1].

Above the spring was a rock face called Pōhaku-pili (clinging stone), which was said to have been placed there by the Hawaiian pig-god, Kamapua'a (Mauricio 1997:7). There were four *heiau* in Waikele, two in the lowland area, just north of the present H-1 highway, and two in the uplands, near the head of Kīpapa Gulch. The two lower *heiau*, Mokoula and Hapupu, had been completely destroyed by or in the early twentieth century, but McAllister found (or was told of) remnants of the two upper *heiau*, Moaula, and the Heiau of 'Umi, during his survey of prominent O‘ahu archaeological sites in the early 1930s.

### 2.2.3 Waipi'o

To the east of Waikele is Waipi'o (see Figure 2), which means “curved, winding water” (Sterling and Summers 1978:1), probably a reference to the curving shorelines of the middle loch of Pearl Harbor, with its many adjacent fishponds. The loch waters were extensively used for gathering limu (seaweed), shellfish and other invertebrates, and fish. After Honouliuli, Waipi'o is the largest next largest *ahupua'a* in Ewa, extending all the way from the tip of Waipi'o

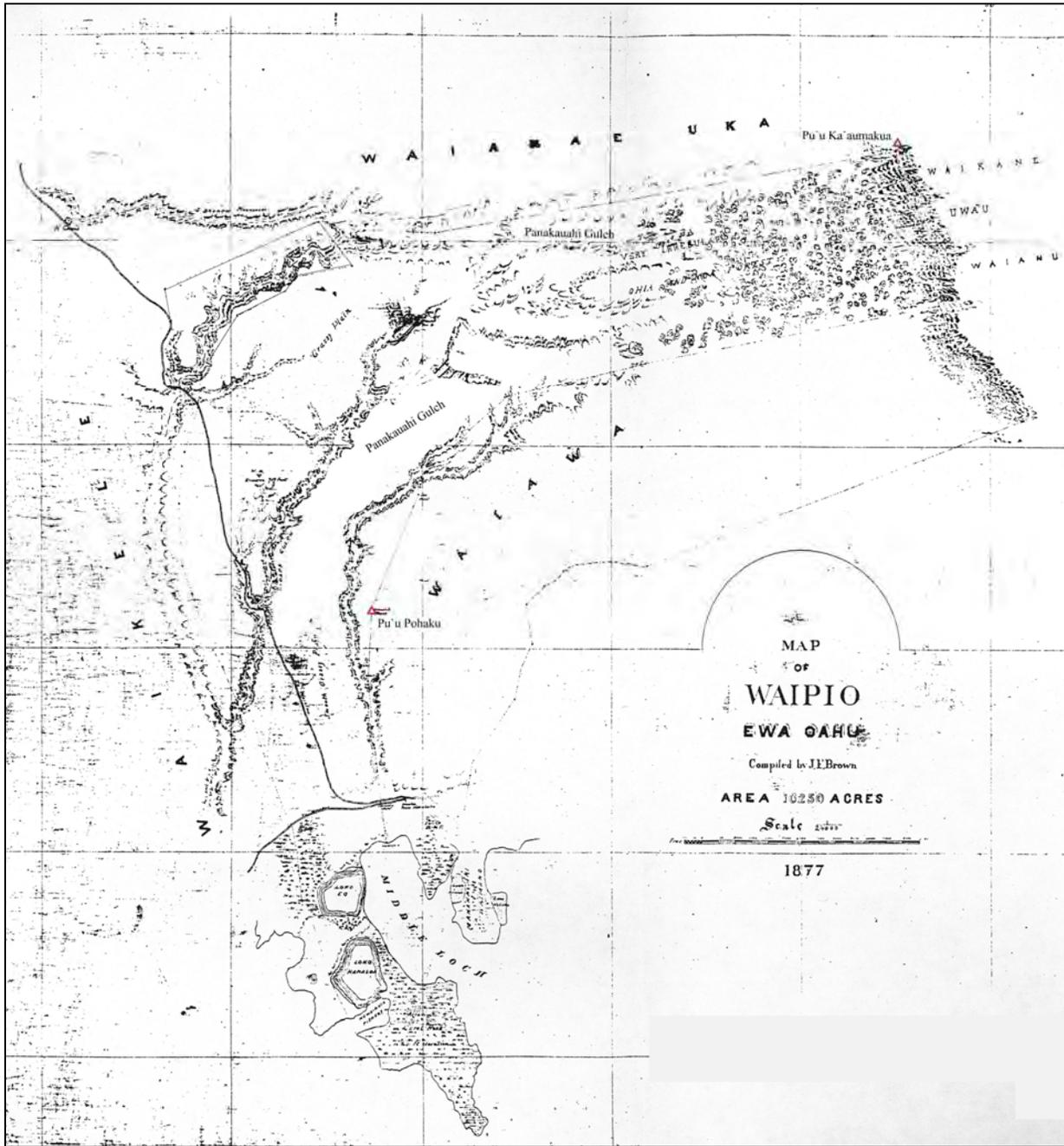


Figure 2. 1877 map of Waikele, Waip'io, and Waiawa Ahupua'a, with landmarks of Waip'io by J. F. Brown (Registered Map No. 499, Hawai'i Land Survey Division)

peninsula between the west and middle lochs up to the boundary with the Ko'olau Mountains. The major stream/gulch is called Kīpapa (“placed prone”), but there are two other gulches in the upland area, Panahakea, and Pānakauahi (“touched by the smoke”). Keakua'ōlelo was the name of a heiau in Pānakauahi Gulch. Pu'u Ka'aumakua is the highest peak; it marks the boundary point between Waipi'o, Wahiawā District, and the Ko'olaupoko District at the *mauka* western corner of the *ahupua'a*. a secondary peak on the Waipi'o/Waiawa border was called Pu'u Kamana (“hill [of] the supernatural power”). There were once a *heiau* in the area between Farrington Highway and the coast, called Ahu'ena “red hot heap”). When Thrum (1907:46), listed it in 1907, he noted that only the foundations remained. John Papa 'Ī'ī was once the custodian of the idols in the *heiau*. There were several fishponds on the Waipi'o; two of the largest were Loko (‘pond’) 'Eo and Loko Hanaloa (“kong bay”).

### 2.2.4 Waiawa

The last *ahupua'a* in the study area is Waiawa (see Figure 2), which like Waipi'o extends from Pearl Harbor (Middle Loch) to the Ko'olau Mountains. In the lower section, it is watered by Waiawa Stream, which in the upper portion splits into Waiawa and Mānana Stream. Near this junction was a long ridge called Lae Pōhaku (“stone point”), a boundary line between Waiawa and Mānana. At this junction, McAllister recorded a heiau called Puoiki. Some historic maps also have a peak called Pu'u Pōhaku (“stone hill”) at the same elevation as Lae Pōhaku, but on the Waiawa/Waipi'o boundary.

The meaning and correct pronunciation of Waiawa is in dispute. It is variously spelled Waiawa or Wai'awa, which leads to different interpretations. *Awa* is the word for milk fish, while 'awa is the word for the native 'awa (*Piper methysticum*) plant, which was used to make a mild narcotic drink by the Hawaiians..

In a portion of a chant for Kūali'i, Fornander (1917, *History of Kualii*, Vol. IV, Part II:394-400), Waiawa is noted for its *awa* fish, *E ku'u kaua i ka loko awa—o Waiawa*, translated as “Let us cast the net in the awa-pond—of Waiawa.” This would be no surprise as the fish ponds of Waiawa, such as Kuhialoko, were well known for their productivity.

Other traditional accounts suggest that Waiawa may have been acknowledged in early times as the site of a special variety of the 'awa

*I ka wa i hiki mai ai ua eueu nei a ku ma ka puka o kahi e komo ai i loko o ua kuahiwi nei o Konahuanui, aia noi na makana a pau ma ka lima o Keanuenue, oia hoi ka puua-pukoa, he puua ehu keia o ka hulu, a he pu awa popolo, aole i laha nui keia awa ma keia pae aina, aia nae keia awa e ulu nei i keai wa ma uka o Waiawa ma Ewa ae nei.*

. . . When the wondrous maiden [Keomelemele] arrived at the entrance to the mountain of Konahuanui, all the offerings were in charge of Ke-anuenue, a puko'a or reddish brown pig, a clump of dark 'awa [*pu 'awa pōpolo*] which was not common in these islands. This variety of 'awa now grows in the upland of Waiawa, down here in 'Ewa [Manu 2002:50, 138; originally published in *Ka Nūpepa Kū'oko'a*, Jan. 17, 1885].

A *kupuna* who grew up in Waiawa and lives there still, Tin Hu Young, suggested a different origin of the name Waiawa. During his interview, he gave this explanation:

. . . In fact, the name 'Wai'awa' means water and 'awa. You know the meaning of 'awa? 'Awa is that kava root that you drink, Hawaiians call it 'awa. I kind of didn't like the idea they called it 'bitter water'. Because 'awa is a little bitter when you drink it, so Wai'awa—Wai'awa Valley was an area known in the ancient days of harvesting 'awa root. It was a ceremonial drink that they had. Of course in the old days only the royalty used that root, until later on, and then the commoners would use it. Then you could sell it in the market and go buy it, like other things. So, Wai'awa was a source of that. But, I like to think that the meaning of 'bitter water' for the name Wai'awa, to me, could come from—because the area is the farther lot, the bottom on the lowland, mauka of Pearl Harbor. And when I used to watch the water, the rivulets would come twisting and turning like little 'awa roots, twisted. If you ever harvest that 'awa root, you got to see, its like a big root coral. It's all tangled into each other. And it reminds me, when it flooded down in the lowland, all these little rivulets, twisting and turning, like the 'awa root. But it's just my romantic— it's just because I live there. I don't want them to say, Ehh you live in bitter water? [Interview with T. H. Young, October 9, 2002, in Bushnell et al. 2003:9-10].

In addition to the milkfish (*Chanos chanos*), *awa* and the 'awa root (*Piper methysticum*), the Hawaiian word *awa* has a third meaning: of harbor, cove or channel or passage (Pukui and Elbert 1986:33). This suggests there may be some link between the rivulets described by Mr. Young and the *awa* or channels which reach the sea.

### 2.2.5 Legends of the Lowlands and Pearl Harbor

John Papa 'Īi noted that the trail in 'Ewa skirted the upper margin of the taro lands in central 'Ewa. Coming from Honolulu (Figure 3):

The trail went down to the stream and up again, thne went above the taro patches of Waiiau, up to a *maika* field, to Waimano, to Manana, and to Waiawa; then to the stream of Kukehi and up to two other *maika* fields, Pueohulunui and Haupuu [in Waiawa]. At Pueohulunui [on the border of Waiawa and Waikele] was the place where a trail branched off to go to Waialua and down to Honouliuli and on the Waianae. . . .

From Kunia [upland of Hō'ae'ae and Honouliuli] the trail went to the plain of Keahumoa [upland area for several *ahupua'a*], on to Maunauna [a peak in upper Honouliuli] aand along Paupauewla [extreme *mauka* 'ili of Honouliuli], which met with the trails from Wahiawā and Waialua ['Īi 1959:97].

Along this trail were several stone markers, called Nāpōhaku-luahine. These are described as old women who were changed into stones. "The names of these royal stones were Kahoaiiai (also the name of an 'ili in Waiawa), Waiawakalea, Piliaumoa, Kahe'ekuluaikamoku, all chiefesses. Their four servants were Nohoana, Kikaeleke, Piliamo'o, Nohoanakai. These were the



Figure 3. Trails in 'Ewa map, drawn to Paul Rockwood (not to scale) to show O'ahu trails ca. 1810, as described by John Papa 'Ī'ī (1959:96)

guardians of the trail” (*Ka Loea Kālai'āina*, June 3, 1899; p. 18). The writer describes the location of the stones, “Here is how the traveler can locate them. When you leave the bridge of Waiawa, for Honolulu, go up and then down an incline. The hill standing on the seaward side is Nuku-o-ka-manu. The next incline is Waiawa. Go up the ascent till you reach the top and above that, about two chains from the road you will find the stones.”

There was a cave named Kapuna on Waipi'o peninsula that was associated with a famous riddle. *No Kapuna ka hale noho ia e ke kai*, or “To Kapuna belongs the house, the sea dwells in it.”

This cave is on the Waipio side and a sea passage separates Waipio and Waikele and Waikele and Honouliuli. The passage is obstructed by three small islands, a middle one and Manana and Laulaunui. These small islands in the middle of the passage to Honouliuli and inside and outside of these small islands is the sea of Kaihuopalaai [Hawaiian name for West Loch] where mullet lived till they whitened with age [*Ka Loea Kālai'āina*, Oct. 7, 1899, translation in Sterling and Summers 1978:24].

Another famous cave of the area was Keanapua'a [in Halawa opposite Waipi'o peninsula], which means "the pig's cave," so named because Kamapua'a once slept there (Pukui et al. 1974:103). This cave was one of the places that the high king of O'ahu, Kahahana, hid after he had killed the priest Ka'opulupulu, thus angering the high chief of Maui, Kahekili.

In Waipi'o, 'Ewa, 'Ai'ai, the son of the fishing god, Kū'ula, was said to have established a *pōhaku i'a* (fish stone) at Hanapouli and a *ku'ula* (stone god used to attract fish) named Ahu'ena (Manu 1902:127).

Kamaika'ahui was a man who could take the form of a shark. In his human form, he had the mouth and teeth of a shark on his back. Whenever he got the chance at his home in Hāna, Maui or his home in Waikele, O'ahu, he would secretly change into his shark form, kill, and eat unsuspecting swimmers. Ahapau, the king of O'ahu, had promised to make king anyone who could drive Kamaika'ahui away from O'ahu. When Palila got to Waikele, he found Kamaika'ahui. At one look of Palila's war club, the shark-man ran away and tried to jump into the sea. But every time he tried to escape, Palila threw his war club, again and again, until finally he killed Kamaika'ahui (Fornander 1919, *Story of Palila*, Vol. V, Part II:373-374).

In the story of Ka'ehuikimanō-o-Pu'uloa (Thrum 1923:301) the shark from Puna, Hawai'i Island goes to visit the famous Ka'ahupāhau, chiefess of the shark gods of Pu'uloa (Pearl Harbor) and finds her and her entourage at Waiawa. Again no details are given. Other references associating the Ka'ahupāhau shark royal court with Waiawa include the naming of a fishpond (Site -119) at Pearl Harbor "Kuhialoko" after the name of a butler or purveyor to the shark queen (*Saturday Press*, January 12, 1884). Ka'ahupāhau's brother, Kahi'uka was said to have a cave in Waiawa below the former home of the Reverend Bishop, who was the pastor in 'Ewa (*Ke Au Hou* Dec. 14, 1910, translation in Sterling and Summers 1978:18).

*Pukana wai o Kahuku.*

The water outlet of Kahuku.

Refers to the outlet of an underground stream that once flowed from Kahuku to Waipahu, O'ahu [Pukui 1983:299].

The most famous *wahi pana* ("legendary place) in Waikele was the Waipahu Spring. Tapa was placed on a wooden board (also called an anvil), and beaten by women with tapa sticks to often and smooth out the fibers. This pounding made a resonant sound, and women could often identify the owner of the board by the sound that was made. One day a woman in Kahuku on O'ahu took her favorite tapa board to a pool to clean it and left it at the side of the pool. The next day the board was missing. The woman first searched the windward districts of the island, but never heard the distinctive ringing sound of her own favorite board. After several months without finding her board, she traveled to the leeward side of O'ahu.

She went from Kahuku on the Koolau side to Kaneohe where she spent the night. There was no sign of the anvil in Koolau, because the sign she sought was the sound it made. . . . She went on and spent the night at Wailupe but did not find hers. She heard other anvils but they were not hers. The night turned into day and she went on to Kapalama where she slept but did not hear what she sought till she came to Waipahu [*Ka Loea Kalaiaina*, June 10, 1899; English translation in Sterling and Summers 1978:25].

At Waipahu Spring in the 'Ewa District, she finally heard the sound of her own board. She followed the sound to the uplands of Waikele and found a woman beating tapa on her board. The woman claimed that she had found the board one day floating on the water at a spring near her house. This legend illustrates the belief by the ancient Hawaiians that there were underground streams and passages that led from one side of the island to the other. In one version of this story, the people of 'Ewa followed the woman back to Kahuku so that she could prove that the board was the same one she had lost. They wrapped a bundle of ti leaves and cast them into the pool near the house of the Kahuku woman. Then returning to 'Ewa, they saw the same bundle of ti leaves a few days later in Waipahu at the spring. Because of this, the Waipahu spring was called Ka-puka-na-wai-o-Kahuku, which means "Outlet of water from Kahuku."

## 2.2.6 Legends of the Inland Plain called Keahumoa

In several legend of 'Ewa, mention is made of the "plain of Keahumoa." John Papa 'Ī'ī shows this plain opposite the trail to Pohakea Pass, stretching across the *ahupua'a* of Honouliuli and Hō'ae'ae (see Figure 3). McAllister (1933) states that the plains was west of Kīpapa Gulch in Waikele; it is also mentioned in legends of Waipi'o. Thus this is probably a general name for the flat plain *mauka* of the productive floodplain area directly adjacent to Pearl Harbor. This plain would have been *mauka* of the present corridor alignment.

### 2.2.6.1 Legend of Nāmakaokapao'o

Nāmakaokapao'o was a Hawaiian hero of legendary strength. Nāmakaokapao'o's mother was Pokai and his father was Kaulukahai, a great chief of Kahiki, the ancestral home of the Hawaiians. The two met in Hō'ae'ae and conceived their child there. The father returned to his home in Kahiki before the birth of his son, leaving his O'ahu family destitute. A man named Puali'i saw Pokai and married her. The couple then resided on the plains of Keahumoa, planting sweet potatoes. Nāmakaokapao'o was a small, brave child who took a dislike to his stepfather, and pulled up the sweet potatoes Puali'i had planted at their home in Keahumoa. When Puali'i came after Nāmakaokapao'o with an axe, Nāmakaokapao'o delivered a death prayer against him, and slew Puali'i, hurling his head into a cave in Waipouli, near the beach at Honouliuli (Fornander 1919, *Legend of Namakaokapao'o*, Vol. V, II:274-276).

### 2.2.6.2 Legend of Pikoi

Pikoi was a legendary hero, the son of a crow ('*alalā*) and brother to five god-sisters in the form of rats. He was famous for his ability to shoot arrows, and often made bets that he could hit rats from a long distance (Fornander 1917, *Story of Pikoikaalala*, Vol. IV, Part III:450-463). Pikoi's skill was commemorated in a saying (Pukui 1983:200):

<i>Ku aku la i ka pana a</i>	Shot by the arrow of Pikoi-[son]
<i>Pikoi-a-ka-'alalā, keiki pana</i>	of-the-crow, the expert rat-shooter
<i>'iole o ke kula o Keahumoa.</i>	Of the plain of Keahumoa.

### 2.2.6.3 Story of Palila

In the legend of the hero Palila, the famous warrior had a supernatural war club. He could throw the club a long distance, hang on to the end of it, and fly along the club's path. Using this

power, he touched down in several places in Honouliuli, Waipi'o, and Waikele. One day he used his supernatural war club to carry himself to Ka'ena Point at Wai'anae, and from there east across the district of 'Ewa.

*Ha'alele keia ia Ka'ena, hele mai la a Kalena, a Pōhākea, Maunauna, Kānehoa, a ke kula o Keahumoa, nana ia 'Ewa. Kū kēia i laila nānā i ke kū a ka ea o ka lepo i nā kānaka, e pahu aku ana kēia i ka la'au palau aia nei i kai o Honouliuli, kū ka ea o ka lepo, nu lalo o ka honua, me he olai la, makau nā kānaka holo a hiki i Waikele. A hiki o Palila, i laila, e pa'apu ana nā kānaka i ka nānā lealea a ke 'li'i o O'ahu nei, oai o Ahuapau.*

After leaving Ka'ena, he came to Kalena, then on to Pōhākea, then to Manuauna [a peak in Honouliuli], then to Kānehoa [a peak in Honouliuli], then to the plain of Keahumoa [upland plain from Honouliuli to Waipi'o] and looked toward 'Ewa. At this place he stood and looked at the dust as it ascended into the sky caused by the people who had gathered there; he then pushed his war club toward Honouliuli. When the people heard something roar like an earthquake they were afraid and they all ran to Waikele. When Palila arrived at Waikele he saw the people gathered there to witness the athletic games that were being given by the king of O'ahu, Ahupau by name [Fornander 1918, *Legend of Palila*, Vol. V, Part I:142-143].

#### 2.2.6.4 *The Demi-god Maui*

In the stories of the demi-god Maui, Keahumoa is the home of Maui's grandfather, Kuolokele (Kū-honeycreeper). One day, Maui's wife, Kumulama, was stolen by the chief Peapeamakawalu, called eight-eyed-Pea-Pea, who is identified in the creation chant *Kumulipo*, as the octopus god (Beckwith 1951:136). The chief disappeared with Kumulama in the sky beyond the sea, and escaped so quickly that Maui could not catch him. To recover his wife, Maui's mother advised him to visit the hut of his grandfather at Keahumoa:

Maui went as directed until he arrived at the hut; he peeped in but there was no one inside. He looked at the potato field on the other side of Poha-kea, toward Hono-uli-uli, but could see no one. He then ascended a hill, and while he stood there looking, he saw a man coming toward Waipahu with a load of potato leaves, one pack of which, it is said, would cover the whole land of Keahumoa [Thrum 1923:253-254].

Kuolokele made a *moku-manu* ("bird-ship") for Maui, who entered the body of the bird and flew to Moanalaha, the land of the chief Peapeamakawalu. This chief claimed the bird as his own when it landed on a sacred box, and took it with him into the house he shared with Maui's wife. When Peapeamakawalu fell asleep, Maui killed him, cut off his head, and flew away back to O'ahu with his wife and the chief's head (Thrum 1923:252-259).

A man named Kaopele, born in Waipi'o, had a tendency to fall into deep trances for months at a time. While awake, he would create plantations of supernatural proportions. However, he was never able to enjoy the fruits of his labors because he would always fall into another deep sleep.

During one profound slumber, Kaopele was believed to be dead; he taken to Wailua, Kaua'i to be offered as a sacrifice. Upon awakening, he married a woman named Makalani and stayed on Kaua'i. They had a son named Kalelealuaka, who was also blessed with supernatural powers. Kaopele instructed the boy in the arts of war and combat, which Kalelealuaka exhibited during two challenges with kings of Kaua'i. One day, Kalelealuaka decided to travel to O'ahu. A boy, Kaluhe, accompanied him and they paddled to Wai'anae. There, he met another companion who he later named Keinoho'omanawanui, the sloven. The three traveled toward the old plantation called Keahumoe (Keahumoa), in the *mauka* regions of Waipi'o, that were formerly planted by Kaopele.

. . . the three turned inland and journeyed till they reached a plain of soft, whitish rock, where they all refreshed themselves with food. They kept on ascending, until Keahumoe lay before them, dripping with hoary moisture from the mist of the mountain, yet as if smiling through its tears. Here were standing bananas with ripened, yellow fruit, upland *kalo*, and sugar cane, rusty and crooked with age, while the sweet potatoes had crawled out of the earth and were cracked and dry [Emerson 1998:86-87].

To determine the best settlement location, Kalelealuaka shot an arrow to see where it would land. He then built a mountain house and called it "Lelepua" (meaning "arrow flight"), after his magic arrows.

One night, Kalelealuaka makes known his wish:

The beautiful daughters of Kakuhihewa to be my wives; his fatted pigs and dogs to be baked for us; his choice *kalo*, sugar cane, and bananas to be served up for us; that Kakuhihewa himself send and get timber and build a house for us; that he pull the famous *awa* of Kahuone; that the King send and fetch us to him; that he chew the *awa* for us in his own mouth, strain and pour it for us, and give us to drink until we are happy, and then take us to our house [Emerson 1998:89].

Upon hearing such a request, the *mō'i* Kākuhihewa confers with his priests and instead of killing Kalelealuaka, decides to test him in battle with Kūali'i. Kalelealuaka proves worthy in battle and is given charge of Kākuhihewa's kingdom.

#### 2.2.6.5 *Hi'iaka, sister to the Hawaiian volcano goddess, Pele*

The goddess, Hi'iaka, sister of the volcano goddess Pele, passed through 'Ewa and met women stringing *ma'o* flowers to make *lei*. Hi'iaka offered a chant, making known her wish for a lei around her own neck.

<i>E lei ana ke kula o Ke'ahumoa i ka ma'o</i>	The plains of Keahumoa are garlanded with <i>ma'o</i>
<i>'Ohu'ohu wale nā wāhine kui lei o ka nahele</i>	The lei-stringing women of the forest are festively adorned
[Ho'oumāhiehiemalie 2006a:287; 2006b:268]	

## 2.2.7 Legends of the Uplands

### 2.2.7.1 *Ke akua 'ōlelo*

Ke akua 'ōlelo is described as a local god of Pānakauahi Gulch, who from his *heiau* in Pānakauahi spotted a woman of high rank from Hawai'i hide her *lei niho palaoa* in a hole of a rock, a rock named *pōhaku huna palaoa*, located on the plain of Punahawe. Ke akua 'ōlelo assured the woman that when the time came for her descendants to find the necklace, he would guide them (*Ka Loea Kālai'āina*, July 22, 1899, translation in Sterling and Summers 1978:22).

Ke akua 'ōlelo also appears in another *mo'olelo*, the legend of the children and the secret eating place, Ka'aimalu. Pūpūkanioe, a boy and Nāluahōkū, a girl who grew up with Pana'iahakea, a tributary gulch located on the boundary of Waipi'o and Waiawa, travel frequently to Kualaka'i to fish. Usually they caught plenty of fish, however on one particular day, they only caught one fish, a *palani* which was considered a woman's fish. As they were on their long journey home, they were both caught up in hunger and the girl insisted they both eat the *palani* secretly. However, Ke akua 'ōlelo was watching and announced their sharing of the woman's fish. This was considered the first time the eating *kapu* was broken, and the spot where they ate is called Ka'aimalu, the secret eating place (*Ka Loea Kālai'āina*, July 22, 1899: p.15, translation in Sterling and Summers, 1978:7).

### 2.2.7.2 *Legned of Maihea*

One story that suggests that Waiawa was named for the 'awa plant is the legend of Maihea.

. . . it was here in 'Ewa that Kāne and Kanaloa were invoked by a planter of sweet potatoes, taros, and 'awa named Maihea. This man, living in the upland of Wai'awa, [Handy and Handy use the glottal stop] when he had prepared his meal and his 'awa, would pray:

O unknown gods of mine,  
Here are 'awa, taro greens and sweet potatoes  
Raised by me, Maihea, the great farmer.  
Grant health to me, to my wife and to my son.  
Grant us *mana*, knowledge and skill.

*Amama*. It is freed.

[Handy and Handy 1972:472]

Another more complete version of the story of Maihea is shared in the June 3, 1899 edition of *Ka Loea Kālai'āina*. In this version, Maihea lived at Waimalu, cultivating sweet potatoes and taro. However, it was on a hill in the upland of Waiawa where he planted his 'awa. He prayed daily to the unknown gods with his offering of 'awa, taro greens and sweet potatoes. In answer to his prayer, Kāne and Kanaloa sent a whale to Waimalu. All the people of the area came to marvel at the sight. The beached whale waited almost four weeks until the son of Maihea, Ula-a-Maihea could resist no longer, and against the wishes of his parents, he went down to the shore to see the spectacle. Once there, he followed the children climbing on to the whale. The whale began to move and Ula-a-Maihea was taken to Kahiki where he was trained in the *kahuna* arts under Kāne and Kanaloa.

The parents grieved for the boy, until two strangers came to the door. Maihea invited them to his house and offered them 'awa, saying his usual prayer to the unknown gods. At this time, Kāne and Kanaloa revealed that they were the unknown gods and that they had answered his prayer by sending their son to Kahiki to learn the arts of the kahuna.

This was the beginning of the travels of these gods on earth and this was also the time when the boundaries of Ewa were made as I told you when I mentioned Pohaku-pili. On their return after dividing the land, they came to the top of Haupuu, (that is the present site of the Kahikuonuolani Church at Waiawa) they turned to look at 'Ewa and when they saw the fish ponds at Waiawa, they said, "May the fish ponds down at Waiawa be as the stars in the sky above. May there be mullets at Kuhia-loko, fine sea weed at Kuhia-waho, salt at Ninauele, the single fruited coconut at Hapenui, the taro greens at Mokaalika and the water of Kaaimalu, to remove the bitterness of the 'awa of Kalahikuola [*Ka Loea Kālai'āina*, June 3, 1899:9, English summary in Sterling and Summers 1978:5].

## 2.2.8 Traditional Accounts of Pre-Contact and Early Post-Contact Hawaiian Battles

The rich resources of the Pearl Harbor lochs, the shoreline fishponds, the numerous springs, and the irrigated lands along the streams made central 'Ewa a prize for competing chiefs. Battles were fought for and on 'Ewa lands, sometimes from competing O'ahu chiefs, and sometimes by invading chiefs from other islands.

### 2.2.8.1 *Mā'ilikūkahī and the Invasion of the Hawaiian Chiefs (16<sup>th</sup> century)*

Born *ali'i kapu* at the birthing stones of Kūkaniloko (Kamakau 1991a:53), Mā'ilikūkahī became *mō'ī* of O'ahu around A.D. 1520 to 1540 (Cordy 2002:19). Mā'ilikūkahī was popular during his reign and was remembered for initiating land reforms, which brought about peace, and for encouraging agricultural production, which brought about prosperity. He also prohibited the chiefs from plundering the *maka'āinana* with punishment of death (Kamakau 1991a:55).

Mā'ilikūkahī's peaceful reign was interrupted by an invasion which would change Waipi'o 'Uka forever. The following is a description of the Battle of Kīpapa by Fornander:

I have before referred to the expedition by some Hawaii chiefs, *Hilo-a-Lakapu*, *Hilo-a-Hilo-Kapuhi*, and *Punaluu*, joined by *Luakoa* of Maui, which invaded Oahu during the reign of *Mailikukahi*. It cannot be considered as a war between the two islands, but rather as a raid by some restless and turbulent Hawaii chiefs . . . The invading force landed at first at Waikiki, but for reasons not stated in the legend, altered their mind, and proceeded up the Ewa lagoon and marched inland. At Waikakalaua they met *Mailikukahi* with his forces, and a sanguinary battle ensued. The fight continued from there to the Kīpapa gulch. The invaders were thoroughly defeated, and the gulch is said to have been literally paved with the corpses of the slain, and received its name "Kīpapa," from this circumstance. *Punaluu* was slain on the plain which bears his name, the fugitives were pursued as far as Waimano, and the head of *Hilo* was cut off and carried in triumph to Honouliuli, and stuck up at a place still called *Poo-Hilo* [Fornander 1996:89-90].

Apparently, Kīpapa Gulch in Waipi'o was named after this particular battle, or more likely renamed. In old Hawai'i, places were often given names based on historic events. The literal translation of the work *kīpapa* is "to be paved," as in "paved with the corpses of the slain."

### 2.2.8.2 *The Rivalry of the Waikīkī and Waikele Chiefs (17<sup>th</sup> century)*

Around A.D. 1600-1620, the entire island of O'ahu was united under the rule of one woman, and *ali'i* named Kala'imanuia (Cordy 2002:30). Before her death, she divided her kingdom between four of her children, giving the districts of Kona and Ko'olaupoko to Kū, the *ahupua'a* of Kalauoa. 'Aiea, Moanalua and Hālawā to Ka'ihikapu, the districts of 'Ewa and Wai'anae to Ha'o, and the districts of Waialua and Ko'olauloa to her daughter Kekela. To Kū, she passed on her title of *mō'i*, or king, so that the other three were still subject to their eldest brother. Kū, however, was greedy and began to try to take the lands allotted to his siblings away from them. Ha'o joined with this brother Ka'ihikapu in a battle defending against an attack by Kū, a battle in which Kū was slain. Ka'ihikapu then became *mō'i* and was a good king, taking care of his subjects and making frequent tours around the island to observe the people. On one of these circuits, he visited his brother Ha'o at his court in Waikele and grew jealous of the riches at his brother's home. Ka'ihikapu sent a large man-eating shark (*Carcharodon carcharias*) that had been caught near his court in Waikīkī to his brother as a gift so that Ha'o could use it as a sacrifice to dedicate to the gods at his *heiau* in Waikele. Ka'ihikapu's forces attacked Ha'o and his priests at the temple as they were unarmed and busy with the dedication ceremonies (Fornander 1996:270-271).

There are other versions of this story that describe the shark as similar to the gift of the Trojan Horse, but Fornander (1996:271) believes that these "embellishments" may have been made in the post-contact period. Two versions of this more elaborate story are presented below

There is a saying concerning this rivalry between the two brothers "*Ke one kuilima laula o 'Ewa*. The sand on which there was a linking of arms [*kuilima*] on the breadth of 'Ewa." This saying is in reference to how Ka'ihikapu took Ha'o's lands from him.

The chiefs of Waikīkī and Waikele were brothers. The former wished to destroy the latter and laid his plot. He went fishing and caught a large *niuhi* [man-eating shark], whole skin he stretched over a framework. Then he sent a messenger to ask his brother if he would keep a fish for him. Having gained his consent, the chief left Waikīkī hidden with his best warriors in the "fish." Other warriors joined them along the way until there was a large army. They surrounded the residence of the chief of Waikele and linked arms [*kuilima*] to form a wall, while the Waikīkī warriors poured out of the "fish" and destroyed those of Waikele [Pukui 1983:191].

In a different version of this story (Kamakau 1991a:61-67), Ka'ihikapu, cut open the shark captured from the Waikīkī waters, removed all the meat, but left the skin and bones. He sent a messenger to his brother, Ha'o, chief of Waikele, offering the shark to him. Ha'o quickly agreed, and waited for the shark to be delivered to Waikele, where he planned to place it at his *heiau* as an offering to the gods. When the shark, was placed on the altar, Ka'ihikapu and his men jumped out and slaughtered his brother and all of the priests. The slain men were then put into the shark and offered as a sacrifice at the former *heiau* of the Waikele. Kamakau (1991a:67) says that the

name of this place of slaughter in Waikele was called Paumakua. Thrum (1922:665) translates this place name as “all fiery eyed.” McAllister (1933:106) located this destroyed *heiau*, called Hapupu, at the site then occupied by the Waipahu plantation stables.

### 2.2.8.3 *The Overthrow of Kahahana and his Escape to 'Ewa (18<sup>th</sup> century)*

Thomas Thrum (1998:203-214) translates the legend of the *kahuna*, or priest, Ka'ōpuluhulu, who lived in Waimea. Kahekili, the king of Maui sent his foster son, Kahahana to rule O'ahu, around the year A. D. 1779 (Cordy 2002:42). Kahahana set up his royal compound in Waikīkī, and commanded the priest Ka'ōpuluhulu to attend him there. At first Kahahana valued the wisdom of this wise priest, but after several years, Kahahana began to be cruel to the people, and in protest Ka'ōpuluhulu left Waikīkī to return to his home in Waimea. This angered the king, who sent messengers to order Ka'ōpuluhulu and his son Kahulupue, to come to Wai'anae, where Kahahana then resided.

At Wai'anae, the two men were placed into a special grass hut, one tied to the end post and one tied to the corner post of the house. The next day, Kahahana ordered his men to torture the son, stabbing his eyes and stoning him while his father watched. When Ka'ōpuluhulu saw this, he commanded his son to flee into the sea, saying these words (Pukui 1983:44), which contained a prophecy.

<i>E nui ke aho, e ku'u keiki,</i>	Take a deep breath, my son, and lay
<i>a moe i ke kai, no ke kai la</i>	yourself in the sea, for then the land
<i>ho'i ka 'āina.</i>	shall belong to the sea.

When Kahekili heard of this outrage, he sent an army to O'ahu to depose Kahahana. The O'ahu force was defeated around the year 1795 (Cordy 2002:19), and Kahahana, his wife, Kekuapoi, and his friend Alapai, fled westward, hiding at many places in 'Ewa.

Upon the arrival here at Oahu of Kahekili, Kahahana fled, with his wife Kekuapoi, and friend Alapai, and hid in the shrubbery of the hills. They went to Aliomanu, Moanalua, to a place called Kinimakalehua; then moved along to Keanapuaa and Kepookala, at the lochs of Puuloa, and then from there to upper Waipio; thence to Wahiawa, Helemano, and on to Lihue [upper plain of Honouliuli, Ho'aeae, and Waipi'o]; thence they came to Poohilo, at Honouliuli, where they first showed themselves to the people and submitted themselves to their care.

Through treachery, Kahahana was induced to leave Pō'ohilo, Honouliuli and was killed on the plains of Hō'ae'ae [Thrum 1998:213-214].

While hiding in Pō'ohilo, and 'ili of Honouliuli:

. . . report thereof was made to Kahekili, the king, who thereupon sent Kekuamanoha, elder brother of Kekuapoi, the wife of Kahahana, with men in double canoes from Waikiki, landing first at Kupahu, Hanapouli, Waipio, and had instructions to capture and put to death Kahahana, as also his friend Alapai, but to save alive Kekuapoi. When the canoes touched at Hanapouli, they proceeded thence to Waikele and Hoaeae, and from there to Poohilo, Honouliuli, where they met with Kahahana and party in conference. At the close of the day Kekuamanoha

sought by enticing words to induce his brother-in-law to go un with him and see the father king and be assured of no death condemnation, and by skilled flattery he induced Kahahana to consent to his proposition, whereupon preparation was made for the return. On the following morning, coming along and reaching the plains of Hoaeae, they fell upon and slew Kahahana and Alapai there, and bore their lifeless bodies to Halaulani, Waipio, where they were placed in the canoes and brought up to Waikiki and placed up in the coconut trees by King Kahekili and his priests from Maui, as Kaopulupulu had been. Thus was fulfilled the famous saying of the Oahu priest in “all its truthfulness.” According to the writings of S. M. Kamakau and David Malo, recognized authorities, the thought of Kaopulupulu as expressed to his son Kahulupue, “This land is the sea’s,” was in keeping with the famous prophetic vision of Kekiopilo that “the foreigners possess the land,” as the people of Hawaii now realize [Manu 1904:112-113].

#### 2.2.8.4 *Kūali‘i’s Defeat of the ‘Ewa chiefs (19<sup>th</sup> century)*

In the first half of the eighteenth century, the island of O‘ahu was ruled by a chief named Kūali‘i who consolidated his supreme power over the entire island by defeating the chiefs of ‘Ewa (Cordy 2002:32). Kūali‘i met the competing army on the plains of Keahumoa, but the ‘Ewa chiefs surrendered when they saw Kūali‘i’s overwhelming forces, and they ceded the lands of Ko‘olauloa, Ko‘olaupoko, Waiialua, and Wai‘anae to him (Fornander 1917, *History of Kualii*, Volume IV, Part II:366, 400).

During the second half of the eighteenth century, Waipi‘o again became a focus of political intrigue and warfare. In 1783, the forces of the Maui chief Kahekili gained control of the island of O‘ahu by defeating the *mō‘ī*, Kahahana, “from the powerful ‘Ewa chiefs’ line” (Cordy 1981:207). Kahekili set up his friend Hu‘eu over the districts of ‘Ewa, Waianae, and Ko‘olauloa. The defeated O‘ahu chiefs plotted to kill the Maui chiefs, and succeeded in killing Hu‘eu, but Kahekili escaped.

The murderers of Hu‘eu were found in Waipi‘o, “therefore Ewa became famed as a land of deadly plots” (*Ka Nūpepa Kū‘okok‘a* Dec. 5, 1868; HEN Vol. I, p. 2734, cited in Sterling and Summers 1978:3). Waipi‘o was given the name “Waipi‘o *kīmopō*,” or “Waipi‘o of secret rebellion” (Pukui 1983:319) due to all the covert planning (Kamakau 1961:138). Following the plan’s failure, Kahekili took revenge on the ‘Ewa and Kona districts:

. . . and when Ka-hekili learned that Elani of ‘Ewa was one of the plotters, the districts of Kona and ‘Ewa were attacked and men, women, and children were massacred, until the streams of Makaho and Niuhelewai in Kona and of Kahoa‘ai‘ai in ‘Ewa were choked with the bodies of the dead, and their waters became bitter to the taste, as eyewitnesses say, from the brains that turned the water bitter. All the O‘ahu chiefs were killed and the chiefesses tortured [Kamakau 1992:138].

If Kamakau is correct, the population of Waipi‘o would have been decimated during the 1780s. Kahekili and the Maui chiefs retained control of O‘ahu until the 1790s. In 1794, Kahekili died at Waikīkī. His son, Kalanikūpule, was defeated the following year at the battle of Nu‘uanu

by Kamehameha, who distributed the O'ahu lands - including Waipi'o Ahupua'a - among his favorite followers which resulted in the displacement of many families. "Land belonging to the old chiefs was given to strange chiefs and that of old residents on the land to their companies of soldiers, leaving the old settled families destitute" (Kamakau 1992:376-377).

## Section 3 Background History

---

### 3.1 'Ewa as a Political Center

There are many documented references that chiefs resided in 'Ewa and that it was a political center in its day. Oral accounts of chiefs and chiefesses recorded by noted Hawaiian historian, Samuel Kamakau, date back to at least the 12th century. He tells us that:

The chiefs of Līhu'e, Wahiawā, and Halemano on O'ahu were called *lō ali'i*. Because the chiefs at these places lived there continually and guarded their *kapu*, they were called *lō ali'i* [from whom a "guaranteed" chief might be obtained, *loa'a*]. They were like gods, unseen, resembling men [Kamakau 1991a:40].

By ca. A.D. 1320, 'Ewa, along with Kona, and Ko'olaupoko were the dominant polities, ruled by the sons of a chief named Māweke (Cordy 2002:21). 'Ewa at this time included the traditional districts of 'Ewa, Wai'anae, and Waialua (Fornander 1996:48). Around A.D. 1400, the entire island was ruled by King La'akona; chiefs within his line, the Māweke-Kumuhonua line, reigned until about A.D. 1520-1540, with their major royal center in Līhu'e, in 'Ewa. (Cordy 2002:24). Haka was the last chief of the Māweke-Kumuhonua line; he was slain by his men at the fortress of Waewae near Līhu'e (Kamakau 1991a:54; Fornander 1996:88). Power shifted between the chiefs of different districts from the 1500s until the early 1700s, when Kūali'i achieved control of all of O'ahu by defeating the Kona chiefs, then the 'Ewa chiefs, and then expanding his control on windward Kaua'i. Peleiholani, the heir of Kūali'i, gained control of O'ahu ca. 1740, and later conquered parts of Moloka'i. He was ruler of O'ahu until his death in ca. 1778 when Kahahana, of the 'Ewa line of chiefs was selected as the ruler of O'ahu (Cordy 2002:24-41).

A 14th century account speaks of the reign of Mā'ilikūkahī, an *ali'i kapu* who was born at Kūkaniloko in Wahiawā around the 14th century A.D. (Pukui et al. 1974:113). Upon consenting to become *mō'i* (king) at the age of 29, he was taken to Kapukapuākea Heiau (temple) at Pa'la'akai in Waialua to be consecrated. Soon after becoming king, Mā'ilikūkahī was taken by the chiefs to live at Waikīkī. The story tells us that he was probably one of the first chiefs to live there. Up until this time the chiefs had always lived at Wai'alua and 'Ewa. Under his reign, the land divisions were reorganized and redefined.

In reference to the productivity of the land and the population during Mā'ilikūkahī's reign Kamakau writes:

In the time of Mā'ili-kūkahī, the land was full of people. From the brow, *lae*, of Kulihemo to the brow of Maunauna in 'Ewa, from the brow of Maunauna to the brow of Pu'uhea [Pu'u Ku'ua] the land was full of chiefs and people. From Kānewai to Halemano in Wai'alua, from Halemano to Paupali, from Paupali to Hālawa in 'Ewa the land was filled with chiefs and people [Kamakau 1991a:55].

The picture presented here is that the whole *moku* (district) of 'Ewa was one of prosperity and productivity and the land was heavily populated. 'Ewa continued to be a political center until the 18th century when Kahahana, a Maui chief, was chosen by the O'ahu chiefs to rule over the

whole island. Somewhere between 1883 and 1885, Kahahana was killed by Kahekili of Maui. Kahahana's father, 'Elani, along with other O'ahu chiefs, plotted to kill Kahekili and his chiefs who were residing at Kailua, O'ahu, as well as his chiefs residing at 'Ewa and Wai'alua. The plot was discovered by Kahekili and a messenger was sent to warn Hū'eu at Wai'alua. For some reason, the messenger never reached Hū'eu and he and his retinue were killed. This slaughter became known as the *Waipi'o Kīmopō* or the Waipi'o assassination because it originated there. Kahekili avenged the death of Hū'eu by pillaging and destroying the districts of Kona and 'Ewa. It is said that the streams of Makaho and Niuhelewai in Kona, as well as Hō'ae'ae in 'Ewa were choked with the bodies of the slain. It was during this time that the O'ahu chiefly lines were nearly exterminated. It is said that one of the Maui chiefs, Kalaikoa, used the bones of the slain to build a wall around his house at Lapakea in Moanalua. The house was known as Kauwalua and could be seen as one passed by the "old upper road to 'Ewa" (Fornander 1996:290).

Even though Waikīkī was a favorite playground for the chiefs of Kona, as with 'Ewa chiefs, there were no deep harbors where large ships could enter port. With the introduction of trade and foreign goods, along with Kamehameha's unifying the islands, attention shifted to Kou (old name for Honolulu, used until about 1800) (Pukui et al. 1974:117), which had a deep enough harbor for ships to pull in and anchor. Kou became the center of activity as royalty moved away from the outer districts toward the center of commerce. The general populace as well moved away from the rural areas as they, too, became dependent on a cash economy. Archibald Campbell writes about O'ahu in 1809:

Although only of secondary size, it [O'ahu] has become the most important island in the group, both on account of its superior fertility, and because it possesses the only secure harbour to be met with in the Sandwich Islands.

In consequence of this, and of the facility with which fresh provisions can be procured, almost every vessel that navigates the North Pacific puts in here to refit. This is probably the principal reason why the king has chosen it as his place of residence [Campbell 1967:109-110].

'Ewa is depicted as an abundant and populated land where chiefs of distinguished lineages were born and resided. The land was fertile and well fed by mountain streams that helped sustain the agricultural lifestyle needed to support the chiefs, their households and their people. An examination of the place names reveal that water was a very important factor in this district. Six of the twelve *ahupua'a* names begin with *wai*, the Hawaiian word for water (Waikele, Waipi'o, Waiawa, Waimano, Waiau, and Waimalu). The fact that there were so many fishponds in the 'Ewa district and in the Pu'uloa area, more than any other district on O'ahu, indicates that agricultural/ aquacultural intensification was a direct link to the chiefs who resided there and, also, to the increasing needs of the population. 'Ewa's part in the politics and history of O'ahu is of noteworthy importance.



John Papa 'Ī'ī described a network of Leeward O'ahu trails, which in historic times encircled and crossed the Wai'anae Range, allowing passage from Lualualei to Honouliuli by three different trails ('Ī'ī 1959:96-98). The coastal trail (see Figure 3) skirted Pearl Harbor, passing by Pu'uokapolei. Following 'Ī'ī's description a portion of the coastal trail would have passed close to the existing Farrington Highway.

Captain Vancouver sailed by Kalaeloa (Barbers Point) in 1792, and recorded his impression of the small coastal village of Kualaka'i and the arid Honouliuli coast.

The point is low flat land, with a reef round it . . . Not far from the S.W. point is a small grove of shabby cocoa-nut trees, and along these shores are a few struggling fishermen's huts [Vancouver 1798, Vol. I:167].

. . . from the commencement of the high land to the westward of Opooroah [Pu'uuloa], was composed of one very barren rocky waste, nearly destitute of verdure, cultivation or inhabitants, with little variation all the way to the west point of the island . . . [Vancouver 1798, Vol. II:217].

. . . This tract of land was of some extent but did not seem to be populous, nor to possess any great degree of fertility; although we were told that at a little distance from the sea, the soil is rich, and all necessaries of life are abundantly produced . . . [Vancouver 1798, Vol. III:361-363].

Subsequent to western contact in the area, the landscape of the 'Ewa plains and Wai'anae slopes was adversely affected by the removal of the sandalwood forest, and the introduction of domesticated animals and new vegetation species. Domesticated animals, including goats, sheep and cattle, were brought to the Hawaiian Islands by Vancouver in the early 1790s, and allowed to graze freely about the land for some time after. It is unclear when the domesticated animals were brought to O'ahu; however, L.A. Henke reports the existence of a longhorn cattle ranch in Wai'anae by at least 1840 (Frierson 1972:10). During this same time, perhaps as early as 1790, exotic vegetation species were introduced to the area. These typically included vegetation best suited to a terrain disturbed by the logging of sandalwood forest and eroded by animal grazing. Within the current project area, the majority of the (non-cultivated) vegetation is comprised of introduced species, mainly grasses.

At contact, the most populous *ahupua'a* on the island was Honouliuli, with the majority of the population centered on Pearl Harbor. In 1832, a missionary census of Honouliuli recorded the population as 1,026. Within four years, the population was down to 870 (Schmitt 1973:19, 22). In 1835, there were eight to ten deaths for every birth (Kelly 1991:157-158). Between 1848 and 1853, there was a series of epidemics of measles, influenza, and whooping cough that often wiped out whole villages. In 1853, the population of 'Ewa and Wai'anae combined was 2,451 people. In 1872, it was 1,671 (Schmitt 1968:71). The inland area of 'Ewa was probably abandoned by the mid-nineteenth century, due to population decline and consolidation of the remaining people in the town of Honouliuli, near Kapapāhi Point.

### 3.2.2 Mid-Nineteenth Century and the Māhele

The Organic Acts of 1845 and 1846 initiated the process of the Māhele, the division of Hawaiian lands, which introduced private property into Hawaiian society. In 1848, the crown,

the Hawaiian government, and the *ali'i* (royalty) received their land titles. The common people (*maka'āinana*) received their *kuleana* awards (individual land parcels) in 1850. It is through records for Land Commission Awards (LCA) generated during the *Māhele* that the first specific documentation of life in 'Ewa, as it had evolved up to the mid-nineteenth century, come to light.

In 1855 the Land Commission awarded all of the unclaimed lands in Honouliuli, 43,250 acres, to Miriam Ke'ahikuni Kekau'ōnohi, Royal Patent #6971 in 1877; Parcel #1069 in the Land Court office, Land Commission Award (LCA) 11218, a granddaughter of Kamehameha I, and the heir of Kalanimōkū, who had been given the land by Kamehameha after the conquest of O'ahu (Indices of Awards 1929; Kame'eleihiwa 1992). Kekau'ōnohi was one of Liholiho's (Kamehameha II's) wives, and after his death, she lived with her half-brother, Luanu'u Kahalai'a, governor of Kaua'i (Kelly 1985:21). Subsequently, Kekau'ōnohi ran away with Queen Ka'ahumanu's stepson, Keli'iahonui, and then became the wife of Chief Levi Ha'alelea. Upon her death on June 2, 1851, all her property was passed on to her husband and his heirs. In 1863, the owners of the *kuleana* lands deeded their lands back to Ha'alelea to pay off debts owed to him (Frierson 1972:12). In 1864, Ha'alelea died, and his second wife, Anadelia Amoe, transferred ownership of the land to her sister's husband John Coney.

During the *Māhele* of 1848, 96 individual claims were made and 72 individual claims in the *ahupua'a* of Honouliuli were registered and awarded by King Kamehameha III to commoners (Tuggle and Tomonari-Tuggle 1997:34). The 72 *kuleana* awards were almost all made adjacent to Honouliuli Gulch, which contained fishponds and irrigated taro fields.

Table 2. 72 *Kuleana* Awards in Honouliuli *Ahupua'a*

LCA	Awardee	'Ii	LCA	Awardee	'Ii
748	Kalauhala	Panahaha, Kaaumakua	906	Kanoho	Kamoku
749	Mahina	Kaulaula	907	Luana	Kamaipipipi, Niukee
751	Kalauli	Kalihikahi	910	Nunu	Kaaumakua
752	Haae	Kailikahi, Kailihai	911	Kauhailepa	Poohilo
753	Manuwa	Kamoku	914	Kamaala	Niukee, Kapapahi
754	Kaunahi	Niukee	916	Kama	Loloulu, Makau
755	Keinohana-nui	Niukee, Kailikahi, Kaakau	917	Kaulu	Kamilomilo, Kaaumakua
756	Kauouo	Kaaumakua	947	Kaopala	Loloulu, Kaulaula
758	Nihua	Niukee	960	Poopuu	Loloulu
760	Kuhemu	Kamaipipipi, Niukee, Naopala, Kailikahi	1565	Kaalauahi	Niukee, Kapapahi
761	Kinolua	Niukee, Kailikahi, Ilikahi, Palahemo	1570	Kekua	Poohilo
762	Kalama	Kaaumakua	1570-B	Paekane	Kaaumakua
763	Keliiaa, Solomona	Hiwa, Poohilo, Mauakapuoā, Uani / Maui, Polapola	1570-C	Naholowaa	Kaaumakua
765	Kamalaē	Niukee, Kailikahi, Palahemo	1573	Kawahamana	Niukee, Kapapahu <sup>o</sup>
766	Paele	Niukee, Kaluamooiki, Kailikahi	1580	Kanahuna	Kamilomilo

LCA	Awardee	'Ii	LCA	Awardee	'Ii
767	Hapauea	Niukee, Kapapahi Kahaumakua, Niukee,	1580-B	Kapioho	Polapola, Kahiwapalaai°
768	Pio	Waioha	1598	Kekua	Loloulu, Kapapahi
827	Kauakahilau	Poohilo	1605-B	Nakai	Mahuna, Niukee°
828	Kawahaea	Poohilo	1666	Mauwele	Poohilo
831	Kaekuna	Poohilo	1666-B	Kuahilo	Poohilo
832	Opiopio	Poohilo	1670	Moano	Loloulu, Kaaumakua
834	Oni	Poohilo, Kailikahi Kamilomilo, Kailikahi,	1672	Makue	Kamoku, Kapapuhi°
839	Kaaiawaawa	Haole, Poohilo	1699	Leleiaupa	Maui, Poiwaikele
845	Kekukahiko	Kapapahi, Niukee	1701	Alaluka	Pohilo
847	Hinaa	Poohilo	1703	Aimaikai	Kamilomilo
848	Kapule	Poohilo	1713	Healani	Niukee, Kapapuhi°
869	Pue	Maui	1719	Hilea	Kaaumakua
872	Kahakuliili	Loloulu, Paakai, Papaioua	1720	Hilinae	Polapola
874	Laamaikahiki	Polapola, Hiwa	5204	Kalama 2	Polapola
876	Nohunohu	Niukee, Nukee	5653	Kua	Maui, Polapola, Kahui
881	Kikala	Polapola	5654	Kuhiena	Maui, Poohilo
886	Kahalewai	Kamoku, Manuwa	5653-B	Kanehikili	Poohilo
892	Aoa, Samuela	Kapapahi, Niukee	5670-B	Kaohai	Kaihuopalaai, Polapola Poohili, Kepoe, Loloulu,
898	Kaneaola	Polapola	5670-C	Kumupopo	Puaaluu
901	Kuahine	Nukee / Niukee,	5950	Pihana	Kamoku
902	Haakue	Waimanalo	10933	Uia	Niukee
905	Kaimuena	Kaaumakua			

An 1875 map of Honouliuli (Figure 4) shows the corridor approximately 2 kilometers north of the middle of the dense cluster of LCA parcels, called on an 1878 map (Figure 5), the “Honouliuli Taro Lands.” The 1878 map shows all of the LCA parcels positioned *makai* of the archaeological study area. Five of these LCAs were awarded near the study area (upper right corner of Figure 5). All five were small awards; each included multiple *lo'i* (taro fields) and a *kula* (pasture or dry field), and two included a house lot (Table 3).

Table 3. Honouliuli Sub-area Land Commission Awards

LCA Number	Contents of Award
848:5	5 <i>lo'i</i> and 1 <i>kula</i>
847:1 and 847:2	14 <i>lo'i</i> , 1 <i>kula</i> , and 1 guard house for the <i>lo'i</i>
911:1	1 house, 1 <i>kula</i> , 5 <i>lo'i</i>
831:3	No data
1570:1	Several <i>lo'i</i> and 1 <i>kula</i>

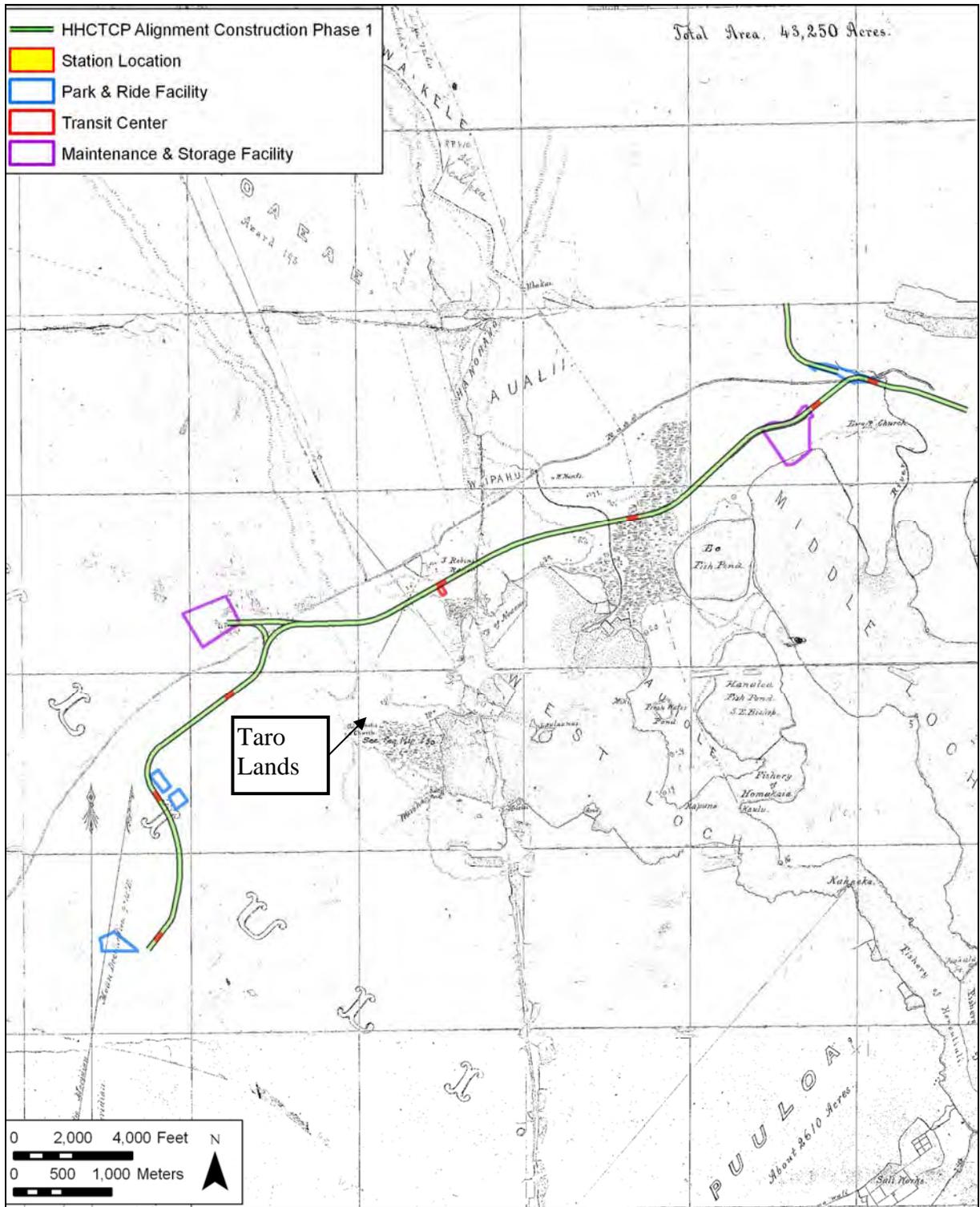


Figure 4. 1875 map of Honouliuli by W. D. Alexander, showing location of corridor in relation to the “Honouliuli Taro Lands” (Registered Map No. 405, Hawai'i Land Survey Division)



### 3.2.3 Late Nineteenth Century to Present

#### 3.2.3.1 Early Ranching in on the 'Ewa Plain

In 1871, John Coney rented the lands of Honouliuli to James Dowsett and John Meek, who used the land for cattle grazing. In 1877, James Campbell purchased most of Honouliuli Ahupua'a –except the 'ili of Pu'uloa - for a total of \$95,000. He then drove off 32,347 head of cattle belonging to Dowsett, Meek and James Robinson, and constructed a fence around the outer boundary of his property (Bordner and Silva 1983:C-12). He let the land rest for one year and then began to restock the ranch, so that he had 5,500 head after a few years (Dillingham 1885, cited in Frierson 1972:14).

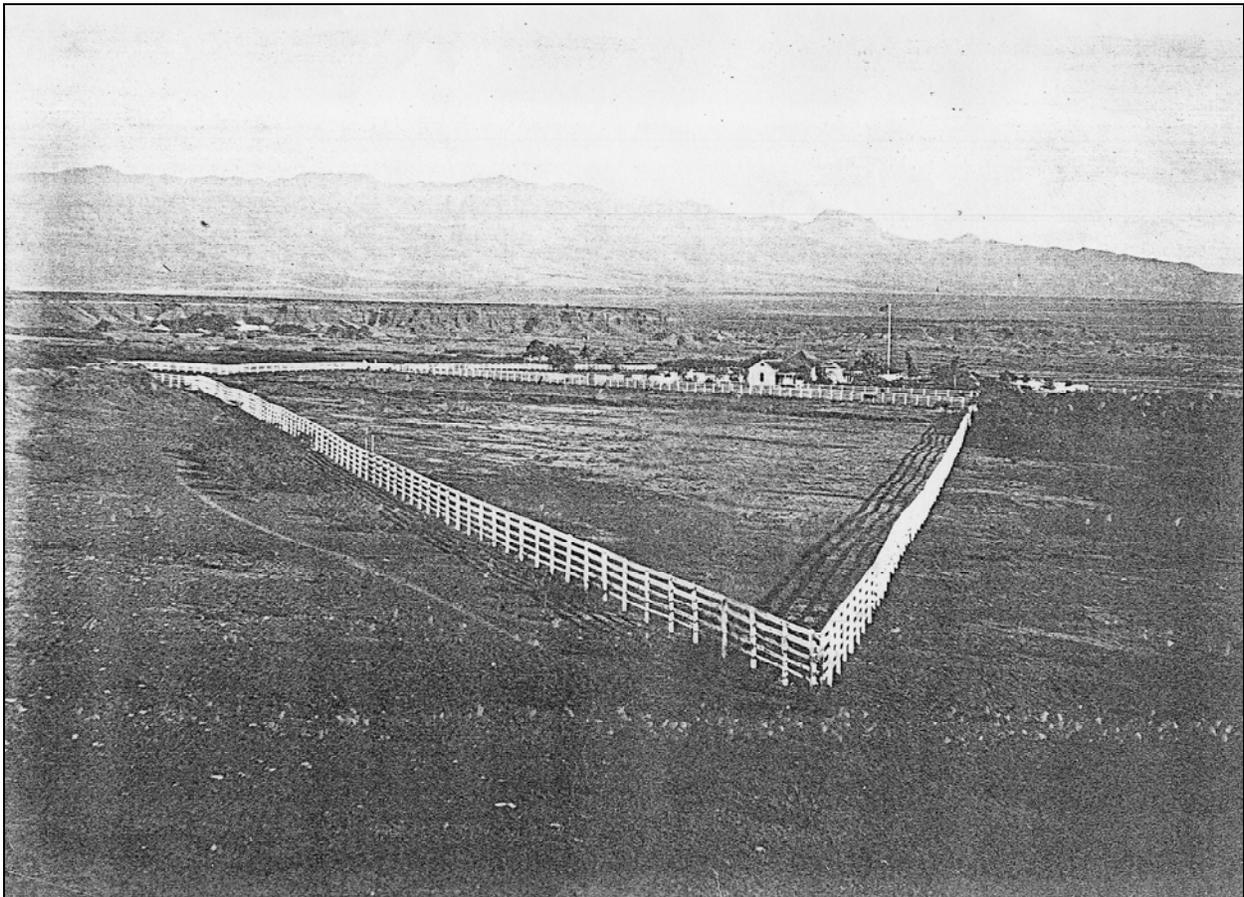


Figure 6. 1880s photograph of James Campbell's residence on the 'Ewa Plain (Hawaii State Archives)

In 1881, a medical student, touring the island to provide smallpox vaccinations to the population, viewed Campbell's property, called the Honouliuli Ranch (Figure 6):

I took a ride over the Honouliuli Ranch which is quite romantic. The soil is a deep, reddish loam, up to the highest peaks, and the country is well-grassed. Springs of water abound. The *'ilima*, which grows in endless quantities on the plains of this ranch, is considered excellent for feeding cattle; beside it grows the indigo plant, whose young shoots are also good fodder, of which the cattle are fond. Beneath these grows the manieizie grass, and Spanish clover and native grasses grow in the open; so there is abundant pasturage of various kinds here. As I rode, to the left were towering mountains and gaping gorges; ahead, undulating plains, and to the right, creeks and indentations from the sea. A wide valley of fertile land extends between the Nuuanu Range and the Waianae Mountains and thence to the coast of Waialua. There are many wild goats in this valley, which are left more or less undisturbed because they kill the growth of mimosa bushes, which would otherwise overrun the country and destroy the pasturage for cattle [Briggs 1926:62-63].

In 1880-81, the Honouliuli ranch was described as:

. . . Acreage, 43,250, all in pasture, but possessing fertile soils suitable for agriculture; affords grazing for such valuable stock. The length of this estate is no less than 18 miles. It extends to within less than a mile of the sea coast, to the westward of the Pearl River inlet. . . . There are valuable fisheries attached to this estate . . . [Bowser 1880:489].

From Mr. Campbell's veranda, looking eastward, you have one of the most splendid sights imaginable. Below the house there are two lochs, or lagoons, covered with water fowl, and celebrated for their plentiful supply of fish, chiefly mullet. . . . Besides Mr. Campbell's residence, which is pleasantly situated and surrounded with ornamental and shade trees, there are at Honouliuli two churches and a school house, with a little village of native huts [Bowser 1880:495].

Most of Campbell's lands in Honouliuli were used exclusively for cattle ranching. At that time, one planter remarked "the country was so dry and full of bottomless cracks and fissures that water would all be lost and irrigation impracticable" (Ewa Plantation Co. 1923:6-7). In 1879, Campbell brought in a well-driller from California to search the 'Ewa plains for water, and the well, drilled to a depth of 240 feet near Campbell's home in 'Ewa, resulted in ". . . a sheet of pure water flowing like a dome of glass from all sides of the well casing" (The Legacy of James Campbell n.d., cited in Pagliaro 1987:3). Following this discovery, plantation developers and ranchers drilled numerous wells in search of the valuable resource (Figure 7).

### 3.2.3.2 Other Enterprises in Campbell Lands

As noted above, part of Mr. Campbell's lands were also used to grow rice. By 1885, 200 acres in Honouliuli were used for rice and 50 acres were used to grow bananas (article in *Pacific Commercial Advertiser*, August 15, 1885, summarized in Silva 1987:A-12). These rice fields were planted in former taro fields or in undeveloped swamps, such as those near the former Honouliuli Taro lands. The rice fields in 1882 were described by Frank Damon, during a tour of the area.

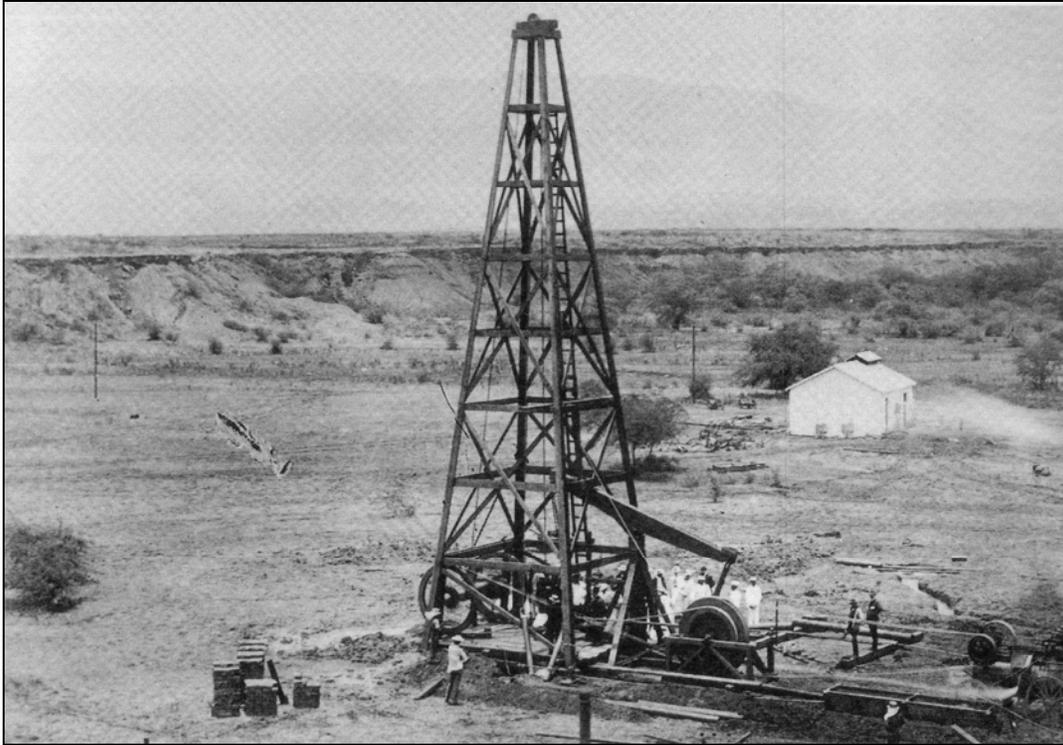


Figure 7. Photo entitled “Drilling artesian well at Ewa ca. 1890” (Wilcox 1996:18)

. . . Towards evening we reached Honouliuli, where the whole valley is leased to rice planters . . . This was one of the largest rice plantations we visited. Sometimes two or three men only, have a few fields which they cultivate for themselves, and we often too came upon houses where there were eight or ten men working their own land. But the larger plantations are owned by merchants in Honolulu, who have a manager acting for them. . . . [Damon 1882:37].

In 1890, Dillingham leased all land below 200 ft to William Castle, who used most of the land for sugar cane, but also leased some lands for rice cultivation, pasture, wood lots, bee-keeping, garden crops, and quarries. Some land above 650 ft was also leased for the cultivation of canaigre, which may be a word used for pineapple (Frierson 1972:15-16).

An additional agricultural trial was conducted in the Honouliuli area for the cultivation of sisal, a plant used to make fibers for rope and other material. Some sisal was planted before 1898 and production continued until the 1920s (Frierson 1972:16). This was grown mainly on the coastal plain of Honouliuli in Kānehili, just *mauka* of Kualaka‘i Beach (now Nimitz Beach). An article in the *Paradise of the Pacific* in 1902 described this venture in glowing terms.

. . . The venture was made and a tract of land containing a large percentage of disintegrated coral, in the neighborhood of Ewa Plantation, where nothing else would grow, was chosen for the planting. . . . The Hawaiian Fiber Co., which Mr. Turner organized, and of which he is now manager, has 755 acres under fence, two and a half miles of which is stone wall with good gates at convenient places. .

. . . In a large field containing 130 acres, mauka of the Oahu Railway & Land Co. track, the first harvest is to be gathered in a few months. . . . Out of this section of 130 acres the company has figured on securing 50 tons of clean fiber, for which it is offered eight cents per pound in Honolulu or nine cents per pound in San Francisco . . . . [*Paradise of the Pacific* March 1902:17].

Into the early twentieth century, some Hawaiian families continued to live in Honouliuli and preserve the traditional lifestyle, including at the fishing village of Kualaka'i. One resident, Mrs. Eli Williamson, recalled:

In the Honouliuli area the train stopped among the *kiawe* (algaraboa) trees and *malina* (sisal) thickets. We disembarked with the assorted food bundles and water containers. Some of the Kualaka'i 'ohana (family) met us to help carry the 'ukana (bundles) along a sandstone pathway through the *kiawe* and *malina*. The distance to the frame house near the shore seemed long. When we departed our 'ukana contained fresh lobsters, *limu* (algae), fish and *i'a malo'o* (dried fish) . . . [Williamson, in Kelly 1985:160].

By the early decades of the 20th century rice farming in the Hawaiian Islands was in decline, beset by crop diseases and cheaper prices for mainland-grown rice. Commercial agriculture in Waialeale became dominated by sugar with the development of the Oahu Sugar Company. The company imposed a new name on the area of its focus when, in 1897, its board of directors decided that "the name of the mill site and office of the company should be 'Waipahu'" (Nedbalek 1984:13).

### 3.2.3.3 History of the Oahu Railway and Land Company (OR&L)

In 1886, Campbell and B. F. Dillingham put together the "Great Land Colonization Scheme," which was an attempt to sell Honouliuli land to homesteaders (Thrum 1887:74). This homestead idea failed; two factors for the failure were the lack of water and the other was the distance from 'Ewa to Honolulu. The water problem was solved by the drilling of artesian wells, and Dillingham decided that the area could be used instead for large-scale cultivation (Pagliaro 1987:4). The transportation problem was to be solved by the construction of a railroad, which B. Franklin Dillingham soon began to finance under the company name of the Oahu Railway and Land Company (OR&L).

During the last decade of the nineteenth century, the railroad would reach from Honolulu to Pearl City in 1890, to Wai'anae in 1895, to Waialua Plantation in 1898, and to Kahuku in 1899 (Kuykendall 1967:III, 100). This railroad line eventually ran across the center of the 'Ewa Plain at the lower boundary of the sugar fields. To attract business to his new railroad system, Dillingham subleased all land below 200 ft to William Castle, who in turn sublet the area to the newly-formed Ewa Plantation Company (Frierson 1972:15). Dillingham's Honouliuli lands above 200 ft that were suitable for sugar cane cultivation were sublet to the Oahu Sugar Company). Throughout this time, and continuing into modern times, cattle ranching continued in the area, and Honouliuli Ranch - established by Dillingham was - the "fattening" area for the other ranches (Frierson 1972:15).

Operations at the OR&L began to slow down in the 1920s, when electric streetcars were built for public transportation within the city of Honolulu and automobiles began to be used by families for transportation outside the city (Chiddix and Simpson (2004:185). The build-up to World War II turned this decline around, as the U.S. military utilized the OR&L lines to transport materials to build defense projects around the island. Historians have noted that one of the most serious mistakes made by the Japanese in their 1941 attack on Pearl Harbor was their decision not to bomb the railway infrastructure. Soon after the attack, the OR&L operated 24 hours a day, transporting war materials and troops from Honolulu to the new and expanded army, naval, and air bases. The huge navy base at Pearl Harbor had its own rail lines that connected to the OR&L rail lines.

In August of 1945, the war ended, and so did OR&L's heyday as a military transport line.

She had served her country well and proudly during the war, but operating round-the-clock on what little maintenance could be squeezed in, had taken a prodigious hit on the locomotives and track. Traffic stayed steady for a short time, but soon dropped precipitously as soldiers and sailors went home, military posts were shrunk or razed, and civilians could again get tires, gasoline and new cars [Chiddix and Simpson 2004:257].

There was no choice but to abandon the OR&L main line, and in 1946 Water F. Dillingham, son of B.F. Dillingham, wrote:

The sudden termination of the war with Japan changed not only the character of our transportation, but cut the freight tonnage to a third and the passenger business to a little above the pre-war level. With the increased cost of labor and material and the shrinkage in freight tonnage and passenger travel, it was definite that the road could not be operated as a common carrier. With no prospect of increased tonnage, and the impossibility of increasing rates against truck competition, your management has applied to the Interstate Commerce for authority to abandon its mainline [Walter Dillingham, cited in Chiddix and Simpson 2004:257].

After the war, most of the 150+ miles of OR&L track were pried up, locomotives were sold to businesses on the US mainland, and railway cars were scrapped. In 1947, the U.S. Navy took over a section of the OR&L track for their own use, to transport bombs, ammunition, and torpedoes from the ammunition magazines at Lualualei, West Loch in Pearl Harbor, and Waikele on OR&L's Wahiawā Branch to Pearl Harbor Naval Base (Treiber 2005:25-26). The track to Waipahu was abandoned in the 1950s, but the line from the magazines in Lualualei to the wharves in West Loch at Pearl Harbor remained open until 1968.

#### *3.2.3.4 History of the Ewa Plantation Company*

The Ewa Plantation Company was incorporated in 1890 for sugar cane cultivation. The first crop, 2,849 tons of sugar, was harvested in 1892 at the Ewa Plantation. Ewa was the first all-artesian plantation, and it gave an impressive demonstration of the part artesian wells were to play in the later history of the Hawaiian sugar industry (Kuykendall 1967:III, 69). As a means to generate soil deposition on the coral plain and increase arable land in the

lowlands, the Ewa Plantation Company installed ditches running from the lower slopes of the mountain range to the lowlands. When the rainy season began, they plowed ground perpendicular to the slope so that soil would be carried down the drainage ditches into the lower coral plain. After a few years, about 373 acres of coral wasteland were reclaimed in this manner (Immisch 1964). By the 1920s, Ewa Plantation was generating large profits and was the “richest sugar plantation in the world” (*Paradise of the Pacific*, December 1902:19-22, cited in Kelly 1985:171).

During the twentieth century, the Ewa Plantation would continue to grow and, by the 1930s, would encompass much of the eastern half of Honouliuli Ahupua‘a. This growth impelled the creation of plantation villages to house the growing immigrant labor force working the fields. After the outbreak of World War II, which siphoned off much of the plantation’s manpower, along with the changeover to almost complete reliance on mechanical harvesting in 1938, there was little need for the large multi-racial (Japanese, Chinese, Okinawan, Korean, Portuguese, Spanish, Hawaiian, Filipino, European) labor force that had characterized most of the early history of the plantation. The Oahu Sugar Company took control over the Ewa Plantation lands in 1970 and continued operations until 1995, when they decided to shut down sugar cane production in the combined plantation areas (Dorrance and Morgan 2000:45, 50).

### 3.2.3.5 *The Military Development of Pearl Harbor*

In 1891, Russian explorer Otto Von Kotzebue tried to observe Pearl River, but his group could not obtain a canoe. What he was told led him to speculate on the possible importance of Pearl Harbor to the future.

In the mouth of this river are several islands; it is so deep, that the greatest ship of the line can lie at anchor a few fathoms from the shore; and so broad, that a hundred vessels can conveniently find room in it. The entrance into the Pearl Rivers is in the same situation as the harbor of Hana-rura; but the windings between the reefs are, however, said to render a passage more difficult. If this place were in the hands of the Europeans, they would certainly employ means to make this harbour the finest in the world [Kotzebue 1821:338-348].

The early missionary Levi Chamberlain was able to take an outrigger canoe trip to Pearl River, and noted the difficulty of access for larger ships.

Kawaa took passage in our canoe to go down the harbor to a place where oysters are abundant to give orders to his people to gather a mess. The sail down the harbor was delightful . . . The passage down the creek for a number of miles was very pleasant till we got down near the reef and our course altered. We then could sail no longer as the wind was against us. The sail was lowered the mast taken down and secured across the outrigger and the rowers plied their paddles [Journal of Levi Chamberlain 1822-1849, Hawaiian Mission Schools, Storage Case 4, p. 899, from Sterling and Summers 1978:51].

The first foreign attempt to survey Pearl Harbor was made in 1840 during the U.S. Exploring Expedition, led by Charles Wilkes.

In this district is a large inlet of the sea, into which the river Ewa empties; at the entrance of this inlet is the village of Laeloa (at Kalaeloa Pont): the shore is known by the name of Pearl River or harbour, from the circumstance that the pearl oyster is found here; and it is the only place in these islands where it occurs.

The inlet has somewhat the appearance of a lagoon that has been partly filled up by alluvial deposits. At the request of the king, we made a survey of it: the depth of water at its mouth was found to be only fifteen feet; but after passing this coral bar, which is four hundred feet wide, the depth of water becomes ample for large ships, and the basin is sufficiently extensive to accommodate any number of vessels. If the water upon the bar should be deepened, which I doubt not can be effected, it would afford the best and most capacious harbour in the Pacific. . . . [Wilkes 1970:79].

Although Wilkes was impressed by the harbor, he was not at this time thinking of how this survey could benefit the American government in the future. In fact, Wilkes (1970:79) concluded, "As yet there is no necessity for such an operation, for the port of Honolulu is sufficient for all the present wants of the islands, and the trade that frequents them."

This had changed in less than 30 years, however. The U.S. military had tried to make a coaling station on Midway Island in 1869 by blasting through the coral reef to make a harbor, but the plan failed. In 1873, General Schofield presented a confidential report to the U.S. Secretary of war, recommending that Pearl Harbor should be available to the U.S. Navy. Schofield wrote:

In case it should become the policy of the Government of the United States to obtain the possession of this harbor for naval purposes, jurisdiction over all the waters of Pearl River with the adjacent shores to the distance of 4 miles from any anchorage should be ceded to the United States by the Hawaiian Government. . . .

The cession of Pearl River could probably be obtained by the United States in consideration of the repeal of the duty of Sandwich Island sugar. Indeed, the sugar-planters are so anxious for a reciprocity treaty, or so anxious rather for free trade in sugar with the United States, that many of them openly proclaim themselves in favor of annexation of these islands of the United States [Sen. Ex. Docs, 52<sup>nd</sup> Cong. 2<sup>nd</sup> Sess. No. 77, pp. 150-154, reproduced in Judd 1971:Appendix 3].

This reciprocity treaty was concluded in 1876 with the provision that Hawai'i would not "lease or relinquish sovereignty to another country or any harbor, etc." In 1887, the treaty was renewed and amended and allowed the United States the "exclusive right to enter the harbor of Pearl River, in the Island of Oahu, at to establish and to maintain there a coaling and repair station for the use of vessels of the United States" (Judd 1971:128).

After annexation of the islands to the United States in 1899, development began in order to make a Pacific base that could be used as a staging area for the Spanish-American war (Coletta 1985:433). Dredging of the harbor began in 1901, and additional dredging to deepen and widen the channel was conducted in 1908 and again in the 1920s. Money for the funding of the construction of dry docks and other support facilities was approved in 1908. In 1931 the Navy

built an ammunition depot at West Loch on a 213-acre parcel that it had bought from the Campbell Estate. Construction of a new depot in Lualualei Valley and at West Loch Harbor began in 1931.

In the early 1930s, the U.S. Navy leased 700 acres of the Campbell Estate to build Ewa Field, a base with a mooring mast for Navy dirigibles. Although the mast was completed, the program was abandoned before the *Akron*, the designated airship for the mast, was built. In 1937, 18 miles of roads were built in the coastal Honouliuli area, and in 1939-1940 the U.S. bought 3,500 acres of land in this area (Landrum et al 1997:62-67), to build several other military camps and installations, including Barbers Point Naval Air Station, at the site of the old mooring mast.

On December 7, 1941 the Japanese Navy launched the devastating surprise attack on the United States base at Pearl Harbor and other military facilities. Although the major battle damage to the U.S. Pacific Fleet was at its base at Ford Island in the Middle Loch of Pearl Harbor, Honouliuli did not escape unscathed.

The Waipahū and Ewa sugar plantation, next to Pearl Harbor and the town of Wahiawa, adjoining Schofield Barracks, saw more action than did Honolulu.

At Waipahu, machine gun bullets, shrapnel, and shells started two cane fires, riddled the sugar mill, hit the plantation hospital in four places, went through the roof of the company store, exploding in an electric supply warehouse, and narrowly missed many houses. In nearly all of the fields of tall cane, many of which contained terrified women and children, shells buried themselves—dozens of them in some concentrated areas—blasting holes in the ground the size of barrels, and flattening cane for several square yards.

At Ewa, after bombing the nearby Marine airfield [at Barbers Point], enemy planes machine-gunned the plantation's main street, the mill and power plant and some 30 houses and started two cane fires [Allen 1999:20].

The attack had consequences not only for the military, but also for the civilians, mostly Japanese, who lived around West Loch.

Two permanent local evacuations were ordered in the first month of the war, partly to remove civilians from areas which might be dangerous in event of further attack and partly to protect installations from possible sabotage or espionage activities. On a Thursday less than two weeks after the bombing, farmers adjacent to West Loch at Pearl Harbor were ordered to leave their farms by sundown. The order was modified to allow two days to prepare and the men were permitted to return to their farms during daylight until livestock could be moved and crops harvested. The displaced farmers, who had only recently been established at West Loch by the Farm Security Administration, were forced to seek temporary housing with friends and relatives or at Ewa plantation. Since they had invested in the enterprises practically all of their life's savings and considerable money borrowed from the FSA as well, several suffered heavy losses [Allen 1999:122].

West Loch was later used as the major staging area for U.S. Navy vessels for the Pacific Fleet, especially for ships called LSTs, those capable of landing on shore to disembark vehicles and marines. On Sunday morning, May 21, 1944, 29 LSTs, slated to sail to the Mariana Islands for the invasion of Saipan, were in West Loch. Each LST carried a crew of 119 men, 200 marines with ammunition and vehicles with gas. An explosion at 3:08 blasted one LST, quickly leading to fires on the other ships. In addition, 20 buildings on shore at the West Loch facility were damaged. In all, six of the LSTs sank, 163 men died, and 396 people, including civilians, were injured (Leniham 1989: Chap. II). A photograph of the harbor and shore damage is shown in Figure 8. NAVMag-West Loch today is used for the storage of ammunition, and the five wharfs at West Loch provide marine terminal services for ocean-transported ordnance (Landrum et al. 1997:68).



Figure 8. Fighting fires at West Loch on May 21, 1944, Signal Corps photo (NPS: USAR Collection)

### 3.2.4 Residential and Commercial Development in Honouliuli

A series of U.S. Geological Survey maps shows the gradual residential and commercial development of Honouliuli. On the 1919 map (Figure 9), residential areas were limited to a cluster at Honouliuli near the old taro lands adjacent to West Loch, and the new Ewa Plantation Village makai of Honouliuli. On the 1927 map (Figure 10), both Honouliuli and 'Ewa Villages were expanding with new improved roads. On the 1943 War Department map (Figure 11), 'Ewa Villages had expanded with additional "ethnic camps," while Honouliuli had become a smaller residential area, rather than a separate "village". On the 1950 Army Mapping Service map (Figure 12), residential subdivisions were spreading to the shore of Pearl Harbor. The Honouliuli lands of Construction Phase I per se, however, remained almost exclusively in sugar cane fields to the end of the twentieth century (Figure 13).

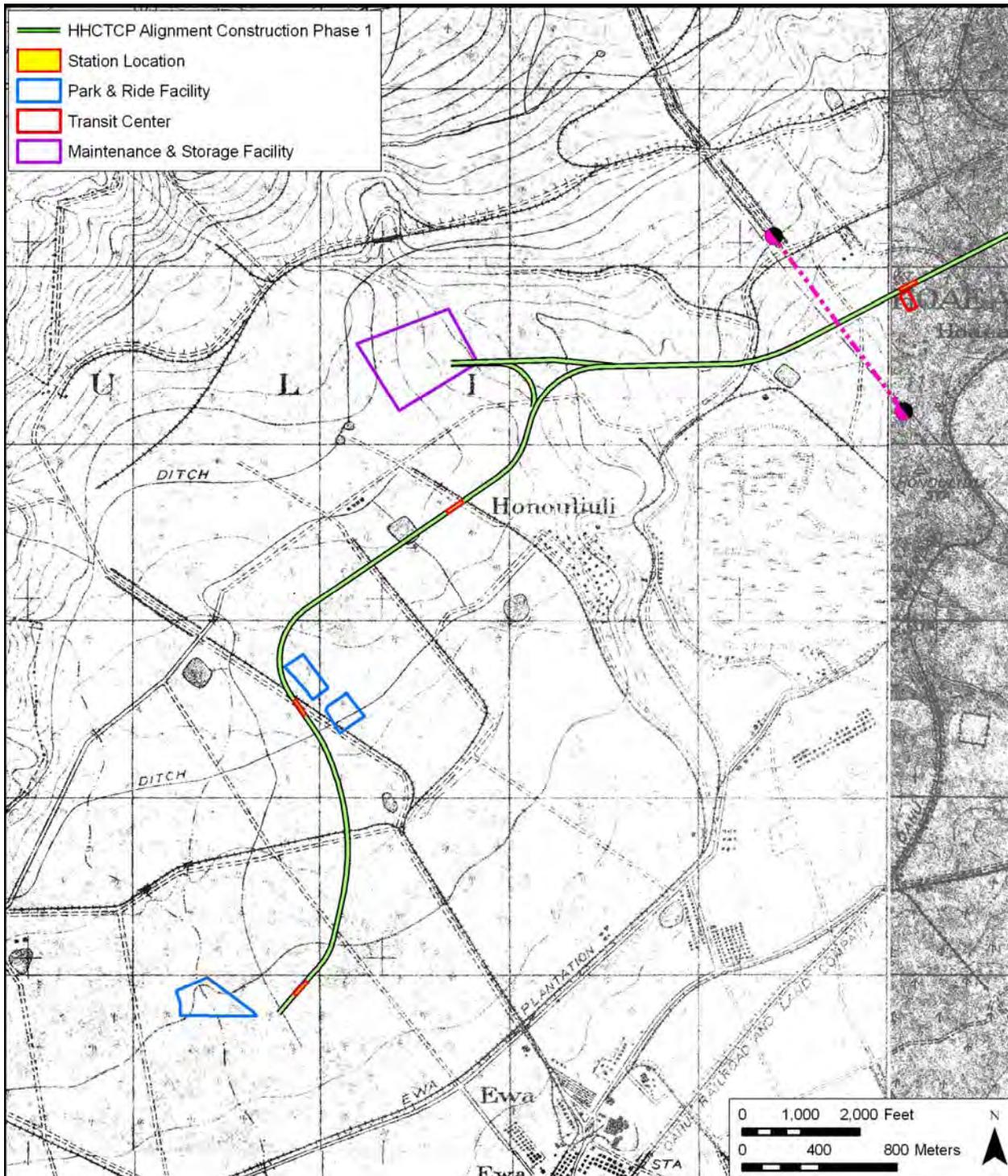


Figure 9. 1919 War Department fire control map, showing location of HHCTCP alignment

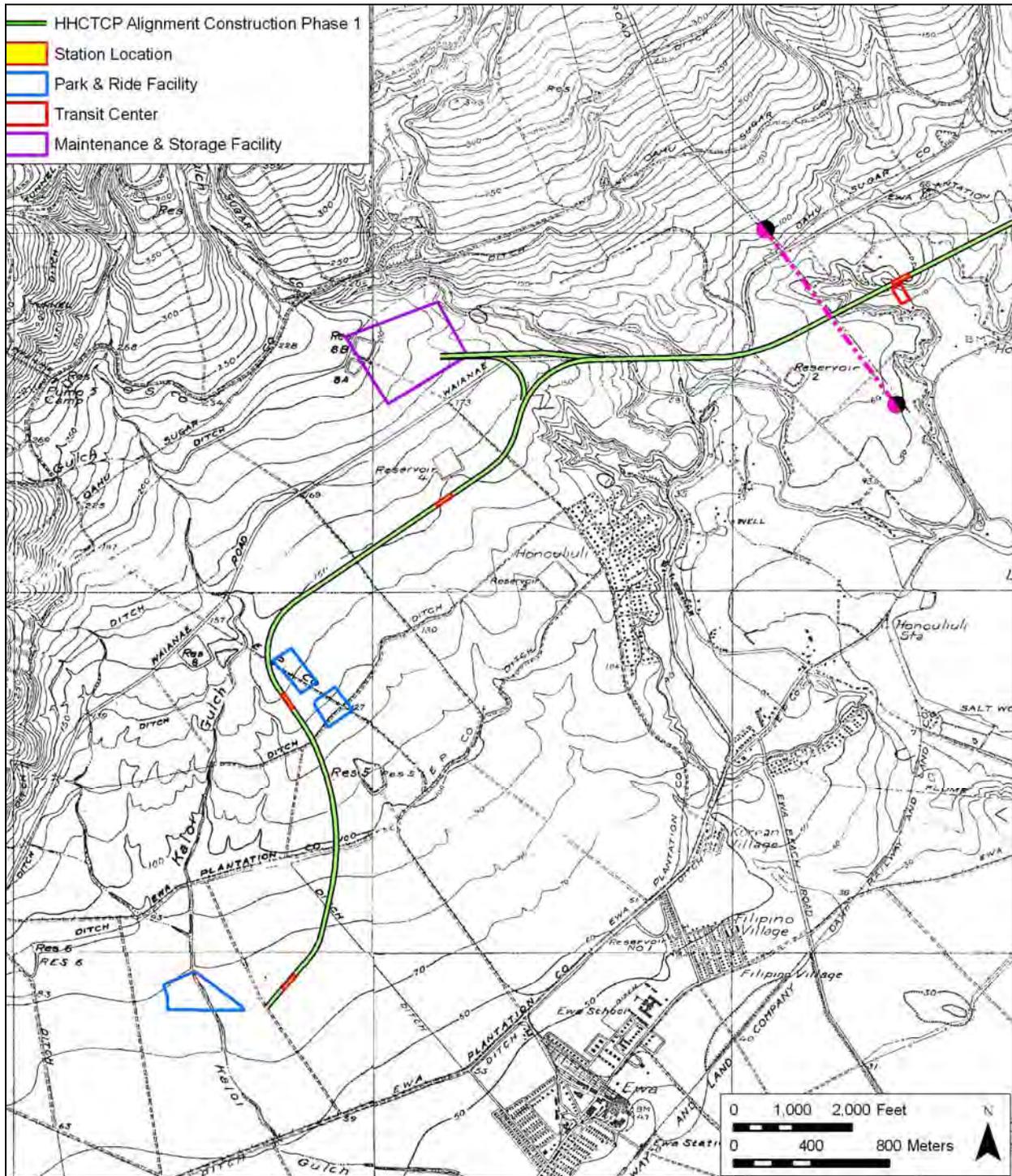


Figure 10. 1927 U. S. Geographic Survey map, showing location of HHCTCP alignment

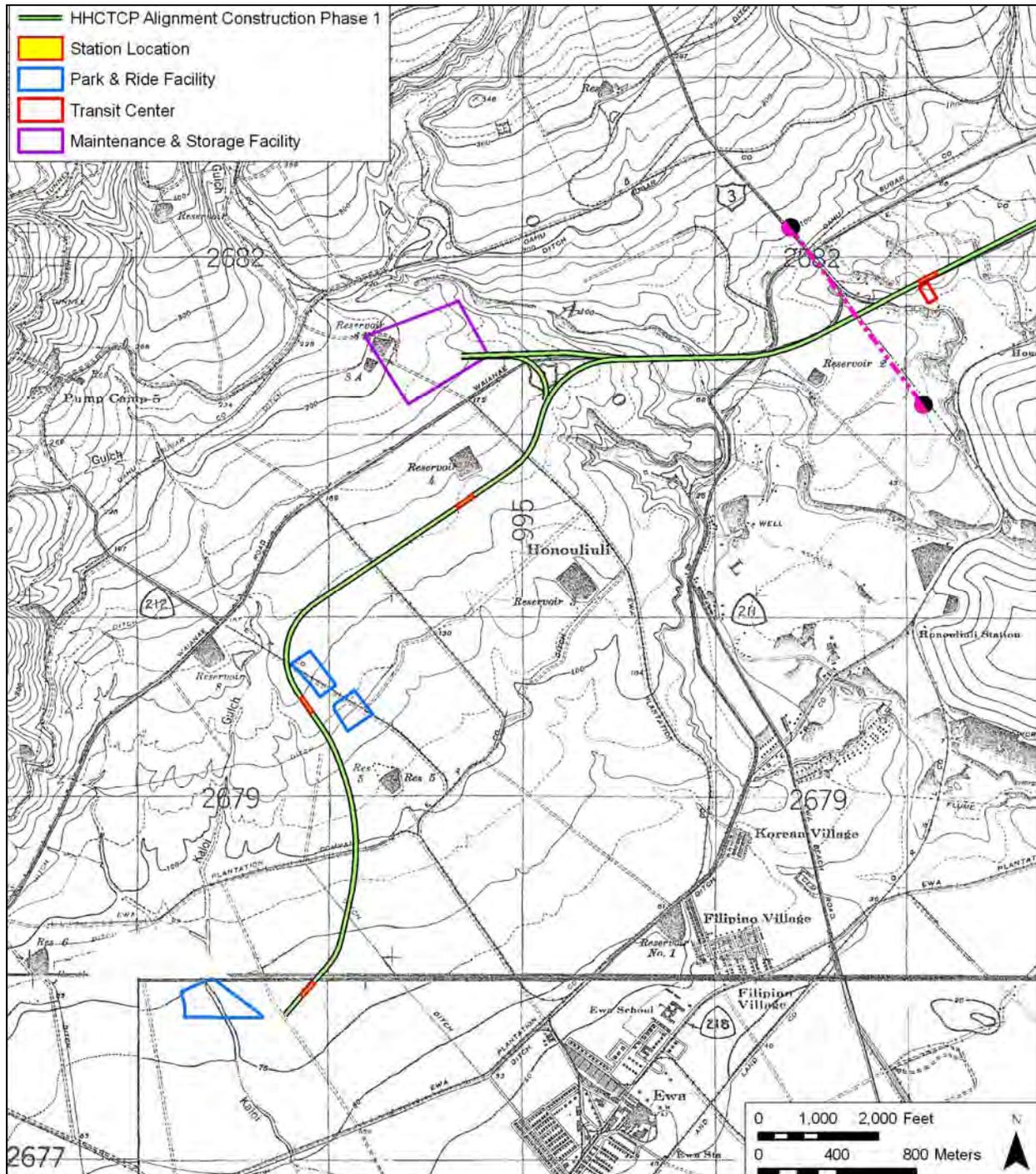


Figure 11. 1943 War Department map, showing location of HHCTCP alignment

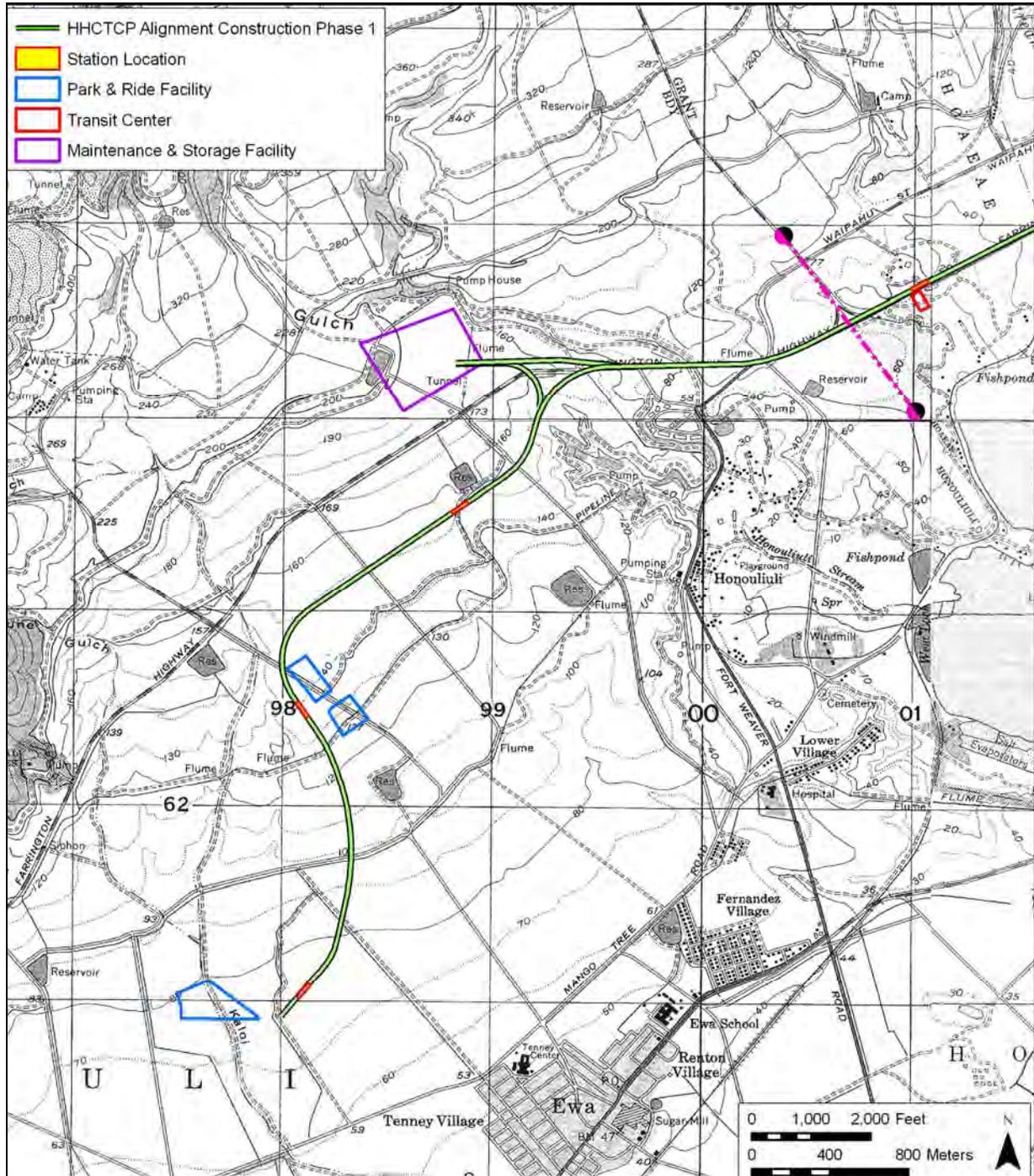


Figure 12. 1950 Army Mapping Service map, showing location of HHCTCP alignment

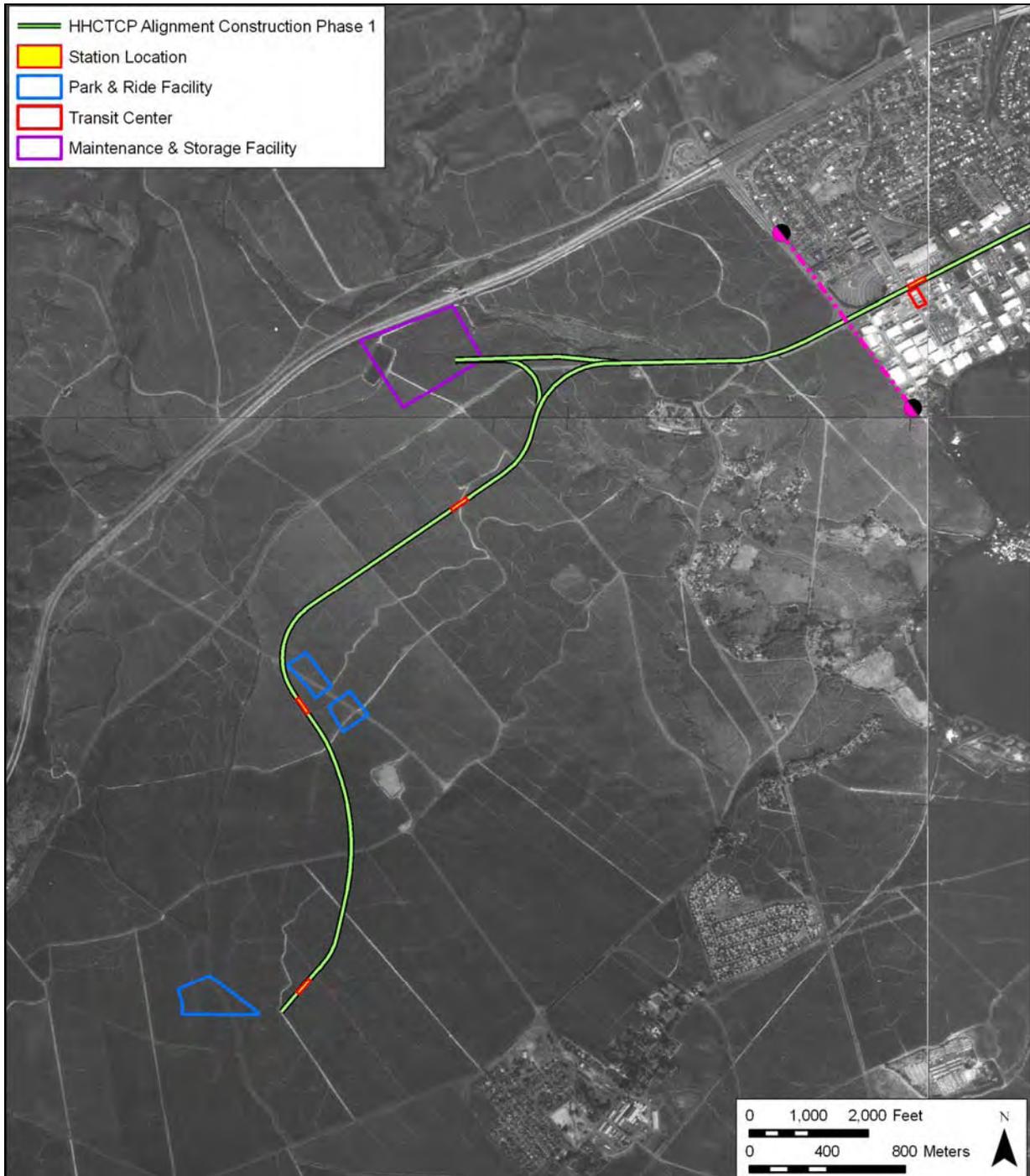


Figure 13. 1970 aerial photograph, showing location of HHCTCP alignment

### 3.3 Central 'Ewa – Hō'ae'ae, Waikele, Waipi'o, and Waiawa

#### 3.3.1 Pre-Contact and Early Post-Contact Agriculture and Habitation

In a study of the resources and population of the *ahupua'a* in 'Ewa, Ross Cordy (1996:12) wrote a correlation study of three factors: floodplain size, fishery size, and population size. Hō'ae'ae had a small floodplain area, directly adjacent to the north shore of Pearl Harbor's West Loch, and a fairly small fishery, which took up only a small portion of West Loch. Waiawa had a medium sized floodplain, shared with the neighboring *ahupua'a* of Mānana, and a small fishery, again shared with Mānana on the north shore of Middle Loch. Waikele had a large floodplain and had irrigated fields along the lower Waikele Stream and the inland Waikakalaua Stream, but only a medium-sized fishery along the west shore of West Loch. Waipi'o had a large floodplain, irrigated fields along Kīpapa Stream, and a large fishery, encompassing most of Middle Loch and the fringes of West Loch along Waipi'o Peninsula. Cordy found that the first two factors were good predictors for pre-contact and early post-contact population. Waipi'o had the largest population, Waikele and Waiawa had a medium-sized population, and Hō'ae'ae had the smallest population of the four.

Thus, of the four *ahupua'a* in central 'Ewa, Waipi'o was the main focus of Hawaiian settlement and activity during the centuries preceding western contact. "The populous dwelling place of the *ali'i* was formerly located on an east point of Waipi'o Peninsula known as Lēpau" (McAllister 1933:106). The *ali'i* (chiefly class) at Waipi'o were no doubt attracted to the great abundance the region offered.

In the early 1940s, E. Craighill Handy made a survey of existing and remnant agricultural areas of the Hawaiian Islands. Of the Waiawa/Mānana floodplain, he says only that "there were a few terraces seaward, irrigated by Waiawa Stream" (Handy 1940:81). For Waikele, he states:

In the flatland, where the Kamehameha Highway crosses the lower valley of Waikele Stream, there are the remains of terraces on both sides of the road, now planted to bananas, beans, cane, and small gardens. For at least 2 miles upstream there were small terrace areas. [Handy 1940:82].

Handy (1940:82) noted that Hō'ae'ae had "a moderate-sized area of terraces watered by springs inland from West Loch of Pearl Harbor." Handy (1940:82) was most impressed by the resources of Waipi'o.

Between West Loch of Pearl Harbor and Loko Eo, the lowlands were filled with terraces which extended for over a mile up into the flats along Waikele Stream. The lower terraces were formerly irrigated partly from Waipahu Spring . . . It is said that terraces formerly existed on the flats in Kipapa Gulch at least 2 miles upstream above its junction with Waikele. Wild taros grow in abundance in upper Kipapa Gulch.

The second great resource for central 'Ewa was the fisheries of Pearl Harbor, including the man-made fish traps and fish ponds. Handy and Handy (1972:240) noted that:

The primary reason for 'Ewa's prominence in history and as an *ali'i* stronghold was undoubtedly the existence of the great number of fishponds at different points

around Pearl Harbor, which was 'Ewa territory. Two of the largest [Loko 'Eo and Loko Hanaloa] were on Waipi'o Peninsula . . .

The 1875 map of Honouliuli (see Figure 4) shows the locations of numerous *loko* (fishponds) adjacent to the West and Middle Lochs of Pearl Harbor and within the *ahupua'a* of Waikele, Waipi'o, and Waiawa Apple and Kikuchi (1975:2) discuss the impact that such fishponds had on the general population of an area:

Accessibility to these ponds and their products was limited to the elite minority of the native population - the chiefs and priests. Prehistoric ponds and pond products appear to have been taboo to the vast majority of Hawaiians and to have yielded them no direct benefit. However, indirect public benefit came from ownership by the chiefs of exclusive food sources. Royal fishponds . . . insured less demand on the commoners' food production resources. Every fish taken from a royal fishpond left its counterpart in the natural habitat available to lesser chiefs and commoners.

The fishponds of 'Ewa, although not necessarily representing beneficial resources for the commoners, can be seen as evidence for a thriving chiefly class in the *ahupua'a*. One of the largest was Loko (pond) 'Eo; 'eo is translated as "full of food" (Pukui and Elbert 1986:42). A nineteenth century visitor to Loko 'Eo provided testimony to the abundant marine resources found in the area:

We rode and reached Waipio. Saw Halaulani House; only the house stood there for the inhabitants had gone to Mana. The bubbling water of the pond Eo rippled on the left. There a recollection came of the bundles of fat eel from that place and the delicious mullet of Makahanaloa. It was delicious clean and that is why the very juice in the ti leaves was sucked up by Kohala's son (*Ka Nūpepa Kū'oko'a* Aug. 11, 1899, cited in Sterling and Summers 1978:20).

### 3.3.2 Protestant Missionaries and Roman Catholic Priests

The first company of Protestant missionaries from America, part of the American Board of Commissioners of Foreign Missions (ABCFM), arrived in Honolulu in 1820. They quickly established churches in Kona, Hawai'i, Waimea, Kauai, and Honolulu, O'ahu. Although the missionaries were based in Honolulu, they traveled around the islands intermittently to preach to the rural Hawaiians and to check on the progress of English and Bible instruction schools set up by local converts.

In 1828, the missionary Levi Chamberlain (1956:39-40) made a circuit of O'ahu Island, stopping wherever there was a large enough population to warrant a sermon or to visit a school. In his trek through the 'Ewa District, coming from Wai'anae, he stopped at Waimanalo 'Ili in Honouliuli, on the western border of 'Ewa. At around 11 o'clock the next day, on a Saturday, Chamberlain and his companions set out towards the east, reaching Waikele at 3 or 4 o'clock. The group did not stop in Hō'ae'ae, suggesting that the population was too small for a school, but Waikele had two schools, an obviously a larger population than Hō'ae'ae. In fact, Chamberlain decided to stay in Waikele until the next day, on the Sabbath, and preach to the Hawaiians who lived there. A crowd of 150 to 200 gathered for the sermon. The next day at 6 o'clock they set

our for the village of Waipi'o, which had one school They left Waipi'o at about 8:30, and walked to Waiawa, where there were two schools. Around ten o'clock, they began their circuit again, stopping only in the *ahupua'a* of Kalauao in the 'Ewa District before they reached Moanalua Ahupua'a in the Kona District. The account does not give much information on the surroundings, but does indicate the relatively populated areas of 'Ewa, in western Honouliuli, Waikele, Waipi'o, Waiawa, and Kalauoa, and the time it took to travel by foot along the trail across the 'Ewa District.

In the next years, the Protestant missionaries established smaller churches in outlying areas, sometimes presided over a foreign missionary or led by a Hawaiian convert, with periodical visits by a visiting pastor from one of the main churches. The first mission in 'Ewa was established in 1834 in Waiawa near Pearl Harbor. Two missionaries, Lowell and Abigail Smith, were assigned to the station, and were in charge of building a church and a house for themselves near the church (Hawaiian Mission Children's Society 1969:3-9). The *ali'i*, Kīna'u, daughter of Kamehameha I and an early Christian convert, offered the missionaries to "settle upon her land, will build us a house and do anything to promote our happiness" (letter from Lowell Smith, June 24<sup>th</sup>, 1833, cited in Frear 1934:69). Citing his wife's poor health, the Smiths went to Molokai instead. But at the General Meeting of the missionaries in June and July of 1834, the board decided that the Smith's should be transferred to 'Ewa to a place three miles from the king's favorite country seat (Frear 1934:93).

Because of her health, at first Abigail stayed in Honolulu, as her husband began to build their new home. But in November, he brought his wife home to their new station:

November 15<sup>th</sup>, 1834. . . . This morning at half past twelve o'clock Abba and myself left the mission families at Honolulu and took up our anchor—and on a double canoe we came to this place, Waiawa, in four hours. . . . She finds the climate, the water, taro, etc. to agree with her much better than at Honolulu. . . . Nov. 25<sup>th</sup> . . . We have been favored with considerable many presents since her arrival viz: some seven or eight fowls, four turkeys, one hog, fish, oysters, potatoes, taro, cabbage, wood, etc. [letters of Lowell Smith, cited in Frear 1934:95-96].

The Smith's congregation was spread out over an area of 20 miles, and Lowell Smith traveled to different areas to preach to crowds usually several hundred strong. He also established two schools, one for boys and one for girls, and treated the sick, especially inoculating his parisoners against smallpox. In 1836, Abigail's health deteriorated, and the mission decided that the two should live in Honolulu instead. To carry on the work at the mission, the Rev. Artemas Bishop and his family were transferred to 'Ewa. Sereno Bishop (1916:41-42), the son of Artemas Bishop, remembered the move:

Our predecessors at Ewa were Rev. and Mrs. Lowell Smith, specially capable and devoted missionaries who had been only two years in the field. Mr. Smith had built a comfortable house of adobe bricks, thatched with grass and well plastered inside and out. He had also erected the adobe walls of a church, capable of holding an audience of about one thousand people. I think the roof also was on. . . . The adobe walls fifteen feet high were covered by a steeply pitched roof, which extended out in a verandah on all four sides, in order to protect the base of

the mud walls from being destroyed by raindrip. The timbers of the roof were long beams dragged from the mountains entirely by human strength, the labor being secured by volunteering, under the leadership of the chiefs.

The mission house was located on the west bank of the Waiawa creek, about one-fourth mile northwest of the present railway station at Pearl City. There was nearly an acre of ground enclosed in an adobe wall. Some distance seaward was a glebe of a couple of acres of taro swamp, a little below where the railway bridge now crosses the creek. A small cattle pen was enclosed about twenty rods north. An old wall of the natives separated the upland from the planted lands and kept out the pigs and afterward the cattle. Copious springs of most delicious water abounded throughout the district of Ewa, a small one being in our own grounds.

In 1837 a new church was completed (Frear 1934:137) on a lot now part of the Leeward Community College. The church, shown on an 1851 sketch (Figure 14), was finally completed in early 1837. It was described as:

An elegant church building, ninety feet long, forty two feet wide with a veranda all around it,--plastered inside and out, a good pulpit, etc., etc. The house will contain from ten to twelve hundred people [letter from Lowell Smith Feb. 4<sup>th</sup>, 1857, cited in Frear 1934:115].

The Bishops had a main residence in Honolulu, as he assisted the minister of Kawaiaha'o Church, although he made monthly visits to 'Ewa. His official assignment to 'Ewa was from 1836 to 1856, but he continued to preach in 'Ewa until 1860.

Smaller churches were also established in neighboring *ahupua'a*. In 1898, Hō'ae'ae was still considered a remote location. It did not merit its own church, but only a mission, with a missionary visiting irregularly. In 1898, there were branch churches at Pearl Harbor and at the Ewa Plantation (Hosmer 1898:148).

One of the main contributions by the missionaries, was their establishment of a census of the population. In ca. 1832, the population of 'Ewa was about 4,015 (Ewa Station Report 1836:4). At the end of 1835 it was 3,423 "a decrease of 592 in 4 years" (Ewa Station Report 1836:4). Population stabilized in the 1830s and early 1840s. In the 1840s, depopulation increased with a measles epidemic in October of 1849. In January 1849, population was 2,386 people. The pastor of the Ewa church noted that some of the depopulation was due to emigration, mainly to Honolulu. Sereno Bishop (1916:44) noted that many taro patches had been abandoned when his family lived in Waiawa. The smallpox epidemic of 1853-1854 shattered the remaining population:

The people of Ewa are a dying people. I have not been able to obtain an exact count of all the deaths & births since the last general meeting. But my impression is that there have been as many as 8 or 10 deaths to one birth. I have heard of but 4 births on Waiawa during the year, & all of these children are dead. I have attended about 20 funerals on that one land, & 16 of these were adults [Rev. L. Smith 1835. Ewa Station Report, p. 8-9].

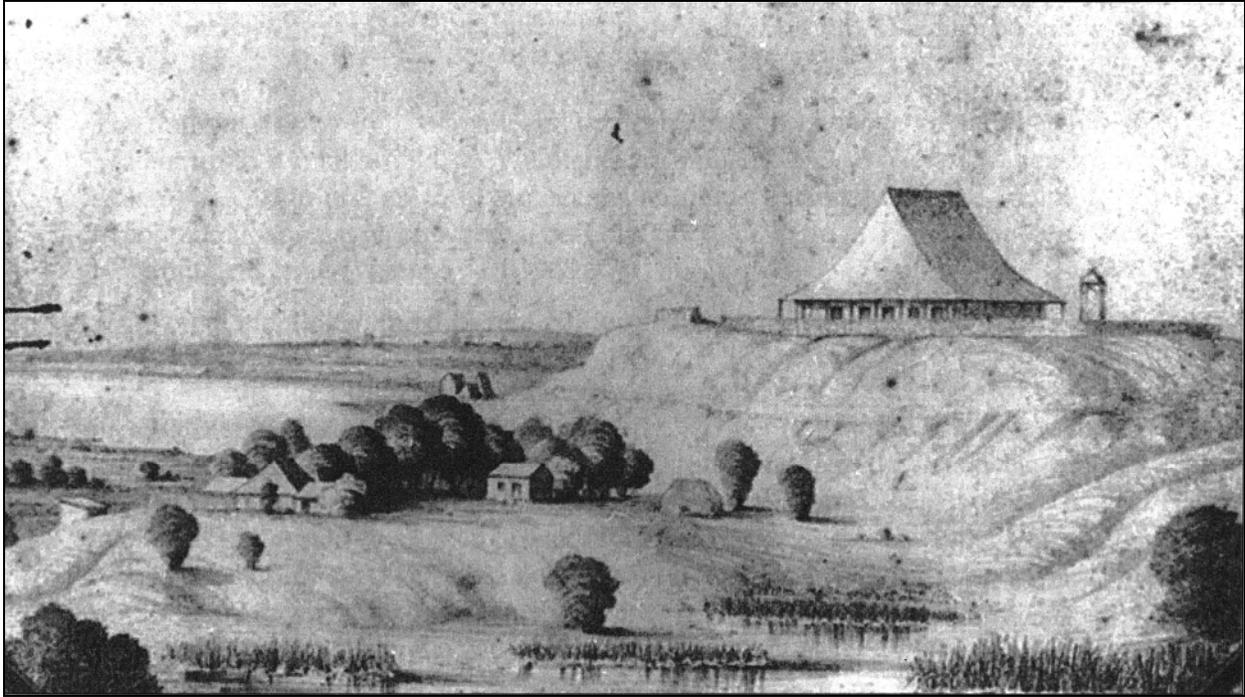


Figure 14. 1851 sketch of Kahikuonālani Church on Haupū in 'Ewa on the shores of Pearl Harbor in Waiawa (original sketch by Paul Emmert in Mission House Museum Library, Honolulu; reprinted in Gowans 1993:10)

In 1860, Artemas Bishop reported:

The people of the district are rapidly diminishing, and whole neighborhoods where in former years were numerous families and cultivated lands, there are now no inhabitants, and the land is left to run to waste. The fathers have died off, and the children wander into other parts, and there are none to fill their places [Bishop 1860, Ewa Station Report:1].

### 3.3.3 The Māhele

The Organic Acts of 1845 and 1846 initiated the process of the Māhele, the division of Hawaiian lands, which introduced private property into Hawaiian society. In 1848, the crown, the Hawaiian government, and the *ali'i* (royalty) received their land titles. The common people (*maka'āinana*) received their *kuleana* awards (individual land parcels) in 1850.

#### 3.3.3.1 Hō'ae'ae

A total of 23 claims were made and 19 claims were awarded in Hō'ae'ae to commoners. All unclaimed lands in the *ahupua'a* were awarded to Nueku Nāmau'u as Māhele Award 63 (LCA 10474). Nāmau'u was a descendant of Hawai'i Island chieftains and a cousin (or nephew) to Mataio Kekūanao'a, the father of two Hawaiian monarchs, Alexander Liholiho (Kamehameha IV) and Lot Kapuāiwa (Kamehameha V) (Day 1984:69). The *kuleana* awards were clustered

around the floodplain on the north shore of Pearl Harbor's West Loch, along Hō'ae'ae Stream and along a large irrigation ditch, as shown on a 1905 map (Figure 15). The awardees claimed *kula* lands (for dry land agriculture or pasture), *lo'i* (irrigated patches) for taro, and house lots (Table 4).

Table 4. Land Commission Awards in Hō'ae'ae Ahupua'a

LCA	Awardee	'Ili
193	Rees, Lewis	
750	Mokumakuaole	Koipu, Kalokoloa
887	Kaihikapu	Kalaikea, Kapapahu, Kuainihi, Kalokoeli, Pakai
889	Puko	Waihi
899	Kahooweliweli	Amakeahilalo
909	Kaneiahuea	Paniu, Kalahale, Lihue, Kumuhau
1533	Kealaiki	Muki, Waihi, Kalokoeli
1561	Kaumanu	Amakeahiluna, Kamalokala
1562	Kapili	Kaaiiole, Koipuu
1571	Kalihue	Kamalokala
1578	Kaihumai	Laekea
1582	Kukahoe	Koipu
1583	Kekapa	Waihi
1601	Kekoamiki	Keahupuaa, Kaaiiole, Holokoeli
1605	Kaualei	Koipuiki, Koipu
1660	Ewa	Kahuu
1707	I	Kalokoeli
1721	Hinawale	Kuainiho, Kaaiiole
5634	Kaiwi	Kalokoeli, Koipuu
10474	Namaau	Ahupua'a

### 3.3.3.2 Waikele

In the Māhele, the *ahupua'a* of Waikele was awarded to the *ali'i* Nahuina; he returned it to the government as a commutation fee to pay for the lands he was kept for himself. Much of the most productive lands were awarded to several *ali'i* as *'ili* awards, such as the 199-acre award of the *'ili* of Auiole to Nāmāhana and Maawe, the 252-acre award for the *'ili* of Koalipea to Nāmākehā, and the 2829-acre award of Pouhala 'Ili to Lūlūhiwalani. In all, 119 claims were made for the *ahupua'a* and 73 of these were awarded, as shown in Table 5.

Taro lands were found at the floodplains along Pearl Harbor, and in inland areas adjacent to the lower section of Kīpapa Stream, along both sides of Waikele Stream, and along Waikakalaua Stream near the upper boundary of Waikele. The taro was irrigated by the water of the streams, and the springs at the based of the bluffs, including the famous Waipahu Spring. The lower portion of the floodplain was used for fishponds. *Kula* lands were used for the cultivation of coconut, breadfruit and pandanus, and for pasture. In a review of a sample of the *kuleana* awards, Cordy (1997:7) noted that approximately 50% mentioned a house lot as part of their claims.

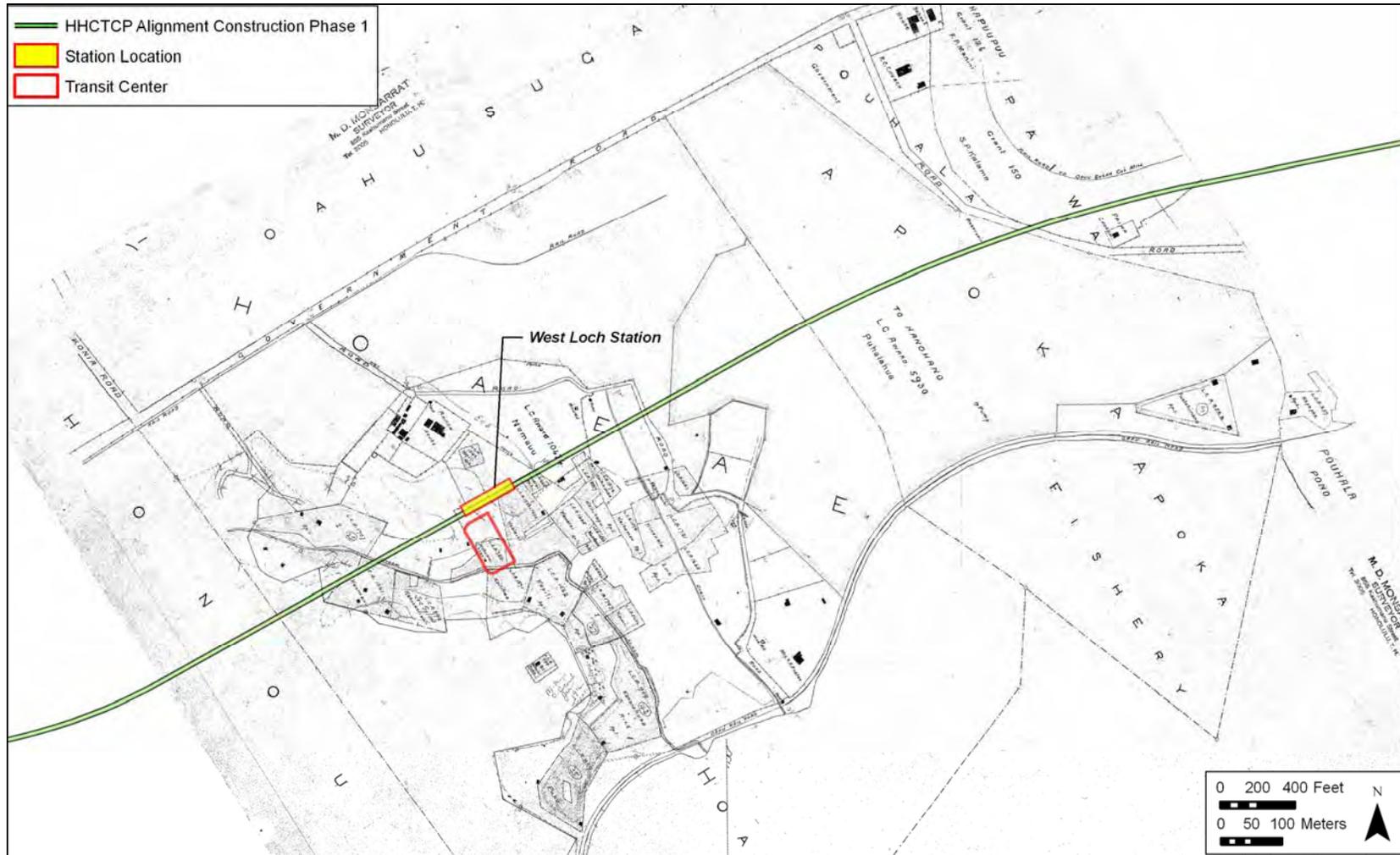


Figure 15. 1905 map of Hō‘ae‘ae (portion), by M. D. Monsarrat, showing relationship of alignment and station to the irrigated taro lands of Hō‘ae‘ae (Map on file at Hawai‘i Land Survey Division, Honolulu); note location of Roman Catholic Church (St. Joseph’s) and school lot and the “Paiwa Church” in Waikele (upper right side of figure)

Table 5. Land Commission Awards in Waikele

LCA	Awardee	'Ii		LCA	Awardee	'Ii
4 MA	Luluhiwalani	Pouhala		1614	Kekualilii	Kahakuohia
39 MA	Kauliokamoa	Kapakahi		1675	Mahoe	Kamohai
61B MA	Namakeha			1675-B	Koniho	Papaa
60	Hunt, Thomas			1675-D	Makalolohe	Kapakahi
130	Kuapanio	Papaa Komohana		1675-E	Kaneolei	Ulumoku
851	Hiwauli, Salai	Papa		1675-F	Kaneiakama	Koheoo, Kahakuohia, Keahupuaa, Manooelua (Waipio, Waikele)
857	Kapepee	Pouhala		1679	Pala	Hopenui, Ulumanu
858	Kanealoha	Waipahu, Pouhala		1680	Pauoa	Lihue
858-B	Puolohinana	Pouhala		1682	Puhi	Kapakahi, Keahupuaa, Kaohai
858-C	Pokini	Pouhala, Paahao		1682-B	Kualii	Kapakahi
859	Kalauao	Lihue, Pouhala, Ohua		1712-B	Hopu	Kaokai
860	Kaaihee	Paahao		1712-C	Nuuanu	Kapuna, Keahupuaa
880	Niulii	Kahapuupuu		1716	Hauna	Kanupo
888	Ilikealani	Waipahu		1812	Ka'u	Kahakuohia
890	Kuhano	Ohua		2944	Marini, P.F. & Marini, Akoni	Kapuukolo, Puiwa, Kekupanio, Lihue
891	Kaakiakiaho	Kahapuupuu		3848	Puhalahua	Apokaa (Waikele, Honuakaha)
896	Nalii	Pouhala		5531	Keawe	Kapakahi
898	Kaneaola	Polapola, Kahawai, Hiwa (Honouliuli, Waikele)		5595-B	Kapahu	Kapakahi
908	Kaniu	Ohua		5595-C	Napupu	Ulumoku
913	Napihe	Kahakuohia		5602	Koliola	Halehalekaiwi, Kaohai, Kapuna
1005	Kahiki	Pouhala		5603	Kookoo	Kapakahi
1008	Ku	Papaa		5663	Kahonu	Pahoa, Paahoa
1009	Kahanu	Napuakalo		5762	Kuaihelani	Papaa, Kapakahi, Ohua
1010	Kahookohu	Papaa		5811	Kumumu	Hanaloa (Waipio, Waikele)
1011	Kakualopa	Papaa		5846	Kalou	Kapakahi, Kapuna
1013	Muhu	Ulumalu		5848	Kaupuaa	Kapakahi
1015	Kuheleloa	Paahao		5930	Puhalahua	Hanohano
1016	Haole	Ulumalu		5989	Makole	Kapakahi
1018	Palaualelo, wahine	Pouhala		6025	Kahaekaua	Ulumanu
1020	Akaakaa	Waipahu		6545	Haalilio, Hana Hupa	Ohua
1021	Maawe	Auiole		7260	Namakeha, B	Kaalaaluna, Kaoliipea
1022	Piimahina	Paiwa		7442	Kuauli	Kahakuohia
1576	Kamole	Kahapuupuu		8597	Kamoana	Paiwa

LCA	Awardee	'Ili		LCA	Awardee	'Ili
1597	Kaihumua	Kapuna, Kamapuna, Auiole		9384-B	Kahula 2	Papaa
1613	Kaihunana	Kahakuohia		9384-C	Kahula 1	Papaa
1613-B	Huailua	Paiwa		10184	Namahana	Auiole
1614-B	Hookaamomi	Ahualii, Mikiokai, Keahupuaa		10831	Puniwai	Kanupoo

The *'ili* and Land Commission Awards of Waikele are shown on three maps, the 1905 map of Hō'ae'ae (Figure 15), which shows part of the *'ili* of Apoka, Pouhala, and Pā'iwa in Waikele, an 1875 map (Figure 16), which shows the *'ili* names and boundaries, and an 1889 map (Figure 17), which shows the Land Commission Awards. Of special interest on these maps is the relationship of the corridor to two churches, one labeled "Paiwa Church" approximately 50 meters south of the corridor, and a Roman Catholic Church and schoolhouse 300 meters north of the corridor. The church is not shown on the earliest (1875) map, and is labeled as "Paiwa Church" on the 1889 and 1905 maps. The symbol for a church (a cross) appears in the same location on the 1927 and 1943 U.S.G.S. maps.

The Roman Catholic diocese, based in Honolulu, began to send priests to convert native Hawaiians to Catholicism in the 'Ewa region as early as the 1840s. A small chapel had been built in Waipahu (Waikele) in the late 1860's by Father Delelande, but as the population grew the Catholic Mission decided to build a church, and acquired a lot adjacent to a school built in 1899 (site of today's Waipahu Elementary, on the *mauka* side of Farrington Highway) (see Figure 15). The church, called St. Joseph's, was completed in 1902 (Schoofs 1978:88). The church had a cemetery adjacent to the west side (on the east side of Waikele Street). This is shown as a small block on the west side of Waipahu Elementary School on modern maps. However, the cemetery area once stretched from the elementary school grounds all the way to Farrington Highway (Mauricio 1997:9), as shown on an 1898 map (Figure 18). According to a *Honolulu Star Bulletin* article (Adamski 1999), this cemetery was used by the Catholic Portuguese and Filipino workers of the Oahu Sugar Co., and Waipahu Mill. The last interment at the cemetery was in 1941 and the cemetery became abandoned afterwards. Apartments were built on part of the site after that, and many of the burials were moved to Mililani Memorial Park. It is possible that burials were missed during this operation, and that there may still be burials adjacent to the project alignment.

In 1939, St. Joseph Church had become termite-infested, and a new lot (east of the area marked "Pawai Church" on the *makai* side of Farrington Highway) was chosen for the new building. In 1946, the area adjacent to the west side of the church, was established as a private school, St. Joseph School.

An extensive search was made on any information on a church called "Paiwa" Church. The church was located in the *'ili* of Pā'iwa, thus its name. The church is labeled as "Paiwa Church" on the 1889 map of Waikele and on the 1905 map of Hō'ae'ae. A fairly large structure, labeled as "church" is shown on an 1895 map in this same place, in the center of LCA 1005 'Āpana 1 to Kahiki. The LCA testimony for Kahiki mentions a house lot on 1005:1, but does not mention a church. The symbol of a church is shown on the same place on the 1927 and 1943 USGS maps,

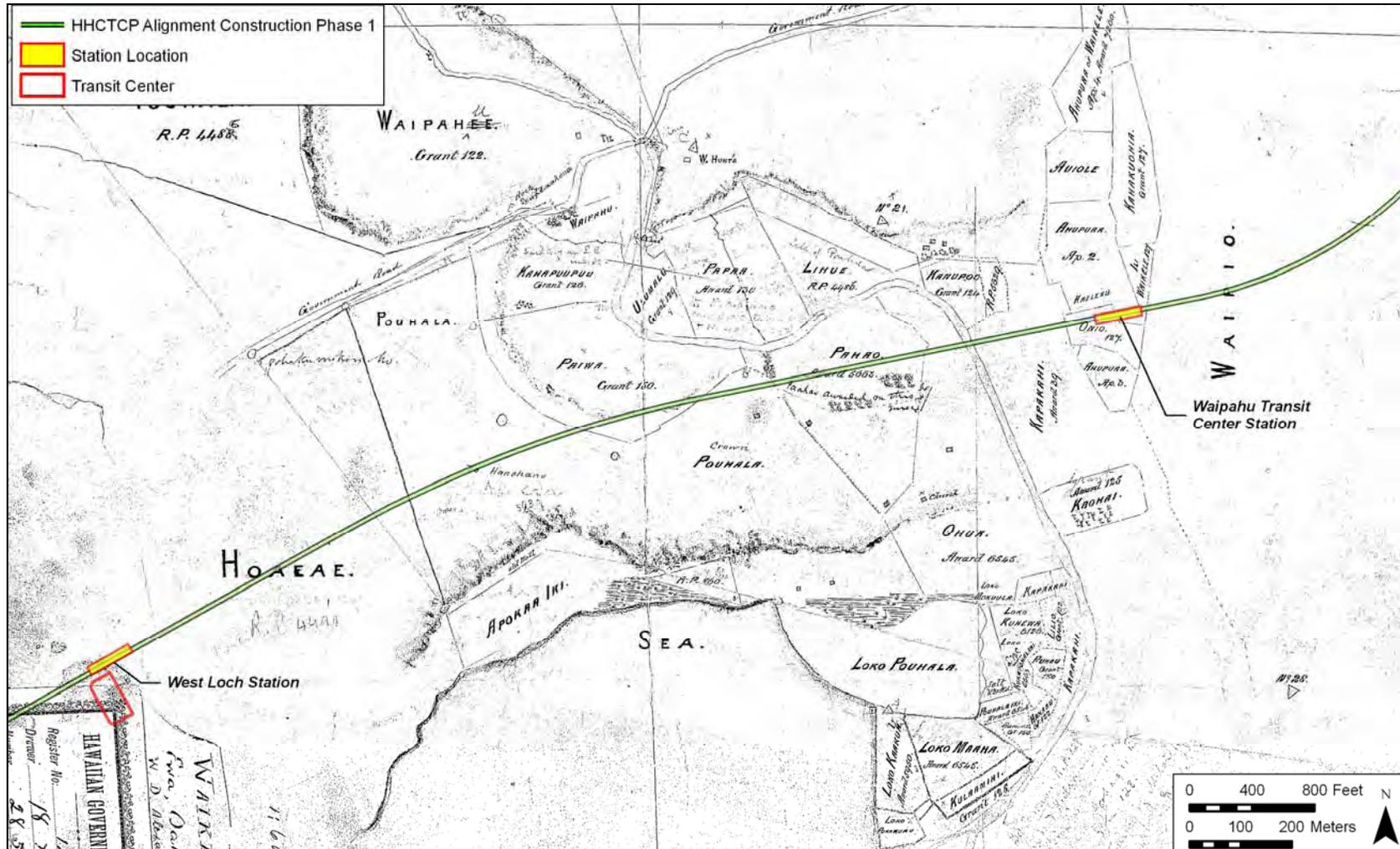


Figure 16. 1875 map of Waialeale by W. D. Alexander, showing 'ili near the HHCTCP alignment (Registered Map No. 120, Hawai'i Land Survey Division)

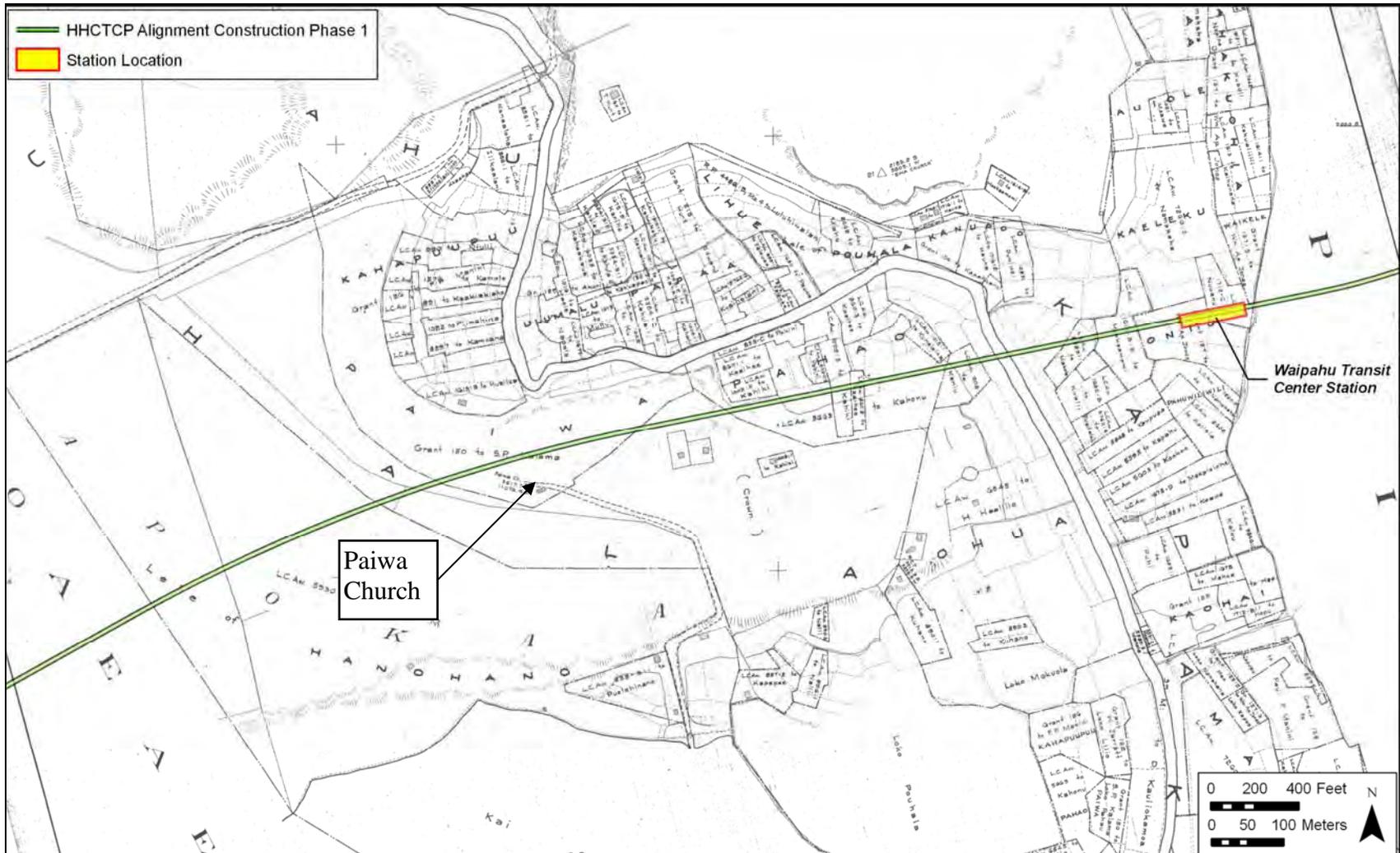


Figure 17. 1889 map of Waikēle, showing Land Commission Awards near the HHCTCP Alignment (Registered Map No. 1498, Hawai'i Land Survey Division); note location of "Paiwa Church"

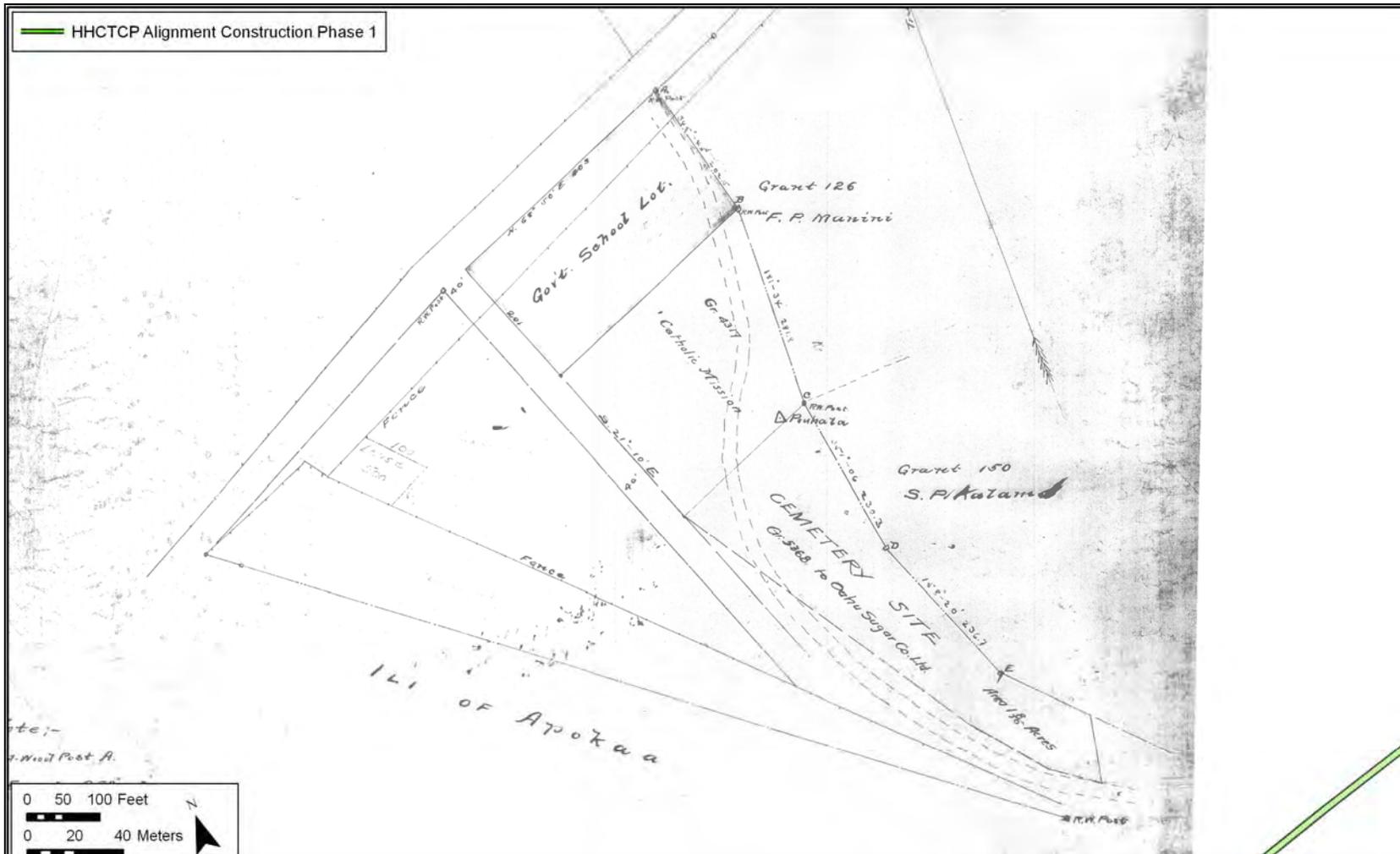


Figure 18. 1898 map of the Pouhala 'Ili School Lot in Waikele Ahupua'a, showing extent of Catholic Cemetery, which once extended makai almost to Farrington Highway and the HHCTCP Alignment (Registered Map No. 1950, Hawai'i Land Survey Division)

but the church is not labeled. This structure was likely a Christian Church for native Hawaiians, as Christian churches for the Japanese, Chinese, and Korean plantation workers were not established in the 'Ewa area until ca. 1905 (Chang 2003:38). It may be related to the St. Joseph Catholic Church or it could be a small branch church of the 'Ewa Protestant Mission station at Waiawa. The proximity of this church to the HHCTCP alignment is important as churches established before 1900 often have undocumented graves in an adjacent cemetery.

### 3.3.3.3 Waipi'o

John Papa 'Ī'i was awarded most of the *ahupua'a* of Waipi'o in LCA 8241, comprising approximately 20,540 acres including Loko 'Eo, seen on an 1851 map (Figure 19). Included in the documentation for 'Ī'i's award is a list of "the people living on the land of Waipi'o 'Ewa in 1848" (Barrere 1994:73). A substantial grant within the *ahupua'a* was awarded to Abenera Pākī, Bernice Pauahi Bishop's father. Part of LCA 10613 given to Pākī comprised the 350 acres of the 'ili of Hanaloa. William Harbottle also received a land award (LCA 2937) in Waipi'o; he claimed two acres at Hanapouli 'Ili.

The remaining land claims documented were a total of 119 claims, 78 of which were awarded (Table 6). The majority of awarded land parcels were located in the *makai* portions of Waipi'o, at or just above the peninsula. Predominant among the claimed land usages in Waipi'o are 312 *lo'i*, irrigated taro patches, of various sizes; and 43 *mo'o*, or fields, comprising indeterminate numbers of *lo'i*. Wetland taro cultivation was the primary agricultural pursuit within the *ahupua'a* at the mid-nineteenth century, and likely reflects a long history of taro farming. At the coast, four fishponds are claimed. In the *mauka* reaches of Waipi'o, 53 claims were made for portions of *kula* (pasture land) and 25 for "*okipu*" or '*okipu'u* (forest clearings). The fact that several claims were made in the *mauka* regions suggests that Waipi'o residents had particular locales that they traveled to repeatedly. *Kula* land is a general term for open fields, pastures,

Table 6. Land Commission Awards in Waipi'o

LCA	Awardee	'Ili	LCA	Awardee	'Ili
21 MA	Honu	Ulu	8241-K	Kuhiwahiwa	Homaikaia, Hanaloa
26 MA	Kailakamoa	Honopue	8241-KK	Kaiki	Pakikakika
1616	Kaluahinenui	Homaikaia	8241-L	Mokunui	Kamalo, Kauhola
1675-F	Kaneiakama	Koheoo, Kahakuohia, Keahupuaa, Manooelua	8241-LK	Kaholohana	Hanaupouli
1685	Peke	Kapaia, Waikaka	8241-LM	Ai	Hanaloa, Holoamana, Homaikaia
1712	Hinaakala	Hanaloa	8241-LN	Nahua	Kaakaulani, Kanonoukuono, Nakumei, Waihaka
3043	Kapiipo		8241-M	Kupokii	Eo
3794	Luheluhe	Kaalakea, Hanapouli	8241-MM	Puhipaka	Aimauino, Himauona, Waihaka
3972	Hinaumai	Hopenui	8241-N	Uekeke	Lelepua
5371	Ehu	Hanaloa, Keahupuaa	8241-NN	Luaka	Kionaole, Kaahukaua, Hanaloa

LCA	Awardee	'Ii		LCA	Awardee	'Ii
5604	Kaahuewalu	Hanaloa		8241-O	Manuwa	Halaula, Waihaka
5606	Kapela	Homaikaia, Hanaloa		8241-P	Uma	Halaula, Waihaka
5647	Kaia	Kalualaea, Eo, Hanaloa		8241-PN	Kahea	Mauoha
5811	Kumumu	Hanaloa (Waipio or Waikele)		8241-PP	Ulakaipo	Hopenui
5972	Manoha	Mohoa		8241-PW	Kupehe	Keahupuaa
5998-B	Puou	Homaikaia		8241-Q	Kamakahi	Kuana, Waianeki
6076	Humehume	Puopae		8241-R	Meahale	Waiakapuaa
8241	Ii, Ioane / Ii, John	Pawaa, Kalawahine (probably Honolulu)		8241-RR	Poikeo	Halaula
8241-AB	Palekaluhi	Kamuku, Lapili		8241-RS	Keliikuhoe	Kahema, Waihaka, Pakikakika
8241-BB	Koleaka	Homaikaia		8241-S	Niau	Eo, Waihaka
8241-BP	Kalauili	Kaahukahua, Kumupali		8241-SM	Ohilau	Hopenui, Laauli
8241-BS	Kahuailana	Kukina, Waihaka		8241-SS	Kauhiohewa	Hanapouli, Kahaole
8241-CB	Keawekolohe	Homaikaia, Hanaloa		8241-T	Kailio	
8241-CC	Poupou	Papa, Leoiki		8241-U	Kailihao	Kapoipuka
8241-CM	Manoha	Mohoa		8241-US	Nahola	Homaikaia
8241-CO	Paakiki	Halaula, Waihaka		8241-UU	Kalaiku	Waipio uka, Lelepua
8241-CW	Leoiki	Hopenui		8241-V	Kauluoaiwi	Honauaka, Waipio uka
8241-D	Makaaloha	Halaula, Waihaka		8241-W	Kaneakauhi	Kaohai
8241-DD	Kalili	Aimalino, Eo, Waihaka		8241-WW	Pi	Papohaki
8241-DO	Hana	Pakikakika, Puopae, Eo		8241-X	Halelaau	Kopilau, Hokapiele
8241-E	Kapule	Eo, Puopae, Kalualaea		8241-Y	Hepa	
8241-F	Kaumiumi	Hoomaikaia, Lepau, Keakiula		8241-Z	Kaioe	Moakea, Puulu, Palikea
8241-G	Ope	Homaikaia, Lepau		10512	Nahuina	Kauaka
8241-GG	Kauhi	Kahaole, Hanaupouli		10613	Paki, Abner	
8241-GH	Moku	Kalualaea		11190	Kanae, S.	Keahupuaa
8241-GO	Kawahine-lawaia	Keio		11193	Kailianu	Lepau, Kanakahiloko]
8241-H	Kamaka	Lepau, Kauakahiki		11195	Kini	Waihaka
8241-HH	Paumano	Eo, Kamalua		11199	Kauaila	Kalualaa, Puuopae
8241-I	Puakea	Halaula, Puualaea		11200	Kihewa	Eoiki, Puuopae
				11205	Kalaiku	Lelepua

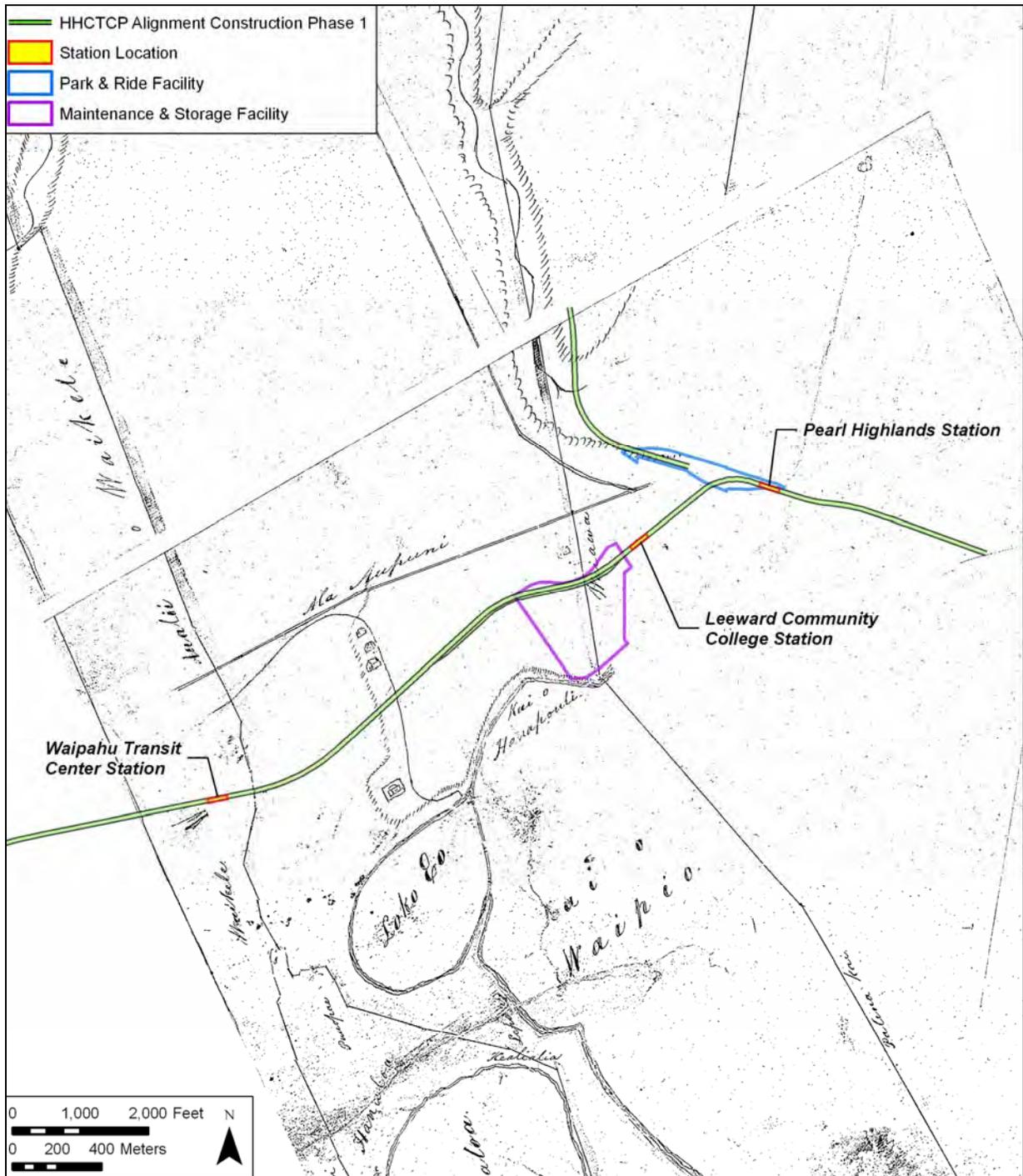


Figure 19. 1851 map of Waipi'o by Rev. Artemas Bishop, showing lands of John Papa 'I'i near the HHCTCP alignment (Registered Map No. 107, Hawai'i Land Survey Division)

uncultivated fields, or fields for cultivation, and upland (drier), which is distinct from meadow or wetland (Lucas 1995:60). *Kula* lands were often used for opportunistic plantings such as bananas, sugar cane, sweet potatoes, dry land taro, and others that did not depend heavily on a consistent source of water. *Okipu'u* is defined as a forest clearing (Lucas 1995:82), a place that was presumably used to gather forest products and medicinal herbs and or for pasturage.

In contrast to the well-populated *makai* lands of Waipi'o, the *mauka* regions were often described in 19th century accounts as virtually uninhabited. The missionary William Ellis described the interior regions of 'Ewa in 1823-24:

The plain of Eva is nearly twenty miles in length, from the Pearl River to Waialua, and in some parts nine or ten miles across. The soil is fertile, and watered by a number of rivulets, which wind their way along the deep water-courses that intersect its surface, and empty themselves into the sea. Though capable of a high state of improvement, a very small portion of it is enclosed or under any kind of culture, and in traveling across it, scarce a habitation is to be seen [Ellis 1963:7].

Despite Ellis' impressions, there is evidence that during the early nineteenth century, the Waipi'o population was not solely focused on the fertile coast. In an inventory of advances in education during the reign of Kamehameha III (from 1825 to 1854), "schools were built in the mountains and in the crowded settlements. Waipi'o had school houses near the coast and in the uplands" (Kamakau 1992:424). The placement of a school "in the uplands" of Waipi'o suggests that some portion of the *ahupua'a* population had settled there.

During the 1830s, cattle grazing began in the *mauka* regions of Waipi'o (Bishop 1901:87). In 1847, residents of more *makai* land petitioned the Minister of the Interior, John Young, to resolve the problem of stray animals. These stray animals may have been from herds of cattle and goats grazing on Waipi'o's *kula* lands. In addition to damage from stray animals on the lands of Waipi'o, the impact of grazing animals was noted several kilometers away at Pearl Harbor and likely near the present project area. Stray cattle continued to be a problem until large-scale agriculture was introduced just prior to the beginning of the twentieth century. The occupation of the uplands by cattle denuded the countryside of ground cover, and caused vast quantities of earth to be washed down by storms into the lagoons, shoaling the water for a long distance seaward (Bishop 1901:87).

John Papa 'I'i was placed in the household of Liholiho (Kamehameha II) when he was ten years old; he became Liholiho's personal attendant and also maintained records of life in the Hawaiian Kingdom. He was born in Waipi'o Ahupua'a at the beginning of the nineteenth century; an account of his birth details the establishment of 'I'i's family at Waipi'o after the ascendancy of Kamehameha on O'ahu:

John Papa 'I'i was born in Kūmelewai, Waipi'o, in 'Ewa, O'ahu, on the third day of August (*Hilinehu* in the Hawaiian calendar) in 1800, on the land of Papa 'I'i, whose namesake he was. Papa ['I'i's uncle] was the owner of the pond of Hanaloa and two other pieces of property, all of which he had received from Kamehameha, as did others who lived on that *ahupua'a*, or land division, after the battle of Nu'uuanu. He gave the property to his *kaikua hine*, or cousin, who was the

mother of the aforementioned boy. Her names were Wanaoa, Pahulemu, and Kalaikane [‘Ī‘Ī 1959:20].

‘Ī‘Ī’s writings provide glimpses of life within Waipi‘o Ahupua‘a during ‘Ī‘Ī’s lifetime. ‘Ī‘Ī mentions the “family [going] to Kīpapa from Kūmelewai by way of upper Waipi‘o to make ditches for the farms” (‘Ī‘Ī 1959:28) and recalls that, during the visit to O‘ahu by the Kaua‘i chief Kaumuali‘i and his entourage, the chief’s attendants were provided with gifts: “From Waipi‘o in ‘Ewa and from some lands of Hawai‘i came *tapa* made of *mamaki* bark” (‘Ī‘Ī 1959:83). ‘Ī‘Ī notes how a period of famine was managed in Waipi‘o and what resources were available during the famine:

Here is a wonderful thing about the land of Waipi‘o. After a famine had raged in that land, the removal of new crops from the taro patches and gardens was prohibited until all of the people had gathered and the farmers had joined in thanks to the gods. This prohibition was called “*kapu ‘ohi‘a*” because, while the famine was upon the land, the people had lived on mountain apples [*‘ohi‘a ‘ai*], *ti*, yams, and other upland foods. On the morning of Kane, an offering of taro greens and other things was made to remove the *‘ohi‘a* prohibition, after which each farmer took of his own crops for the needs of his family [‘Ī‘Ī 1959:77].

The end of the eighteenth century and beginning of the nineteenth century marked Hawai‘i’s entry into world trade networks. One of the chief exports at this time was sandalwood (*Santalum* sp.) or *‘iliahi*, which was prized in China for its unique fragrance and used in the manufacture of household items, as incense, as perfume, and as medicine (St. John 1947:13). The central plains of ‘Ewa supplied the Hawaiian Kingdom with *‘iliahi*. One of the first generation missionaries, Sereno Bishop (1901), described his memories of the central O‘ahu region in the 1830s:

Our family made repeated trips to the home of Rev. John S. Emerson at Waialua during those years. There was then no road save a foot path across the generally smooth upland. We forded the streams. Beyond Kīpapa Gulch the upland was dotted with occasional groves of Koa trees. On the high plains the *ti* plant abounded, often so high as to intercept the view. No cattle then existed to destroy its succulent foliage. According to the statements of the natives, a forest formerly covered the whole of the then nearly naked plains. It was burned off by the natives in search of sandalwood, which they detected by its odor burning. (cited in Sterling and Summers 1978:89)

After John Papa ‘Ī‘Ī’s death in 1870, his estate--including the Waipi‘o lands-- was inherited by his daughter Irene ‘Ī‘Ī Brown. Shortly after, small parcels within the *ahupua‘a* were sold off (Barrere 1994:75).

### 3.3.3.4 Waiawa

During the Māhele land division of Hawai‘i in 1848, Waiawa Ahupua‘a was awarded to Princess Victoria Kamāmalu (sister of Kamehameha IV and V) as part of land claim 7713. During the second half of the 19th century, Waiawa was passed on to successive members of the *ali‘i*: Victoria Kamāmalu died in 1866 at the age of twenty-seven. Her entire estate was inherited

by her father, Mataio Kekūānao'a died two years later and the estate went to Kekūānao'a's son Lota Kapuāiwa, who by that time reigned as Kamehameha V. Kapuāiwa died intestate in 1872, whereupon Ruta Ke'elikōlani, Kapuāiwa's half-sister, petitioned for and received in 1873 the entire estate. By 1883, Ruta Ke'elikōlani died, leaving all of her estate to her cousin Bernice Pauahi Bishop (Kame'eleihiwa 1992:309-310). The Kamehameha Schools (Bernice Pauahi Bishop Estate) presently retains ownership of most of the *ahupua'a*.

A total of 57 *kuleana* claims were made and 31 were awarded (Table 7). One of these was an award to the American Board of Commissioners for Foreign Missions: LCA 387 comprised 4.13 acres in the *makai* portion of Waiawa and included a salt pond, a *mo'o* (land strip) for the church, and a house lot. Making the application was Artemis Bishop, the Protestant missionary stationed at 'Ewa from 1836-1856, who drew a map of the Waiawa *kuleana* awards in 1887 (Figure 20). Another claim by a non-Hawaiian was made by William Wallace in LCA 10942, which comprised 3.2 acres including a house lot, 2 *mo'o*, and 6 *lo'i*. The remaining 50 claims (for individual *'āpana*) by 29 claimants in Waiawa were for *kuleana*; the claims included: 28 house lots, 176 taro *lo'i*, 20 fishponds, 23 *kula* or pasture, 8 *paukū 'auwai* [length of ditch], and 7 banana *kula*. Modern tax maps show the 31 claims actually awarded all located in the *makai* portion of the *ahupua'a*. While the uplands of Waiawa were probably used for the procurement of resources, we have no evidence anyone actually lived there permanently in traditional Hawaiian times.

Table 7. *Kuleana* Awards in Waikele Ahupua'a

LCA	Awardee	'Ili		LCA	Awardee	'Ili
879	Puakai	Panaio, Kapuāihalulu, Kainalu		5644	Kamalii	Kuhia
882	Poonui	Mooiki		5646	Kaionio	Panaio
904	Naheana, Noa	Panio, Kahoaiiai, Kuhia, Panaio		5847	Kapaa	Hanakehau
1594	Keawe	Honokehau		6086	Makanui	Hanakehau, Ananakehau
1604	Kakoo	Kuhiawaho		9294	Kekeni	Piliaumoa
1683	Peahi	Panaio		9320	Keoho	Kapaloa
1696	Namomoku			9357B	Opunui	Panaio
1711	Hanamaulu	Kuhiawaho		9358	Kaanuu	Kapuāihalulu
1715	Haa	Kuhuoloko		9362-B	Naone	Kapuāihalulu
2146	Paahana	Kapuāihalulu		9376	Kupihea	Kapaloa
2448	Kikane	Panio, Kapuāihalulu		9377	Lio	Kapaloa, Haleaha
2685	Ohia	Holoipiapia, Kapuāihalulu		9384	Nahalepili	Kapoupou
4213	Kauhi	Holoipiapia, Kahoaiiai, Kapuāihalulu, Kalona		9409	Puhiki	Kaakauwaihau
4529	Ohia	Holoipiapia, Kapuāihalulu		10567	Ohulenui	Kapuāihalulu, Kolona
5591	Kekua	Kahoaeae		10942	Wallace,	Kahoaiiai

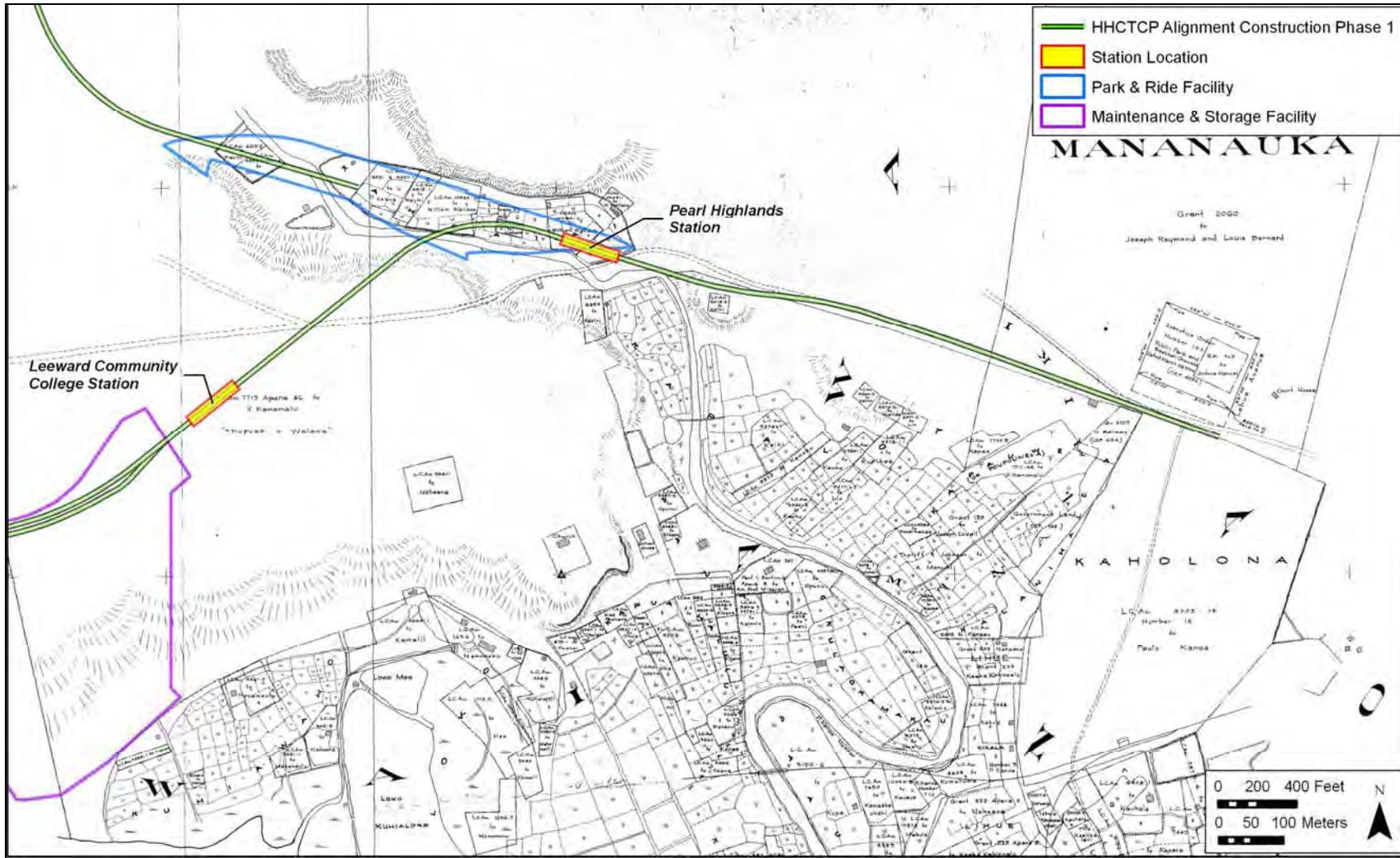


Figure 20. 1887 map of Waiawa, Mānana, and Waimano by Rev. Artimas Bishop, showing Land Commission Awards (Registered Map Mo. 1258, Hawai'i Land Survey Division)

### 3.3.3.5 Land Commission Awards in the Central 'Ewa sub-area

The distribution of LCA parcels during the Māhele reflects the distribution of population in these four *ahupua'a* in the mid-19th century. In all four cases the bulk of the *ahupua'a* was awarded to one or more *ali'i*, government officials, or foreign residents favored by the throne. In Honouliuli, Hō'ae'ae, and Waikele all *kuleana* awards, and in Waipi'o most *kuleana* awards, were granted for small claims on the low floodplains near Pearl Harbor.

Thirty-seven LCA claims were awarded in the sub-area; four of these were large awards to *ali'i* (Table 8). The remaining LCA claims reflect the agricultural nature of the region. Nearly all of the 33 awards included *lo'i* (irrigated pond fields – an average of two *lo'i* per award); half of the awards included *kula*; and a third included house lots. Many of the LCA claims were clustered near the Government Road, which ran *mauka* of the plain.

Table 8: Farrington Highway Sub-area Land Commission Awards

LCA Number	Ahupua'a	'Ili (listed west to east)	Contents of Award
1707:2	Hō'ae'ae	Kalokoeli	3 <i>lo'i</i> and 1 <i>kula</i>
1561	Hō'ae'ae	Amakeahiluna, Kamalokala	2 <i>lo'i</i> and 1 <i>kula</i>
899	Hō'ae'ae	Amakeahilalo	1 house lot (1 house), 5 <i>lo'i</i> , and 1 <i>kula</i>
750	Hō'ae'ae	Koipu, Kalokoloa	5 <i>lo'i</i>
1571	Hō'ae'ae	Kamalokala	1 house lot (1 house), 1 <i>lo'i</i> , and 1 <i>kula</i>
1533 and 1696	Hō'ae'ae; Waiawa	Muki, Waihi, Kalokoeli	1 house lot (1 house), 4 <i>lo'i</i> , 1 <i>kula</i>
887:1	Hō'ae'ae	Kalaikea, Kapapahu, Kuainihi, Kalokoeli, Pakai	1 house, 1 <i>kula</i> , and 5 <i>lo'i</i>
1578:2	Hō'ae'ae	Laekea	1 <i>lo'i</i> and 1 <i>kula</i>
5930	Waikele	Hanohano	'ili of Hanohano to Puhalahua
858:2	Waikele	Pouhala, Waipahu	5 <i>lo'i</i> and 1 fishpond
857:1	Waikele	Pouhala	1 house lot (2 houses)
1018	Waikele	Pouhala	1 house lot (1 house) and 1 <i>kula</i>
860:1 and 860:2	Waikele	Paahao	1 house lot (1 house), 6 <i>lo'i</i> , and 2 salt lands
1005:1, 2 and 3	Waikele	Pouhala	4 <i>lo'i</i> and 1 <i>kula</i>
858-C:2	Waikele	Pouhala, Paahao	5 <i>lo'i</i>
1015:1	Waikele	Paahao	1 house lot (1 house), 3 <i>lo'i</i> , and 1 <i>kula</i>
5663:1	Waikele	Pahoa, Paahao	'ili of Pahao (14.37 acres) to Kahonu

<b>LCA Number</b>	<b>Ahupua'a</b>	<b>'Ili (listed west to east)</b>	<b>Contents of Award</b>
908	Waikele	Ohua	1 lo'i
6545:1	Waikele	Ohua	'ili of Ohua (30.32 acres) to Hana Hupa Haalilio
5989:1	Waikele	Kapakahi	3 taro patches ( <i>lo'i</i> ) and 1 pasture ( <i>kula</i> )
1682-B:	Waikele	Kapakahi	2 lo'i
1614-B:2	Waikele	Ahualii, Mikiokai, Keahupuaa	1 house lot
7260:2	Waikele	Kaolipea	'ili of Waikele and Kaolipea (291.58 acres) to Bennett Namakeha
1712-C:2	Waikele	Kapuna, Keahupuaa <sup>o</sup>	1 house lot and garden
10512	Waipi'o	Kauaka	3 lo'i
1685:1	Waipi'o	Kapaia, Waikaka	3 taro patches ( <i>lo'i</i> ) and 1 pasture ( <i>kula</i> )
8241 L.K.:2	Waipi'o	Hanaupouli	5 lo'i
8241 S.S.:2	Waipi'o	Hanapouli, Kahaole	(0.73-acre) lot
10613:4	Waipi'o		Lands to Abner Pākī ( <i>Ali'i</i> Award)
4213:1 and 4213:2	Waiawa	Holoipiapia, Kahoaiiai, Kapuaihalulu, Kalona	3 <i>lo'i</i> and 1 <i>kula</i> , ½ house lot
4529 and 2685	Waiawa	Holoipiapia, Kapuaihalulu	1 house lot, 6 <i>lo'i</i> , 1 <i>'auwai</i> , and 1 steep banana plantation
904:3	Waiawa	Panio, Kahoaiiai, Kuhia	1 house lot (3 houses), 1 <i>lo'i</i> , and 2 fishponds
5591 and 9357:1	Waiawa	Kahoaee; Panaio	5 <i>lo'i</i> and 1 <i>kula</i>
9294	Waiawa	Piliaumoa	1 house lot
9368:1; 1604	Waiawa	Kuhiawaho	3 taro patches ( <i>lo'i</i> ) and 1 pasture ( <i>kula</i> )
10942:1, 10942:2, 10942:3, and 10942:4	Waiawa	Kahoaiiai	1 house lot (1 house) and 8 <i>lo'i</i> to William Wallace

In summary, the alignment for Central 'Ewa extends directly through the former irrigated taro fields near Pearl Harbor through Hō'ae'ae and Waikele. The alignment also passes through former taro lands in Waipi'o, but this area was mainly owned by only one man, John Papa 'Ī'ī. In Waiawa the alignment extends through a cluster of LCA parcels at the base of a *pali* on the western side of the *ahupua'a*.

### 3.3.4 The Oahu Sugar Co. and the Waiahole Ditch System

In 1889, Benjamin Dillingham organized the Oahu Railway and Land (OR&L) Company. The railroad connected the outlying areas of O'ahu to Honolulu. By 1890, the railroad reached from Honolulu to Pearl City and continued on to Waianae in 1895, to Waiālua Plantation in 1898, and to Kahuku in 1899 (Kuykendall 1967:100).

In 1897, B. F. Dillingham established the Oahu Sugar Company (OSC) on 12,000 acres leased from the estates of John Papa 'Ī'ī, Bishop, and Robinson. The Oahu Sugar Co. had over 900 field workers, composed of 44 Hawaiians, 473 Japanese, 399 Chinese, and 57 Portuguese. The first sugar crop was harvested in 1899, ushering in the sugar plantation era in Waipahu (Ohira 1997).

Prior to commercial sugar cultivation, these lands were described as being “of near desert proportion until water was supplied from drilled artesian wells and the Waiahole Water project” (Condé and Best 1973:313). Dillingham had successfully promoted the Ewa Plantation Company in 1890; the sprawling sugar company was just south of and adjacent to the OSC. Artesian wells had converted those arid Ewa lands into a thriving plantation, and Dillingham recognized the same potential in the northern area.

Water to irrigate the upper cane fields was initially pumped to levels of 500 ft (150 m) by some of the “largest steam pumps ever manufactured” (Dorrance and Morgan 2000:49). The expense of pumping water to the high elevations of the plantation led to the proposal to transport water from the windward side of the Ko'olau Mountains. The Waiahole Water Company was formally incorporated in 1913 and was originally a subsidiary of the Oahu Sugar Company. The Waiahole Ditch was designed by engineer Jorgen Jorgensen, with recommendations by engineer J.B. Lippencott and assisted by W.A. Wall. The original system, when completed, included 27 tunnels connecting with 37 stream intakes on the north side of the Ko'olau, with the main bore through Waiāhole Valley, then connecting it to the 14 tunnels on the southern side of the Ko'olau at Waiawa, and thence by ditch westward to Honouliuli, covering a total of 13.6 kilometers ((Condé and Best 1973:37). Upon its completion in 1916, the Waiahole Ditch was 21.9 miles long (35 kilometers) and cost \$2.3 million. The 32 million gallons of daily water enabled the O'ahu Sugar Company to grow to “some 20 square miles . . . ranging in elevation from 10 feet at the Waipio Peninsula . . . to 700 feet at the Waiahole Ditch” (Condé and Best 1973:313). The ditch system, with some modifications is still in use. It is included on the state inventory of archaeological sites as Site no. 50-80-09-2268.

This ditch complex first passed through Hō'ae'ae, bringing much needed water to the area.

West of Waikakalaua Gulch, through Hoaeae and to the upper boundary of Oahu Plantation in Honouliuli, the conduit consists of 12,650 feet of cement-lined ditches, and three redwood pipes 5 feet in diameter, having an aggregate length of 2,830 feet [Kluegel 1917:96].

The Waiahole Water Co. has taken over from the Oahu Sugar Co. the Ahrens Ditch in Waiawa, the Kipapa Ditch, the Waikakalaua Ditch in Waipio, and the Hoaeae Ditch. Two redwood pipes having a total length of 1,223 feet have been laid across two gulches on the line of Hoaeae Ditch, cutting out 21/4 miles of ditch. The water delivered by the Waiahole System is chiefly used on newly planted cane on land above the lift of the pumps [Kluegel 1917:107].

### 3.3.5 Other Agricultural Enterprises

As the sugar industry throughout the Hawaiian kingdom expanded in the second half of the 19th century, the need for increased numbers of field laborers prompted passage of contract labor laws. In 1852 the first Chinese contract laborers arrived in the islands. Contracts were for five years, and pay was \$3 a month plus room and board. Upon completion of their contracts, a number of the immigrants remained in the islands, many becoming merchants or rice farmers. As was happening in other locales, in the 1880s, groups of Chinese began leasing and buying — from the Hawaiians of Waikele and Waipi'o *ahupua'a* — former taro lands for conversion to rice farming. The taro lands' availability throughout the islands in the late 1800s reflected the declining demand for taro as the native Hawaiian population diminished.

The Hawaiian islands were well-positioned for rice cultivation. A market for rice in California had developed as increasing numbers of Chinese laborers immigrated there since the mid-19th century. Similarly, as Chinese immigration to the islands also accelerated, a domestic market opened.

During the later 1800's, the taro fields of central 'Ewa were converted to rice fields as Chinese immigrants began to lease and purchase 'Ewa lands (Figure 21). By 1892 there were 333 acres of land devoted to rice farming in Waikele and Waipi'o *ahupua'a* (Coulter and Chun 1937: 21)



Figure 21. Undated photograph of the Waipahu Rice Field

As in Honouliuli, the cultivation of sisal was attempted on arid lands. Thrum's *Hawaiian Almanac and Annual* speaks of the prospect of sisal cultivation glowingly from 1904 to 1913, but the greater profits to be made from sugar cane cultivation eventually led to the decline of this industry. Upper Hō'ae'ae seems to have been the focus for sisal cultivation in central 'Ewa, as shown in excerpts from the 1909 and 1913 annuals.

The Hawaiian Fiber Co. increases its capital stock to \$150,000, over 500 acres of new planting having been set out on their recently acquired Hoaeae land, and work being pushed to cover the entire tract of some 1,800 acres [Thrum 1909:167].

New and enlarged machinery for the sisal decorticating mill has been installed at the Pouhala station of the company on the upper Hoaeae lands, with which to care for the fibre product from their enlarging area. Some 1750 acres are now planted out, including the fields of Sisal [Thrum 1913:170-171].

An attempt to grow cotton was made on "the semiarid uplands at Kunia and Waipahu" in the early twentieth century, but the enterprise was not profitable (Krause 1911:66).

John Papa 'Ī'ī associated Waiawa, 'Ewa with the brewing of intoxicants in the early 1800s and gives an account of the making of 'ōkolehao, an alcoholic drink made from brewing the roots of the ti plant (*Codyline fruticosa*).

It was interesting to see how ti root was converted into a strong liquor. When the root was boiled on a stove, the liquid came forth like the flowing of sweat from a bud. The hand was wetted with the first drippings and then waved over the flames, when the drippings burned brightly. The first brew was called *lolo*, the second *kawai*, and the last *kawai hemo* ('Ī'ī 1959:85).

Between the years of 1861 and 1873, parcels of Waiawa were leased to Valdemar Knudsen for use as grazing lands for live stock. A fifty-year lease and leaseholds were granted to James Robinson in 1868. After James Robinson's death in 1890, his son, Mark P. Robinson, acquired a twenty-five year lease. Overwritten on the lease was the "permission granted to assign the lease to the Oahu Railway and Land Company" (Bureau of Land Conveyances 115:496). This lease was subleased from Oahu Railway and Land Company to the Oahu Sugar Company for forty-three years on January 1st 1897. It is probable that much of the upper grasslands of Hō'ae'ae, Waikele, Waipi'o and Waiawa were used for cattle pasture.

In the early decades of the twentieth century, lands in *mauka* Waipi'o and Waiawa were being acquired for pineapple cultivation. There is a record of attempted pineapple irrigation utilizing water from shallow wells in Waiawa Gulch in 1893; and prior to 1913, most of the plateaus in the Waiawa project area were planted in pineapple (Goodman and Nees 1991: 59). In 1901, the Hawaiian Pineapple Company obtained 61 acres in Waiawa through public auction. Initially, most pineapple was shipped to California for packing. In an attempt to speed up processing, save money and produce a fresher product, a cannery was constructed in Waiawa. This cannery was constructed by the Pearl City Fruit Company but became a part of the Hawaiian Pineapple Company operations after the Pearl City Fruit Company went bankrupt. The cannery was in operation from 1905 to 1935.

A 1908 lease from the John 'Ī'ī Estate, Ltd. to Yoshisuke Tanimoto and Kintaro Izumi led to the formation of the Waipi'o Pineapple Company, which cleared and cultivated approximately 223 acres in portions of Kīpapa Gulch. In 1909, the government appropriated the Waipi'o peninsula from the 'Ī'ī estate. The land was valued at \$10,000 for purposes of fair compensation (Dept. of Land and Natural Resources Land Record Books 1909:228-235). In 1915, Libby, McNeill & Libby took over Waipi'o Pineapple Company's leases and continued to cultivate pineapple in the area. By the late 1920s, James Dole's Hawaiian Pineapple Company, incorporated in 1901, was cultivating pineapple on thousands of acres leased from the 'Ī'ī estate in the *mauka* area of Waipi'o.

Besides sisal, cotton, and pineapples, other crops were grown in central 'Ewa, such as macadamia nuts.

At Hoaeae, in the Ewa district, is another tract of about six acres on the Robinson estate, reported to be in fine condition. . . Mr. Grant Bailey, manager of the Hoaeae Ranch, kindly furnishes the following data on the infant industry. . . “Our planting is about six acres. Apparently one would have to wait about ten years before expecting commercial results on the planting. Our oldest trees are seven years old and they are just now beginning to bear” [Thrum 1927:96].

### 3.3.6 The Military in Central 'Ewa

Early in the twentieth century, the U.S. Government began acquiring the coastal lands of 'Ewa for the development of a naval base at Pearl Harbor. In 1901, the U.S. Congress formally ratified the annexation of the Territory of Hawai'i, and the first 1,356.01 acres of Pearl Harbor land were transferred to U.S. ownership. The U.S. Navy began a preliminary dredging program, which created a 30-foot deep entrance channel measuring 200 feet wide and 3,085 feet long. In 1908, money was appropriated for five miles of entrance channel dredged to an additional 35 feet down (Downes 1953). In 1909, the government appropriated the entire Waipi'o peninsula from the 'Ī'ī estate.

By 1941, Pacific Naval Air Bases expenditures for new construction at Pearl Harbor were in the hundreds of millions of dollars. The Japanese attack on Pearl Harbor, December 7, 1941, damaged or destroyed much of the new construction. Reconstruction was instituted to double the Pearl Harbor's war capacity. Military planners approved a new ammunition depot in the mountainside of Waipahu, a large new hospital in 'Aiea, and thousands of additional changes to the Navy Yard to accommodate the new aircraft carrier task forces (Woodbury 1946). During World War II, the military used the sugar cane rail system to “haul large quantities of ammunition” (Condé and Best 1973:315). A 1956 U.S. Army Map Service map shows Loko 'Eo completely drained, filled in, and converted into a “naval reservation”

After entering WWII, a military reservation was established in the upland regions of Waiawa. The reservation is 650.0 acres consisting of both gulch and plateau lands. From 1941 to 1945, the reservation was used as a training area for tanks and personnel and as an artillery impact area. The area was also used for the storage of munitions and supplies. The primary structure built by the military was a communications center. This center consists of four buildings and a tunnel system. The communications center is currently being used by the State of Hawai'i as a minimum security prison (Waiawa Correctional Facility).

### 3.3.7 From Rural Farms to Modern Urban Development

During the second half of the twentieth century, growth in central Ewa focused on the development of residential and military expansion, especially near Pearl Harbor. A series of U.S. Geographic Survey maps (taken over by the military during wartime), shows the increasing urban development surrounding the corridor from 1917 to 1970. On a 1919 map (Figure 22), the area was still rural, crossed only by the tracks of the OR&L railway and plantation rail lines. The main population center was around the mill town of Waipahu in Waikele Ahupua'a. On the 1927 (Figure 23) and 1943 maps (Figure 24), Waipahu had expanded; marshy areas (former taro lands) were still indicated in the *ahupua'a* of Waiawa. On the 1943 map (Figure 25), Waipahu town had expanded from Waikele into Waipi'o. A 1970 aerial photograph (Figure 26) indicates urban development along the complete extent of the HHCTCP alignment.

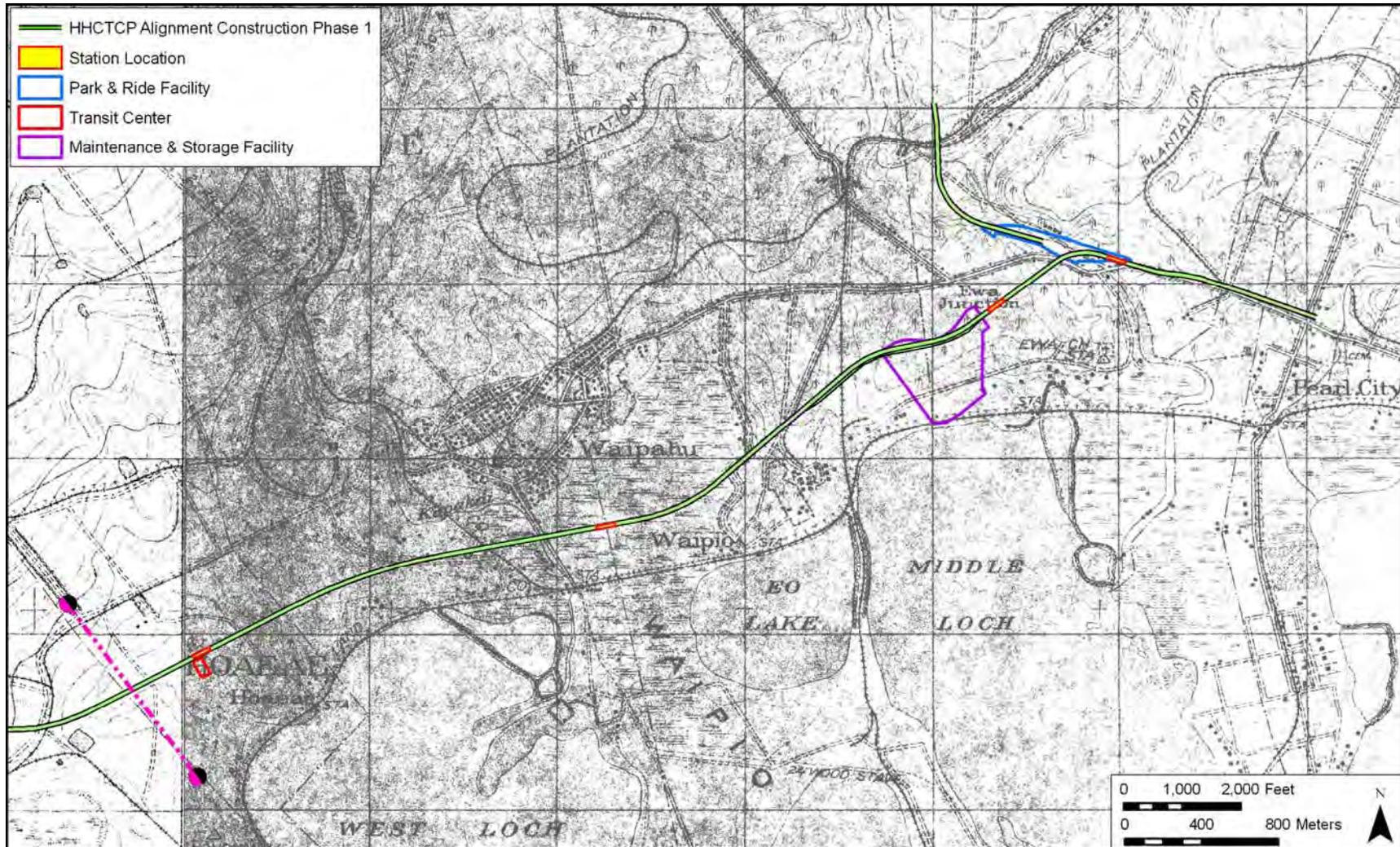


Figure 22. 1919 War Department Fire Control map, showing HHCTCP alignment

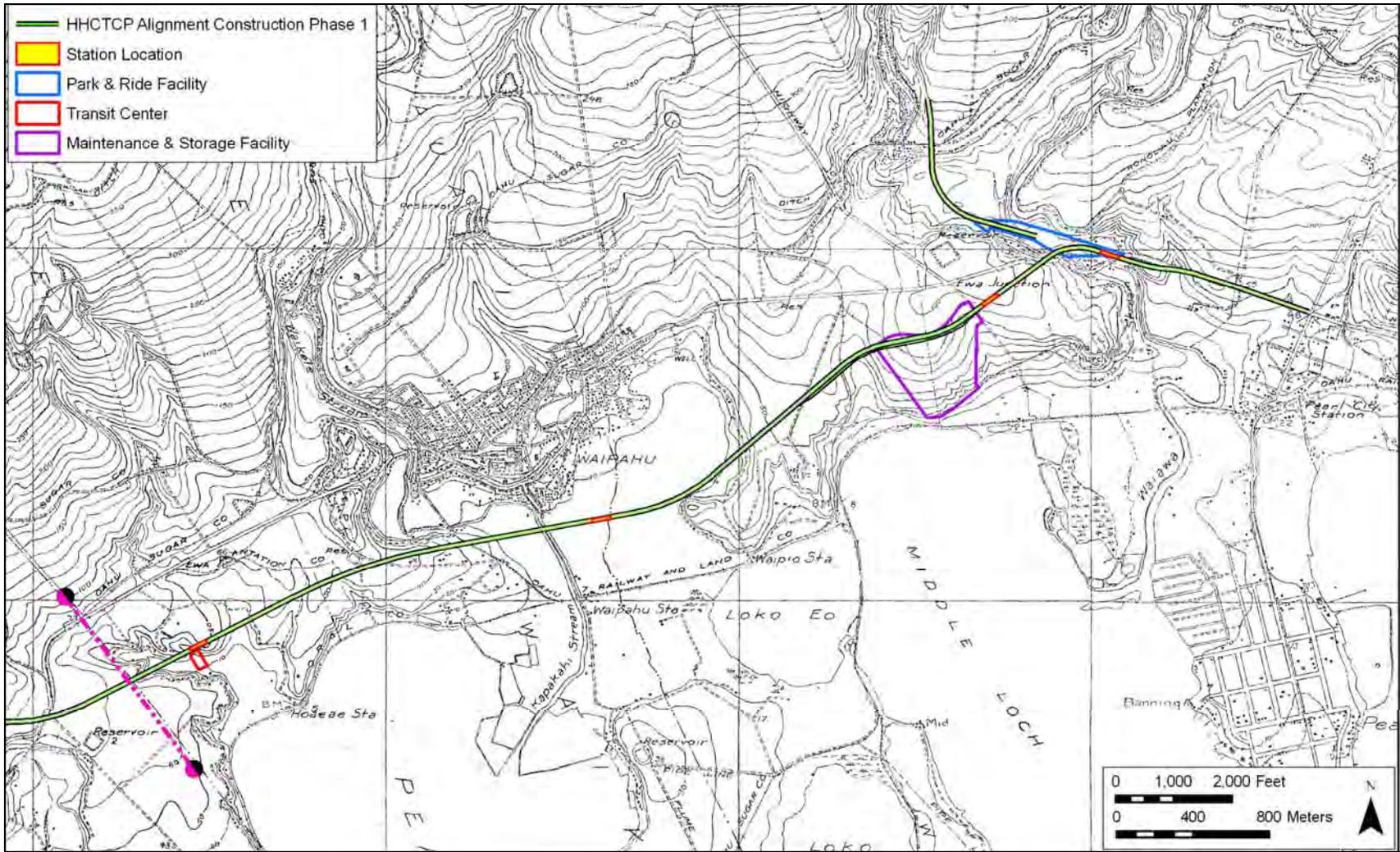


Figure 23. 1927 U.S Geographic Survey, showing HHCTCP alignment

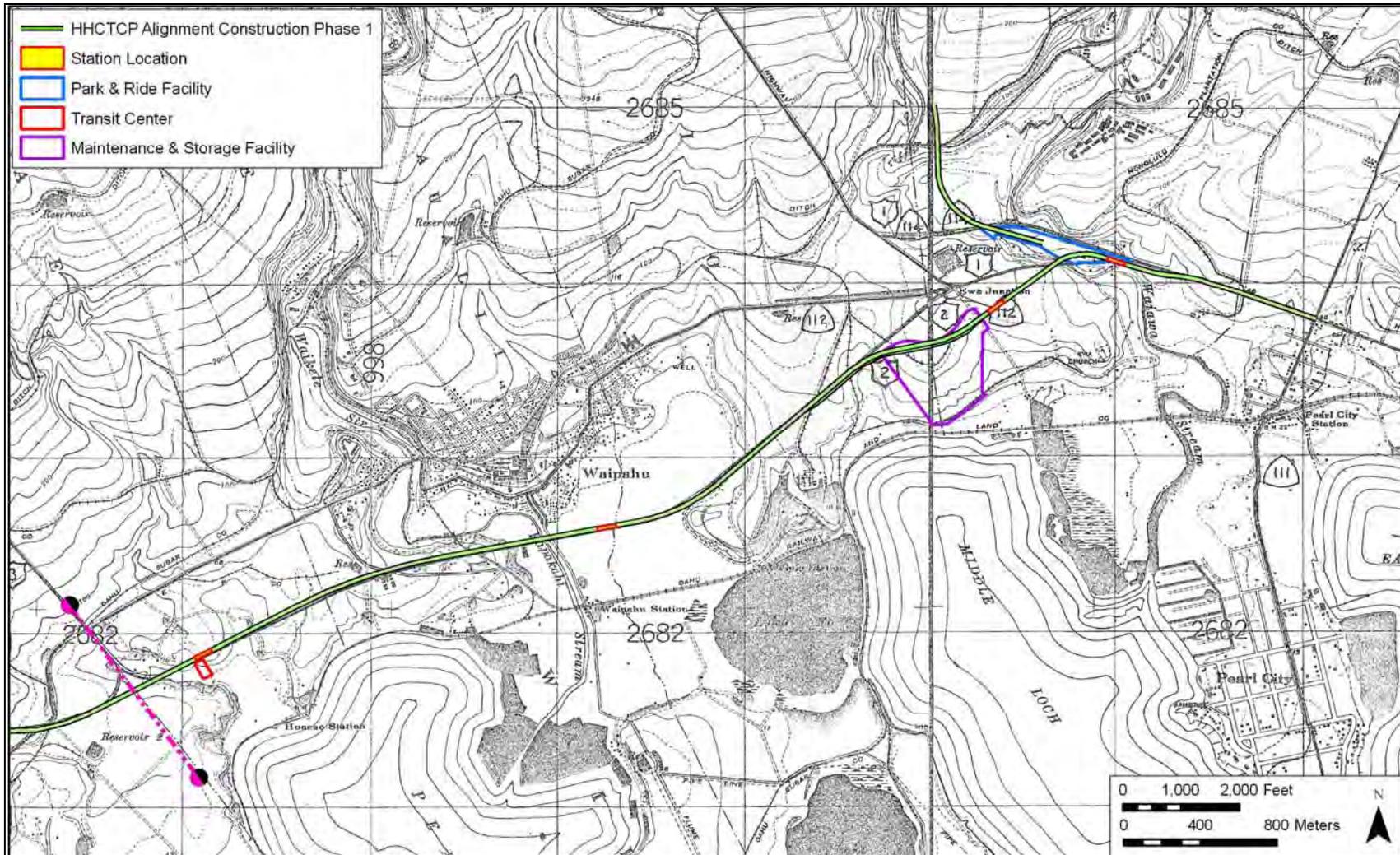


Figure 24. 1943 War Department map, showing HHCTCP alignment

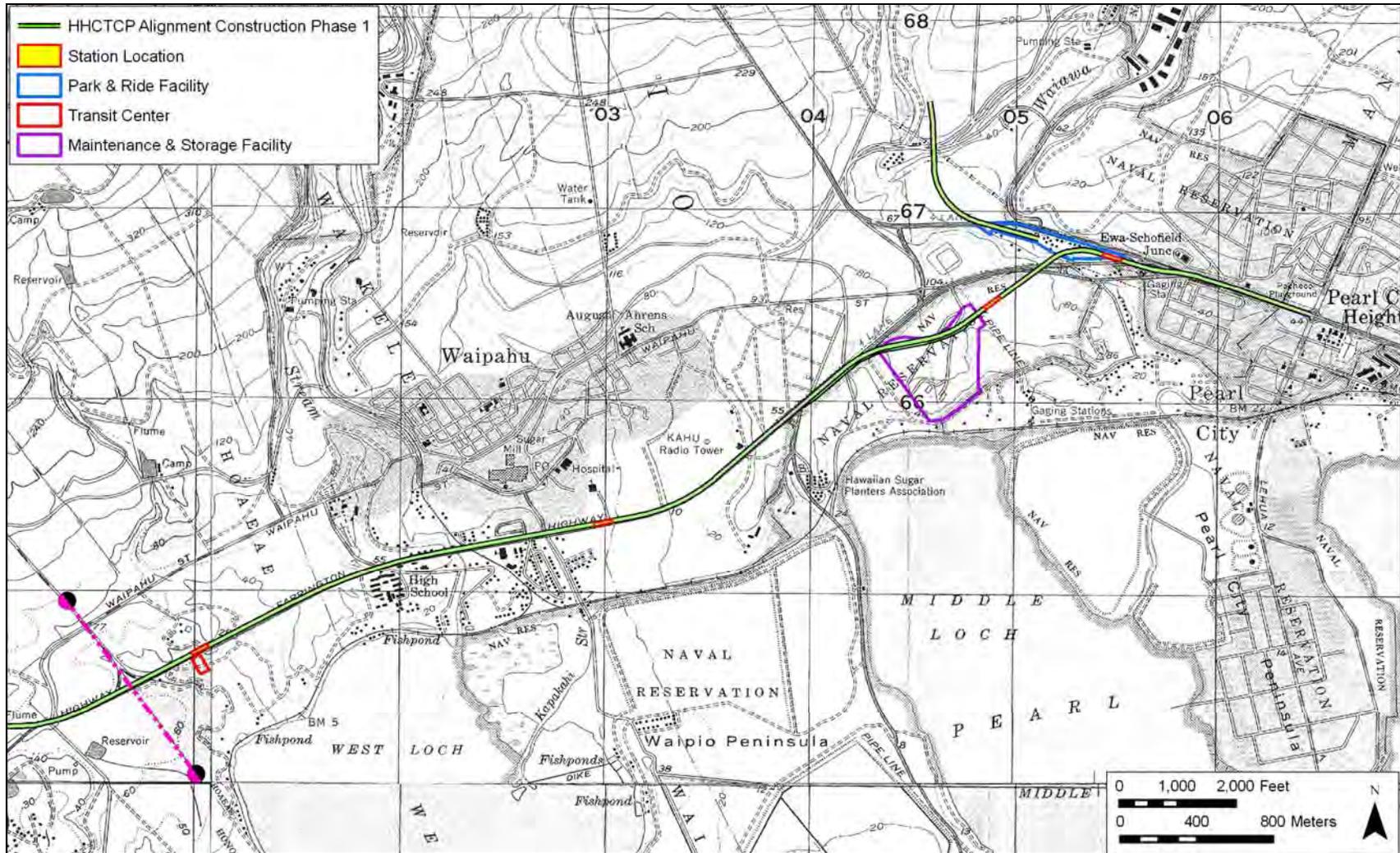


Figure 25. 1950 U.S. Geographic Survey map, showing HHCTCP alignment

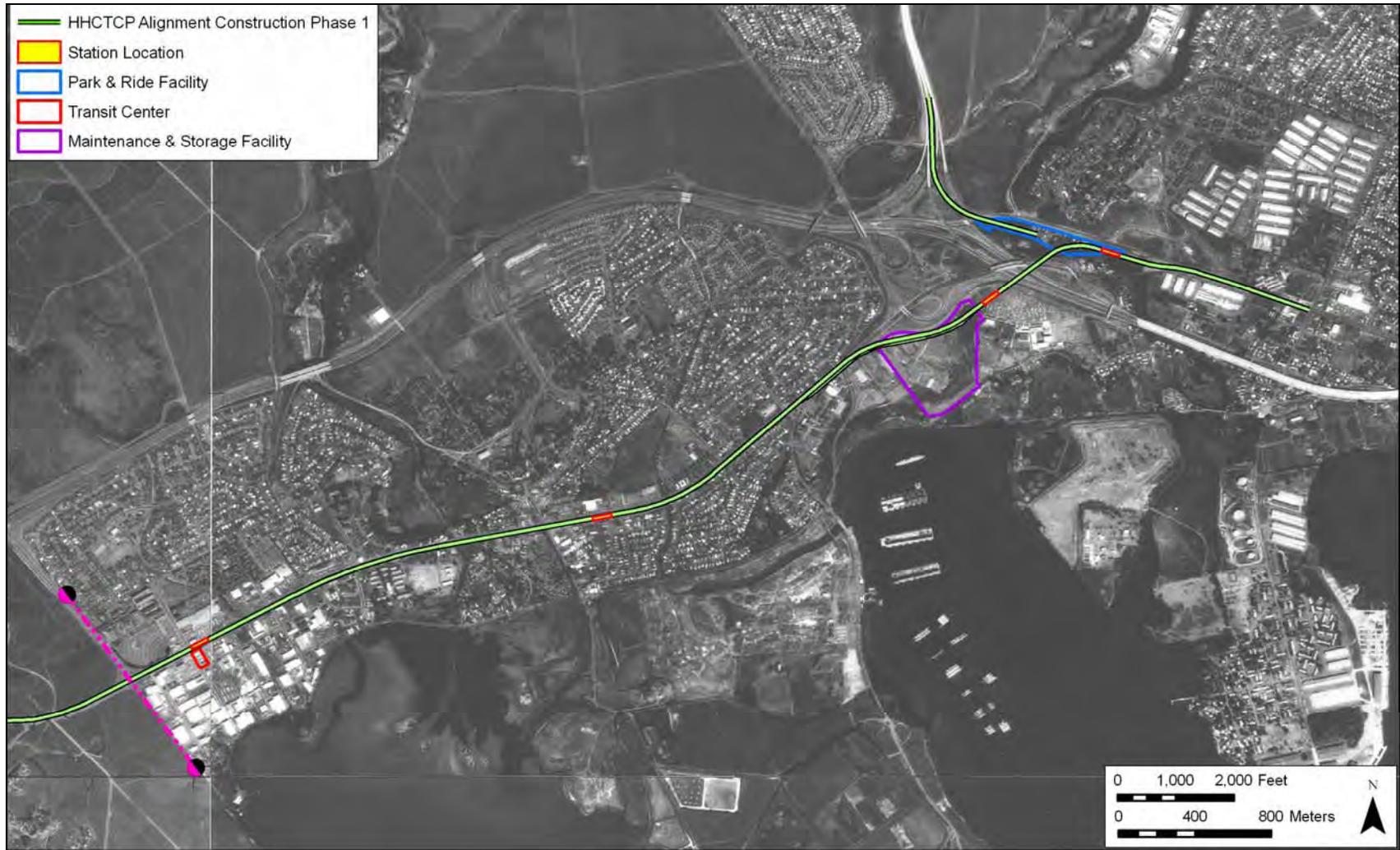


Figure 26. 1970 Aerial photograph of central Ewa, showing urban development around the HHCTCP Alignment

---

## Section 4 Previous Archaeological Research

---

While the southwest corner of the Island of O‘ahu is arguably one of the most studied areas in Polynesia, the first construction phase of the Honolulu High-Capacity Transit Corridor is environmentally distant from the focus of most of this previous work (particularly the Barbers Point or Kalaeloa area). It is suggested that an in-depth analysis of the results of the previous archaeology of the Honouliuli *ahupua‘a* would do little to elucidate the present project lands and the following discussion focuses on previous archaeological projects believed to be directly relevant to the lands under study.

Because the first construction phase lies in two rather different geographic areas, it is suggested to be appropriate to divide the discussion of previous archaeological studies between the relatively inland southwestern Honouliuli lands that were, as a generalization, relatively barren and little used prior to being placed under sugar cane cultivation for a century, and the lands on the margin of Pearl Harbor that were much more intensively used in traditional Hawaiian times and that have continued under fairly intensive habitation to the present time. A rather convenient and only slightly arbitrary division is Kunia Road (Station 562+00).

### 4.1 Previous Archaeological Investigations West of Kunia/Fort Weaver Roads

The previous archaeological investigations within the first construction phase of the Honolulu High-Capacity Transit Corridor west of Kunia Road/Fort Weaver Road usually cover relatively large parcels of land (often hundreds of acres). It is noteworthy that nearly 100 percent of this portion of the corridor has been previously studied in prior archaeological investigations (Figure 27). The following discussion of previous archaeological investigations generally proceeds from the southwest terminus (vicinity of the East Kapolei Station) towards the northeast up to the Kunia Road/Fort Weaver Road intersection.

#### Spear 1996

In 1996, Scientific Consultant Services, Inc. conducted an archaeological reconnaissance and assessment of the East Kapolei Development Project, southeast of the H-1 Freeway, ‘Ewa of Fort Weaver Road, and including portions of Kaloi and Hunehune Gulches. This brief 1996 letter report appears to address more than a thousand acres (the actual acreage is unclear). This study included within it the present Transit Corridor as far north as approximately the 440+00 point (covering the southwestern-most 4,800 feet (0.91 miles or 1.46 km.) and the northern-most of the two proposed 5-acre park-and-ride facilities by the proposed UH West O‘ahu Station. This brief 1996 letter report appears to address more than a thousand acres (the actual acreage is unclear). The study cites a 1994 SHPD letter (Doc No 9408TD01) that “clearly indicates that most of the present [Spear 1996] project area has been declared to have “no effect” on historic sites due to the many years of commercial sugarcane production on these lands.”

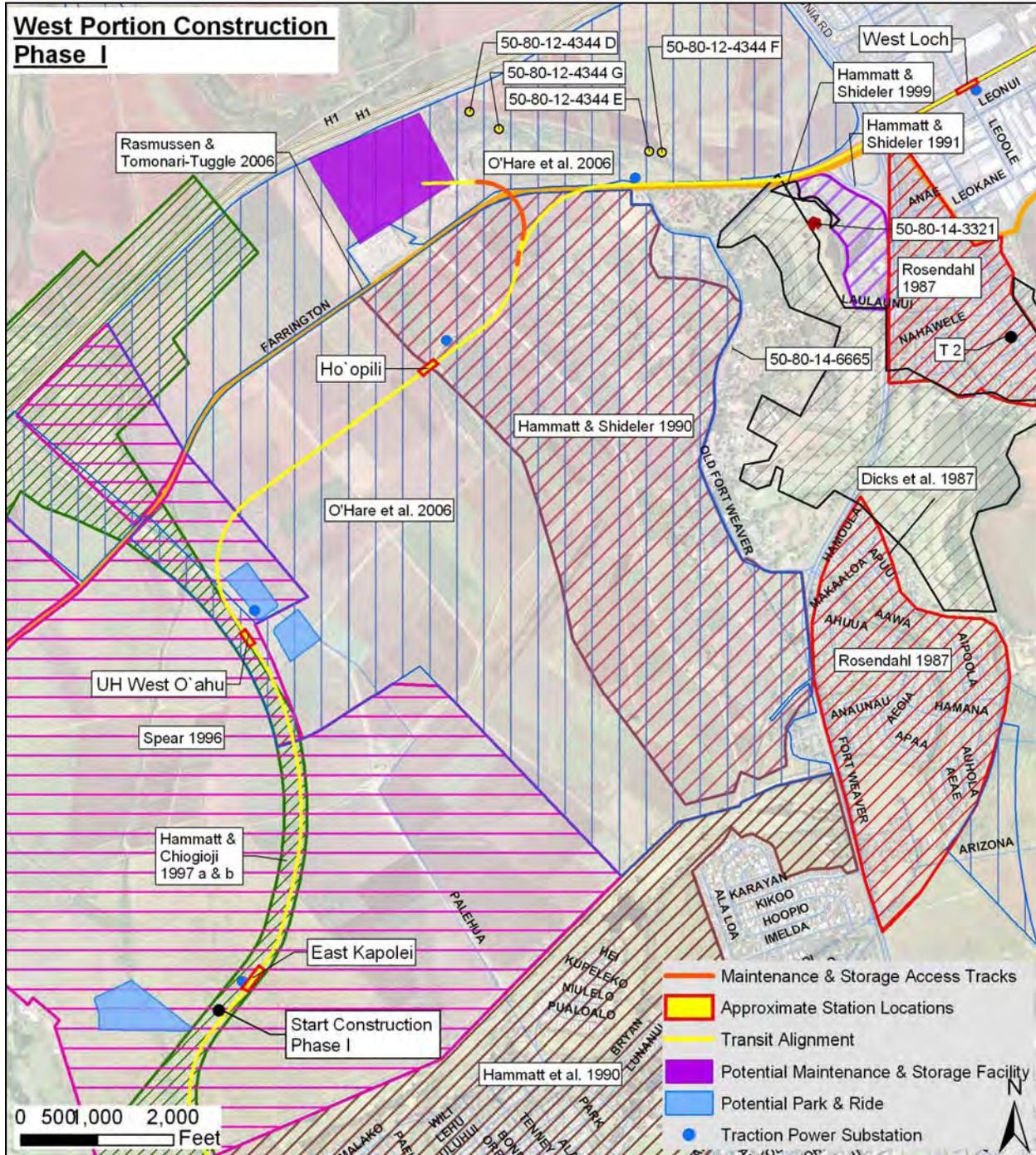


Figure 27. Map showing location of previous archaeological studies near the east end of the transit corridor

A limited field inspection documented in the Spear 1996 letter report located no cultural resources but noted that the 4 m wide and 4 m deep Kalo'i and Hunehuna Gulches had been modified for cane irrigation. The study concludes that, on the basis of the SHPD letter and the field check: "that future development on these land parcels will have 'no effect' on historic sites, and that no further cultural resource work is required." (Spear 1996:1). While it is not clear to us whether there was ever a formal SHPD response to the Spear 1996 letter report the conclusions seems eminently reasonable.

### **Hammatt and Chiogioji 1997a &b**

In 1997, Cultural Surveys Hawai'i, Inc., prepared two quite similar archaeological reconnaissance survey of a corridor that would become the "North-South Road project" extending south from the H-1 Freeway. The earlier (Hammatt and Chiogioji 1997a) March study extended south to approximately 5,300 feet inland from the 'Ewa Beach shoreline. The later (Hammatt and Chiogioji 1997b) September study was shorter in length not extending south of the O.R. & L. alignment. For the purposes of the present first construction phase the two Hammatt and Chiogioji 1997 studies are essentially identical both addressing the area of the first construction phase from its southern beginning up to approximately 460+00 where the Honolulu High-Capacity Transit alignment veers east off of the North-South Road alignment (these two studies partially overlapped with the Spear 1996 study).

Thus the two Hammatt and Chiogioji 1997 studies address the first 6,800 feet (1.29 miles or 2.07 kilometers) of our present project area. The two Hammatt and Chiogioji 1997 studies were both "Reconnaissance Surveys" and may not meet contemporary standards for Archaeological Inventory Survey/Archaeological Assessments the records of Cultural Surveys Hawai'i show they were made available to the City and County of Honolulu to support planning. It is unclear whether either of these studies were ever commented on by the State Historic Preservation Division. A letter signed by Dr. Don Hibbard, SHPD Administrator dated March 8, 1996 (Log No 16697, Doc No 9603NN03) on the subject of the "North-South Road Corridor Project" only expresses concern for appropriate mitigation of impact to the O.R.& L. alignment.

Background research and a pedestrian survey for the Hammatt and Chiogioji 1997a & b studies revealed that the entire area had been extensively graded in association with sugar cane cultivation and the construction of plantation infrastructure. The Hammatt and Chiogioji 1997a study corridor crossed two previously identified areas of archaeological concern (both well south of the present study area: SIHP # 50-80-12-9786 consisting of the 'Ewa Villages Historic District and SIHP # 50-80-12-9714, the Oahu Railway & Land Company right-of-way. These were no longer an issue for the shorter Hammatt and Chiogioji 1997b study that did not extend so far south as proximity to these two sites. The Hammatt and Chiogioji 1997b study concluded: "No further archaeological investigation is recommended for the entire project area corridor and on-site or on-call monitoring is not justified during future construction activities." (Hammatt and Chiogioji 1997b:22).

Despite the summary recommendation cited above, the build-out of the North-South Road Corridor has been attended by two monitoring programs (for Phases 1A and 1C with Kiewit Pacific Co. and Phase 1B with Goodfellow Brothers) following a somewhat generic monitoring plan prepared by the State Department of Transportation to the satisfaction of the SHPD with on-

call monitoring as the standard methodology. There have been no significant finds to date (after a year of weekly spot check monitoring).

Given the summary recommendation of the Hammatt and Chiogioji (1997b:22), the fact that no inventory survey per-se was required by the SHPD for the North-South Road project and that the two monitoring programs have documented no significant finds it is consistent to recommend that there is no need for archaeological inventory survey subsurface testing in the first 6,800 feet (1.29 miles or 2.07kilometers) of our present project area on the basis of strictly archaeological concerns.

### **O'Hare et al. 2006**

In 2005 and 2006, Cultural Surveys Hawai'i, Inc. conducted an archaeological inventory survey (O'Hare et al. 2006) of some 1,630 acres for the East Kapolei Project (subsequently known as the Ho'opili Project) that was accepted by an SHPD letter of November 3, 200 (Log No. 2006.3670, Doc. No. 0611amj01)

The project area was bounded on the east side by Fort Weaver Road, was bounded *makai* by Mango Tree Road, and was bounded on the north or *mauka* side by the H-1 Freeway (O'Hare et al. 2006). This project area was configured by the owner/developer interests to dove-tail with the Spear 1996 study. Thus the west corner of the O'Hare et al. 2006 study area fills in a certain un-addressed rectangular area extending south from the H-1 freeway and the general configuration of the west side of the O'Hare et al. 2006 study matches the general configuration of the east side of the Spear 1996 study. A second non-contiguous portion of the study area was *mauka* of the H-1 Freeway surrounding a reservoir and is away from transit corridor concerns.

In the immediate vicinity of the proposed UH West O'ahu Station the transit corridor crosses a narrow corridor that was part of both the Spear 1996 and O'Hare et al. 2006 study areas, and then takes a sharp turn to the east within the north portion of the Spear 1996 study area and re-enters the O'Hare et al. 2006 study area at approximately the 467+59 point. The transit route then traverses the north central portion of the O'Hare et al. 2006 study area, reaching Farrington Highway near a major dog-leg turn of the highway. The transit corridor then continues east along a stretch of Farrington highway that lies entirely within the O'Hare et al. 2006 study area to approximately station 536+00. From there until Fort Weaver Road at Station 570+00 the O'Hare et al. 2006 study area lies on the south side of the transit corridor along Farrington Highway. In summary for approximately 6,841 feet (2.09 kilometers, 1.3 miles; from approximately the 467+59 point to the 536+00 station) the transit corridor lies entirely within the O'Hare et al. 2006 study area and then an additional 3,400-foot long (1.04 kilometer, 0.64 mile) stretch to the east along Farrington Highway (from the 536+00 station to Fort Weaver Road at Station 570+00) is bound on the south side by the O'Hare et al. 2006 study area.

The southeastern-most of the two proposed 5-acre park-and-ride facilities by the UH West O'ahu Station lies within the west central portion of the O'Hare et al. 2006 study area. The northwestern-most of the two proposed 5-acre park-and-ride facilities by the UH West O'ahu Station appears to straddle the northeastern portion of the Spear 1996 study and the west central portion of the O'Hare et al. 2006 study area. A proposed turn off from the main line arcing to the north and west to a 12-acre maintenance and storage facility (lying adjacent to the north of an existing electric substation) lies entirely within the O'Hare et al. 2006 study area

Several sites within the study area had previously been identified during a survey in 1990 (Hammatt and Shideler 1990). These previously identified historic archaeological sites included SIHP # 50-80-12-4344 (plantation infrastructure), 50-80-12-4345 (railroad berm), 50-80-12-4346 (northern pumping station), 50-80-12-4347 (central pumping station), and 50-80-12-4348 (southern pumping station). Four additional features were documented and recommended eligible to the State Register of Historic Places during the 2005-2006 survey. These additional features, grouped under SIHP # 50-80-14-4344, are -4344-D, a linear wall along the Koko Head bank of Honouliuli Stream; -4344-E, a linear wall along the Koko Head bank of Honouliuli Stream; -4344-F, a stone-faced berm constructed perpendicular to the orientation of the stream; and -4344-G, a concrete ditch and concrete masonry catchment basement on the 'Ewa bank of Honouliuli Gulch (O'Hare et al. 2006).

No areas of concern were documented any where near the transit corridor in the O'Hare et al. 2006 study. While certain plantation irrigation features of site 50-80-14-4344 (Features D through G) were documented just to the north of the corridor and just to the east of the proposed 12-acre maintenance and storage facility no further study was recommended and there are no preservation concerns (O'Hare et al. 2006:116-117)

### **Rasmussen and Tomonari-Tuggle 2006**

In 2004, archaeological monitoring was conducted along the Waiiau Fuel Pipeline corridor from the HECO Barbers Point Tank Farm to the Waiiau Generating Station in the 'Ewa District. It appears that the Waiiau Fuel Pipeline corridor followed Farrington Highway west of the western portion of the present transit corridor study area meeting the transit corridor in the vicinity of Station 532+00 on Farrington Highway. The Waiiau Fuel Pipeline corridor then appears to have turned south off of Farrington Highway at approximately the present station 570+00 following at least approximately the Kaihuopalaai Street alignment down to the OR& L alignment and then roughly parallels the OR& L alignment eastward. It appears that no archaeological monitoring was conducted west of the west side of Waipi'o Peninsula. It appears this lack of monitoring west of the west side of Waipi'o Peninsula was because the corridor to the west had been determined to not be archaeologically sensitive. The eastern portion of the Rasmussen and Tomonari-Tuggle (2006) east of Kunia Road/Fort Weaver Road is discussed further below.

### **Dicks et al. 1987**

The Dicks et al. (1987) archaeological reconnaissance survey study for West Loch Estates golf course and parks addressed a 216 acre project area that straddled the present (new) Fort Weaver Road extending from the margin of the West Loch of Pearl Harbor up to Farrington Highway. The project area included only a very narrow frontage (only 100 m or so) along Farrington Highway (the present golf course) between old Fort Weaver Road on the west and the present Saint Francis Medical Center-West on the east side at approximately station 552+00 and 556+00.

While a great wealth of archaeological finds were indicated east of the (new) Fort Weaver Road at some remove from Farrington Highway transit corridor, only one site (SIHP # 50-80-13-3321) was recorded west of Fort Weaver Road approximately 140 m south of the transit corridor. The subsurface cultural layers, included a human burial, artifacts, midden, subsurface features,

and structural remains, This cultural layer was determined to be of pre-contact origin and may have been occupied as early as the mid-6th to mid-9th centuries, with subsequent occupations occurring up to the early 1800s (Dicks et al. 1987:45-51).

Although a fairly rich site was indicated in relatively close proximity to the transit corridor, site 50-80-13-3321 relates to a complex of Land Commission Awards that lies in Honouliuli Stream bottomlands some 80 vertical feet below the Farrington Highway transit corridor. Thus although the site is only approximately 140 m south of the transit corridor it is ecologically a world away.

Given the preparation of the study for inclusion in an EIS it is assumed that the study was reviewed and found to be acceptable to allow development to proceed.

### **Hammatt and Shideler 1999**

In 1999, Cultural Surveys Hawai'i, Inc. conducted an archaeological assessment for the proposed expansion of St. Francis Medical Center West, *makai* of Farrington Highway and 'Ewa of Fort Weaver Road (Hammatt and Shideler 1999). The archaeological investigation involved historical research to construct a history of land use and to determine if archaeological resources have been recorded on or near the project area, as well as a limited field inspection of the project area to identify any surface archaeological resources. No archaeological resources were identified within the project area. However background research revealed that a subsurface cultural layer (SIHP # 50-80-13-3321), containing a human burial, artifacts, midden, subsurface features, and structural remains, was previously identified 'Ewa of the project area. This cultural layer was determined to be of pre-contact origin and may have been occupied as early as the mid-6th to mid-9th centuries, with subsequent occupations occurring up to the early 1800s. Thus an archaeological inventory survey with a focus on subsurface testing was recommended for a portion of the project area prior to any development involving ground disturbance (Hammatt and Shideler 1999).

### **Hammatt and Shideler 1991**

In 1991, Cultural Surveys Hawai'i, Inc. conducted an archaeological inventory survey for a proposed expansion of Saint Francis Medical Center West on an approximately 24-acre parcel south of Farrington Highway and west of (the new) Fort Weaver Road (Hammatt and Shideler 1991) adjacent on the west side of the Saint Francis Medical Center West buildings that existed at that time. This study lies adjacent to the transit corridor along Farrington Highway for approximately 800 feet (244 m; between Station 556+00 and Station 564+00) A pedestrian survey and background research revealed that the entire area, located entirely on a bluff northeast of the flood plain of Honouliuli Stream had been extensively disturbed, contained no surface structures or other remains and was unlikely to contain any subsurface archaeological resources. It is understood that the SHPD rendered a "no impact" letter for this project.

### **Rosendahl 1987**

Paul Rosendahl conducted a combined surface and sub-surface survey of some 232 acres in two discontinuous increments along Fort Weaver Road. The northernmost of the two (Increment I) extended up on the east side of (new) Fort Weaver Road to an apex at Farrington Highway. The frontage along the Farrington Highway transit corridor is virtually a point at approximately

Station 570+00. The main relevance in the study is in documentation of the virtual absence of finds in the vicinity. In the *mauka* Increment I area of approximately 100 acres there was one greatly disturbed surface artifact collection area (designated "T-2") relating to a pre-1900 historic habitation consisting of a scatter of glass and ceramic vessel fragments. This was located approximately 900 m south of the present transit corridor. Given the preparation of the study for inclusion in an EIS it is assumed that the study was reviewed and found to be acceptable to allow development to proceed.

## 4.2 Previous Archaeological Investigations East of Kunia/Ft. Weaver Roads to Waimano Home Road

The majority of the Farrington Highway sub-area as it exists today (along with much of the built environment around it) was constructed during the 1960s (Voss 2008). Although the highway was built over existing roadways (including the previously mentioned Government Road), the reconstruction led to residential and commercial growth, which occurred before archaeological investigations became standard in the late 1970s. This may explain why there are so few archaeological investigations within the area. The sub-area also parallels a portion of the H-2 Freeway, which was built in 1977 (Voss 2008). However, according to traditional land use and historical LCA information, there is little evidence of Native Hawaiian habitation in the vicinity of the H-2 Highway.

Near Farrington Highway, previous archaeological investigations show varied types of archaeological resources, including traditional Hawaiian remains, plantation infrastructure, and World War II historic infrastructure. Three of the five previous archaeological investigations are proximal to the project's potential maintenance and storage facility, near the Leeward Community College Station. The discussion of previous archaeological investigations proceeds from 'Ewa to Koko Head (refer to Figure 28 for the locations of prior archaeological investigations in this sub-area).

### Hammatt and Chiogioji 2000

In 2000, Cultural Surveys Hawai'i, Inc. prepared an archaeological assessment of an approximately 2,600-foot-long portion of Farrington Highway for proposed improvements between Anini Place and Waipahu Depot Road in Waikele (Hammatt and Chiogioji 2000). Background research indicated that the study area ran along land that was, until the mid-19th century, *lo'i*. Many of the *lo'i* were replaced by rice fields in the 20th century. During the 20th century, O'ahu Sugar Company had been established and Waipahu Town developed around the sugar mill and plantation. OR&L tracks ran perpendicular across Hammatt and Chiogioji's (2000) study area. Background research also indicated the study area includes historic buildings and constructions more than 50 years old. The historic features mentioned in the report include a railway overpass on the *makai* side of Farrington Highway with a drainage canal bridge constructed in the late 1930s (which had no markings or relation to the OR&L) and the St. Joseph Church and school, also on the *makai* side of Farrington Highway, built in 1940s. St. Joseph Church and school are in use today, are not currently listed on either the State or National

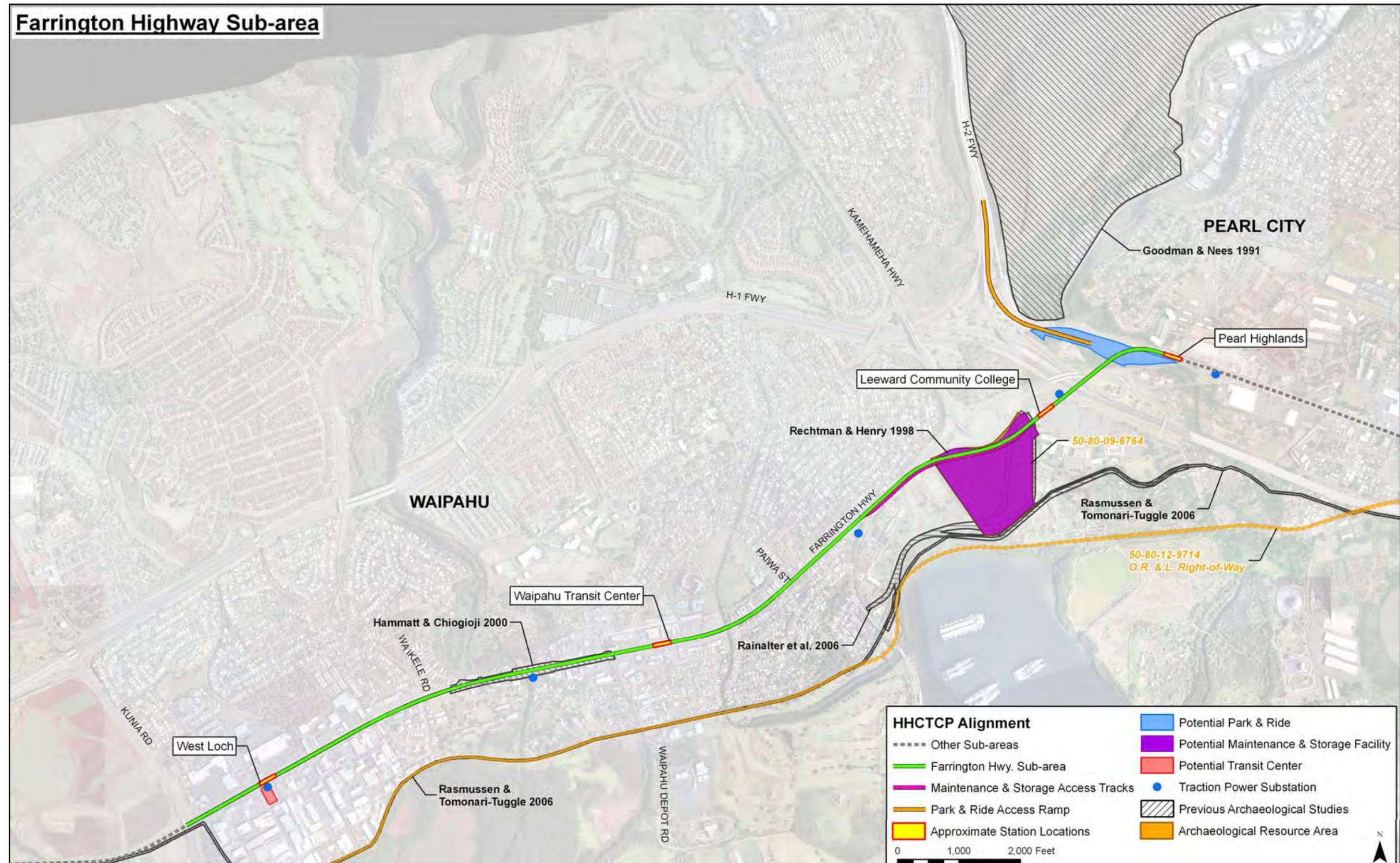


Figure 28. Farrington Highway portion of Construction Phase 1 depicting previous archaeological investigations and previously recorded archaeological resources

Register of Historic Places, and do not appear to have been evaluated for State or National Register eligibility. Background research also indicated that no archaeological inventory surveys had been conducted within the current Farrington Highway sub-area or within the immediate vicinity. In addition, no surface archaeological resources were observed, indicating little likelihood of finding prehistoric surface or subsurface archaeological remains since all areas along the study area have been subjected to decades of urban development that would have removed any surface remnants related to traditional Hawaiian activities.

### **Rasmussen and Tomonari-Tuggle 2006**

In 2004, archaeological monitoring was conducted along the Waiau Fuel Pipeline corridor from the HECO Barbers Point Tank Farm to the Waiau Generating Station in the 'Ewa District. The portion of this corridor west of Kunia Road/Fort Weaver Road (addressed above) appears not to have been monitored because that portion of the corridor had been determined to not be archaeologically sensitive. East of Kunia Road/Fort Weaver Road the Waiau Fuel Pipeline corridor generally approximated the OR&L right-of-way; 1,000 feet or so south of the transit corridor. The Waiau Fuel Pipeline corridor (Rasmussen and Tomonari-Tuggle 2006) did skirt the south edge of the proposed 43.3 acre maintenance and storage facility located immediately west of Leeward Community College and did develop stratigraphic data in that area. The Waiau Fuel Pipeline corridor monitoring south and southeast of Leeward Community College occurred in the direct vicinity of previously identified traditional Hawaiian burials (SIHP # 50-80-09-3761 and SIHP # 50-80-09-5302) and the fishponds of Loko Kuhialoko (SIHP # 50-80-09-0119) and Loko Mo'ō (SIHP # 50-80-09-0120). No new archaeological remains were discovered however (Rasmussen and Tomonari-Tuggle 2006).

### **Rechtman and Henry 1998**

In 1998, PHRI completed an archaeological reconnaissance survey at two discrete locations the Red Hill Fuel Storage Area, *mauka* of Moanalua Freeway, and, what concerns us here, the 'Ewa Junction Drum Filling and Fuel Storage Area, *makai* of Farrington Highway and *mauka* of Middle Loch (Rechtman and Henry 1998). The later study area is the presently proposed 43.3 acre maintenance and storage facility located immediately west of Leeward Community College. The project was undertaken in compliance with Section 110 of the National Historic Preservation Act (NHPA). "The 'Ewa Drum Filling and Fuel Storage Area received a 100% surface survey." (Rechtman and Henry 1998:6) No archaeological historic properties were identified within the project areas in the course of the fieldwork and it was concluded that: "Due to the amount of prior disturbance and development at both of these facilities it is highly unlikely that any such resources, if they once existed, would have been preserved." (Rechtman and Henry 1998:ii) The study concluded that: "NHPA Section 110 responsibilities with respect to the identification and evaluation of archaeological resources located within these facilities" had been fulfilled.

### **Rainalter et al. 2006**

In 2006, Cultural Surveys Hawai'i, Inc. conducted an archaeological field inspection and literature search for the construction of a proposed Leeward Community College Second Access Road. The study area was bounded on the *mauka* side by the Middle Loch of Pearl Harbor, on the *makai* side by Farrington Highway, on the 'Ewa side by Waipi'o Point Access Road, and on

the Koko Head side by Waiawa Stream (Rainalter et al. 2006). Two archaeological resources were identified within that study area: SIHP # 50-80-09-5302, a burial site containing both coffin and pit burials (located well south of the present study corridor), and SIHP # 50-80-09-6764, the 'Ewa Junction Navy Fuel Drum Site, a fuel storage facility designed to store automobile gasoline and aviation kerosene in underground storage tanks. The Rainalter et al. (2006) study included three proposed corridors that crossed through and/or wrapped around the south and east sides of the presently proposed 43.3 acre maintenance and storage facility located immediately west of Leeward Community College ('Ewa Junction Navy Fuel Drum Site). The study develops fairly detailed data on the 'Ewa Junction Navy Fuel Drum Site and, following consultation with the Navy, concludes: "based on this initial evaluation by the Navy, it is likely that the site would be considered eligible by the Navy for listing on the National Register..."

### **Goodman and Nees 1991**

In 1991, the Bishop Museum (Goodman and Nees 1991) conducted a reconnaissance survey of 3,600 acres in Waiawa Ahupua'a, adjacent to the H-2 Freeway. The southern tip of the Goodman and Nees (1991) project area lies just north (across Kamehameha Highway) from the transit project's proposed 11-acre park-and-ride facility to the west of the Pearl highlands Station. Seventeen sites were reported from the study area (SIHP # 50-80-09-1469 to 1472; 2261 to 2273). Four pre-contact sites were recorded: a rock-shelter complex, a mound complex, a trail, and a lithic scatter. Post-contact features, such as irrigation ditches, a railroad system, and a cannery, were described. Four features associated with World War II military training were also found. None of these recorded archaeological resources are within or in the vicinity of the current Farrington Highway sub-area.

### **McGerty and Spear 1995**

In 1995 Scientific Consultant Services completed an archaeological assessment for the Department of Housing and Community Project. The project area consisted of 138.5 acres on two parcels bisected by Kamehameha Highway in the Mānana Pearl City Junction (TMK 9-7-23 and 9-7-24). The upper parcel is bounded on the 'Ewa side by Hale Ola, Holiday City subdivisions, and Mānana-Kai Park; on the *makai* side by Cane Haul Road; on the Koko Head side by Waimano Home Road and Kauhale Mānana sub-division; and on the *mauka* side by Kamehameha Highway. The southern parcel, which particularly concerns us here, is bounded on the *mauka* side by Kamehameha Highway; on the 'Ewa and Koko Head side by cleared lots; and on the *makai* side by land belonging to the University of Hawai'i. The background research indicated intensive post-contact agricultural and military use of the project area. Thus, the potential of locating intact archaeological resources has been significantly decreased. No archaeological resources were encountered during this investigation (McGerty and Spear 1995).

## **4.3 Background Summary and Predictive Model**

It has been useful to think of Construction Phase 1 as falling into two discrete sections, only slightly arbitrarily divided at the Kunia/ "new" Fort Weaver Road overpass on the basis of the very different pre-contact and post-contact land-use history.

### 4.3.1 Predictive Model West of Kunia Road

West of Kunia Road there are no commoner Land Commission Awards and previous archaeological studies have indicated no concerns in the immediate transit corridor. The distance from the coast (and generally from fresh water) made this a little used area in pre-contact times. The intensive land disturbance of a century of commercial cane cultivation probably removed most of what little evidence of pre-contact use there ever was. The archaeological sensitivity of this area is generally regarded as low. As the transit corridor crosses Honouliuli Stream and passes within 300 m of the northern-most extent of the "Honouliuli Taro Lands" the sensitivity is believed to increase somewhat but is still regarded as low. Even though the distance to the former taro lands is not that far, the bottom lands that were preferred for pre-contact agriculture and habitation near the mouth of Honouliuli Stream seem in terms of environment to have been a world away. Archaeological deposits associated with pre-contact Hawaiian habitation and burial are a remote possibility. Post-contact archaeological deposits are not anticipated in any abundance on the basis of the historic record and the results reported in prior archaeological studies.

### 4.3.2 Predictive Model East of Kunia Road

East of Kunia Road the environment changes rather abruptly a fact that was mirrored in pre-contact settlement patterns that has continued right on up to the present day. The margins of the lochs of Pearl Harbor were proverbially "fat" "fertile" and "sweet" (*momona*) lands owing to the availability of marine resources, lacustrine resources, good, well-watered bottom lands for *kalo* cultivation and other forms of agriculture, and the generally sheltered conditions. These lands responded rapidly to human endeavor and the many fish ponds, fish traps, irrigation ditches and ponded fields of the margins of Pearl Harbor undoubtedly supported a relatively large and dense Hawaiian population for a thousand years. As such, the prospect of subsurface deposits relating to traditional Hawaiian habitation, burial, and agriculture having been present in the transit corridor is great. Furthermore the richness of the margins of Pearl Harbor attracted Hawaiian settlement and then settlement by other ethnic groups throughout the early historic period. The prospect of subsurface deposits relating to post-contact habitation, burial, and agriculture having been present in the transit corridor is high.

Weighing against this is the virtual complete absence of reports of significant finds of cultural resources and/or *iwi kūpuna* in the historic and archaeological record. Undoubtedly this in part reflects the very substantial history of land alteration for transportation, commercial, and residential use in the twentieth century. It appears likely that the acidity and humidity of the soil has not been conducive to preservation.

Certainly cultural resources and/or *iwi kūpuna* relating to both pre-contact and post-contact habitation, agriculture and burial may be encountered almost anywhere in the project alignment east of Kunia Road. The likelihood of such finds, as a sweeping generalization, is suggested to be higher in the vicinity of known Land Commission Awards, streams and the coast.

---

## **Section 5 Proposed Archaeological Inventory Survey Methods**

---

### **5.1 Field Methods**

#### 1. Personnel

Fieldwork will proceed under the direction of Hallett H. Hammatt, Ph.D., founder and president of Cultural Surveys Hawai'i. It is anticipated that four field personnel will conduct the field survey, including collection of GPS data, mapping and test excavations in the project area. It is expected that the fieldwork would take approximately three months.

#### 2. Extent of Pedestrian Coverage

The surface survey will effectively cover 100% of the project area (on the basis of 10 m spacing) that has not been addressed in prior archaeological inventory surveys reviewed and accepted by the State Historic Preservation Division (SHPD).

#### 3. Extent of Ground Penetrating Radar Coverage

All areas chosen for subsurface testing will be first surveyed with ground penetrating radar.

#### 4. Mapping

GPS data will be collected for all sites and features identified in the project area and will be made available to SHPD for inclusion in the State database. Scale maps of the project area showing all sites and features will be included in the inventory survey report

Scale maps of all sites and features identified in the project area will be included in the survey report. Additional notations on feature content and location of excavation units, as appropriate, will be shown on these historic property maps.

### **5.2 Ground Penetrating Radar (GPR) Methodology**

#### **5.2.1 Survey Methodology**

Survey will be performed using a Geophysical Survey Systems, Inc. SIR-3000 system equipped with a 400 MHz antenna. This is a bistatic system in which electromagnetic energy in the radar frequency range is transmitted into the ground via a sending antenna. Radar energy is reflected off of the subsurface matrix and is then received by another, paired antenna. Reflected energy is sampled and the travel time (in nanoseconds) of the individual reflection waves is recorded. Wave propagation speed varies depending on the nature of the subsurface medium. Any changes in density or electromagnetic properties within the stratigraphic column may cause observable variations in reflection intensity. Reflection features may include discrete objects, stratigraphic layering, or other subsurface unconformities.

The GPR survey for the approximately 1 km (0.6 mi) stretch of the HHCTCP alignment from the proposed East Kapolei Station to the proposed maintenance and storage facility situated near the junction of the HHCTCP alignment with Farrington Highway, will be carried out in a single transect line running along the middle of the HHCTCP alignment.

GPR surveys at select support column locations will consist of six 6 ft long parallel transect lines, spaced 1 ft apart, within the footprint of each 6 ft diameter support column.

### 5.2.2 Data Collection & Post-processing

Data collection parameters (Table 9) will be held constant throughout the survey under the assumption that soil conditions are relatively consistent across the study area.

All collected radar data will be post-processed using RADAN 6.5 software. Specific processing methods could include removal of horizontal banding using a Horizontal High Pass (Background Removal) Finite Impulse Response “Boxcar” filter. Gain settings could then be adjusted to amplify weak, subtle features and to compensate for depth-associated radar attenuation.

Table 9. Data Collection Settings

Parameter	Settings
Antenna	400 MHz
Samples per Scan	512
Format (bits)	16
Scan Rate	18 scans/ft
Depth	10 ft
Dielectric	8
Soil	Type 2

## 5.3 Excavation Methods

The following methods will be used in accomplishing test excavations:

1. A portion of surface structures (such as mounds) will be dismantled to ground surface or bedrock, whichever appears first. If there is soil beneath the surface structure, a 1 by 1 m unit will be excavated below the structure. Mechanical means may be used.
2. For units excavated in soil, all excavated sediments will be screened through 1/8 inch mesh screen.
3. All artifacts and shell and bone midden will be recovered from the screens.
4. In situ charcoal samples and charcoal samples from the screening of sediments will be collected for radiocarbon dating and wood species identification as appropriate.
5. A minimum of one stratigraphic profile from each unit from each feature will be recorded by scale drawing. One profile from each excavated feature will show stratigraphic relationship of structural elements to the sediment layers.
6. All test units will be excavated to culturally sterile sediments or bedrock.
7. Cultural soil strata will be excavated in 10 cm levels, where applicable.

## 5.4 Laboratory Methods

This phase of work will involve the identification and cataloguing of artifactual material. Both historic and pre-Contact artifact assemblage forms will be completed. Spatial and functional analyses will be performed on the assemblages of each feature and cluster of features to examine the type and extent of activities taking place in each feature and cluster. Artifacts will be measured, weighed and described with representative samples drawn and/or photographed .

Midden will be identified as to genus and species, weighed, and analyzed. Data will be tabulated by depth and stratigraphic unit for each excavation unit. Concentration indices will be compiled and evaluated.

Appropriate charcoal samples will be submitted for radiocarbon dating. A minimum of three samples will be dated if appropriate samples can be recovered.

## 5.5 Descriptions of Sites

The description of State Inventory of Historic Properties (SIHP) numbered historic properties will include the type of site, the function of the site, basic dimensions of the site, the number of intimately related features in a group, and the general relationship to other close features in the larger complex. SIHP site numbers will be obtained for any sites that have not yet been assigned State site numbers.

Site descriptions will incorporate descriptions from existing sources (Hammatt et al. 1978; Hammatt et al. 1985; Hammatt 1991; Hammatt et al. 1991) and descriptions taken in the field during the inventory survey.

## 5.6 Reporting

The inventory survey report will include the following sections:

Natural Setting

History

Previous Archaeology

Excavation Methods

Laboratory Methods

Excavation Results

    Stratigraphy

    Artifact and Midden Analyses

    C14 Dating Results

    Discussion of Site Types

Site Descriptions

Summary and Interpretation

Significance and Recommendations

References Cited

Appendices including:

Master Artifact Catalog

Midden Catalog

Select photos

## **5.7 Disposition of Finds and Documentary Data**

All materials generated by this project (except burials) will be temporarily stored at the archaeologist's facilities until a suitable depository acceptable to the landowner and the SHPD is available for curation on O'ahu Island.

Disposition of any burial finds will be determined by the O'ahu Island Burial Council and SHPD/DLNR. Much of this project corridor is an agricultural area notable for its lack of human burials. In previous testing, within the project corridor lands, no burials were found. In the unlikely event that burials, or any human remains, are encountered during fieldwork, State and Federal law on treatment of burials will be complied with.

---

## Section 6 Sampling Strategy

---

### 6.1 Archaeologist Observation of Geotechnical Testing

The HHCTCP will involve geotechnical testing (some preliminary testing has already occurred). Typically this will involve coring but larger excavations may be indicated in some special cases. We are recommending that geotechnical testing in potentially sensitive areas, specifically within known Land Court Awards, known historic properties, and within 100 m of streams or the sea, be observed by an archaeologist as part of the archaeological inventory survey program. An archaeologist would document sediments from the surface to the water table or to a depth below any possible cultural deposits. Any significant finds during this geotechnical testing would be understood as “previously identified.”

The documentation of any culture bearing strata within the geotechnical testing would suggest the appropriateness of additional subsurface testing (of neighboring column foundations, stations, or ancillary facilities) as a supplemental part of the archaeological inventory survey program. The specifics of any additional testing resulting from observations of geotechnical testing results would be determined in consultation with the State Historic Preservation division and the City and County of Honolulu.

It is recommended that this approach of archaeologist observation of geotechnical testing in sensitive areas be a standard part of the inventory surveys for subsequent phases of the HHCTCP.

### 6.2 Ground Penetrating Radar

Ground Penetrating Radar (GPR) will be employed along the southwestern portion of Construction Phase I of the Honolulu High-Capacity Transit Corridor Project (HHCTCP) alignment, extending from the proposed East Kapolei Station to the proposed maintenance and storage facility situated near the junction of the HHCTCP alignment with Farrington Highway. This approximately 1 km (0.6 mi) stretch of the HHCTCP alignment will be inspected for the presence of limestone bedrock existing beneath surface sediments down to a depth of 3 m (10 ft).

Additionally, all areas chosen for subsurface testing will be first surveyed with GPR. GPR will also be employed at select locations of additional proposed support columns (above and beyond those locations selected for subsurface testing), constituting minimally a 20% sample of the total number of support columns estimated for Construction Phase I of the HHCTCP alignment. Sample areas will be focused within areas where LCAs are located. GPR investigations will attempt to locate subsurface anomalies which may correspond to subsurface cultural deposits, buried building foundations, and human burials.

### 6.3 Excavation Sampling Strategy

The proposed sampling strategy has been developed in consideration of soil types, natural geographic features, historic records (particularly Land Commission Award Data), the results of previous archaeological studies in the vicinity, the results of consultation with the Native

Hawaiian community, an assessment of the impact of prior land development, and a consideration of safety concerns for actually carrying out the archaeological work.

### 6.3.1 Excavation Sampling Strategy – Park-and-Ride and Maintenance Facilities

This plan addresses six proposed park-and-ride and maintenance facilities at five general locations (the UH West O'ahu location includes two possible 5-acre facilities) summarized in Table 10. Excavation will follow pedestrian survey and ground penetrating radar study. With the exception of the Pearl Highlands Station Park-and-Ride Facility, the probability of significant finds in the vicinity of the other park-and-ride and maintenance facilities is believed to be low.

The first phase of excavation will begin with 16 test trenches (typically 8.0 m x 0.6 m) with the distribution as indicated in Table 10 and shown on relevant figures. An additional phase of testing, if any, will be based on the results of the first phase of testing. Additional testing will occur adjacent to any test trench in which there are significant finds.

Table 10. Proposed Sampling Strategy at Park-and-Ride and Maintenance Facility Locations

Proposed Facility	Acreage	Proposed Approach
East Kapolei Station Park-and-Ride Facility (TMK: 9-1-16:108)	11.8 acres	1 test trench (8 m x 0.6 m). Evaluation of further testing to follow results of first test trench
UH West O'ahu Park-and-Ride facilities (2 locations) (TMK: 9-1-17:4)	10.3 acres total (one 5-acre and one 5.3-acre area)	2 test trenches - 1 test trench (8 m x 0.6 m) in each of the two facilities (minimum total 2). Evaluation of further testing to follow results of first two test trenches.
Maintenance and Storage Facility by Farrington Highway (TMK 9-1-18:1)	40.9 acres	1 test trench (8 m x 0.6 m). Evaluation of further testing to follow results of first test trench.
Maintenance and Storage Facility by Leeward Community College (TMK 9-4-8:10)	43.3 acres	1 test trench (8 m x 0.6 m). Evaluation of further testing to follow results of first test trench
Pearl Highlands Station Park-and-Ride Facility (TMK: 9-6-3: several parcels)	11.2 acres	11 test trenches (typically 8 m x 0.6 m). Evaluation of further testing to follow results of first 11 test trenches.
Total for six facilities	117.5 acres	16 test trenches (typically 8 m x 0.6 m). Evaluation of further testing to follow results of first 15 test trenches.

The proposed initial sample size is small (16 trenches of approximately 4.8 m<sup>2</sup> each for a total of approximately 76.8 m<sup>2</sup> in a total area of 117.5 acres (475,506 m<sup>2</sup>). This initial sample size appears appropriate in consideration of the cultural history, previous archaeological studies and

informant concerns and preliminary consultation with the State Historic Preservation Division. The determination of the extent of additional testing, if any, will be made in consultation with the State Historic Preservation Division on the results of the initial phase of excavation. SHPD staff will be given notice of the proposed initial testing and invited to observe.

It is believed that, in general the impediments to carrying out testing within the proposed park-and-ride and maintenance facility areas will be modest and relatively easy to avoid by off-setting to utility free areas. It is anticipated that the proposed initial sample (16 trenches of approximately 4.8 m<sup>2</sup> each for a total of approximately 76.8 m<sup>2</sup>) at the six proposed park-and-ride and maintenance facilities will be completely achievable. Supplementary testing in adjacent areas will be carried out in the event of significant finds in the initial testing, in consultation with the State Historic Preservation Division.

### **6.3.2 Excavation Sampling Strategy - Stations**

Preliminary consultation with the State Historic Preservation Division and the O'ahu Island Burial Council emphasized the importance of a substantial testing component focused on the location of the seven proposed transit stations in Construction Phase I (Table 11). This was emphasized because the stations will be locations of a relatively high density of subsurface impacts and also because the stations may prove more problematic to re-locate owing to geographical and engineering constraints. The proposed approach, as summarized in Table 11 (below), is shown on Figures 29 to 35, and is discussed below on a station by station basis from west to east.

#### East Kapolei Station

The East Kapolei Station (Figure 29) lies on lands previously evaluated by the SHPD (1994 SHPD letter of 1994; Doc No 9408TD01) and addressed in previous archaeological studies (Spear 1996; Hammatt and Chiogioji 1997a & 1997b) (see Figure 27). Additionally the vicinity has been addressed under an on-going archaeological monitoring program that to date has identified only modest sugar plantation infrastructure. The probability of significant finds in the vicinity of the East Kapolei Station is believed to be low. One trench, approximately 8 m long by 60 cm wide is proposed in the west portion of the station (Figure 29) indicated for construction subsurface impacts. This is primarily as a double check of stratigraphy. The trench will be excavated as deep as prudent. The need for further testing will be determined in consultation with the State Historic Preservation Division on the basis of the results of the ground penetrating radar work and the first test trench.

#### UH West O'ahu Station

The University of Hawai'i West O'ahu Station (Figure 30) lies on lands previously evaluated by the SHPD (1994 SHPD letter of 1994; Doc No 9408TD01) and addressed in previous archaeological studies (Spear 1996; Hammatt and Chiogioji 1997a & 1997b) (see Figure 27). Additionally the vicinity has been addressed under an on-going archaeological monitoring program that to date has identified only modest sugar plantation infrastructure. The probability of significant finds in the vicinity of the UH West O'ahu Station is believed to be low. One trench, approximately 8 m long by 60 cm wide is proposed in the northwest portion of the station (Figure 30) indicated for construction subsurface impacts. This is primarily as a double check of

Table 11. Proposed Sampling Strategy at Stations and Column Foundation Locations

<b>Location</b>	<b>Number (Size) of Proposed Test Trenches</b>
East Kapolei Station	1 (8m x 0.6 m)
UH West O'ahu Station	1 (8m x 0.6 m)
Ho'opili Station	1 (8m x 0.6 m)
West Loch Station	13 (ranging from 4 to 8 m in length and 60 cm in width)
Waipahu Transit Center Station	11 (ranging from 4 to 8 m in length and 60 cm in width; as well as 3 column foundations in the immediate vicinity)
Leeward Community College Station	3 (8m x 0.6 m)
Pearl Highlands Station (note: testing in the Park & Ride is addressed in Table 10)	2 (2.5 m by 2.5 m); as well as 11 trenches in the adjacent park-and-ride and 7 column foundations in the immediate vicinity
Column foundations in Construction Sheet 1	1 out of 20 (selection somewhat arbitrary)
Column foundations in Construction Sheet 2	1 out of 17 (selection somewhat arbitrary)
Column foundations in Construction Sheet 3	1 out of 18 (selection somewhat arbitrary)
Column foundations in Construction Sheet 4	1 out of 16 (selection somewhat arbitrary)
Column foundations in Construction Sheet 5	1 out of 17 (selection somewhat arbitrary)
Column foundations in Construction Sheet 6	1 out of 17 (selection somewhat arbitrary)
Column foundations in Construction Sheet 7	4 (2.5 m by 2.5 m) out of 16
Column foundations in Construction Sheet 8	2 (2.5 m by 2.5 m) out of 19
Column foundations in Construction Sheet 9	2 (2.5 m by 2.5 m) out of 18
Column foundations in Construction Sheet 10	3 (2.5 m by 2.5 m) out of 18
Column foundations in Construction Sheet 11	5 (2.5 m by 2.5 m) out of 18
Column foundations in Construction Sheet 12	2 (2.5 m by 2.5 m) out of 17
Column foundations in Construction Sheet 13	1 out of 24 (selection somewhat arbitrary)
Column foundations in Construction Sheet 14	1 out of 14 (selection somewhat arbitrary)
Column foundations in Construction Sheet 15	7 (2.5 m by 2.5 m) out of 12 (does not include testing at station or park & ride facility)
Column foundations in Construction Sheet 16	1 out of 14 (selection somewhat arbitrary)
Column foundations in Construction Sheet 17	1 out of 14 (selection somewhat arbitrary)
Total	35 column supports*; 32 trenches at stations

\* subject to consideration of utility locations and other specific constraints; a minimum of 28 column foundations will be tested

stratigraphy. The trench will be excavated as deep as prudent. The need for further testing will be determined in consultation with the State Historic Preservation Division on the basis of the results of the ground penetrating radar work and the first test trench.

#### Ho'opili Station

The Ho'opili Station lies on lands previously addressed in an archaeological inventory survey (O'Hare et al. 2006) reviewed and accepted by the SHPD letter of November 3, 200 (Log No. 2006.3670, Doc. No. 0611amj01) (see Figure 27). The probability of significant finds in the vicinity of the Ho'opili Station is believed to be low. One trench, approximately 8 m long by 60 cm wide is proposed in the northwest portion of the station (Figure 31) indicated for construction subsurface impacts. This is primarily as a double check of stratigraphy. The trench will be excavated as deep as prudent. The need for further testing will be determined in consultation with the State Historic Preservation Division on the basis of the results of the ground penetrating radar work and the first test trench.

#### West Loch Station

The West Loch Station is in an area that has not been subject to prior archaeological study (see Figure 28) and that includes a number of LCAs to the south and west (Figure 32 and particularly see Figure 45). Substantial archaeological inventory survey testing is proposed of the ground level stations to the northwest (6 proposed test trenches) and southeast (7 proposed test trenches) for a total of 13 proposed test trenches (ranging from 4 to 8 m in length and 60 cm in width). The need for further testing will be determined in consultation with the State Historic Preservation Division on the basis of the results of the first test trenches.

#### Waipahu Transit Center Station

The Waipahu Transit Center Station is in an area that has not been subject to prior archaeological study (see Figure 28) and that includes a number of LCAs to the west and east (Figure 33 and particularly see Figure 48). Substantial archaeological inventory survey testing is proposed including 100% testing of five median column foundations in the immediate vicinity and substantial testing of the ground level stations to the northwest (5 proposed test trenches) and southeast (6 proposed test trenches) for a total of 11 proposed test trenches (ranging from 4 to 8 m in length and 60 cm in width). The need for further testing will be determined in consultation with the State Historic Preservation Division on the basis of the results of the first test trenches.

#### Leeward Community College Station

The Leeward Community College Station is in an area that has not been subject to prior archaeological study. Neighboring studies (Rechtman and Henry 1998; Rainalter et al. 2006) have indicated a relatively low level of concern for this vicinity. The probability of significant finds in the vicinity of the Leeward Community College Station is believed to be low. Three spaced trenches, each approximately 8 m long by 60 cm wide are proposed in the central platform and station plaza portion of the station (Figure 34) indicated for construction subsurface impacts. This is primarily as a double check of stratigraphy. The trenches will be excavated as deep as prudent. The need for further testing will be determined in consultation with the State Historic Preservation Division on the basis of the results of the first test trenches.

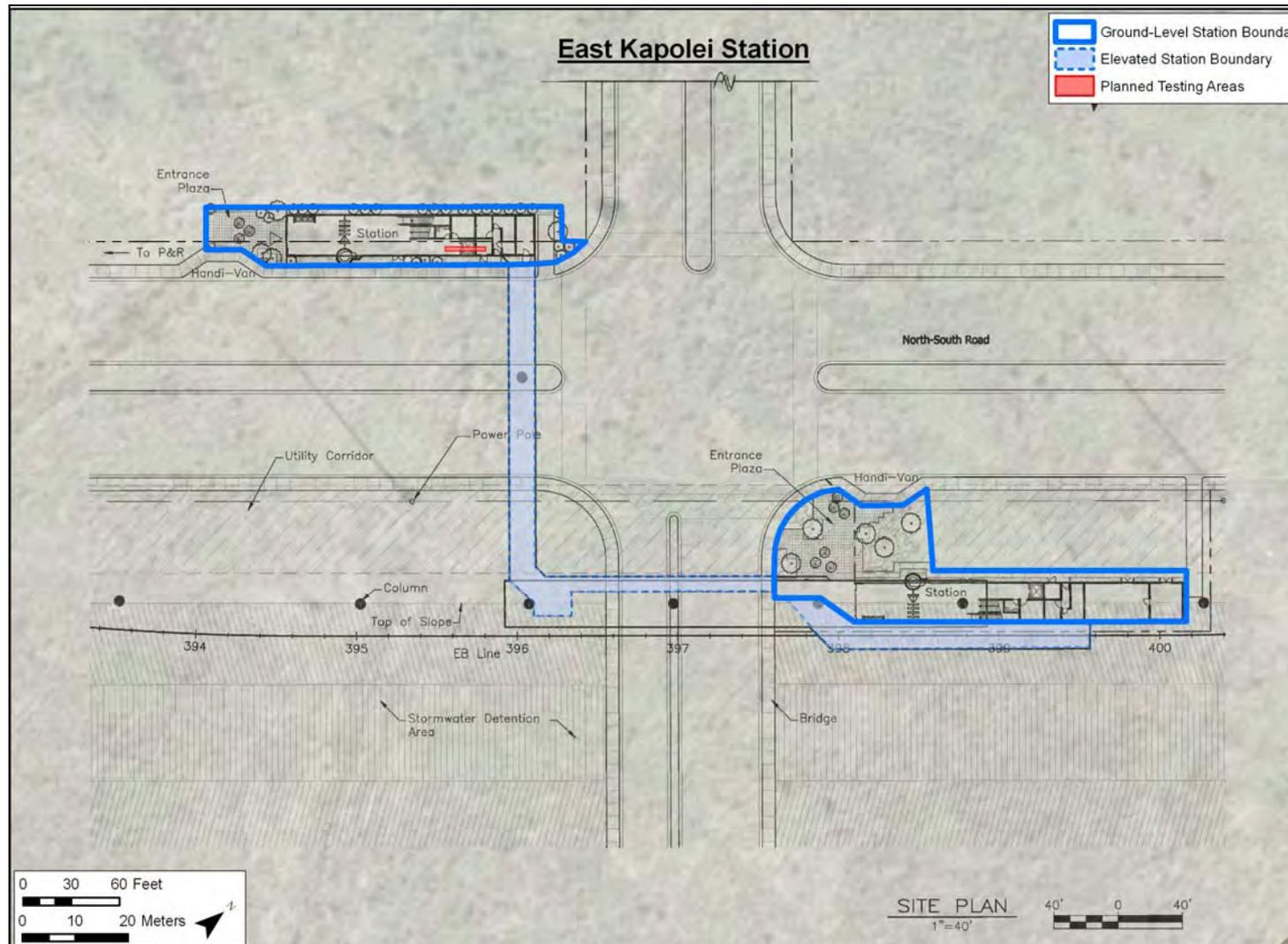


Figure 29. East Kapolei Station proposed archaeological inventory survey sampling (one trench in west portion of station)

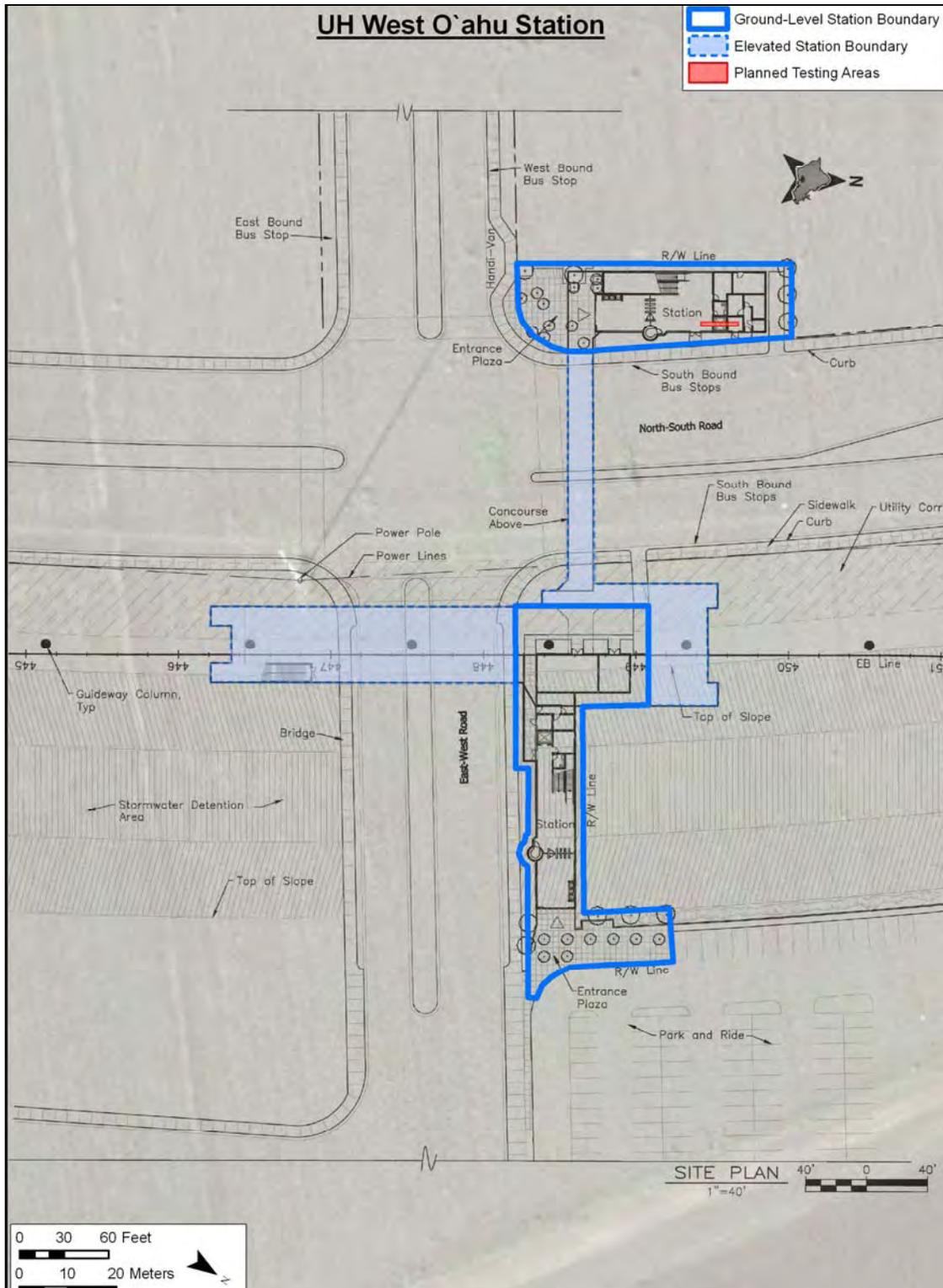


Figure 30. UH West O'ahu Station proposed archaeological inventory survey sampling (one trench in west portion of station)

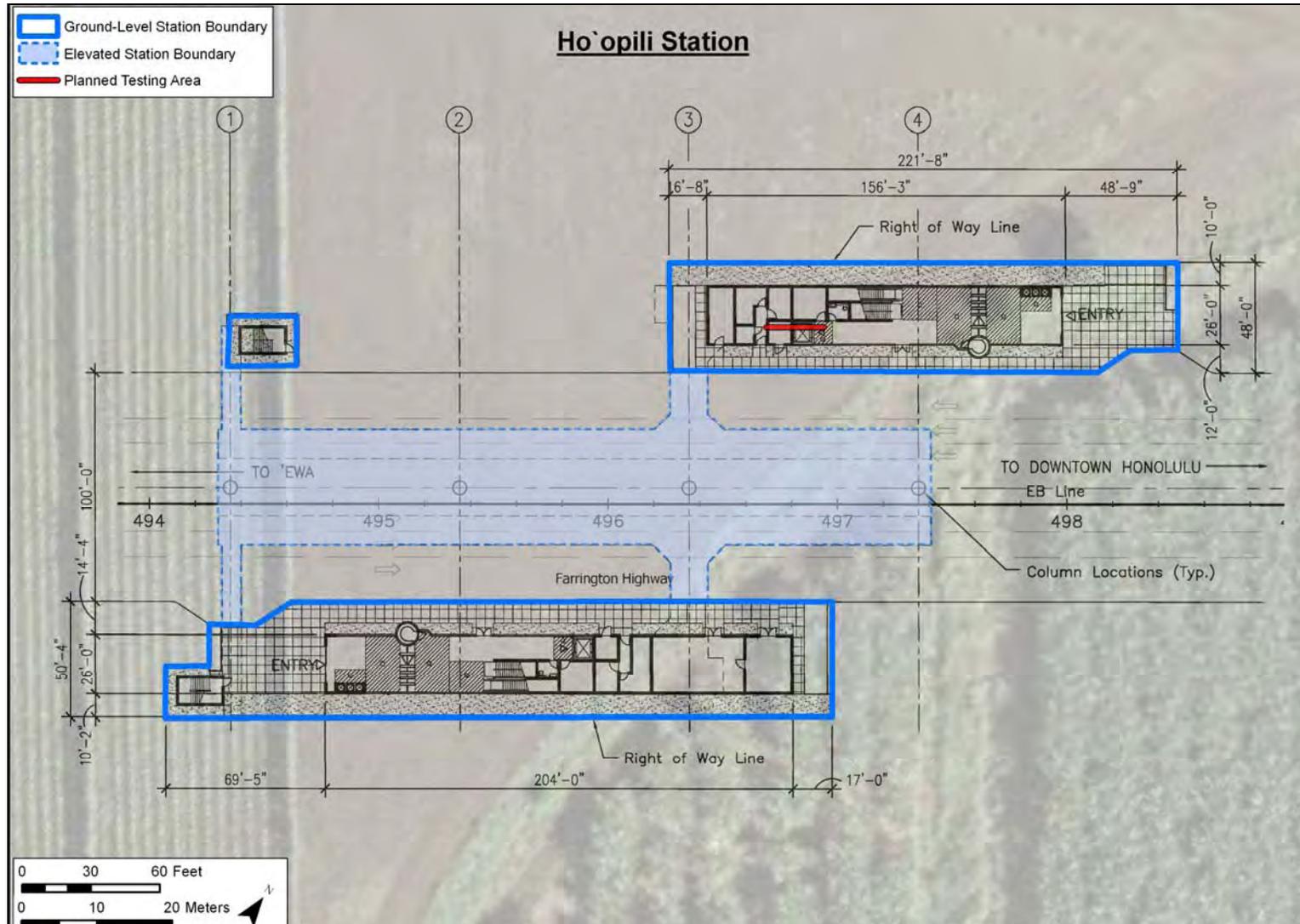


Figure 31. Ho'opili Station proposed archaeological inventory survey sampling (one trench in west portion of station)

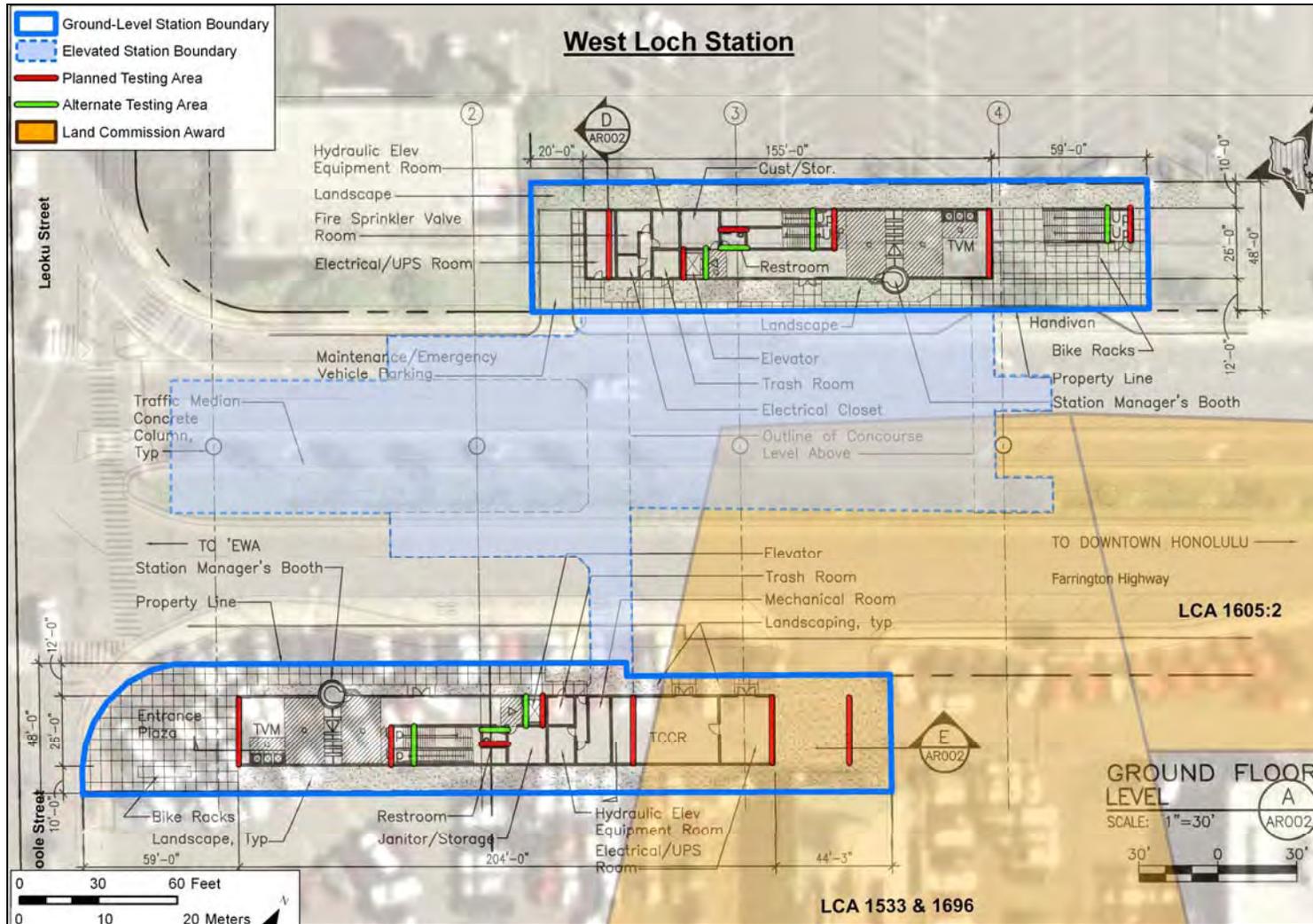


Figure 32. West Loch Station proposed archaeological inventory survey sampling (13 proposed trench locations – constraints permitting)

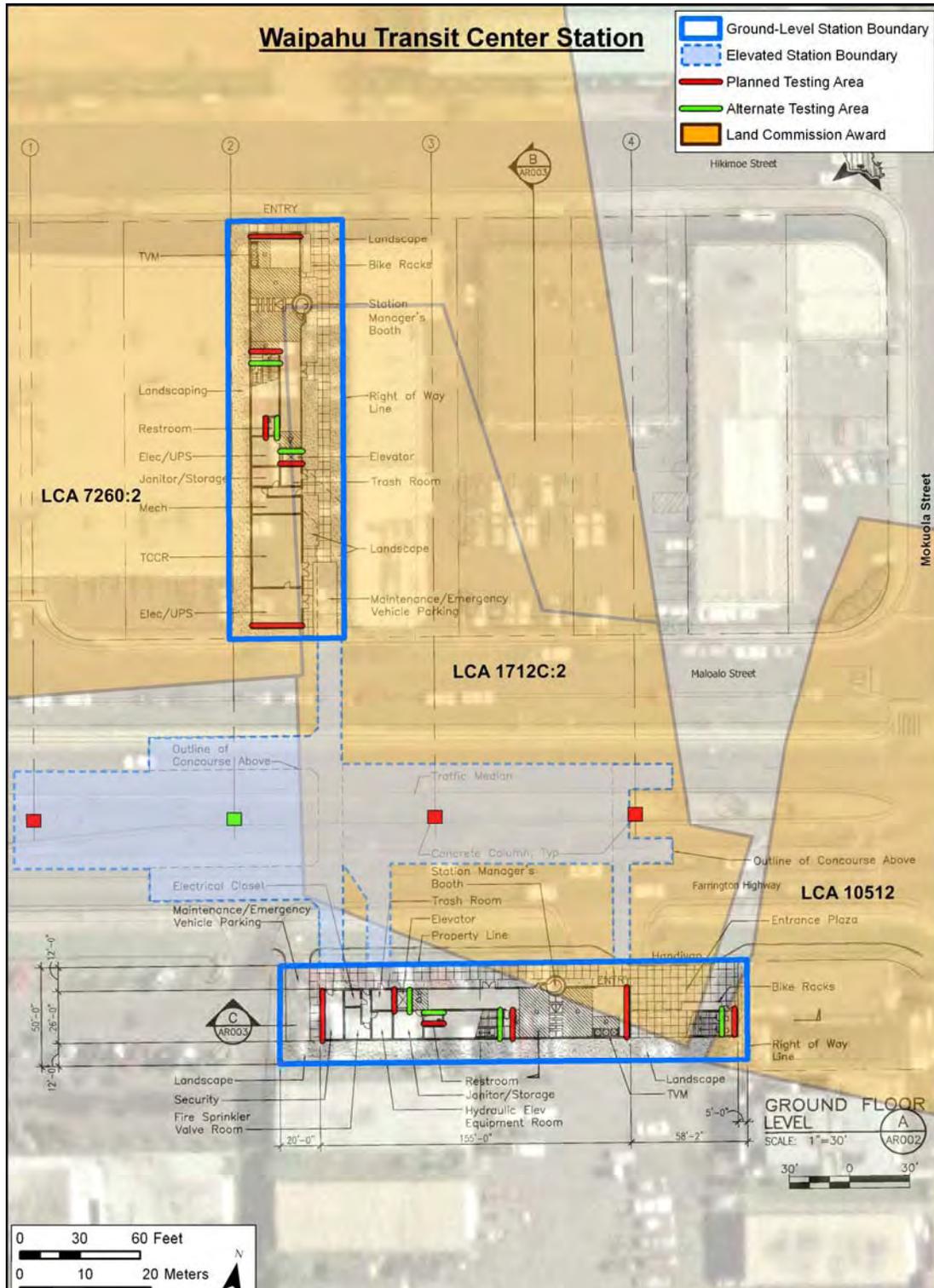


Figure 33. Waipahu Transit Center Station proposed archaeological inventory survey sampling (11 proposed trench locations – constraints permitting)

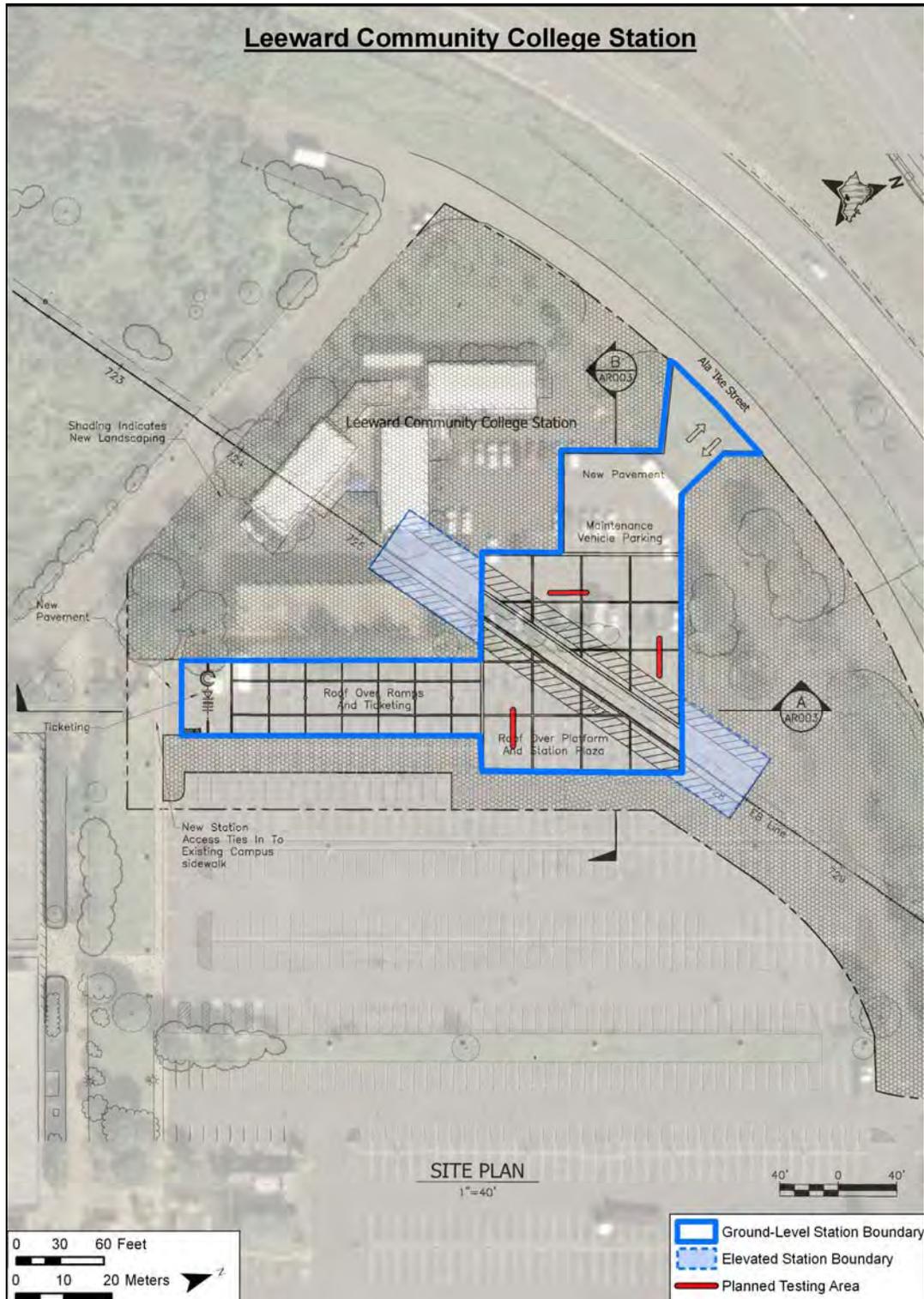


Figure 34. Leeward Community College Station proposed archaeological inventory survey sampling (3 spaced trenches in northwest central portion of station)

### Pearl Highlands Station

The Pearl Highlands Station is in an area that has not been subject to prior archaeological study (see Figure 28) and that includes a number of LCAs to the west and east (Figure 35 and particularly see Figure 52). Substantial archaeological inventory survey testing is proposed including 100% testing of seven column foundations in the immediate vicinity, 11 test trenches in the park-and-ride area and 2 test trenches of the station per se (1 in the entry court, and 1 in the pedestrian concourse).

The need for further testing will be determined in consultation with the State Historic Preservation Division on the basis of the results of the first test trenches.

It is believed that, in general the impediments to carrying out testing within the seven proposed transit station areas will be modest and relatively easy to avoid by off-setting to utility free areas (specific preferred alternate testing locations are indicated on the relevant figures). It is anticipated that the proposed sample (32 trenches of approximately 4.8 m<sup>2</sup> each for a total of approximately 153.6 m<sup>2</sup>) at the seven proposed transit station areas will be achievable. Supplementary testing in adjacent areas will be carried out in the event of significant finds in the initial testing in consultation with the State Historic Preservation Division.

#### **6.3.3 Excavation Sampling Strategy – Column Foundation Locations**

As summarized in Table 11 (above) and the following Figures 38 to 54 (see Figures 36 & 37 for a key to the column foundation maps), some 35 column foundation locations are recommended for consideration for the first phase of archaeological inventory survey testing subject to further consideration of utility locations and other specific constraints. The selection is primarily based on the relationship to commoner (*kuleana*) Land Commission Awards as indicators of areas of intensive traditional Hawaiian activity. A secondary factor in selection was consideration of the proximity of landscape features – particularly streams.

In general, the approach would be to locate on the ground as precisely as possible the footprint of the proposed column foundation – which would be addressed as a square - 2.5 m on a side (6.25 m<sup>2</sup>). Ground penetrating radar and other “toning” procedures would be used to identify as much as possible the presence of utilities. If utilities (and utility-related ground disturbance) were identified as probably present then the proposed testing site would not be chosen. If the proposed testing site appears to be free of utilities, then test area preparation would typically move forward, typically with saw cutting of asphalt and/or concrete in a square of 2.5 m on a side. As many as 20% of the posited 35 column foundation locations for testing could be eliminated on the basis of 1) concerns over traffic (both as safety risk and the impediment testing would cause to vehicular flow) and 2) other significant impediments to the work such as trees, hedges, fences, guard rails, thick concrete, etc.)

It should be noted that the constraints of existing utilities are understood to be extraordinarily great. Even where utilities are absent the constraints of traffic and physical impediments (mature trees, guard rails, fences, thick concrete) will often be extraordinarily great. It is anticipated that testing at some of the posited 35 specific column foundation locations will simply not be feasible within a reasonable good faith effort. Offsetting to the nearest adjacent column foundation will be considered in each case where a column foundation location proves not to be feasible but it

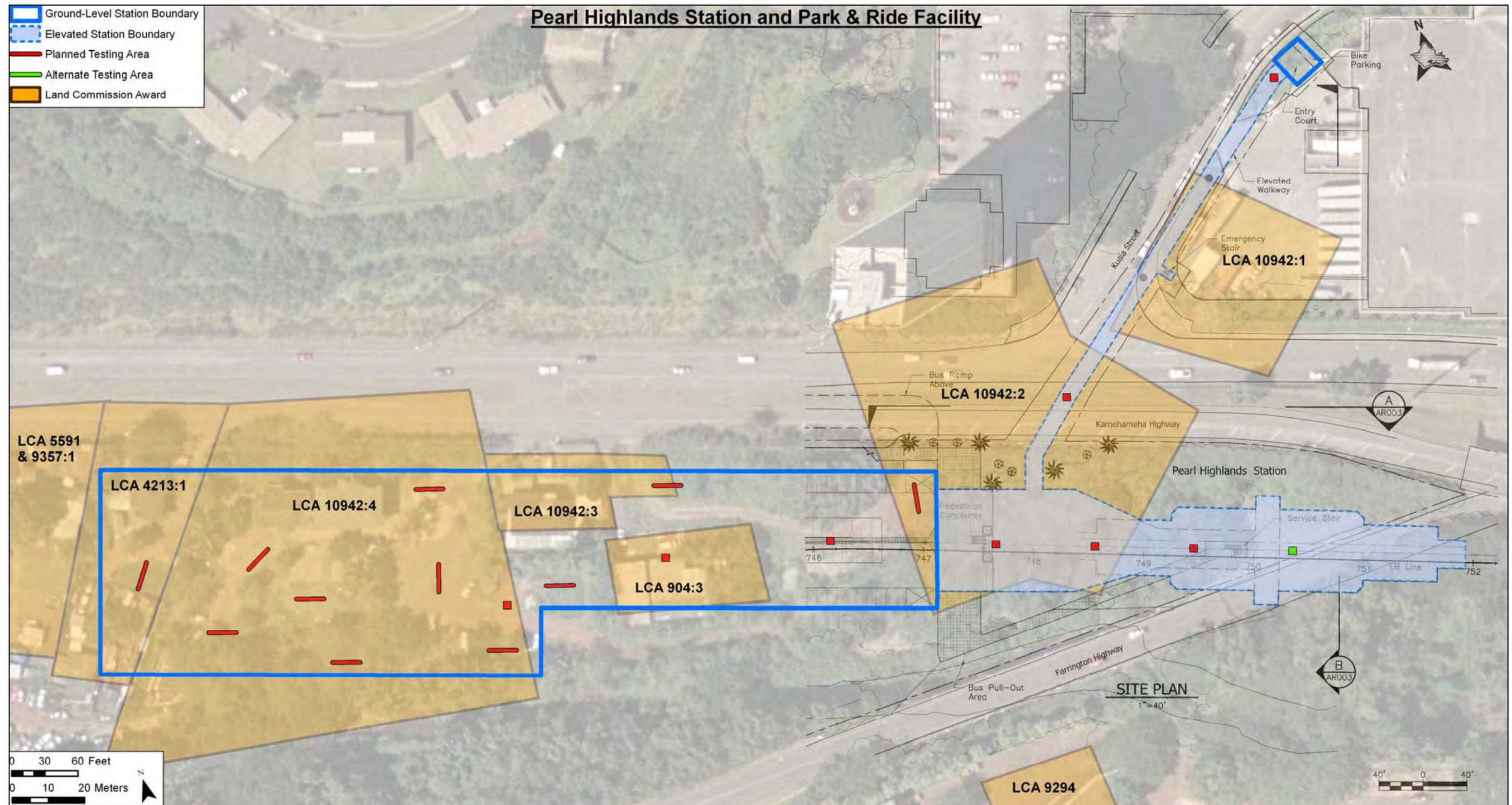


Figure 35. Pearl Highlands Station and Park & Ride Facility proposed archaeological inventory survey sampling (11 proposed trench locations in park-and-ride, 7 column foundations in the immediate area are to be tested, and 2 additional test trenches are to be placed in the station area – constraints permitting)

will often be the case that off-setting the 100+ feet largely removes the rationale for the testing all together. A minimum of 28 approximately 2.5 m<sup>2</sup> on a side (6.25 m<sup>2</sup>) test trenches will be carried out at column foundation locations.

Supplementary testing in adjacent areas will be carried out in the event of significant finds in the initial testing in consultation with the State Historic Preservation Division. This will include testing of the two closest column foundations - subject to consideration of utility locations and other specific constraints.

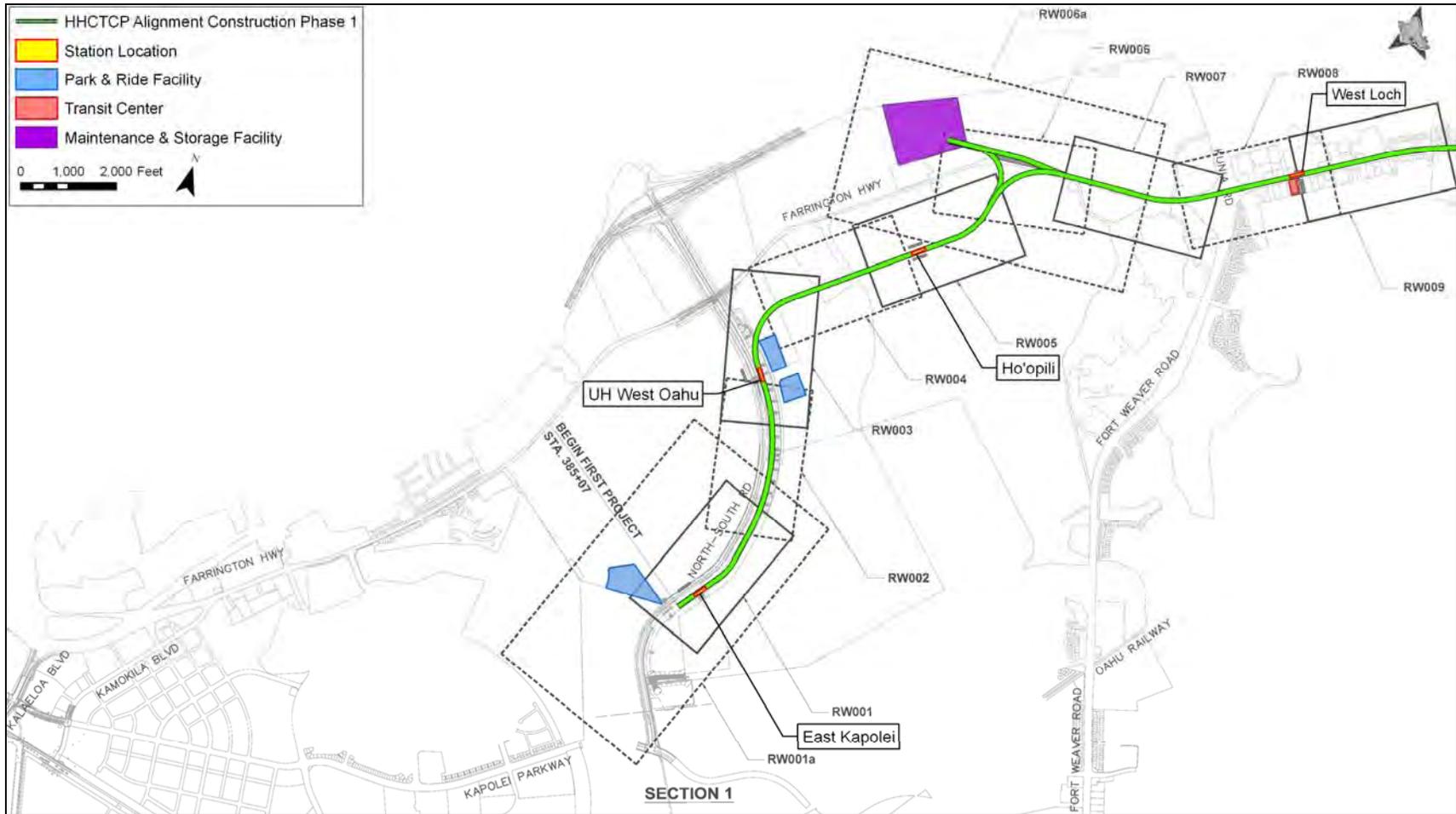


Figure 36. Key to the following maps of column foundations recommended for testing in the western portion of Construction Phase 1

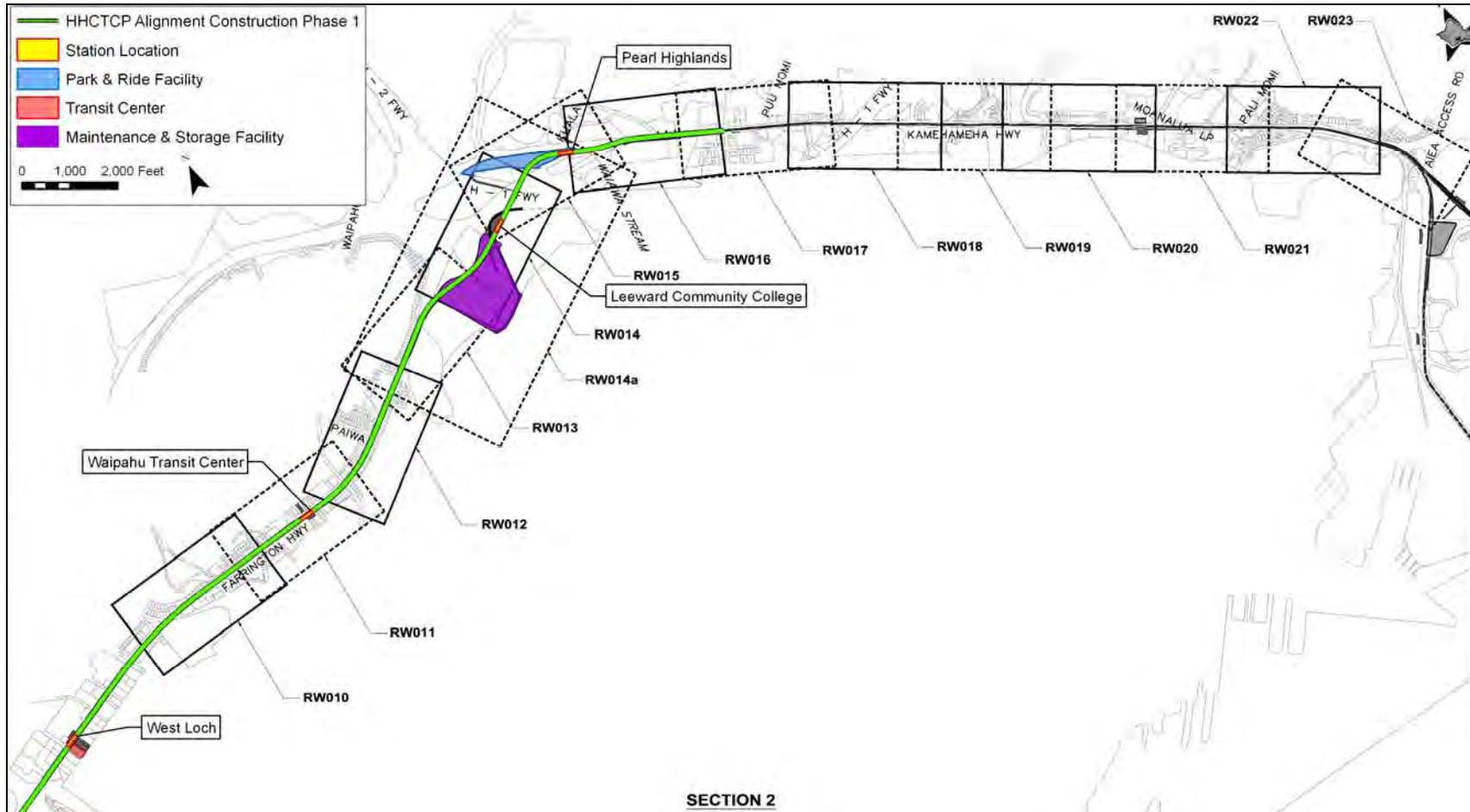


Figure 37. Key to the following maps of column foundations recommended for testing in the eastern portion of Construction Phase 1

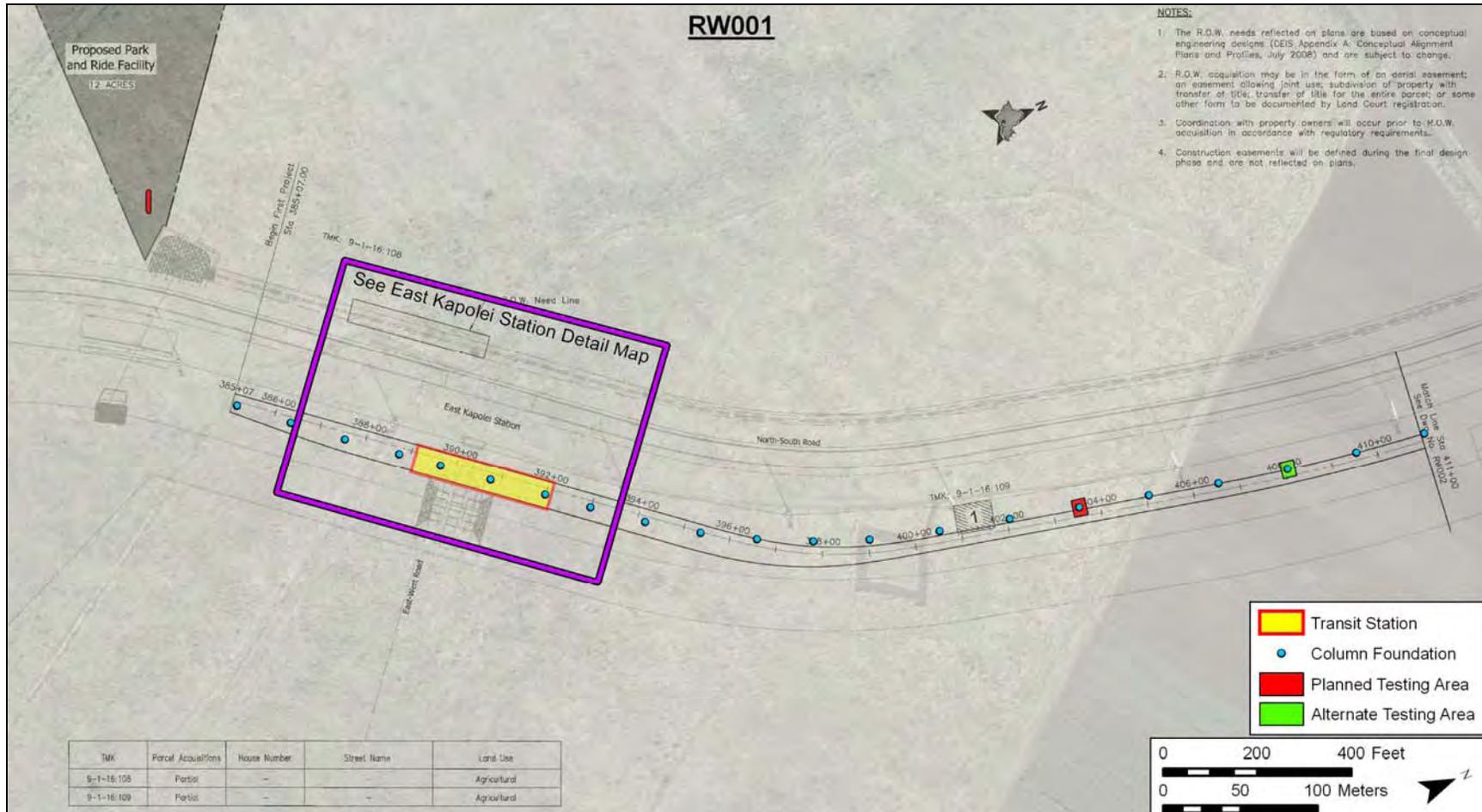


Figure 38. Schematic Plan Construction Phase I Sheet RW001 extending from Station 385+07 (Start Construction) to 411+00 including East Kapolei Station (see Figure 29) and an associated proposed 12-acre park-and-ride facility (at upper left) (proposed subsurface testing is one trench at the park-and-ride facility, one trench at the station and excavation of the column foundation at approximately 404+00)



Figure 39. Schematic Plan Construction Phase I Sheet RW002 extending from Station 411+00 to 435+00 (proposed subsurface testing is excavation of the column foundation at approximately 417+00)

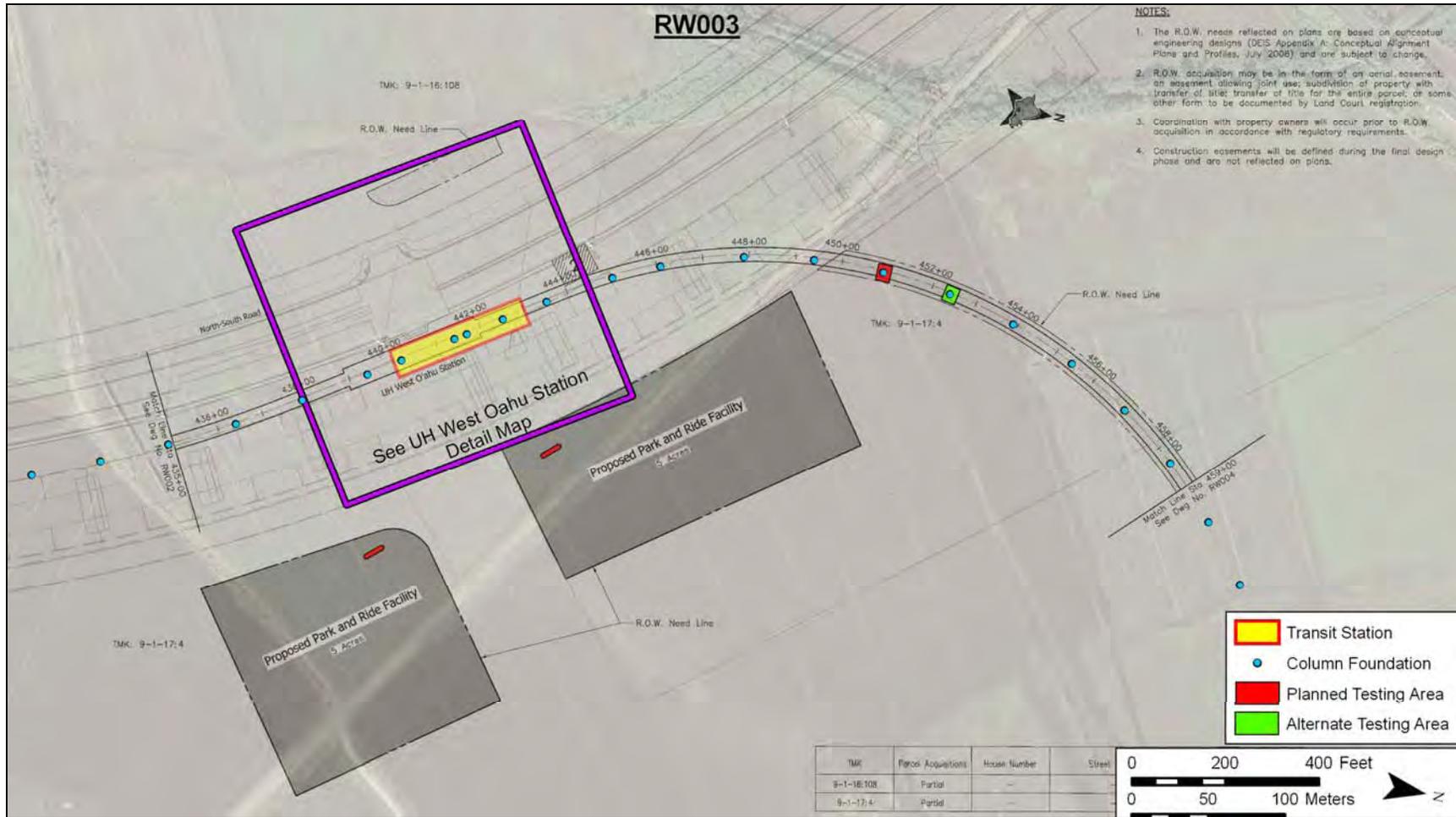


Figure 40. Schematic Plan Construction Phase I Sheet RW003 extending from Station 435+00 to 459+00, including U H West O’ahu Station (see Figure 30), and two associated proposed 5-acre park-and-ride facilities (proposed subsurface testing is one trench at each of the two park-and-ride facilities, one trench at the station and excavation of the column foundation at approximately 451+00)



Figure 41. Schematic Plan Construction Phase I Sheet RW004 extending from Station 459+00 to 483+00 (proposed subsurface testing is excavation of the column foundation at approximately 470+50)



Figure 42. Schematic Plan Construction Phase I Sheet RW005 extending from Station 483+00 to 507+00 and including Ho‘opili Station (see Figure 31) (proposed subsurface testing includes one trench at the Ho‘opili Station and excavation of the column foundation at approximately 502+30)

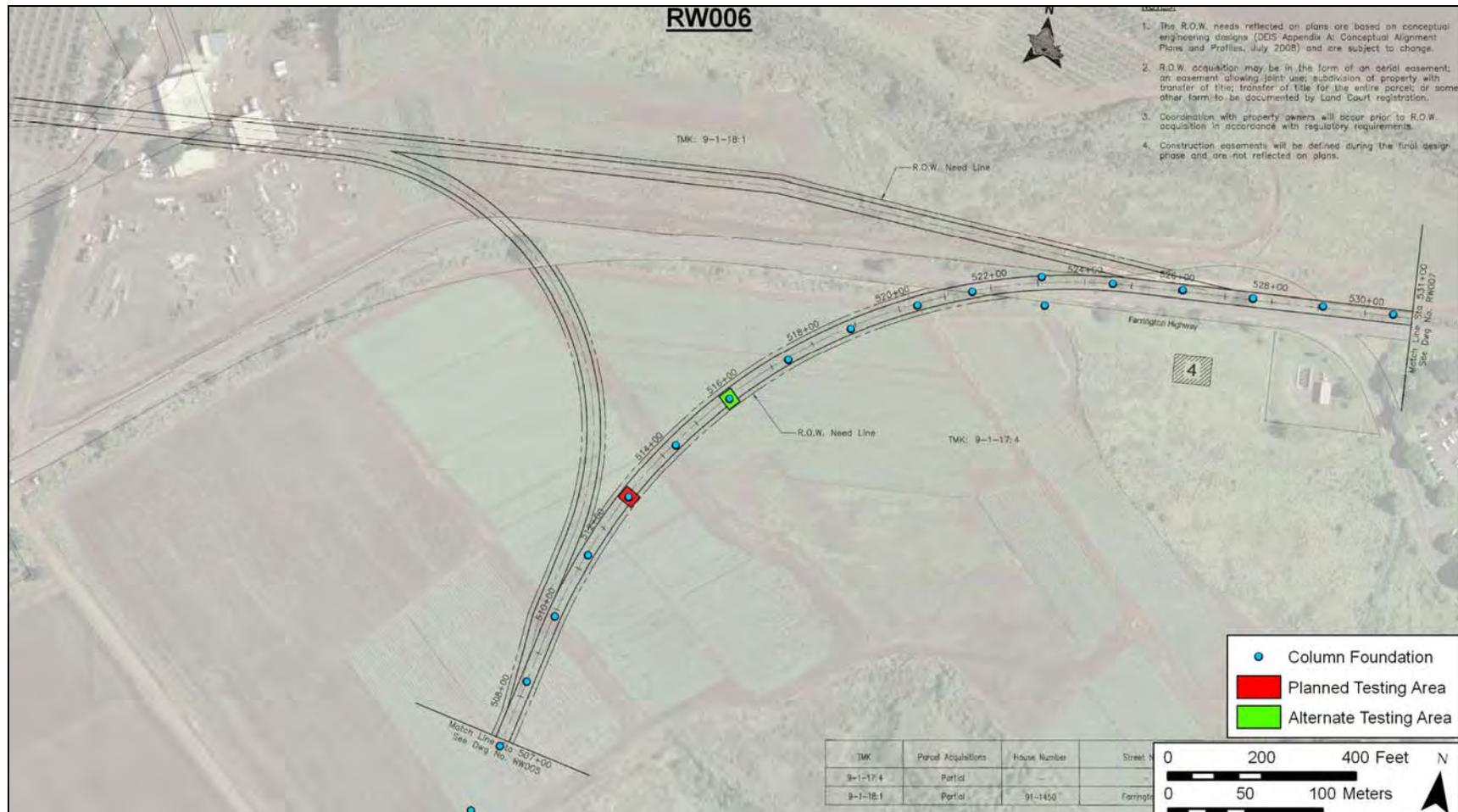


Figure 43. Schematic Plan Construction Phase I Sheet RW006 extending from Station 507+00 to 531+00 and a western spur to a proposed 41-acre Maintenance and Storage Facility (proposed subsurface testing includes one trench at the proposed maintenance facility – to the northwest off map – and excavation of the column foundation at approximately 513+00)

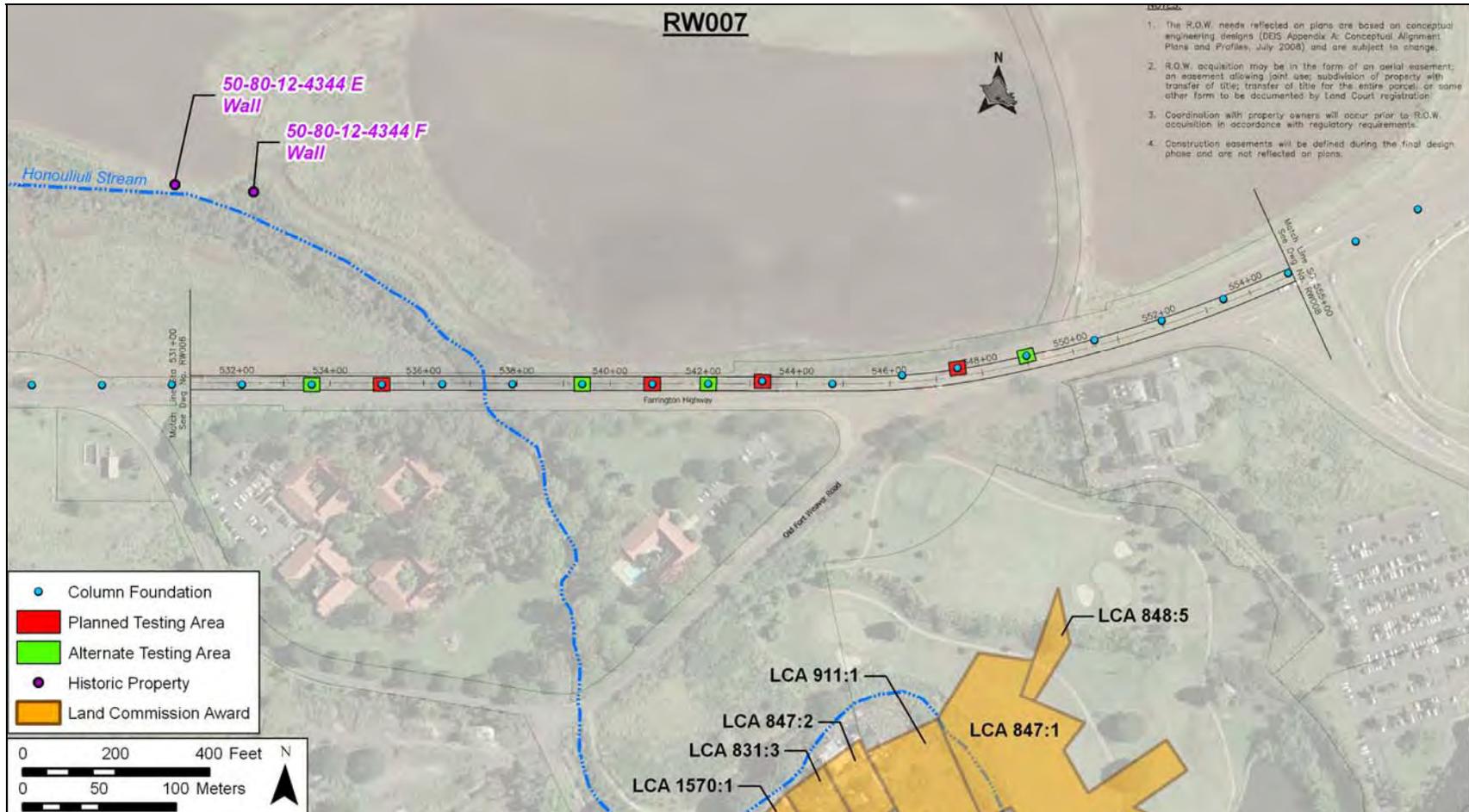


Figure 44. Schematic Plan Construction Phase I Sheet RW007 extending from Station 531+00 to 555+00 (proposed areas for testing are 4 column foundations at approximately 535+00, 541+00, 543+00 and 547+50 – constraints permitting)

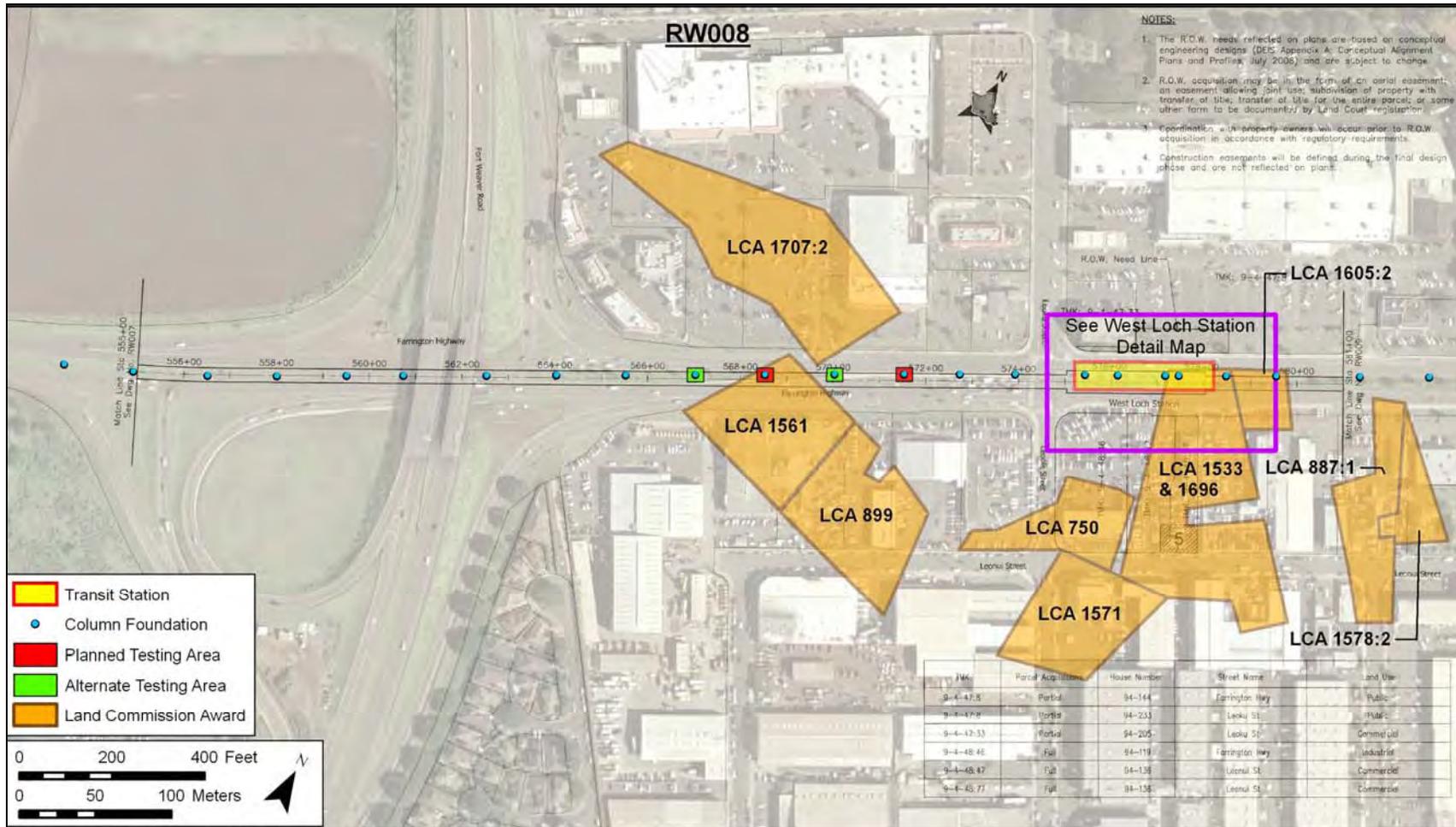


Figure 45. Schematic Plan Construction Phase I Sheet RW008 extending from Station 555+00 to 581+00, and including West Loch Station (see Figure 32), (and proposed areas for testing are 2 column foundations within sheet at approximately 568+50 and 571+50 – constraints permitting)

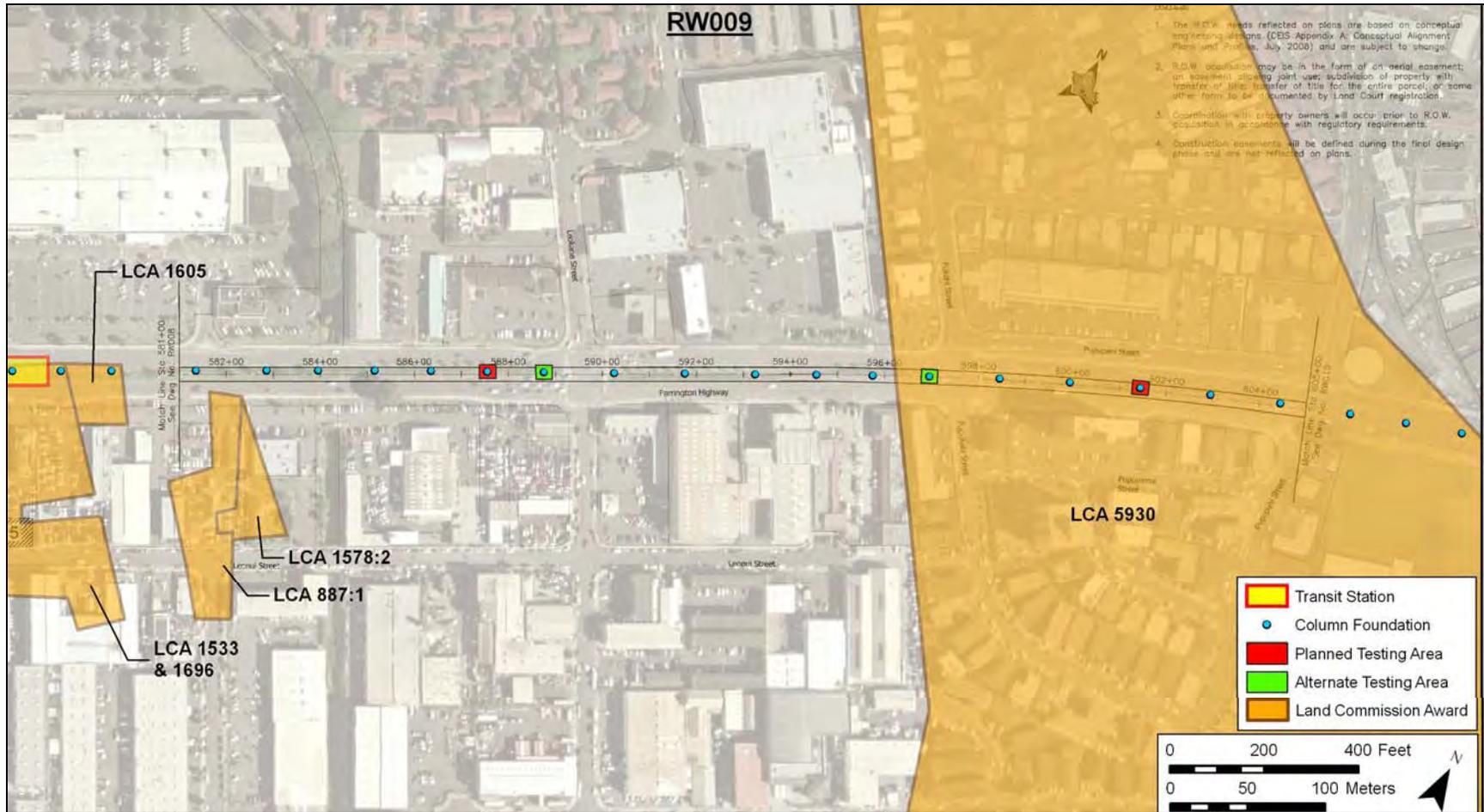


Figure 46. Schematic Plan Construction Phase I Sheet RW009 extending from Station 581+00 to 605+00 (proposed areas for testing are 2 column foundations within sheet at approximately 587+50 and 588 + 80 – constraints permitting)

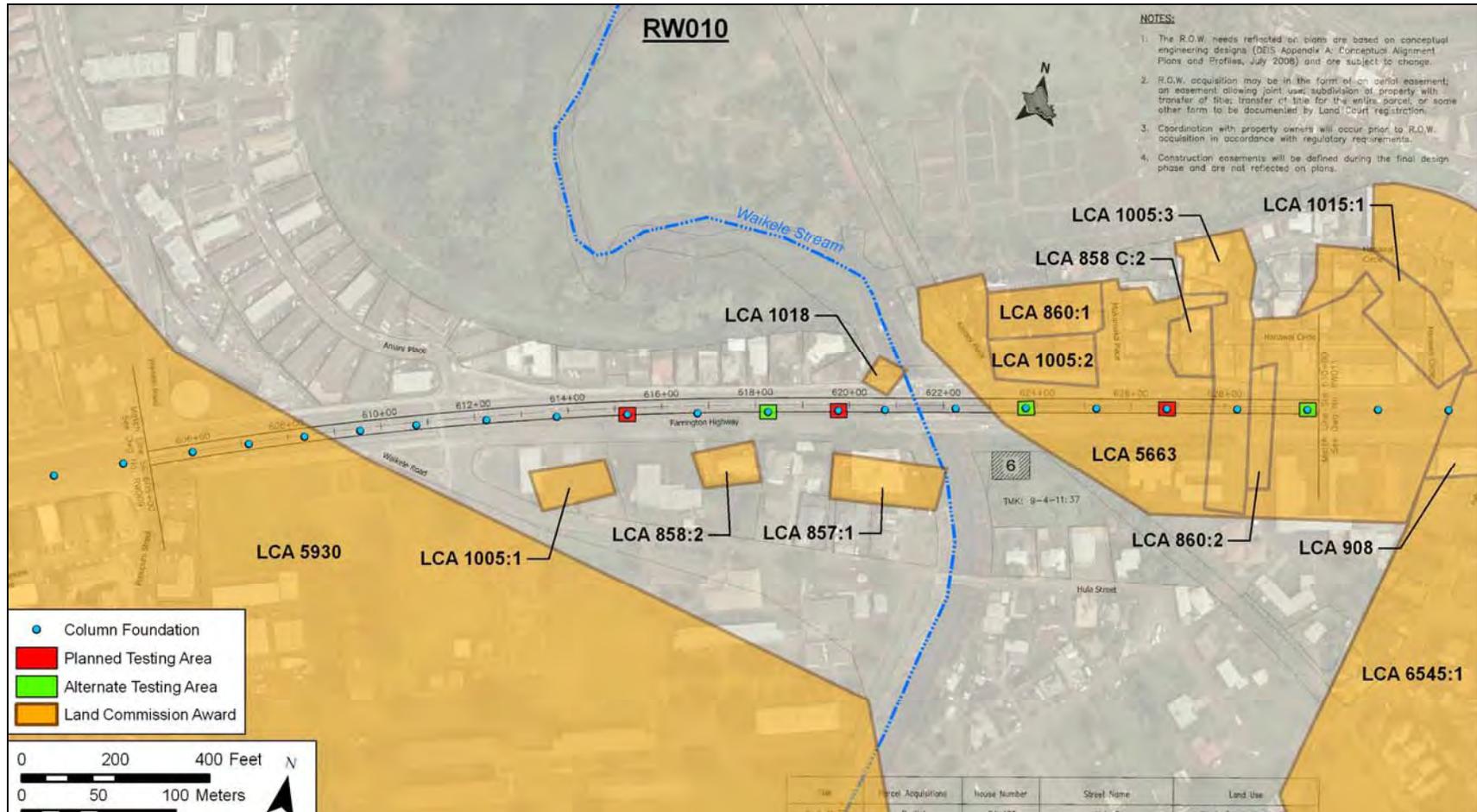


Figure 47. Schematic Plan Construction Phase I Sheet RW010 extending from Station 605+00 to 630+00 (proposed areas for testing are 3 column foundations within sheet at approximately 615+20, 619+80 and 626+80 – constraints permitting)

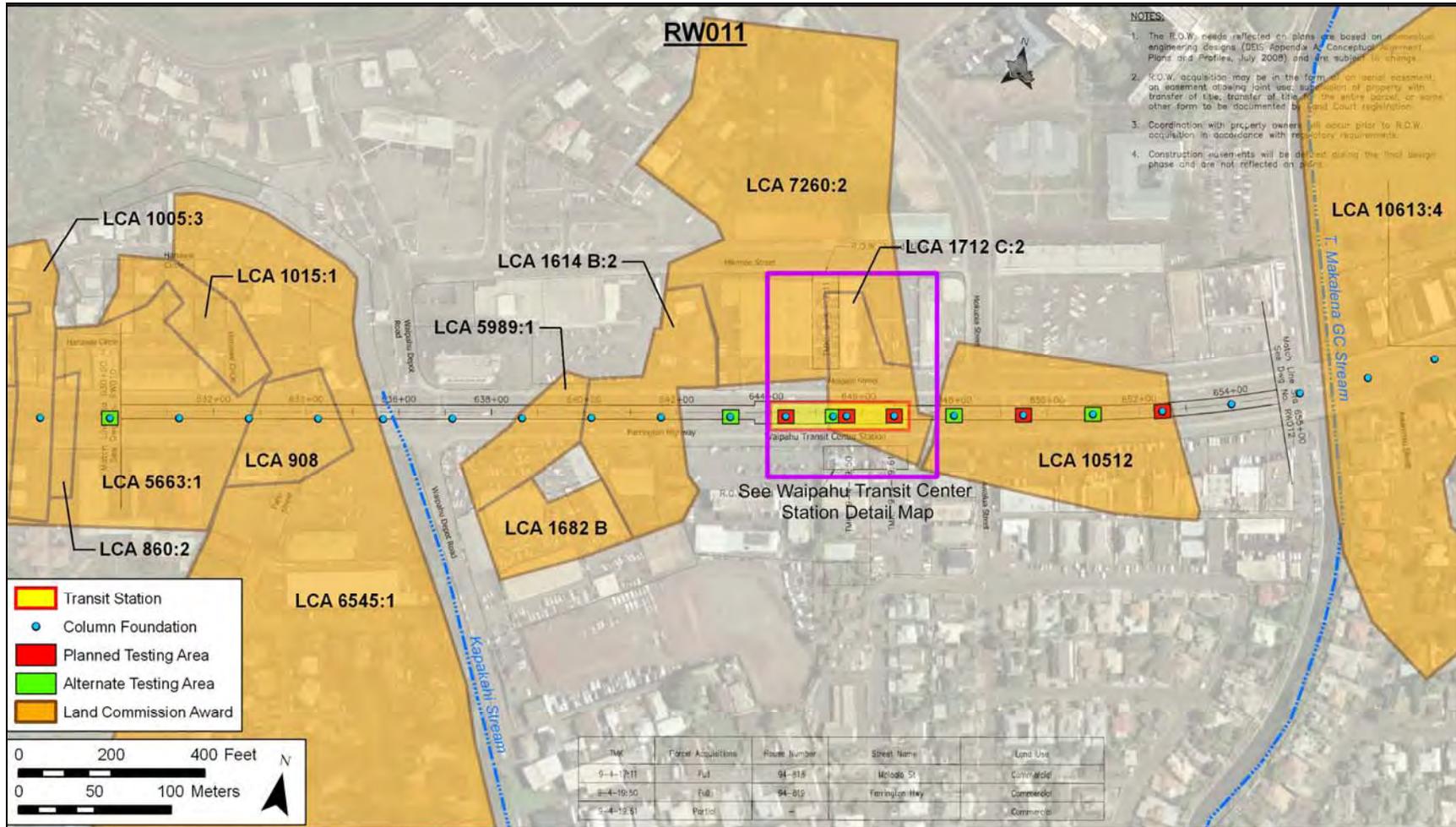


Figure 48. Plan Construction Phase I Sheet RW011 extending from Station 630+00 to 655+00 and including the Waipahu Transit Center Station (see Figure 33) (proposed areas for testing are 5 column foundations within sheet at approximately 644+50, 645+70, 647+00, 649+50 and 652+50 – constraints permitting)

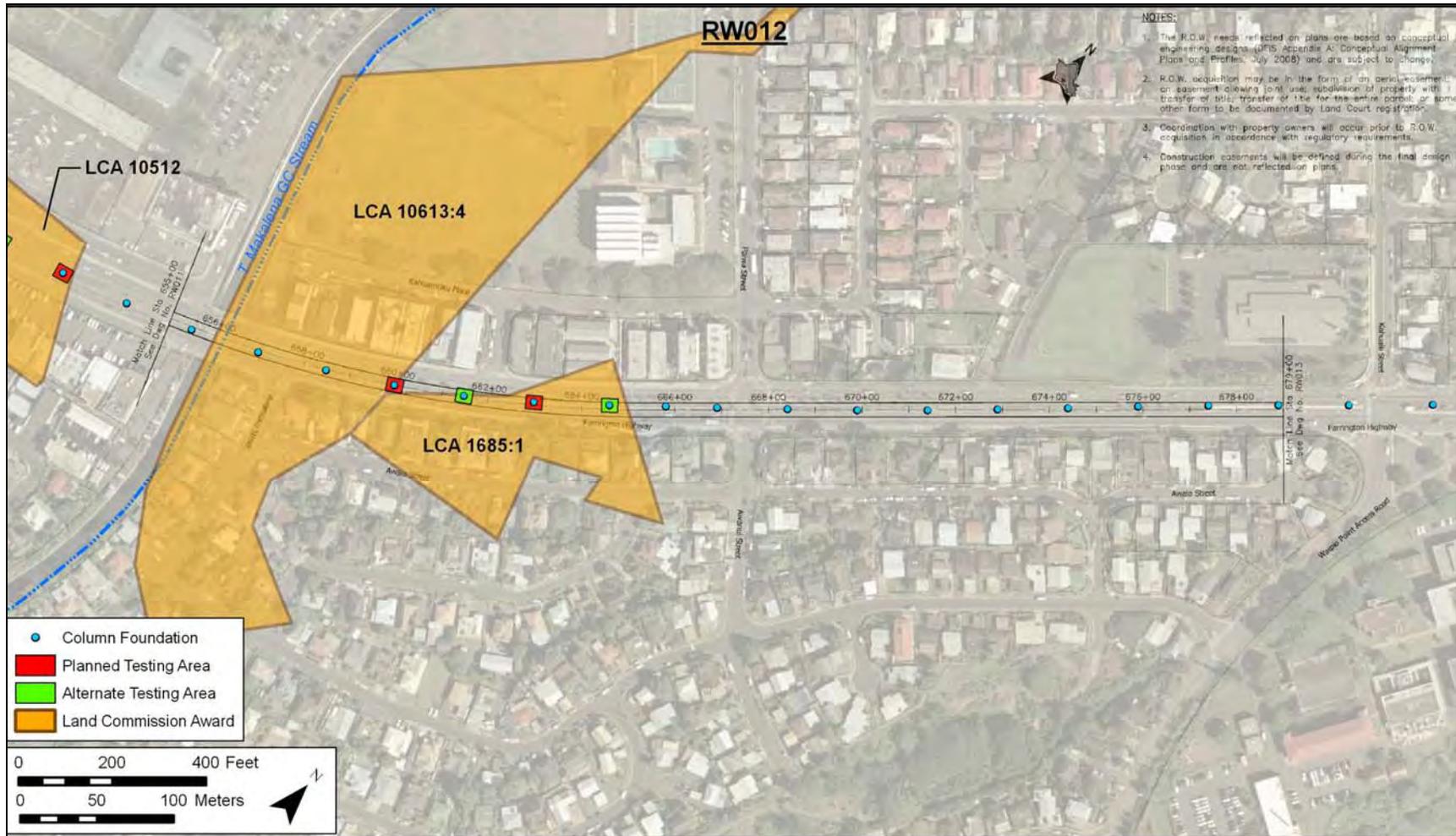


Figure 49. Plan Construction Phase I Sheet RW012 extending from Station 655+00 to 679+00 (proposed areas for testing are 2 column foundations at approximately 660+00 and 663+00)

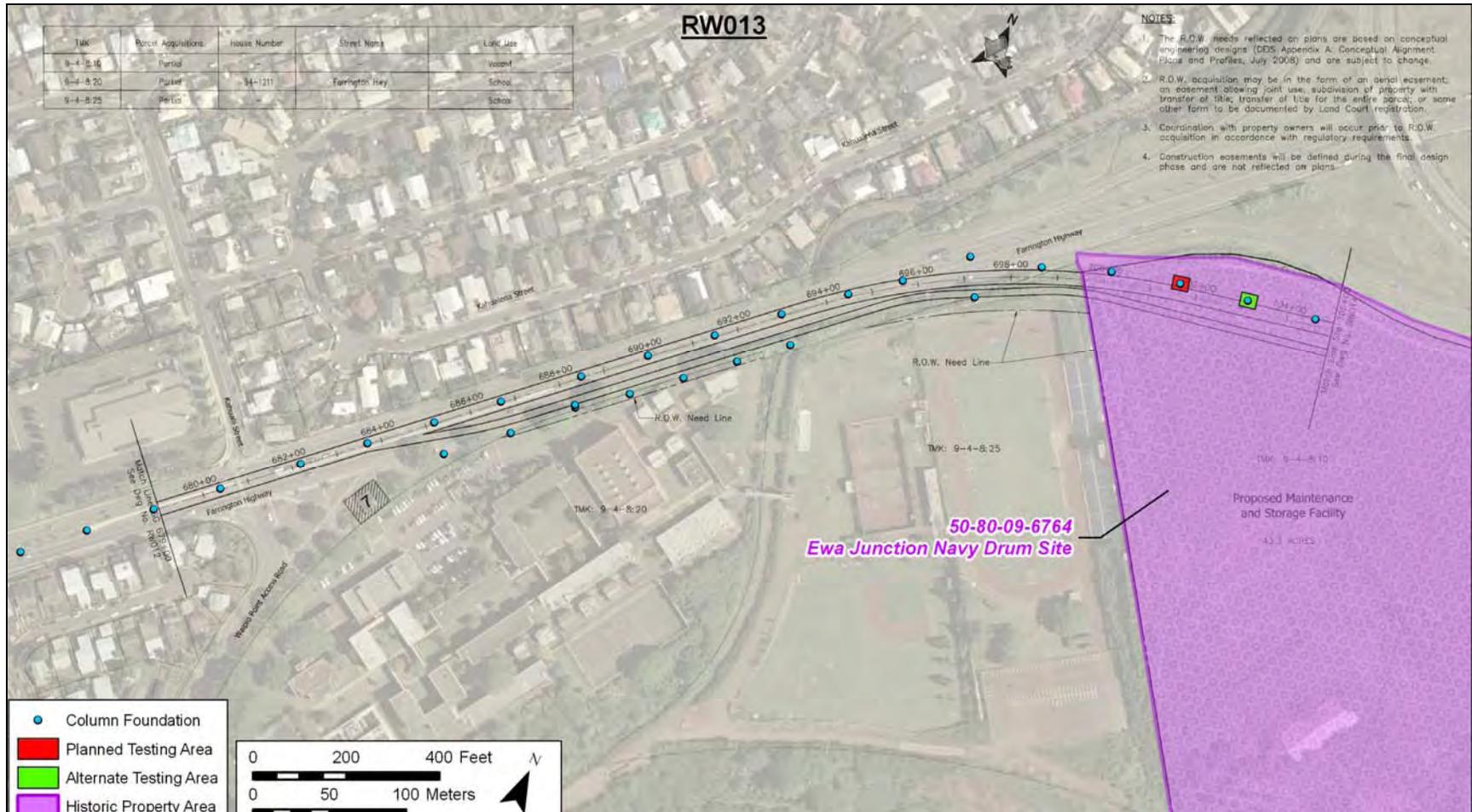


Figure 50. Plan Construction Phase I Sheet RW013 extending from Station 679+00 to 705+00 and showing the northwest portion of a Proposed 43.3-acre Maintenance and Storage Facility (proposed area for testing is 1 column foundation at approximately 701+50)

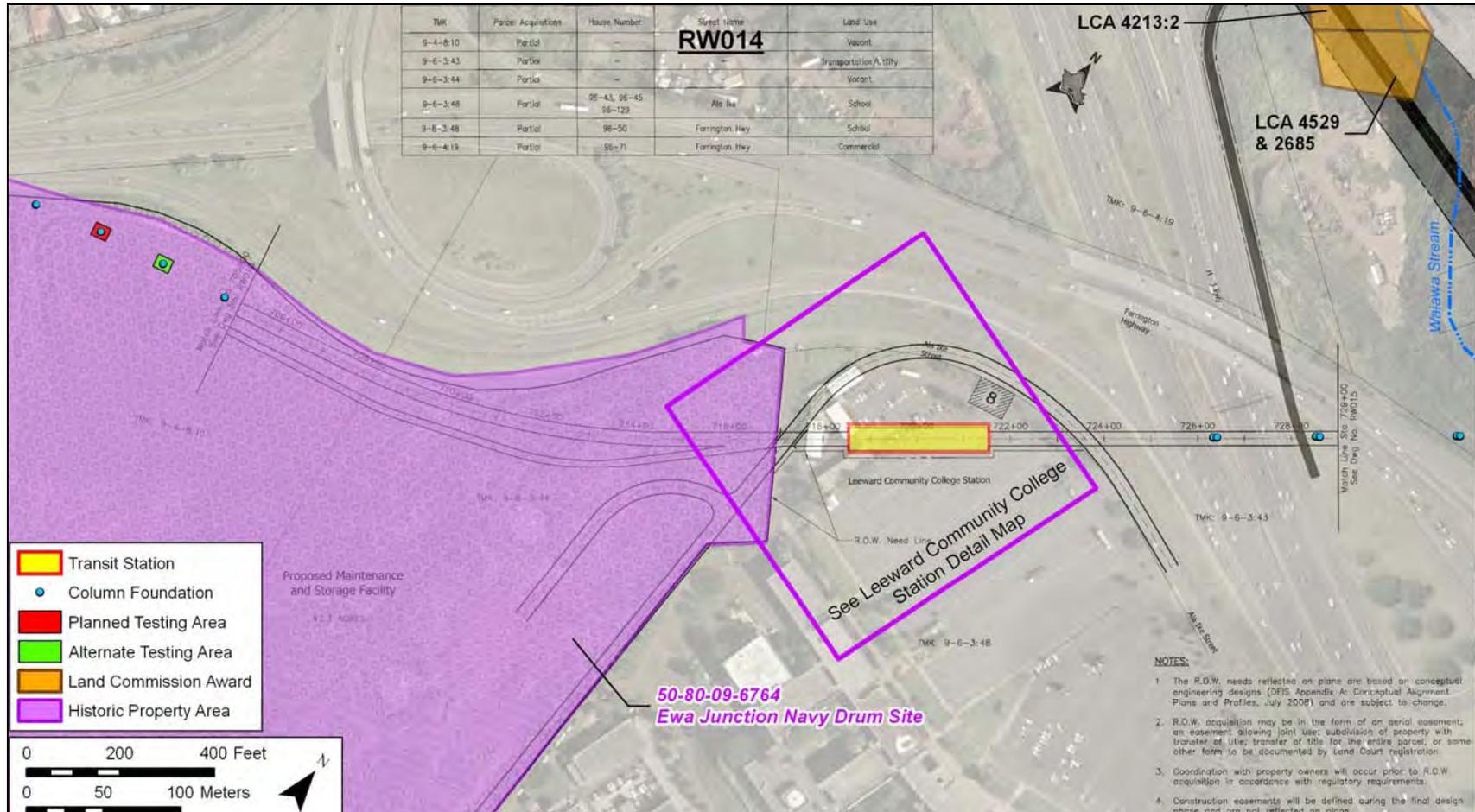


Figure 51. Plan Construction Phase I Sheet RW014 extending from Station 704+00 to 728+00 showing the northeast portion of a Proposed 43.3-acre Maintenance and Storage Facility and Leeward Community College Station (see Figure 34) (proposed area for testing is 1 column foundation to be located somewhat arbitrarily – not shown)

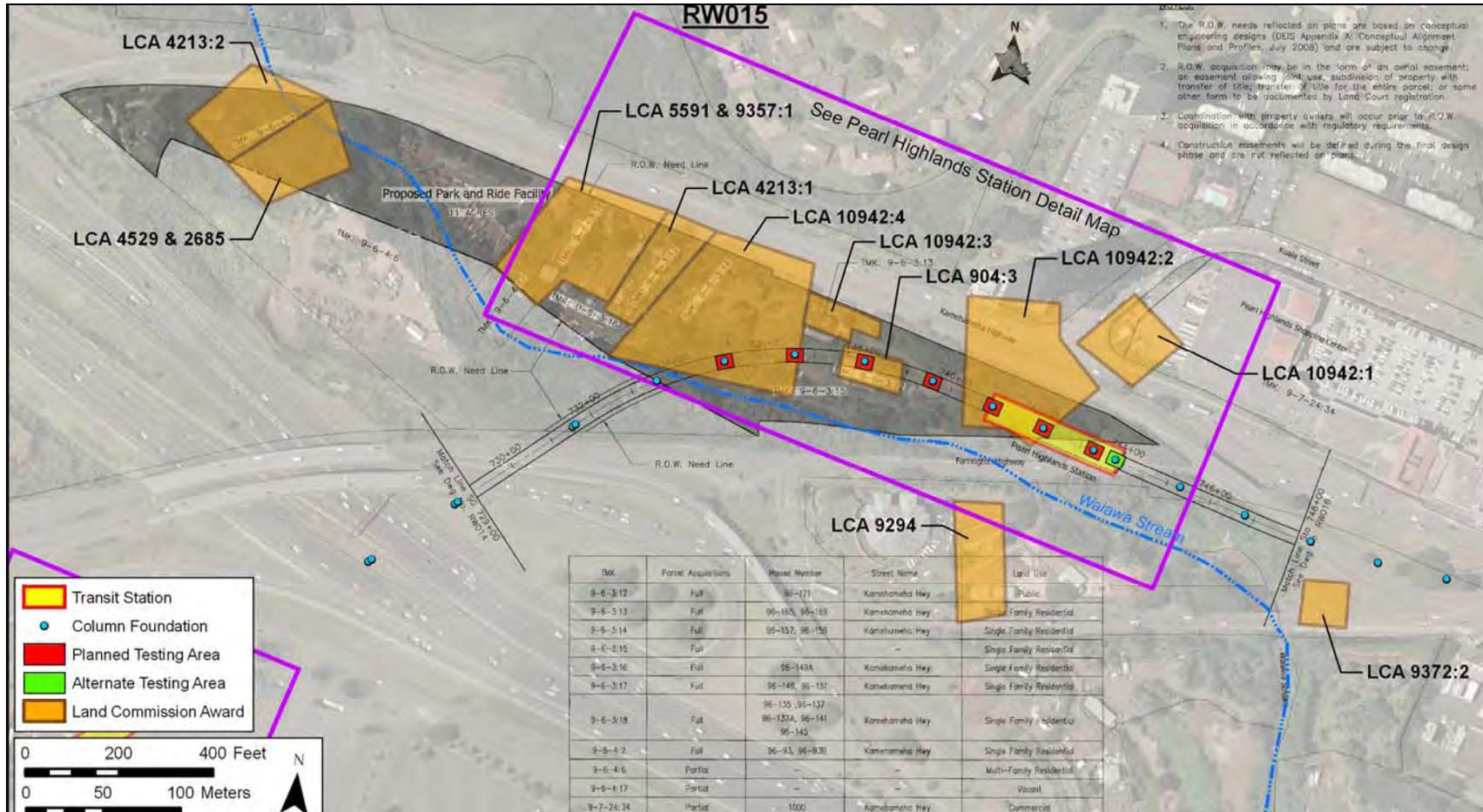


Figure 52. Plan Construction Phase I Sheet RW015 extending from Station 728+00 to 748+00, showing a proposed 11-acre park-and-ride facility, and the Pearl Highlands Station (see Figure 35) (proposed area for testing is 7 column foundations at approximately 735+00, 736+50, 738+20, 739+50, 741+00, 742+00 and 743+30)

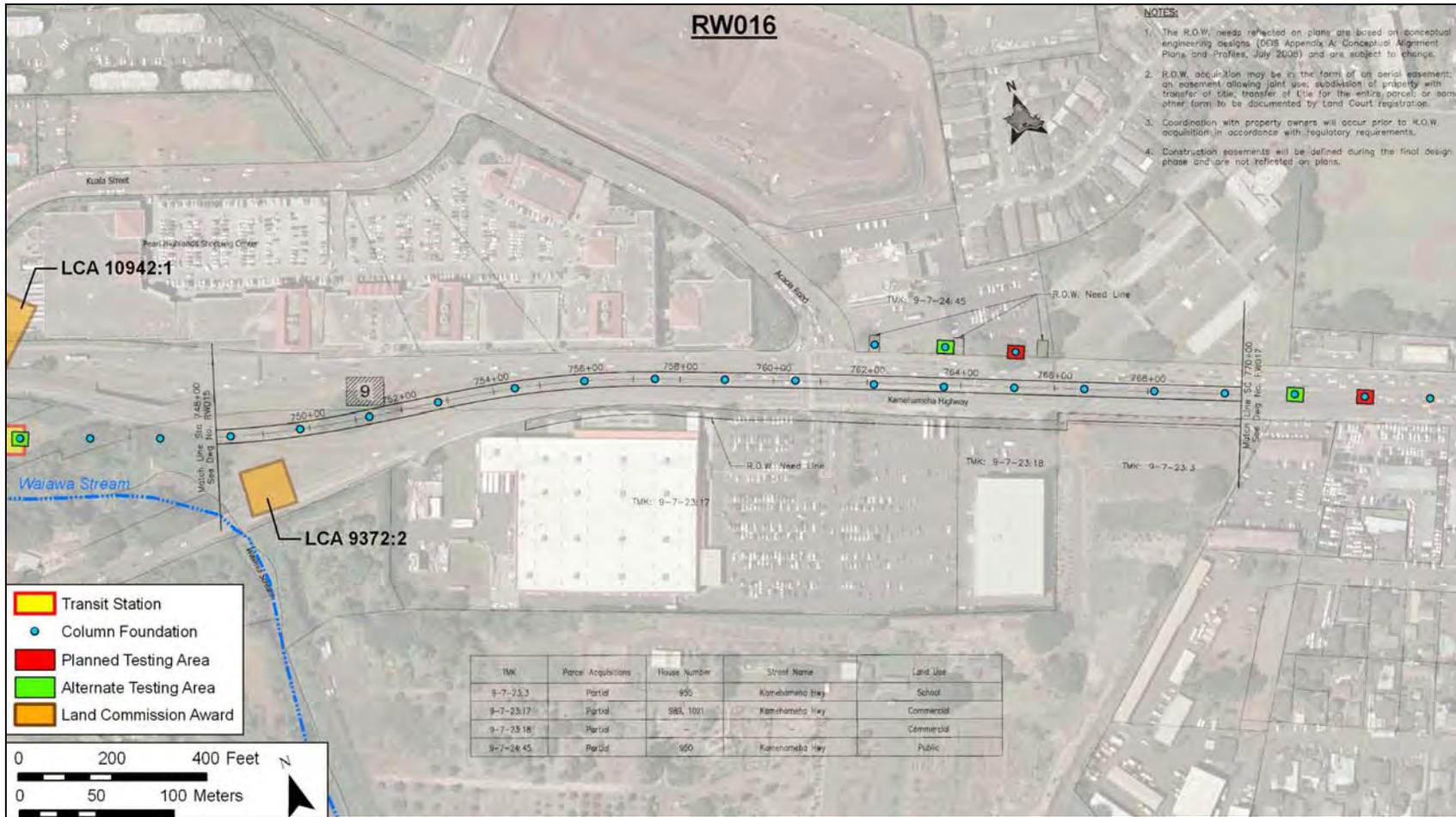


Figure 53. Plan Construction Phase I Sheet RW016 extending from Station 748+00 to 770+00 (proposed area for testing is 1 column foundation just north of approximately 765+00)



Figure 54. Plan Construction Phase I Sheet RW017 extending from Station 770+00 to 794+00 (proposed area for testing is 1 column foundation at approximately 772+70)

## Section 7 References Cited

---

### **Adamski, Mary**

1999 Neglect erodes link to past [Waipahu Cemetery]. *Honolulu-Star-Bulletin* December 9, 1999. Page A-1, A-6.

### **Alexander, W. D.**

1907 The Funeral Rites of Prince Kealiiahonui. *Annual Report of the Hawaiian Historical Society* for 1906, pp. 26-28. Hawaiian Historical Society, Honolulu.

### **Allen, Gwenfread**

1999 *Hawaii's War Years 1941-1945*. Pacific Monograph, Kailua, Hawai'i.

### **Apple, Russell A., and William K. Kikuchi**

1975 *Ancient Hawaii Shore Zone Fishponds: An Evaluation of Survivors for Historical Preservation*. Office of the State Director, National Park Service, U.S. Dept. of the Interior, Honolulu.

### **Barrere, Dorothy B.**

1994 *The King's Mahele: The Awardees and Their Lands*. Dorothy B. Barrere, Compiler, Hilo, Hawai'i. Ms. on file, Historic Preservation Division, State of Hawaii Department of Land and Natural Resources, Honolulu.

### **Beckwith, Martha**

1918 *The Hawaiian Romance of Laieikawai*, with introduction and translation by Martha Warren Beckwith. Reprinted from the 33rd Annual report of the Bureau of American Ethnology. Washington, D.C., U.S. Govt. Print. Office. Unpaginated version reproduced online at [http://www.blackmask.com/thatway/books164c/hrom.htm#1\\_3\\_87](http://www.blackmask.com/thatway/books164c/hrom.htm#1_3_87), downloaded May 16, 2005).

1940 *Hawaiian Mythology*. University of Hawai'i Press, Honolulu.

1951 *The Kumulipo, A Hawaiian Creation Chant*. University of Chicago Press, Chicago.

### **Bingham, Hiram**

1847 *A Residence of Twenty-One Years in the Sandwich Islands*. Huntington, Hartford Connecticut.

### **Bishop, Sereno**

1901 Ewa, O'ahu. Old Memories. *The Friend*, May 1901.

1916 *Reminiscences of Old Hawaii*. Hawaiian Gazette Co., Ltd., Honolulu.

### **Bordner, Richard, and Carol Silva**

1983 *Archaeological Reconnaissance and Historical Documentation for Waimanalo Gulch and Ohikilolo Valley, TMK: 9-2-03: 2,40,13 (por)*. Richard Bordner. Copy on file at Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai'i.

**Bowser, George**

1880 *The Hawaiian Kingdom Statistical and Commercial Directory*. Geo. Bowser & Co., Honolulu and San Francisco.

**Briggs, L. Vernon**

1926 *Experiences of A Medical Student in Honolulu, and on the Island of O'ahu 1881*. David D. Nickerson Co., Boston.

**Bureau of Land Conveyances**

1915 *Commissioner of Public Lands*. Territory of Hawai'i, Honolulu.

**Bushnell, K. S., David W. Shideler, and Hallett H. Hammatt**

2003 *A Cultural Impact Assessment for 3,600 acres in Waiawa and Waipi'o Ahupua'a, O'ahu, (TMK 9-4-06:11, 9-6-04:4 and 9-6-5:3)*. Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

**Campbell, Archibald**

1967 *A Voyage Round the World from 1806 to 1812*. University of Hawai'i Press, Honolulu.

**Chamberlain, Levi**

1956 *Tour Around Oahu, 1828*. *Tour Around Oahu, 1828*. *Hawaiian Historical Society Annual Report* 65:25-41.

**Chang, Roberta**

2003 *The Koreans in Hawai'i. A Pictorial History, 1903-2003*. University of Hawai'i Press, Honolulu.

**Charvet-Pond, Ann, and Bertel D. Davis**

1992 *Volume I: West Beach Data Recovery Program, Phase 4 - Archaeological and Paleontological Excavations (Two volumes). Ko Olina Resort, Land of Honouliuli, Ewa, Island of Oahu*. Paul H. Rosendahl, Ph.D., Inc., Hilo, Hawai'i.

**Chiddix, Jim, and MacKinnon Simpson**

2004 *Next Stop Honolulu! The Story of the Oahu Railway & Land Company*. Sugar Cane Press, Honolulu.

**Clark, John R. K.**

1977 *The Beaches of O'ahu*. University of Hawai'i Press, Honolulu.

**Cobb, John N.**

1903 *Commercial Fisheries of the Hawaiian Islands—1903*. *Bulletin of the U.S. Fish Commission*, Vol. IIII, Part 2.

**Coletta, Paolo (editor)**

1985 *United States Navy and Marine Corps Bases, Domestic*. Greenwood Press, Westport, Connecticut.

**Condé, Jesse, and Gerald M. Best**

1973 *Sugar Trains: Narrow Gauge Rails of Hawaii*. Glenwood Publishers, Felton, California.

**Cordy, Ross**

- 1981 *A Study of Prehistoric Social Change: The Development of Complex Societies in the Hawaiian Islands*. Academic Press, New York.
- 1996 *The Great 'Ewa Lands of La'akona 1840-1850 Settlement Patterns in the 'Ewa Lands Located Around Pearl Harbor: A Look at where Houses, Irrigated Taro Fields, Fishponds, and other Types of Sites were Located*. Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai'i.
- 1997 *Māhele Era Settlement Patterns of Waikele Ahupua'a, 'Ewa District, O'ahu*. Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai'i.
- 2002 *The Rise and Fall of the O'ahu Kingdom. A Brief Overview of O'ahu's History*. Mutual Publishing, Honolulu.

**Coulter, J., and C. Chun**

- 1937 *Chinese Rice Farmers in Hawaii*. University of Hawai'i Research Publications, Number 16, University of Hawai'i, Honolulu.

**Damon, Frank**

- 1882 Tours Among the Chinese, No. 1. *The Friend*, April 1882.

**Day, A. Grove**

- 1984 *History Makers of Hawaii: A Biographical Dictionary*. Mutual Publishing, Honolulu.

**Department of Land and Natural Resources**

- 1845-1903 *Land Record Books*. Commissioner of Public Lands, Territory of Hawai'i, Honolulu.

**Dicks, A. Merrill, Alan E. Haun and Paul H. Rosendahl**

- 1987 *Archaeological Reconnaissance Survey for Environmental Impact Statement West Loch Estates – Golf Course and Parks, Land of Honouliuli, Ewa district, Island of Oahu*, PHRI, Hilo

**Dillingham, B.F.**

- 1885 *Memos concerning Honouliuli, Kahuku, and Hawailoa ranches*. B.F. Dillingham, Honolulu.

**Dorrance, William H. and Francis S. Morgan**

- 2000 *The 165-Year Story of Sugar in Hawai'i*. Mutual Publishing, Honolulu

**Downes, Cornelius D., (editor)**

- 1953 *History of Pearl Harbor. Pearl Harbor Shipyard Log* Vol. VII No. 27, July 3, 1953. Pearl Harbor.

**Ellis, William**

- 1963 *Journal of William Ellis: Narrative of a Tour of Hawai'i with Remarks on the History and Traditions*. Reprint of 1917 edition. Advertising Publishing Co., Honolulu.

**Emerson, J. S.**

- n.d. Hawaii Sharks. *Hawaiian Ethnological Notes* Vol. 1:586.  
 1892 The Lesser Hawaiian Gods. *Papers of the Hawaiian Historical Society*, Paper No. 2.

**Emerson, Nathaniel B.**

- 1993 *Pele and Hi'iaka*. Original published in 1919. 'Ai Pōhaku Press, Honolulu.  
 1998 Kalelealuaka. In *Hawaiian Folk Tales*, compiled by Thomas G. Thrum, pp. 74-106. Mutual Publishing, Honolulu.

**Emory, Kenneth P., J. Halley Cox, William J. Bonk, Yosihiko H. Sinoto, Dorothy B. Barrere**

- 1959 *Natural and Cultural History Report on the Kalapana Extension of the Hawaii National Park, Vol. I, Cultural History Report*. Prepared by the Bernice P. Bishop Museum for the Hawai'i National Park Service, Honolulu.

**Ewa Plantation Company**

- 1923 *Ewa Plantation Company Annual Report*. Microfilm at University of Hawai'i at Mānoa, Hamilton Library, Honolulu.

**Ewa Station Reports**

- 1835 *Ewa Station Reports for 1835*. Microfilm at Hawaiian Mission Children's Museum, Honolulu.  
 1860 *Ewa Station Reports for 1860*. Microfilm at Hawaiian Mission Children's Museum, Honolulu.

**Fornander, Abraham**

- 1917 *History of Kualii*. In, In, *Fornander Collection of Hawaiian Antiquities and Folklore* Vol. IV, Part II:364-434. Memoirs of the Bernice P. Bishop Museum, Bishop Museum Press, Honolulu.  
 1917 *Story of Pikoikaalala*. In, *Fornander Collection of Hawaiian Antiquities and Folklore* Vol. IV, Part III:450-463. Memoirs of the Bernice P. Bishop Museum, Bishop Museum Press, Honolulu.  
 1918 *Legend of Palila*. In, *Fornander Collection of Hawaiian Antiquities and Folklore* Vol. V, Part I:142-143. Memoirs of the Bernice P. Bishop Museum, Bishop Museum Press, Honolulu.  
 1919 Legend of Maikoha. In, *Fornander Collection of Hawaiian Antiquities and Folklore* Vol. V, Part II:270-273. Memoirs of the Bernice P. Bishop Museum, Bishop Museum Press, Honolulu.  
 1919 *Legend of Kamapuaa*, In, *Fornander Collection of Hawaiian Antiquities and Folklore* Vol. V, Part II:314-363. Memoirs of the Bernice P. Bishop Museum, Bishop Museum Press, Honolulu.  
 1919 *Story of Palila*. In, *Fornander Collection of Hawaiian Antiquities and Folklore* Vol. V, Part II:373-375. Bernice P. Bishop Museum, Bishop Museum Press, Honolulu.

- 1919 A Lamentation for Kahahana. In, *Fornander Collection of Hawaiian Antiquities and Folklore* Vol. VI, Part II:292-306. Bernice P. Bishop Museum, Bishop Museum Press, Honolulu.
- 1996 *Fornander's Ancient History of the Hawaiian People to the Times of Kamehameha I*. Originally published in 1880 as *An Account of the Polynesian Race. Its Origins and Migrations, Volume II*. Mutual Publishing, Honolulu.

**Frear, Mary Dillingham**

- 1934 *Lowell and Abigail, A Realistic Idyll*. Privately Printed, New Haven.

**Frierson, Barbara**

- 1972 *A Study of Land Use and Vegetation Change: Honouliuli, 1790-1925, Manuscript prepared for Graduate Seminar in Geography (750)*. University of Hawai'i, Honolulu.

**Goodman, Wendy, and Richard C. Nees**

- 1991 *Archaeological Reconnaissance and Inventory Survey of 3,600 Acres in Waiawa, 'Ewa, O'ahu*. Public Archaeology Section, Applied Research Group, Bernice P. Bishop Museum, Honolulu.

**Gowans, Alan**

- 1993 *Fruitful Fields. American Missionary Churches in Hawai'i*. Department of Land and Natural Resources, State Historic Preservation Division, Honolulu.

**Halliday, William R.**

- 2005 Current Status of the 'Ewa Karst, Honolulu County, Hawai'i. *The Cave Conservationist*. February 1998. Electronic File at <http://www.caves.org/section/ccms/wrh/>, accessed December 22, 2005.

**Hammatt, Hallett H., and Rodney Chiogioji**

- 2000 Archaeological Assessment of an Approximately 2,600-ft Portion of Farrington Highway Project between Anini Place and Waipahu Depot Road, Waialele Ahupua'a, 'Ewa District, Island of O'ahu, (TMK 9-4-11). Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

**Hammatt, Hallett H., and Rodney Chiogioji**

- 1997a *Archaeological Reconnaissance Survey of a 29,100-ft. Long Land Corridor within Honouliuli Ahupua'a, 'Ewa District, O'ahu Island*. Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i. March 1997

**Hammatt, Hallett H., and Rodney Chiogioji**

- 1997b *Archaeological Reconnaissance Survey of a 4.5-Kilometer (14,730-Ft.) Long Land Corridor within Honouliuli Ahupua'a, 'Ewa District, O'ahu Island*. Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i. September 1997

**Hammatt, Hallett H., and William H, Folk**

- 1981 *Archaeological and Paleontological Investigation at Kalaeloa (Barber's Point), Honouliuli, 'Ewa, O'ahu, Federal Study Areas 1a and 1b, and State of Hawai'i Optional Area 1*. Archaeological Research Center Hawai'i, Lawa'i, Hawai'i.

**Hammatt, Hallett H., Sallee Freeman and David W. Shideler.**

2004 *Archaeological and Cultural Assessment in Support of the Waipahu Drainage Improvements Project, Waipahu, Waipi'o Ahupua'a, 'Ewa District, O'ahu, TMK 9-4-09 and 9-4-59:72, 73, 74.* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

**Hammatt, Hallett H., Jennifer J. Robins, Mark Stride, and Matthew J. McDermott**

1990 *An Archaeological Inventory Survey for the Maka'iwa Hills Project Site, Honouliuli, 'Ewa, O'ahu.* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

**Hammatt, Hallett, H., and David W. Shideler**

1999 *Archaeological Assessment for a Proposed Expansion of Saint Francis Medical Center West (TMK 9-1-17: por.17 & 60), Honouliuli, 'Ewa, O'ahu.* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

**Hammatt, Hallett, H., and David W. Shideler**

1991 *Archaeological Inventory Survey for a Proposed Expansion of Saint Francis Medical Center West (TMK 9-1-17: por.56), Honouliuli, 'Ewa, O'ahu.* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

**Hammatt, Hallett, H., and David W. Shideler**

1990 *Archaeological Inventory Survey of the West Loch Bluffs Project Site, Hono'uli'uli, 'Ewa, O'ahu.* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

**Handy, E.S. Craighill**

1940 *The Hawaiian Planter, Volume 1. His Plants, Methods and Areas of Cultivation.* Bernice P. Bishop Museum Bulletin 161, The Museum, Honolulu.

**Handy, E.S. Craighill, and Elizabeth G. Handy**

1972 *Native Planters in Old Hawaii: Their Life, Lore, and Environment.* Bishop Museum Bulletin 233. Bernice P. Bishop Museum, Honolulu.

**Hawaiian Mission Children's Society**

1969 *Missionary Album, Sesquicentennial Edition 1820-1970.* Edward Enterprises, Honolulu.

**Ho'oulumāhiehie**

2006a *Ka Mo'olelo o Hi'iakaikapoliopole.* Original Hawaiian text taken from series of articles in *Ka Na'i Aupuni* 1905-1906. Awaiaulu Press, Honolulu.

**Ho'oulumāhiehie**

2006b *The Epic Tale of Hi'iakaikapoliopole. As Told by Ho'oulum'hiehie.* Translated by M. Puakea Nogelmeier. Awaiaulu Press, Honolulu.

**Hosmer, F. A.**

1898 Religious Opportunities. In, *Hawaiian Almanac and Annual for 1898*, pp. 146-149. Thos. G. Thrum, Honolulu.

**Ī'i, John Papa**

1959 *Fragments of Hawaiian History.* Pukui translation. Bernice P. Bishop Museum Press, Honolulu

**Immisch, George B.**

- 1964 *Land Reclamation and the Role of the Hydroseparator at Ewa Plantation: A Case Study of Some of the Effects of Mechanized Harvesting in the Hawaiian Sugar Industry*. Master's thesis, University of Hawaii at Mānoa, Honolulu.

**Indices of Awards**

- 1929 *Indices of Awards Made by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands*. Commissioner of Public Lands, Territory of Hawaii. Star-Bulletin Press, Honolulu.

**Jarrett, L.**

- 1930 *A Source Book in Hawaiian Geography*. M.A. Thesis, University of Hawai'i, Honolulu.

**Judd, C. A.**

- 1933 The Parasitic Habit of the Sandalwood Tree. *Hawaiian Almanac and Annual for 1933*, pp. 81-88. Thos. G. Thrum, Honolulu.

**Judd, Walter F.**

- 1971 Hawaii's Military Heritage, Polynesian to Annexation. Unpublished manuscript. Copy on file at Cultural Surveys Hawai'i, Kailua, Hawai'i.

**Ka Hōkū o Hawai'i**

- 1927 He Mo'olelo Ka'ao no Hi'iaka- i-ka poli-o-Pele. *Ka Hōkū o Hawai'i*, February 15, 1927.
- 1927 He Mo'olelo Ka'ao no Hi'iaka- i-ka poli-o-Pele. *Ka Hōkū o Hawai'i*, February 22, 1927.

**Ka Loea Kālai'āina**

- 1899 Na Wahi Pana o Ewa. *Ka Loea Kālai'āina*, June 3, 1899.
- 1899 Na Wahi Pana o Ewa. *Ka Loea Kālai'āina*, June 10, 1899.
- 1899 Na Wahi Pana o Ewa. *Ka Loea Kālai'āina*, July 8, 1899.
- 1899 Na Wahi Pana o Ewa. *Ka Loea Kālai'āina*, July 15, 1899.
- 1899 Na Wahi Pana o Ewa. *Ka Loea Kālai'āina*, July 22, 1899.
- 1899 Na Wahi Pana o Ewa. *Ka Loea Kālai'āina*, Oct. 7, 1899.
- 1899 Na Wahi Pana o Ewa. *Ka Loea Kālai'āina*, Oct. 21, 1899.
- 1913 Na Wahi Pana o Ewa. *Ka Loea Kālai'āina*, Jan. 13, 1900.

**Ka Nūpepa Kū'oko'a**

- 1868 He Wanana Ana [A Prophecy]. *Ka Nūpepa Kū'oko'a*, December 5, 1868. Translation in Hawaiian Ethnological Notes (HEN) Vol. I, p. 2734.
- 1908 Pōhaku Anae. *Ka Nūpepa Kū'oko'a*, October 2, 1908.

**Kahiolo, G. W.**

- 1978 *He Moolelo No Kamapuaa, The Story of Kamapuaa*. Translated by Esther T. Mookini and Erin C. Neizmen with the assistance of David Tom. Hawaiian Studies Program, University of Hawai'i at Mānoa, Honolulu.

**Kamakau, Samuel M.**

- 1976 *The Works of the People of Old, Nā Hana a Ka Po'e Kahiko*. Bernice P. Museum Special Publication 61. Originally published 1869-1870. Bishop Museum Press, Honolulu.
- 1991a *Tales and Traditions of the People of Old; Nā Mo'olelo a Ka Po'e Kahiko*. Originally published 1865-1869. Bishop Museum Press, Honolulu.
- 1991b *Ka Pō'e Kahiko; The People of Old*. Originally published 1869-1870. Bishop Museum Press, Honolulu.
- 1992 *Ruling Chiefs of Hawaii*. Revised Edition. Originally published 1867-1870. Kamehameha Schools Press, Honolulu.

**Kame'eleihiwa, Lilikala**

- 1992 *Native Land and Foreign Desires. Pehea La E Pono Ai?* Bishop Museum Press, Honolulu.

**Ke Au Hou**

- 1910 Place Names – O'ahu. *Ke Au Hou*, Dec. 14, 1910

**Kelly, Marion**

- 1983 *Na Mala o Kona: Gardens of Kona, A History of Land Use in Kona, Hawaii*, Bishop Museum Dept. Report Series 83-2, Honolulu.
- 1985 Notes on the History of Honouliuli. Appendix A IN *An Archaeological Survey of the Naval Air Station, Barber's Point O'ahu, Hawai'i*, by A. E. Haun. Department of Anthropology, Bernice P. Bishop Museum, Honolulu.
- 1991 Notes on the History of Honouliuli. In A.E. Haun, *Archaeological Survey of the Naval Air Station, Barber's Point O'ahu, Hawai'i, Appendix A*. Applied Research Group, Bernice P. Bishop Museum, Honolulu.

**Kluegel, Chas. H.**

- 1917 Engineering Features of the Water Project of the Waiahole Water Company. *Hawaiian Almanac and Annual for 1916*, pp. 93-107. Thos. G. Thrum, Honolulu.

**Knudsen, Eric**

- 1946 *Teller of Hawaiian Tales*. Mutual Publishing, Honolulu.

**Kotzebue, Otto**

- 1821 *Voyage of Discovery into the South Seas and to the Bering Straits, Aboard the Kamchatka in the Years 1815-1818*. Translated and published by Longman and Hurst, London.

**Krause, F. G.**

- 1911 Cotton Culture in Hawaii. In, *Hawaiian Almanac and Annual for 1911*, pp. 58-67. Thos. G. Thrum, Honolulu.

**Kuykendall, Ralph S.**

- 1967 *The Hawaiian Kingdom: 1874-1893. Volume 3*. University Press of Hawai'i, Honolulu.

**Landrum, James, Robert Drolet, and Katharine Bouthillier**

1997 *Cultural Resources Overview Survey, Naval Magazine Lualualei, Island of O'ahu, Hawai'i*. Ogden Environmental and Energy Services Co., Inc. Honolulu.

**Lucas, Paul F.**

1995 *A Dictionary of Hawaiian Legal Land-Terms*. Published by Native Hawaiian Legal Corporation, Honolulu, and the University of Hawai'i Committee for the Preservation and Study of Hawaiian Language, Art and Culture, Honolulu.

**Maly, Kepā**

1992 Historical Documentary Research. Appendix E In, Berdena Burgett and Paul H. Rosendahl *Archaeological Inventory Survey, Contaminated Soil Stockpile/Remediation Facility.*, Paul H. Rosendahl, Ph. D., Inc., Hilo, Hawai'i.

1997 Historical Documentary Research. In *Archaeological Reconnaissance Survey, Naval Magazine Lualualei, NAVMAG-West Loch, Lands of Pu'uloa, Honouliuli, Waikele, and Waipi'o, District of 'Ewa, Island of O'ahu*, By Peter M. Jensen, and James Head, pp. 7-59. Paul H. Rosendahl, Ph.D., Inc., Hilo, Hawai'i.

**Manu, Moses**

1885 The Legend of Keaomelemele. *Ka Nūpepa Kū'oko'a* April 25, 1885; translation in Hawaiian Ethnological Notes, HEN Vol. II:872. Bernice P. Bishop Museum, Honolulu.

1902 Aiai, son of Ku-ula, Beeing Part of Ku-ula, the Fish God of Hawaii. *Hawaiian Almanac and Annual for 1902*, pp. 114-128. Translation by N. B. Emerson. Thos. G. Thrum, Honolulu.

1904 Traditional Account of the Ancient Hawaiian Prophecy. In, *Hawaiian Almanac and Annual for 1904*, pp. 105-113. Thos. G. Thrum, Honolulu.

2002 Keaomelemele. Translated by Mary Kawena Originally published in serial form in the Hawaiian language newspaper, *Ka Nūpepa Kū'oko'a*, September 6, 1884 to June 27, 1885. Translated by Mary Kawena Pukui. Bishop Museum Press, Honolulu.

**Mauricio, Michael (editor)**

1997 *Waipahu: Its People and Heritage*. Waipahu Centennial Committee, Waipahu, Hawai'i.

**McAllister, J.G.**

1933 *Archaeology of Oahu*. Bernice P. Bishop Museum Bulletin 104, Honolulu.

**McGerty, Leann, and Robert Spear**

1995 *An Archaeological Assessment of the Mānana and Pearl City Junction Sites, Mānana and Waiawa Ahupua'a, 'Ewa District, O'ahu Island*. Scientific Consultant Services, Inc., Honolulu, Hawai'i.

**McGuire, Ka'ohulani**

- 2000 *A Traditional Practices Assessment for the Proposed Faulkes Telescope on 1.5 Acres of the University of Hawai'i Facility at Haleakalā, Papa'anui Ahupua'a Makawao District, Island of Maui (TMK 2-2-07:8)*. Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

**Mylroie, John E., and James L. Carew**

- 1995 Karst Development on Carbonate Islands. Chapter 3, in D. A. Budd and A. Saller, eds. *Unconformities and Porosity in Carbonate Strata*. American Association of Petroleum Geologists Memoir 63.

**Nakuina, Emma M.**

- 1904 *Hawaii - Its People and Their Legends*. Hawai'i Promotion Committee, Honolulu.

**Nakuina, Moses K.**

- 1992 *The Wind Gourd of La'amaomao, The Hawaiian Story of Pāka'a and Kūapāka'a, Personal Attendants of Keawenuia'umi, Ruling Chief of Hawaii and Descendants of La'amaomao*. Collected, edited, and expanded by Moses K. Nakuina, translated by Esther T. Mookini and Sarah Nākoa. Kalamakū Press, Honolulu.
- 1998 Fish Stories and Superstitions. In, *Hawaiian Folk Tales*, compiled by Thomas G. Thrum, pp. 269-274. Mutual Publishing, Honolulu.

**Nedbalek, Lani**

- 1984 *Waipahu: A Brief History*. Wonder View Press, Mililani, Hawai'i.

**O'Hare, Constance R., David W. Shideler, and Dr. Hallett H. Hammatt**

- 2006 *An Archaeological Inventory Survey for the Ho'opili Project, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu, TMK: (1) 9-1-010:001, 9-1-017:004, 059, 072; 9-1-018:001, 004, 9-2-002:004, 005* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

**Ohira, Rod.**

- 1997 "Waipahu Turns 100. One Sweet Century." *Honolulu Star Bulletin*, June 12, 1997.

**Pacific Commercial Advertiser**

- 1885 *Pacific Commercial Advertiser*, August 15, 1885. Honolulu.

**Pagliari, Penny**

- 1987 *Ewa Plantation: An Historical Survey 1890 to 1940*. Manuscript, Historic Preservation Program, University of Hawaii at Mānoa, Honolulu.

**Paradise of the Pacific**

- 1902 Hawaiian Fiber Company. *Paradise of the Pacific*, March 1902. Vol. 15:17-18.
- 1902 Ewa Plantation Company. *Paradise of the Pacific*, December 1902. Vol. 15:19-22.

**Pukui, Mary Kawena**

- 1943 Ke Awa Lau o Pu'uloa: The Many-Harbored Sea of Pu'uloa. *Hawaiian Historical Society Report* 52:56-62. Honolulu.

- 1983 *‘Ōlelo No‘eau: Hawaiian Proverbs and Poetical Sayings*. Bishop Museum Special Publication No.71, Bishop Museum Press, Honolulu.
- Pukui, Mary Kawena, and Samuel H. Elbert**  
1986 *Hawaiian Dictionary*. 2nd Edition. University of Hawai‘i Press, Honolulu.
- Pukui, Mary Kawena, and Laura Green**  
1995 *Folktales of Hawai‘i. He Mau Ka‘ao Hawai‘i*. Collected and translated by Mary Kawena Pukui with Laura C. S. Green. Bishop Museum Press, Honolulu.
- Pukui, Mary K., Samuel H. Elbert, and Esther Mookini**  
1974 *Place Names of Hawai‘i*. University of Hawai‘i Press, Honolulu.
- Rasmussen, Coral M., and Myra J. Tomonari-Tuggle**  
2006. *Archaeological Monitoring of Waiiau Fuel Pipeline, ‘Ewa District, Island of O‘ahu*. International Archaeological Research Institute, Inc., Honolulu, Hawai‘i.
- Rechtman, Robert B. and Jack D. Henry**  
1998. *Archaeological Reconnaissance Survey, Red Hill Fuel Storage Area and Ewa Drum Filling and Fuel Storage Area, Lands of Waipi‘o, Wai‘awa, Hālawā, ‘Ewa District and Moanalua, Honolulu District, Island of O‘ahu*. Paul H. Rosendahl Ph.D., Inc. Hilo, Hawai‘i.
- Rosendahl, Paul**  
1987 *Archaeological Reconnaissance Survey for Environmental Impact Statement West Loch Estates – Residential Increments I and II, Land of Honouliuli, Ewa district, Island of Oahu*, PHRI, Hilo
- Saturday Press**  
1883 *Dictionary of Hawaiian Localities*. *Saturday Press*, Aug. 11, 1883.  
1884 *Dictionary of Hawaiian Localities*. *Saturday Press*, January 12, 1884
- Schmitt, Robert C.**  
1968 *Demographic Statistics of Hawaii: 1778-1965*. University of Hawai‘i Press, Honolulu.  
1973 *The Missionary Censuses of Hawaii*. Bernice P. Bishop Museum, Honolulu.
- Schoofs, Robert**  
1978 *Pioneers of the Faith: History of the Catholic Mission in Hawaii, 1827-1840*. Edited by Louis Boeynaems. Sturgis Printing, Honolulu.
- Sheldon, Henry L.**  
1883 *Reminiscences of Honolulu Thirty-Five Years Ago*. *Saturday Press*, May 26, 1883.
- Silva, Carol**  
1987 Appendix A: Historical Documentary Research. IN, *Archaeological Reconnaissance Survey for Environmental Impact Statement, West Loch Estates - Golf Course and Parks, Land of Honouliuli, Ewa District, Island of Oahu*, by A. Merrill Dicks, Alan E. Haun, and Paul H. Rosendahl. Paul H. Rosendahl, Ph.D., Inc., Hilo, Hawai‘i.

**Spear, Robert L.**

- 1996 *Archaeological Reconnaissance and Assessment of the H.F.D.C. – East Kapolei Development Project*. Scientific Consultant Services, Inc., Pu'unene, Hawai'i.

**St. John, Harold**

- 1947 The history, present distribution, and abundance of sandalwood on Oahu, Hawaiian Islands. *Pacific Science* 1(1):5-20, January 1947.

**Sterling, Elspeth P., and Catherine C. Summers (comp.)**

- 1978 *Sites of O'ahu*. Bernice P. Bishop Museum, Department of Anthropology, Honolulu.

**Thrum, Thomas G.**

- 1886 Great Land Colonization Scheme. *Hawaiian Almanac and Annual* for 1887:73-80. Thos. G. Thrum, Honolulu.
- 1907 Heiau and Heiau Sites throughout the Hawaiian Islands. *Hawaiian Almanac and Annual* for 1907:36-47.
- 1909 Retrospect for 1908. *Hawaiian Almanac and Annual for 1909*, pp. 163-182. Thos. G. Thrum, Honolulu.
- 1913 Retrospect for 1912. *Hawaiian Almanac and Annual for 1919*, pp. 163-184. Thos. G. Thrum, Honolulu.
- 1922 Hawaiian Place Names. In, *A Dictionary of the Hawaiian Language*, by Lorrin Andrews, pp. 625-674. Originally published in 1865. Revised by Henry Parker, 1922. Board of Commissioners of Public Archives of the Territory of Hawai'i, Honolulu.
- 1923 *More Hawaiian Folk Tales*. A.C. McClurg & Co., Chicago. *Further Exploits of Maui*, pp. 248-260. *Story of Ka-ehu-iki-mano-o-Pu'u-loa* (The small blonde shark of Puuloa), pp. 293-306.
- 1927 Our Widening Industries: Macadamia Nut Culture. *Hawaiian Almanac and Annual for 1927*, pp. 95-97. Thos. G. Thrum, Honolulu
- 1998 This Land is the Sea's. Traditional Account of an Ancient Hawaiian Prophesy. In, *Hawaiian Folk Tales, A Collection of Native Legends*, pp. 203-214. Translated from Moke Manu by Thomas G. Thrum. Mutual Publishing, Honolulu.

**Titcomb, Margaret**

- 1979 *Native Use of Marine Invertebrates in Old Hawaii*. University of Hawaii Press, Honolulu.

**Treiber, Gale**

- 2005 Oahu's Narrow Gauge Operations in Hawaii Since WWII. *The Railroad Press* 66:10-29.

**Tuggle, H. David, and M. J. Tomonari-Tuggle**

- 1997 *Synthesis of Cultural Resource Studies of the 'Ewa Plain, Task 1a: Archaeological Research Services for the Proposed Cleanup, Disposal and Reuse of Naval Air Station Barbers Point, O'ahu, Hawai'i*. International Archaeological Research Institute, Inc., Honolulu.

**Vancouver, George**

- 1798 *A Voyage of Discovery to the North Pacific Ocean...performed in the years 1790, 1791, 1792, 1793, 1794, and 1795, in the Discovery . . . and . . . Chatham . .* Vols. 1-3. Amsterdam, N. Israel, London.

**Webb, E. Lahilahi**

- 1923 Mikololou. In, *More Hawaiian Folk Tales*, compiled by Thomas G. Thrum, A. C. McClurg, Co., Chicago.

**Westervelt, William D.**

- 1923 Lepe-a-moa (The Chicken Girl of Palama). In, *More Hawaiian Folk Tales*, compiled by Thomas G. Thrum, pp. 154-184. A. C. McClurg and Co., Chicago.
- 1963 *Legends of Old Honolulu*. Collected and Translated from the Hawaiian by W. D. Westervelt. Press of George H. Ellis Co., Boston.

**Wilcox, Carol**

- 1996 *Sugar Water: Hawaii's Plantation Ditches*. University of Hawai'i Press, Honolulu.

**Wilkes, Charles**

- 1970 *Narrative of the U.S. Exploring Expedition, Volume IV*. Republished by The Gregg Press, Upper Saddle River, New Jersey.

**Woodbury, David O.**

- 1946 *Builders for Battle, How the Pacific Naval Air Bases were Constructed*. E. P. Dutton and Company, New York.