
APPENDIX G-9

SUBSURFACE ARCHAEOLOGICAL SURVEY REPORT

Final Report

**ARCHAEOLOGICAL SUBSURFACE SURVEY WITHIN THE
COMPANY COMBINED ARMS ASSAULT COURSE (CCAAC)
CIRCUMSCRIBED BY THE SOUTH FIREBREAK ROAD,
MAKUA MILITARY RESERVATION, MĀKUA AHUPUA‘A,
WAI‘ANAЕ DISTRICT, O‘AHU ISLAND, HAWAI‘I
(TMK 8-2-01:020)**

Prepared By:

US Army Garrison, Hawaii
Directorate of Public Works
Environmental Division
572 Santos Dumont Avenue
Building 105, Wheeler Army Airfield
Schofield Barracks, HI 96857-5013

January 2007

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ABSTRACT

This report presents the results of archaeological subsurface survey within the Company Combined Arms Assault Course (CCAAC) circumscribed by the south fire break road at Makua Military Reservation, Mākua Ahupua‘a, Wai‘anae District, O‘ahu Island, Hawai‘i (TMK 8-2-01:020). The survey was undertaken to satisfy the terms of a settlement agreement.

The subsurface survey was conducted by the US Army Garrison, Hawaii (USAG-HI), Directorate of Public Works, Environmental Division, Cultural Resources Section staff archaeologists. The project was completed in a period of several weeks on three occasions spanning from November 2005 to December 2006. A total of 550 shovel probes were attempted within the survey area. The project’s objective was to determine a presence or absence of intact cultural deposit within the survey area where no surface features are contemporarily discernible due to either the natural dilapidation of surface structures or other effects from the change in use of the area over time.

Of the completed probes, only two demonstrated a potential for yielding intact cultural deposit. All other probes attempted were sterile. At least three previously unrecorded site areas containing several feature components were observed within the survey area. In addition, several previously unrecorded features may be added to State Site 50-80-03-4536. The detailed recordation, mapping, and Global Positioning System (GPS) data collection of the previously unrecorded features is planned to be undertaken in a separate project by Cultural Resources archaeologists.

ACKNOWLEDGEMENTS

The subsurface survey involved the efforts of many individuals from the project's planning stages to the production of this report. The individuals on the field crew are acknowledged for their professionalism and enthusiasm in doing quality fieldwork: Carly Antone, B.A., Christophe Descantes, Ph.D., Alton Exzabe, B.A., Laura Gilda, B.A., James Head, B.A., and George MacDonell, M.A. The individuals worked under the direction of the Cultural Resources Manager, Dr. Laurie Lucking, who oversaw all details of the project. The project also would not be possible without unexploded ordnance technicians provided by Donaldson Enterprises, Incorporated: Travis Flowers, Ron Smith, and Vaughn Hochhalter.

Two fundamental groups helped the project run efficiently during each period of fieldwork. These people include the Makua Military Reservation Range Control staff under the management of Mr. Bert Borja, as well as Mr. Sammy Houseberg and Mr. William Bouley from the Installation Fire and Safety Office who ensured the standard for safe working conditions.

The project was also supported by Mr. Thomas Piskel, Range Control Division Hawaii, who tracked the field schedule and progress, and Mr. David Cox, Senior Cultural Resources Specialist, who served as the field crew's in office contact.

All project Global Information Systems data contained in this report was prepared by Alton Exzabe.

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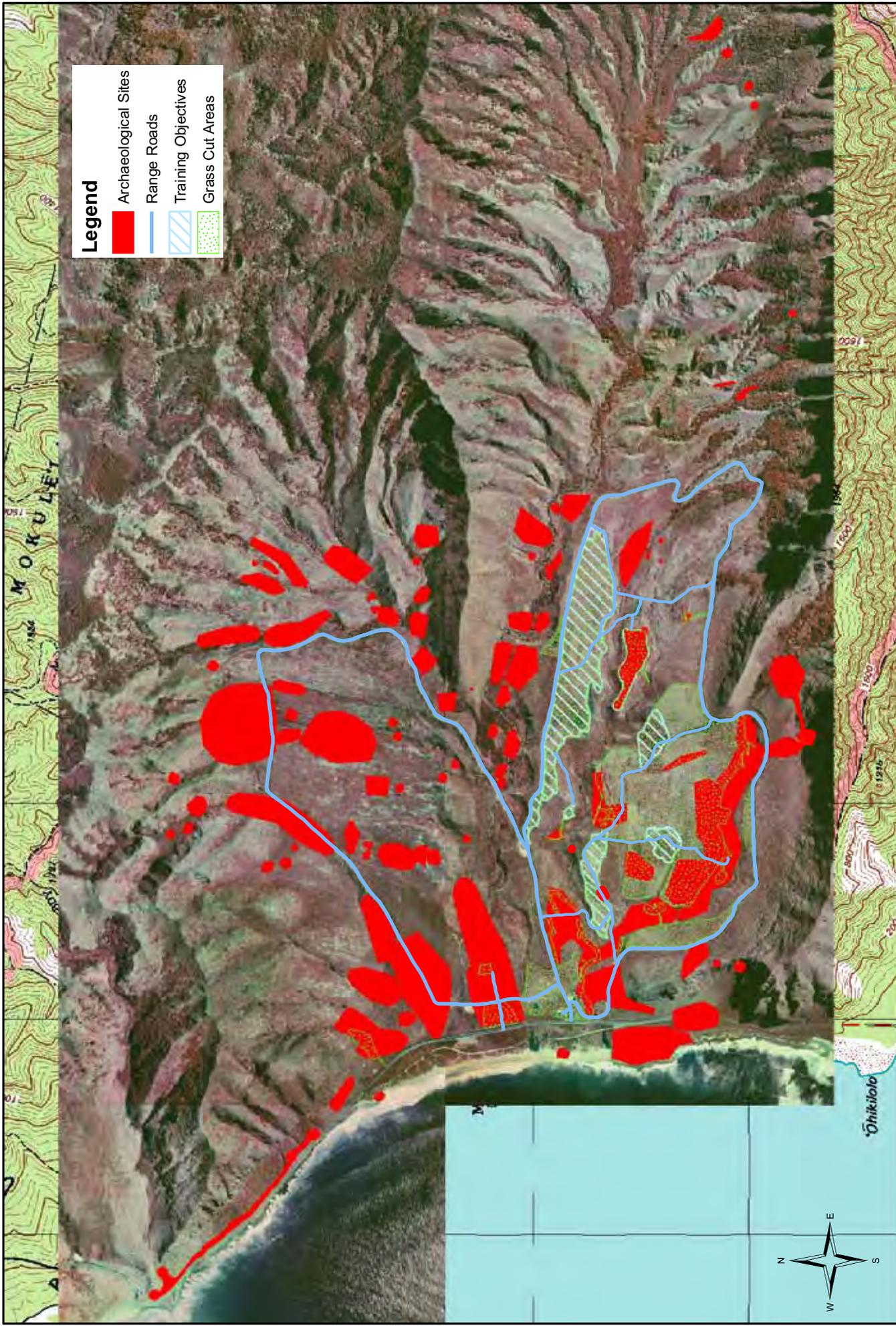
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Makua Military Reservation
Archaeological Sites Located in Makua, Oahu

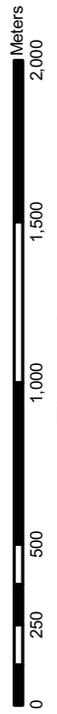


Figure 1



1.0 INTRODUCTION

The US Army Garrison, Hawaii, Directorate of Public Works, Environmental Division, Cultural Resources Section archaeologists conducted subsurface survey of areas within the Company Combined Arms Assault Course (CCAAC) that showed no signs of archaeological remains on the surface, or which had been subject to a high level of disturbance. The survey sought to determine a presence or absence of intact cultural deposit in these locations.

Under normal circumstances, a subsurface survey of this nature would be unlikely. Resources would not readily be invested into man hours to conduct a subsurface survey in areas exhibiting no surface indication of archaeological features, a high level of soil disturbance, and low probability of uncovering intact cultural deposit. For these reasons, subsurface testing at MMR has, in the past, always been completed within site areas or where construction has necessitated archaeological testing be done (see Section 1.1 for reference to subsurface testing projects). Moreover, subsurface archaeological investigations destroy the integrity of cultural remains, and in recent years, have been conducted less to demonstrate cultural sensitivity for the preservation of sites. However, the subsurface survey was completed to satisfy terms of a settlement agreement.

Fieldwork was completed in several weeks during three periods spanning from November 2005 to December 2006. A crew of 2-5 archaeologists was tasked to conduct fieldwork during each survey period. Fieldwork was headed by Carly Antone, B.A., Alton Exzabe, B.A., and George MacDonell, M.A., each on separate occasions under the direction of Laurie Lucking, Ph.D. The field crew conducted all operations with an unexploded ordnance technician from Donaldson Enterprises, Incorporated. In addition, observers from the Plaintiff's organization were given the opportunity to watch fieldwork operations and were on hand to do so on most occasions.

1.1 Project Chronology

Subsurface Testing within the CCAAC was previously completed on several occasions: Eble et al. (1995) tested three sites (50-80-03-4542, -4543, -4544), Williams and Patolo (2000) conducted testing at Site 50-80-03-5456, Williams et al. (2002) did one test unit each at sites -4543, -4544, and -4546, and Robins et al., (2005) completed subsurface testing at eight sites (-4537, -4538, -4542, -4543, -4544, -4545, -4546, and -4547). Each of these studies was done in locations where surface features were present, and yielded traditional Hawaiian artifacts and deposit. From the previous fieldwork, a correlation between the presence of surface remains and intact deposit is clear. Only one of the areas tested, (-5456, by Williams and Patolo, 2000) showed no signs of surface features but contained subsurface features (*imu*, or earth ovens) uncovered during grading activities. For this subsurface survey, the purpose was to test the strength of the correlation by excavating in areas without surface archaeological remains to see whether intact subsurface cultural features or deposits, like the *imu*, could be commonly found without the presence of surface features.

In planning to undertake the subsurface survey in the required areas, the level of sampling needed to be ascertained. If the subsurface survey was conducted uniformly, it would have been necessary to excavate over 28,000 test units measuring 0.5 m² positioned 10-15 meters apart over the area requiring subsurface survey to arrive at a one percent sample. This level of subsurface survey is estimated to take approximately 11 years for a crew of four working five days a week to complete. Moreover, this level of subsurface survey would be tremendously intrusive and destructive to intact cultural deposits. Therefore, the Cultural Resources Manager directed the archaeological crew in designing a stratified random sampling plan consisting of 350 shovel probes as a more reasonable strategy for subsurface survey. The survey area was divided into three area types based on terrain, amount of former ground disturbance, and site probability (based on results of former fieldwork). Figure 2 shows the sampling plan.

During the first portion of fieldwork completed in November 2005, 150 stratified random samples had been designated in sampling Area 1 and Area 3. Area 1 includes all of the range training objectives that have been subject to known disturbance during range construction. Combined, Area 1 contains 50 probes. Area 3 contains 100 shovel probes. In this area there are signs of soil disturbance and no surface indications of archaeological remains. However, Area 3 includes areas between known sites and some remnants of cultural occupation were to be expected. Survey in this area did not require a prescribed burn due to unexploded ordnance prior to work.

Area 2 could not be surveyed during the first period of survey in November 2005. The area required a prescribed burn in order to enter due to the presence of unexploded ordnance. Figure 3 shows the stratified random sampling plan for Area 2. After four attempts were made in early March 2006, the Installation Fire and Safety Office declared the fuel moisture contained in the vegetation was too great to burn. The subsurface survey in area 2 as proposed was postponed indefinitely. As an alternative, the Cultural Resources Manager proposed that the remaining 200 probes be added to the area that did not call for a prescribed burn. This survey area is described as "Alternative Area 2". Due to the unavailability of accessible areas without a prescribed burn, probe locations were not random. The 200 probes were placed roughly 5 meters apart in all available locations found within the survey area, which were primarily trails and alongside range roads. Figure 18 illustrates the alternative subsurface survey area.

In a second effort to complete the samples contained in the originally proposed sampling plan, a prescribed burn was again attempted in December 2006. On this occasion, the burn was successful and archaeologists were able to finish the final 200 stratified random probes contained in the initial sampling plan at the start of the project.

1.2 Organization of Report

The complex chronology of events that altered the original sampling plan and then returned it back again produced what may essentially be viewed as two projects. Therefore, the authors have organized this report in two distinct sections. The methodology discussion describes the difference between the original sampling plan for 350 probes and the alternative sampling plan consisting of 200 probes. This discussion is immediately followed by the primary concentration of this report, the subsurface survey results of the original sampling plan under Section 3.1.

The results of the Alternative Area 2 subsurface survey done in lieu of the prescribed burn is offered subsequent to the presentation of the results for the 350 stratified random samples under the Results heading, Section 3.2. A brief discussion of the overall findings is offered lastly. References may be found under Section 5.0.

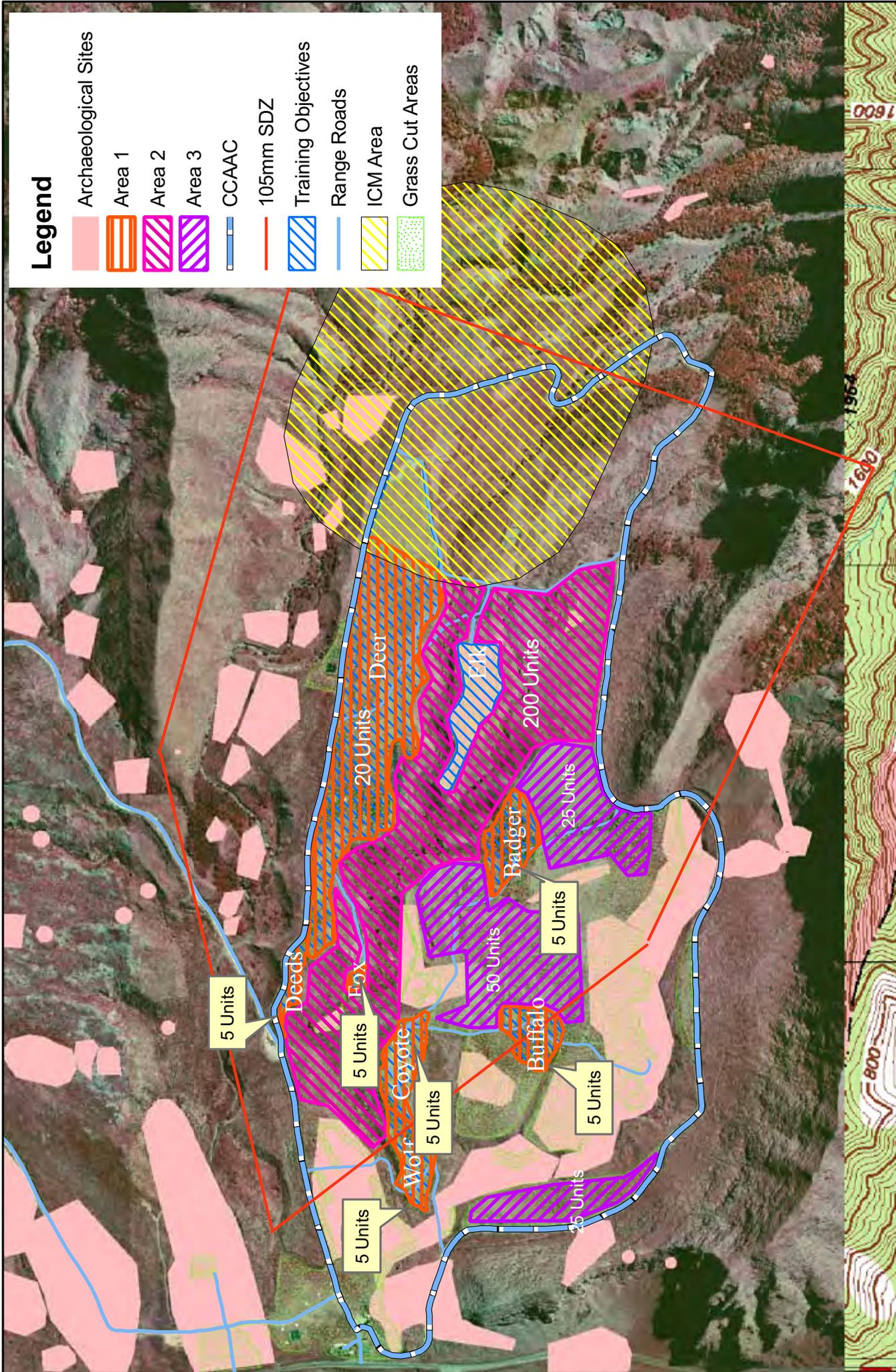


Figure 2

2.0 METHODOLOGY

Two types of sampling were done from November 2005 to December 2006. The main attention of this report is given to the original sample plan that called for 350 shovel test probes following a stratified random sample. The alternative survey area (referred to as Alternative Area 2,) contained 200 shovel test probes that were dictated by a stratified systematic sampling plan. The stratified systematic sampling plan is presented subsequent to the stratified random sampling plan below.

2.1 Stratified Random Sampling

The probes completed under the original sampling plan are the focus of this report, consisting of 350 probes. The probes governed by this plan were stratified random samples. To explain, stratified sampling in effect groups members of the population into relatively homogeneous subgroups. With random sampling each unit of the population has a known probability of occurring. It is important to note that no technique can guarantee a representative sample, but random sampling is the best means for obtaining unbiased samples.

For the 350 stratified random samples, the area subsurface tested at Makua Military Reservation was divided into three areas based on terrain, amount of former ground disturbance and site probability (based on results of former fieldwork). Area 1 contained 50 shovel tests due to known soil disturbance from extensive and widespread bulldozing during range construction. These actions lowered the probability of uncovering intact cultural deposits significantly. The purpose of these probes was to determine whether the A and B soil horizons were still in place. In Area 2, 200 subsurface probes were proposed. While there was apparent impact from ordnance and little surface indication of archaeological remains, there was a better probability that there would be intact cultural deposits on either side of the stream cut. It is commonplace to find archaeological evidence of cultural occupation along streams. Area 3 contained 100 shovel probes. In this area there were signs of soil disturbance and no surface indications of archaeological remains. However, Area 3 included areas between known sites and some remnants of cultural occupation were to be expected.

In each of the stratified locations, probe distribution was generated randomly. First, a 20 meter² grid was made for each of the three areas. Each grid was assigned a number. The random numbers chosen were computer generated and then plotted on maps. The coordinates were entered into a Global Positioning System (GPS) device to ensure accurate probe location in the field.

2.2 Stratified Systematic Sampling

The sampling completed in lieu of a prescribed burn was done in a much smaller area. The stratified area included trails and positions adjacent to range roads. Due to the size of the survey area and the number of probes to be completed (200), systematic sampling was employed. This allowed the units to be conducted uniformly across the survey area. The 200 probes were placed roughly 5 meters apart in all available locations found within the survey area (see Figure 18).

2.3 Field Methods

Despite the different sampling plans, fieldwork was lead by essentially the same guidelines. Only one distinction applies: the stratified random sampling plan used shovels to excavate all probes while the stratified systematic sampling plan used in Alternative Area 2 also engaged the aid of a gas-powered auger. A gas-powered auger was utilized in Alternative Area 2 largely because of the compacted and rocky terrain that dominated the survey area.

Each excavated probe was verified relatively safe for soil movement by an unexploded ordnance technician prior to any ground-disturbing activity. Depth of excavation varied from 5 centimeters below surface (cmbs) to 60 cmbs. Depth of any given unit was determined by sedimentary characteristics and general terrain. All excavated soils were examined using 1/8th inch screen mesh. Probe sidewalls were inspected for uninterrupted stratigraphy and intact cultural deposit.

All probes were excavated unless rejected from the survey for one or more of the following reasons:

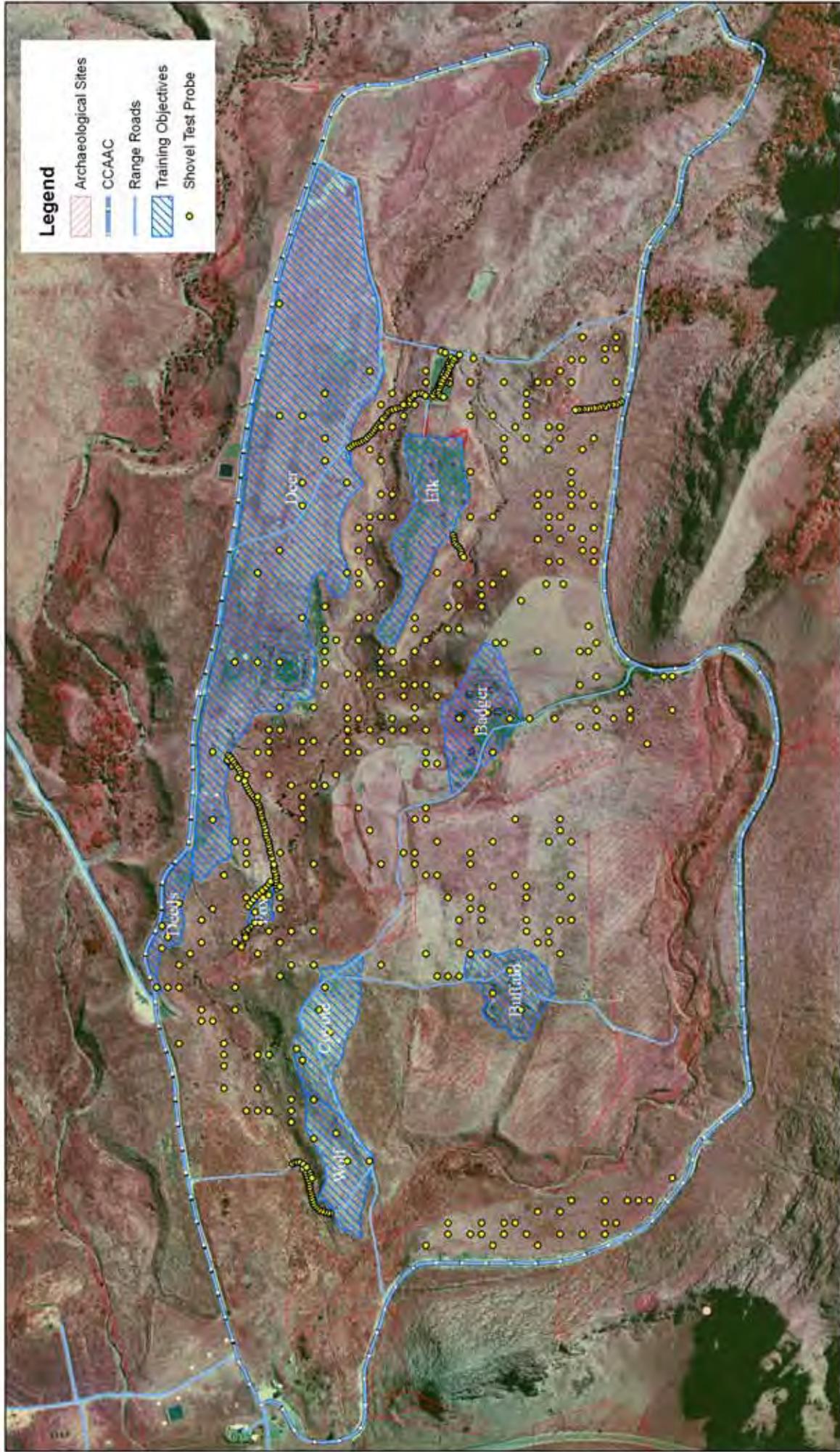
- a) Terrain was too steep to safely conduct excavation. The unexploded ordnance technician and field supervisor determined this collectively.
- b) Probe was located in a stream or other water drainage. Stream deposit is ever changing, leaving no deposit of integrity.
- c) Thick unburned vegetation (i.e., koa haole and guinea grass) covered the probe location. Patches of unburned vegetation may contain unexploded ordnance hidden from view. The unexploded ordnance technician determined entry.
- d) A metal anomaly was detected below the surface in a probe location by the unexploded ordnance technician.
- e) Probe was located in the vicinity of a previously unrecorded archaeological feature and/or site.

3.0 RESULTS

The stratified random sampling plan for 350 shovel probes resulted in a total of 277 excavated probes and 73 rejected probes attributed to one or more of the reasons listed the Field Methods section of this report. Almost all were sterile, and no conclusive cultural deposit was found. Only two probes exhibited a potential for finding intact cultural deposit, however, additional controlled subsurface testing would need to be conducted in order to determine whether these locations in fact contain cultural deposit. One of the probes with potential to hold intact cultural deposit in the immediate area displayed clearly banded stratigraphic layers, however, no cultural deposit was found within those layers. The other probe with potential to contain intact cultural deposit yielded two fire affected mammal bones (non-human). While it is possible that the bones were traditionally cooked, evidence suggests that a past fire is responsible for the charred nature of the bones. Discussion regarding these probes and other notable excavations are detailed in section 3.1. Table 1 quantifies the overall findings.

The stratified systematic sampling plan in Alternative Area 2 was completed with all of the planned 200 probes excavated. All were sterile, with no indication of intact cultural deposit found. The findings suggest that in these highly disturbed areas (alongside range roads and trails,) the A and B horizons are longer intact. Maps and statistics of this project are located in section 3.2.

Figure 3 captures a comprehensive overview combining the two projects to show the locations of all 550 probes.



Makua Military Reservation
 Subsurface Survey within the CCAAC
 550 Shovel Test Probes (STP)
 Nov05-Dec06

0 100 200 400 600 800 Meters



Figure 3

**Makua Military Reservation Subsurface Survey Results
350 Stratified Random Samples**

STP Area	Total Number of STP Planned	Total Number of STP Excavated	Total Number of STP with Notable Deposit and/or Surface Indication of Site	Total Number of STP Unexcavated	Unexcavated Due to Presence of Previously Unrecorded Archaeological Features
Badger	5	5	0	0	0
Buffalo	5	5	0	0	0
Coyote	5	5	0	0	0
Deeds	5	3	0	2	0
Deer	20	19	0	1	0
Fox	5	5	0	0	0
Wolf	5	5	0	0	0
2a	50	41	1	9	0
2b	50	32	2	18	0
2c	25	12	0	13	1
2d	75	48	0	27	1
3a	25	25	0	0	0
3b	50	46	0	4	0
3c	25	25	0	0	0

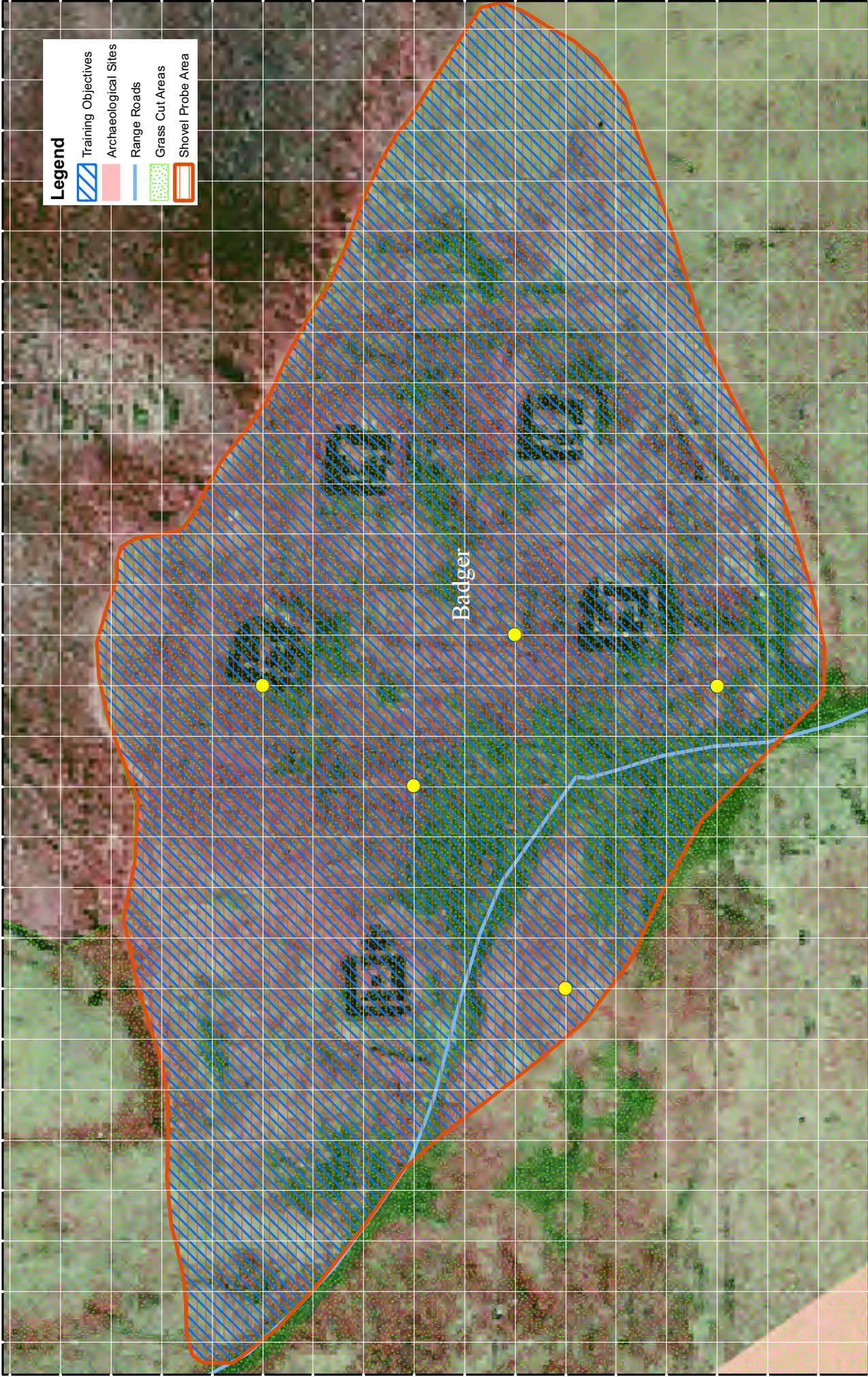
Table 1. Overview of Numerical Results of Stratified Random Sampling Plan

3.1 Stratified Random Sampling Plan Results

Area 1 was composed of all training objectives and contained 50 shovel probes. Of those, 47 were excavated and three were rejected for one or more reasons listed in the Field Methods section of this report. All excavated probes were sterile. Figures 4 through 10 illustrate these results.

Probe Area	Total Number of Probes Planned	Total Number of Probes Completed	Cultural Deposit Present? Yes/No
Badger	5	5	No
Coyote	5	5	No
Wolf	5	5	No
Fox	5	5	No
Buffalo	5	5	No
Deeds	5	3	No
Deer	20	19	No

Table 2. Showing numerical results of Area 1.



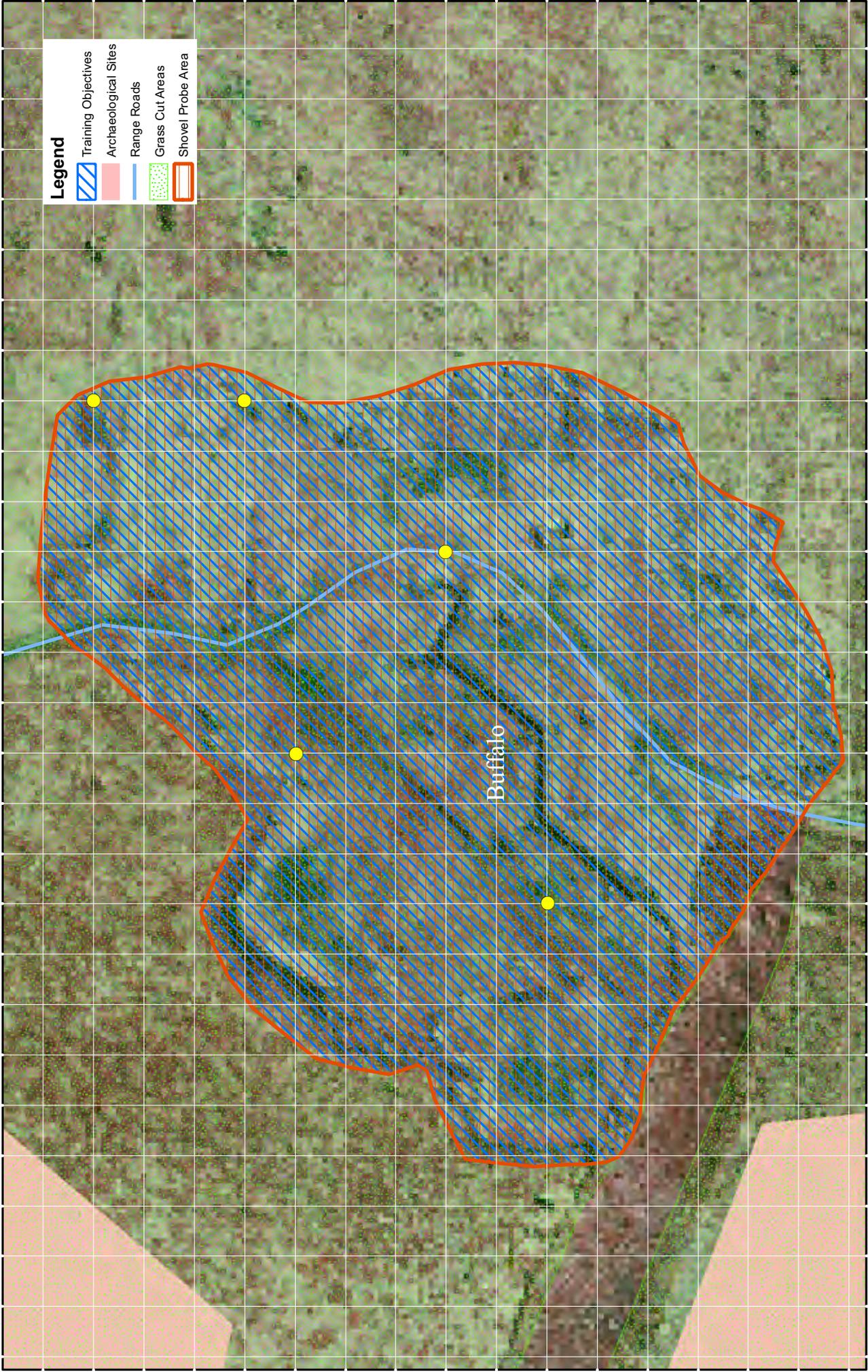
Legend

-  Training Objectives
-  Archaeological Sites
-  Range Roads
-  Grass Cut Areas
-  Shovel Probe Area

Makua Military Reservation
 Subsurface Survey Area
 Objective Badger: 5 Shovel Test Probes (STP)
 ● : Excavated Shovel Test Probe (5)
 ● : Unexcavated Shovel Test Probe (0)



Figure 4



Legend

-  Training Objectives
-  Archaeological Sites
-  Range Roads
-  Grass Cut Areas
-  Shovel Probe Area

Makua Military Reservation

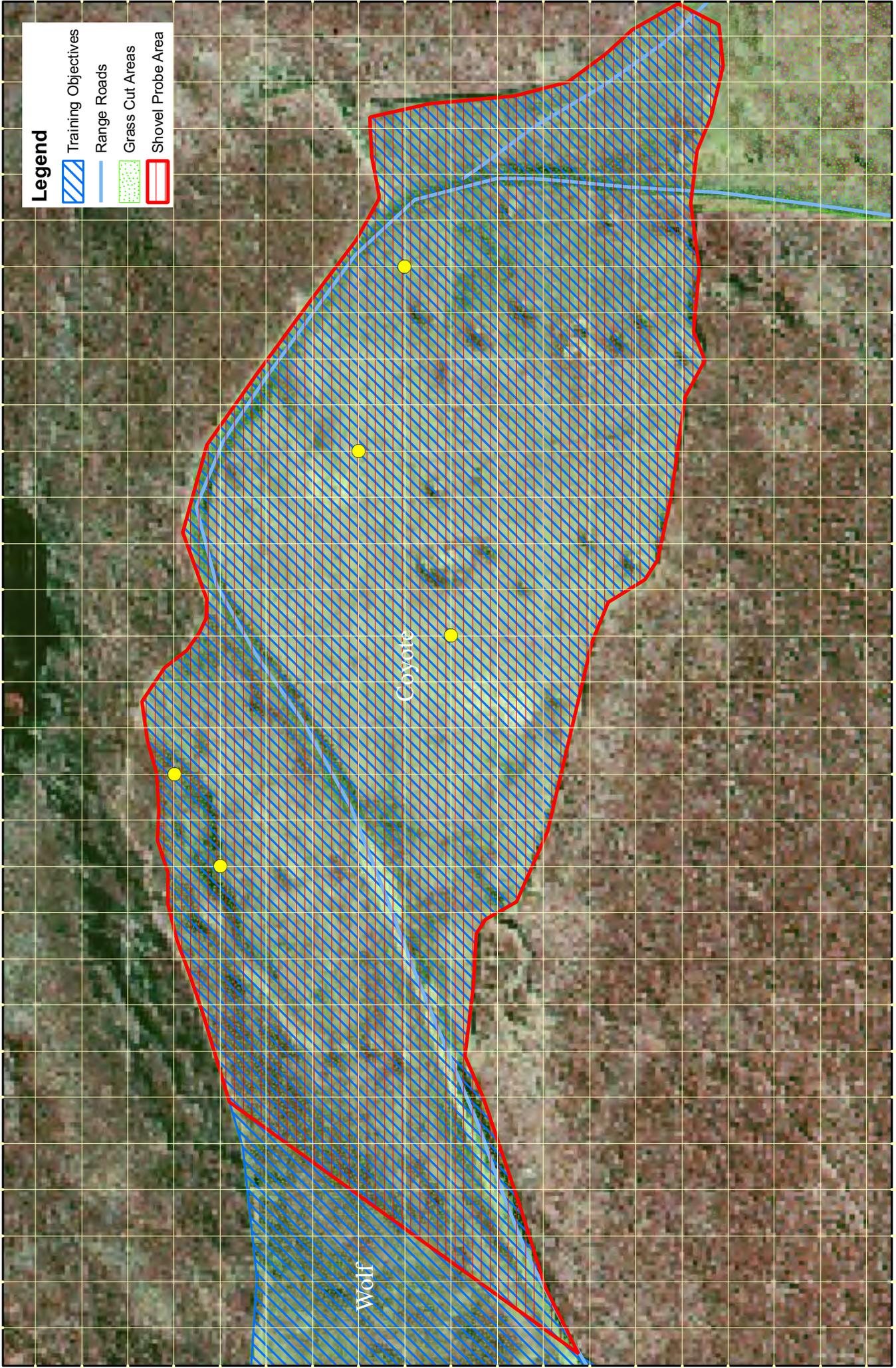
Subsurface Survey Area

Objective Buffalo: 5 Shovel Test Probes (STP)

-  : Excavated Shovel Test Probe (5)
-  : Unexcavated Shovel Test Probe (0)



Figure 5



Makua Military Reservation

Subsurface Survey Area

Objective Coyote: 5 Shovel Test Probes (STP)

● : Excavated Shovel Test Probe (5)

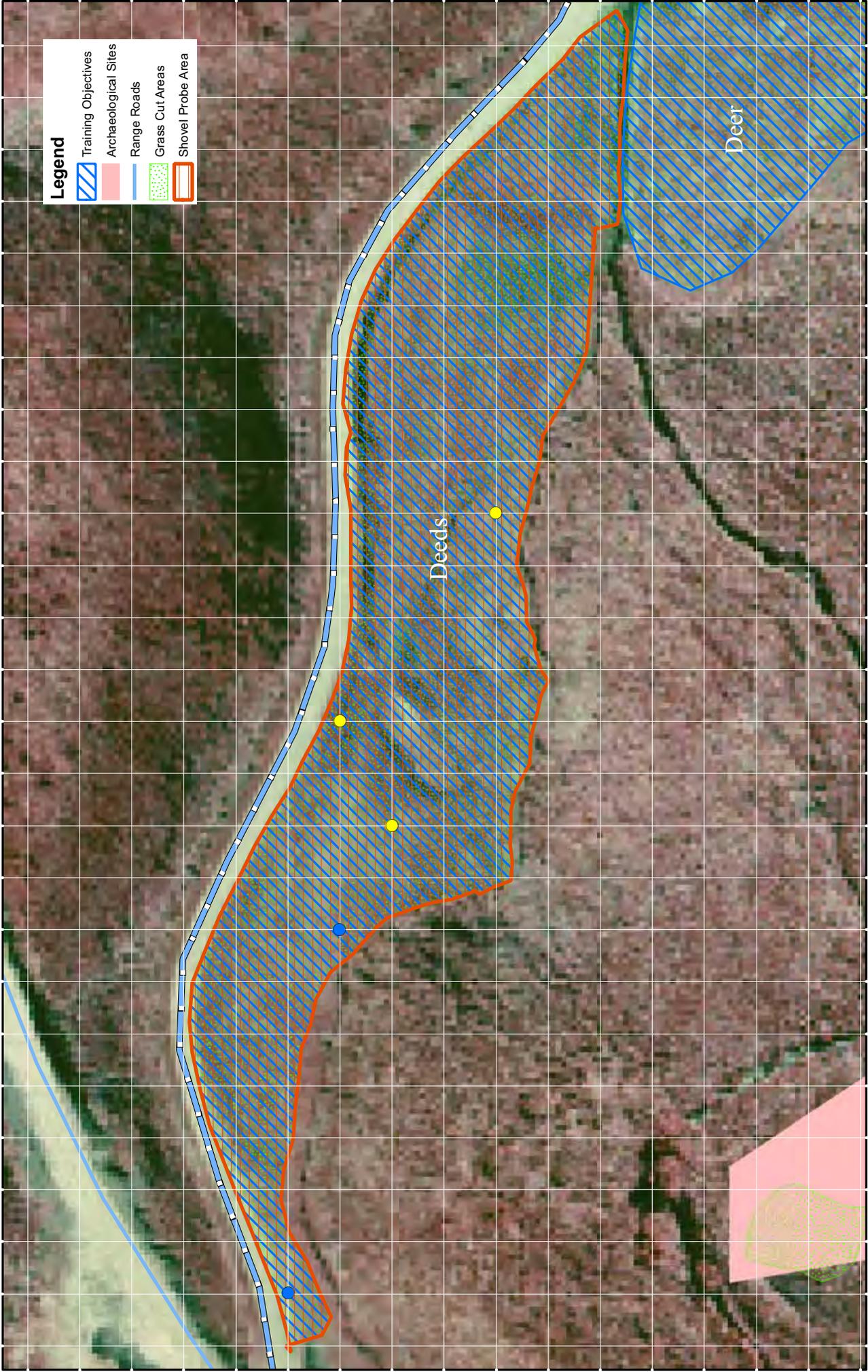
● : Unexcavated Shovel Test Probe (0)

0 10 20 40 60 80 Meters



Figure 6





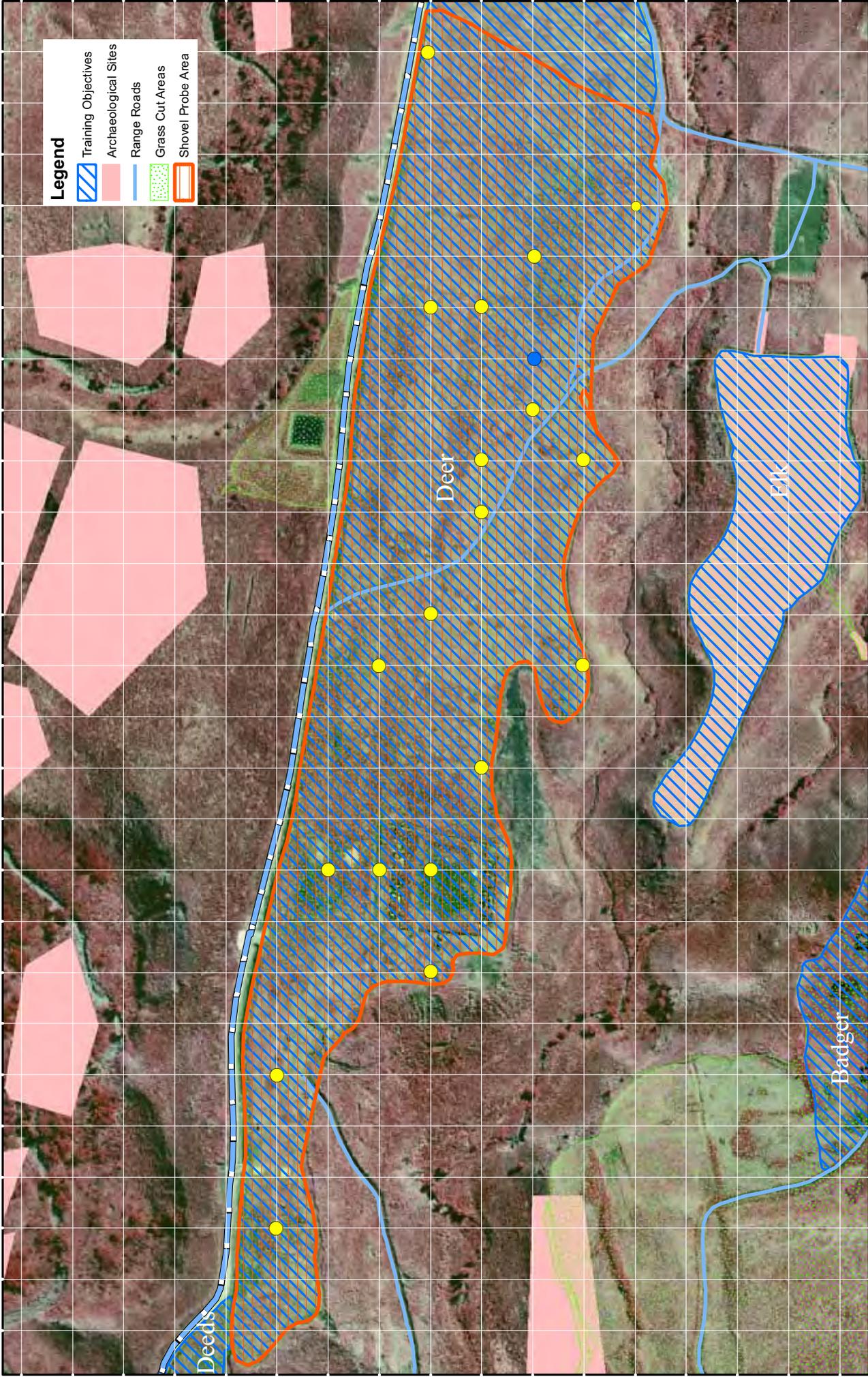
Makua Military Reservation
 Subsurface Survey Area
 Objective Deeds: 5 Shovel Test Probes (STP)
 ● : Excavated Shovel Test Probe (3)
 ● : Unexcavated Shovel Test Probe (2)

0 10 20 40 60 80 Meters



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 Cultural Resources
 January 2007

Figure 7



Makua Military Reservation

Subsurface Survey Area

Objective Deer: 20 Shovel Test Probes

- : Excavated Shovel Test Probe (1)
- : Unexcavated Shovel Test Probe (19)

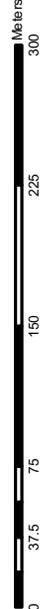
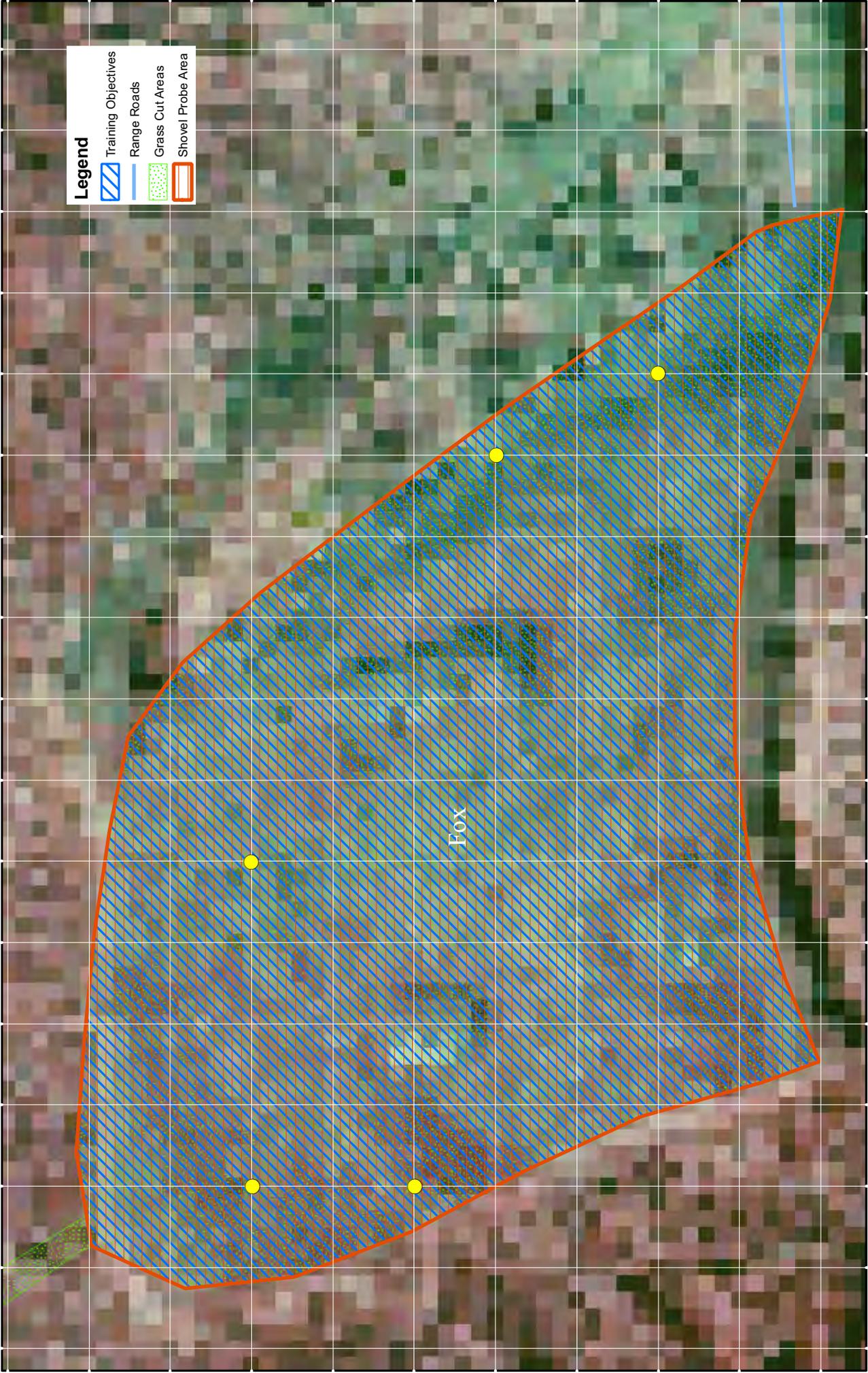
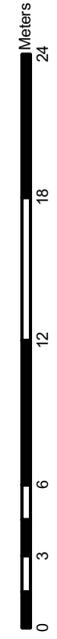


Figure 8



Legend

-  Training Objectives
-  Range Roads
-  Grass Cut Areas
-  Shovel Probe Area

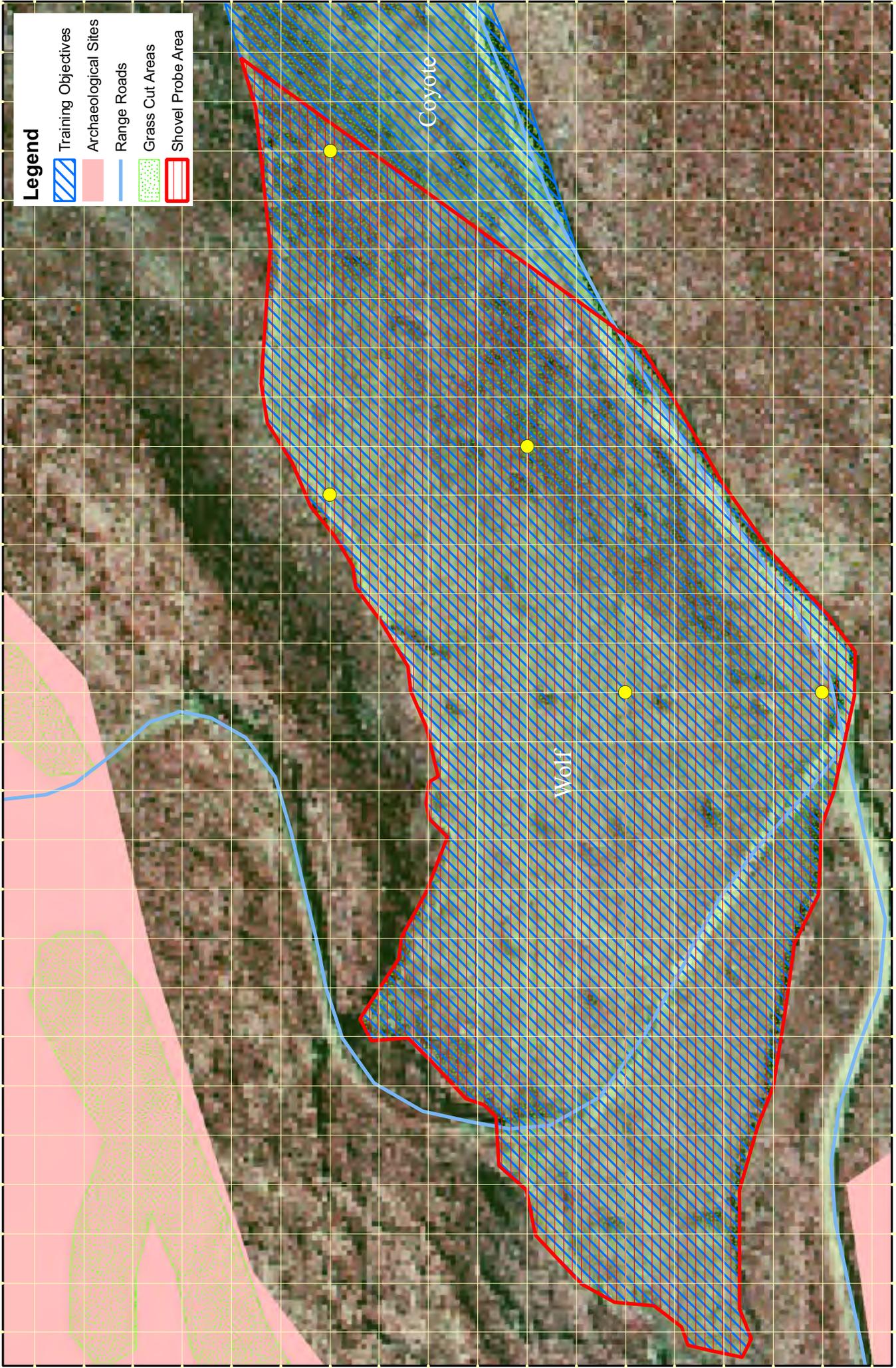


Makua Military Reservation
 Subsurface Survey Area
 Objective Fox: 5 Shovel Test Probes (STP)

-  : Excavated Shovel Test Probe (5)
-  : Unexcavated Shovel Test Probe (0)



Figure 9



Legend

-  Training Objectives
-  Archaeological Sites
-  Range Roads
-  Grass Cut Areas
-  Shovel Probe Area

Makua Military Reservation

Subsurface Survey Area

Objective Wolf: 5 Shovel Test Probes

 : Excavated Shovel Test Probe (5)

 : Unexcavated Shovel Test Probe (0)

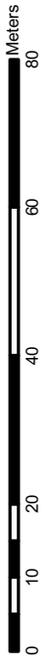
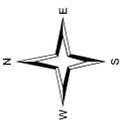


Figure 10

Area 2 was divided into four areas (2a, b, c, and d), for a total number of 200 probes. 133 were excavated, and 67 were rejected due to one or more of the reasons given in the Field Methods section. Several notable probes are discussed below.

Area 2a, Shovel Probe #173

Shovel probe 173 was located within Area 2a on a flat bank on the south side of a streambed in a slight depression. Excavation yielded two fragmented fire affected unidentifiable large mammal bones at 20 cmbs, each piece measuring approximately 5 cm in length. It is the archaeologists' professional opinion that the bones were non-human, more likely belonging to a pig or dog. The bones were not found within a cultural layer of the stratigraphy. In fact, no stratigraphic layer changes were observed. While there is a potential that these items have been charred in some cultural context (i.e., cooking), the uniform stratigraphy and lack of a cultural layer, the absence of a hearth or any other traditional Hawaiian archaeological features, and shallow provenience of the items make it difficult to attribute the fire affected mammal bones to traditional activities. Proximity to the stream and terrain of this flat bank with few rocks and highly silty deposit suggests this area is a floodplain.

The deposit was evaluated, the bones were left in situ, and the probe was closed. No cultural deposit, midden, etc. were found in the probe. Soil is described as reddish black silty loam. No traditional Hawaiian surface features were observed in the vicinity; The nearest archaeological feature lies more than 20 m away, first identified by Eble et al. (1995) as a modern military c-shape.

Area 2b, Shovel Probe #212

Shovel probe 212 exhibited the highest potential for finding intact cultural deposit in the extended area. The probe contained uninterrupted stratigraphic layers. Layer I is described as dark brown silty clay loam. From 20-30 cmbs a second layer was apparent, being described as black silty loam. Layer III occurred from 30-40 cmbs, and is described as dark reddish brown silty clay loam. While no cultural deposit was evident, further investigation of the probe location revealed its position was on the level soil area of a previously unrecorded remnant rock retained soil terrace.

Area 2b, Shovel Probe #228

Probe 228 probe was done in a remnant extent of an unrecorded site area in Area 2b. The unrecorded features included several rock retained soil terraces and remnant mounds. Excavation measured from 0-45 cmbs. No layer distinctions were made, the deposit being described as very dark brown silty loam. However, this probe was absent of cultural deposit, perhaps indicating the westernmost extent of the site.

Area 2c, Shovel Probe #270

Area 2c, Probe 270 was rejected from the subsurface survey. The location of this probe was in an area containing a series of three previously unrecorded mounds and several other previously unrecorded archaeological features. The presence of surface features indicates traditional cultural use, removing the need to excavate the area for cultural deposit below the surface.

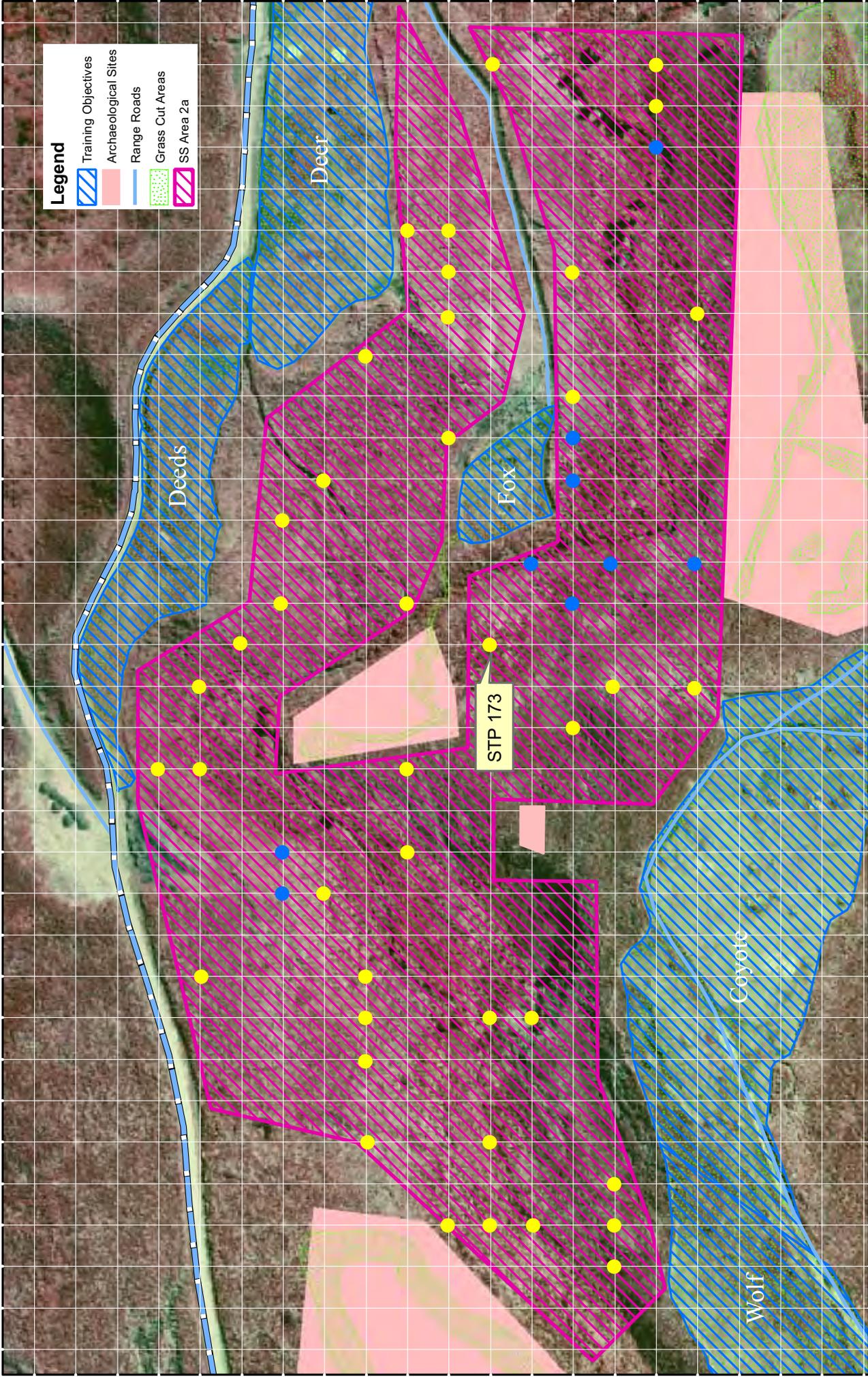
Area 2d, Shovel Probe #340

Probe 340 was also rejected from the subsurface survey. A previously unrecorded kiawe fence post with wire fencing was located at the probe position and continued to run in a north/south direction for approximately 150 meters or more. This is probably associated with historic ranching activities.

Figures 11 through 14 indicate each probe's characteristics as either excavated or unexcavated, with labels describing individual probes discussed in this section.

STP Area	Total Number of STP Planned	Total Number of STP Excavated	Total Number of STP with Notable Deposit and/or Surface Indication of Site	Total Number of STP Unexcavated	Unexcavated Due to Presence of Previously Unrecorded Archaeological Features
2a	50	41	1	9	0
2b	50	32	2	18	0
2c	25	12	0	13	1
2d	75	48	0	27	1

Table 3. Showing numerical results of Area 2.



Makua Military Reservation

Subsurface Survey Area 2a

Parcel Surrounding Objective Fox:

50 Shovel Test Probes (STP)

- : Excavated Shovel Test Probe (41)
- : Unexcavated Shovel Test Probe (9)

0 20 40 80 120 160 Meters

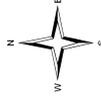
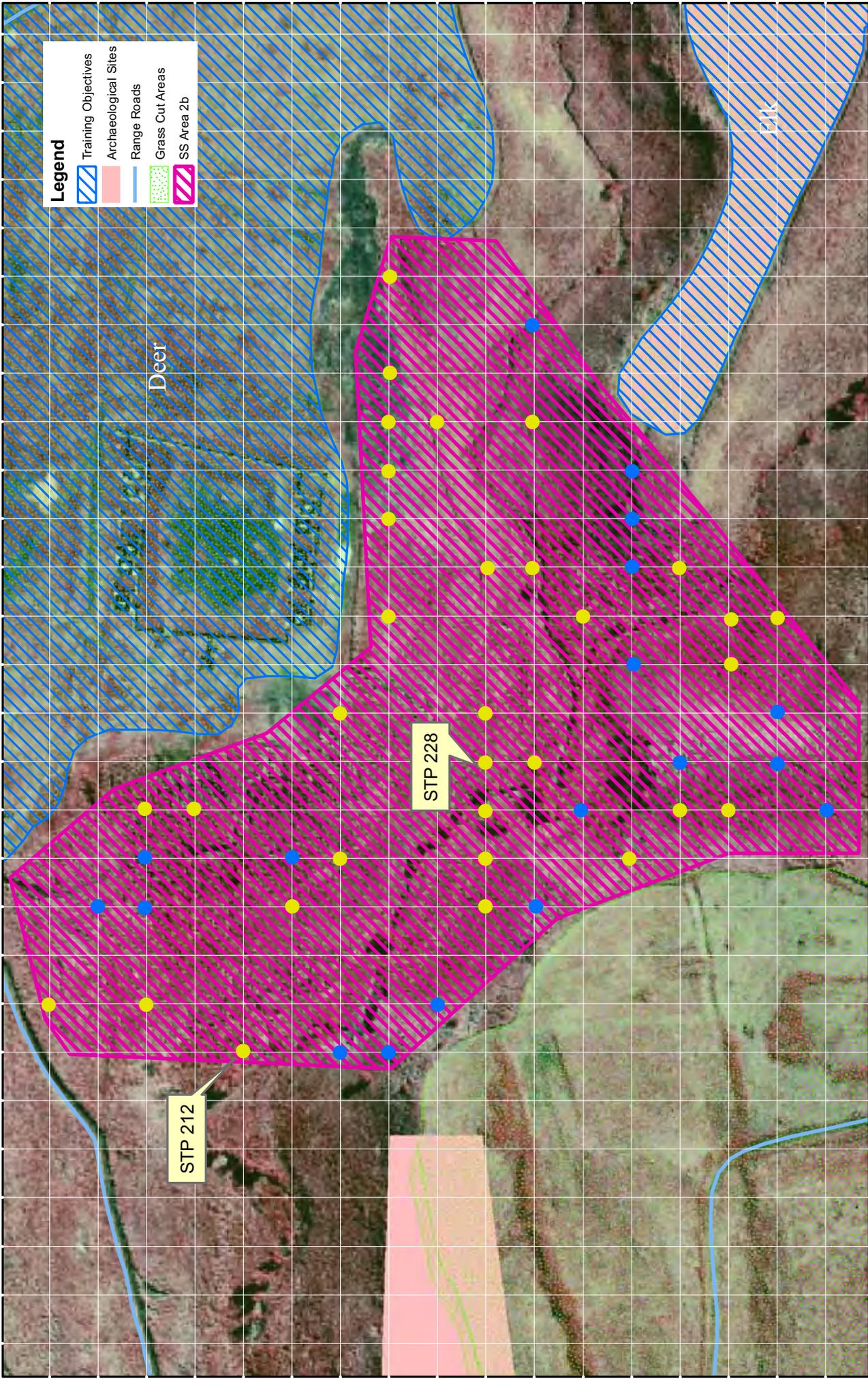


Figure 11



Makua Military Reservation
 Subsurface Survey Area 2b
 Parcel West of Objective Elk
 50 Shovel Test Probes (STP)

- : Excavated Shovel Test Probe (32)
- : Unexcavated Shovel Test Probe (18)



Figure 12



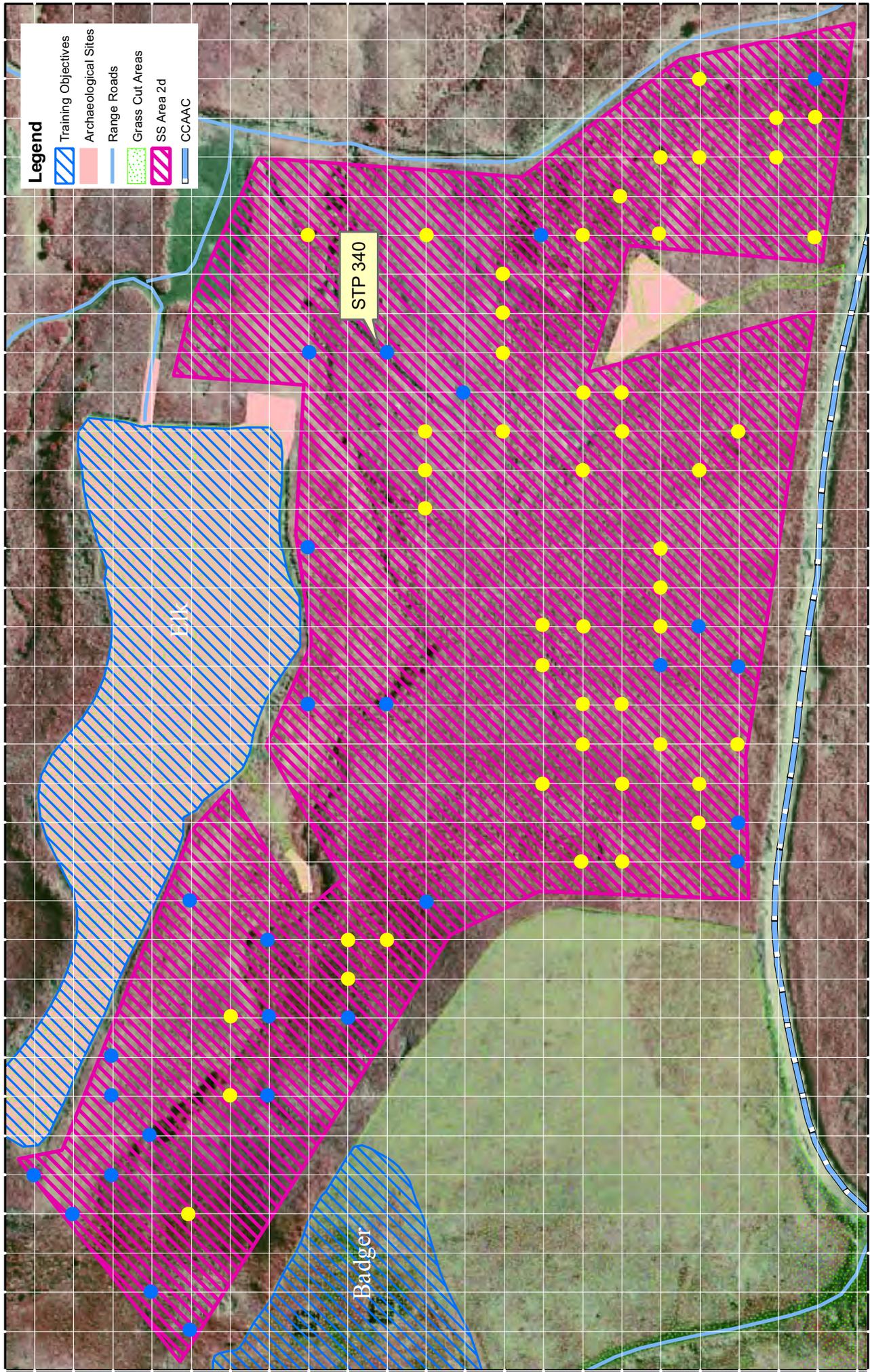
Makua Military Reservation
 Subsurface Survey Area 2c
 Parcel North of Elk:
 25 Shovel Test Probes (STP)

- : Excavated Shovel Test Probe (12)
- : Unexcavated Shovel Test Probe (13)



DPW Environmental
 Cultural Resources
 January 2007

Figure 13



Legend

- Training Objectives
- Archaeological Sites
- Range Roads
- Grass Cut Areas
- SS Area 2d
- CCAAC

Makua Military Reservation
 Subsurface Survey Area 2d
 Parcel South of Objective Elk:
 75 Shovel Test Probes (STP)

● : Excavated Shovel Test Probe (48)
 ● : Unexcavated Shovel Test Probe (27)

0 20 40 80 120 160 Meters

N
 W E S

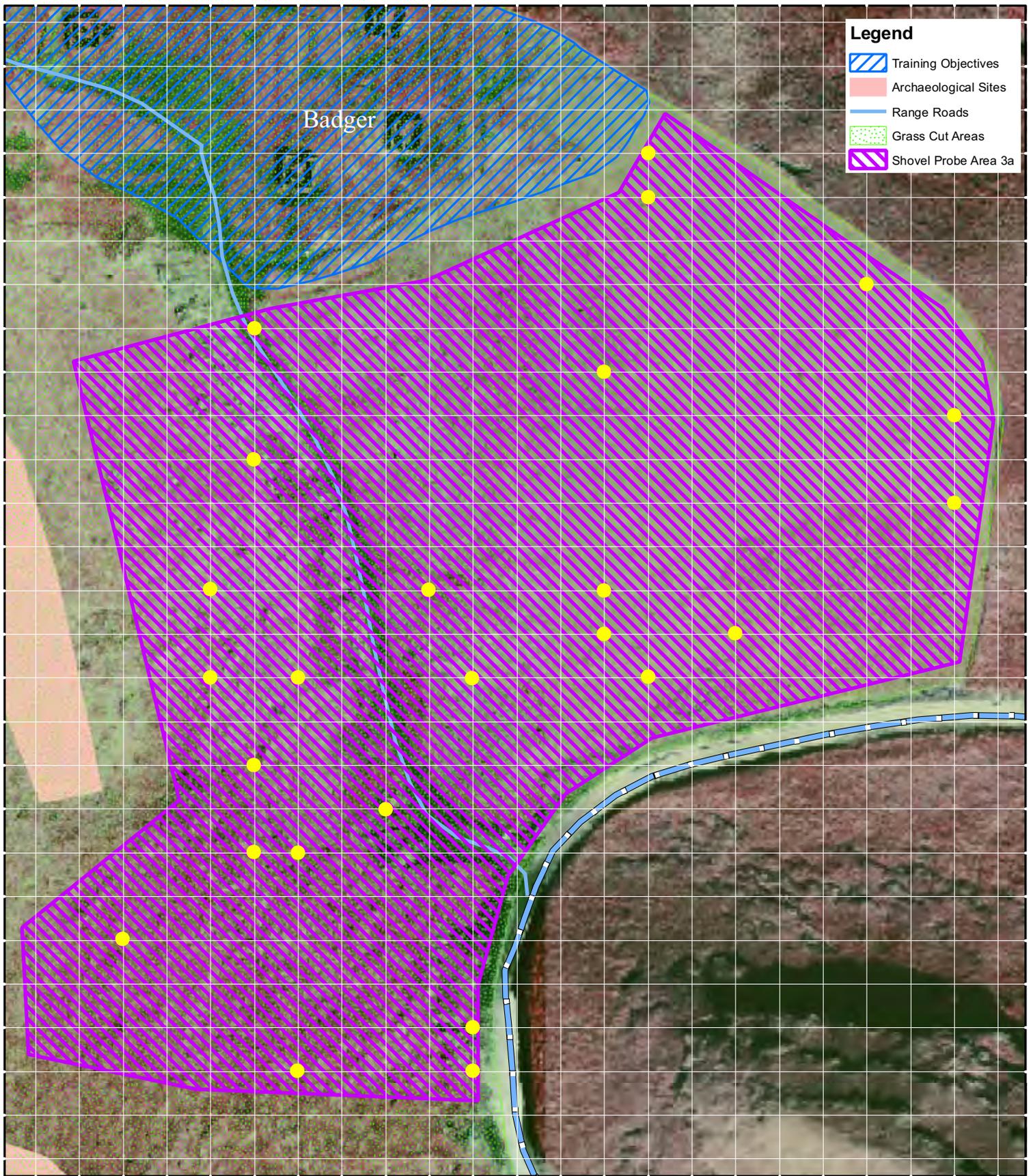


Figure 14

Area 3 was allotted 100 shovel probes. Four of these went unexcavated due to one or more of the reasons listed under the Field Methods section. All of the excavated probes were sterile, with no cultural deposit found. Figures 15 through 17 demonstrate these results.

Probe Area	Total Number of Probes Planned	Total Number of Probes Completed	Cultural Deposit Present? Yes/No
3a	25	25	No
3b	50	46	No
3c	25	25	No

Table 4. Showing numerical results of Area 3.



- Legend**
-  Training Objectives
 -  Archaeological Sites
 -  Range Roads
 -  Grass Cut Areas
 -  Shovel Probe Area 3a

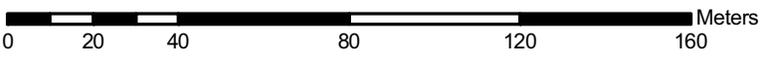
Badger

Makua Military Reservation

Subsurface Survey Area 3a
 Parcel Between South Fuel Break Road
 and Objective Badger:

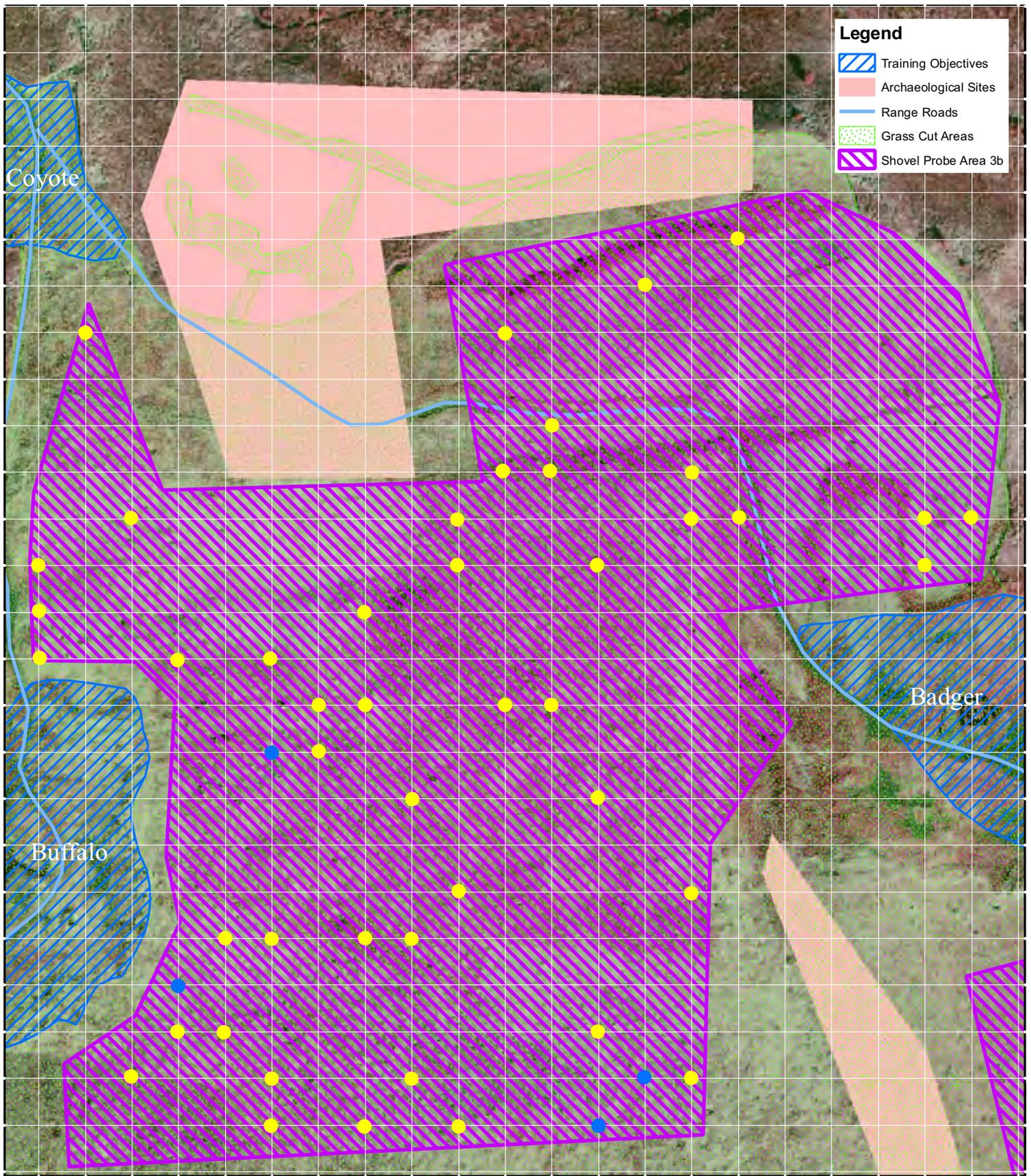
25 Shovel Test Probes (STP)

-  : Excavated Shovel Test Probe (25)
-  : Unexcavated Shovel Test Probe (0)



DPW Environmental
 Cultural Resources
 January 2007

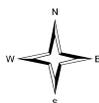
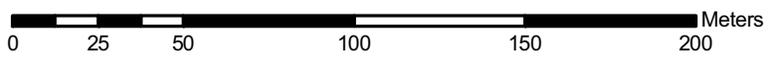
Figure 15



Makua Military Reservation

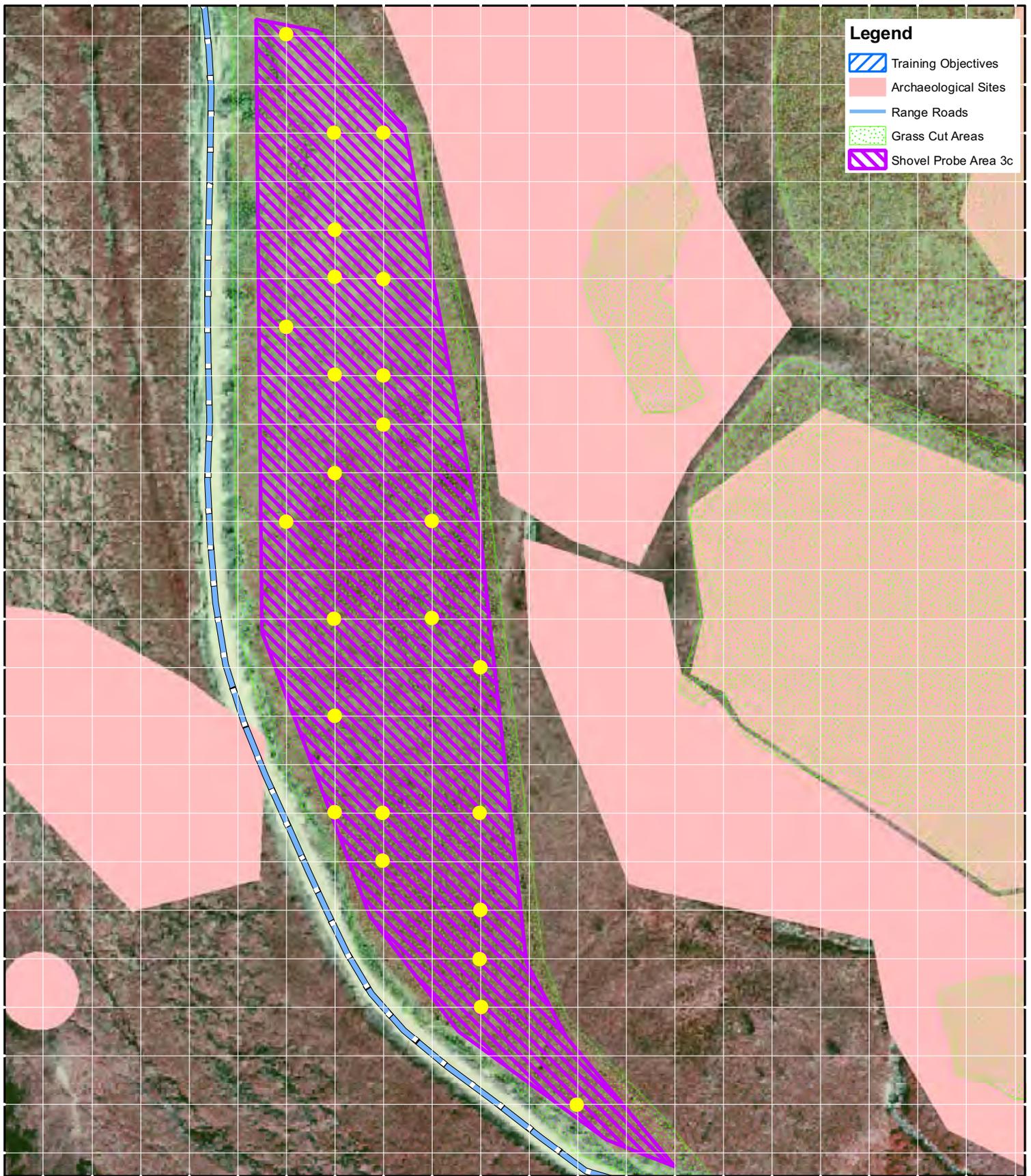
Subsurface Survey Area 3b
 Parcel Between Objective Buffalo
 and Objective Badger: 50 Shovel Test Probes (STP)

- : Excavated Shovel Test Probe (46)
- : Unexcavated Shovel Test Probe (4)



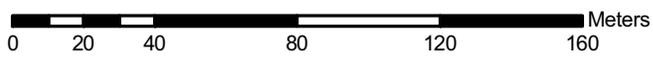
DPW Environmental
 Cultural Resources
 January 2007

Figure 16

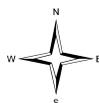


Makua Military Reservation

Proposed Subsurface Survey Area 3c
 Parcel Between South Fuel Break Road
 and the West Side of Kalena Stream: 25 Shovel Test Probes (STP)



- : Excavated Shovel Probe (25)
- : Unexcavated Shovel Probe (0)



DPW Environmental
 Cultural Resources
 January 2007

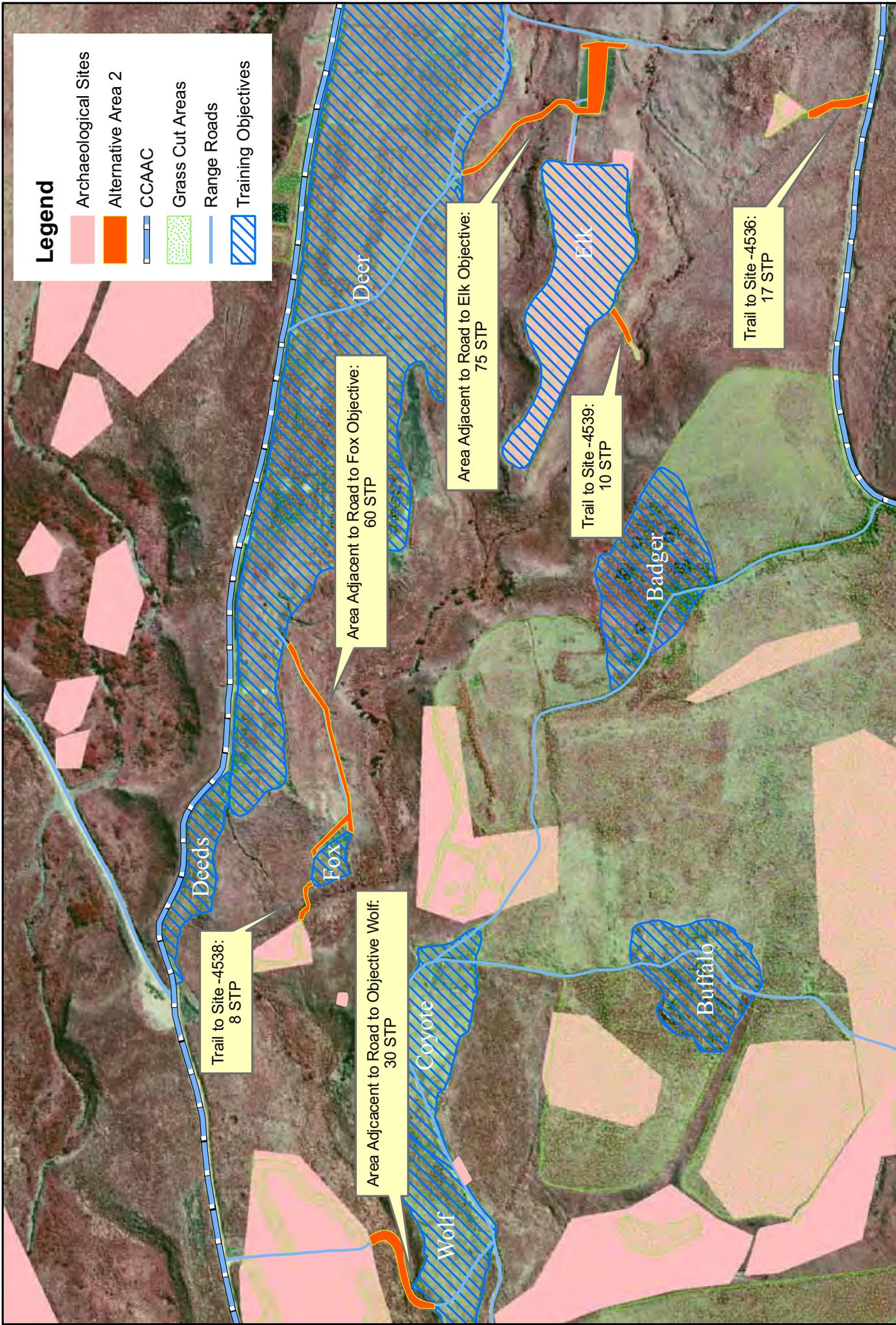
Figure 17

3.2 Stratified Systematic Sampling Plan Results

Alternative Area 2 contained 200 shovel probes. All 200 were excavated, some with the aid of a gas-powered auger. Excavation depth varied from 5 cmbs to 60 cmbs, depending on sedimentary characteristics and general terrain. All were sterile with no cultural deposit noted. Figures 18-19 show the Alternative Subsurface Survey Area and Results, respectively.

Description of Probe Area	Total Number of Probes at ~5 Meters Apart	Total Number of Probes Executed	Cultural Deposit Present? Yes/No
Trail to Site -4538	8	8	No
Area Adjacent to Road to Fox Objective	60	60	No
Trail to Site -4539	10	10	No
Area Adjacent to Road to Elk Objective	75	75	No
Trail to Site -4536	17	17	No
Area Adjacent to Road to Objective Wolf	30	30	No

Table 5. Showing Alternative Area 2 numerical results.



Makua Military Reservation

Location of Alternative Area 2
 Subsurface Survey
 200 Shovel Test Probes (STP)

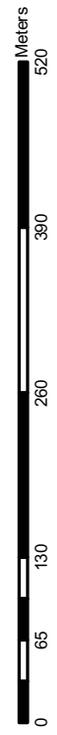
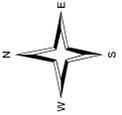
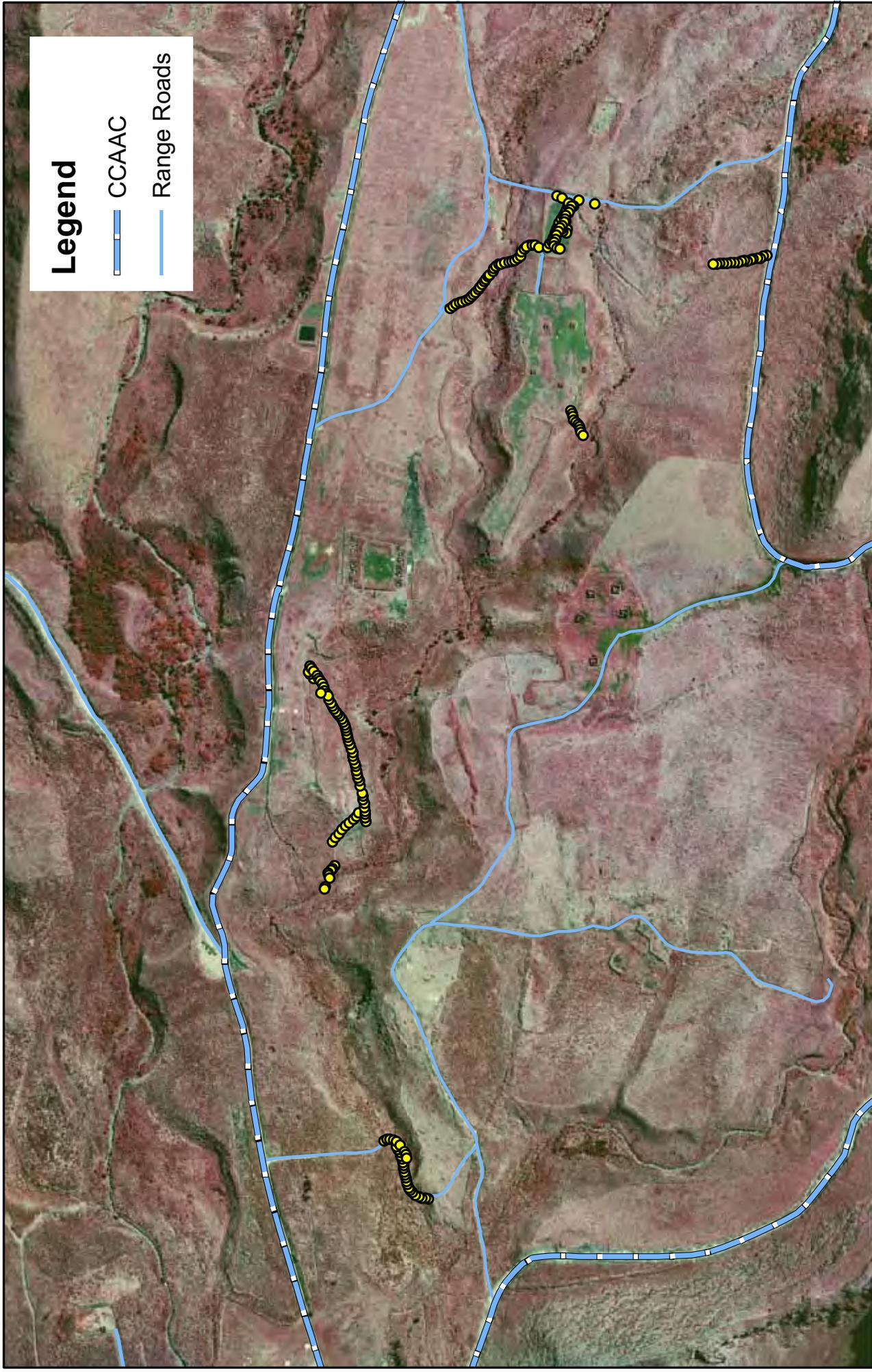


Figure 18



Legend

-  CCAAC
-  Range Roads

Makua Military Reservation

Subsurface Survey
 Alternative Area 2
 200 Shovel Test Probes (STP)

-  : Excavated Shovel Test Probe (200)
-  : Unexcavated Shovel Test Probe (0)



Figure 19

4.0 FINDINGS

The stratified random sampling and the stratified systematic sampling resulted in several findings. Areas 1, 2, and 3 under the original sampling plan are discussed below first; Conclusions from the Alternative Area 2 stratified systematic plan follows.

The findings for original sampling plan covering 350 probes are arranged here according to survey area. In Area 1, the training objectives, 50 subsurface probes further confirmed that the A and B horizons had been completely removed during the construction of these, leaving no contextual deposit.

Area 2, where no surface archaeological remains were present, was stratified into four parcels of 50, 50, 25, and 75 probes distributed by parcel size. Findings were a mixed bag, showing that in areas where no surface indicators were observed, no intact cultural deposit was found, and that in areas containing remnant features there was a potential for cultural deposit (see results for Probes 173 and 212). Furthermore, at least three previously unrecorded archaeological site areas were observed in Area 2, comprised of several features in each area. The Cultural Resources Section archaeologists have planned to undertake the task of recordation, detailed mapping, and GPS data collection of the unrecorded features in a separate project on a later date.

Finally, Area C, containing 100 probes, included locations between known sites and areas displaying some evidence of disturbance, yielded no cultural deposit. The findings suggest that known site boundary buffers have been accurately depicted.

Findings in Alternative Area 2 confirm assumptions drawn from known activities to have occurred in this stratigraphic area. Alternative Area 2, defined as alongside range roads and trails, are known to have been subject to soil disturbance when being built. All 200 of the probes planned for this area were excavated, and all were sterile. The findings substantiate the assumption that the A and B horizons were removed by the construction activity.

5.0 REFERENCES

Eblé, F. J., P. L. Cleghorn, et al.

- 1995 Archaeological Investigations at Proposed MK-19 Range, Makua Military Reservation, Wai'anae District, O'ahu, Prepared for the U.S. Army Corps of Engineers, Fort Shafter, HI. BioSystems Analysis, Inc., Kailua, Hawai'i.

Robins, J. J., L. Gilda, et al.

- 2005 Final Report—Archaeological Subsurface Testing and Survey of Sites in the Company Combined Arms Assault Course, Makua Military Reservation, Mākua Ahupua'a, Wai'anae District, O'ahu Island, Hawai'i (TMK 8-2-01). Prepared for the U.S. Army Corps of Engineers, Fort Shafter, HI. Garcia and Associates (GANDA), Kailua, HI.

Williams, S. S. and T. Patolo

- 2000 Final Report—Intensive Archaeological Survey and Monitoring for Proposed Modifications to the Company Combined Assault Course (CCAAC) and Construction of a Fire Access Trail at the U.S. Army Makua Military Reservation, Makua Valley, Island of Oahu, Hawaii. Prepared for the U.S. Army Engineer Division, Fort Shafter, HI. Ogden Environmental and Energy Services Co., Inc. Honolulu, Hawai'i.

Williams, S., J. Robins, et al.

- 2002 Final Report—Historic Preservation Studies and Investigations for Firebreak Road Improvements at the U.S. Army Makua Military Reservation, O'ahu Island, Hawaii. Prepared for the U.S. Army Corps of Engineers, Fort Shafter, HI, Ogden Environmental and Energy Services Co., Inc., Honolulu, Hawai'i.

**APPENDIX A- Project Notification and
Distribution List, November 17 2005**



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
SCHOFIELD BARRACKS, HAWAII 96857-5000

NOV 17 2005

Directorate of Public Works

Mr. Peter Young
Chairman and State Historic Preservation Officer
Department of Land and Natural Resources
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawai'i 96707

Dear Mr. Young:

The US Army Garrison, Hawai'i (USAG-HI) is writing to inform you of a requirement to carry out archaeological subsurface survey at Makua Military Reservation, (TMK: 1-8-1:01), O'ahu Island. The subsurface survey must be completed to satisfy the instructions set forth in the Makua Settlement Agreement and Stipulated Order dated 2001, *Mālama Mākua v. Rumsfeld, et al.*, (Civil No. 00-00813 SOM LEK).

The Settlement Agreement requires subsurface survey to occur within the Company Combined Assault Course (CCAAC) circumscribed by the South Fuel Break, and Surface Danger Zone (SDZ) of the 105 mm artillery round defined in that document. Surface surveys and a total of 9 sites with 61 test units, 6 shovel probes and 2 trench profiles have been previously completed within the area (see enclosure 1). Areas where either extensive disturbance has occurred (i.e., training objectives, bulldozed areas) and areas where there are no surface indications of archaeological remains (outside the extent of what may be considered an archaeological site) are directed for subsurface survey by the Settlement Agreement at this time.

If the subsurface survey area was conducted uniformly, including areas exhibiting high levels of soil disturbance, it would be necessary to excavate over 28,000 test units measuring 0.5 m² situated 10-15 meters apart over the area proposed for subsurface survey to arrive at a one percent sample (see enclosure 2). However, this level of survey would take approximately 11 years to complete, estimating 10 units completed a day in a five day week with a crew of four. This level of subsurface survey would be tremendously intrusive and destructive to intact cultural deposits.

USAG-HI has developed a more attainable goal in the form of a stratified random sample of the proposed survey area. This sampling plan consists of a minimum of 350 shovel test probes distributed throughout the survey area based on terrain, amount of former ground disturbance and site probability (based on results of former fieldwork).

Enclosure 3 describes the distribution of subsurface survey probes. Area 1 contains 50 probes due to known soil disturbance from extensive and widespread bulldozing during range construction. These actions lower the probability of uncovering intact cultural deposit significantly. In Area 2, 200 subsurface probes have been proposed. While there is apparent impact from ordnance and little surface indication of archaeological remains, there is a better probability that there would be intact cultural deposits on either side of the stream cut. It is commonplace to find archaeological evidence of cultural occupation along streams. Area 3 proposes 100 shovel probes. In this area there are signs of soil disturbance and no surface indications of archaeological remains. However, Area 3 includes areas between known sites and some remnants of cultural occupation are to be expected. It is important to note that these places are not utilized in training activities (other than foot maneuvers) due to the threat it would pose to the known archaeological sites nearby. Subsurface survey here would actually cause more impact to the section than it currently receives from training, accounting for the reduced number of shovel probes allotted.

The test probes are optimistically estimated to take 35 working days to complete with 4-5 crew members. It is anticipated that additional time will be needed to allow for scheduling, a prescribed burn prior to survey in Area 2 for unexploded ordnance identification and avoidance.

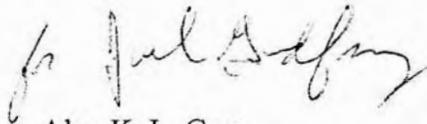
The subsurface survey will be completed by Cultural Resources staff archaeologists with the aid of an unexploded ordnance escort who will verify reasonably safe conditions for soil movement at the surface and every ten centimeters thereafter. Thus, areas that are deemed too dangerous by the project's associated safety personnel, unexploded ordnance escort, or field supervisor to access or be subsurface sampled will be ineligible for testing. This will subsequently cause the sampling plan to be scaled back.

All subsurface activities will be documented on standardized forms. If any materials are collected they will be recorded, appropriately analyzed and ultimately curated. In the case that human remains or other items characterized under the Native American Graves Protection and Repatriation Act (NAGPRA) are encountered, all activities will cease and the directives of NAGPRA will be followed.

The Cultural Resources Section emphasizes that this project has limited potential of producing significant data about the whole of Mākua, as obtaining a representative sample of the designated survey area cannot be plausibly realized. Furthermore, the Cultural Resources Section is devoted to the preservation of cultural resources and is aware of the project's intrusive nature, but is legally bound by the Settlement Agreement to perform the subsurface survey.

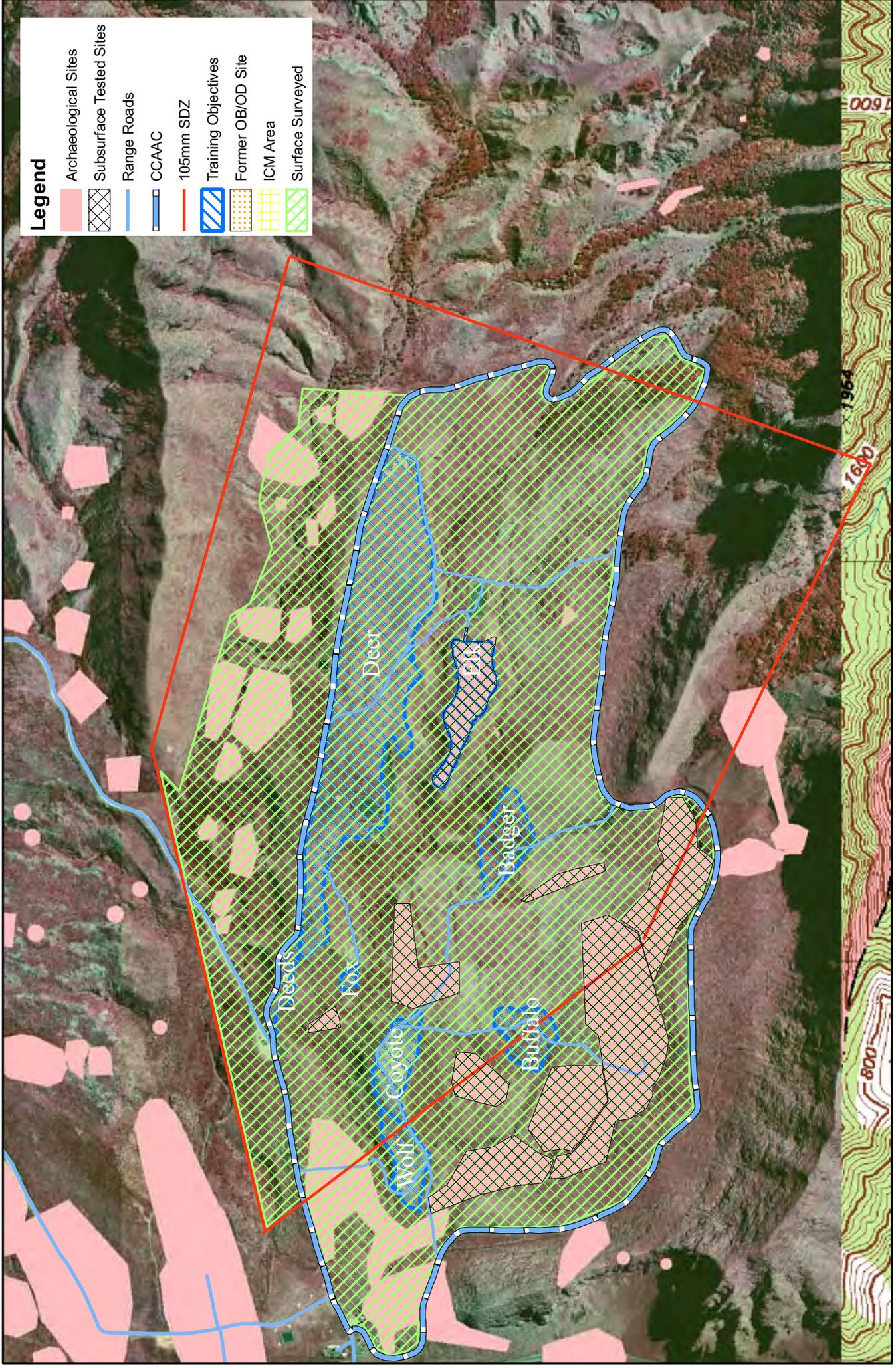
If you would like further clarification on this requirement or would like to have your concerns recorded, we urge you to contact the Cultural Resources Manager, Dr. Laurie Lucking at the US Army Garrison Hawai'i, Directorate of Public Works, Environmental Division (808) 656-2878, extension 1052.

Sincerely,

A handwritten signature in black ink, appearing to read "Alan K. L. Goo". The signature is written in a cursive style with a large initial "A".

Alan K. L. Goo
Director of Public Works

Enclosures



Legend

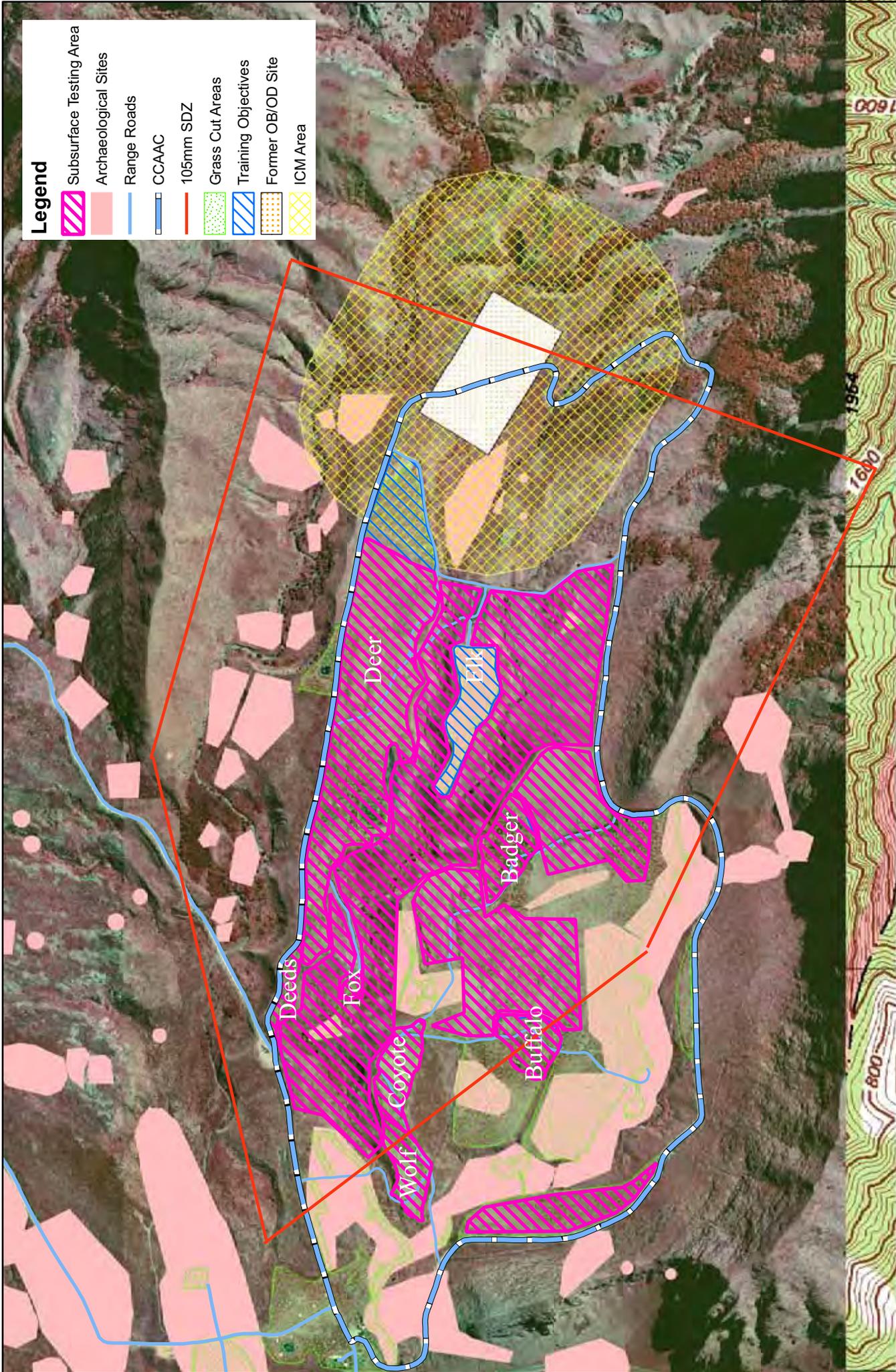
- Archaeological Sites
- Subsurface Tested Sites
- Range Roads
- CCAAC
- 105mm SDZ
- Training Objectives
- Former OB/OD Site
- ICM Area
- Surface Surveyed

Makua Military Reservation
 Previous Archaeological Surface Surveyed Areas
 And Subsurface Tested Sites
 Within the CCAAC and 105mm SDZ

DPW Environmental
 Cultural Resources
 October 2005

Meters
 0 125 250 500 750 1,000

Enclosure 1



Legend

- Subsurface Testing Area
- Archaeological Sites
- Range Roads
- CCAAC
- 105mm SDZ
- Grass Cut Areas
- Training Objectives
- Former OB/OD Site
- ICM Area

Makua Military Reservation
 Subsurface Survey Areas
 Required Under Settlement Agreement

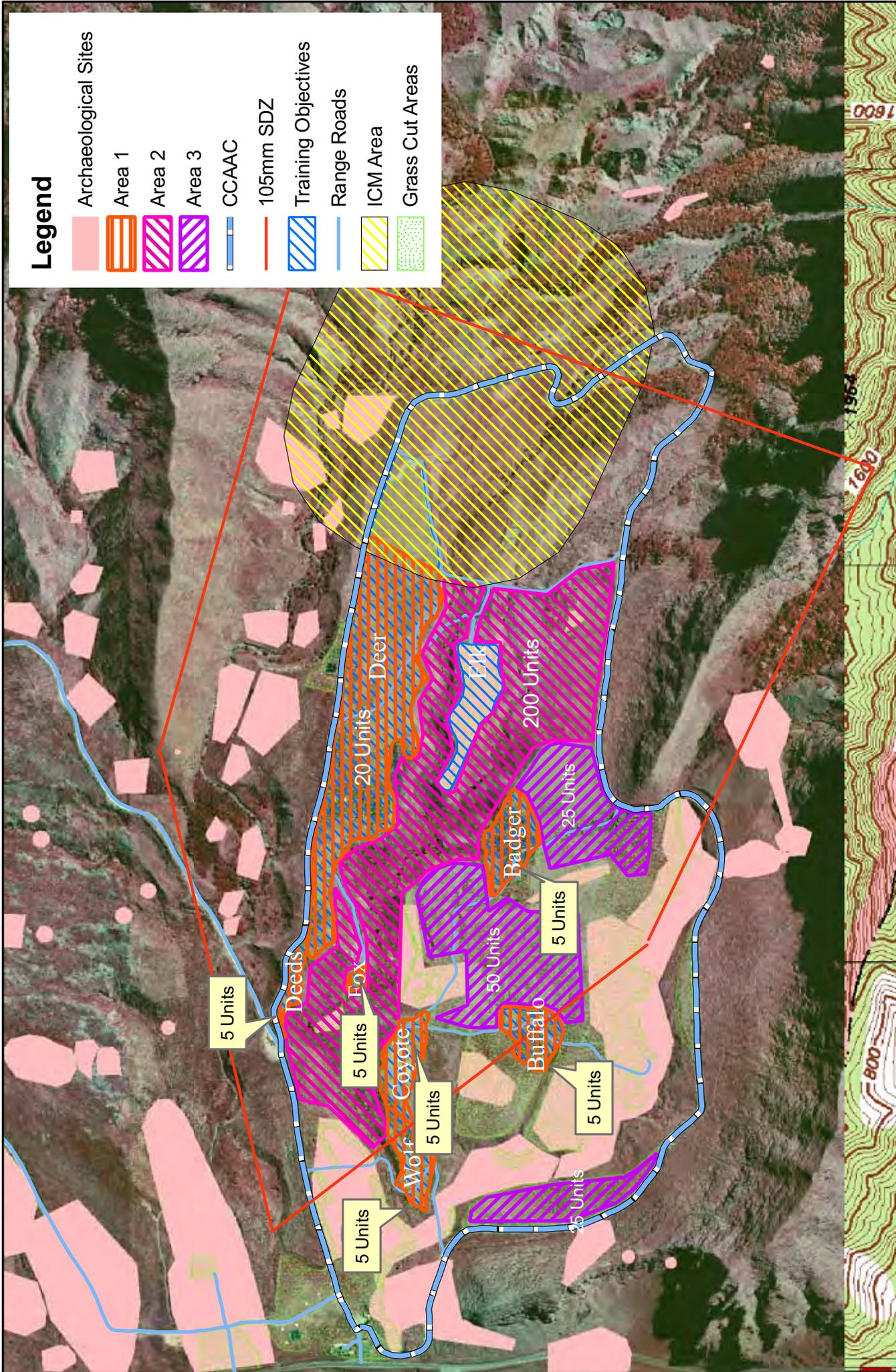
Estimated Acreage: 178
 Estimated Number of Test Units
 To Achieve a 1% Sample: 28,807

0 125 250 500 750 1,000 Meters

N
 W E S

DPW Environmental
 Cultural Resources
 October 2005

Enclosure 2



Legend

- Archaeological Sites
- Area 1
- Area 2
- Area 3
- CCAAC
- 105mm SDZ
- Training Objectives
- Range Roads
- ICM Area
- Grass Cut Areas

Makua Military Reservation

Proposed Subsurface Survey Areas



Consultation List

Mr. Peter Young
Chairman and State Historic Preservation Officer
Department of Land and Natural Resources

Mr. Clyde Nāmu'o
Administrator
Office of Hawaiian Affairs

Mr. Charles Maxwell
President, Board of Directors
Hui Mālama I Na Kupuna O Hawai'i Nei

Mr. Edward Halealoha Ayau
Po'o
Hui Mālama I Na Kupuna O Hawai'i Nei

Ms. Nalani Tavares
Ukanipo Heiau Advisory Council

Mr. Glen Makakaualii Kila
Kahu Kulaiwi, Ko'a Mana, Kupukaaina o Wai'anae Moku, O'ahu

Mr. Alike Poe Silva
Kahu Kulaiwi, Ko'a Mana, Kupukaaina o Wai'anae Moku, O'ahu, Hawaiian National

Henry Kila Hopfe
Kahu Kahakai, Ko'a Mana, Kupukaaina o Wai'anae Moku, O'ahu, Hawaiian National

Mr. Clarence Ha'o DeLude
Kahu Kulaiwi, Ko'a Mana, Kupukaaina o Wai'anae Moku, O'ahu

Mālama Mākua c/o
David Henkin
Attorney, Earthjustice

Mr. William Aila Jr.
Hui Mālama Mākua

**APPENDIX B- End of Fieldwork Memos,
Tables and Maps**



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
SCHOFIELD BARRACKS, HAWAII 96857-5000

APVG-GWV-N

22 November 2005

MEMORANDUM FOR THE RECORD

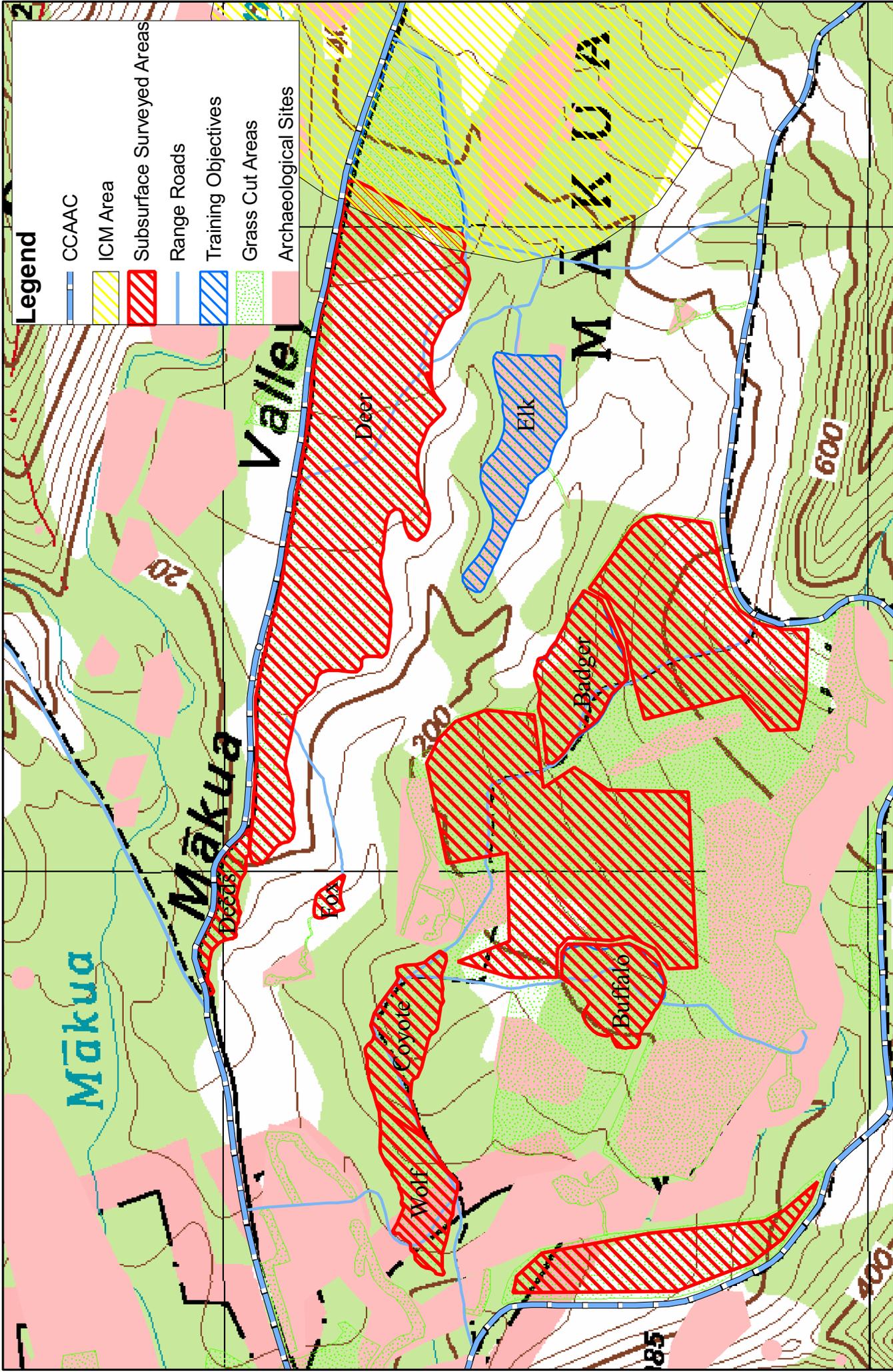
SUBJECT: End of Fieldwork, Subsurface Survey at Makua Military Reservation (MMR), Wai'anae District, O'ahu Island.

1. The first portion of an archaeological subsurface survey was completed on 21 November 2005. The subsurface survey was directed under Cultural Resources Manager, Laurie Lucking, Ph.D., with fieldwork conducted by Cultural Resources Section archaeologists Carly Antone, Christophe Descantes, Alton Exzabe, Laura Gilda, and George MacDonell. Fieldwork occurred over three weeks. Unexploded ordnance avoidance support was provided by Ron Smith and Vaughn Hochhalter of Donaldson Enterprises, Incorporated.
2. A total of 350 shovel test probes are planned for areas within the Company Combined Assault Course (CCAAC) circumscribed by the South Fuel Break where there are no surface indications of archaeological remains (outside the extent of what may be considered an archaeological site) and where extensive disturbance has occurred (i.e., training objectives, bulldozed areas). During this phase of the subsurface survey, 150 stratified random samples were planned. The 150 probes comprised of all the required survey locations that did not require a prescribed burn due to unexploded ordnance prior to work (see attached map). The remaining 200 probes are set to be completed following an approved prescribed burn.
3. Of the 150 probes randomly selected, 8 were withdrawn due to unreasonability of location (road fill, steep slope), or presence of anomalies identified by unexploded ordnance support personnel. A total of 142 shovel probes were excavated. Depth varied from 10 centimeters below surface (cmbs) to 80cmbs, according to sedimentary characteristics and general terrain. All were sterile, with no cultural deposit found. See the attached table for detailed probe distribution numbers.
4. Point of contact for this action is the Cultural Resources Manager Dr. Laurie Lucking at (808)656-2878 extension 1052.

**Makua Military Reservation, November 2005 Subsurface Survey
150 Stratified Random Samples**

Probe Area	Total Number of Probes Planned	Total Number of Probes Completed	Cultural Deposit Present? Yes/No
Badger	5	5	No
Coyote	5	5	No
Wolf	5	5	No
Fox	5	5	No
Buffalo	5	5	No
Deeds	5	3	No
Deer	20	19	No
3a	25	25	No
3b	50	46	No
3c	25	25	No

Table 1

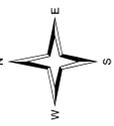


Legend

- CCAAC
- ICM Area
- Subsurface Surveyed Areas
- Range Roads
- Training Objectives
- Grass Cut Areas
- Archaeological Sites

Makua Military Reservation

Subsurface Surveyed Areas
 November 2-21 2005
 Acreage: 92
 Shovel Probes: 150





REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
SCHOFIELD BARRACKS, HAWAII 96857-5000

APVG-GWV-N

15 May 2006

MEMORANDUM FOR THE RECORD

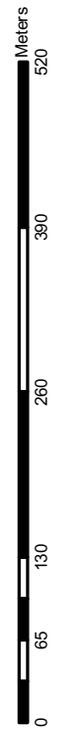
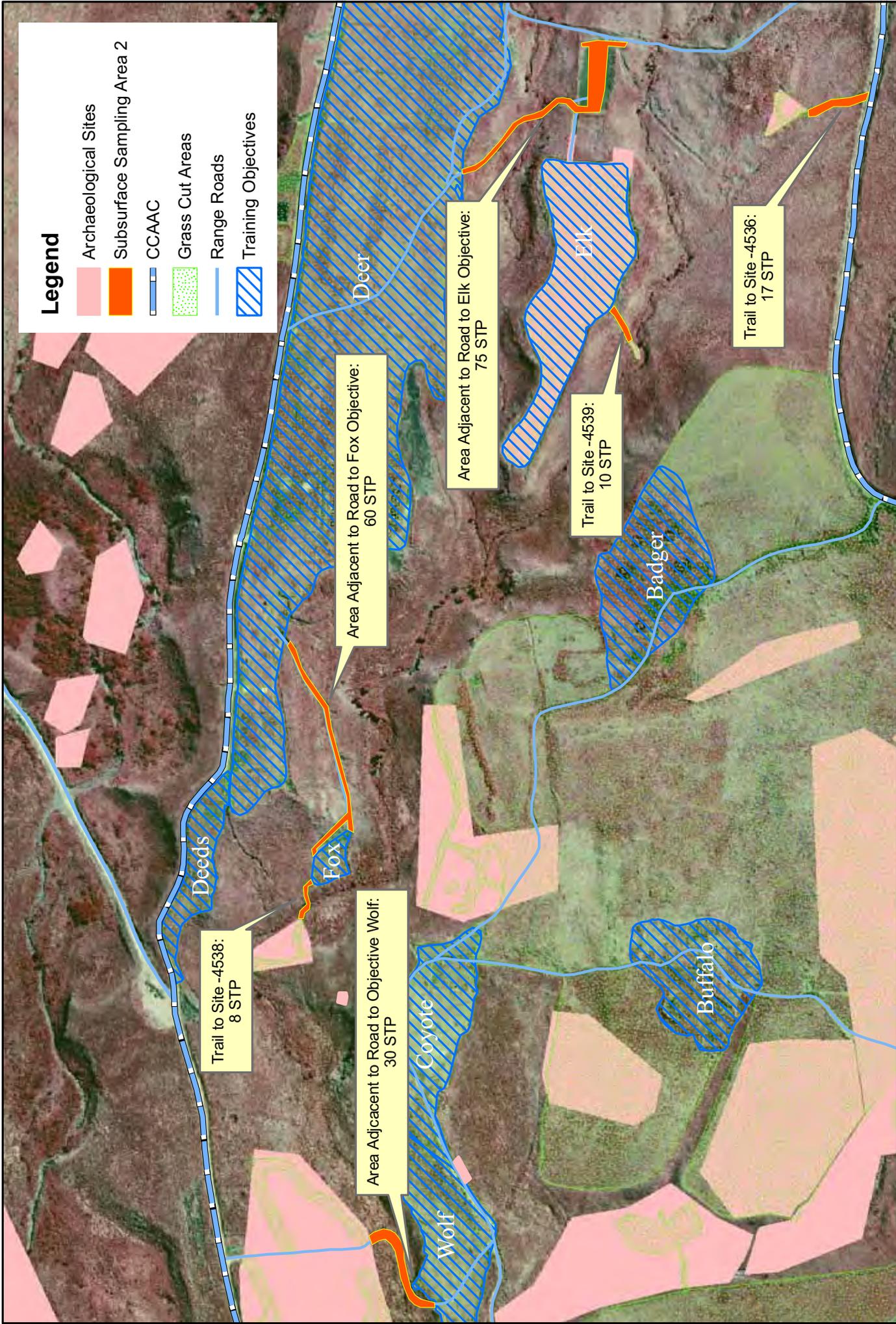
SUBJECT: End of Fieldwork, Subsurface Survey at Makua Military Reservation (MMR), Wai'anae District, O'ahu Island.

1. The second half of an archaeological subsurface survey was completed on 08 May 2006. The subsurface survey was directed under Cultural Resources Manager, Laurie Lucking, Ph.D., with fieldwork conducted by Cultural Resources Section archaeologists Carly Antone, Christophe Descantes, Alton Exzabe, Laura Gilda, and George MacDonell. Fieldwork occurred over a three week span. Unexploded ordnance avoidance support was provided by Ron Smith and Vaughn Hochhalter of Donaldson Enterprises, Incorporated.
2. A total of 350 shovel test probes were to be completed for this project. The subsurface survey was carried out within the Company Combined Assault Course (CCAAC) circumscribed by the South Fuel Break, where there are no surface indications of archaeological remains (outside the extent of what may be considered an archaeological site) and where extensive disturbance has occurred (i.e., training objectives, bulldozed areas). The first half of this project was carried out in November 2005, when 150 stratified random samples were completed in survey areas that did not require a prescribed burn prior to work. Initially, the remaining 200 probes were anticipated to be completed following an approved prescribed burn. However, the prescribed burn could not be completed due to environmental conditions. As an alternative, the remaining 200 shovel probes were added to the survey area that did not call for a prescribed burn to occur in order to accommodate the archaeological survey.
3. Due to the unavailability of accessible areas without a prescribed burn, probe locations were not random. The 200 probes were placed roughly 5 meters apart in all available locations found within the survey area (see attached map). Each probe was plotted under the guidance of an unexploded ordnance escort who ensured a UXO surface cleared path to and subsurface inspection of each unit. All probes were excavated, some with the aid of a power auger. Depth of excavation varied from 5 centimeters below surface (cmbs) to 60cmbs, according to sedimentary characteristics and general terrain. All were sterile, with no cultural deposit found. See the attached table for detailed probe distribution numbers.
4. Point of contact for this action is the Cultural Resources Manager Dr. Laurie Lucking at (808)656-2878 extension 1052.

**Makua Military Reservation, May 2006 Subsurface Survey
200 Stratified Systematic Samples**

Description of Probe Area	Total Number of Probes at ~5 Meters Apart	Total Number of Probes Executed	Cultural Deposit Present? Yes/No
Trail to Site -4538	8	8	No
Area Adjacent to Road to Fox Objective	60	60	No
Trail to Site -4539	10	10	No
Area Adjacent to Road to Elk Objective	75	75	No
Trail to Site -4536	17	17	No
Area Adjacent to Road to Objective Wolf	30	30	No

Table 1



Makua Military Reservation

General Location of
Subsurface Survey Area 2
200 Shovel Test Probes (STP)



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
SCHOFIELD BARRACKS, HAWAII 96857-5000

APVG-GWV-N

January 3, 2007

MEMORANDUM FOR THE RECORD

SUBJECT: End of Fieldwork, Subsurface Survey at Makua Military Reservation (MMR), Wai'anae District, O'ahu Island.

1. The final portion of an archaeological subsurface survey was completed on 20 December 2006. The subsurface survey was directed under Cultural Resources Manager, Laurie Lucking, Ph.D., with fieldwork conducted by Cultural Resources Section archaeologists Carly Antone, Alton Exzabe, James Head, and George MacDonell. Fieldwork occurred over a two week span. Unexploded ordnance avoidance support was provided by Travis Flowers of Donaldson Enterprises, Incorporated.

2. **Project Background.** A total of 350 shovel test probes were to be completed for this project at the outset. The conclusion of this portion of subsurface survey brings the total number of probes to 550. The subsurface survey was carried out within the Company Combined Assault Course (CCAAC) circumscribed by the South Fuel Break, where there are no surface indications of archaeological remains (outside the extent of what may be considered an archaeological site) and where extensive disturbance has occurred (i.e., training objectives, bulldozed areas). The first half of this project was carried out in November 2005, when 150 stratified random samples were completed in survey areas that did not require a prescribed burn or unexploded ordnance (UXO) surface clearance prior to work. When the remaining 200 probes to be completed following an approved prescribed burn could not be done due to environmental conditions, the alternative was to do 200 shovel probes to the survey area which did not call for a prescribed burn and UXO surface clearance to occur in order to accommodate the archaeological survey. This second field event was completed in May 2006. However, an approved prescribed burn was successfully accomplished on 06 December 2006, allowing for the initially intended 200 probes to be carried out.

3. **Methodology.** The 200 probes were stratified random samples within the survey area (see attached map). The burned area was divided into four parcels, with 20 meter by 20 meter electronic grids laid over each parcel. Each grid was given a number that was used in a random selection to determine probe location. Each probe was plotted under the guidance of an unexploded ordnance escort who ensured a UXO surface cleared path to and subsurface inspection of each unit. Of the 200 probes planned, 133 were excavated, and 67 were discarded due to unfeasible terrain (stream, steepness, or unburned thick vegetation), metal anomalies, or the presence of previously unrecorded archaeological surface features.

APVG-GWV-N

SUBJECT: End of Fieldwork, Subsurface Survey at Makua Military Reservation (MMR),
Wai'anae District, O'ahu Island, Page 2.

In the case where archaeological features were located on the surface, no subsurface probing was necessary to determine the presence or absence of archaeological data. The Cultural Resources Section plans to carry out detailed recordation, mapping, and GPS data collection of the previously unrecorded features in a separate project on a later date.

4. **Results.** Depth of excavation varied from 10 centimeters below surface (cmbs) to 50cmbs, according to sedimentary characteristics and general terrain. Most were sterile, with no conclusive cultural deposit found. Only two probes exhibited a potential for finding intact cultural deposit. In Area 2b, one probe displayed an uninterrupted stratigraphic deposit. While no cultural deposit was evident, further investigation of the probe location revealed its position on the level soil area of a remnant rock retained soil terrace. It is recommended that this area undergo a more intense surface survey and that detailed mapping, recordation, and GPS (Global Positioning System) data collection. In Area 2a, a probe located in a depression yielded two fragmented medium to large fire affected mammal bones at 20 cmbs. Although the field crew handling the excavation determined the remains were likely pig, excavation of the probe ceased, the deposit left in situ, and the probe closed. No surface features are apparent in the immediate vicinity. Additional surface survey may realize remnant archaeological features not observed on this occasion. Notably, another probe was done in a remnant extent of an unrecorded site area in Area 2b. However, this probe was absent of cultural deposit, perhaps indicating the westernmost extent of the site. With the exception of the two probes described above, all probes excavated were sterile. See the attached table for detailed probe distribution information.

5. Point of contact for this action is the Cultural Resources Manager, Laurie Lucking, Ph.D., at (808)656-2878 extension 1052.

Makua Military Reservation, December 2006 Subsurface Survey
200 Stratified Random Samples

STP Area	Total Number of STP Planned	Total Number of STP Excavated	Total Number of STP with Notable Deposit and/or Surface Indication of Site	Total Number of STP Unexcavated	Unexcavated Due to Presence of Previously Unrecorded Archaeological Features
2a	50	41	1	9	0
2b	50	32	2	18	0
2c	25	12	0	13	1
2d	75	48	0	27	1

1. Comment: Thomas Dye-26 Mar 2007 letter -Section 2- General Comments. 2nd paragraph- “The negative attitude toward excavation outside areas with surface architecture in this paragraph reflects a somewhat...It seems out of place in a document of this type and should either be deleted or rewritten so that it reflects a more objective stance.”

Response: The view expressed by this author is based on a review of a single archaeological survey report of Makua Military Reservation (MMR), and therefore is made without knowledge of the context in which this survey was undertaken.

Contrary to the comments expressed by Dr. Dye, the Army’s archaeological survey as described in the 2007 archaeological report was performed consistent with both the Secretary of the Interior’s Standards and Guidelines for Archaeological and Historic Preservation, as well as the Department of Defense Guidelines regarding Archaeological Inventory Survey Standards and Cost-estimation Guidelines. The Secretary of Interior’s guidelines provides, with respect to research design objectives, that research design is a vehicle for integrating the various activities performed during the identification process and for linking those activities directly to the goals and the historic contexts for which those goals were defined. Identification activities should be guided by the research designs and the results discussed in those terms.

Here, because numerous archaeological surveys had been conducted at MMR in the past, there was a high level of soil disturbance in the area to be surveyed (extensive and widespread bulldozing during range construction), there were no surface indication of archaeological features in the area to be surveyed, and a low probability of uncovering intact cultural deposits there, the Army, consistent with the above identified standards, would not have surveyed the area in question but for a court order to do so. The perceived “displeasure” was more a concern by the Army that invasive subsurface probing would be more destructive than the mortar rounds that are shot at MMR, which generally cause less damage than the subsurface surveys. The Army currently protects all identified sites within the CCAAC.

In addition, the Army consulted via a letter dated October 17, 2007, with Malama Makua, the State Historic Preservation Office, State of Hawaii, and other interested parties about the methodology that the Army would implement to complete the subsurface surveys identified by the 2001 court order. At the time of the consultation letter, moreover, Malama Makua had access to funds to pay for technical assistants. Notwithstanding the Army’s consulting efforts and funds for technical assistants, not one of the consulting parties submitted any comments or objections to the Army’s methodology used for the 2007 survey report. It is noteworthy that the 600 test probes examined in the 2007 report resulted in no findings of archaeological features.

The claim that there is a “2006 draft statement that urged archaeologists to dig outside areas with surface architecture” prepared by “The Archaeological Working Group convened by the Department of the Land and Natural Resources” is incorrect. According to the Army’s Cultural Resources section, no such statement was ever agreed to and adopted by the Department of Land and Natural Resources. Nor was such draft statement circulated to archaeologists to use as a working model. Moreover, were such a statement adopted, to be consistent with the Secretary of Interior’s Standards and the DoD’s standards identified above, archaeologists are to take into consideration in designing a survey project the historical body of research of the area. Again, as noted previously, the area that was surveyed in 2006 was the location of a high level of soil

disturbance in the past and had been previously surveyed, and therefore was unlikely to yield archaeological features. With the body of knowledge that exists, the Army would not have surveyed the area but for a court order. It is noteworthy that the 2007 report, during which 600 test probes were undertaken, resulted in no archaeological features.

2. Comment: Thomas Dye-26 Mar 2007 letter-Section 3- Methods, 1st para., pages 2&3

“The methodology section is incomplete and one can’t make sense... This is not an acceptable situation in a report of this type.”

Response: The Army conducted its survey in accordance with both the Secretary of the Interior’s Standards and Guidelines for Archaeological and Historic Preservation, as well as the Department of Defense Guidelines regarding Archaeological Inventory Survey Standards and Cost-estimation Guidelines. Because of the numerous surveys conducted in the past at MMR and because of the high level of soil disturbance, the Army – consistent with the Secretary of the Interior and DoD standards -- would not have surveyed this area but for the court order because there were site types that were expected. The results of the survey, moreover, established this point when the 400 test probes revealed no archaeological features.

The intervals expressed by the author are unreasonable and are not consistent with the Secretary of the Interior’s Standards and Guidelines for Archaeological and Historic Preservation or the Department of Defense Guidelines regarding Archaeological Inventory Survey Standards and Cost-estimation Guidelines. While it is axiomatic that a higher intensity survey will yield a larger number of sites, such a design is not appropriate in all instances. Indeed, the aforementioned guidelines make clear that a high intensity design was not appropriate at MMR. The design identified in the 2007 survey report was based in part on the body of archaeological knowledge regarding the area and past excavation activities, including a high level of soil disturbance.

2. Comment: Thomas Dye-26 Mar 2007 letter-Section 3- Methods, 2nd para, page 3

“ In the section on stratified sampling , the attributes...to the *a priori* likelihood of finding cultural deposits.”

Response: The Army identified the attributes used to stratify the survey area: the area had a high level of soil disturbance in the past, there were no surface indication of archaeological features in the area to be surveyed, and a low probability of uncovering intact cultural deposits. Prior to the survey, the Army did in fact rank Area 1, 2 and 3 in its October 17, 2007, letter describing its objectives and methodology as to the likelihood of finding cultural deposits.

4. Comment: Thomas Dye-26 Mar 2007 letter-Section 3- Methods, 3rd and 4th para., page 3.

“The section on stratified random sampling needs to indicate the area of each of Areas...Two excavations within terraces are described on page 19.”

Response: The Army developed the stratified sampling plan consistent with both the Secretary of the Interior’s Standards and Guidelines for Archaeological and Historic Preservation and the Department of Defense Guidelines regarding Archaeological Inventory Survey Standards and Cost-estimation Guidelines. Moreover, as Area 2 was likelier to uncover cultural deposits than Areas 1 and 3, the Army did in fact have the highest density of sampling units in Area 2. It is

noteworthy that 600 test probes uncovered no archaeological features, which is consistent with the fact that this area had been bulldozed during construction activities in the past.

5. Comment: Thomas Dye-26 Mar 2007 letter-Section 4- Results, 1st paragraph, page 3

“The Results section indicates that about 20% of the planned excavations were not carried out due to a variety...affect the likelihood that sites of the type expected during the survey would be found?”

Response: The comments by this reviewer by his own admission were made based on the review of a single survey, and therefore lack a complete context in which to evaluate the 2007 survey report. As noted previously, however, the survey was designed and conducted in accordance with the Secretary of Interior’s standards, as well as guidelines for the Department of Defense. Given the number of previous surveys, the high level of disturbance due to bulldozing during construction on the range, among other factors identified in the 2007 report, to select another hole as a substitute would not necessarily be consistent with the random design, but would merely be adding more holes. The area of highest likelihood actually was sampled at the highest density and there was no effect to the likelihood of sites expected to be found because from the beginning this area was not considered appropriate to survey under the guidelines of the Secretary of Interior or the DoD.

6. Comment: Thomas Dye-26 Mar 2007 letter-Section 4- Results, 2nd para. page 3

“ The potential problems introduced by the reduction of sampling effort, which was...for this project was not completed.”

Response: The comments are made without the benefit of knowledge of all the previous surveys, and therefore are not based in fact but on incorrect assumptions. The 200 samples by the road were on original uncleared land, and thus alleviated the potential problems of the alleged reduction of sampling effort. The roads in question, contrary to the comment, had not been previously excavated: the sampled area was part of the original landscape. The 200 sampling results near the road yielded no evidence of archaeological features. The conclusion that the sampling was not completed is incorrect. Indeed, 600 test probes yielded no archaeological features.

7. Comment: Thomas Dye-26 Mar 2007 letter-Section 4- Results, 3rd para. page 4

“ Presumably, excavation of 477 sampling units yielded quite a bit of Stratigraphic data. ...of the zones could then be described in detail.”

Response: The Army did not include the field notes as part of the report because, as noted previously, the survey described in the 2007 report was not consistent with Secretary of the Interior and/or DoD standards. Rather, the Army conducted the survey as a consequence of a court order. Field notes were provided to Malama Makua’s technical experts and provided sufficient detail to be useful to future researchers in conjunction with the previous archaeological reports.

8. Comment: Thomas Dye-26 Mar 2007 letter-Section 4- Results, 4th para. page 4

“ Excavation of shovel probe #212 in Area 2b yielded a stratigraphic section that appears , on its face...characteristics of the layer II deposit lead to conclusion that it is not cultural?”

Response: This reviewer ignores the description that this probe was described as erosional wash and not an “in-situ” deposit. There was no evidence of a traditional Hawaiian cultural deposit.

9. Comment: Thomas Dye-26 Mar 2007 letter-Section 5- Conclusions, page 4.

“Due to various deficiencies in the report...appears to have been excavated but not regconized.”

Response: The survey described in the 2007 report was consistent with the Secretary of Interior’s guidelines for archaeology, as well as the DoD guidelines. Moreover, SHPO and other consulting parties were consulted on the methodology prior to the execution of the surveys. No comments to the methodology was provided by SHPO or other consulting parties, although some consulting parties did object to the invasiveness of the surveys. Because of the numerous past archaeological surveys at MMR and the high level of soil disturbance, among other factors noted in the report, the design developed was appropriate. It is noteworthy that of the 600 shovel probes, no archaeological features were uncovered.

1. Comment: David Henkin-03 April 2007 letter –Draft Archaeological Subsurface Survey-

“The Army has failed to satisfy its legal obligations regarding ...cultural resources posed by the Army’s proposed undertaking.”

Response: The Army has completed surface and subsurface archeological surveys of all areas with the CCACC to include the southeast lobe and sites 5587 and 5589, consistent with the 2001 Settlement Agreement and Stipulated Order and the 2007 Partial Settlement re: Plaintiff’s Motion to Enforce (“2007 Partial Settlement”). Under the terms of the 2007 Partial Settlement, the ICM area is to be surveyed only if a waiver is granted by the Department of the Army. The Army submitted a waiver request for the ICM area, which was denied by the Deputy Assistant Secretary of the Army (Environment Safety and Occupational Health) in January 2007.

The post November 2005 subsurface survey methodology, when examined in conjunction with previous archaeological surveys of MMR, do provide a representative sample of MMR.

The December 2006 subsurface survey methodology were performed in accordance with the Department of the Defense and Department of Interior’s standards. The imu referenced in this comment was discovered not during any surface and/or subsurface surveys but during construction earthmoving activities in this area, and only after the first of foot was soil was removed. To survey using the methodology described in this comment – to locate items with a 5 to 10 cm radius (such as a post mold) -- would require the removal of the first foot of soil from all MMR. Such a methodology would destroy numerous surface and subsurface cultural resources, and is objectionable based on an archaeological professional standard given the surveys already conducted in this area, as well as from a cultural perspective as expressed by various native Hawaiian groups and individuals.

The Army performed more that 400 shovel probes in carrying out the 2006 subsurface survey. The presence of metal anomalies was the reason for not performing 8 of the 350 planned excavations, which approach was consistent with the Army’s initial Section 106 consultation in October, 2005. The Army received no comment on the methodology described in its October, 2007, consultation. The 2007 Partial Agreement required UXO removal to the conduct the survey, which the Army conducted, and consultation with Malama Makua was only required if the survey could not be performed because of UXO safety issues. The settlement document did not require efforts to clear every metal anomaly. The protocols for the survey were submitted to the SHPO on or about October 17, 2007, and to other interested parties, including Malama Makua and its attorney. Not one of the listed consulting parties had any objections and/or comments to the proposed methodology to conduct the subsurface survey described in the October 17, 2007, letter.

The assumption underlying this comment is that the 2007 Archaeological Survey is the only survey that was done at MMR. The assumption is wrong because numerous previous surveys of this area have been performed over the last 10 years. It was for this reason that the Army did not believe it was appropriate to subsurface this area. Further,

to substitute new probes sites for probes that were not further explored due to the presence of anomalies would have undermined the random sampling criteria used to +- select the initial probes. Since this 2007 survey found nothing of archaeological significance, it would be destructive to continue to create more holes in the landscape with no obvious evidence of the potential for archaeological artifacts.

The Army performed surface and subsurface surveys of areas within the CCAACC with the exception of the ICM area. All of thee results of the surveys have been made available to the public consistent with applicable laws.

There was not a discovery of a possible burial mound at shovel probe 270. Analysis shows that the deposits were the result of soil migration and not an in situ site.

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