



# U.S. Army Corps of Engineers Proposed Plan Former Pali Training Camp

FUDS Project Number H09HI027701

Contract: W912DY-10-D-0053, Task Order: 0003

Kailua, Hawaii

October 2015

*Text shown in **boldface font** are defined in the Glossary of Terms found at the end of this document.*

## Mark Your Calendar!

USACE is soliciting public review and comment on all the alternatives identified for the site. Public comments are considered before any action is selected and approved.

### Public Meeting

**Date:** October 21, 2015

**Time:** 6:30 PM

**Place:** Kailua High School Cafeteria  
451 Ulumanu Drive, Kailua, HI 96734

Representatives from the USACE and the State of Hawaii Department of Health (HDOH) will be present at the meeting to explain this Proposed Plan, listen to concerns raised, answer questions, and accept public comments.

### Public Comment Period

Written comments will be accepted throughout a public comment period from **October 19, 2015 through November 19, 2015**. Please submit written comments to the CEPOH:

Kevin Pien– Project Manager  
USACE – Honolulu District  
Building 230, Room 103  
Ft. Shafter, HI 96858  
Kevin.C.Pien@usace.army.mil



This **Proposed Plan** is being presented by the United States Army Corps of Engineers (USACE)<sup>1</sup> to allow the public to review and comment on the preferred remedial alternative to address the potential remaining **munitions and explosives of concern (MEC)** at the **munitions response site (MRS)** known as the former Pali Training Camp (PTC), **Formerly Used Defense Sites (FUDS)** Project No. H09HI027701. This Proposed Plan provides basic background information on the project site, identifies the **Preferred Alternative** for remedial action (which is removal of MEC in highly accessible areas and **land use controls [LUCs]**), explains why this alternative is preferred, and describes the other alternatives that were considered. The proposed remedial action is designed to protect the public from explosive hazards associated with MEC located within the boundaries of the property.

The FUDS program addresses the potential explosives safety, health, and environmental issues resulting from past munitions use at former defense sites under the Department of Defense (DoD) *Military Munitions Response Program*, established by the U.S. Congress under the *Defense Environmental Restoration Program*. The FUDS program only applies to properties that were transferred from DoD control before October 17, 1986. The Army is the executive agent for the FUDS program, and USACE is the program's **Lead Agency** with the State of Hawaii Department of Health (HDOH) as the regulatory agency. In fulfilling its obligations under FUDS, the first priority of USACE is the protection of human health, safety, and the environment

The former PTC is located at the base of the Koolau mountain range, near Kailua on the southeast side of the Island of Oahu, Hawaii and consists of four non-contiguous parcels located in portions of the Maunawili and Makalii Valleys (Figure 1 on the following page). Each parcel is considered a munitions response area containing one MRS. The four MRSs are:

- Maunawili Valley Impact Area (MVIA)
- Maunawili Training Course (MTC)
- Makalii Valley Training Course (MVTC)
- Ulumawao Training Course (UTC)

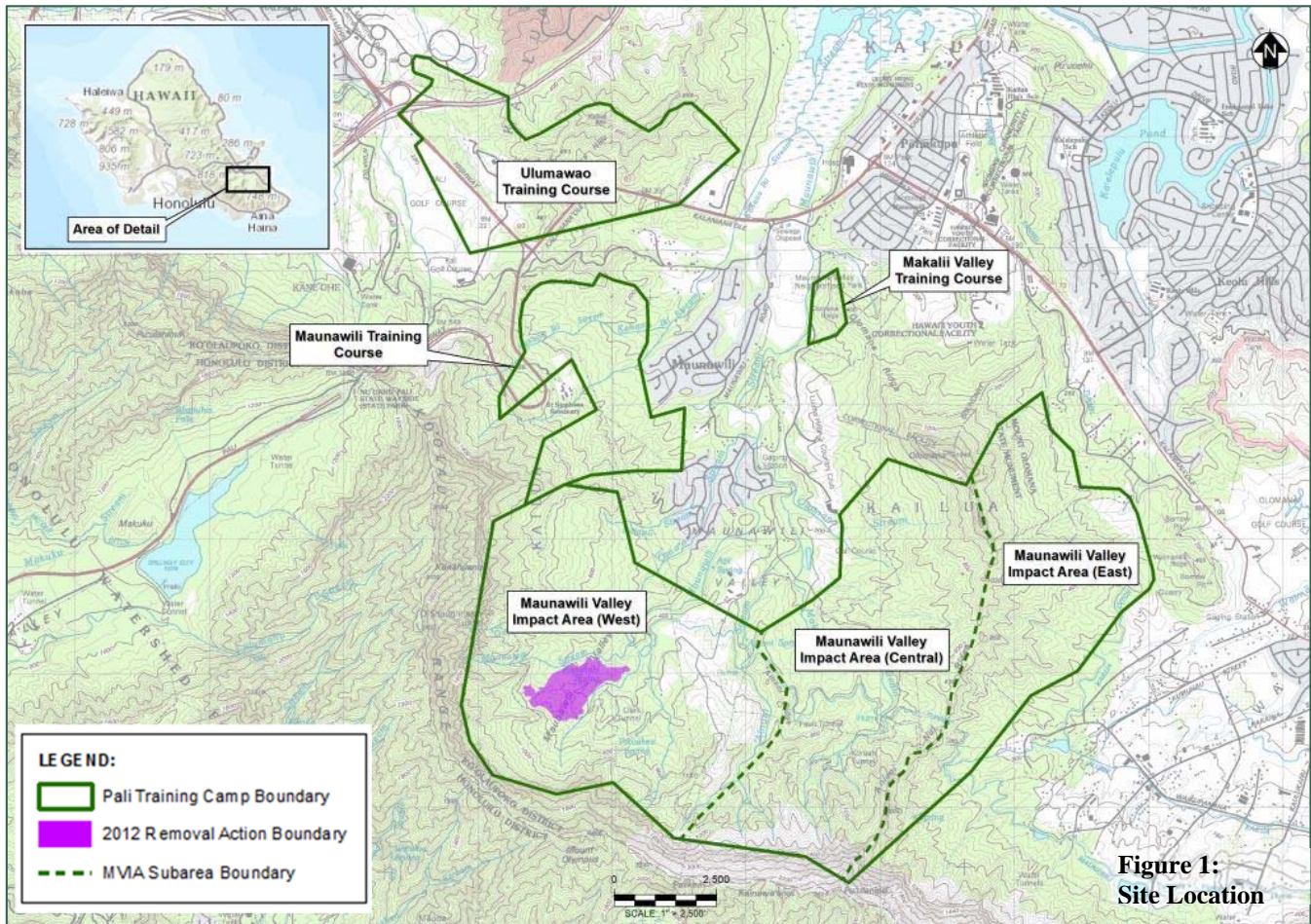
A **Remedial Investigation (RI)** Report completed for the entire FUDS project site documents the nature and extent of MEC, **munitions debris (MD)**, and **munitions constituent (MC)** concentrations so that the former PTC could be adequately characterized for the purpose of developing and evaluating effective remedial alternatives in the **Feasibility Study (FS)**.

<sup>1</sup> A list of acronyms and abbreviations are found at the end of this document.



# Former Pali Training Camp – Proposed Plan

FUDS Project Number H09HI027701



Of the four MRSs, only MVIA (the largest MRS) was evaluated under a FS to determine the appropriate course of action. Right-of-entry could not be obtained from the MTC property owners during the RI. As a result, a FS could not be performed for MTC.

The RI Report determined that there were no known or suspected MEC hazards within the MVTC and UTC MRSs. A FS was not performed since this is a No Action Decision. Action is not necessary for protection in these MRSs.

The RI Report recommended that the MVIA MRS be subdivided into three distinct areas based on investigation findings, land use, and topographical features (refer to Figure 1):

- MVIA – West (western MRS boundary to the Ainoni ridgeline)
- MVIA – Central (Ainoni ridgeline to Aniani Nui/Olomana ridgeline)

- MVIA – East (Aniani Nui/Olomana ridgeline to eastern MRS boundary)

Based on the data collected from previous investigations and subsequent RI, no unacceptable hazards to humans have been identified in MVIA – Central or MVIA – East. A FS was not performed for these subareas since this is a No Action Decision. Action is not necessary for protection in these subareas.

The RI Report concluded the potential for exposure to MEC is confined to MVIA – West. A FS for MVIA – West was conducted and the remedial alternatives were presented in the FS Report. The information and recommendations contained in this Proposed Plan focus on the MVIA – West area.

The HDOH Office of Hazard Evaluation and Emergency Response (HEER) and the State of Hawaii Department of Land and Natural Resources (DLNR) have reviewed the RI Report and FS Report and agreed with the conclusions and recommendations in those documents.



# Former Pali Training Camp – Proposed Plan

FUDS Project Number H09HI027701

## Project Related Documents

After coordination with HDOH and considering all public comments, USACE will select a final remedy for the former PTC. The public is encouraged to review supporting technical documents and community outreach material available in the **Administrative Record File** and digitally on the project website:

[www.poh.usace.army.mil/Missions/Environmental/FUDS.aspx](http://www.poh.usace.army.mil/Missions/Environmental/FUDS.aspx)

The documents are also available in hardcopy at the Administrative Record File repositories located at:

Kailua Public Library  
239 Kuulei Rd  
Kailua, HI 96734

Kaneohe Public Library  
45-829 Kamehameha Highway  
Kaneohe, HI 96744

USACE- Honolulu District  
Building 230  
Fort Shafter, Hawaii 96858

The selected remedy will be announced in a local newspaper notice and in the final decision document.

## 1.0 PROJECT SITE BACKGROUND

The former PTC was established in 1943 as a regimental combat training center emphasizing the use of and familiarity with modern arms and field weapons, in addition to providing rugged terrain for jungle and ranger training. Troops were housed in a sprawling tent city at the base of Nuuanu Pali capable of supporting 3,000 to 5,000 individuals. In addition to barracks, the encampments also contained latrines, showers, mess halls, administration buildings, and motor pools. Additional barracks, an ice plant, a bakery, and gun pits were situated within MVTC. A field hospital was erected where Maunawili Park now resides. Although records indicate a list of these uses/structures, their specific locations are unknown. Camp training aids consisted of 200- and 300-yard rifle ranges, a 1,000-inch range, four obstacle courses, an infiltration course, a combat in cities course, a close combat course, and a 400-yard long jungle firing course. An artillery impact area was also established in the rear of Maunawili Valley (USACE, 1994).

On 8 October 1945, G-3 Headquarters ordered the release of the PTC. The encampment was abandoned by the end of 1945. By the end of 1946, military-erected structures at PTC were subsequently sold as surplus by bid sale. Although the PTC's impact area was reportedly cleared of ordnance by the 212th ordnance disposal squad and the 18th engineer search team prior to property disposal in 1945, a warning to the public was issued in June 1948 by the Commanding Officer of Army Ordnance Services. The impact area in Maunawili Valley was one of several sites in which the public was advised to exercise caution when

entering the area due to the potential presence of dud ordnance rounds (USACE, 1994).

## 1.1 PREVIOUS INVESTIGATIONS

An Inventory Project Report was prepared in 1994 identifying 37-millimeter (mm) high explosive (HE) projectiles, 75-mm HE projectiles; 60-mm HE mortars, and 2.36- and 3.5-inch high explosive anti-tank rockets as munitions historically detected at the site (USACE, 1994).

In 2008, 26.3 acres in MVIA, MTC, and MVTC were inspected during an Engineering Evaluation/Cost Analysis. An additional 5.7 acres in MVIA were geophysically mapped. No MEC items were found, however 103 MD items were discovered in MVIA. The data defined an impact area in the bowl-shaped section of Maunawili Valley (Zapata, 2008).

Soil, surface water, and sediment samples were collected from the MVIA MRS in the 2009 Site Investigation. The samples were analyzed for metals and explosive compounds. Seven metals (aluminum, arsenic, chromium, cobalt, iron, mercury, and vanadium) and one explosive compound (hexahydro-1,3,5-trinitro-1,3,5 triazine, also known as research development explosive or cyclonite) were identified as contaminants of potential concern for MVIA (Wil Chee, 2009).

In 2012, a Removal Action was conducted to remove and dispose of all MEC and MD on 40 acres within MVIA (refer to Figure 1). Approximately 1,067 pounds of MD and 26 MEC items were removed. The types of MEC items found included: 60-mm HE mortar, 37-mm HE projectile, 75-mm shrapnel



# Former Pali Training Camp – Proposed Plan

FUDS Project Number H09HI027701

projectile, fuzes, 57-mm Armor Piercing Tracer projectile, 37 mm Armor Piercing Capped Tracer projectile, 2.36-inch rocket motor, 81 mm HE mortar, and fuze of a projectile (Environet, 2012).

Approximately 46.41 miles of transects were investigated during the 2014 RI. Seven MEC items (37-mm HE, 75-mm shrapnel, and 105-mm HE projectiles; 81-mm HE mortar) and 1,252 MD items were found in the MVIA – West. Ninety-four MD items were found in MVIA – Central. Neither MEC nor MD were found in MVIA – East (USACE, 2014).

The cumulative findings of MEC and MD items from all investigations are presented on Figure 2 below.

**Photo 1: Terrain and Vegetation**



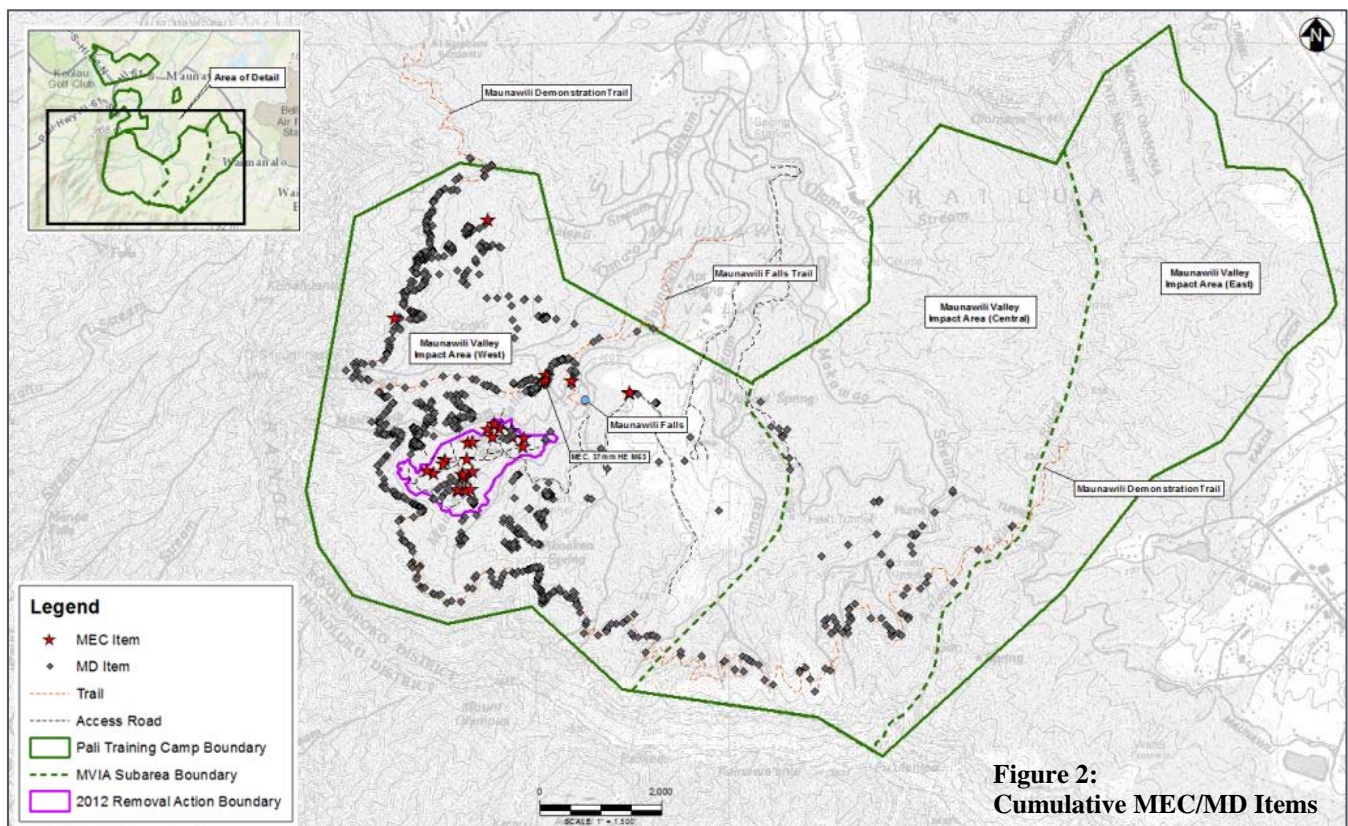
## 2.0 PROJECT SITE CHARACTERISTICS

### 2.1 PHYSICAL CHARACTERISTICS

The PTC is mostly undeveloped, rugged, and densely forested land (Photo 1) with mixed residential, agricultural, occupational, and recreational uses. Each parcel contains shallow to deep gulches and moderate to steep slopes with elevations ranging from 50 feet mean sea level (MSL) to 2,000 feet MSL at the Koolau

ridgeline. Median annual rainfall for the area is between 24 to 47 inches per year (Wil Chee, 2009). Runoff is slow to rapid, and the erosion hazard is slight to severe.

Most of the area is dominated by introduced plant species; however, eight native species (ohia lehua, hala, papala kepau, ulei, palaa fern, ekaha or birds nest fern, uluhe, ama) and four endemic species (koa, ohia lehua, uki, and hapuu) have been observed (USACE, 2014).





# Former Pali Training Camp – Proposed Plan

FUDS Project Number H09HI027701

A portion of the critical habitat unit designated for the Oahu Elepaio falls within the project area. Although the Elepaio was not observed during the RI, one migratory shorebird, the Pacific Golden-Plover or Kolea was observed. The Kolea is not a threatened or endangered species; however, they are protected by Federal law under the Migratory Bird Treaty Act and by State law under Hawaii Administrative Rules Title 13 Chapter 124 (USACE, 2014)

Several pre-European contact and post-contact archaeological sites, including heiau, trails, shelters, fire pits, and agricultural complexes are located within the FUDS project site (Cultural Surveys, 2013).

## 2.2 LAND USE

The State of Hawaii owns and manages the majority of the land within the MVIA boundary. The land is zoned as Preservation and is primarily undeveloped with rugged terrain. Portions of the State of Hawaii owned land are used for recreational activities such as hiking, biking, or horseback riding. There are approximately 10 miles of well-used public trails that pass through the MVIA. DLNR workers and public utilities occupational workers require access to perform periodic maintenance on the various trails, power line infrastructure, and irrigation water lines/ditches/tunnel that are found throughout MVIA. In addition, activities within MVIA also include:

- Agricultural activities are conducted in the MVIA – West by the Hawaii Agriculture Research Center (HARC) and Luluku Banana Farmers.
- The Royal Hawaiian Golf Club operates on approximately 40 acres in the MVIA – Central.
- Thirteen residential parcels overlap or are located within the MVIA – East.

The future uses of the MVIA subareas are not expected to change.

## 2.3 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Response actions under the Military Munitions Response Program must identify and attain or formally waive applicable or relevant and appropriate requirements (ARARs) under federal and state laws. The three ARARs identified for this project are provided in Table 1 (following page). All response

actions must meet the requirements set forth in these regulations or provide grounds for a waiver.

## 2.4 NATURE AND EXTENT OF CONTAMINATION

### MEC Characteristics and Distribution

Cumulatively, 33 MEC items have been identified in MVIA – West at the locations designated by the red stars in Figure 2 on the previous page. All of the MEC items were located less than two feet below ground surface. No MEC items have been documented within MVIA – Central, MVIA – East or the two other MRS' with right of entry, MVTC and UTC.

Over 1,500 MD items have been found in the MVIA during previous investigations. No MD has been found in MVIA – East and only 94 MD items were located in MVIA – Central. None of the areas containing the MD in MVIA – Central were determined to be target areas.

All of the MEC and the majority of the MD found to date has been concentrated at two target areas and one impact area in MVIA – West. Therefore, potential MEC or MD is more likely to be present in the 1,096 acres defined as MVIA – West.

### MC Assessment

Surface soil samples were collected and analyzed for MCs (i.e. MEC-related metals and explosive compounds). Concentrations of MCs were below the HDOH Tier 1 environmental action levels and do not pose an unacceptable risk to human or ecological health. Thus, MC exposure pathways to human and ecological receptors are considered negligible.

## 3.0 SCOPE AND ROLE OF RESPONSE ACTION

The proposed remedial action is designed to reduce munitions-related hazards within the MVIA – West through a combination of MEC removal and land use controls. The proposed remedial action for the MVIA – West protects the public and environment from the hazards related to MEC potentially present at the site.



# Former Pali Training Camp – Proposed Plan

FUDS Project Number H09HI027701

## 4.0 SUMMARY OF PROJECT SITE HAZARDS AND RISKS

Site hazards and risks were evaluated in terms of an exposure model that consists of a source of contamination (MEC), a receptor (recreational and occupational users), and interaction at the exposure point (disturbing a MEC item). The RI Report evaluated the possible hazards associated with MEC. Based on the evaluation, the MVIA – West is a potential source of MEC with an exposure pathway to receptors.

## 5.0 REMEDIAL ACTION OBJECTIVE

The remedial action objective (RAO) identified for MVIA – West is to reduce recreational user and worker exposure to explosive hazards associated with munitions items varying in size from fuzes up to 105-mm projectiles present on the surface and down to two feet below ground surface within the 1,096 acres defined as the MVIA – West to acceptable hazard levels. Acceptable hazard is defined such that exposure to MEC can be considered an “unlikely” or a

“negligible” hazard to the public. The implementation of this RAO is based on (1) the majority of MVIA – West being inaccessible due to terrain and vegetation and (2) the current and future use of the land being limited to recreational and agricultural purposes.

## 6.0 SUMMARY OF REMEDIAL ALTERNATIVES

The remedial alternatives for the MVIA – West are designed to reduce the overall hazards associated with MEC potentially present on site. The alternatives are described in the following sections in terms of their objectives and anticipated implementation measures. General assumptions for each alternative are provided in this section. Additional details related to the cost estimates are included in the FS Report.

### Alternative 1 – No Action

Under Alternative 1, no response action would be taken. Potential MEC would be left in place as-is, without implementing any LUCs or remedial actions. The no-action alternative is not considered an effective response action that meets the requirements of CERCLA because it does not address the explosive

**Table 1: Applicable or Relevant and Appropriate Requirements**

Requirement/Citation	Description	Applicability to Site
<b>Detonation</b> 40 CFR § 264.601 (RCRA, Subpart X)	Requires miscellaneous units for the management of hazardous waste, such as open burning/open detonation units, to be located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of human health and the environment.	MEC recovered during a remedial action and/or accidentally discovered during implementation of LUCs may need to be detonated or burned before off-site disposal. Permits are not required for on-site response actions conducted under <b>Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)</b> . Only the substantive requirements of Subpart X are considered ARARs.
<b>Endangered Species Act</b> 16 USC § 1538(a)(1)(B)	Prohibits the “taking” of any federally listed threatened or endangered species of fish or wildlife. In addition, federal agencies must ensure that their actions will not jeopardize the continued existence of any listed species or result in the destruction or adverse modification of the designated critical habitat of a listed species.	Multiple threatened and endangered species are located within the site per the Hawaii Biodiversity & Mapping Program.  Formal consultation is not an ARAR because it is an administrative requirement.
<b>Indigenous Wildlife, Endangered and Threatened Wildlife, and Introduced Wild Birds</b> Hawaii Revised Statutes Title 12, Chapter 195D-4(e)(2) Hawaii Administrative Rules Title 13, Chapter 124-3(b)(1)	Prohibits the take of any threatened or endangered species of aquatic life, wildlife, or land plant within the State of Hawaii. In addition to species listed under the federal Endangered Species Act, the prohibition on take under the state endangered species law applies to certain other indigenous species identified under state law as endangered or threatened.	Multiple threatened and endangered species are located within the site per the Hawaii Biodiversity & Mapping Program.  The Kolea is not threatened or endangered; however it is protected under this requirement.  Only substantive requirements are considered ARARs.



# Former Pali Training Camp – Proposed Plan

FUDS Project Number H09HI027701

hazard posed to humans or the environment by potential MEC at the site. No cost is assumed for this alternative. The No Action Alternative does not adequately meet the RAOs and is used solely as a baseline for comparison, as required by the National Contingency Plan (NCP) under 40 CFR 300.430(e)(6).

## Alternative 2 – Land Use Controls

Alternative 2 implements LUCs as the primary means for reducing exposure to explosive hazards. LUCs meet the RAOs by restricting public access to the site and/or by reducing the probability of a human encounter with MEC and the potential for unintentional MEC detonation, which may result in injury or death to humans. Generally, LUCs will include a combination of administrative mechanisms, engineering controls, and educational controls. The LUCs alternative includes ongoing long-term management of engineering and educational controls. DLNR and the City and County of Honolulu Department of Planning and Permitting are willing to participate in the implementation and maintenance of the LUCs.

The LUCs implemented as Alternative 2 would include:

Administrative Mechanisms: DLNR issues leases and right-of-entry permits to entities working in portions of the MVIA – West. Special conditions would be appended to the lease agreements or right-of-entry permits to inform the parties of the hazards related to munitions items potentially preset at the site. These conditions could include informational material regarding the presence of munitions debris, safety precautions, and necessary procedures, as well as define areas unavailable for use and direct users away from potentially MEC-contaminated sites.

Engineering Controls: Public access within MVIA – West would be restricted to designated trails marked at periodic intervals with warning signs notifying the public to stay on the designated trails because of the potential presence of an explosive hazard. Enforcement of this restriction would be carried out by DLNR staff. DLNR is authorized to enforce State laws and rules involving State-owned lands.

Educational Controls: Safety and awareness training of DLNR and occupational workers would be implemented. Community outreach would focus on educating the public of access restrictions as well as the presence and dangers of MEC. Visitor education would include installation of educational signs at key

locations such as publically accessible trailheads throughout the MVIA – West. A large educational sign, similar to those found in national parks, could be installed at a community information board designated by the DLNR. The sign would summarize key safety and access limitation information.

This alternative does not reduce the toxicity, mobility, or volume of potential explosive hazards through treatment nor does it eliminate access to areas with potential explosive hazards. Therefore, the hazard level would not be significantly reduced from the baseline condition when implementing this alternative.

In addition to implementing LUCs, five-year reviews are a requirement for alternatives not allowing for unlimited use/unrestricted exposure (UU/UE) in accordance with 40 CFR 300.430(f)(4)(ii). Under this option, five-year reviews would be required because MEC remains on the site above levels that allow for UU/UE.

## Alternative 3 – Removal of MEC in Highly Accessible Areas and LUCs

Alternative 3 incorporates LUCs (similar to those described for Alternative 2) with surface and subsurface clearance of 3 acres of accessible areas in MVIA – West. By removing MEC from these areas, the probability of a human encounter with MEC and the potential for unintentional MEC detonation is significantly reduced, thus effectively meeting the RAOs.

Under Alternative 3, UXO-trained personnel will use visual and analog methods to identify and remove MEC (and MD, if identified) from publically-accessible areas, specifically ancillary trails and areas adjacent to the Maunawili Falls and Maunawili Demonstration hiking trails within MVIA – West. The Maunawili Falls and Maunawili Demonstration Trails were 100 percent geophysically mapped and investigated during the RI. Treatment would include disposal of MEC by detonation in place or, if deemed acceptable to move, at a consolidation point, and disposal of MD in 55-gallon drums to a recycler.

Five-year reviews will also be conducted, as described under Alternative 2, since Alternative 3 does not allow for UU/UE.



## Alternative 4 – Complete Removal of MEC in High Density Areas

Alternative 4 includes removal of surface and subsurface MEC from 96 acres of high density areas in MVIA – West (locations identified as target and impact areas) using visual and analog methods. Following implementation of Alternative 4, the potential explosive hazards associated at the site would be eliminated because of the lack of an exposure pathway to MEC, resulting in a UU/UE condition. The same technologies used for the limited surface removal in Alternative 3 would be employed in Alternative 4. Treatment includes demilitarization of MEC by detonation in place or, if deemed acceptable to move, at a consolidation point, and disposal of MD in 55-gallon drums to a recycler.

## 7.0 EVALUATION OF ALTERNATIVES

The rationale for selecting the Preferred Alternative was based on nine criteria used to compare alternatives to one another in a detailed analysis. The nine criteria fall into three groups: threshold criteria, primary balancing criteria, and modifying criteria (see Table 2). Threshold criteria are requirements that each alternative must meet to be eligible for selection. Primary balancing criteria are used to weigh major tradeoffs among alternatives. Modifying criteria (which include State/Support Agency Acceptance and Community Acceptance) may be considered to the extent that information is available during the FS, but they can be fully considered only after public comment is received on the Proposed Plan. In the final balancing of tradeoffs between alternatives upon which the final remedy selection is based, modifying criteria are of equal importance to the balancing criteria. A comparative analysis of the alternatives for each criteria is provided in the following sections.

### 7.1 EVALUATION SUMMARY

The following remedial alternatives were evaluated against the threshold and primary balancing evaluation criteria:

- Alternative 1: No Action
- Alternative 2: Land Use Controls
- Alternative 3: Removal of MEC in Highly Accessible Areas and LUCs

- Alternative 4: Complete Removal of MEC in High Density Areas

### Threshold Criteria

#### *Overall Protectiveness of Human Health and the Environment*

Overall protection of human health and the environment is a threshold criterion. Protection is not measured by degree; rather, each alternative is considered as either protective or not protective. Alternatives 2, 3, and 4 are protective. Alternative 1 is not protective.

#### *Compliance with Applicable or Relevant and Appropriate Requirements*

Compliance with ARARs is a threshold criterion. An alternative must either comply with ARARs or provide grounds for a waiver. Alternatives 2, 3, and 4 comply with ARARs. Alternative 1 does not include any response action, thus ARARs are not applicable.

### Balancing Criteria

#### *Long-Term Effectiveness and Permanence*

The long-term effectiveness and permanence of Alternative 4 is rated the highest with a rating of excellent because it would remove surface and subsurface MEC from the high density areas identified as impact or target areas, thereby permanently removing explosive hazards to the public and environment from potential MEC. Alternative 3 is rated very good because it would significantly reduce the explosive hazard to the public and environment from potential MEC; however, under Alternative 3, MEC may remain in inaccessible areas of the site and present a low but not zero hazard. Alternative 2 is ranked poor because MEC would not be removed and the threat of human exposure to explosive hazards is subject to the effectiveness of the LUCs being implemented by the landowner over the long term. Alternative 1 is rated not acceptable because it does not provide any long-term effectiveness or permanence since no response action would be undertaken.

#### *Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment*

Alternative 4 is rated highest with a rating of excellent because it would remove surface and subsurface MEC from the high density areas identified as impact or target areas and permanently remove the mobility, toxicity, and volume of MEC through demolition. Alternative 3 is rated very good because it would also





# Former Pali Training Camp – Proposed Plan

FUDS Project Number H09HI027701

reduce the mobility, toxicity, and volume of MEC through destruction, albeit less than the complete removal of MEC in high density areas. Alternatives 1 and 2 are rated poor because neither alternative includes a reduction component for MEC.

### *Short-Term Effectiveness*

Alternative 3 is rated highest with a rating of excellent for short-term effectiveness because the removal action conducted in accessible areas and the LUCs could be implemented within 6 to 12 months and would reduce explosive hazards to the public from potential MEC in the short term. The limited removal actions and LUC implementation in Alternative 3 would not result in increased hazards to the public or site workers and would have minimal impact on the environment. Alternative 3 achieves the RAO in a reasonable period of time. Alternative 2, LUCs, is rated lower than Alternative 3 because while it also can be implemented quickly and reduces the potential for public interaction with MEC in the short-term, it does not achieve the RAOs in a reasonable period of time. Alternative 2 is rated good for this criteria. Alternative 4 is rated good because it would not result in increased hazards to the public or site workers during implementation and it achieves the RAOs in a reasonable period of time, but it takes longer to implement than Alternatives 2 and 3 and would have a significant impact on the environment in the short term. Alternative 1 is rated not acceptable for short-term effectiveness because, by undertaking no response action, explosive hazards to the public would remain from MEC potentially present at the site.

### *Implementability*

Alternatives 1, 2, and 3 were rated excellent for implementability because they are technically feasible; the alternatives are conventional and commonplace; and the technical expertise, labor, equipment, and materials would be readily available. Alternative 4 (Complete Removal of MEC in High Density Areas) was rated poor because the rugged terrain of the site is difficult to traverse and therefore would be difficult to implement.

### *Cost*

Alternative 1 requires no action; therefore, no costs are associated with this alternative. Alternative 2 is the least costly at a total cost of \$1,215,704 because it is limited to LUCs. Alternative 3, which includes a limited removal in addition to LUCs, has a total cost of

\$1,714,668. Alternative 4, which entails a removal over 96 acres of extremely rugged terrain, is the most expensive alternative at a total cost of \$5,431,686.

## **Modifying Criteria**

### *State/Support Agency Acceptance*

HDOH supports the selection of Alternative 3 Removal of MEC in Highly Accessible Areas and LUCs as the Preferred Alternative. HDOH is not supportive of Alternative 2 because it is insufficient to protect visitors who may be on trails or occupational workers. Alternative 4 is also not preferred because of the damage to the environment during implementation of the removal action.

### *Community Acceptance*

Community acceptance of the Preferred Alternative will be evaluated after the public comment period ends and will be described in the **Decision Document** for MVIA – West.

## **7.2 SELECTION SUMMARY**

Table 2 (following page) summarizes the comparison of each remedial alternative to the seven CERCLA criteria evaluated. The ranking categories used in the discussion of the alternatives are (1) protective or not protective, and meets ARARs or does not meet ARARs, for the two threshold criteria; and (2) excellent, very good, good, poor, and not acceptable for the five balancing criteria.

Alternative 3, Removal of MEC in Highly Accessible Areas and LUCs received the highest rating with an overall rating of very good. This alternative, when compared against the other three alternatives, presents the best alternative for achieving overall protection of human health and the environment in compliance with ARARs. Because MEC hazards will be removed from the ancillary trails and accessible areas adjacent to the trails, which are the areas most frequently accessed, the long-term effectiveness and permanence and reduction of mobility, or volume of the potential hazards criteria for Alternative 3 were rated as very good. The short-term effectiveness and implementability were rated as excellent because this alternative is relatively easy to implement and can be completed within 12 months, with the fieldwork conducted in less than 2 months. It also achieves the RAO within a reasonable amount of time.



**Table 2: Summary Comparison of Remedial Alternatives with CERCLA Criteria**

Alternatives	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Mobility, Toxicity, or Volume through Treatment	Short-Term Effectiveness	Implementability	Cost	Overall Rating
<i>Threshold Criteria</i>			<i>Balancing Criteria</i>					
Alternative 1: No Action	Not Protective	N/A	NA	P	NA	E	E	NA
Alternative 2: LUCs	Protective	Complies	P	P	G	E	VG	G
Alternative 3: Removal of MEC and MD in Highly Accessible Areas and LUCs	Protective	Complies	VG	VG	E	E	G	VG
Alternative 4: Complete Removal of MEC in High Density Areas	Protective	Complies	E	E	G	P	P	G

Notes:

ARARs = applicable or relevant and appropriate requirements  
E = excellent

G = good  
NA = not acceptable

N/A = not applicable  
P = poor

V = very good

Alternatives 2 and 4 received overall ratings of good; however, the cost for Alternative 4 is significantly higher than Alternatives 2 and 3 for minimal additional reduction in hazards. Alternative 4 also presents a significant increase in the impacts to the environment during implementation and is much more difficult to implement than Alternatives 2 or 3.

Alternative 2 would reduce the probability of a human interaction with MEC and the probability that such an encounter would result in an unintended detonation of MEC; however, highly frequented areas would not be cleared of MEC, resulting in a greater hazard to the public and environment than under Alternative 3 or 4. The long-term effectiveness and permanence and the reduction of mobility, or volume criteria were rated as poor, resulting in Alternative 2 receiving an overall rating of good.

Alternative 1 is not protective of the public or the environment; therefore, it is not eligible for selection as the preferred alternative.

**8.0 PREFERRED ALTERNATIVE**

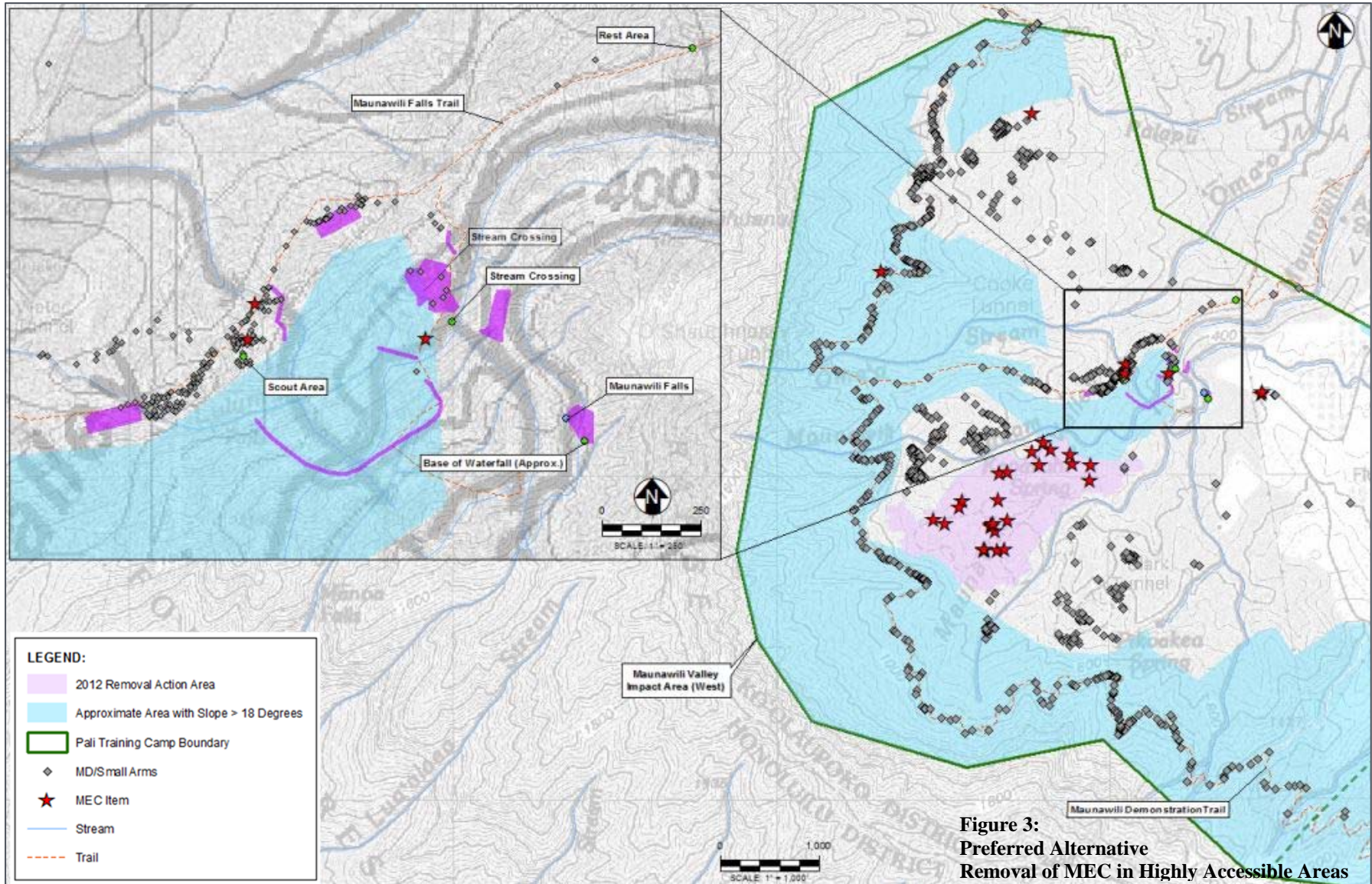
In accordance with the comparative analysis of identified alternatives, Alternative 3 Removal of MEC and MD in Highly Accessible Areas and LUCs is the recommended alternative for remedial action at the MVIA – West. The proposed removal area is shown

on Figure 3 (following page). Alternative 3 would meet the RAOs, achieve a substantial reduction in the hazards posed by MEC in highly accessible areas by conducting surface and subsurface MEC removal, with the most cost-effectiveness. Although MEC could potentially remain at the site, the exposure pathway is significantly reduced because of the difficult terrain and accessibility under current and reasonably anticipated future land uses. It should be noted, however, that the Preferred Alternative may change in response to public comments or new information. Based on the information currently available, Alternative 3 meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives for the balancing and modifying criteria. The Preferred Alternative meets the statutory requirements of CERCLA§121(b), which include protectiveness of human health and the environment, compliance with ARARs, cost-effectiveness, uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable, and satisfies the preference for treatment as a principle element. The Preferred Alternative is implementable and is expected to be highly effective in the long-term by reducing and managing potential MEC hazards with minimal impact to the environment. No adverse impacts to the MVIA – West are anticipated with implementation of this alternative.



# Former Pali Training Camp – Proposed Plan

FUDS Project Number H09HI027701



**Figure 3:**  
**Preferred Alternative**  
**Removal of MEC in Highly Accessible Areas**



---

# Former Pali Training Camp – Proposed Plan

FUDS Project Number H09HI027701

---

## REFERENCES

---

CFR. Title 40 Protection of Environment, Part 264.

CFR. Title 40 Protection of Environment, Part 300.

Environet, 2012. *Site Specific Final Report, Munitions and Explosives of Concern (MEC) Removal Action and Supporting Functions, Former Heeia Combat Training Area and Former Pali Training Camp, Island of Oahu, Hawaii*. July.

Hawaii Administrative Rules. Title 13 DLNR, Chapter 124 Indigenous Wildlife, Endangered & Threatened Wildlife, Injurious Wildlife, Introduced Wild Birds, and Introduced Wildlife

Hawaii Revised Statutes. Title 12 Conservation and Resources.

USACE, 1994. *DERP-FUDS Inventory Project Report, Pali Training Camp*. May.

USACE, 2014, *Final Remedial Investigation Report, Pali Training Camp, Oahu, Hawaii*. November.

USC. Title 16, Conservation.

Wil Chee – Planning, Inc., 2009. *Final Site Investigation Report, Pali Training Camp, Heeia Combat Training Area, and Waikane Training Area, Oahu, Hawaii*. September.

Zapata Incorporated, 2008. *Final Revision 1 Engineering Evaluation / Cost Analysis (EE/CA) Report, Former Heeia Combat Training and Pali Training Camp, Island of Oahu, Hawaii*. June.



## GLOSSARY OF TERMS

---

**Administrative Record File** – A compilation of all documents relied upon to select a remedial action pertaining to the investigation and remediation of the project site.

**Applicable or Relevant and Appropriate Requirements (ARARs)** – Applicable requirements means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable.

Relevant and appropriate requirements means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not “applicable” to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, otherwise known as Superfund)** – Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986.

**Decision Document** – A report documenting the final action, approved by the regulatory agencies, that is required at CERCLA sites.

**Feasibility Study (FS)** – A study undertaken by the lead agency to develop and evaluate options for remedial action. The RI data are used to define the objectives of the response action, to develop remedial action alternatives, and to undertake an initial screening and detailed analysis of the alternatives. The term also refers to a report that describes the results of the study.

**Formerly Used Defense Site (FUDS)** – A facility or site which was under the jurisdiction of the Secretary of Defense and owned by, leased to, or otherwise possessed by the United States at the time of actions leading to contamination by hazardous substances, and transferred from DoD control prior to 17 October 1986, for which the Secretary of Defense shall carry out all response actions with respect to releases of hazardous substance from that facility or site.

**Land Use Controls (LUCs)** – Physical, legal, or administrative mechanisms that restrict the use of, or limit access to, real property, to prevent or reduce risks to human health and the environment. Physical Mechanisms encompass a variety of engineered remedies to contain or reduce contamination and physical barriers to limit access to real property, such as fences or signs. The legal mechanisms used for LUCs are generally the same as those used for institutional controls as discussed in the NCP.

**Lead Agency** -- The agency that provides the On-scene Coordinator/Remedial Project Manager to plan and implement response actions under the NCP. EPA, the USCG, another federal agency, or a state (or political subdivision of a state) operating pursuant to a contract or cooperative agreement executed pursuant to section 104(d)(1) of CERCLA, or designated pursuant to a Superfund Memorandum of Agreement entered into pursuant to subpart F of the NCP or other agreements may be the lead agency for a response action. In the case of a release of a hazardous substance, pollutant, or contaminant, where the release is on, or the sole source of the release is from, any facility or vessel under the jurisdiction, custody, or control of Department of Defense (DoD) or Department of Energy (DOE), then DoD or DOE will be the lead agency. Where the release is on, or the sole source of the release is from, any facility or vessel under the jurisdiction, custody, or control of a federal agency other than EPA, the USCG, DoD, or DOE, then that agency will be the lead agency for remedial actions and removal actions other than



# Former Pali Training Camp – Proposed Plan

FUDS Project Number H09HI027701

emergencies. The federal agency maintains its lead agency responsibilities whether the remedy is selected by the federal agency for non-NPL sites or by EPA and the federal agency or by EPA alone under CERCLA section 120.

**Munitions Constituents (MC)** – Any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and nonexplosive materials, as well as emission, degradation, or breakdown elements of such ordnance or munitions.

**Munitions Debris (MD)** – Remnants of munitions (e.g., penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

**Munitions and Explosives of Concern (MEC)** – This term, which distinguishes specific categories of military munitions that may pose unique explosives safety hazards, specifically composed of (a) unexploded ordnance; (b) discarded military munitions; or (c) explosive MC present in high enough concentrations to pose an explosive hazard.

**Munitions Response Site (MRS)** – A discrete location within a defense site that is known to require a munitions response (investigation, removal action, or remedial action).

**Preferred Alternative** – The alternative that, when compared to other potential alternatives, was determined to best meet the CERCLA evaluation criteria and is proposed for implementation at a site.

**Proposed Plan** – A plan that identifies the preferred remedial alternative for a site and is made available to the public for comment.

**Remedial Investigation (RI)** – A process undertaken by the lead agency to determine the nature and extent of the problem presented by the release. The RI emphasizes data collection and site characterization, and is generally performed concurrently and in an interactive fashion with the feasibility study. The RI includes sampling and monitoring, as necessary, and includes the gathering of sufficient information to determine the necessity for remedial action and to support the evaluation of remedial alternatives.

## ACRONYMS AND ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DLNR	Department of Land and Natural Resources, State of Hawaii
DoD	Department of Defense
FS	feasibility study
FUDS	Formerly Used Defense Sites
HDOH	Department of Health, State of Hawaii
HE	high explosive
HEER	Hazard Evaluation and Emergency Response
LUC	land use control
MC	munitions constituent(s)
MD	munitions debris
MEC	munitions and explosives of concern
mm	millimeter
MRS	munitions response site
MSL	mean sea level
MTC	Maunawili Training Course
MVTC	Makalii Valley Training Course
MVIA	Maunawili Valley Impact Area
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
PTC	Pali Training Camp
RAO	remedial action objective



---

# Former Pali Training Camp – Proposed Plan

FUDS Project Number H09HI027701

---

RI	remedial investigation
USACE	United States Army Corps of Engineers
USC	United States Code
UTC	Ulumawao Training Course
UU/UE	unlimited use/unrestricted exposure



# Follow the 3Rs

## Recognize

**Recognize when you may have encountered a munition.**

Recognizing when you may have encountered a munition is the most important step in reducing the risk of injury or death. Munitions may be encountered on land or in the water. They may be easy or hard to identify.

To avoid risk of injury or death:

- Never move, touch, or disturb a munition or suspect munition.
- Be aware that munitions do not become safer with age, in fact, they may become more dangerous.
- Don't be tempted to take or keep a munition as a souvenir.

Munitions come in many sizes, shapes, and colors. Some may look like bullets or bombs while others look like pipes, small cans or even a car muffler. Whether whole or in parts, new or old, shiny or rusty, munitions can still explode.

## Retreat

**Do not touch, move, or disturb it; but carefully leave the area.**

Avoid death or injury by recognizing that you may have encountered a munition and promptly retreating from the area.

If you encounter what you believe is a munition, do not touch, move, or disturb it. Instead, immediately and carefully leave the area by retracing your steps, leaving the same way you entered. Once safely away from the munition, mark the path (e.g., with a piece of clothing or global positioning system (GPS) coordinates) so response personnel can find the munition.

## Report

**Immediately notify the police.**

Protect yourself, your family, your friends, and your community by immediately reporting munitions or suspected munitions to the police.

Help the police by providing as much information as possible about what you saw and where you saw it. This information will help the police and the military or civilian explosives ordnance disposal personnel find, evaluate, and address the situation.

If you believe you may have encountered a munition, call and report the following:

- The area where you encountered it.
- Its general description. Remember: do not approach, touch, move, or disturb it.
- When possible, provide:
  - Its estimated size
  - Its shape
  - Any visible markings, including coloring



**CALL 911**





-----fold-----

-----fold-----

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PLACE STAMP  
HERE  
The Post Office will  
not deliver mail  
without postage.

**Kevin Pien**  
**Project Manager**  
**US Army Corps of Engineers, Honolulu District**  
**Building 230, Room 103**  
**Ft. Shafter, HI 96858**