

9.0 RECOMMENDED OE RESPONSE ACTION ALTERNATIVES

This chapter presents the recommendations for reducing OE risk at the Former Waikoloa Maneuver Area and Nansay Sites, Island of Hawai'i, Hawai'i.

The OERIA evaluation areas developed in Chapter 4.0 to evaluate the level of OE hazard were used in Chapter 8.0 to compare the effectiveness, implementability (including local agency and community acceptance), and cost of the four OE response action alternatives identified in this EE/CA report. The OE hazard level (determined in Chapter 4.0) and the best ranking OE response action alternative (determined in Chapter 8.0) for each OERIA evaluation area were used to help develop and recommend the most appropriate OE response actions for the Former Waikoloa Maneuver Area and Nansay Sites. Although in some cases, the best ranking OE response action alternative in Chapter 8.0 was identified as either NAI, Institutional Controls, or Surface Clearance of OE, professional judgement was employed to determine whether a more protective OE response action should be recommended (based on the presence of UXO and local agency and community acceptance) for a specific OERIA evaluation area. The OERIA evaluation areas and risk evaluation results from Chapter 4.0 are shown as an overlay on Figure 9-1.

The recommended OE response actions were developed using the following: type, quantity, location, and depth of UXO and OE scrap recovered during the Phase II EE/CA field investigation; documented records of previous OE recovered at the former maneuver area; past, current, and future land use (as taken from the *General Plan, Hawai'i County* [County of Hawai'i, 1989]); input from local agencies, stakeholders, and the community (i.e., RAB meetings, interviews with local agencies, interaction with local communities and stakeholders); and the Institutional Analysis (Chapter 5.0). The primary goals of these recommendations are to provide: (1) the most effective protection to the public and the environment from OE and (2) a plan for managing risk associated with exposures to and interaction with OE at the Former Waikoloa Maneuver Area and Nansay Sites. The USACE, Honolulu District (CEPOH), will maintain its responsibilities for the residual risk that remains once the recommended OE response actions have been implemented by performing recurring reviews, which involves returning to the site 5 years after the recommended OE response actions have been initiated to assess their effectiveness and reliability. After the initial review has been conducted, recurring reviews will be performed at 5-year intervals. The need for recurring reviews will be coordinated with regulators and stakeholders and justified in each recurring review report (as outlined in Chapter 10).

Final recommendations for the site will be documented in an Action Memorandum (as outlined in Chapter 10). A Removal Design will be prepared in accordance with the decisions documented in the Action Memorandum and will provide specific details on how the OE response actions will be implemented. An Explosives Safety Submission (ESS) Document, which summarizes the Removal Design, will be prepared and submitted to the Department of Defense Explosives

Safety Board (DDESB) for their review and approval prior to implementation of any OE response actions.

9.1 GENERAL RECOMMENDATIONS

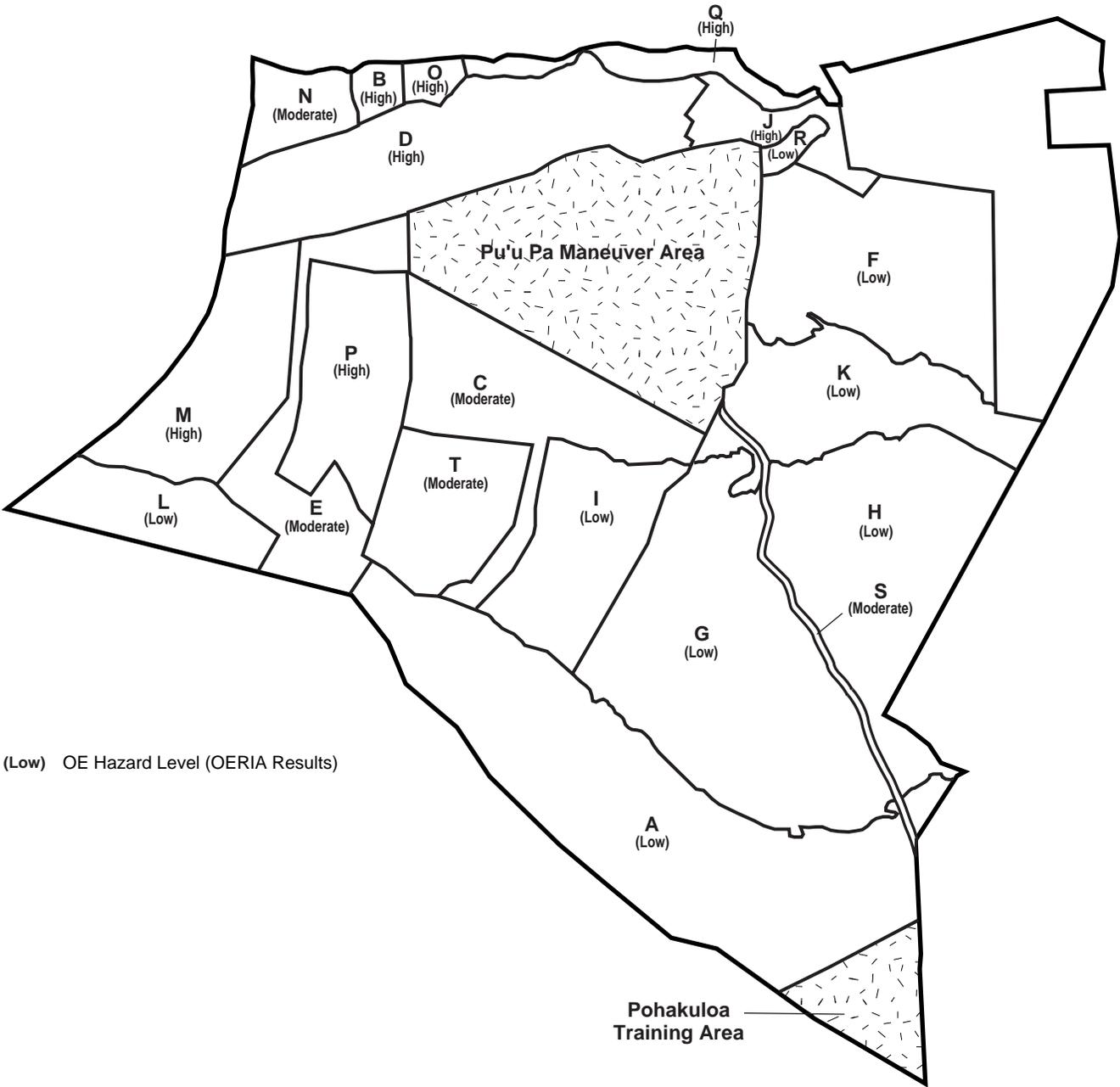
Institutional Controls are recommended for the entire Former Waikoloa Maneuver Area and Nansay Sites. These institutional controls include the following:

- Three display cases and numerous warning signs positioned strategically within the former maneuver area where OE has previously been recovered, with emphasis near local public gathering areas and primary access points.
- Distribution of informational pamphlets to residents and local businesses.
- Periodic community awareness meetings.
- Letter notifications to landowners.
- Worker/resident OE safety awareness education by means of a training video.
- Precoordinated construction support.

The display cases (see Figure 9-1), warning signs, distribution of informational pamphlets, periodic community awareness meetings, letter notifications to landowners, and worker/resident education will provide effective risk management by educating the local community and tourists concerning the dangers associated with OE at the Former Waikoloa Maneuver Area and Nansay Sites. It is recommended that informational pamphlets (detailing the types of ordnance used at the site, the hazards associated with these types of ordnance, and whom to contact if ordnance is found) be distributed to all residents and businesses of Waimea/Kamuela, Waikoloa Village, Hawai'ian Homelands, and workers of resort hotels near the western boundary of the former maneuver area. Additional copies of the informational pamphlets should be distributed to all local police and fire departments and public libraries, where they will be available to the public. Letter notifications detailing the findings and recommendations of the EE/CA investigation should be mailed to landowners within the former maneuver area. It is recommended that community awareness meetings be conducted periodically in Waimea/Kamuela and the Waikoloa Village and that worker education training be given (by means of an OE safety awareness training video) to all staff at local hotels/resort areas, Parker Ranch employees, and all employees of local enterprises (e.g., West Hawai'i Concrete) conducting business within the Former Waikoloa Maneuver Area and Nansay Sites.

Construction support, as defined in Section 7.1.2.4, is a Subsurface Clearance of OE to Depth of Detection of limited footprints in areas where construction would occur. Construction support is only recommended as a precoordinated option in areas that have not been recommended for a subsurface clearance (see Section 9.2 and Figure 9-1). These are areas where there is a very low probability of

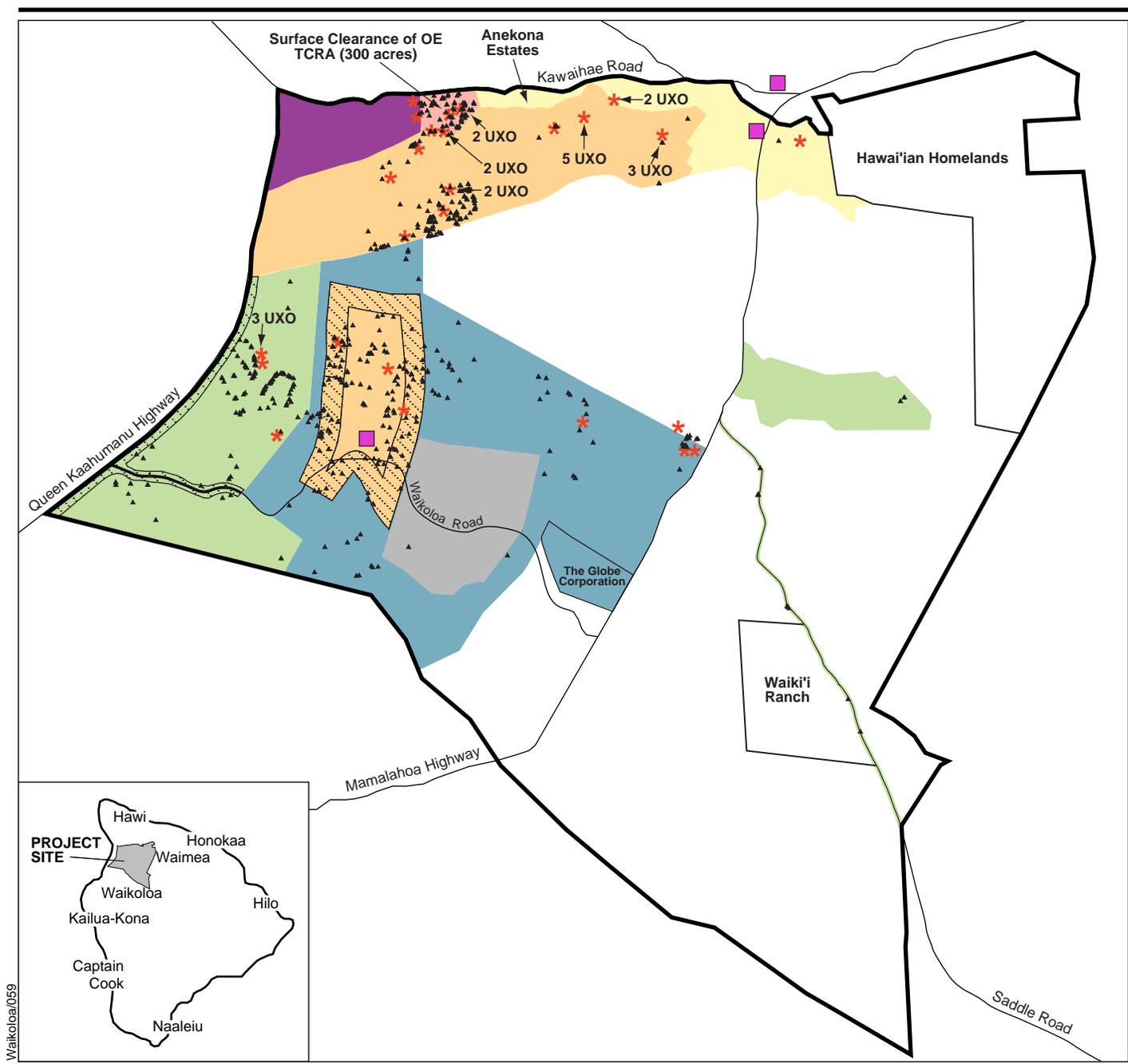
OERIA Evaluation Areas and Results



(Low) OE Hazard Level (OERIA Results)

Pohakuloa Training Area





Waikoloa/059

EXPLANATION

- Phase II EE/CA Project Boundary
- Display case locations
- UXO recovered during Phase II EE/CA
- OE Scrap recovered during Phase II EE/CA
- OERIA Area O (1,127 acres): Surface Clearance of OE Time Critical Removal Action (TCRA) for 300 acres. Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection.
- OERIA Area P (4,507 acres): Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection (includes a 2,000-foot buffer area around the Waikoloa Village). Developed properties excluded.
- OERIA Areas J, Q, and R (3,659 acres): Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection. Developed properties excluded.
- OERIA Area D (8,130 acres): Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection.
- OERIA Areas B and N (1,896 acres): Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection.
- OERIA Area M (4,972 acres): Surface Clearance of OE in areas to be disturbed and/or developed. Surface Clearance of OE in 500-foot buffer area along major roads.
- OERIA Area L (3,080 acres): Surface Clearance of OE in areas to be disturbed and/or developed. Surface Clearance of OE in 500-foot buffer area along major roads.
- OERIA Area T (3,824 acres): Surface Clearance of OE. Subsurface Clearance of OE to Depth of Detection in areas to be disturbed and/or developed.
- OERIA Areas A, C, E, and I (14,332 acres): Surface Clearance of OE for 100 feet on either side of fences and in the vicinity of existing structures/facilities (e.g., corrals and holding pens). Subsurface Clearance of OE to Depth of Detection on unpaved roads.
- OERIA Area K (2,262 acres): Surface Clearance of OE.
- OERIA Area S (86 acres): Surface Clearance of OE for 40 feet on either side of paved road (highway easement).
- Buffer Area



Note: Institutional controls are recommended for the entire Former Waikoloa Maneuver Area and Nansay Sites.

Recommended OE Response Actions Former Waikoloa Maneuver Area and Nansay Sites

Figure 9-1

ordnance being present. The recommended institutional controls (i.e., community outreach programs, educational media, and precoordinated construction support) sufficiently address the residual risk in these areas. Details concerning the procedures for precoordinated construction support are outlined in Section 7.1.2.5.

Data obtained during future construction support activities will be reviewed/evaluated on a continual basis to determine if any further risk management actions are necessary. It is recommended that a map be developed showing the areas where construction support has been implemented and that the map be filed with the county of Hawai'i.

The estimated cost to implement this alternative is \$16,959,211. The majority of this cost (\$14,895,048) is associated with precoordinated construction support. The USACE, Honolulu District (CEPOH), will fund the initial set-up, development, and distribution of institutional controls (i.e., display cases, warning signs, informational pamphlets, notification letters, and OE safety awareness training video). Long-term implementation of institutional controls (with the exception of construction support) will be the responsibility of landowners and local agencies. Costing assumptions and costing backup for the recommended institutional controls are presented in detail in Appendix H.

9.2 RECOMMENDATIONS FOR SPECIFIC AREAS

Eleven specific areas at the Former Waikoloa Maneuver Area and Nansay Sites are recommended for surface and/or subsurface clearance actions (Plate 9-1), based on the risk evaluation performed in Chapter 4.0 and the evaluation of the OE response action alternatives in Chapter 8.0. These eleven OE response action areas are listed in order of recommended implementation priority in Table 9-1 based on the risk that OE poses to the public in each of these areas. For example, areas of highest priority are those where UXO has been recovered (either during the Phase II EE/CA or during previous investigations), the public is already using the land, and construction and development are underway. Justification for these recommendations is presented in detail in the following subsections. Table 9-1 provides the estimated cost for implementation of the recommended OE response actions. Costing assumptions and costing backup for each of the recommended OE response action areas are presented in detail in Appendix H.

Subsurface Clearance of OE to Depth of Detection is recommended as an appropriate OE response action for several areas even though there were only two UXO items recovered subsurface (i.e., 2 inches bgs and 6 inches bgs) throughout the former maneuver area during the Phase II EE/CA field investigation. A surface clearance is only as effective as what can visually be seen and detected at the surface, either with the naked eye or with a standard metal detector. The geology (i.e., iron-rich basalt) in some areas affects visual identification of ordnance (i.e., difficulty in discriminating oxidized ordnance from oxidized iron-rich rock). Therefore, in some areas, the difficulty in discrimination of oxidized iron-rich basalt and oxidized ordnance is one of the reasons for recommending a Subsurface Clearance of OE to Depth of Detection. The

Table 9-1. Recommended OE Response Actions and Estimated Costs

Recommended Priority	Total Acreage ^(a)	Total UXO ^(b)	Total OE Scrap ^(b)	Recommendations	Estimated Cost
OERIA Area O - O'uli Parcel	1,127	9	256	Surface Clearance of OE TCRA for 300 acres. Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection.	\$13,093,728
OERIA Area P - Waikoloa Village (West)	4,507	3	945	Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection (includes a 2,000-foot buffer area ^(c) around the Waikoloa Village). Developed properties excluded.	\$47,931,730
OERIA Areas J, Q, and R - Waimea/Kamuela	3,659	3	1	Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection. Developed properties excluded.	\$41,804,520
OERIA Area D - Lalamilo State Land	8,130	14	471	Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection.	\$101,948,247
OERIA Areas B and N - Intersection of Kawaihae Road and Queen Kaahumanu Highway	1,896	-- ^(d)	--	Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection.	\$23,911,171
OERIA Area M - Puako Parcel	4,972	5	283	Surface Clearance of OE in areas to be disturbed and/or developed. Surface Clearance of OE in 500- foot buffer area along major roads.	\$3,068,130
OERIA Area L - Intersection of Waikoloa Road and Queen Kaahumanu Highway	3,080	--	12	Surface Clearance of OE in areas to be disturbed and/or developed. Surface Clearance of OE in 500- foot buffer area along major roads.	\$1,360,650
OERIA Area T - Waikoloa Village (East)	3,824	--	1	Surface Clearance of OE. Subsurface Clearance of OE to Depth of Detection in areas to be disturbed and/or developed.	\$20,052,373
OERIA Areas A, C, E, and I - Area Surrounding Waikoloa Village	14,332	4	177	Surface Clearance of OE for 100 feet on either side of fences and in the vicinity of existing structures/ facilities (e.g., corrals and holding pens). Subsurface Clearance of OE to Depth of Detection on unpaved roads.	\$10,962,987
OERIA Area K - Parker Ranch Property/West Hawai'i Concrete Plant	2,262	--	3	Surface Clearance of OE.	\$2,750,625
OERIA Area S - Saddle Road Easement	86	--	11	Surface Clearance of OE for 40 feet on either side of paved road (highway easement).	\$489,170
All Areas of the Former Waikoloa Maneuver Area and Nansay Sites	--	--	--	Community awareness outreach programs and educational media (i.e., display cases, warning signs, informational pamphlets, periodic community awareness meetings, OE safety awareness training video, landowner notifications) and precoordinated construction support.	\$16,959,211
Total Estimated Cost					\$284,332,542

Notes: (a) In some areas, only a portion of the area will be included in the clearance action (see Sections 9.2.1 through 9.2.11).

(b) UXO and OE scrap recovered during the Phase II EE/CA field investigation.

(c) Buffer area based on maximum fragmentation range of a 105mm projectile recovered in this area.

(d) A 105mm projectile (unexploded ordnance) was reportedly found near this area during a previous investigation.

OE = ordnance and explosives

OERIA = Ordnance and Explosives Risk Impact Assessment

TCRA = Time-Critical Removal Action

UXO = unexploded ordnance

primary reason for recommending a Subsurface Clearance of OE to Depth of Detection is the strong evidence of the potential for UXO in developed or soon-to-be-developed areas.

Although Institutional Controls (as discussed in Section 9.1) are recommended for the entire Former Waikoloa Maneuver Area and Nansay Sites, construction support is not an option in areas where a Subsurface Clearance of OE to Depth of Detection has been recommended. Ordnance will be removed in these areas during the subsurface clearance, negating the need for construction support. However, construction support in these areas, if requested prior to the implementation of a Subsurface Clearance of OE to Depth of Detection, will be evaluated and reviewed on a case by case basis. Precoordination with the USACE, Honolulu District (CEPOH), is required, as discussed in detail in Chapter 7.0.

In Areas J, P, Q, and R (see Table 9-1), "developed" properties will be excluded from the OE clearance response action. Developed properties are those that have been previously disturbed by earthmoving equipment, either through construction or prior development (e.g., housing lots, golf courses). Primary construction in these developed areas has already been completed. Ordnance that may have been in these areas would have been removed during earthmoving activities. Development assumptions used to determine estimated clearance acreages are provided in Appendix H (Table H-23).

9.2.1 OERIA Area O - O'uli Parcel

Surface Clearance of OE Time-Critical Removal Action (TCRA) is recommended for 300 acres of Area O. Once the Surface Clearance of OE TCRA is completed in the primary areas of concern (i.e., areas currently being utilized by the public), it is recommended that a Surface Clearance of OE and a Subsurface Clearance of OE to Depth of Detection be performed throughout Area O (see Figure 9-1).

The following provides information concerning the recommended Surface Clearance of OE TCRA: On 9 March 2001, Earth Tech submitted correspondence to the CEHNC recommending that the USACE conduct a TCRA in the vicinity of the O'uli Parcel (Area O on Figure 9-1). Earth Tech recommended that a surface clearance be performed in the area, with emphasis placed on areas currently being utilized by the public. A TCRA is a clean-up or stabilization action to a release (in this case, OE) that must be initiated to reduce the risk to public health and/or the environment posed by the release. This recommendation was based on the type, number, and depth of UXO recovered in this area during the Phase II EE/CA field investigation, the close proximity of occupied homes, and that the area is frequently utilized and visited by local residents and children who play in this area. Representatives from the CEHNC and the CEPOH conducted a site visit on 5-6 April 2001 to assess the need for the recommended TCRA. During the site visit, flyers describing the ordnance danger present in the area were distributed to residents of the O'uli Parcel. The public was also notified at the RAB meeting held at the Waikoloa Elementary School on 6 April 2001. An Action Memorandum to conduct a Surface Clearance of OE TCRA over 300 acres in the O'uli Parcel was signed and a contract to

perform the TCRA was awarded on 28 June 2001. Field activities were initiated in October 2001.

The recommendation for this area is based on the following:

- Nine UXO items were recovered in this area during the Phase II EE/CA field investigation; one UXO item was recovered 2 inches bgs and the remaining UXO were found on the surface. The types of UXO found in this area include: three 60mm mortars, two Mk2 hand grenades, one 81mm mortar WP, one 81mm mortar, one 37mm projectile, and one M9 rifle grenade; all of these have the potential to cause fatal injury if detonated by an individual's activities.
- In 1993, Donaldson Enterprises, Inc., performed surveys in this area and recovered two Mk2 hand grenades (UXO) in the southeast corner of Area O (near the boundary separating the O'uli Parcel from the Lalamilo State Land). In 1998, the South Kohala Police District reported that grass fires west of Area O (on the west side of the rock wall) detonated approximately 40 potential OE items. In 1999, during the Earth Tech site visit to this area, two UXO items (one 81mm mortar and one 2.36-inch rocket) were recovered in the western region of Area O, adjacent to and west of the rock wall.
- Nansay Hawai'i, Inc., has already developed residential lots and housing in this area and construction continues. Although most of the homes are near Kawaihae Road (near the northern boundary of this area), residential expansion is ongoing. Activities that occur throughout this area are surveying, construction, small-scale agricultural activities, and recreational activities (e.g., walking dogs, child play, hiking). These activities affect the ground surface at depths up to and including 12 inches bgs and pose a significantly high risk of exposure to OE.
- Future land use for this area is defined as rural, bringing an even greater population to this area.

The estimated cost to implement this recommended OE response action is \$13,093,728.

9.2.2 OERIA Area P - Waikoloa Village (West)

Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection is recommended for Area P (see Figure 9-1). Properties that are already developed (as defined in Section 9.2) will be excluded from the clearance (approximately 1,100 acres). The clearance area includes a 2,000-foot buffer area around the Waikoloa Village that was determined using the maximum fragmentation range (approximately 2,000 feet) of a 105mm projectile found previously in this area.

Based on the types of ordnance recovered in the village area prior to the Phase II EE/CA field investigation, sufficient knowledge of the area was already known to presuppose that a subsurface clearance action would be necessary. However, information pertaining to the number of anomaly sources and the geophysical

signatures associated with potential anomaly sources within the village area needed to be collected. Therefore, geophysical mapping activities were conducted during the Phase II EE/CA field investigation with the intent that intrusive investigation of these anomalies would not be conducted. During geophysical mapping activities, 160 significant anomaly sources were identified in this area; 62 of these were outside the minimum separation distance (MSD) for the village area and were investigated; the remaining 98 potential OE-related anomalies lie in or within 2,000 feet of the Waikoloa Village area. Some of these anomalies are of special interest because their geophysical signatures resemble those of ordnance. These anomalies were intentionally not investigated because they lie within the MSD of the village area, meaning that evacuation of residents and local area businesses would have been required (i.e., the MSD of a 105mm projectile is approximately 2,000 feet). The CEHNC and the CEPOH decided to postpone the relocation of residential and business personnel in the areas where a clearance was already warranted to prevent unnecessary inconvenience and business losses. Prior to initiation of the recommended OE response action in this area, residents and local businesses will be notified well in advance by the CEPOH concerning the clearance action schedule and evacuation procedures.

The recommendation for this area is based on the following:

- Three UXO items were recovered on the surface immediately outside of the village area during the Phase II EE/CA field investigation. The types of UXO include two 75mm projectiles and one 105mm projectile; all of these have the potential to cause fatal injury if detonated by an individual's activities. OE scrap was also observed by field crews throughout the area surrounding the Waikoloa Village during the EE/CA field investigation.
- OE has been previously reported in this area, most recently a 105mm projectile (UXO) that was found partially exposed in the elementary school yard in 1994.
- Although a majority of the geophysical anomalies in this area were not investigated (due to the MSD), assumptions were made based on data collected around the Waikoloa Village and reports of OE found at depth within the village area; these data suggest that ordnance is present within the village area.
- Future land use for this area is defined as predominantly low density urban along with medium density urban, industrial, urban expansion, open space and resort areas (i.e., fairways).
- Area P is a highly developed residential area with some commercial development and additional development is anticipated.

The estimated cost to implement this recommended OE response action is \$47,931,730.

9.2.3 OERIA Areas J, Q, and R - Waimea/Kamuela

Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection is recommended for Areas J, Q, and R (see Figure 9-1). Properties that are already developed (as defined in Section 9.2) will be excluded from the clearance (approximately 550 acres). Although right-of-entry to investigate the Anekona Estates was not granted during the EE/CA field investigation, the Anekona Estates is included in this recommended OE response action area (as discussed in Section 9.2.12).

The recommendation for this area is based on the following:

- Three UXO items were recovered on the surface in this area during the EE/CA field investigation. The types of UXO include two Mk2 hand grenades and one M9 rifle grenade (HEAT); all of these have the potential to cause fatal injury if detonated by an individual's activities.
- Documented reports (extending from October 1998 to May 2001) from the U.S. Army Pacific 706th EOD Unit have shown incidences of Mk2 hand grenades requiring explosive detonation for disposal throughout this area. These items are very sensitive; simple movement or touch can cause them to detonate, likely causing fatal injury.
- The areas are already highly developed with residential, agricultural, and commercial land uses and some light industrial uses with additional development and expansion anticipated. These types of land uses make an area wide subsurface clearance impractical since the land is already developed and there is little or no risk of exposure to OE in these areas.
- Future land use for this area is defined as low and medium density urban, intensive agriculture, urban expansion, and extensive agriculture.

The estimated cost to implement this recommended OE response action is \$41,804,520.

9.2.4 OERIA Area D - Lalamilo State Land

Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection is recommended for undeveloped portions (approximately 8,000 acres) of Area D (see Figure 9-1). The recommendation for this area is based on the following:

- Fourteen UXO items were recovered on the surface in this area during the Phase II EE/CA field investigation. The types of UXO include four 2.36-inch rocket warheads, four 60mm mortars, two 75mm projectiles, one 155mm projectile, one M9 rifle grenade, one 2.36-inch rocket motor, and one 81mm mortar WP; all of these have the potential to cause fatal injury if detonated by an individual's activities. OE scrap was also observed in large quantities primarily

in the central region of this area during the Phase II EE/CA field investigation.

- This area consists of state land that will predominantly remain as open space and extensive agriculture, with small focused areas designated for industrial use and urban expansion. The west region of this area is used primarily for ranching activities. Industrial land in the south-central region consists of the wind farm (few people utilize this area with the exception of wind farm employees). Urban expansion is expected to occur immediately west of the wind farm (see Figure 5-5).
- The west portion of this area is characterized by a'a lava rock that decreases to the east; however, the north and east regions of this area are easily accessed by local residents who use this area for various recreational activities (e.g., walking dogs, hiking, child play) and consider it a part of their local community.

The estimated cost to implement this recommended OE response action is \$101,948,247.

9.2.5 OERIA Areas B and N - Intersection of Kawaihae Road and Queen Kaahumanu Highway

Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection is recommended for undeveloped portions (approximately 1,800 acres) of Areas B and N (see Figure 9-1). This recommendation is based on the following:

- A 105mm projectile (UXO) was reportedly found near this area during a previous investigation. The exact location of this item is unknown; however, it was reportedly found to the immediate west of Area N. The close proximity of this item to Area N indicates the potential for ordnance in this area.
- Plans for construction and development are currently being initiated in this area; subsurface intrusive activities would be conducted in support of construction.
- Future development will bring an increased population to this area.

The estimated cost to implement this recommended OE response action is \$23,911,171.

9.2.6 OERIA Area M - Puako Parcel

Surface Clearance of OE is recommended for areas to be disturbed and/or developed in Area M (approximately 2,500 acres). It is also recommended that a Surface Clearance of OE be conducted in a 500-foot buffer area parallel to Queen Kaahumanu Highway and Waikoloa Road (see Figure 9-1). The 500-foot buffer area was developed in areas where tourists have been seen hiking to place graffiti on the lava rock and participate in off-road sightseeing.

The recommendation for this area is based on the following:

- Five UXO items were recovered on the surface in this area during the Phase II EE/CA field investigation. The types of UXO include three 75mm projectiles and one 155mm projectile, all of which have the potential to cause fatal injury if detonated by an individual's activities; an M54 Powder Train Time Fuze (PTTF) fuze (also recovered in this area) has the potential to cause severe injury if detonated by an individual's activities. OE scrap was also observed in large quantities throughout this area during the Phase II EE/CA field investigation.
- In 1990 and 1993, surveys performed in this area recovered one expended 105mm HE projectile, one 155mm projectile (illumination), and large concentrations of artillery fragments and fuze components.
- This area will be intensely impacted by resort areas (i.e., golf course communities) that are currently scheduled for development in this area.
- This area is used for limited recreational (i.e., hiking and hunting) and large-scale construction and ground intrusive activities (to depths greater than 12 inches bgs). These activities disturb the ground surface where UXO has been previously recovered.
- Future land use for this area is defined as urban expansion. Future development in this area as a golf course community by Nansay Hawai'i, Inc., will bring a large increase to the population and general activity in this area.
- Although the area is currently being developed, portions of this area are characterized with little soil development and unstable a'a lava flows, making accessibility difficult and recreational use limited; therefore, a surface clearance over this entire area is not necessary.

The estimated cost to implement this recommended OE response action is \$3,068,130.

9.2.7 OERIA Area L - Intersection of Waikoloa Road and Queen Kaahumanu Highway

Surface Clearance of OE in areas to be disturbed and/or developed is recommended for Area L (approximately 900 acres). Additionally, Surface Clearance of OE is recommended for a 500-foot buffer area parallel to Queen Kaahumanu Highway and Waikoloa Road (see Figure 9-1). The 500-foot buffer area was developed in areas where tourists have been seen hiking to place graffiti on the lava rock and participate in off-road sightseeing.

The recommendation for this area is based on the following:

- There were no UXO items recovered in this area during the EE/CA field investigation; however, OE scrap items were identified

throughout the area in several locations. OE scrap is nonhazardous and does not pose a safety risk; however, it does indicate a potential for UXO to be in this area.

- Future land use for this area is defined as urban expansion; therefore, a majority of this area will be developed.
- This area currently has very little development and is mostly occupied by a'a lava flows which makes accessibility difficult and recreational use unlikely; therefore, a surface clearance over this entire area is not necessary.

The estimated cost to implement this recommended OE response action is \$1,360,650.

9.2.8 OERIA Area T - Waikoloa Village (East)

Surface Clearance of OE is recommended for undeveloped portions (approximately 3,600 acres) of Area T (see Figure 9-1). Additionally, Subsurface Clearance of OE to Depth of Detection is recommended for areas to be disturbed and/or developed (approximately 1,300 acres). The recommendation for this area is based on the following:

- There were no UXO items recovered in this area during the Phase II EE/CA field investigation; however, OE scrap was identified in one location. OE scrap is nonhazardous and does not pose a safety risk; however, it does indicate a potential for UXO to be in this area.
- Future land use for this area is defined as rural (including golf course communities) and low density urban.
- This area is southeast of the Waikoloa Village and is expected to see an increase in population (i.e., new residents and tourists) once construction activities and development of new homes and golf courses are completed in this area.

The estimated cost to implement this recommended OE response action is \$20,052,373.

9.2.9 OERIA Areas A, C, E, and I - Area Surrounding Waikoloa Village

Surface Clearance of OE is recommended for 100 feet on either side of fences and in the vicinity of existing structures/facilities (e.g., corrals and holding pens) in Areas A, C, E, and I (approximately 1,400 acres). Subsurface Clearance of OE to Depth of Detection is recommended for unpaved roads (see Figure 9-1) in Areas A, C, E, and I (approximately 700 acres). Although right-of-entry to investigate the Globe Corporation property area was not granted during the Phase II EE/CA field investigation, the Globe Corporation property area is included in this recommended OE response action area (as discussed in Section 9.2.12).

The recommendation for this area is based on the following:

- Four UXO items were recovered in this area during the Phase II EE/CA field investigation. Three UXO items were recovered on the surface; one UXO item was recovered 6 inches bgs. The types of UXO include one 4.5-inch barrage rocket (6 inches bgs), one 60mm mortar, one 81mm mortar, and one 105mm projectile; all of these have the potential to cause fatal injury if detonated by an individual's activities. The 60mm mortar was found approximately 1,300 feet north of Area C in the Pu'u Pa Maneuver Area. The Pu'u Pa Maneuver Area was not investigated during the EE/CA and therefore not included in Area C because it is actively used by the U.S. military for training exercises.
- One of the UXO items (81mm mortar) recovered in this area was exposed by vehicle traffic on the tank road (dirt road) where vehicles had driven over the item unaware that it was there.
- This area is characterized by high-intensity surface activities (e.g., driving) and low-intensity intrusive activities (e.g., fence installation).
- The east portion of this area is utilized by the Parker Ranch for cattle grazing and consists of private property parcels that are not accessible to the general public (i.e., only travel along established roads and trails is assumed).
- Future land use for this area is defined as intensive agriculture, extensive agriculture, and open space. Little to no development is anticipated in this area; therefore, the area will continue to be used for cattle grazing and open space (i.e., infrequent visitor use). Risk reduction by means of a surface clearance is only necessary in areas where people regularly access/utilize the area.
- The southeast region of this area (south of the Globe Corporation property area) is not included in the recommended OE response action area because this area was surveyed during visual reconnaissance and no evidence of OE was recovered.

The estimated cost to implement this recommended OE response action is \$10,962,987.

9.2.10 OERIA Area K - Parker Ranch Property/West Hawai'i Concrete Plant

Surface Clearance of OE is recommended for undeveloped portions (approximately 2,200 acres) of Area K (see Figure 9-1). The recommendation for this area is based on the following:

- There were no UXO items recovered in this area during the Phase II EE/CA field investigation; however, OE scrap items were identified in two locations. OE scrap is nonhazardous and does not pose a safety risk; however, it does indicate a potential for UXO to be in this area.

- The existing land use consists of cattle grazing and quarrying activities; therefore, the number of people accessing the site are limited in number and to specific areas.
- Future land use for this area is defined as intensive agriculture (which has the potential for relatively shallow intrusive activities).

The estimated cost to implement this recommended OE response action is \$2,750,625.

9.2.11 OERIA Area S - Saddle Road Easement

Surface Clearance of OE is recommended for 40 feet on either side of a portion of Saddle Road (i.e., highway easement) within the former maneuver area (see Figure 9-1). The recommendation for this area is based on the following:

- There were no UXO items recovered in Area S during the Phase II EE/CA field investigation; however, 11 OE scrap items were identified in this area. OE scrap is nonhazardous and does not pose a safety risk.
- Thirty-eight anomaly sources identified during geophysical mapping of the roadway easement during the Phase II EE/CA field investigation were investigated. All of the investigated anomaly sources were non-OE and only one anomaly source was OE scrap (found on the surface). The remaining ten OE scrap items were recovered in this area on the surface during visual reconnaissance. There were no ordnance items recovered subsurface in this area.
- This portion of Saddle Road was commonly used in the past by the U.S. military. The OE scrap items recovered in this area likely fell out of a military transport vehicle en route to the Pohakuloa Training Area and were not the result of military training activities in this area; therefore, a subsurface clearance in this area is not necessary.
- Saddle Road is well traveled by residents and tourists, who may be exposed to ordnance while driving, mountain biking, or off-road sightseeing.

The estimated cost to implement this recommended OE response action is \$489,170.

9.2.12 No Right-of-Entry Areas

There are four specific areas within the Phase II EE/CA project boundary that were specifically not investigated during the EE/CA field investigation. Right-of-entry into these properties was either denied completely or access was granted after the conclusion of EE/CA field activities. Recommendations for these areas were developed based on recommendations for OE response actions in adjoining areas. Estimated costs for the recommendations made for the Anekona Estates and the Globe Corporation are included in their associated OERIA evaluation areas, as discussed below. Estimated costs for institutional

controls, recommended for all four of the no right-of-entry areas, are included in the total cost of institutional controls, as shown in Table 9-1. The following OE response actions are recommended for the four no right-of-entry areas (see Figure 9-1):

Anekona Estates. Surface Clearance of OE and Subsurface Clearance of OE to Depth of Detection is recommended for the Anekona Estates. Properties that are developed (as defined in Section 9.2) will be excluded from the clearance action. This recommendation is based on the types of ordnance recovered in adjoining areas and the EE/CA recommendations made for Areas J, Q, and R (see Section 9.2.3).

The Globe Corporation. Surface Clearance of OE is recommended for 100 feet on either side of fences and in the vicinity of existing structures/facilities (e.g., corrals and holding pens). Subsurface Clearance of OE to Depth of Detection is recommended for unpaved roads (see Figure 9-1). This recommendation is based on the types of ordnance recovered in adjoining areas and the EE/CA recommendations made for Areas A, C, E, and I (see Section 9.2.9).

Waiki'i Ranch. Institutional Controls (i.e., community awareness outreach programs, educational media, and precoordinated construction support), as described in Section 9.1, are recommended for the Waiki'i Ranch area. This recommendation is based on data collected in adjoining areas during the Phase II EE/CA field investigation (see Plate 9-1).

Hawai'ian Homelands. Institutional Controls (i.e., community awareness outreach programs, educational media, and precoordinated construction support), as described in Section 9.1, are recommended for the Hawai'ian Homelands area. This recommendation is based on data collected in adjoining areas during the Phase II EE/CA field investigation (see Plate 9-1) and that the area is almost already completely developed.

THIS PAGE INTENTIONALLY LEFT BLANK

