

**DECISION DOCUMENT**

**SOUTHEASTERN REGION MRS  
RMIS ID: H09HI035401**

**WAIKANE TRAINING AREA  
KANEOHE, OAHU, HAWAII**



**U.S. Army Corps of Engineers  
Honolulu District**

**JULY 2015**

## **EXECUTIVE SUMMARY**

ES.1 This Decision Document (DD) presents the selected remedy for the Southeastern Region Munitions Response Site (MRS) (RMIS ID: H09HI035401).

ES.2 The Southeastern Region MRS is within the Former Waikane Training Area (WTA), Formerly Used Defense Sites (FUDS) Property No. H09HI0354. This MRS is comprised of 151 acres located in Waikane Valley in the District of Koolaupoko on the windward side of the island of Oahu, Hawaii (Figure 1). The Southeastern Region MRS was used from 1942 to 1976 by the Department of Defense (DoD) as a training and artillery impact area. Live fire at the former WTA reportedly ceased in the early 1960s, but numerous types of munitions and explosives of concern (MEC) have since been recovered from the site. Current and reasonably anticipated future land uses includes one residential parcel, agriculture and recreational activities such as hunting, motocross, and all-terrain vehicle (ATV) riding. Additionally, the City and County of Honolulu has a master plan to establish the Waikane Valley Nature Park on approximately 40 acres of the site.

ES.3 The Remedial Action Objective (RAO) is to limit or mitigate interactions between a receptor and potential MEC items remaining in the MRS. The selected remedy is chosen to satisfy the RAO. A clearance to a depth of two feet below ground surface (bgs) is based on known MEC depths (less than two feet bgs), current land use and reasonably anticipated future land use. Potential residual MEC hazard will be mitigated through educational Land Use Controls (LUCs). Such educational LUCs will be implemented and maintained by the U.S. Army Corps of Engineers (USACE) and will include community MEC awareness training and distribution of informational materials. Five-year reviews will be conducted to ensure the selected remedy remains effective in protecting human health and the environment.

ES.4 The Selected Remedy for the Southeastern Region MRS is Surface and Subsurface MEC Clearance and Implementation of educational LUCs. This remedy includes a MEC clearance of approximately 36 acres of the MRS. The areas identified for clearance include an expanded area around the previous Non-Time Critical Removal Action area in the Southeastern Region MRS; in focused areas within the Southeastern Region MRS where anticipated future land use includes intrusive activities; and in the area within the Southeastern Region MRS where the highest relative munitions debris (MD) density was identified. The MEC clearance areas for the MRS and the approximate acreage are shown on Figure 4. The selected remedy will reduce a risk of exposure to explosive hazards.

ES.5 The selected remedy is protective of human health and the environment and is cost effective. The estimated cost for implementing the selected remedy at the Southeastern Region MRS is approximately \$3,097,590 for the remedial action and represents approximately 68% of the total estimated cost-to-complete response actions for the entire FUDS property. The total estimated present worth cost of Surface and Subsurface MEC Clearance and Implementation of educational LUCs over 30 years is approximately \$3,844,760. The funds for the remedial action design and implementation are required for Fiscal Year 2015.

ES.6 Other MEC response actions were considered and evaluated against the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) nine criteria. The alternatives included No Action; Land Use Controls; Surface MEC Clearance and Implementation of educational LUCs; and Subsurface Clearance to Support Unlimited Use. Munitions constituents (MC) do not pose an unacceptable risk to human health and the environment and no further action is recommended for MC at the Southeastern Region MRS.

ES.7 The expected result of implementing this remedy is to reduce potential explosive hazards and prevent interaction between receptors (i.e., humans) and MEC on the surface and in the subsurface for current and reasonably anticipated future land use activities based on best available information at this time.

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## **ABBREVIATIONS AND ACRONYMS**

ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	chemical of concern
COPC	Chemicals of Potential Concern
CSM	conceptual site model
DD	Decision Document
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
EAL	Environmental Action Level
EE/CA	Engineering Evaluation/Cost Analysis
FRMS	FUDS Record Management System
FS	Feasibility Study
FUDS	Formerly Used Defense Sites
FUDSMIS	Formerly Used Defense Sites Management Information System
HDOH	State of Hawaii, Department of Health
HE	High explosive
HEAT	High explosive anti-tank
LUC	land use control
MC	munitions constituent
MD	munitions debris
MEC	munitions and explosives of concern
MEC HA	MEC Hazard Assessment
mm	millimeter
MRS	munitions response site
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NTCRA	Non-Time Critical Removal Action
RAB	Restoration Advisory Board
RAO	remedial action objective
RI	Remedial Investigation
SI	Site Inspection
TAL	Target Analyte Metals
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USEPA	U.S. Environmental Protection Agency
USMC	U.S. Marine Corps
UU/UE	unlimited use/unrestricted exposure
UXO	unexploded ordnance
WTA	Waikane Training Area
WVTA	Waikane Valley Training Area
ZAPATA	Zapata Incorporated

## **1.0 PART 1: THE DECLARATION**

### **1.1 PROJECT NAME AND LOCATION**

The Southeastern Region MRS (RMIS ID: H09HI035401) is the south-easternmost portion of the WTA Formerly Used Defense Site (FUDS) (FUDS Property No. H09HI0354). The former WTA is located in Waikane Valley in the District of Koolaupoko on the windward side of the island of Oahu, Honolulu County, Hawaii.

### **1.2 STATEMENT OF BASIS AND PURPOSE**

1.2.1 This Decision Document is being presented by the USACE to describe the DoD selected remedy for the Southeastern Region MRS of the former WTA in Honolulu County, Hawaii. The DoD DERP Manual (DoDM 4715.20) designated the Secretary of the Army as the Lead Agent for FUDS program, subject to the oversight of the DUSD(I&E), regardless of which DoD component previously owned or used the property. The Secretary of the Army further delegated the program management and execution responsibility for FUDS to the USACE. The USACE is responsible for investigating, reporting, evaluating and implementing remedial actions at the former WTA.

1.2.2 This Decision Document is a requirement of Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S. Code (USC) § 9617), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), also known as Superfund, and follows the requirements of USACE Engineer Regulation 200-3-1, Formerly Used Defense Site Program Policy, and the United States Environmental Protection Agency (USEPA) guidance provided in EPA 540-R-98-031, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*.

1.2.3 The remedy described in this Decision Document was selected in accordance with CERCLA, 42 USC § 9601 et seq., as amended, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300. The State of Hawaii, Department of Health (HDOH) has reviewed the Proposed Plan and provided no comment on the acceptability of the selected remedy. The Administrative Record provides supporting documentation for this decision.

### **1.3 ASSESSMENT OF PROJECT MRS**

Historical information related to the former use of the WTA as a training and artillery impact area indicated the potential for MEC to be present on the site. Prior investigations and a previous non-time critical removal action confirmed MEC, in the form of unexploded ordnance (UXO), potentially remained in Southeastern Region MRS which may present risks to human health and the environment. The Remedial Investigation identified additional areas of concern to be addressed by the selected remedy. The selected remedy is necessary to protect the public health and welfare or the environment from potential interaction with UXO.

### **1.4 DESCRIPTION OF SELECTED REMEDY**

1.4.1 The response action selected in this Decision Document is necessary to protect the public health and welfare or the environment from potential interaction with unexploded ordnance (UXO), if encountered. The selected remedy for addressing potential hazards at Southeastern

Region MRS is Surface and Subsurface MEC Clearance and Implementation of educational Land Use Controls which involves the following components:

- Detection, clearance and disposal of MEC to depth of two feet bgs over 36.0 acres; and
- Implementation of educational LUCs in the form of community MEC awareness training and distribution of informational documents.

1.4.2 Surface and subsurface clearance of MEC will address hazard at the site by reducing the potential for direct contact with MEC, both at the surface and subsurface for residential users, recreational users, and agricultural workers. Educational LUCs will be implemented by the USACE to make residents, workers, and site visitors aware of the potential for MEC at the site, educate them on recognizing military items such as MEC; precautions if a suspected MEC item is encountered; and how to contact the proper authorities if potential MEC is found. The City and County of Honolulu, Department of Planning and Permitting is willing to participate in implementing the selected remedy by attaching informational documents with approved building permits for the parcel. The City and County of Honolulu, Department of Emergency Management is willing to maintain and reproduce copies of the informational documents in accordance with Emergency Planning and Community Right-to-Know Act.

## **1.5 STATUTORY DETERMINATIONS**

1.5.1 In accordance with CERCLA §121, the selected remedy is protective of human health and the environment; complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action; is cost effective; and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of MEC).

1.5.2 The NCP, at 40 CFR 300.430(f)(4)(ii), requires five-year reviews if the remedial action results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure. Because the selected remedy may result in pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment. Statutory reviews will continue to be conducted no less often than every five years.

## **1.6 DATA CERTIFICATION CHECKLIST**

1.6.1 The following information is included in the Decision Summary section of this Decision Document. Additional information can be found in the Administrative Record file.

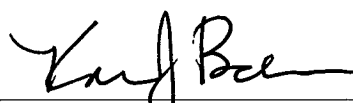
- MEC suspected to be present;
- Baseline hazard represented by MEC;
- How MEC will be addressed;
- Current and reasonably anticipated future land use assumptions;
- Total present worth costs and the number of years over which the remedy cost estimates are projected; and
- Key factors that led to selecting the remedy.

1.6.2 The risk assessment concluded that the potential for adverse risks to human health or ecological receptors from exposure to MC in soil and sediment are considered negligible at the former WTA. No further action is recommended for MC.

### **1.7 AUTHORIZING SIGNATURES**

This Decision Document presents the selected response action for the Southeastern Region MRS (RMIS ID: H09HI035401) at the former Waikane Training Area (Formerly Used Defense Site Property No. H09HI0354) located in Kaneohe, Oahu, Hawaii. As the Responsible Agency for executing this response action, the U.S. Army Corps of Engineers, under the delegated authority from the Secretary of the Army, has developed this Decision Document for the remediation of the Waikane Training Area Formerly Used Defense Site. This Decision Document is consistent with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This Decision Document will be incorporated into the Administrative Record file for the former Waikane Training Area, which is available for public view at the Kaneohe Public Library, 45-829 Kamehameha Highway, Kaneohe, HI96744 and at KEY Project, 47-200 Waihee Road, Kaneohe, HI 96744. This document, presenting a selected remedy with a present worth cost of \$3,844,760, is approved by the undersigned, pursuant to Memorandum, DAIM-ZA, September 9, 2003, subject: Policies for Staffing and Approving Decision Documents, and to Engineer Regulation 200-3-1, Formerly Used Defense Sites Program Policy.

APPROVED:

  
\_\_\_\_\_  
KAREN J. BAKER  
Acting Chief, Environmental Community of Practice  
Directorate of Military Programs  
United States Army Corps of Engineers

*17 Aug 15*  
\_\_\_\_\_  
Date



## **2.0 PART 2: THE DECISION SUMMARY**

### **2.1 PROJECT NAME, LOCATION, AND BRIEF DESCRIPTION**

2.1.1 The former WTA, Formerly Used Defense Site Property Number H09HI0354, is located in Waikane Valley in the District of Koolau-poko on the windward side of the island of Oahu, Honolulu County, Hawaii. The former WTA was a portion of the Waikane Valley Training Area (WVTA). The WVTA consisted of approximately 1,061 acres that were used by the Department of Defense as a training and artillery impact area. The former WTA covers approximately 933 acres of the WVTA and consists of three MRSs (Southeastern Region MRS, Southern Impact Region MRS, and Western/Mountainous Region MRS). Figure 1 presents the location of the former WTA and the MRSs. The remainder of the WVTA is currently owned by the U.S. Marine Corps (USMC) and is therefore not an eligible property under the Defense Environmental Restoration Program-Formerly Used Defense Sites (DERP-FUDS) program. This Decision Document addresses the Southeastern Region MRS (RMIS ID: H09HI035401).

2.1.2 This Decision Document is being presented by the USACE to describe the DoD-selected remedy for Southeastern Region MRS at the former WTA in Waikane Valley. The DoD DERP Manual (DoDM 4715.20) designated the Secretary of the Army as the Lead Agent for FUDS program, subject to the oversight of the DUSD(I&E), regardless of which DoD component previously owned or used the property. The Secretary of the Army further delegated the program management and execution responsibility for FUDS to the USACE. The USACE is responsible for investigating, reporting, evaluating, and implementing remedial action at the Southeastern Region MRS. The regulatory agency for this project is the HDOH. The DERP-FUDS is responsible for funding MEC response actions.

2.1.3 The Southeastern Region MRS is presently owned by the City and County of Honolulu and private landowners. The Southeastern Region MRS (151 acres) is bordered by the Southern Impact Region MRS to the west, the USMC parcel to the north and City and County of Honolulu property to the south and east. The majority of the area is composed of dense vegetation, rolling hills, and steep slopes, with smaller areas that have been cleared for agriculture, roadways, and a homestead. Although site access is limited by dense vegetation, terrain and a gated access road, the site remains relatively accessible to any of the local residents that possess keys to the main gate. As for individuals that do not possess a key, the site can be accessed by trails, paths, and streams along Kamehameha Highway.

### **2.2 PROJECT HISTORY**

2.2.1 In 1942, the Department of the Army entered into a lease agreement with Lincoln L. McCandless heirs and Waiahole Water Company, Ltd. for the right to use approximately 1,061 acres in Waikane Valley for advanced offensive warfare training and air-to-ground practice bombing due to the valley's geographical location and terrain. Between 1943 and 1953, the Army used this property for maneuvers, jungle training, and small arms, artillery, and mortar firing. Authorization for the Army to use Waikane Valley continued until July 1953, when the USMC was substituted as lessee. USMC training consisted of small arms fire, 3.5-inch rockets, and possibly medium artillery fire. Due to fire hazards, incendiaries were prohibited and all

ammunition in excess of .50 caliber was to be fired into the designated impact area. The USMC leased the property from 1953 until 1976. Live fire reportedly ceased in the early 1960's.

2.2.2 In 1944, while the site was an active training area, a 60mm High Explosive (HE) mortar was discovered in Waikane Valley. The accidental detonation of that mortar killed two individuals and injured two others. Three children were injured in 1963 when a souvenir rifle grenade, reportedly discovered in Waikane Valley, exploded after it was thrown against a wall. There are no other reports of fatalities or injuries attributable to MEC discovered at Waikane Valley.

2.2.3 In 1989, the United States acquired title to the USMC property. Consequently, the USMC property is not eligible for cleanup under the FUDS program. Instead, it is currently being investigated by the USMC under the Military Munitions Response Program.

### **2.3 PREVIOUS INVESTIGATIONS AND REMOVAL ACTIONS**

#### ***2.3.1 1976 and 1984 Surface Clearance***

Two explosive ordnance demolition (EOD) sweeps of artillery impact areas at the WTA have taken place; one in August 1976 and the other from February to April 1984. These clearances recovered as much as 40,000 pounds of demilitarized practice ordnance as well as 37mm and 75mm high explosive rounds, 60mm mortars, 2.36 and 3.5-inch High explosive anti-tank (HEAT) rockets, M28 HEAT grenades, and M9A1 anti-tank (AT) rifle grenades, which were summarily destroyed.

#### ***2.3.2 1990 Archaeological Survey***

In 1990, an archaeological survey was conducted south and west of the USMC property. Three MEC items were identified in what is now called the Southern Impact Region MRS.

#### ***2.3.3 Inventory Project Report (INPR) 1996 and Supplement 2004***

The INPR was approved in 1996, followed by an INPR Supplement in 2004. These documents established the Waikane Training Area as a FUDS, established a site boundary, defined the past usage, and assigned the former WTA FUDS Project No. H09HI0354. Based on the historic use of the site, the INPR recommended further action.

#### ***2.3.4 2006 Engineering Evaluation/Cost Analysis***

An EE/CA evaluating MEC hazard within the 933-acre former WTA was conducted in 2006 (*Final Engineering Evaluation/Cost Analysis Report, Former Waikane Valley Training Area, Island of Oahu, Hawaii, November 2008*). During the EE/CA, 150 grids (100-ft by 100-ft) and nine miles of transects (three feet wide) were investigated. Seven MEC items were recovered: two 81mm HE mortar rounds, three 60mm HE mortar rounds, and two 37mm HE projectiles. All of the MEC items were recovered in the southeastern portion of the former WTA, which adjoins the southern boundary of the USMC property. According to field observations made during the EE/CA fieldwork, most of the former WTA appeared to have been used for foot maneuvers as evidenced by the significant amount of small arms throughout the valley. The former WTA was divided up into the four regions during the EE/CA with an outcome of three recommended MRSs at completion.

### **2.3.5 2008 Abbreviated Site Investigation**

An abbreviated Site Investigation (SI) focusing on the FUDS property was conducted in 2008 by USACE. The sampling team collected two multi-incremental soil samples in areas where MEC was found during the EE/CA, and collected two co-located surface water and sediment samples from Waikane Stream, downstream of locations where MEC was found. The samples were analyzed for Target Analyte Metals (TAL) metals and explosives. Resulting Chemicals of Potential Concern (COPC) identified in the SI were chromium, iron, vanadium, cobalt, mercury, and RDX.

### **2.3.6 Former Waikane Training Area RI/FS and Proposed Plan**

2.3.6.1 In 2011, USACE conducted a Remedial Investigation (RI) at the former WTA in Waikane Valley to determine the nature and extent of MEC and MC contamination in order to adequately characterize the area (*Final Remedial Investigation Report for the Former Waikane Training Area, Kaneohe, Oahu, Hawaii, August 2012*). Transects generally traversed the Southern Impact Region MRS and Southeastern Region MRS in a west to-east direction and extended into the Western/Mountainous Region MRS. Approximately 6.47 acres (3-foot path width) were investigated and was comprised of over 17.8 miles of transect coverage. Based on the results of analog-and-dig transect surveys, an additional 0.82 acres (57 individual 25-foot x 25-foot grids) of geophysical grids were intrusively investigated.

2.3.6.2 During the RI, a total of 5,341 anomalies were identified and intrusively investigated. The items recovered included over 3,400 items of MD but no MEC. The MD included remnants of 37mm and 75mm projectiles, 60mm and 81mm HE mortars, 3.5-inch rockets, hand grenades, rifle grenades, trip flares, expended fuzes, and small arms ammunition, and other unidentifiable munitions fragments. The majority of the MD was found in the Southeastern Region MRS.

2.3.6.3 MC sampling was also conducted to support the RI; discrete subsurface soil, multi-incremental soil (MIS) samples and discrete sediment samples were collected from the Southeastern Region MRS. Samples were collected in areas of relatively high munitions debris to bias towards the highest possible potential of contamination. These were analyzed for explosives constituents, including nitroglycerine and PETN, using sample preparation and analysis methodology outlined in EPA Method 8330B. In addition, samples were analyzed for selected metals (copper and lead) using EPA Method 6010C. Confirmation soil sampling was performed in the area where the highest lead concentration was measured.

2.3.6.4 Groundwater in this area is not expected to be part of a complete exposure pathway to receptors at this site, therefore was not sampled.

2.3.6.5 A risk assessment was conducted to determine the human health and ecological risks associated with potential MC exposure at the Southeastern Region MRS. Based on the MC analytical results, the risk assessments concluded that the potential for adverse risks to human health or ecological receptors from exposure to MC is negligible. Therefore, MC do not pose an unacceptable risk to human health and the environment and no further action is recommended for MC.

2.3.6.6 The Feasibility Study (FS) developed and evaluated effective remedial alternatives using the result from the RI (Final Feasibility Study Report for the Former Waikane Training Area, Kaneohe, Oahu, Hawaii, June 2013). The Proposed Plan was presented by the U.S. Army Corps of Engineers USACE to facilitate public involvement to review and comment in the remedy selection process for the former WTA.

### **2.3.7 Removal Action**

2.3.7.1 A Non-Time Critical Removal Action (NTCRA) Action Memorandum (*Former Waikane Training Area Action Memorandum, Non-Time Critical Removal Action, Island of Oahu, Hawaii, June 2009*) was developed upon finalization of the EE/CA. As was noted, a clearance to depth of detection was the recommended alternative for approximately 14.9 acres and 26.2 acres encompassing areas where MEC and relatively high MD concentrations were found in the Southern Impact Region MRS and Southeastern Region MRS, respectively. It was determined during the EE/CA that a response action was not required for the Western/Mountainous Region MRS.

2.3.7.2 A NTCRA was conducted in 2011 and occurred in 7.3 acres of the Southern Impact Region MRS, 32.6 acres of the Southeastern Region MRS, and 0.5 acres of unimproved road surface area spanning the two MRSs; the results were presented the Site Specific Final Report, Munitions and Explosives of Concern Removal Action and Supporting Functions, Waikane Training Area, Island of Oahu, Hawaii, 2012.

## **2.4 CERCLA ENFORCEMENT ACTIONS**

No CERCLA enforcement actions have taken place at the Southeastern Region MRS.

## **2.5 COMMUNITY PARTICIPATION**

2.5.1 A Public Involvement Plan was prepared in April 2010 to facilitate dialogue between the USACE and residents of the surrounding community regarding the RI/FS activities at the former WTA. Fact sheets were prepared in August 2010 and distributed to property owners and tenants, citizen groups, environmental groups, area businesses, regulatory officials, elected/civic officials, and local and regional media to address concerns expressed by the local community and update the status of studies and removal actions.

2.5.2 A Restoration Advisory Board (RAB) was formed in 2011 to increase public awareness and encourage open communication with the community. The first RAB meeting was held in April 2011. Subsequent RAB meetings have been held in May 2011, June 2011, July 2011, September 2011, April 2012, February 2013 and June 2013 to keep the public informed of ongoing activities at the former WTA. During these RAB meetings the reasonably anticipated future land uses were determined by input from landowners.

2.5.3 The RI Report, Feasibility Study Report, and Proposed Plan for the former WTA Southeastern Region MRS were made available to the public for commenting and are available in the Administrative Record file, which is located at the Kaneohe Public Library, 45-829 Kamehameha Highway, Kaneohe, Hawaii 96744 as well as online (i.e., KEY project) and at the USACE-Honolulu District Office. The Proposed Plan was issued on 19 June 2013, and a public meeting was held at the Waiahole Elementary School, Waiahole, Hawaii on 19 June 2013. The

notice of the public meeting and the availability of the Proposed Plan was published on 13 June 2013 in the Honolulu Star-Advertiser, military newspapers and MidWeek Magazine, which all circulate in the City and County of Honolulu, State of Hawaii. Oral and written comments were solicited at the meeting and accepted during a public comment period from 19 June 2013 through 19 July 2013. No comments were received.

## **2.6 SCOPE AND ROLE OF RESPONSE ACTION**

2.6.1 The former WTA is comprised of three MRSs. This Decision Document only addresses the Southeastern Region MRS. The Southern Impact Region MRS and Western/Mountainous Region MRS will be addressed in separate Decision Documents.

2.6.2 The selected remedy for the Southeastern Region MRS, Surface and Subsurface MEC Clearance and Implementation of educational LUCs, is protective of human health and the environment through eliminating, reducing, or controlling potential MEC exposure hazards at the site. The remedy will also provide community MEC awareness training and distribution of informational documents to land users on past military-related activities and information regarding appropriate responses, if munitions are encountered. The risk assessment concluded that the potential for adverse risks to human health or ecological receptors from exposure to MC in soil and sediment are considered negligible in the Southeastern Region MRS. No further action is recommended for MC. Implementation of this remedy can occur within three to six months with ongoing distribution of materials. It is anticipated that fact sheets will be prepared and distributed to the community with subsequent MEC awareness training. The selected remedy will be implemented under the authority of the USACE.

## **2.7 PROJECT MRS CHARACTERISTICS**

### **2.7.1 *Site Characteristics***

2.7.1.1 Site risks were evaluated in terms of a Conceptual Site Model that consists of a source of contamination, a receptor, and interaction at the exposure point or exposure pathways (Figures 2 and 3). Within this model, the sources would consist of MEC in the environment. Much of the MRS is heavily vegetated and currently use is limited to a single family residence and recreational activities including hunting, motocross, and ATV riding. Future land use includes the aforementioned usage and activities associated with restoring/preserving the native forest; re-establishing taro farming; growing cacao; and constructing a single-home residence for owner personal use. Receptors include residents (adults and children), workers associated with agriculture or construction, recreational users, and visitors. The pathway is the interaction between a receptor and a potential explosive hazard source located on, or below, the ground surface.

2.7.1.2 The Southeastern Region MRS (approximately 151 acres) is bordered by the Southern Impact Region MRS to the west, the USMC parcel to the north and City and County of Honolulu property to the south and east. A portion of the MRS was likely used as an impact area. The terrain in the Southeastern Region is mostly rolling hills with areas of steep slopes in excess of 58 percent grade. An unimproved dirt road off of Waikane Valley Road is the main route leading into and through the area. The entrance to the access road is gated and locked. Although

site access is limited by dense vegetation, terrain and a gated access road, the site remains relatively accessible to the public.

2.7.1.3 The Waikane-Waikeekē Stream system is the primary stream network passing through the three MRSs. The Waikane and Waikeekē Streams originate at Koolauloa Mountain Range and are fed by spillway tunnels associated with the Waiahole Ditch Tunnel Network. The Waikane and Waikeekē Streams combine and drain into Kaneohe/Koolau Bay. The tunnel network was completed in 1916 to transport water to the leeward side of the island for irrigation. The area is well drained, generally to the east, with no wetlands except along the creek banks near the streams outlets.

2.7.1.4 Encounters with species listed as threatened or endangered under the Endangered Species Act are possible since there is the potential for such wildlife to be present in areas within the former WTA. Efforts were made to avoid, minimize or mitigate any potential impacts during performance of the fieldwork. However, no endangered species were encountered during the RI field work. There are numerous threatened and endangered species on Oahu; threatened and endangered species that may potentially occur within the Waikane site include:

- Newell's Shearwater (*Puffinus auricularis newelli*) - threatened. This seabird breeds in burrows dug into steep mountain slope areas that are usually sheltered by 'uluhe. Otherwise it spends most of its life at sea.
- Oahu Elepaio (*Chasiempis ibidis*) – endangered. These little wren-like flycatchers occur in a variety of forest types and across a range of elevations, primarily in valleys and particularly those with tall riparian vegetation, a continuous canopy, and dense understory. Populations have seriously declined in recent decades on Oahu.
- Snail Species (*Achatinella spp.*) - endangered. These small tree snails are isolated on Oahu's mountain ridges spend almost their entire lives on one tree (usually an 'ohia or kopiko tree) and feed on a type of fungus that grows on the leaves.

2.7.1.5 A number of culturally significant and archeological sites exist within the Southeastern Region MRS. A field archaeologist accompanied project field personnel on all field activities to identify cultural resources and make recommendations to avoid or mitigate any potential impacts during field activities.

## **2.7.2 Sampling Strategy**

2.7.2.1 The areas of interest within the site were determined from the existing archival impact regions and training area information, supplemented with information derived from previous investigations including the EE/CA conducted in 2006. A combination of transects and grids were positioned across the MRSs and along the Waikane Stream and Unnamed Stream to characterize nature and extent of MEC contamination. Analog instrument assisted dig investigations were conducted over a total of 7.3 acres (transects and grids) within the former WTA using a MineLab Explorer SE PRO Series metal detector. After reviewing the MEC data collected during the RI transect investigation and the data gathered during the EE/CA, areas of high to medium density munitions debris were identified for further MEC investigation. Fifty-seven 25-ft by 25-ft grids were placed in these areas to further characterize nature and extent of MEC.

2.7.2.2 MC sampling was also conducted to support the RI; discrete subsurface soil, MIS samples and discrete sediment samples were collected from the Southeastern Region MRS. Samples were collected from August 15 through 31, 2011 with additional sampling of some locations on October 11 and November 7, 2011 in areas of relatively high munitions debris to bias towards the highest possible potential of contamination. These were analyzed for explosives constituents, including nitroglycerine and PETN, using sample preparation and analysis methodology outlined in EPA Method 8330B. In addition, samples were analyzed for selected metals (copper and lead) using EPA Method 6010C. Confirmation soil sampling was performed in the area where the highest lead concentration was measured.

2.7.2.3 MIS sampling was conducted in 100-ft x 100-ft decision units (DUs) and were collected in triplicate (one primary and two replicates). Samples were collected from a total of 16 DUs within the Southeastern Region MRS. Each sample consisted of approximately 50 increments collected at randomly selected, evenly-spaced points along parallel lines traversing the DU at a depth of approximately 2-in. bgs.

2.7.2.4 A total of 28 discrete subsurface soil (not accounting for quality control/quality assurance [QC/QA] samples) samples were collected within the MRS from a depth of 0.5 to 1-ft bgs. Discrete subsurface soil samples were collected across the MRS with the majority of the samples being collected within DUs chosen for MIS samples.

2.7.2.5 Two sediment samples (not accounting for QC/QA samples) were collected from selected areas upstream and downstream of the MRS along the Waikane Stream to delineate potential MC.

2.7.2.6 Groundwater in this area is not expected to be part of a complete exposure pathway to receptors at this site, therefore was not sampled.

### **2.7.3 Southeastern Region MRS Contamination**

2.7.3.1 No MEC items were recovered in the areas investigated during the RI. The 2011 NTCRA recovered 42 individual MEC items from the Southeastern Region MRS from depths less than two feet bgs. Several MEC items were recovered within 25 feet of the Area of Concern #2 (AOC #2) boundary. MD was found at depths less than two feet bgs throughout the Southeastern Region MRS and included mortar debris, HE fragments, identifiable 60mm and 81mm practice mortars, illumination flare, and small arms ammunition. Relatively high MD density was distributed along the southern half of the MRS.

2.7.3.2 Lead concentrations above the HDOH Environmental Action Level (EAL) were detected in two discrete subsurface soil samples collected from the Southeastern Region MRS: The highest lead concentration was measured at a sample location within AOC #2.

2.7.3.3 The HDOH requested that confirmation samples be collected where the highest lead concentration was detected. Samples were collected subsequent to the RI. The confirmation subsurface soil sample lead concentrations were below the HDOH EAL. The risk assessment concluded that the potential for adverse risks to human health or ecological receptors from

exposure to MC in these media is considered negligible at the former WTA. As such, MC do not pose an unacceptable risk to human health and the environment and no further action is recommended for MC.

#### **2.7.4 Location of Contamination and Routes of Migration**

2.7.4.1 Although a previous NTCRA was conducted in a portion of the MRS, MEC was recovered in close proximity (less than 25 feet) to the removal boundary (AOC #2, Figure 4). As such, a focused removal action in an expanded area around the previous NTCRA area in the Southeastern Region MRS; in focused areas within the Southeastern Region MRS, where anticipated future land use activities include intrusive activities (agricultural); and in the area within the MRS where the highest relative MD density was identified, are selected for MEC removal under this remedy (Figure 4). The actual known depth of MEC and MD is less than two feet bgs. Surface and Subsurface MEC Clearance will occur over 36 acres of the MRS and will remove MEC to a depth of two feet bgs.

2.7.4.2 Potential human exposure routes involve residual MEC on the surface and/or below the ground surface being encountered during the aforementioned current or anticipated future land use activities.

2.7.4.3 MEC may remain for long periods of time, as evidenced by the discovery of numerous WWII-era MEC items during the 2006 EE/CA and 2011 Removal Action. Several factors influence the possible migration of MEC from the site. The possibility exists for human activity resulting in redistribution of MEC items. Another factor involves ground movement resulting from erosion and landslides, which may unearth existing buried MEC items.

2.7.4.4 Human populations which could be affected include residents (adults and children), workers associated with agriculture or construction, recreational users, and visitors.

## **2.8 CURRENT AND FUTURE LAND AND WATER USES**

### **2.8.1 Land Uses**

2.8.1.1 The MRS contains residential, private, and publicly (i.e., City and County of Honolulu) owned land parcels and is comprised of mostly undeveloped open areas and densely forested lands. Most site activities do not involve disturbance of the subsurface (hiking and hunting); however, activities related to motocross or ATV riding could result in intrusive activities in the shallow subsurface (up to one foot). It is likely that the MRS will continue to be accessed and used for recreational activities such as hiking, hunting, motocross, etc. Most residential activities involve only localized subsurface disturbance (i.e., installing fence posts and gardening, etc.).

2.8.1.2 Ohulehule Forest Conservancy, LLC, owner of the majority of the land (TMK Nos.: 4-8-006:001 and 4-8-014:005), has publically presented future land use plans that include restoring/preserving the native forest; protecting the only known 'elepaio (*Chasiempis ibidis*--listed as endangered) nesting grounds on the windward side of Oahu; re-establishing taro farming along Waikane stream and lower portions of Waikeekie stream; growing high-quality organic cacao; and building a single-home residence for owner personal use. In the interim, it is



expected that current land use patterns (i.e., recreational use such as hiking, hunting, motocross, etc.) will likely continue.

2.8.1.3 The City and County of Honolulu produced a Master Plan to potentially develop a fraction of the existing Southeastern Region MRS (TMK No.: 4-8-006:008) for a Waikane Valley Nature Park, which is the basis for subsequent design plans developed by the city for improvements on the site. The city is planning to establish trails, rest and picnic areas, lookouts to view surrounding landmarks of the site, a ceremonial gathering place (halau), re-vegetation areas for native plants, stream ecology study areas, ponds for aquatic wildlife studies, agricultural fields, parking areas and a visitor orientation area.

## **2.8.2 Groundwater and Surface Water Uses**

2.8.2.1 Groundwater in this area is not expected to be part of a complete exposure pathway to receptors at this site. A shallow (< 12 ft bgs) groundwater well was identified using well records data but was not sampled due to lack of right-of-entry. Groundwater wells installed to shallow depths are typically used for irrigation purposes not as a source for drinking water.

2.8.2.2 Another groundwater well was located along the Waikane Road. The well had a rusted padlock at the top. According to well records, the well name is Waikane 3, was installed in 1989 to a depth of 250 ft, and is owned by Waikane Development Co. The rusted appearance of the well indicated that it likely has not been accessed for many years and was not serving as a current groundwater source. The well was not sampled.

2.8.2.3 The primary water use for the Waikane and Waikēēē Streams is to supply water to the leeward side of the island for irrigation via the Waiahole Ditch Tunnel Network.

## **2.9 SUMMARY OF PROJECT SITE RISKS**

### **2.9.1 Human Health & Ecological Risks**

During the RI, a risk assessment was conducted to determine the human health and ecological risks associated with potential MC exposure at the Southeastern Region MRS. Based on the MC analytical results, the risk assessments concluded that the potential for adverse risks to human health or ecological receptors from exposure to MC is negligible. Therefore, MC do not pose an unacceptable risk to human health and the environment and no further action is recommended for MC.

### **2.9.2 MEC Hazard Assessment (HA)**

2.9.2.1 A qualitative MEC Hazard Assessment (HA) was conducted using information from investigations completed at the Site to provide a baseline assessment of response alternatives. Previous investigations have revealed that the Southeastern Region MRS contained MEC items initiating a NTCRA in portions of this MRS. A MEC HA was prepared for the Southeastern Region MRS with baseline conditions representing current conditions (i.e., post NTCRA).

2.9.2.2 Considering the current site conditions (i.e., post NTCRA) as the baseline, the MEC HA results potential for explosive hazard conditions is considered “low” for current and reasonably anticipated future land uses at the Southeastern Region MRS. Results of the Hazard Assessment

are discussed in detail within the RI Report, which are available on the project website, in the Administrative Record file and FUDS Record Management System (FRMS).

2.9.2.3 The MEC HA Category 4 reflects a “low” Hazard Level since a subsurface removal action was conducted within the MRSs. Although a MEC removal action was conducted within these MRSs, previous MEC presence at an MRS means that a potential explosive hazard may exist and cannot be completely dismissed. As such, MEC may still pose a hazard at a Hazard Level 4 MRS (i.e., low hazard level). Some typical characteristics of a Hazard Level 4 MRS include the following:

- A MEC cleanup was performed
- Accessibility is limited or very limited
- Potential receptor contact hours are few or very few

2.9.2.4 Previously recovered MEC locations, MD density and future land-use activities were also used to assess response alternatives and develop basis for the selected remedy. In areas with a higher relative MD density, a receptor (human) may have a greater chance of encountering MEC based on anticipated future land use activities in these areas.

### ***2.9.3 Basis for Response Action***

2.9.3.1 Within the Southeastern Region MRS, MEC were located in close proximity (less than 25 feet) to the perimeter of the NTCRA area (AOC #2). The EE/CA, NTCRA and RI identified MD including remnants of various munitions including projectiles (i.e., 37mm and 75mm); mortars (60mm and 81mm HE); 3.5-inch rockets; hand grenades; rifle grenades; trip flares; expended fuzes; hundreds of pieces of unidentifiable munitions fragmentation, and small arms ammunition to a maximum depth of two feet bgs. The highest MD density was observed southwest of AOC #2 within the Southeastern Region MRS near the former WTA boundary.

2.9.3.2 The MEC found within the Southeastern Region MRS are suspected to be associated with a potential impact area. It is suspected that MEC found outside of this area during previous investigations may have resulted from misfire or were abandoned during training events. Figure 4 shows the distribution of MEC recovered during the EE/CA, NTCRA and relative MD density.

2.9.3.3 The selected response action presented in this Decision Document is necessary to protect public health and welfare from potential MEC on the surface and subsurface of the Southeastern Region MRS in the following areas: a buffer area around the previous Removal Action area; in focused areas where reasonably anticipated future land use includes intrusive activities; and within the area where the highest relative MD density was identified (Figure 4).

2.9.3.4 The completion of the MEC clearance would reduce MEC hazards; however, due to limitations in detection technology and because 100% coverage will not be possible in all areas due to steep terrain and heavy vegetation, it is possible that munitions may remain at the site. Educational LUCs would be implemented to manage hazard associated with potential residual munitions.

## **2.10 REMEDIAL ACTION OBJECTIVES**

The Remedial Action Objective (RAO) is to limit or mitigate an interaction between a receptor and potential MEC items remaining in the MRS. The selected remedy is chosen to satisfy the RAO. A clearance to a depth of two feet bgs is based on known MEC depths (less than two feet bgs), current land use and reasonably anticipated future land use. Potential residual MEC hazard will be mitigated through educational Land Use Controls. This response action reduces the volume of MEC thus reducing MEC hazards at the site.

## **2.11 DESCRIPTION OF ALTERNATIVES**

2.11.1 The FS developed and evaluated four remedial alternatives for the Southeastern Region MRS:

- Alternative 1 – No Action;
- Alternative 2 – educational LUCs;
- Alternative 3 – Surface MEC Clearance and Implementation of educational LUCs; and,
- Alternative 4 – Surface and Subsurface MEC Clearance and Implementation of educational LUCs.

2.11.2 An additional alternative, Alternative 5 (Unlimited Use/Unrestricted Exposure) was developed but not evaluated because it is not technically feasible and would negatively impact ecological and culturally sensitive areas present across the MRS. This alternative would involve extensive site-wide vegetation clearance and mechanical excavation of the soil to depth compatible with unlimited use over the entire MRS. Excavated soil would be sifted and backfilled using heavy mechanical equipment. Site wide soil revitalization and re-vegetation would occur to return the MRS to pre-existing site conditions and allow for unlimited use. Current technology has not advanced enough to quantitatively demonstrate that residual risk from MEC hazards no longer exists. It is unlikely that the alternative could be performed in a manner to attain Applicable or Relevant and Appropriate Requirements (ARARs) and overall effectiveness is debatable among regulators, landowners, and community members. Therefore, Alternative 5 was eliminated from further evaluation during the initial screening of the alternatives during the FS.

### **2.11.3 Remedy Components**

2.11.3.1 Alternative 1 - No Further Action is carried forward for Southeastern Region MRS to represent the current existing condition at the site. Under CERCLA, the No Action alternative is required for use as a baseline measure against the other alternatives. No Further Action assumes the following:

- No treatment technology;
- No containment technology;
- No institutional controls; and
- No monitoring requirements.

2.11.3.2 Alternative 2 – educational LUCs assumes that no physical MEC remediation would take place but would involve the following components:

- Funded and implemented by USACE;

- Community MEC awareness training conducted by USACE; and
- Distribution of informational documents by USACE, Landowner and Local Agency.

2.11.3.3 Alternative 3 – Surface MEC Clearance and Implementation of educational LUCs, combines educational LUCs with surface clearance of MEC. Alternative 3 involves the following major components:

- Funded and implemented by USACE;
- Community MEC awareness training conducted by USACE;
- Distribution of informational documents by USACE, Landowner and Local Agency; and
- Clearance of MEC items visible on the ground surface over 36 acres of Southeastern Region MRS.

2.11.3.4 Alternative 4 – Subsurface and Subsurface MEC Clearance with educational LUCs, combines educational LUCs with a surface and subsurface clearance of MEC from an expanded area around the 2011 Removal Action area in the Southeastern Region MRS (AOC #2, Figure 4); in focused areas within the Southeastern Region MRS, where anticipated future land use events include intrusive activities; and in the area within the Southeastern Region MRS where the highest relative MD density was identified. The following components make up Alternative 4:

- Funded and implemented by USACE;
- Community MEC awareness training conducted by USACE;
- Distribution of informational documents by USACE, Landowner and Local Agency; and
- Surface and subsurface clearance of MEC to a depth of two feet bgs over the 36 acres of Southeastern Region MRS.

#### ***2.11.4 Common Elements and Distinguishing Features of Each Alternative***

##### **2.11.4.1 Applicable or Relevant and Appropriate Requirements (ARARs)**

ARARs are “those cleanup standards, standards of control, and other substantive environmental protection 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” as defined in 40 CFR 300.5. With the exception of No Further Action and educational LUCs, ARARs for the remedial alternatives for the Southeastern Region MRS are listed in Table 2-1.

**TABLE 2-1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)**

<b>Regulatory Authority</b>	<b>Law/Regulation</b>	<b>Requirement</b>	<b>Comment</b>
Federal	40 CFR 264.601	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.	Prevent any releases that may have adverse effects on human health or the environment due to migration of waste constituents in ground water, subsurface soil, surface water, wetlands, surface soil and/or air. Specifically referenced for consolidation of MEC.

#### 2.11.4.2 Endangered Species

<b>Regulatory Authority</b>	<b>Law/Regulation</b>	<b>Requirement</b>	<b>Comment</b>
Federal	<i>Endangered Species Act of 1973</i> 16 U.S.C. §1538(a)(1)(B).	Prohibits the take of species listed as threatened or endangered under the Act.	The former WTA is in a region that is known to have a high probability for containing endangered and threatened species. However, none were identified within the Southeastern Region MRS during the RI investigation.

#### 2.11.5 Long-term Reliability

2.11.5.1 Alternative 1 – No Further Action provides no reduction in MEC hazard and therefore, offers no permanent remedy.

2.11.5.2 Alternative 2 – Educational LUCs provides no reduction in MEC volume because no MEC clearance will take place. However, there is a reduction of MEC hazard to former WTA residents, workers, and site visitors through community MEC awareness training and distribution of informational documents.

2.11.5.3 Alternative 3 – Surface MEC Clearance and Implementation of educational LUCs greatly permanently reduces the risk of an accidental encounter with MEC on the surface, but provides only limited protection for intrusive activities.

2.11.5.4 Alternative 4 – Surface and Subsurface MEC Clearance and Implementation of educational LUCs would provide permanent reduction of hazard for former WTA residents, workers, and site visitors performing intrusive activities in areas where present and future land-use dictates (i.e. cacao farming).

**2.11.6 Estimated time to Implement**

2.11.6.1 Alternative 1 – No Further Action can be implemented immediately.

2.11.6.2 Alternative 2 – Implementation educational LUCs can occur within three to six months. Distribution of material should be ongoing.

2.11.6.3 Alternative 3 – Surface MEC Clearance and Implementation of educational LUCs can be implemented within four to six months. Time frame to complete the remedial design, field work and reporting is dependent on design and review schedule, site conditions at the time of field work execution, and public and regulatory review accommodations; however, a conservative estimated time-to-completed would be two years.

2.11.6.4 Alternative 4 – Surface and Subsurface MEC Clearance and Implementation of educational LUCs can be implemented within four to six months. Time frame to complete the remedial design, field work and reporting is dependent on design and review schedule, site conditions at the time of field work execution, and public and regulatory review accommodations; however, a conservative estimated time-to-completed would be two years.

**2.11.7 Cost**

Estimated present worth costs for each alternative are shown in Table 2-2.

**TABLE 2-2 ALTERNATIVE APPROXIMATE COST SUMMARY**

Alternative	Present Worth* (\$)
1. No Action	\$0
2. Educational LUCs	\$747,170
3. Surface MEC Clearance and Implementation of educational LUCs	\$2,688,010
4. Surface and Subsurface MEC Clearance and Implementation of educational LUCs	\$3,844,710

\*The estimated present worth cost for this alternative is over 30 years. Though not part of the remedy, the cost of 5-year reviews is included where applicable.

**2.11.8 Expected Outcomes of Each Alternative**

2.11.8.1 Southeastern Region MRS is owned by the City and County of Honolulu, Ohulehule Forest Conservancy, LLC, and private landowners. Ohulehule Forest Conservancy, LLC, owner of the majority of the land has publically presented future land use plans that include restoring/preserving the native forest; re-establishing taro farming along Waikane stream and lower portions of Waikēē stream; growing high-quality organic cacao; and building a single-home residence for owner personal use. In the interim, it is expected that current land use patterns (i.e., recreational use such as hiking, hunting, motocross, etc.) will likely continue.

2.11.8.2 Alternative 1 affords no protection to human health and is not effective in reducing the MEC hazard at the Southeastern Region MRS. Alternative 2 – educational LUCs reduce MEC hazards through education of residents, workers and site visitors. However, there is no reduction in volume of MEC with Alternative 2. Alternative 3 – Surface MEC Clearance with educational LUCs greatly reduces the risk of an accidental encounter with MEC on the surface over the entire area of the Southeastern Region MRS, but leaves subsurface MEC in place. However, educational LUCs will reduce the hazard to residents, workers, and site visitors through community MEC awareness training and distribution of informational documents. Alternative 4 – Subsurface MEC Clearance with educational LUCs would provide permanent reduction of hazard for former WTA residents, workers, and site visitors performing surface and intrusive activities. Educational LUCs will reduce the hazard to residents, workers, and site visitors through community MEC awareness training and distribution of informational documents.

## **2.12 COMPARATIVE ANALYSIS OF ALTERNATIVES**

Table 2-3 provides an assessment of each remedial alternative with respect to the nine NCP criteria.

TABLE 2-3 ASSESSMENT OF REMEDIAL ALTERNATIVES - SOUTHEASTERN REGION MRS

Remedial Alternative	EPA's CERCLA Nine Evaluation Criteria							Modifying Criteria		
	Threshold Criteria			Balancing Criteria				Cost	State Acceptance	Community Acceptance
	Overall Protectiveness of Human Health and the Environment	Compliance with ARARs	Short-Term Effectiveness	Long-Term Effectiveness & Permanence	Reduction of Toxicity, Mobility, and Volume Through Treatment	Implementability				
<b>Alternative 1</b> <b>No Action</b> No action would be taken to reduce potential MEC hazards to a potential receptor.	No action would be taken to reduce potential MEC hazards to a potential receptor. This alternative is not protective of human health and the environment.	N/A	No action would be taken to reduce potential MEC hazards to a potential receptor. Accordingly, alternative would be implemented immediately, there would be no risks resulting from implementation, but risks to receptors would remain the same.	No action would be taken to reduce potential MEC hazards to a potential receptor.	No action would be taken to reduce potential MEC hazards to a potential receptor.	No action would be taken to reduce potential MEC hazards to a potential receptor.	No action would be taken to reduce potential MEC hazards to a potential receptor.	No cost associated with this alternative.	The State did not comment on the acceptability of this Alternative.	No comments from the public were received.
<b>Alternative 2</b> <b>Educational Land Use Controls (LUCs)</b> LUCs include a community MEC awareness training and distribution of informational documents.	LUCs will reduce the hazard to human receptors through education resulting from a community MEC awareness training and distribution of informational documents.	N/A	Individuals familiar with formerly used military sites, munitions types, and safety would be involved with the development of community MEC awareness training and distribution of informational documents. Protection will occur immediately following implementation and can be executed within three to six months. Distribution of materials will be ongoing.	Since MEC is not removed from the MRS, the long-term effectiveness/permanence is questionable. Distribution of community MEC awareness training and distribution of informational documents would need to occur continually to ensure availability to receptors.	No reduction in volume as no MEC clearance would take place.	Community MEC awareness training and distribution of informational documents are technically feasible. Materials and personnel are readily available for implementation. Property rights-of-entry would likely not be required. Implementation of LUCs can occur within three to six months. Distribution of materials should be ongoing.	\$747,170	The State did not comment on the acceptability of this Alternative.	No comments from the public were received.	
<b>Alternative 3</b> <b>Surface MEC Clearance and Implementation of educational LUCs</b> Clearance of surface or partially buried MEC. Will include use of LUCs.	This alternative is protective of human health and the environment by eliminating, reducing, or controlling hazards at the site through treatment (i.e., clearance) and land use controls.	YES	The clearance of surface and partially buried MEC is effective in mitigating immediate hazards in areas identified for surface activities.	The long-term effectiveness/permanence of surface clearance is dependent upon the presence of subsurface MEC and potential for those items to migrate to the surface via erosion.	All surface and partially buried MEC would be removed, resulting in the reduction of mobility and volume. However, reduction of MEC volume is limited, as the subsurface MEC (i.e., deeper than six inches) will remain.	Surface clearance of MEC is technically feasible for an entire MRS or a smaller footprint within an MRS, based on accessibility and land use. Moderate technical effort required for implementation.	\$2,688,010	The State did not comment on the acceptability of this Alternative.	No comments from the public were received.	
<b>Alternative 4</b> <b>Surface and Subsurface MEC Clearance and Implementation of educational LUCs</b> This alternative includes clearance of surface MEC and MEC from below the surface, to a depth compatible with land use or actual known depths of the ordnance. Will include use of LUCs.	This alternative is protective of human health and the environment by eliminating, reducing, or controlling hazards at the site through treatment (i.e., clearance) and land use controls.	YES	The clearance of surface and subsurface MEC is effective. Potential significant exposure to UXO workers during implementation. Hazard to the public resulting from implementation is considered minimal.	This alternative is effective as a long-term remedy if MEC is present. It should be noted that with any clearance action, there is no assurance that 100% of MEC has been removed.	Greatest reduction of MEC volume. Surface and subsurface MEC would be removed using the most effective technology available, resulting in the reduction of mobility and volume.	Surface and subsurface clearance of MEC is technically feasible for an entire MRS or a smaller footprint within an MRS, based on accessibility and land use. UXO-qualified personnel would visually inspect, aided by hand-held instruments, the ground surface of the MRS and use hand-held sensors to detect items under dense vegetation. Suspected MEC items would be inspected for explosive hazards and disposed of accordingly.	\$3,844,710	The State did not comment on the acceptability of this Alternative.	No comments from the public were received.	



## **2.13 PRINCIPAL MEC/MC ISSUES**

2.13.1 The principal issue at the Southeastern Region MRS is MEC. The selected remedy will be protective by utilizing a MEC clearance to locate and remove explosive hazards.

## **2.14 SELECTED REMEDY**

The selected remedy for the Southeastern Region MRS is surface and subsurface MEC clearance with implementation of educational LUCs.

### ***2.14.1 Summary of the Rationale for the Selected Remedy***

2.14.1.1 The selected remedy, which implements a MEC clearance with educational LUCs, is appropriate for this MRS. The selected remedy will reduce potential hazard associated with MEC exposure through reduction in MEC volume. Active response measures are not practical in many areas of the MRS due to worker safety concerns and site accessibility limitations. A relatively low long-term threat for a complete MEC exposure pathway is suspected in these areas of the MRS. The implementation of educational LUCs will manage potential residual hazards within all areas of the MRS. The selected remedy is technically and administratively feasible to implement. The selected remedy will comply with the ARARs listed in Table 2-1.

2.14.1.2 USACE believes that the remedy is protective of human health and the environment and satisfies the statutory requirements of CERCLA §121(b): (1) be protective of human health and the environment; (2) comply with ARARs; (3) be cost effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) satisfy the preference for treatment as a principal element.

### ***2.14.2 Detailed Description of the Selected Remedy***

2.14.2.1 The selected remedy includes clearance of MEC from the surface and in the subsurface from an expanded area around the previous Removal Action area (AOC #2) in the Southeastern Region MRS; in focused areas within the Southeastern Region MRS, where projected future land use activities include intrusive activities; and in the area within the Southeastern Region MRS where the highest relative MD density was identified (Figure 4). The selected remedy is considered appropriate in areas where MEC items are present on the surface and in the subsurface. Hand-held analog geophysical instruments would be used over the accessible portions of the proposed clearance areas, and anomalies would be identified for intrusive excavation. If MEC is encountered, the item would be disposed of using approved/safe procedures. Extensive brush clearance would likely be required in many areas prior to the response action. The MEC clearance would not be conducted under any existing paved surfaces, streams, and structures. Accessibility to areas within the MRS will be dependent upon vegetation/terrain, landowner cooperation, and granting of right of entry. Each anomaly would be investigated and MEC/MD removed to a maximum depth of two feet.

2.14.2.2 The completion of the MEC clearance would reduce MEC hazards; however, due to limitations in detection technology and because 100% coverage will not be possible in all areas of the site, it is possible that some munitions may be undetected. To reduce hazard associated with potential residual munitions, educational LUCs would be implemented and will include community MEC awareness training and distribution of informational documents. This sequence of the selected remedy will inform the public about potential hazards (MEC) and will

explain appropriate response procedures in the event MEC is found. USACE will conduct MEC awareness training on an annual basis at a centrally located facility, such as the Waiahole Elementary School, mail informational documents (i.e., fact sheets) to local residents, and make informational documents (i.e. fact sheets) available at community gathering locations such as public schools and libraries within a two-mile radius of the MRS. Mailings will occur on an annual basis or more often if deemed appropriate. The City and County of Honolulu, Department of Planning and Permitting is willing to participate in implementing the selected remedy by attaching informational documents with approved building permits for the parcel. The City and County of Honolulu, Department of Emergency Management is willing to maintain and reproduce copies of the informational documents in accordance with Emergency Planning and Community Right-to-Know Act. The Landowner is accepting of the selected remedy and will be provided fact sheets to distribute to site visitors.

### ***2.14.3 Cost Estimate for Selected Remedy***

2.14.3.1 A summary of the cost estimate for a Surface and Subsurface MEC Clearance and Implementation of educational LUCs is provided in Tables 2-4 and 2-5. Detailed cost is provided in the Feasibility Study Report located in the Information Repository/Administrative Record.

2.14.3.2 The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file, an explanation of significant differences, or a Decision Document amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

### ***2.14.4 Expected Outcomes of the Selected Remedy***

The expected result of implementing this remedy is to reduce potential explosive hazards by preventing interaction between receptors (i.e., humans) and MEC on the surface and in the subsurface for current and reasonably anticipated future land use activities based on best available information at this time. The selected remedy will provide permanent reduction of hazard for residents, workers, and site visitors performing surface and intrusive activities in the Southeastern Region MRS. Educational LUCs will reduce the hazard to residents, workers, and site visitors through community MEC awareness training and distribution of informational documents. No limits will be placed on groundwater or surface water under this remedy. Extensive brush clearance will be required in many areas prior to the response action. The MEC clearance would not be conducted under any existing paved surfaces, streams, and structures. Accessibility to areas within the MRS will be dependent upon vegetation/terrain, landowner cooperation, and granting of right of entry. Each anomaly would be investigated and MEC/MD removed to a maximum depth of two feet. If MEC is encountered, the item would be disposed of using approved/safe procedures. The completion of the MEC clearance would reduce MEC hazards; however, due to limitations in detection technology and because 100% coverage will not be possible in all areas of the site, it is possible that some munitions may be undetected. To reduce hazard associated with potential residual munitions, educational LUCs would be implemented and will include community MEC awareness training and distribution of

informational documents. The selected remedy will not impact current or anticipated future land uses.

**TABLE 2-4 COST ESTIMATE - EDUCATIONAL LAND USE CONTROLS**

	DESCRIPTION	Total*
	<b>Land Use Controls: Educational Material</b>	
	Contractor Cost (Labor, Supplies, and Travel)	\$ 36,200.00
	Government Cost (30% of Contractor Cost)	\$ 10,860.00
	Subtotal	\$ 47,060.00
	Contingency (20% of Subtotal)	\$ 9,420.00
	<b>Total</b>	<b>\$ 56,480.00</b>
	<b>Land Use Controls: Community Relations Plan</b>	
	Contractor Cost (Labor, Supplies, and Travel)	\$ 18,440.00
	Government Cost (30% of Contractor Cost)	\$ 5,540.00
	Subtotal	\$ 23,980.00
	Contingency (20% of Subtotal)	\$ 4,800.00
	<b>Total</b>	<b>\$ 28,780.00</b>
	<b>Land Use Controls: MEC Awareness Training</b>	
	Contractor Cost (Labor, Supplies, and Travel)	\$ 35,370.00
	Government Cost (30% of Contractor Cost)	\$ 10,620.00
	Subtotal	\$ 45,990.00
	Contingency (20% of Subtotal)	\$ 9,200.00
	<b>Total</b>	<b>\$ 55,190.00</b>
	<b>GRAND TOTAL:</b>	<b>\$ 140,450.00</b>
	<b>Long Term Management (5-yr reviews)</b>	
	Contractor Cost (Labor, Supplies, and Travel)	\$ 42,130.00
	Government Cost (100% of Contractor Cost)	\$ 42,130.00
	Subtotal	\$ 84,260.00
	Contingency (20% of Subtotal)	\$ 16,860.00
	Subtotal	\$ 101,120.00
	<b>6 Reviews Present Worth</b>	<b>\$ 606,720.00</b>

Cost Assumptions:

\* See individual cost sheets for detailed cost breakdown contained in Feasibility Study  
Though not part of the remedy, the cost of 5-year reviews is included.

**TABLE 2-5 COST ESTIMATE – SURFACE AND SUBSURFACE MEC CLEARANCE**

Task	DESCRIPTION	Total*
	<b>Surface and Subsurface MEC Removal: TPP</b>	
	Contractor Cost (Labor, Supplies, and Travel)	\$ 58,530.00
	Government Cost (30% of Contractor Cost)	\$ 17,560.00
	Subtotal	\$ 76,090.00
	Contingency (20% of Subtotal)	\$ 15,220.00
	<b>Total</b>	<b>\$ 91,310.00</b>
	<b>Surface and Subsurface MEC Removal: Public Involvement Plan and Community Relations Support</b>	
	Contractor Cost (Labor, Supplies, and Travel)	\$ 111,940.00
	Government Cost (30% of Contractor Cost)	\$ 33,590.00
	Subtotal	\$ 145,530.00
	Contingency (20% of Subtotal)	\$ 29,110.00
	<b>Total</b>	<b>\$ 174,640.00</b>
	<b>Surface and Subsurface MEC Removal: Work Plan</b>	
	Contractor Cost (Labor, Supplies, and Travel)	\$ 48,800.00
	Government Cost (30% of Contractor Cost)	\$ 14,640.00
	Subtotal	\$ 63,440.00
	Contingency (20% of Subtotal)	\$ 12,690.00
	<b>Total</b>	<b>\$ 76,130.00</b>
	<b>Surface and Subsurface MEC Removal Mobilization/Demobilization</b>	
	Contractor Cost (Labor, Supplies, and Travel)	\$ 33,780.00
	Government Cost (5% of Contractor Cost)	\$ 1,690.00
	Subtotal	\$ 35,470.00
	Contingency (20% of Subtotal)	\$ 7,100.00
	<b>Total</b>	<b>\$ 42,570.00</b>
	<b>Surface and Subsurface MEC Removal Field Work (Brush Cutting, Removal, Soil Samples)</b>	
	Contractor Cost (Labor, Supplies, and Travel)	\$ 1,691,150.00
	Government Cost (30% of Contractor Cost)	\$ 507,350.00
	Subtotal	\$ 2,198,500.00
	Contingency (20% of Subtotal)	\$ 439,700.00
	<b>Total</b>	<b>\$ 2,638,200.00</b>
	<b>Surface and Subsurface MEC Removal: Site Specific Final Report</b>	
	Contractor Cost (Labor, Supplies, and Travel)	\$ 54,750.00
	Government Cost (30% of Contractor Cost)	\$ 16,430.00
	Subtotal	\$ 71,180.00
	Contingency (5% of Subtotal)	\$ 3,560.00
	<b>Total</b>	<b>\$ 74,740.00</b>
	<b>GRAND TOTAL:</b>	<b>\$ 3,097,590.00</b>

Cost Assumptions:

\* See individual cost sheets for detailed cost breakdown.

## **2.15 STATUTORY DETERMINATIONS**

In accordance with statutory requirements of CERCLA, the remedial action shall be protective of human health, comply with ARARs, be cost effective, utilize permanent solutions and alternative treatment technologies to the maxim extent practicable, and prefer treatment as a principal element.

### ***2.15.1 Protection of Human Health and the Environment***

This remedy is protective of human health and the environment by eliminating, reducing, or controlling hazards at the site through treatment (i.e., MEC clearance) and educational LUCs. The actual known depth of MEC/MD is less than two feet bgs. Surface and Subsurface MEC clearance will occur over 36 acres and will remove MEC to a depth of two feet bgs. Source reduction is used to minimize hazard related to a receptor interaction with a MEC hazard. In addition to the clearance, educational LUCs in form of community MEC awareness training and distribution of informational documents, will educate residents, recreational users, workers and site visitors on MEC safety. The implementation of the Selected Remedy will not pose unacceptable short-term risks to human health or the environment or result in any cross-media impacts.

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

The selected remedy will comply with ARARs.

### ***2.15.3 Cost Effectiveness***

The selected remedy is considered cost effective because it provides the most comprehensive means of reducing MEC exposure hazard to individuals who are engaged in intrusive activities as compared to the other alternatives. The estimated costs presented in Table 2-4 and Table 2-5 represent the costs developed for the Feasibility Study Report, which considered a remediation timeframe of 30 years.

### ***2.15.4 Permanent Solution and Alternate Technology***

Since MEC is removed from the MRS, the permanence of the selected remedy is extremely effective as a long-term remedy. It should be noted that with any response action, there is no assurance that 100% of MEC has been removed. A community MEC awareness training would be offered and distribution of informational documents would occur as needed to ensure availability to residents, workers, site visitors and recreational users.

### ***2.15.5 Preference for Treatment as a Principal Element***

The selected remedy includes treatment as a principal component. A surface and subsurface clearance will be used to actively treat the area by removing MEC and achieving the greatest reduction of MEC volume. Surface and subsurface MEC would be removed using the most effective technology available, resulting in the reduction of mobility and volume.

### ***2.15.6 Five-year Reviews***

Five-year reviews are a requirement for alternatives not allowing for unlimited use and unrestricted exposure (UU/UE) in accordance with 40 CFR 300.430(f)(4)(ii). Five-year reviews would be conducted to 1) ensure that public health, safety, and the environment are being protected by the response actions implemented; 2) verify the integrity of any site controls; 3)

determine if new information has become available that may warrant further action; 4) determine if there is an immediate threat to the public or environment that may require an accelerated response; and 5) review decisions for technical impracticability to determine if new technology will address potential MEC safety hazard. Data gathered during the review process will be used to determine if further action needs to be taken to protect public safety and the environment. If no changes have taken place, the site would continue to be monitored at the specified intervals. At the completion of the review, a Five-year Review Report would be prepared, and a public notice would be placed in the local newspaper concerning the continued effectiveness of the remedy.

## **2.16 DOCUMENTATION OF SIGNIFICANT CHANGES FROM THE PROPOSED PLAN**

The Proposed Plan for the Southeastern Region MRS at the former WTA was released for public comment on 19 June 2013. The Proposed Plan identified Alternative 4 – Surface and Subsurface MEC Clearance and Implementation of educational LUCs as the Preferred Alternative. No significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

### **3.0 PART 3: THE RESPONSIVENESS SUMMARY**

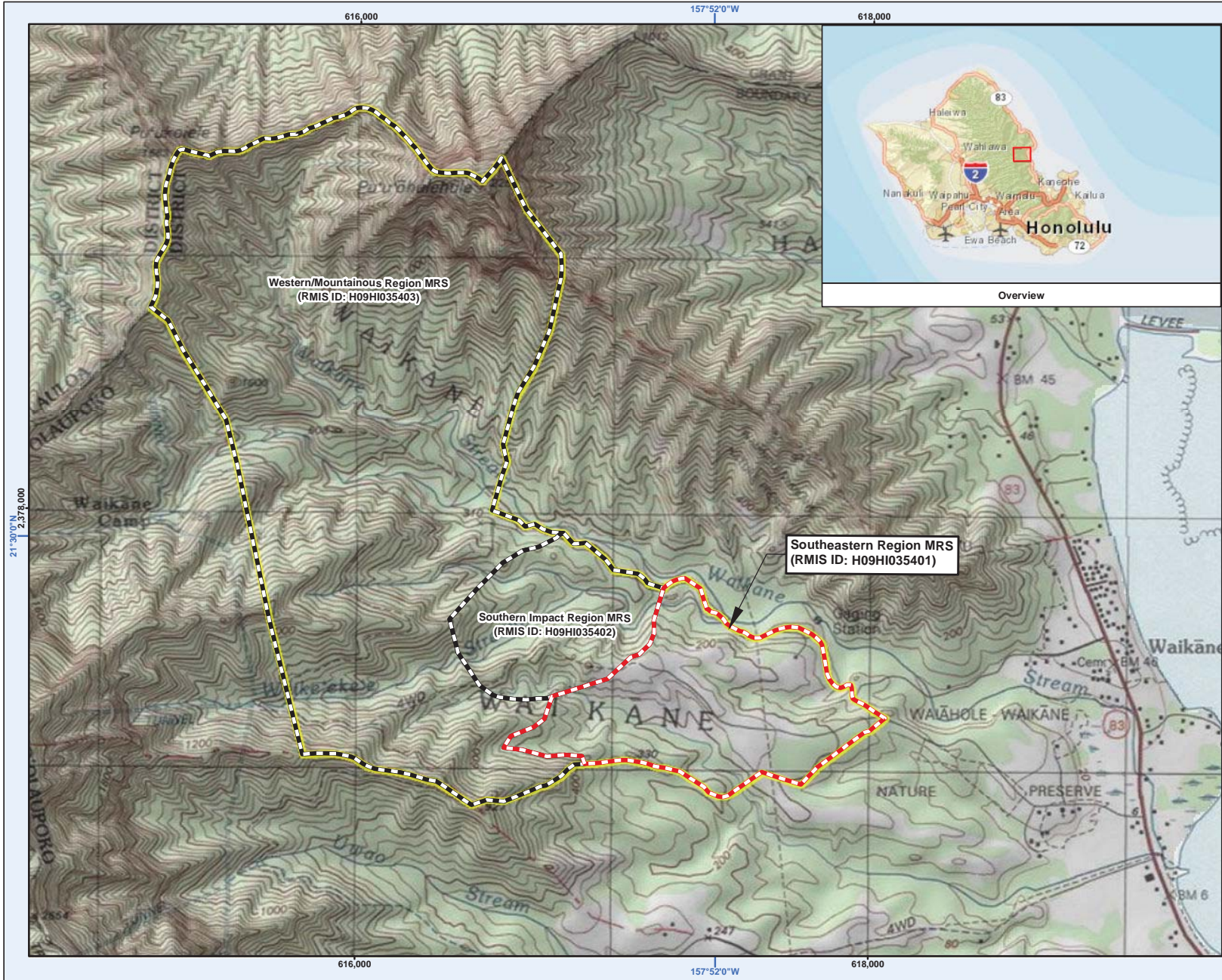
The public comment period for the Proposed Plan was from 19 June 2013 to 19 July 2013. USACE sponsored a public meeting at the Waiahole Elementary School Cafeteria on 19 June 2013.

#### **3.1 STAKEHOLDER ISSUES AND LEAD AGENCY RESPONSES**

No comments were received on the Proposed Plan.

#### **3.2 TECHNICAL AND LEGAL ISSUES**

No technical or legal issues have been identified.



Site Location  
 Decision Document - Southeastern Region MRS  
 Former WTA, Oahu, HI

Project Number 00008	Date May 2014	Figure 1
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**KEY**

- MRS Boundary
- Southeastern Region MRS
- WTAMRA

**Source(s)**  
 ZAPATA, USAESCH, USGS, ESRI, NOAA

**Projection**  
 WGS 1984 UTM Zone 4N  
 Note: Main Data Frame Rotated to True North

**Note(s)**  
 Engineering scale may only be accurate on a map size of 11 x 17  
 Magnetic Declination Date: 5/23/2011  
 Magnetic Declination Shifting by 0° 2' W per year

Checked By DSW	Engineering Scale 1" = 1,200'	Drawn By CRP
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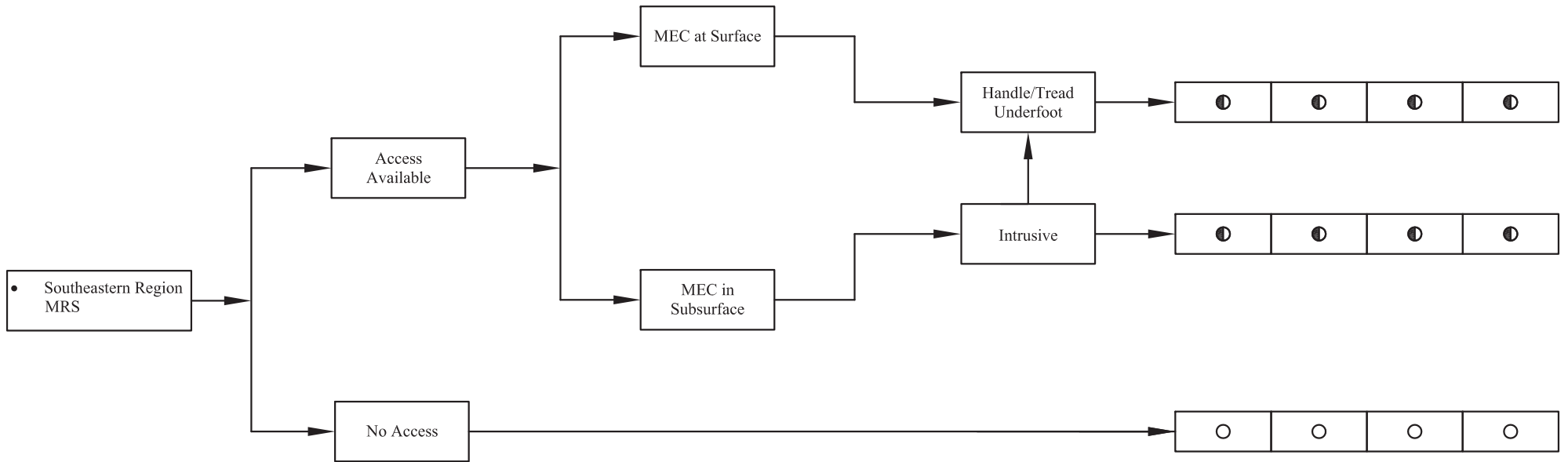


U.S. Army Corps of Engineers  
 Engineering and Support Center Huntsville  
 4820 University Square  
 Huntsville, AL 35816



Source Area	Access	MEC Locations/Release Mechanisms	Activity	Receptors
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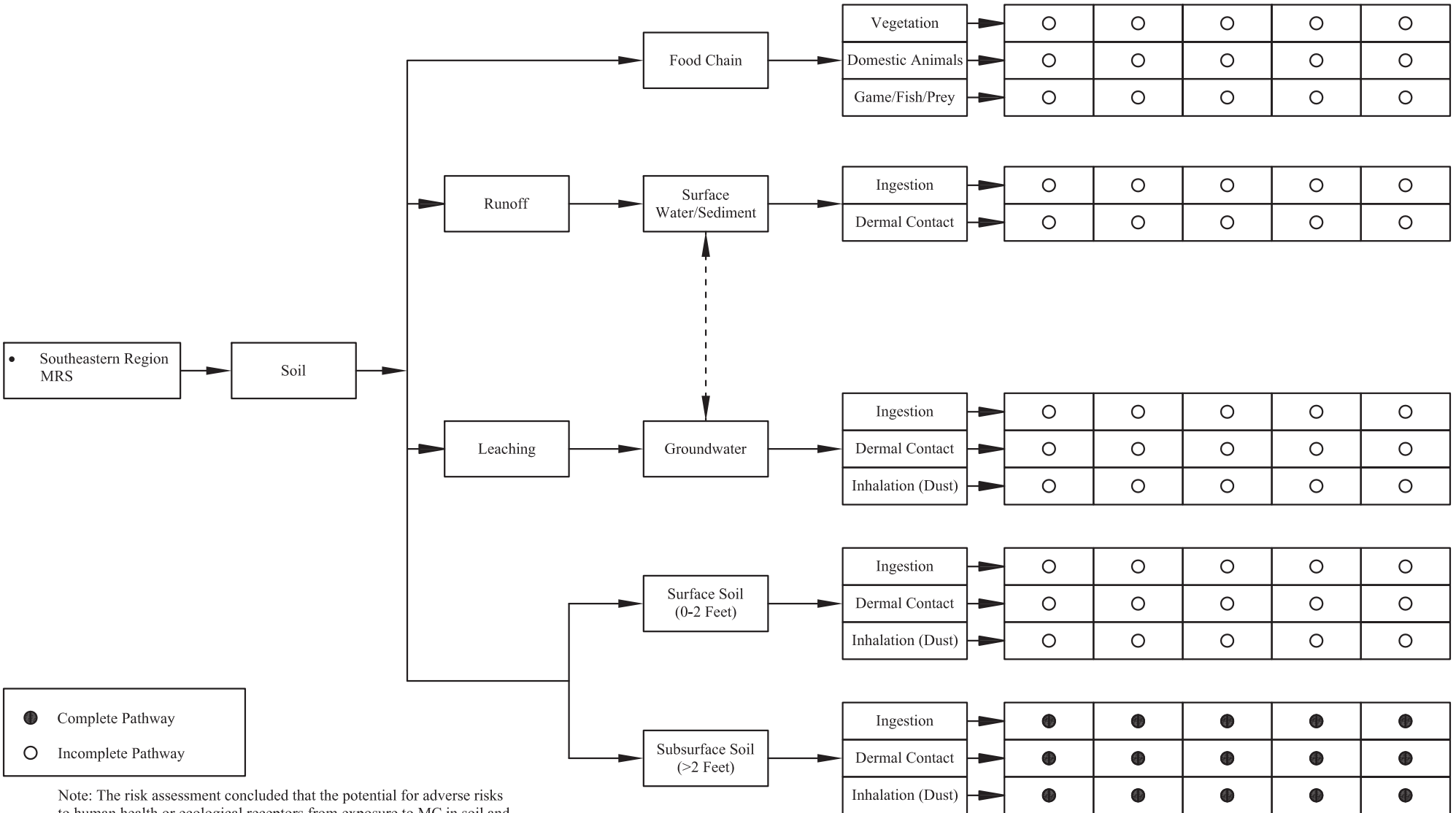
Residents	Authorized Contractors and Vistors	Agriculture or Construction Workers	Recreational Users or Trespassers
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- Potential Complete Pathway
- Complete Pathway
- Incomplete Pathway

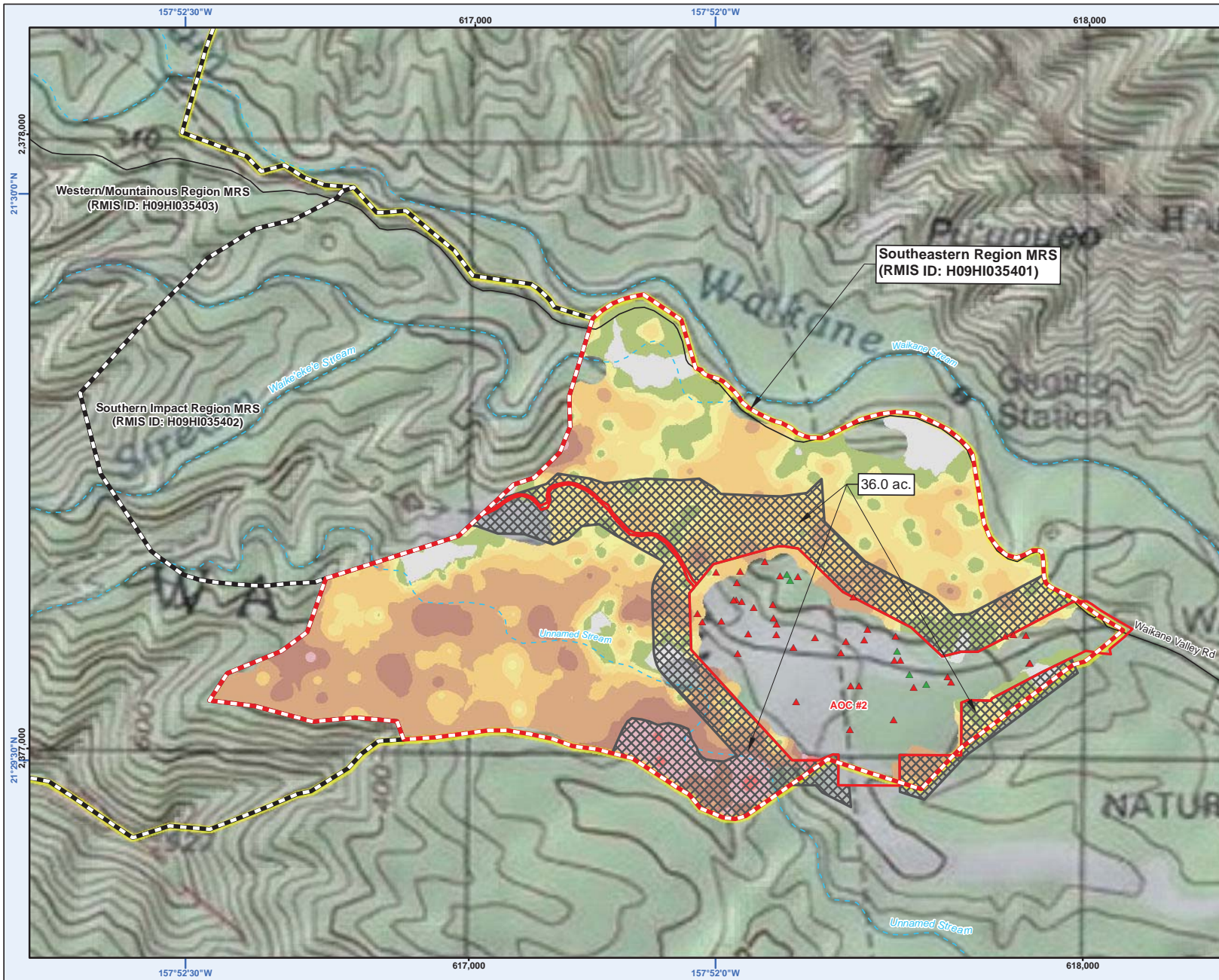
Source Area	Source Media - If MC is Present	Release Mechanism	Exposure Media	Exposure Routes	Receptors
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Residents	Authorized Contractors and Visitors	Agriculture or Construction Workers	Recreational Users or Trespassers	Ecological
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Note: The risk assessment concluded that the potential for adverse risks to human health or ecological receptors from exposure to MC in soil and sediment are considered negligible.

Zapata Incorporated	Prepared for: 	CSM - MC Exposure Pathway Analysis Decision Document - Southeastern Region MRS Former WTA, Oahu, HI	Figure 3
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MEC / Estimated MD Distribution and Selected Remedy  
Former Waikane Valley Training Area  
Oahu, HI

Project Number	Date	Figure
00008	May 2014	4

**KEY**

- ▲ MEC From EE/CA, 2008
- ▲ MEC From Removal Action<sup>2</sup>
- ~ Roads
- Stream
- Removal Action Area<sup>2</sup>
- Proposed Removal Action Area: Southeastern Region MRS - 36.0 ac.
- MRS Boundary
- Southeastern Region MRS
- WTA MRA

MD/Acre (Without Small Arms Ammunition)

- 0
- 0 - 25
- 25.1 - 50
- 50.1 - 100
- 100.1 - 200
- 200.1 - 400
- 400.1 - 800
- 800.1 - 1,600
- 1,600.1 - 2,290

GN  
MN

0 250 500 Feet

**Source(s)**  
ZAPATA, USAESCH, USGS, NOAA

**Projection**  
WGS 1984 UTM Zone 4N  
Note: Main Data Frame Rotated to True North

**Note(s)**  
Engineering scale may only be accurate on a map size of 11 x 17

Magnetic Declination Date: 5/23/2011  
Magnetic Declination Shifting by 0° 2' W per year

<sup>1</sup> NTCRA Action Memorandum (UASCE-POH, 2009)  
<sup>2</sup> Removal Action was conducted on a separate contract (Environet 2011)

Checked By	Engineering Scale	Drawn By
DSW	1" = 500'	CRP

