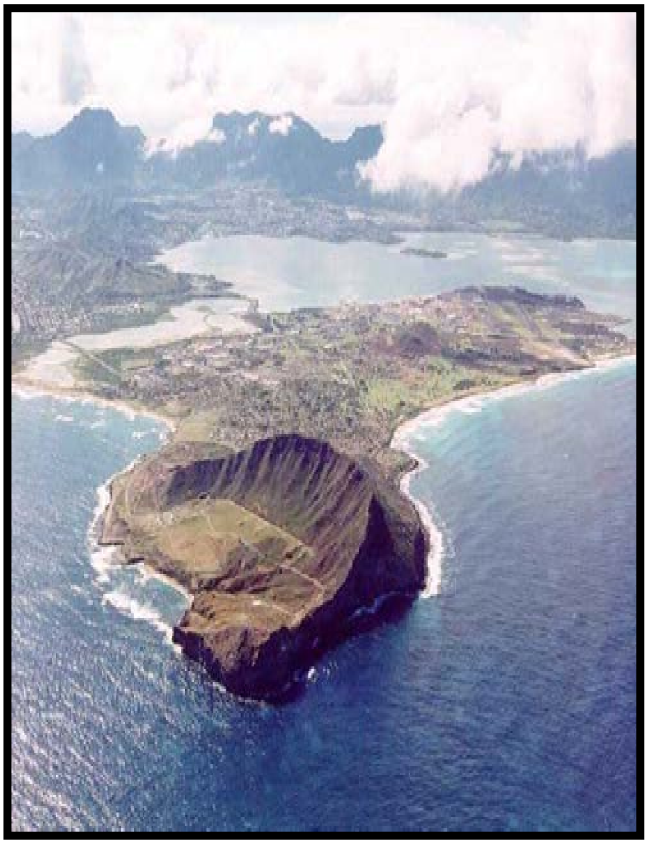
ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT



Construction and Use of an Explosives Training Range

At Ulupa‘u Crater

Marine Corps Base Hawaii, Kaneohe Bay

January 2012

Finding of No Significant Impact (FONSI)
For Construction of an Explosives Training Range at Ulupaʻu Crater, Marine Corps Base Hawaii Kaneohe Bay

United States Marine Corps Base (MCB) Hawaii proposes to develop an explosives training range (ETR) on the northwestern (outer) side of Ulupaʻu Crater on Mōkapu Peninsula, Kāneʻohe Bay, Oʻahu. The proposed range would support levels of explosives training that are not currently available at MCB Hawaii Kaneohe Bay. The United States (U.S.) Marine Corps unit requirements for explosives and demolition training are currently not fully supported by existing facilities in Hawaiʻi. The proposed ETR would satisfy and support those requirements.

The National Environmental Policy Act of 1969 (NEPA) requires federal agencies to consider potential environmental impacts prior to undertaking a course of action. Within the U.S. Marine Corps, NEPA is implemented through regulations promulgated by the Council on Environmental Quality [40 CFR Parts 1500 – 1508], with supplemental guidance provided by <u>Marine Corps Order P5090.2A Environmental Compliance and Protection Manual</u>.

DESCRIPTION OF ACTION AND ALTERNATIVES

<u>Alternative 1 – Proposed Action.</u> Under the proposed action, MCB Hawaii would construct and use an ETR on the northwestern (outer) slope of Ulupaʻu Crater on the Mōkapu Peninsula, in the same vicinity of a historic rocket range used during the late 1950s and the 1960s. The proposed range would be used for training in safe handling and use of explosives. Training would consist of preparation and detonation of charges in various configurations buried approximately 1 m (3 ft) in sand demolition pits and cutting pieces of steel and timber using explosives. Detonations would be triggered using electronic devices and timed fuses. All cutting charges would be detonated inside a bunker designed to eliminate flying debris and reduce noise.

Typical usage of the ETR would consist of platoon-size training of up to 50 Marines at a time. Training activities would take place on average of one to two days per week or up to approximately 100 days per year. Each training event (or day) would consist of between five and thirty explosions. The size and type of explosive material used would vary, and individual charges would not exceed 7.1 lb of net explosive weight.

<u>Alternative 2 – No Action.</u> Under the no-action alternative the site would not be developed. Alternative facilities would need to be identified so that U.S. Marine Corps training requirements for explosives handling could be met.

<u>Alternatives Considered but not Carried Forward.</u> Other alternatives considered included explosives training at alternative locations at MCB Hawaii Kaneohe Bay. However, other training land parcels are located too near non-military residential areas to be suitable for the ETR, The topography and distance from urban areas makes the proposed location preferred over other possible locations on the base. The ETR could not be sited further south due to surface danger zone and noise abatement requirements.

ANTICIPATED ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

The environmental assessment (EA) analyzed the impacts of each alternative on the affected environment as well as cumulative impacts of the proposed action. Mitigation of impacts would be accomplished through adherence to standard construction practices and best management practices, and other guidelines, such as avoidance of areas with known federally-listed species, and monitoring to minimize spread of invasive vegetation. The following section summarizes the anticipated environmental impacts of the proposed action:

Air Quality. Fugitive dust and combustive emissions from explosions would produce localized, short-term emissions that would not result in any long-term impact to air quality. Particulate matter could be produced from detonations; however, burial of explosives prior to detonation and use of a sand substrate would reduce the quantity of respirable fugitive dust. Therefore, potential impacts would be minor.

Geology and Soils. Impacts to soil would result from minor ground disturbance during construction of access roads, safety bunkers and other support facilities. Geology would not be affected. Construction designs and construction best management practices would be employed to mitigate impacts to geology and soils, resulting in minor effects on those components.

Water Quality. The activities described under the proposed action would not adversely affect surface water quality in the long-term. Short-term impacts to surface water during and shortly after construction would be minimized by use of best management practices, and therefore, potential impacts would be minor.

Flora. The site is dominated by non-native vegetation. Threatened or endangered plants are not known or anticipated within the area based on a recent assessment and survey documented in this report. Therefore, impacts to threatened and endangered plant species would be minor.

Fauna. No terrestrial or avian threatened and endangered faunal species issues are associated with the area included in the proposed action. Offshore waters in the vicinity of MCB Hawaii Kaneohe Bay host several federally listed species, including the threatened green sea turtle, the endangered Hawaiian monk seal that occasionally uses the Mōkapu shoreline beaches for resting, and the endangered humpback whale. The primary effect of concern regarding the proposed action is the potential impacts of noise and associated pressure generated by explosive blasts on land. Available information indicates the potential for adverse impacts to marine wildlife from the proposed level of explosives training at Ulupaʻu Crater is minor or negligible. The impacts to wildlife associated with the proposed action would be minor.

Reef Systems. No long-term impacts to reef systems are expected. Short-term impacts to nearshore water quality would result from surface water run-off during construction. These impacts would be reduced by following base standard operating procedures during and after construction. Ongoing maintenance of erosion and sediment control measures would ensure no long term impacts occur. There would be no disturbance to the coastal strand or near shore ocean bottom. Therefore, the impacts to reef systems would be minor.

Cultural and Archeological Resources. No historic properties will be affected by this action. A section 106 consultation was filed with the State Historic Preservation Office by MCB Hawaii staff in September 2009. The State concurred with the NHPA Section 106 Review that determined a finding of "no historic properties affected". Letters describing the proposed action and potential effects on cultural resources were sent to native Hawaiian organization (NHO) claimants in September, 2010. No responses were received by MCB Hawaii from the claimants. The potential for impacts to cultural and archaeological resources are considered minor.

Noise. Usage of Ulupaʻu Crater as an ETR would be closely managed to produce only minimal change to the current noise levels. Noise impacts to the public would be mitigated to less than significant by limiting the size and frequency of explosive changes.

Hazardous Materials and Waste. Detonation of modern explosives charges is typically a highly efficient process that generates little residue or associated contamination of soil or air. The design of the detonation pits will minimize transport of accumulated residues to the ocean via infiltration or runoff. The proposed action would not increase the risks associated with historic ordnance already exposed at the site. The anticipated effects of the proposed action would be minor.

CUMULATIVE EFFECTS

The geographical scope of analysis included the extent of sensitive environmental resources potentially affected by the project, as well as the boundaries of other projects and actions that may affect those same resources. The proposed action, in conjunction with other actions on and in the vicinity of the ETR, would not result in incrementally or collectively significant and unmitigable cumulative adverse effects.

CONCLUSIONS

This environmental assessment found the proposed action (Alternative 1) would not have any unmitigable direct, indirect or cumulative adverse impacts on human health or the environment. As such, this proposed action does not require the completion of an environmental impact statement, as defined by the Council on Environmental Quality regulations (40 CFR 1500-1508) and 32 CFR Part 651.

Approved by:

BRIAN ANNICHIARICO Colonel, U.S. Marine Corps Commanding Officer U.S. Marine Corps Base Hawaii	9 FEB 2012 Date

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Environmental Assessment for

Construction of an Explosives Training Range at Ulupaʻu Crater

Marine Corps Base Hawaii Kaneohe Bay

January 2012

Prepared By
Center for Environmental Management of Military Lands
Colorado State University
Fort Collins, Colorado 80523-1490

For
Chief, Operations and Training Directorate
U.S. Marine Corps Base Hawaii

ABSTRACT: U.S. Marines must receive sufficient explosives and demolition training to deny resources and maneuverability to the enemy. All Marines require basic knowledge and skills regarding the safe handling and use of explosives. To meet this requirement the Marine Corps Base (MCB) Hawaii proposes to develop an explosives training range on the northwestern (outer) side of Ulupaʻu Crater on Mōkapu Peninsula, Kāneʻohe Bay, Oʻahu. The proposed range would support levels of explosives training that are not currently available at MCB Hawaii Kaneohe Bay.

Under the no action alternative, the US Marine Corps Base Hawaii would not construct the explosives training range at Ulupaʻu Crater. This EA analyzes the potential environmental consequences of the proposed action and no-action alternative for: geology and soils, water quality, flora and fauna, coastal and reef systems, cultural resources, socioeconomics and environmental justice, noise, and hazardous materials and waste. Findings indicate that the proposed action would not adversely impact to a significant level any variable of environmental concern. There are no significant cumulative impacts anticipated from the development and use of the explosives training range in conjunction with other past, present, or reasonably foreseeable actions.

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LIST OF FIGURES

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ACRONYMS

AICUZ	Air Installation Compatible Use Zone
BMP	Best management practices
BNOISE2	Blast noise model version 2
C4	Composition 4
CFR	Code of Federal Regulations
dB	Decibel
dBP	Peak decibel
DNL	Day night level
EA	Environmental Assessment
EIS	Environmental Impact Statement
ETR	Explosives Training Range
FONSI	Finding of No Significant Impact
HMX	High molecular weight RDX, or octogen
Ldn	Average day-night noise level
MCB	Marine Corps Base
MEF	Marine Expeditionary Force
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
Pk 15(met)	Peak noise exceeded by 15 percent of firing events
PETN	Pentaerythrite tetranitrate
RDX	Cyclotrimethylenetrinitramine
SDZ	Surface danger zone
SOP	Standing operating procedures
TNT	2,4-6 trinitrotoluene
UG/TC	User Group/Tenet Command
USMC	United States Marine Corps
UXO	Unexploded ordnance

EXECUTIVE SUMMARY

PROPOSED ACTION: Construction of an Explosives Training Range at Ulupaʻu Crater, Marine Corps Base Hawaii Kaneohe Bay

United States Marine Corps Base (MCB) Hawaii proposes to develop an explosives training range (ETR) on the northwestern (outer) side of Ulupaʻu Crater on Mōkapu Peninsula, Kāneʻohe Bay, Oʻahu. The proposed range would support levels of explosives training that are not currently available at MCB Hawaii Kaneohe Bay. The United States Marine Corps unit requirements for explosives and demolition training are currently not fully supported by existing facilities in Hawaiʻi. The proposed ETR would satisfy and support those requirements.

The National Environmental Policy Act of 1969 (NEPA) requires federal agencies to consider potential environmental impacts prior to undertaking a course of action. Within the U.S. Marine Corps, NEPA is implemented through regulations promulgated by the Council on Environmental Quality [40 CFR Parts 1500 – 1508], with supplemental guidance provided by <u>Marine Corps Order P5090.2A Environmental Compliance and Protection Manual</u>.

DESCRIPTION OF ACTION AND ALTERNATIVES

<u>Alternative 1 – Proposed Action.</u> Under the proposed action, MCB Hawaii would construct and use an ETR on the northwestern (outer) slope of Ulupaʻu Crater on the Mōkapu Peninsula, in the vicinity of several historic ranges used during the late 1950s and the 1960s. The facility would consist of a main parking lot, a small upper parking lot, an access road, a safety bunker, and a bermed range enclosing three demolition pits. Outdoor lighting with downward shades may be installed at the facility and in parking areas. The new range would be accessed via a new unpaved road that would extend from the gated end of Uli Street off Daly Road. The proposed range would be used for training in safe handling and use of explosives. Training would consist of preparation and detonation of charges in various configurations buried approximately 1 m (3 ft) deep in sand demolition pits and cutting pieces of steel and timber using explosives. Detonations would be triggered using electronic devices and timed fuses. All cutting charges would be detonated inside a bunker designed to eliminate flying debris and reduce noise. Typical usage of the ETR would consist of platoon-size training of up to 50 Marines at a time. Training activities would take place on average of one to two days per week or up to approximately 100 days per year. Each training event (or day) would consist of between five and thirty explosions. The size and type of explosive material used would vary, and individual charges would not exceed 7.1 lb of net explosive weight.

<u>Alternative 2 – No Action.</u> Under the no-action alternative the site would not be developed. Alternative facilities would need to be identified so that U.S. Marine Corps training requirements for explosives handling and detonation could be met.

<u>Alternatives Considered but not Carried Forward.</u> Other alternatives considered included explosives training at alternative locations at MCB Hawaii Kaneohe Bay. However, other training land parcels are located too near non-military residential areas to be suitable for the training range. The topography and distance from urban areas makes the proposed location preferred over other possible locations on the base. The training range could not be sited further south due to surface danger zone and noise abatement requirements.

ANTICIPATED ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

The environmental assessment (EA) analyzed the impacts of each alternative on the affected environment as well as cumulative impacts of the proposed action. Mitigation measures described in the EA would be employed to ensure that effects on resources are minor or negligible. Mitigation measures include: 1) updating the MCB Hawaii range regulation to ensure that all units using the range are aware of and understand the procedures for using the range; 2) obtaining all necessary permits and approvals before implementation of the project; 3) employing construction and soil erosion/sediment control best management practices (BMPs) (see details below); 4) monitoring and managing the establishment of any targeted invasive plant species over time at the proposed facility; 5) establishing signage and gated access to minimize public access; 6) using detonation bunkers to eliminate the possibility of flying debris during the use of cutting charges; 7) employing noise mitigation measures (see details below); 8) suspending or re-scheduling training when marine mammals are in the vicinity of the range; and 9) implementing wildland fire ignition minimization measures. The following section summarizes the anticipated environmental effects of the proposed action.

Environmental Components Examined in Detail

Air Quality. Emissions during construction would not substantially increase the concentrations of any of the criteria pollutants and these emissions would be short-term (i.e., during construction) and localized. In general, fugitive dust and combustive emissions would produce localized, short-term emissions that would not result in any long-term impact to air quality. Detonations would primarily produce carbon dioxide and nitrogen. Restriction of detonations to atmospherically favorable times for noise minimization will also promote dispersion of exhaust gases in the atmosphere. Particulate matter could be produced from detonations, mostly from the shattering and mobilization of the soil surface. However, burial of explosives prior to detonation and use of a sand substrate would reduce the quantity of respirable fugitive dust. Fugitive dust and combustive emissions from explosions would produce localized, short-term emissions that would not result in any long-term impact to air quality. Therefore, potential impacts would be minor.

Geology and Soils. Construction activities would involve disturbance of soil; removal of vegetation; cut and fill operations along the roadway, parking areas, and range site; grading; and road compaction. Best management practices such as proper grading, stabilization, culverts to channel storm water runoff, and sediment retention fences would minimize adverse effects during construction. Following completion of construction, all disturbed surfaces would be revegetated or stabilized using rock or other materials.

Runoff, erosion, and sediment transport would be minimized during construction using a variety of BMPs. Large rainfall or runoff events during construction or during the revegetation period following construction could result in localized soil erosion and runoff and associated sediment plumes in the ocean. Any necessary in-place detonation of historical unexploded ordnance could cause short term impacts due to soil disturbance and destabilization. Management of runoff from the proposed range, parking areas, and access road would be critical to minimize runoff and erosion on slopes above the shoreline. Mitigation best management practices used to minimize effects on soils include: minimizing soil disturbance; minimizing sediment generation during construction; stabilizing berms, employing erosion and sediment control BMPs and products to slow water flow, increase infiltration, and minimize movement of sediment off site; quickly establishing vegetation and ground cover on disturbed areas; covering piles of stockpiled soil; and applying standard BMPs to road construction. Overall impacts to soils would result from minor ground disturbance during construction of access roads, safety bunkers and other support facilities. Construction designs and BMPs and maintenance activities would be employed to mitigate impacts to geology and soils, resulting in minor effects to those components.

Water Quality. Impacts to the ocean and water quality may include short-term effects associated with construction, post-construction effects, and periodic/intermittent effects. Possible effects of construction include release of sediment plumes into the ocean during rainfall events. Currently, most of the area is well-vegetated and fairly stable; storm runoff travels to the ocean by way of natural gullies and drainages. Potential post-construction effects include erosion and sedimentation associated with unvegetated areas. These areas would be stabilized to some degree by revegetation efforts but some soil movement could occur while revegetation takes place. Storm water and erosion control BMPs are standard practice for construction projects that take place across MCB Hawaii. Bare soil surfaces resulting from maintenance and/or construction activities would be covered with suitable erosion controls. Use of BMPs, mitigation measures, and monitoring would ensure that impacts to ocean water quality are minimal.

The activities described under the proposed action would not adversely affect surface water quality in the long-term. Potential impacts to water quality are therefore anticipated to be minor.

Flora. Threatened or endangered plants are not known or anticipated within the area. Vegetation is dominated by non-native species. Construction effects on vegetation would occur in habitat with predominantly alien vegetation, and no adverse impacts to rare plant species are expected. Vegetation impacts are anticipated to be localized and short-term in nature. Seeds of undesirable non-native species could be transported to the site attached to trucks, equipment and personal gear associated with training at the proposed ETR. Established policies and procedures for importing soil would help ensure that no noxious plant species would be brought to the site where they could colonize and spread. For example, construction BMPs would require that construction vehicles be pre-washed and inspected prior to use at this site to avoid inadvertent transport of weed seeds from other areas. All plant species used for revegetation and soil stabilization would comply with MCBH guidance and species lists. Impacts to vegetation and threatened and endangered plant species are therefore anticipated to be minor.

Fauna. The proposed action would have a minor or negligible effect on terrestrial mammals and birds. The habitat is highly degraded and few native terrestrial species are present. Therefore there would be minimal impact to native faunal communities. Roosting and nesting seabirds using the shoreline along the north side of the Ulupaʻu Crater could be negatively impacted by construction and use of the explosive training range. However no roosting or nesting seabirds were observed during the recent seabird habitat survey conducted in the project area. The area does contain potential habitat for eight seabird species, but the presence of predators common throughout Oʻahu makes it unlikely that most seabirds would attempt to nest there. Increased human presence and noise levels during range construction and use might temporarily disturb the normal behavior of birds in the immediate vicinity of the proposed project. Any outdoor lighting would be down-shielded to prevent attraction of birds such as Newell's or wedge-tailed shearwaters that could potentially be attracted to the lights.

Offshore waters in the vicinity of MCB Hawaii Kaneohe Bay host several federally listed species, including the threatened green sea turtle, the endangered Hawaiian monk seal that occasionally uses the Mōkapu shoreline beaches for resting, and the endangered humpback whale. Potential effects to marine fauna include sediment and contaminant effects to reef and marine systems and noise effects. Construction could disturb existing soil contaminants linked to historic range usage. Coupled with sediment transported to the ocean during storm events, the proposed action could negatively affect coral reef community structure and lead to the loss of habitats and species. Sea turtles and other species that depend on coral habitat could have reduced foraging opportunities and limited habitat options as a result. Use of construction BMPs would avoid otherwise potentially adverse effects of runoff and sediment delivery to the ocean. These areas would be regularly monitored for erosion during and after construction. Increased human presence and noise levels during range construction and use might temporarily disturb the normal behavior of sea turtles, monk seals and humpback whales on the shore and/or in off-shore habitats adjacent to the proposed project area. Marine mammals may also be affected indirectly when prey such as fish are affected by human-caused sound.

Noise from explosions or concussive (impulse/shock) waves that originate on land could have short-term impacts on marine mammals if impulse waves penetrate into the marine habitat. The possibility of transmission into the marine habitat is not known. The impact of anthropogenic sounds on marine life depends on the frequency, intensity, duration, and location of the sound. Existing modeling of noise from explosions and consultations with marine animal experts from the University of Hawaii, Naval Facilities Hawaii, and a private consulting firm indicate that the noise/shock wave effects of the proposed action would be very minor. Therefore, according to available information the potential for adverse impacts to marine wildlife from explosives training at Ulupaʻu Crater is anticipated to be minor or negligible.

Reef Systems. Soil disturbance associated with the proposed action could result in temporarily increased erosion and runoff into the ocean, resulting in the generation of sediment plumes. These potential effects could be minimized and confined to short-term effects through the implementation of proper facility designs and mitigation measures. There is also a possibility that digging and construction could disturb existing soil contaminants linked to historic range usage. These disturbances could negatively affect coral reef community structure and lead to the loss of habitats and species. Mitigation best management practices, monitoring, staff oversight, and agency permitting requirements would ensure that impacts associated with sediment and runoff are minimized. There would be no disturbance to the coastal strand or nearshore ocean bottom. Debris would be removed and no new UXO would be generated with potential to damage reef systems. The site would be regularly monitored for erosion during and after construction. Ongoing maintenance of erosion and sediment control measures would ensure no long-term impacts occur. Therefore, the impacts to reef systems are anticipated to be minor.

Cultural and Archeological Resources. No historic properties will be affected by the proposed action. The area is considered to be of low archaeological sensitivity, and no historic structures or archaeological sites occur within the area of potential effect. A section 106 consultation was filed with the State Historic Preservation Office by MCB Hawaii staff in September 2009. The State concurred with the NHPA Section 106 Review that determined a finding of “no historic properties affected”. Letters describing the proposed action and potential effects on cultural resources were sent to native Hawaiian organization (NHO) claimants in September, 2010. No responses were received by MCB Hawaii from the claimants. The potential for impacts to cultural and archaeological resources are considered minor.

Noise. Adverse noise impacts could include shaking, rattling, and structural damage to nearby residences. Additionally, an adverse noise impact could occur if peak noise levels were loud enough to cause annoyance to nearby residents and result in frequent noise complaints. Based on recommendations related to a high probability of complaints, a peak acceptable level of 130 dB or less was established at the edge of the on-base residences. In keeping with guidance for noise Zone I (residential), an average day-night level of 62-70 dB was also used to estimate maximum allowable detonations. Noise will be managed through a combination of management techniques including: (1) adapting range hours to allow use only during times that are least likely to be objectionable, (2) locating the range so as to avoid sound-sensitive locations, and (3) using engineering techniques to control sound by reflecting, redirecting, absorbing, containing or isolating the sound. Hearing protection would be worn by users of the range during all detonations and observers would be positioned within or behind the bunker located approximately 100 m (330 ft) from the range. Noise impacts to the public would be mitigated to less than significant by limiting the size and frequency of explosive changes.

Hazardous Materials and Waste. The proposed range would only support explosives training using modern, highly efficient explosives, which typically produce little residue. During training, sufficient time would be allowed for blast fumes, dust, and mists to clear before inspecting or occupying the blasting area. Existing studies suggest that little of the explosive material would remain to contaminate the soil in the detonation pits or to be dispersed from the site into the atmosphere. Small amounts of explosives residues could accumulate in soil over a very long time and could be transported to the ocean by runoff. However, the use of demolition pits and the containment of soil therein would greatly minimize the potential for movement of residues off-site. The proposed action would not increase the risks associated with historic ordnance already exposed at the site. Therefore, the anticipated effects would be minor.

Environmental Components Considered But Not Examined in Detail

Some components would not be affected by the proposed action and have been eliminated from detailed analysis. They include wetlands and floodplains, land use and recreation, public safety, socioeconomics and environmental justice, and wildland fire.

CUMULATIVE EFFECTS

The geographical scope of analysis included the extent of sensitive environmental resources potentially affected by the project, as well as the boundaries of other projects and actions that may affect those same resources. The proposed action, in conjunction with other actions on and in the vicinity of the ETR, would not result in incrementally or collectively significant and unmitigable cumulative adverse effects.

CONCLUSIONS

This environmental assessment found the proposed action (Alternative 1) would not have any unmitigable direct, indirect or cumulative adverse impacts on human health or the environment. As such, this proposed action does not require the completion of an environmental impact statement, as defined by the Council on Environmental Quality regulations (40 CFR 1500-1508) and 32 CFR Part 651.

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1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The United States Marine Corps (USMC) prepared this environmental assessment (EA) in compliance with the National Environmental Policy Act (NEPA) of 1969. The USMC requires facilities to train Marines in handling and using explosive devices. The Marine Corps Base (MCB) Hawaii (Figure 1-1) proposes to develop an explosives training range (ETR) on the northwestern (outer) side of Ulupaʻu Crater on Mōkapu Peninsula, Kāneʻohe Bay, Oʻahu (Figure 1-1). The proposed range would support levels of explosives training that are not currently available at MCB Hawaii Kaneohe Bay. USMC is conducting this analysis to determine the potential environmental impact of the proposed action and alternative actions, including the no-action alternative. Under the no-action alternative, the explosives training range would not be constructed, MCB Hawaii Kaneohe Bay units would continue to conduct most explosives training at Army facilities off-site, and training efficiency and scheduling would continue to be constrained.

1.2 BACKGROUND

1.2.1 Marine Corps Base Hawaii Mission and Units

The MCB Hawaii training facilities support both III Marine Expeditionary Force (III MEF) (Hawaiʻi) and Navy units. Major III MEF ground units include the 3rd Marine Regiment (Reinforced), Combat Service Support Group-3, the 3rd Radio Battalion, and the 4th Force Reconnaissance Company. Air units include Marine Aircraft Group 24 (three heavy helicopter squadrons) and three Navy air units. The III MEF is a major user of operational facilities at MCB Hawaii Kaneohe Bay and other ground training facilities. The mission of the III MEF is to execute amphibious assault and other required air/ground operations. This mission requires constant deployment of appropriately organized units of an air/ground task force. Units of the III MEF (Hawaiʻi) may also be required to augment other Marine Corps air/ground task forces. MCB Hawaii facilities on Oʻahu include MCB Hawaii Kaneohe Bay, MCB Hawaii H.M. Camp Smith, Marine Corps Training Area Bellows, Manana Housing Area, and Puʻuloa Range Training Facility. These facilities provide operational, training, maintenance, berthing, and personnel support facilities to support the III MEF (Department of the Navy 2006).

Marine Corps Base Hawaii Kaneohe Bay occupies approximately 1,194 hectares (ha) (2,951 acres [ac]) of land on the Mōkapu Peninsula on the windward side of Oʻahu and exercises control of a 457-meter (m) (500-yard [yd]) security buffer zone extending seaward from the shoreline (MCB Hawaiʻi and sustainable Resources Group International, Inc [SRGII] 2006). The proposed project area is located on the northwestern exterior slopes of Ulupaʻu, a volcanic crater that encompasses approximately 165 ha (410 ac) on the northeast portion of the peninsula (Figure 1-2).

1.3 PURPOSE AND NEED FOR THE PROPOSED EXPLOSIVES TRAINING RANGE

The USMC must provide realistic training opportunities that simulate current and future battle environments to prepare Marine Corps units for combat duty. Existing and emerging training requirements driven by theatre of war considerations support the need for new ranges and other training facilities. MCB Hawaii unit requirements for explosives and demolition training are currently not fully supported by existing facilities in Hawaiʻi. If used properly, explosives serve as a combat multiplier to deny resources and maneuverability to the enemy. All Marines require basic knowledge and skills regarding the safe handling and use of explosives. Furthermore, additional training in the use of specialized charges and advanced explosives concepts is needed. Training that takes place on an explosives training range complements classroom instruction, which occurs prior to training at the range. A combination of classroom and field training is used to instruct Marines in the theory of explosives, their characteristics and common uses, calculations for various types of charges, and standard methods of priming and placing these charges.

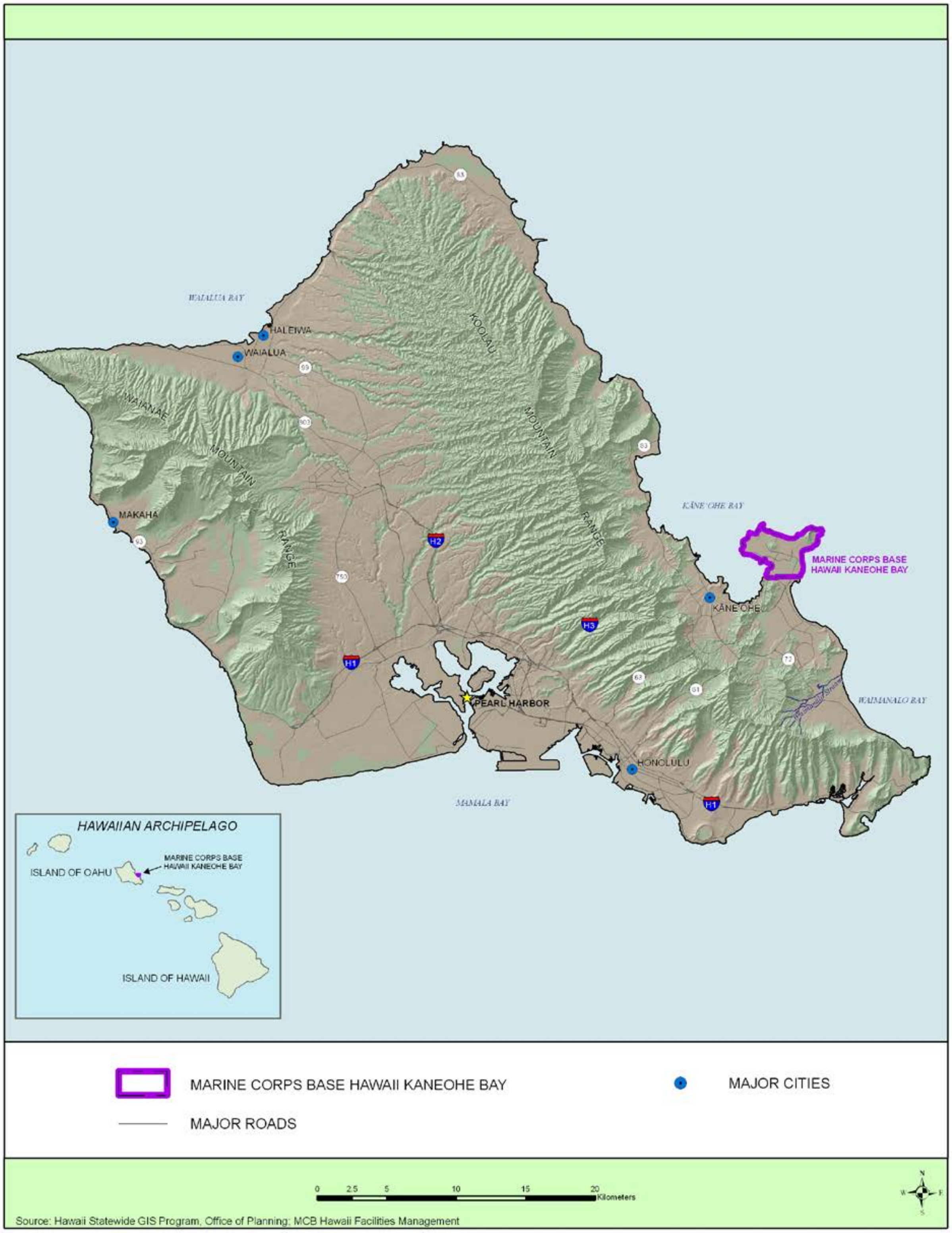

Figure 1-1. Location of Marine Corps Base Hawaii Kaneohe Bay on the Island of Oʻahu.

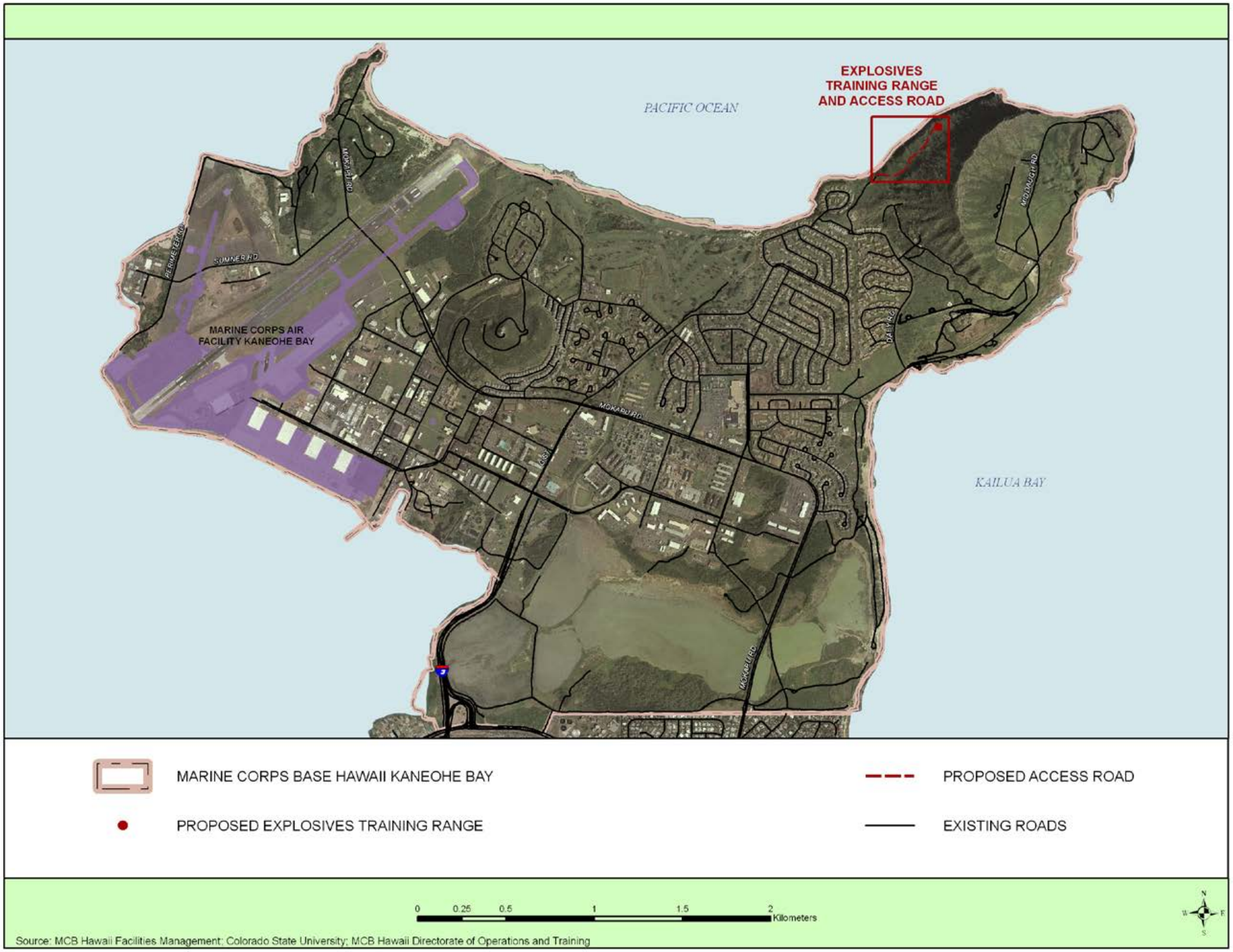

Figure 1-2. Location of the proposed action on Marine Corps Base Hawaii Kaneohe Bay.

There is currently no home station facility for explosives training by MCB Hawaii Marines that can accommodate a charge larger than 2 pounds. Marines currently train at several facilities in Hawai‘i but cannot meet training needs due to logistical/cost considerations, range limitations, and scheduling difficulties. The ranges currently used by Marine units in Hawai‘i include an engineering range (Range 9) at the Army’s Pōhakuloa Training Area on the Island of Hawai‘i (charges up to 50 pounds [lb]), Range 8 at the Ulupa‘u Range Training Facility on MCB Hawaii Kaneohe Bay (charges up to 2 lb), and three ranges at the Army’s Schofield Barracks Military Reservation on O‘ahu (Range MF-5 allows demolitions using up to 150 lb; the Infantry Demolition Range allows charges up to 1 lb; and the FP-HALO Range allows training with up to 40 lb of selected explosives). Army facilities are available to the Marines but can be difficult to schedule due to their usage by Army engineering and other units. Range 8 at the Ulupa’u Range Training Facility supports very limited demolition charge types and is within the surface danger zone of several other ranges, which prevents the concurrent use of Range 8 with several other ranges and thus constrains scheduling and use of Range 8 as well as other facility ranges. Range 8 does not support the use of larger amounts of explosives because of safety design limitations, wildland fire risk, proximity to a sensitive seabird rookery, and noise concerns.

Due to limitations of these existing ranges, logistical and cost considerations such as the ready storage of explosives materials at MCB Hawaii Kaneohe Bay, and scheduling constraints, there is a significant need for a dedicated range for Marines at MCB Hawaii Kaneohe Bay. This is the only property on O‘ahu owned by the Marine Corps capable of supporting the safety and noise consideration associated with a range supporting up to 7.1 lb of explosives.

Marine Corps Base Hawaii proposes to develop an explosives training range at MCB Hawaii Kaneohe Bay to satisfy training requirements, minimize costs and logistics, and optimize training schedules. The project would re-activate and redevelop the historic detonation site. The proposed range would be easily accessed by Marines stationed at MCB Hawaii Kaneohe Bay with minimal transportation requirements, would take advantage of explosives material storage facilities near the site, would not conflict with other military ranges, would be easily scheduled to accommodate MCB Hawaii Marines training schedules and needs, and would support a range of light demolition explosive charges (e.g., cutting charges, and other demolitions charges up to 7.1 lb at a time). The development of this range at the proposed location was initially proposed in the MCB Hawaii Kaneohe Bay Master Plan (Department of the Navy 2006).

1.4 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT AND DECISION TO BE MADE

This environmental assessment (EA) was prepared in compliance with the National Environmental Policy Act of 1969 (NEPA) (42 USC 4321 *et seq.*), the Council on Environmental Quality Regulations implementing NEPA, (40 CFR Parts 1500-1508), Marine Corps Order (MCO) P5090.2A, Chapter 12, *Environmental Compliance and Protection Manual* (USMC Headquarters 2008), and other applicable federal and state-delegated environmental legislation.

A specific requirement for this EA is an appraisal of the impacts of the construction and training activities associated with the proposed action. The EA is used to determine whether or not a Finding of No Significant Impact (FONSI) is appropriate or whether a Notice of Intent to prepare an environmental impact statement (EIS) is required.

The EA is structured in the following manner:

- Chapter 2 describes the proposed action and alternatives to the action. Mitigation measures for the proposed action and a summary of the effects of each alternative on all assessed components are also provided in Chapter 2.
- Chapter 3 presents the affected environment and anticipated environmental effects of the proposed action and alternatives.
- Chapter 4 addresses the potential for cumulative effects.

- Chapter 5 provides a listing of individuals and agencies consulted during preparation of the EA.
- Chapter 6 identifies persons who prepared the document.
- Chapter 7 includes bibliographical information for cited sources.

1.4.1 Issues Analyzed

Potential issues incorporated into design considerations and mitigation activities include noise impacts to installation residents, the potential for soil erosion and runoff with associated impacts to water quality, and noise effects on marine animals. Relevant environmental components identified and evaluated in this EA include:

- air quality
- geology and soils
- water quality
- flora
- fauna (terrestrial and marine)
- reef systems
- cultural and archaeological resources
- noise
- hazardous materials and waste

1.4.2 Issues Considered and Eliminated from Detailed Analysis

Some issues would not be affected by the proposed action and have been eliminated from in-depth analysis. These include:

- wetlands and floodplains
- land use and recreation
- public safety
- socioeconomics and environmental justice
- wildland fire

Rationale for the treatment of these components is offered in Section 3.11, *Environmental Components Not Examined in Detail*.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter describes the proposed action (construction and use of an explosives training range at MCB Hawaii Kaneohe Bay) and a no-action alternative, and compares the alternatives in terms of their environmental effects (summarized from Chapter 3) and achievement of project objectives. The no-action alternative provides the baseline for comparison with other alternatives. Alternatives considered and eliminated from detailed analysis are also described.

2.1 ALTERNATIVE 1: PROPOSED ACTION – CONSTRUCTION AND USE OF AN EXPLOSIVES TRAINING RANGE AT ULUPAʻU CRATER

2.1.1 Location and Site History

The site proposed for the explosives training range (ETR) is on the northwestern (outer) slope of Ulupaʻu Crater on the Mōkapu Peninsula. A 3.5-inch hand-fired rocket range, oriented in a southwest to northeast direction along the slope, existed during the late 1950s and the 1960s in the vicinity of the proposed range location. Photographs from 1960 also show a hand grenade range and a small arms incinerator on the northern, outer slope of Ulupaʻu Crater. The incinerator and the open burn/open detonation site were located at the eastern end of the 3.5-inch rocket range. The old detonation site is sometimes referred to as "Site 18" following an installation restoration site inventory performed in 1984 (Department of the Navy 1984). The old detonation site is proposed to be developed as the new ETR (Figure 1-2). The old ranges are not well-documented and the original access trail is overgrown with shrubs and other vegetation. The small-arms incinerator is still on site (personal observation October 2007) approximately 50 m (165 ft) west of the old detonation site. With the exception of the location of the historic detonation site, little information exists regarding the exact location of former ranges on the northern Ulupaʻu slopes and it is not possible to know the relationship between the historic range facilities and the proposed development of the site. Photographs depicting the vicinity of the proposed range are presented in Figure 2-1 and Figure 2-2.

The historic detonation site (Site 18) was never closed nor listed as a Formerly Utilized Defense Site and slated for cleanup. In addition, the old demolition site is not listed as an Installation Restoration Site in the 2006 MCB Hawaii Master Plan (Department of the Navy 2006).

2.1.2 Design and Construction of Alternative 1

Considerations for site selection and design include requirements for large surface danger zones and noise considerations. The facility would consist of a main parking lot, a small upper parking lot, an access road, a safety bunker, and the bermed range enclosing three demolition pits (Figure 2-3). Outdoor lighting may be installed at the facility and in parking areas. All lighting would have downward shades to minimize aesthetic and biological effects (e.g., attractant to seabirds). The new range would be accessed via a new unpaved road that would extend from the gated end of Uli Street off Daly Road near the edge of a family housing area. Prior to construction, unexploded ordnance would be cleared from the proposed ETR pit area and a 50-m (165-ft) buffer, parking lot areas, safety bunker area, and along the range access road.

The disposal method for unexploded ordnance would be at the discretion of the explosive ordnance disposal officer on scene in coordination with the MCB Hawaii Environmental and Compliance Protection Department. Discovered ordnance would either be taken to the existing Range 8 at the Range Training Facility on the east side of Ulupaʻu Crater for disposal or would be detonated in place. Access to areas surrounding the new facility would be restricted for safety reasons related to existing unexploded ordnance. Access to any areas that have not been surveyed and cleared for unexploded ordnance would require escort by personnel trained in unexploded ordnance demolitions. Signage would be placed along the access road, parking areas, and range perimeter warning of the presence of unexploded ordnance.

Figure 2-1. (left) View of area looking northeast from perimeter fence of housing area toward the proposed access road alignment. (right) Rocky shore below proposed explosives training range site.

Figure 2-2. (left) View looking southwest from the proposed explosives training range. (right) View looking downslope from the proposed explosives training range.

Figure 2-3. Layout of proposed explosives training range, access road, parking areas, and safety bunker.

The detonation site would consist of a 15 m × 15 m (50 ft × 50 ft) area with three detonation "pits". The pits would be comprised of massive earthen berms amassed above grade level into bowl-shaped structures with an opening on one end of each demolition pit. The pit openings would face a central corridor used for access and to transport explosives to the demolition pits. The pits would be excavated and filled with pebble free sand to a depth of approximately 2 m (7 ft) for safety reasons and to facilitate refilling of craters and removal of demolished materials following training exercises. Sand would originate from an off-site source that would require approval by the MCB Hawaii Environmental Compliance and Protection Department. With the exception of cutting charges, all charges would be buried approximately 1 m (3 ft) prior to detonation. Cutting charges would be detonated in a small concrete detonation bunker, which would be located within the range. Berms approximately 6 m (20 ft) tall would be constructed on the lateral and downhill perimeters of the detonation area for safety purposes and noise mitigation. The uphill side would not require a berm, as the existing hillside would provide safety protection and noise mitigation. An observation/safety bunker approximately 5 m × 5 m (17 ft ×17 ft) would be constructed adjacent to the eastern lateral safety berm at a minimum of 100 m (330 ft) from the detonation area. The safety bunker would be constructed from concrete blocks. Berms would be constructed and stabilized using guidelines presented in SRGII (2005), and would use material from the site supplemented with off-site fill, as necessary. All off-site fill material would be approved by the MCB Hawaii Environmental Compliance and Protection Department. Specific BMPs are discussed in Section 2.1.4, *Mitigation Measures for Alternative 1*.

Soils and vegetation disturbance associated with construction would be minimized to the greatest extent possible. Parking lots would be surfaced with pervious materials such as Grasscrete® or Geoblock® to maximize infiltration of rainfall and minimize surface runoff. Disturbed areas around the site would be stabilized using soil stabilization matting, revegetation, and/or other erosion and runoff control BMPs upon completion of construction activities. Revegetation and seeding would follow BMPs and utilize native species prescribed for use on MCB Hawaii lands (MCB Hawaii and SRGII 2006, Appendix D). Any deviations from the species list would be subject to MCB Hawaii Environmental Compliance and Protection Department approval. Inspections would be conducted to ensure successful plant establishment and stabilization has occurred upon completion of construction activities. Only areas necessary for construction would be disturbed, cleared, or graded.

2.1.3 Explosives and Training Activities Associated with Alternative 1

2.1.3.1 Explosive Materials

To be suitable for military training and use, explosives should be minimally toxic when stored, handled, and detonated. The following types of demolition materials (i.e., explosives) would possibly be used on the proposed range (U.S. Army 1998a).

Amatol. Amatol is a mixture of ammonium nitrate and trinitrotoluene (TNT). It is a substitute for TNT in bursting charges. Some older bangalore torpedoes use 80-20 amatol (80 percent ammonium nitrate and 20 percent TNT).

Ammonium Nitrate. Ammonium nitrate is the least sensitive of the military explosives. It requires a booster charge to initiate detonation successfully, and is a component of many composite explosives (combined with a more sensitive explosive).

Black Powder. Black powder is the oldest known explosive and propellant. It is a composite of potassium or sodium nitrate, charcoal, and sulfur. Time fuses, some igniters, and some detonators contain black powder.

Composition A3. Composition A3 is a composite explosive containing 91 percent cyclotrimethylenetrinitramine (RDX) and 9 percent wax. The purpose of the wax is to coat, desensitize, and bind the RDX particles. Composition A3 is the booster charge in some newer shaped charges and bangalore torpedoes.

Composition B. Composition B is a composite explosive containing about 60 percent RDX, 39 percent TNT, and 1 percent wax. It is more sensitive than TNT. Because of its shattering power and high detonation rate, composition B is the main charge in shaped charges.

Composition B4. Composition B4 contains 60 percent RDX, 39.5 percent TNT, and 0.5 percent calcium silicate. Composition B4 is the main charge in newer models of bangalore torpedoes and shaped charges.

Composition C4. C4 is a moldable composite explosive containing 91 percent RDX and 9 percent non-explosive plasticizers. Burster charges are composed of C4.

Cyclotrimethlenetrinitramine (RDX). RDX is a highly sensitive and very powerful military explosive. It forms the base charge in some nonelectric blasting caps and serves as a sub-booster, booster, bursting charge, or demolition charge. RDX is the primary explosive material used in composite explosives, including composition A, B, and C explosives. RDX is available commercially under the name “cyclonite”.

Military Dynamite. Military dynamite is a composite explosive that contains 75 percent RDX, 15 percent TNT, and 10 percent desensitizers and plasticizers. Military dynamite is not as powerful as commercial dynamite. Military dynamite's equivalent strength is 60 percent of commercial dynamite. Because military dynamite contains no nitroglycerin, it is more stable and safer to store and handle than commercial dynamite.

Pentaerythrite Tetranitrate (PETN). PETN is a highly sensitive and very powerful military explosive. Its explosive potential is comparable to RDX and nitroglycerin. Boosters, detonating cord, and some blasting caps contain PETN. It is also used in composite explosives with TNT or with nitrocellulose. A PETN-nitrocellulose composite (M118 sheet explosive) is a demolition charge.

Pentolite. Pentolite is a mixture of PETN and TNT. Because of its high power and detonating rate, a mixture of 50-50 pentolite (50 percent PETN and 50 percent TNT) makes an effective booster charge in certain models of shaped charges.

Standard Dynamite. Most dynamites, with the notable exception of military dynamite, contain nitroglycerin plus varying combinations of absorbents, oxidizers, antacids, and freezing-point depressants. Dynamites vary greatly in strength and sensitivity depending on, among other factors, the percentage of nitroglycerin they contain. Dynamites are for general blasting and demolitions, including land clearing, cratering and ditching, and quarrying.

Tetryl. Tetryl is an effective booster charge in its non-composite form and a bursting or a demolition charge in composite forms. Tetryl is more sensitive and powerful than TNT. However, RDX- and PETN-based explosives, which have increased power and shattering effects, are replacing tetryl and composite explosives containing tetryl.

Tetrytol. Tetrytol is a composite explosive containing 75 percent tetryl and 25 percent TNT. It is the explosive component in demolition charges. Different mixtures of tetryl and TNT are required for booster charges.

Trinitrotoluene (TNT). TNT is the most common military explosive. It may be in composite form (such as a booster, a bursting or demolition charge) or in a non-composite form. Since TNT is a standard explosive, it is used to rate other military explosives.

2.1.3.2 Explosive Charges

The following types of explosive charges, composed of the explosive materials described above, are commonly used by the military and would possibly be used on the proposed range. The charges are prepackaged with all necessary materials for field use and or training purposes. Prepackaging materials into charges of known sizes results in predictable explosive power and enhances safety for trainees. Block demolition charges are prepackaged high explosive charges for general demolition operations, such as cutting, breaching, and cratering. They are composed of the high explosive TNT, tetrytol, composition C-series, and ammonium nitrate (U.S. Army 1998a). The maximum size charge for the proposed range would be limited to 7.1 lbs by the hearing protection zone (see Section 3.9, *Noise*) and applied mitigation measures.

Demolition accessories that might be used at the proposed range include time blasting fuses, detonating cord, blasting caps, priming adapters, and electric blast initiation machines. Detonating cord is sometimes used to create demolition effects simulators for training and rehearsals.

M1 Military Dynamite. M1 military dynamite is an RDX-based composite explosive containing no nitroglycerin. M1 dynamite is packaged in ½-lb, paraffin-coated, cylindrical paper cartridges. M1 dynamite's primary uses are stump removal, military construction, quarrying, ditching, and service demolition work.

M112 Block Demolition Charge. An M112 charge consists of 1¼ lb of C4 packed in a container that has a pressure-sensitive adhesive tape on one surface. The M112 charge is used primarily for cutting and breaching and is ideally suited for cutting irregularly shaped targets such as steel. The M112 charge is the primary block demolition charge presently in use.

M118 Block Demolition Charge. An M118 charge or sheet explosive is a block of four ½-lb sheets of flexible explosive packed in a plastic envelope. Twenty M118 charges and one package of 80 M8 blasting-cap holders are packed in a wooden box. Each sheet of the explosive has a pressure-sensitive adhesive tape attached to one surface. The M118 charge is designed for cutting, especially against steel targets.

M183 Demolition Charge Assembly. An M183 charge or satchel charge consists of sixteen M112 (C4) demolition blocks and four priming assemblies. The M183 assembly is used primarily for breaching obstacles or demolishing structures when large demolition charges are required. The M183 charge also is effective against smaller obstacles.

M186 Roll Demolition Charge. An M186 charge is identical to the M118 charge except that the sheet explosive is in roll form on a 50-ft plastic spool. Each foot of the roll provides about ½ lb of explosive. Included with each roll are 15 M8 blasting cap holders.

TNT Block Demolition Charge. TNT charges come in ¼-, ½- and 1-lb sizes, and are effective for all types of demolition work except special steel-cutting charges. The ¼-lb charge is primarily for training purposes. TNT is not recommended for use in closed spaces because one of the products of an explosion is poisonous gases.

2.1.3.3 Training Activities

The proposed range would be used for training in safe handling and use of explosives. The term *explosives training*, as it is used in this EA, is generally synonymous with demolitions training. Primary objectives include basic explosives detonation and use of explosive charges to cut timber and steel. Demolition of unexploded ordnance is not part of the proposed action.

Trainees would be transported to the main parking lot at the ETR facility by trucks and buses. They would then walk or ride in smaller vehicles up the road approximately 250 m (275 yd) to the explosives training range (ETR). An ambulance and an ammunition transport truck would be stationed at the upper parking area during training events. Explosive materials would be transported from the MCB Hawaii ammunition supply point as needed to the site following the route shown on Figure 2-4. Ammunition would only be stored at the ETR for the duration of the scheduled training. Typical usage of the ETR would consist of platoon-size training of up to 50 Marines at a time. Training activities would take place on average of one to two days per week or up to approximately 100 days per year. Use is projected to be limited to weekdays between the hours of 9 a.m. and 6 p.m. Each training event (or day) would consist of between five and thirty explosions. The size and type of explosive material used would vary, and individual charges would not exceed 7.1 lb of net explosive weight, to ensure compliance with noise requirements at nearby residences based on modeled noise contours. Multiple explosions of charges weighing up to 7 lb would also be allowed, as long as the 7-lb charge maximum is not exceeded.

Training would consist of preparation and detonation of charges in various configurations buried approximately 1 m (3 ft) in the sand demolition pits (without demolishing anything) and cutting pieces of steel and timber using explosives. Metal and timber cutting explosives training prepares Marines in the demolition of bridges, buildings, and other structures, and the creation of mobility obstacles. Steel material used in explosives training typically consists of steel rods, plates, and I-beams. C4 or TNT block explosives are often used for cutting steel. Timber demolition material typically consists of dimensional timbers, railroad ties, old telephone poles, and logs. Plastic explosives such as C4 are the best timber-cutting charges for both internal (packed in holes drilled in the wood) and external placement. Detonations would be triggered using electronic devices and timed fuses. Charges used to cut steel and demolish wooden timbers produce metal and wood fragments. All cutting charges would be detonated inside a bunker designed to eliminate flying debris and reduce noise.

MCB Hawaii Kaneohe Bay range standing operating procedures (SOP) and training regulations applicable to all ETR activities would be developed and implemented prior to activation of the range. The range would be scheduled and operated by the MCB Hawaii Operations and Training Directorate Range Manager. All training activities taking place at the proposed facility would be supervised by the training officer in charge, who assumes ultimate responsibility for the demolition design and all procedures to ensure the safe and efficient application of explosives. The projected surface danger zone is shown in Figure 2-5.

2.1.4 Mitigation Measures for Alternative 1

Mitigation measures associated with implementation of the proposed action are listed below.

2.1.4.1 Range Regulations/SOPs

MCB Hawaii Base Order P1500.10 (MCB Hawaii 2008) establishes policies, procedures and responsibilities for control and use of all training areas within MCB Hawaii. This regulation would be updated to include training activities at the proposed range. Range usage would be managed to ensure safety to users and the public.

2.1.4.2 Permits and Review

The proposed action would disturb an area of more than one acre, and would require a National Pollutant Discharge Elimination System (NPDES) permit for the discharge of storm water associated with construction activities. The permit application would contain a list of best management practices (BMPs) that would be used during site preparation and construction activities to avoid discharges of sediment-laden or historic-ordnance laden stormwater runoff from the project site (including stockpile sites and access roads) and the site itself. It is anticipated that the final NPDES permit issued by the State would list all the necessary BMPs to minimize adverse effects on water quality. The calculation of the disturbed area includes laydown and stockpile areas. The project was evaluated and categorized as de minimis in accordance with Department of Commerce, National Oceanic and Atmospheric Administration, Coastal Zone Management Agency Federal Consistency Regulations, as the project would not directly affect coastal components (Appendix C). Construction potentially affecting water quality would be coordinated with the state of Hawaiʻi and federal agencies, and all necessary permits and approvals would be obtained before implementation of the project.

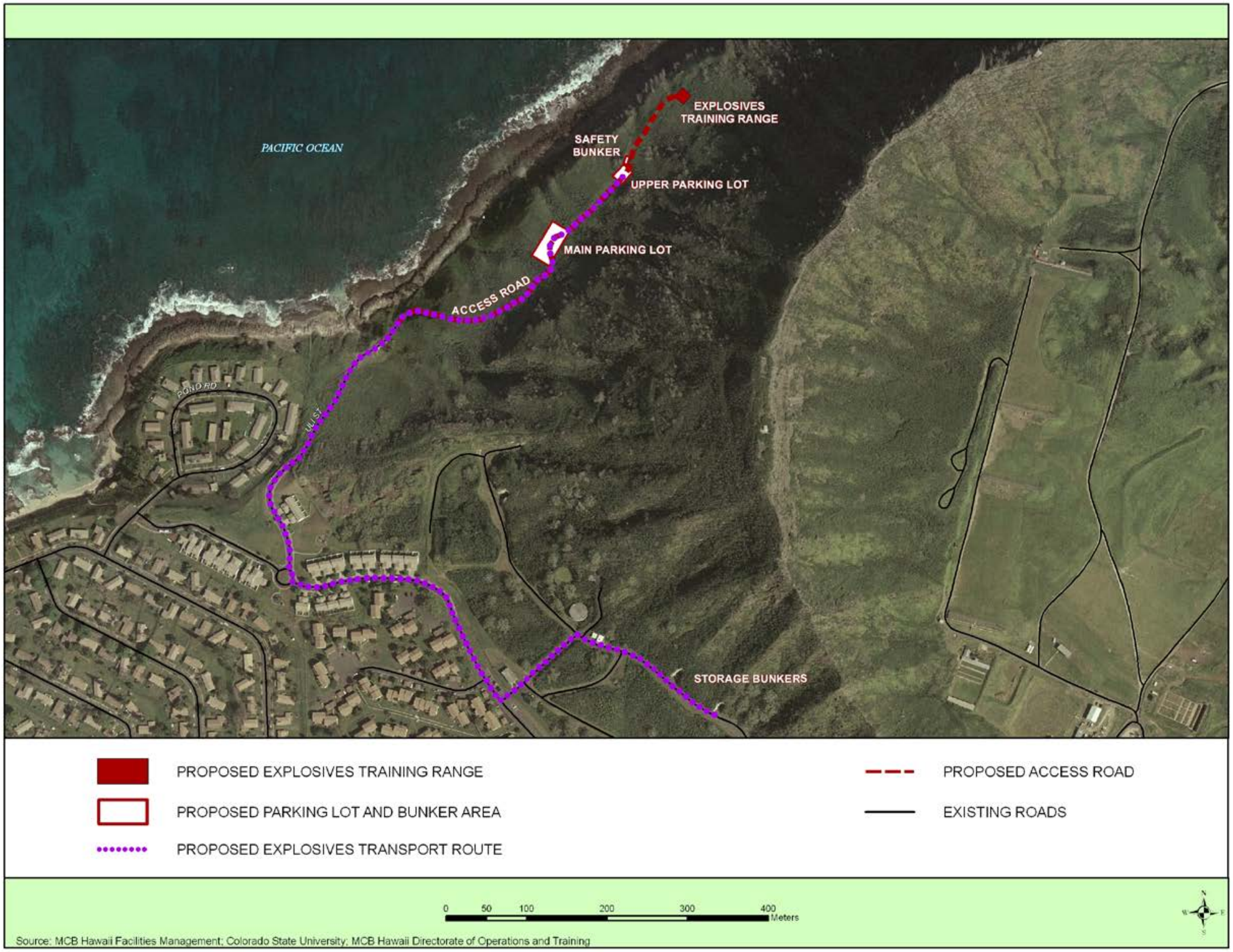

Figure 2-4. Proposed transportation route from storage bunkers to the ETR.

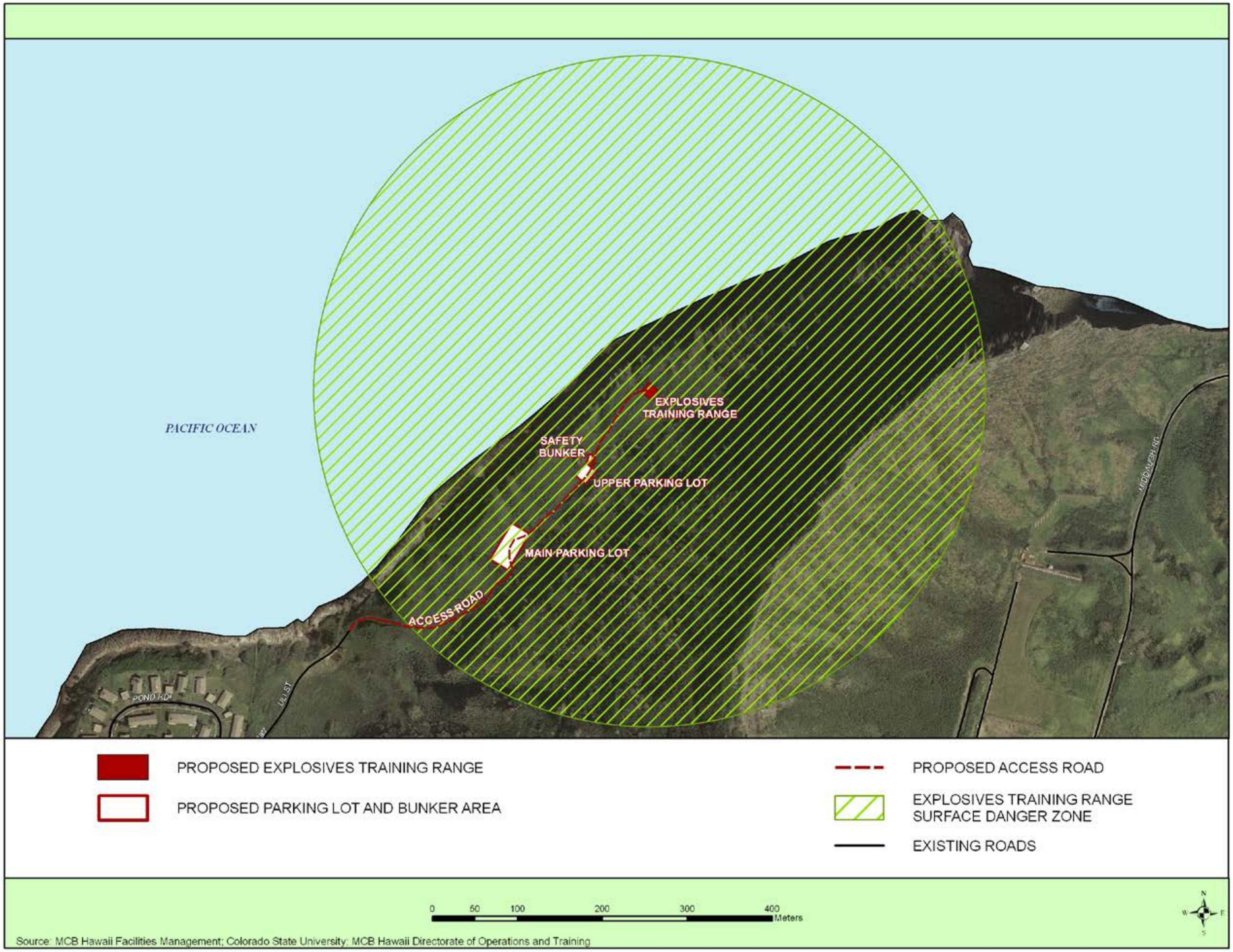

Figure 2-5. Surface danger zone for Ulupaʻu explosives training range.

2.1.4.3 Watershed, Erosion and Sediment Control Best Management Practices

This project would employ a “watershed” approach for planning activities and evaluating watershed-related problems and solutions. All construction activities would incorporate best management practices to prevent erosion and sedimentation, which could cause water quality degradation and possible adverse effects to the marine ecosystem. Erosion and sediment control is most important during construction and for the first year after construction while vegetation is getting established on disturbed areas. In accordance with the Storm Water Pollution Prevention Plan for MCB Hawaii Kaneohe Bay (Hawaii Pacific Engineers 2001), during construction and excavation activities, soils would be stabilized to minimize transport of soil off-site due to storms. Stockpiled soils would be stored on flat locations and/or would be covered with tarpaulins or other covers, and surrounded with hay bales, silt fences, or other runoff controls. Following construction, all berms and other disturbed and bare soil areas would be seeded using approved planting mixes and stabilized using mulch or other soil stabilizing material to minimize the potential for soil erosion and transport of sediments by gullies or via overland flow to the beach and ocean. MCB Hawaii-specific recommendations for best management practices have been developed for berm stabilization (SRGII 2005) and erosion and sediment transport minimization (SRGII 2007). Revegetation would be used as a BMP in accordance with established MCB Hawaii landscaping BMP practices. Irrigation water would be included in the cost of the project and trucked to the site by truck. Revegetation and seeding would follow best management practices and utilize native species prescribed for use on MCB Hawaii lands (MCBH and SRGII 2006, Appendix D). All revegetation activities would require review and approval by the Environmental Compliance and Protection Department. If assisted revegetation is not feasible, rock and other materials would be used more extensively to stabilize soils and minimize soil erosion and rainfall runoff. Possible runoff, erosion, and sediment control mitigation measures are presented in Table 2-1. Disturbed areas would be regularly monitored for erosion during and after construction.

Additional design features that can be used to minimize runoff, erosion, and sediment delivery and maximize infiltration include rolling dips and water bars, out-sloped road drainage, crown-center road drainage, energy dissipation where concentrated flows are discharged, rock-lined channels with geotextile liners, grass-lined channels, straw rolls and coir logs placed along slope contours, drop inlet structures, and slope drains. Conceptual designs, specifications for design and construction, and maintenance requirements of these features are presented in SRGII (2007).

2.1.4.4 Non-native Plant Species Monitoring and Control

The site is currently covered with non-native vegetation, and there are no specific invasives of concern along the road alignment or at the proposed range location. Establishment of any targeted invasive plant species over time at the proposed facility would be monitored and managed by the MCB Hawaii Environmental Compliance and Protection Department.

2.1.4.5 Federally Listed Species

No known federally threatened or endangered species occur at the proposed project location (see Appendix *A: Survey Report for Seabird Presence and Habitat Quality in the Area of the Proposed Explosives Training Range*). If a listed species or evidence of a listed species is identified during construction activities, all activities in the area would be halted immediately, the sensitive area would be protected from further damage, Range Control would be notified, and any damage caused would be reported. The MCB Hawaii Environmental Compliance and Protection Department would be contacted for advisement.

Table 2-1. Potential minimization and design best management practices (BMPs) for erosion and sediment control.

Area of Concern	Potential Issues	Minimization and Design BMPs
Disturbed areas (in general)	Runoff, erosion, concentrated flows, delivery of excess sediment to marine environments	• Minimize site disturbance. • Stabilize soils using revegetation BMPs (soil amendments, geotextiles/fiber matting, seeding, and mulch) or gravel/rock. • Trap sediment in catchment basins or behind silt fences. • Stockpiled soil used for berms or other construction would be covered under rainy conditions to prevent erosion. • Stabilize soils using revegetation BMPs (soil amendments, geotextiles/fiber matting, seeding, and mulch) or gravel/rock, as per SRGII (2005) recommendations. • To ensure optimum germination and establishment of vegetation, revegetation should be conducted during the months of November to January, when feasible. • If 90% vegetation cover is not achieved within revegetation areas after 12 months, additional hydromulching can be used.
Berms	Runoff, erosion, delivery of excess sediment to marine environments	• Stabilize soils using revegetation BMPs (soil amendments, geotextiles/fiber matting, seeding, and mulch) or gravel/rock, as per SRGII (2005) recommendations. Hydromulch with a tacifier (binding) agent may be used prior to applying the erosion matting. • Use perennial grass species that will self-perpetuate via seed or rhizomes and provide dense ground and vegetation cover, including species such as *Sporobolus virginicus* (aki aki) and *Heteropogon contortus* (Pili). • Water concentrating at the base of berms should be channelized or managed using culverts or other diversion structures with armored channels and outlets. Where flows are low and grades are moderate, hydromulching and matting may provide adequate scour protection.
Roads and parking areas	Stormwater runoff, sources of sediment, increased erosion along flow paths, sediment generation, and maintenance of water and sediment management structures	• Minimize the amount of impervious ground created and use pervious parking area substrates in conjunction with vegetation to minimize runoff. • Use road aggregate that does not break down and contribute to sediment loads (e.g., preference for basalt vs. coral road material). • Employ proper road construction BMPs, such as proper crowning, drainage, sediment control, and cut/fill procedures.
Drainages and ditches	Stormwater runoff, sources of sediment, increased erosion along flow paths, sediment generation	• Slow water flow in natural drainages and altered ditches flowing to the ocean and across disturbed or denuded earthwork areas using a combination of vegetation, rock linings, or other structural controls. • Identify drainage segments with actively cutting channels and stabilize those sections to minimize sediment generation and incision over time.

2.1.4.6 Cultural and Archaeological Resources

The project area falls within Anderson's (1996) survey area 2. The survey included areas accessible by the "cutback" road presumably used to access the hand-fired rocket range that existed in the late 1950s and early 1960s. This same road approximates the alignment of the proposed access road. The surface features identified by Anderson are related to post-World War II era military activities and are likely associated with the former hand-fired rocket range and other training activities. There are no known historic properties in the area of potential effect, which is defined here as the access road, main parking lot, upper parking lot, bunker and explosive training range.

The outer edge of Ulupaʻu Crater, where the ETR, access road and parking areas are to be constructed, is an area of low archaeological sensitivity. Low sensitivity zones are areas where no cultural resources have been found and there is almost no probability of encountering cultural resources (U.S. Army Corps of Engineers Honolulu District 2006). As such, no archaeological monitoring is recommended. In the event that previously unknown or unanticipated archaeological resources are discovered in the area, the activity proponent would:

1. stop land-disturbing work within a minimum of 20 m (65.6 ft) radius around the point of discovery;
2. take all necessary precautions to protect the resource from damage, loss or destruction;
3. notify the cultural resources manager within 24 hours of the discovery; and
4. cease work until notified to do so by the cultural resources manager or other authority.

The cultural resources manager would follow the procedures from 36 CFR Part 800.4 – 800.6 to determine the proper management or treatment of the archaeological remains (U.S. Army Corps of Engineers Honolulu District 2006).

If potential human remains and associated objects were inadvertently discovered, the User Group/Tenant Command (UG/TC) sponsoring the activity leading to the discovery would immediately stop ground-disturbing activities a within a minimum of 20 m from the discovery. The UG/TC would, as soon as possible (but within 24 hours), notify the NEPA program manager and the cultural resources manager of the discovery. The UG/TC would make a reasonable effort to protect the human remains or object discovered to avoid any damage or loss. In this way, resources would remain as much as possible in the location and condition of discovery (U.S. Army Corps of Engineers Honolulu District 2006).

The Marine Corps Base Hawaii *Integrated Cultural Resources Management Plan* (ICRMP) 2006 – 2010 provides a detailed description of the roles and responsibilities surrounding inadvertent discoveries of cultural resources (U.S. Army Corps of Engineers, Honolulu District 2006).

2.1.4.7 Public Safety

Access to the area of the proposed facility is limited to some degree by the steep terrain of the crater rim and the dense shrubby vegetation. Access is possible via a very steep downhill hike from the crater rim, although access to the crater rim is limited by restricted areas and fences. The area is fenced off from the western portion of the base, near the edge of the housing area. There is access from the west via the shore, which is extremely rocky along the western end of Ulupaʻu Crater. Several “keep out” signs are posted near the shore but are not easily seen from the shore. A security gate would be maintained to keep public vehicles from using the proposed facility road. Additional signage would be posted along the shoreline and on the western perimeter fence to discourage entry by the public. These measures would discourage public access and reduce the potential for unexploded ordnance hazards (historic) and access to the vicinity of the proposed range.

The use of a bunker to contain cutting explosions and burial for all other explosions would eliminate flying debris and its associated safety hazards. Detonation of some explosive compounds such as TNT release small amounts of poisonous gases, however these gases are less toxic in open spaces and undergo direct photolysis in the atmosphere. Detectable amounts, if any, of these by-products would be low and confined to the vicinity of the proposed facility immediately following each detonation, so exposure of the public would not be likely.

Military carriers are subject to regulations when transporting military explosives and other dangerous military materials. The transportation of explosives to the ETR would adhere to MCO P8020.10B (USMCHQ 2007) and AR 55-355 (U.S. Army 1986) and minimum safety requirements outlined in TM 9-1300-206 (U.S. Army 1989).

2.1.4.8 Noise

Mitigation measures would be implemented to minimize operational noise impacts on residents and others within audible range. Measures include limiting the charge size to the maximum tolerable noise level (7.1 lb), conducting training only on weekdays during daytime hours (9 a.m. to 6 p.m.), limiting detonations during unfavorable atmospheric conditions to the greatest extent possible, and using soil burial to further reduce noise impacts. The effect of atmospheric conditions (i.e., weather) on noise is discussed in Section 3.9, *Noise*. Annoyance associated with noise from explosions would also be minimized by communicating with the public prior to the event (e.g., publishing a blasting schedule). This strategy has shown to reduce complaints and annoyance for large, infrequent noise events (Canter et al. 2007).

2.1.4.9 Marine Organisms

Adverse impacts to marine mammals due to generation of noise or pressure waves are not expected to be significant, based on studies for similar detonations but with higher levels of explosives for the Makua EIS (Marine Acoustics Inc 2005). Nonetheless, explosions would be avoided if marine mammals were detected within or approaching an established safety zone of 500 m (1,640 ft) (Wright and Hopky 1998). Visual surveys would be done prior to explosives training.

2.1.4.10 Wildland Fire

The range area encompassed by the berms and containing the three demolition pits would be maintained clear of all vegetation and combustible materials to minimize the likelihood of wildland fire ignition. The uphill side of the range would be maintained clear of vegetation to a distance of 15 m (50 ft) uphill from the southernmost demolition pit. This area may be stabilized with gravel or other inert, non-flammable materials. Military helicopters would be made available to dump water for fire suppression in the unlikely event a wildland fire starts despite the referenced precautions.

2.2 ALTERNATIVE 2: NO ACTION

Under Alternative 2, the proposed development of an explosives training range at MCB Hawaii Kaneohe Bay would not take place. Marines currently conduct explosives training at several locations in Hawaiʻi and would continue to do so under this alternative. Marines use an engineering range (Range 9) at the Army's Pōhakuloa Training Area on the Island of Hawaiʻi during quarterly training exercises. The Pōhakuloa range supports up to 50 lb charges with Bangalore torpedoes and cratering/shape charges, as well as other smaller charges. This is the only range in Hawaiʻi used by the Marines that currently supports cratering/shape charges. Explosives training at Pōhakuloa Training Area requires transporting Marines and materials to the Island of Hawaiʻi and scheduling the range in conjunction with other facilities used during the quarterly training cycles. Range 8 at the Ulupaʻu Range Training Facility on MCB Hawaii Kaneohe Bay currently supports demolition training using up to 2 lb of explosives. Range 8 supports very limited demolition charge types and is within the surface danger zone of several other ranges, which prevents the concurrent use of Range 8 with several other ranges and thus constrains scheduling and use of Range 8 as well as other facility ranges. Range 8 does not support the use of larger amounts of explosives because of safety design limitations.

Marines also train with explosives at the Army's Schofield Barracks Military Reservation on Oʻahu. Range MF-5 allows demolitions using up to 150 lb of TNT and C4, up to one pound of explosives per pit is authorized at the Infantry Demolition Range, and up to 40 lb of TNT or C4 is authorized at the FP-HALO Range. The Schofield Barracks facilities are available to the Marines but can be difficult to schedule due to their usage by Army engineering and other units. Additionally, Marines and explosive materials would require transport across the island.

There is a significant need for a dedicated explosives training at MCB Hawaii Kaneohe Bay. The no-action alternative is not considered feasible because existing facilities are inadequate to fully support training requirements for light demolition explosives and training.

2.3 ALTERNATIVES CONSIDERED AND ELIMINATED

2.3.1 Alternative Locations at MCB Hawaii Kaneohe Bay for an Explosives Training Range

The proposed alternative (Alternative 1) was initially proposed in the *MCB Hawaii Master Plan* (Department of Navy 2006) at the same location where it is currently proposed. The optimal location for a new ETR is on MCB Hawaii Kaneohe Bay-owned land on or near MCB Hawaii Kaneohe Bay, where Marines are stationed and receive much of their training. Placing the new range on MCB Hawaii-controlled land also provides the most flexibility in scheduling. Other decision factors included consideration for public safety, noise, and transportation of explosives materials over long distances. The land available for training on MCB Hawaii Kaneohe Bay is classified as "Air and Ground Operations Training" land (Department of Navy 2006). The area encompassing Ulupaʻu Crater and the Ulupaʻu Range Training Facility on the eastern crater basin is in Land Use Zone 6, which contains training areas for ground units. Given the proximity of other training land parcels to non-military residential areas, Land Use Zone 6 is the only location that could support the proposed ETR range. The topography and distance from urban areas makes the proposed location preferred over other possible locations on the base. The ETR could not be sited further south due to surface danger zone and noise abatement requirements.

2.4 PAST, PRESENT AND FUTURE ACTIONS CONTRIBUTING TO CUMULATIVE EFFECTS

Analysis of cumulative effects is required for NEPA documents. Cumulative effects result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can also result from individually minor but collectively significant actions taking place locally or regionally over time. Impacts of these cumulative activities are discussed in Chapter 4 of this EA. Other actions to be considered in assessing cumulative effects at Ulupaʻu Crater include projects, training activities, and nonmilitary actions.

2.5 SUMMARY OF POTENTIAL ENVIRONMENTAL CONSEQUENCES

Determination of the significance of effects should consider both the context and intensity of an effect, whether beneficial or adverse. Significant impacts infer a substantial or potentially substantial change to an environmental component in the local proposed project area. Significance is determined by evaluating the action, alternatives, and proposed mitigation measures as it relates to the individual environmental component.

Air Quality. An alternative could have a significant air quality effect if it would cause federal or state air quality standards to be exceeded. Emissions during construction would not substantially increase the concentrations of any of the criteria pollutants and these emissions would be short-term (i.e., during construction) and localized. In general, fugitive dust and combustive emissions would produce localized, short-term emissions that would not result in any long-term impact to air quality. Detonations would primarily produce carbon dioxide and nitrogen. Restriction of detonations to atmospherically favorable times for noise minimization will also promote dispersion of exhaust gases in the atmosphere. Particulate matter could be produced from detonations, mostly from the shattering and mobilization of the soil surface. However, burial of explosives prior to detonation and use of a sand substrate would reduce the quantity of respirable fugitive dust. Fugitive dust and combustive emissions from explosions would produce localized, short-term emissions that would not result in any long-term impact to air quality. Therefore, potential impacts would be minor.

Geology and Soils. An alternative could have a significant effect if it results in extensive loss of soil (erosion) or a change in the availability of a geologic component. Construction activities would involve disturbance of soil; removal of vegetation; cut and fill operations along the roadway, parking areas, and range site; grading; and road compaction. Best management practices such as proper grading, stabilization, culverts to channel storm water runoff, and sediment retention fences would minimize adverse effects during construction. Following completion of construction, all disturbed surfaces would be revegetated or stabilized using rock or other materials.

Runoff, erosion, and sediment transport would be minimized during construction using a variety of BMPs. Large rainfall or runoff events during construction or during the revegetation period following construction could result in localized soil erosion and runoff and associated sediment plumes in the ocean. Any necessary in-place detonation of historical unexploded ordnance could cause short term impacts due to soil disturbance and destabilization. Management of runoff from the proposed range, parking areas, and access road would be critical to minimize runoff and erosion on slopes above the shoreline. Mitigation best management practices used to minimize effects on soils include: minimizing soil disturbance; minimizing sediment generation during construction; stabilizing berms, employing erosion and sediment control BMPs and products to slow water flow, increase infiltration, and minimize movement of sediment off site; quickly establishing vegetation and ground cover on disturbed areas; covering piles of stockpiled soil; and applying standard BMPs to road construction. Overall effects to soils and geology would be minor.

Overall impacts to soils would result from minor ground disturbance during construction of access roads, safety bunkers and other support facilities. Construction designs and BMPs and maintenance activities would be employed to mitigate impacts to geology and soils, resulting in minor effects to those components.

Water Quality. An alternative could have a significant impact to water quality if it would cause federal or state water quality standards to be exceeded. Impacts to the ocean and water quality may include short-term effects associated with construction, post-construction effects, and periodic/intermittent effects. Possible effects of construction include release of sediment plumes into the ocean during rainfall events. Currently, most of the area is well-vegetated and fairly stable; storm runoff travels to the ocean by way of natural gullies and drainages. Potential post-construction effects include erosion and sedimentation associated with unvegetated areas. These areas would be stabilized to some degree by revegetation efforts but some soil movement could occur while revegetation takes place. Storm water and erosion control BMPs are standard practice for construction projects that take place across MCB Hawaii. Bare soil surfaces resulting from maintenance and/or construction activities would be covered with suitable erosion controls. Use of BMPs, mitigation measures, and monitoring would ensure that impacts to ocean water quality are minimal. The activities described under the proposed action would not adversely affect surface water quality in the long-term. Potential impacts to water quality are therefore anticipated to be minor.

Flora. Threatened or endangered plants are not known or anticipated within the area. Vegetation is dominated by non-native species. Construction effects on vegetation would occur in habitat with predominantly alien vegetation, and no adverse impacts to rare plant species are expected. Vegetation impacts are anticipated to be localized and short-term in nature. Seeds of undesirable non-native species could be transported to the site attached to trucks, equipment and personal gear associated with training at the proposed ETR. Established policies and procedures for importing soil would help ensure that no noxious plant species would be brought to the site where they could colonize and spread. For example, construction BMPs would require that construction vehicles be pre-washed and inspected prior to use at this site to avoid inadvertent transport of weed seeds from other areas. All plant species used for revegetation and soil stabilization would comply with MCBH guidance and species lists. Impacts to vegetation and threatened and endangered plant species are therefore anticipated to be minor.

Fauna. The proposed action would have a minor or negligible effect on terrestrial mammals and birds. The habitat is highly degraded and few native terrestrial species are present. Therefore there would be minimal impact to native faunal communities. Roosting and nesting seabirds using the shoreline along the north side of the Ulupaʻu Crater could be negatively impacted by construction and use of the explosive training range. However no roosting or nesting seabirds were observed during the recent seabird habitat survey conducted in the project area. The area does contain potential habitat for eight seabird species, but the presence of predators common throughout Oʻahu makes it unlikely that most seabirds would attempt to nest there. Increased human presence and noise levels during range construction and use might temporarily disturb the normal behavior of birds in the immediate vicinity of the proposed project. Any outdoor lighting would be down-shielded to prevent attraction of birds such as Newell's or wedge-tailed shearwaters that could potentially be attracted to the lights.

Offshore waters in the vicinity of MCB Hawaii Kaneohe Bay host several federally listed species, including the threatened green sea turtle, the endangered Hawaiian monk seal that occasionally uses the Mōkapu shoreline beaches for resting, and the endangered humpback whale. Potential effects to marine fauna include sediment and contaminant effects to reef and marine systems and noise effects. Construction could disturb existing soil contaminants linked to historic range usage. Coupled with sediment transported to the ocean during storm events, the proposed action could negatively affect coral reef community structure and lead to the loss of habitats and species. Sea turtles and other species that depend on coral habitat could have reduced foraging opportunities and limited habitat options as a result. Use of construction BMPs would avoid otherwise potentially adverse effects of runoff and sediment delivery to the ocean. These areas would be regularly monitored for erosion during and after construction. Increased human presence and noise levels during range construction and use might temporarily disturb the normal behavior of sea turtles, monk seals and humpback whales on the shore and/or in off-shore habitats adjacent to the proposed project area. Marine mammals may also be affected indirectly when prey such as fish are affected by human-caused sound.

Noise from explosions or concussive (impulse/shock) waves that originate on land could have short-term impacts on marine mammals if impulse waves penetrate into the marine habitat. The possibility of transmission into the marine habitat is not known. The impact of anthropogenic sounds on marine life depends on the frequency, intensity, duration, and location of the sound. Existing modeling of noise from explosions and consultations with marine animal experts from the University of Hawaii, Naval Facilities Hawaii, and a private consulting firm indicate that the noise/shock wave effects of the proposed action would be very minor. Therefore, according to available information the potential for adverse impacts to marine wildlife from explosives training at Ulupaʻu Crater is anticipated to be minor or negligible.

Reef Systems. An alternative could adversely impact coral reef systems if the action results in degradation of reef habitat or reduces the numbers of important reef species and/or communities. Soil disturbance associated with the proposed action could result in temporarily increased erosion and runoff into the ocean, resulting in the generation of sediment plumes. These potential effects could be minimized and confined to short-term effects through the implementation of proper facility designs and mitigation measures. There is also a possibility that digging and construction could disturb existing soil contaminants linked to historic range usage. These disturbances could negatively affect coral reef community structure and lead to the loss of habitats and species. Mitigation best management practices, monitoring, staff oversight, and agency permitting requirements would ensure that impacts associated with sediment and runoff are minimized. There would be no disturbance to the coastal strand or nearshore ocean bottom. Debris would be removed and no new UXO would be generated with potential to damage reef systems. The site would be regularly monitored for erosion during and after construction. Ongoing maintenance of erosion and sediment control measures would ensure no long-term impacts occur. Therefore, the impacts to reef systems are anticipated to be minor.

Cultural and Archeological Resources. No historic properties will be affected by the proposed action. The area is considered to be of low archaeological sensitivity, and no historic structures or archaeological sites occur within the area of potential effect. A section 106 consultation was filed with the State Historic Preservation Office by MCB Hawaii staff in September 2009. The State concurred with the NHPA Section 106 Review that determined a finding of "no historic properties affected". Letters describing the proposed action and potential effects on cultural resources were sent to native Hawaiian organization (NHO) claimants in September, 2010. No responses were received by MCB Hawaii from the claimants. The potential for impacts to cultural and archaeological resources are considered minor.

Noise. An alternative could have a significant impact if noise levels cause physical harm, are above established criteria, or are unacceptable to the public. Adverse noise impacts could include shaking, rattling, and structural damage to nearby residences. Additionally, an adverse noise impact could occur if peak noise levels were loud enough to cause annoyance to nearby residents and result in frequent noise complaints. Based on recommendations related to a high probability of complaints, a peak acceptable level of 130 dB or less was established at the edge of the on-base residences. In keeping with guidance for noise Zone I (residential), an average day-night level of 62-70 dB was also used to estimate maximum allowable detonations. Noise will be managed through a combination of management techniques including: (1) adapting range hours to allow use only during times that are least likely to be objectionable, (2) locating the range so as to avoid sound-sensitive locations, and (3) using engineering techniques to control sound by reflecting, redirecting, absorbing, containing or isolating the sound. Hearing protection would be worn by users of the range during all detonations and observers would be positioned within or behind the bunker located approximately 100 m (330 ft) from the range. Noise impacts to the public would be mitigated to less than significant by limiting the size and frequency of explosive changes.

Hazardous Materials and Waste. The proposed range would only support explosives training using modern, highly efficient explosives, which typically produce little residue. During training, sufficient time would be allowed for blast fumes, dust, and mists to clear before inspecting or occupying the blasting area. Existing studies suggest that little of the explosive material would remain to contaminate the soil in the detonation pits or to be dispersed from the site into the atmosphere. Small amounts of explosives residues could accumulate in soil over a very long time and could be transported to the ocean by runoff. However, the use of demolition pits and the containment of soil therein would greatly minimize the potential for movement of residues off-site. The proposed action would not increase the risks associated with historic ordnance already exposed at the site. Therefore, the anticipated effects would be minor.

Five categories of effect are used in this environmental assessment:

- Significant Adverse (impacts that cannot be successfully mitigated)
- Significant but Mitigable (impacts that can be reduced/avoided by mitigation measures)
- Less than Significant
- Minor or No Impact
- Beneficial Impact

The beneficial effects of mitigation actions (Section 2.1.4) are included in the determination of overall effects. Without the implementation of listed mitigation, adverse effects could be more severe. The proposed action would have minor adverse effects on air quality, water quality, flora, fauna, reef systems, cultural and archeological resources, and hazardous materials and waste. Impacts to humans from noise generated by the action were found to be less than significant because of their short-term nature and distance to the source. The EA also found that impacts to geology and soils would be less than significant. No beneficial consequences of the proposed action or no action were identified.

The anticipated environmental consequences of the proposed action (including mitigation) and no-action alternative are summarized in Table 2-2 and discussed in detail in Chapter 3.

Table 2-2. Summary of environmental consequences by variable of environmental concern for the proposed action and no-action alternative.

Variable of Environmental Concern	Alternative 1 (Proposed Action)	Alternative 2 (No Action)
Air Quality (Section 3.2)	minor or no impact	minor or no impact
Geology and Soils (Section 3.3)	minor or no impact	minor or no impact
Water Quality (Section 3.4)	minor or no impact	minor or no impact
Flora (Section 3.5)	minor or no impact	minor or no impact
Fauna (terrestrial and marine) (Section 3.6)	minor or no impact	minor or no impact
Coastal and Reef Systems (Section 3.7)	minor or no impact	minor or no impact
Cultural and Archaeological Resources (Section 3.8)	minor or no impact	minor or no impact
Noise Effects (Section 3.9)	less than significant	minor or no impact
Hazardous Materials and Waste (Section 3.10)	minor or no impact	minor or no impact

3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES OF EACH ALTERNATIVE

As set forth in Section 1.3.1, per 40 CFR 1501.7(a) (3), this EA addresses a focused scope of potentially impacted variables of environmental concern or issues: air quality, geology and soils, flora, aquatic and terrestrial wildlife, reef systems, cultural and archaeological resources, noise, and hazardous materials and wastes. Variables deemed to be unaffected by the proposed action and not examined in detail are described in Section 3.11.

This chapter provides an overview of the existing environmental conditions (affected environment) of the area(s) created or affected by the proposed action. Only components relevant to the proposed projects or of public concern are presented and analyzed in this section of the EA. The affected environment portion for each variable of environmental concern provides background information on the existing environment and discusses the current conditions of the component within the vicinity of the proposed action.

This chapter also identifies the probable direct or indirect effects (environmental consequences) to the environmental components that would be affected by the proposed action and alternatives and discusses the cumulative effects that would occur upon implementation of the proposed action. Anticipated neutral, adverse or beneficial effects are presented for each component and provide the scientific and analytical basis for comparison and decision-making.

Chapter 3 is organized by variable of environmental concern. For each variable, a description of the affected environment is presented followed by discussion of the environmental consequences for the proposed action and alternatives. Assessment of environmental effects considers listed mitigation as part of the proposed action. This discussion is followed by disclosure of the potential cumulative impacts of the proposed action.

3.1 CLIMATIC SETTING

The Oʻahu climate is comprised of continuous mild maritime/tropical weather with relatively stable year-round temperatures. The warmer and drier season occurs from May to October, while a cooler and wetter season occurs from November to April. Weather is semitropical, with temperatures largely remaining in the 70 to 80 degrees F (Fahrenheit) range. Windward Oʻahu is subject to northeast trade winds, mild temperatures, and higher rainfall levels than other parts of the island. Mōkapu, however, being relatively distant from the orographic influence of the mountains, experiences an average annual rainfall of approximately 40 inches (Drigot et al. 2001).

Trade winds averaging 14 miles (22.5 km) per hour blow for approximately 80-95 percent of the time during May through September and 50-75 percent of the time during October through April. The average daily temperature and relative humidity for the summer months are 77ºF and 52 percent, respectively. During the winter these values are 72ºF and 61 percent. The proximity of Ulupaʻu Crater to the coast and trade wind effects have a significant impact on evapotranspiration rates. While the crater area is relatively dry compared to other parts of the windward district, the relative humidity levels over the peninsula are high enough to keep the annual evapotranspiration rates below the average annual rainfall rate. Even though annual rainfall exceeds evapotranspiration, there are periods during the summer months when evapotranspiration exceeds rainfall, resulting in low soil moisture levels (SRGII 2007).

Precipitation events include trade wind showers, cold front storms, Kona storms, and intense tropical storms. Hurricanes and tropical storms are rare occurrences in the region. Rainfall rates associated with these storms often can exceed soil infiltration rates and result in overland flow. Of the rainfall events that impact Ulupaʻu Crater, the dominant type is a brief trade wind shower that precipitates very low rainfall levels (<0.05 inch). However, trade wind showers that follow in close succession to one another can result in moderate precipitation amounts. The intensity of the trade wind showers does not usually exceed the natural infiltration rate of the soils found on the peninsula or the evapotranspiration rates. Thus most of the pervious areas do not generate overland flow from these trade wind showers (SRGII 2007).

3.2 AIR QUALITY

3.2.1 Affected Environment

Air quality in Hawai'i is generally good due to the small size and isolated location of the state. O'ahu's relatively small size limits opportunities for locally generated air pollutants to accumulate or recirculate before being transported offshore and away from land areas. There are currently no identified sources of air pollution on MCB Hawaii Kaneohe Bay that would result in non-compliance with National Ambient Air Quality Standards established for carbon monoxide, nitrogen dioxide, sulfur dioxide, particular matter less than 10 microns in aerodynamic diameter (PM10), ozone, and lead (Wilson Okamoto and Associates [1999] as cited in Drigot et al. [2001]). Prevailing winds generally blow from the east and the northeast with an annual mean wind velocity of 10.38 knots (11.9 mph) (Drigot et al. 2001). There is the potential for temporary air quality impacts resulting from mobile sources (i.e., vehicles, aircraft) and stationary sources, along with those related to training or construction activities (e.g., fugitive dust from earth movement). Such impacts are minimal since emissions from mobile and stationary sources are easily dispersed and standard procedures are followed to minimize other emissions (Wilson Okamoto and Associates [1999] as cited in Drigot et al. [2001]).

3.2.2 Environmental Consequences to Air Quality

Emissions during construction would not increase the concentrations of any of the criteria pollutants substantially and these emissions would be short-term (i.e., during construction) and localized. In general, fugitive dust and combustive emissions would produce localized, short-term emissions that would not result in any long-term impact to air quality.

When explosives are detonated, gases are produced and released into the atmosphere. For example, C4 (an RDX composition) reactions produce primarily carbon dioxide and nitrogen. Explosions occur in two phases. During the first phase an area of very low pressure is created around the explosion's origin by the rapidly expanding gases. In the second phase, the gases rush back in to the partial vacuum creating a secondary, less destructive energy wave. C4 detonations would produce carbon dioxide and nitrogen; however, restriction of detonations to atmospherically favorable times for noise minimization will also promote dispersion of these gases in the atmosphere.

Particulate matter could be produced from detonations, mostly from the shattering and mobilization of the ground surface. However, burial of explosives prior to detonation and use of a sand substrate would reduce the quantity of respirable fugitive dust.

3.3 GEOLOGY AND SOILS

3.3.1 Affected Environment

The proposed project would be located on the northern, outer slope of the Ulupa'u Crater, which is located on the Mōkapu Peninsula. The Mōkapu Peninsula was formed by basaltic lava eruptions from four separate volcanic events during the last period of volcanic activity on O'ahu. The elevation ranges from sea level to 194 m (638 ft) mean sea level (msl) at Ulupa'u Crater on the north crest of the crater rim. The Ulupa'u Crater includes steep slopes on the crater rim and a rocky interface with the ocean at the base of the slopes.

Ulupa'u Crater is a remnant volcanic tuff cone formed some 1 million years ago (Stearns 1961). Ulupa'u Crater formed on top of existing nephelinite lavas that were laid down by earlier eruptions. In addition to resting on the older lavas, the crater sits on top of marine sediments that were formed during periods when the sea level was higher than present. The eruptions from this volcanic vent were explosive types, classified as phreatomagmatic eruptions since the lavas were in contact with seawater. Flows projected from this vent are classified as tuff lavas. Following the eruptive stage, the crater was eroded by waves along the east and north sections of its outer circumference, and by runoff over its surfaces. Cone parent material is comprised of tuff materials that are cemented ashes deposited from the various eruptions. The outer slopes of a tuff cone are comprised of mantle bedding layers that are individual layers of tuff that arc up and over the crater. Over thousands of years, water flowing down the steep crater slopes created drainage channels that are relatively uniform in size and spacing along the outer slopes. These drainages are aligned in a radial pattern and diverge as they traverse away from the crater's rim. Due in part to the low permeability of the tuff lava, the hydrogeology or aquifer properties of this substrate are poor. Boring data sampled within the landfill basin reveals that the groundwater table is located approximately at sea level (100 feet). The aquifer classification code adopted by the State classifies the groundwater beneath the Crater as comprised of two fresh water aquifers buoyed on top of a salt water lens (SRGII 2007). The Natural Resource Conservation Service (2008) classifies the soils on the steep uplands of the crater and along the shoreline area as Rock Land with Makalapa clay in disturbed residential areas (Figure 3-1). The rock land of Ulupa'u is comprised of tuff substrate that is moderately weathered. The slopes are dissected by a series of drainages where runoff from heavy rains concentrates naturally and flows to the ocean. Due to the cone shape of the crater, the channels diverge from one another as they proceed down the slope. None of the channels are perennial, and most only flow after storms that produce significant precipitation or following precipitation events on saturated soils. Rainfall rates associated with intense tropical storms often exceed soil infiltration rates, especially during the winter months, and it is during these storms and immediately afterwards that erosion rates and impacts from erosion are highest (SRGII 2007).

An erosion assessment of the northern, outer Ulupa'u slopes was completed by SRGII in 2007. The project surveyed the outer slope of the Ulupa'u Crater, identified erosion sources and areas where concentrated overland flow occurs, and provided conceptual design solutions for problem sites (SRGII 2007). Report preparers estimated that most of the non-point source pollutants, including sediment, originate from residential areas as opposed to the upper crater slopes. While this conclusion may describe the current dynamics, there is evidence that materials have moved downslope since the 3.5 inch rocket range was developed in the 1950s. Evidence includes incised, unvegetated ephemeral drainages and the presence of numerous UXO and rocket remnants along the shore. There appears to be some soil movement on the slope and in the drainages, as well as erosion of the scarp above the beach, but the timing and rate of this movement is unknown and may represent natural soil movement conditions for the site.

3.3.2 Environmental Consequences to Geology and Soils

3.3.2.1 Alternative 1: Proposed Action – Construction and Use of an Explosives Training Range at Ulupa'u Crater

Construction and ground-disturbing activities would occur on the northwestern side of Ulupa'u Crater. Construction activities would involve disturbance of soil; removal of vegetation; cut and fill operations along the roadway, parking areas, and range site; grading; and road compaction. Best management practices such as proper grading, stabilization, culverts to channel storm water runoff, and sediment retention fences, as needed, would minimize adverse effects during construction. Following completion of construction, all disturbed surfaces would be revegetated or stabilized using rock or other materials. If fill material were needed, it would be selected for use in accordance with the specifications provided by a certified soils engineer to ensure stability of the built environment without an increase to maximum peak flow rates of storm drainage. In addition, soil or mulch used for stabilization would be certified as weed free to comply with MCB Hawaii's recommended best management practices to reduce risk of introducing invasive species (MCBH and SRGII 2006 Appendix D).

Runoff, erosion, and sediment transport would be minimized during construction using a variety of best management practices. Large rainfall or runoff events during construction or during the revegetation period following construction could result in localized soil erosion and runoff and associated sediment plumes in the ocean. Any necessary in-place detonation of historical unexploded ordnance could cause short term impacts due to soil disturbance and destabilization. Management of runoff from the proposed range, parking areas, and access road would be critical to minimize runoff and erosion on slopes above the shoreline. Mitigation BMPs to be used in this project to minimize effects on soils are described in Section 2.1.4.3.

3.3.2.2 Alternative 2: No Action

Under the no-action alternative, the explosives training range would not be constructed and no additional impacts to soil beyond those associated with the current condition would occur. The area is currently heavily vegetated and relatively stable. Periodic heavy rainfall events, especially those occurring when soils are saturated, can result in runoff that concentrates in the natural drainages leading to the ocean. These natural gulches may therefore experience periodic scouring, but do not appear to be a significant source of sediment plumes that develop in adjacent marine environments. Historic materials associated with the 3.5 inch rocket range would continue to move downslope.

3.4 WATER QUALITY

3.4.1 Affected Environment

The proposed explosives training area is more than 100 m (328 ft) inland and upslope from the Pacific Ocean. No other surface water exists within the area. From a hydrological perspective, Ulupaʻu Crater's capacity to absorb rainfall has been slightly diminished due in part to alterations to vegetation. Runoff generated from upslope areas follows the path of least resistance on its way to the shoreline where it enters the Pacific Ocean. Erosion of soil particles occurs during rainfall/runoff events across most of the outer crater slopes and along the shoreline. These waters could carry soil into the Pacific Ocean and damage adjacent coral reef ecosystems.

Surface waters surrounding the Mōkapu Peninsula are classified and regulated by the state of Hawaiʻi under Title 11 Hawaiʻi Administrative Rules, Department of Health, Chapter 54 *Water Quality Standards*. The waters offshore of Ulupaʻu Crater are designated Class A marine waters. The management objective of Class A waters is to protect the waters for recreational purposes and aesthetic enjoyment[1]. The waters immediately surrounding MCB Hawaii Kaneohe Bay are used by Marines for various activities including helicopter search and rescue training. Access within a 500-yard buffer surrounding the installation is restricted due to its designation as a Naval Defense Sea Area.

There are no surface waters at Ulupaʻu Crater where the ETR is proposed. Rapid runoff and erosion can be severe on the steep slopes of Ulupaʻu Crater (SRGII 2004). Currently, runoff from the ETR area is occasionally conveyed by sheet flow and gulches to the ocean when rainfall intensities exceed infiltration rates. Range and road construction would incorporate BMPs and design elements to minimize exposed, erodible soil, sediment transport, and runoff from developed/disturbed areas. With the exception of the observation bunker, all developed areas, including roads, would be pervious surfaces consisting of vegetation, gravel/rock, or other erosion control materials. Water runoff from roads and parking areas would be managed for optimal dispersion and infiltration to minimize creation of concentrated flows downslope. Existing concentrated flows in gullies may actually be ameliorated by structural controls associated with the proposed facility, which could intercept and disperse concentrated flows originating upslope from the facility.

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[1] State of Hawaii, Department of Health. Hawaii Administrative Rules: Amendment and Compilation of Chapter 11-54. 31 August 2004. http://www.hawaii.gov/health/about/rules/11-54.pdf.

3.4.2 Environmental Consequences to Water Quality

3.4.2.1 Alternative 1: Proposed Action – Construction and Use of an Explosives Training Range at Ulupaʻu Crater

Impacts to the ocean and water quality may include short-term effects associated with construction, post-construction effects, and periodic/intermittent effects associated with use of the ETR. Possible effects of construction include release of sediment plumes into the ocean during rainfall events. Currently, most of the area is well-vegetated and fairly stable; storm runoff travels to the ocean by way of natural gullies and drainages.

Potential post-construction effects include erosion and sedimentation associated with unvegetated areas. These areas would be stabilized to some degree by revegetation efforts but some soil movement could occur while revegetation takes place. Use of standing operating procedures, mitigation measures, and monitoring would ensure there are no significant impacts to shoreline water quality of the Pacific Ocean. Storm water and erosion control BMPs are standard practice for construction projects that take place across MCB Hawaii. Bare soil surfaces resulting from maintenance and/or construction activities would be covered with suitable erosion controls (see Section 2.1.4, *Mitigation Measures for Alternative 1*). Overall impacts to water quality would be minor.

3.4.2.2 Alternative 2: No Action

Under the no-action alternative, the ETR would not be constructed. Impacts related to historical UXO sources would continue to occur. During high rainfall events, sediment and nutrients would continue to be flushed to the ocean. With the exception of the immediate construction area, no impacts to surface or ground water of a long-term nature would be expected to occur with implementation of the proposed action.

3.5 FLORA

3.5.1 Affected Environment

Vegetation includes coastal strand and upland terrestrial plant communities. The affected environment for vegetation includes those areas subject to ground disturbance activities and adjacent areas where non-native invasives could establish and spread.

From the crest of the Ulupaʻu rim down to the coastal zone, vegetation is dominated by alien and invasive species. The coastal zone, identified as the area from the reach of high wave run-up to the transition line to upland vegetation, contains a mixture of endemic, indigenous, invasive and non-native plant species. The type is referred to as coastal mixed and beach strand vegetation. Along the shoreline, native plants are found growing in small patches interspersed with invasive and other nonnative plants. In addition to the beach strand vegetation along the shoreline, there are three main vegetation types on the outer slopes of the crater. The first and smallest by area is located along the steep northern section occupied by an over-story of ironwood (*Casuarina equisetifolia*) trees and an understory of mixed grasses and low shrubs. In general, the outer slopes are dominated by invasive grasses, herbaceous shrubs, and woody shrubs. The western section of the outer slopes, bounded by the crater rim down to an elevation of 200 feet msl, has an over-story of kiawe (*Prosopis pallida*) trees with some koa haole (*Leucaena leucocephala*) trees and an understory of mixed grasses and low shrubs. Lastly, within the natural drainages, and at several locations in relatively flat areas near the urban interface at approximately 200 feet msl, there are several dense stands of kiawe trees. There are native plants dispersed throughout the outer Ulupaʻu Crater slopes, although these species are generally isolated in small patches inland from the shoreline (SRGII 2007). Vegetation types in the vicinity of the proposed actions are shown in Figure 3-2.

There are no natural occurrences of plants currently listed or pending listing as “endangered” under the Federal Endangered Species Act (Drigot et al. 2001). There are two records of plants of rare plants on the Mōkapu Peninsula. *Capparis sandwichiana* (Hawaiian caper bush or Maiapilo) is an endemic Hawaiʻi species of concern that was documented in the Ulupaʻu Crater area historically. *Sesbania tomentosa* (ʻOhia) is an endemic federally endangered plant that was last documented in the Ulupaʻu Crater area in 1934 (Hawaii Biodiversity and Mapping Program, data received February 2008). Historic records for these two species are located on the opposite side of the crater rim from the proposed action, within the northern portion of the existing Range Training Facility at Ulupaʻu Crater. Extensive searches for these species in the vicinity of historic observations and within the Ulupaʻu Crater vicinity have failed to find any individuals of these species (Herbst 1998; Diane Drigot personal comm. 2008). It is highly unlikely that these species occur on the north side of the crater rim (Diane Drigot personal comm. 2008). The areas proposed for soil disturbance would be surveyed by a qualified botanist before construction begins to verify that no sensitive plant taxa are present.

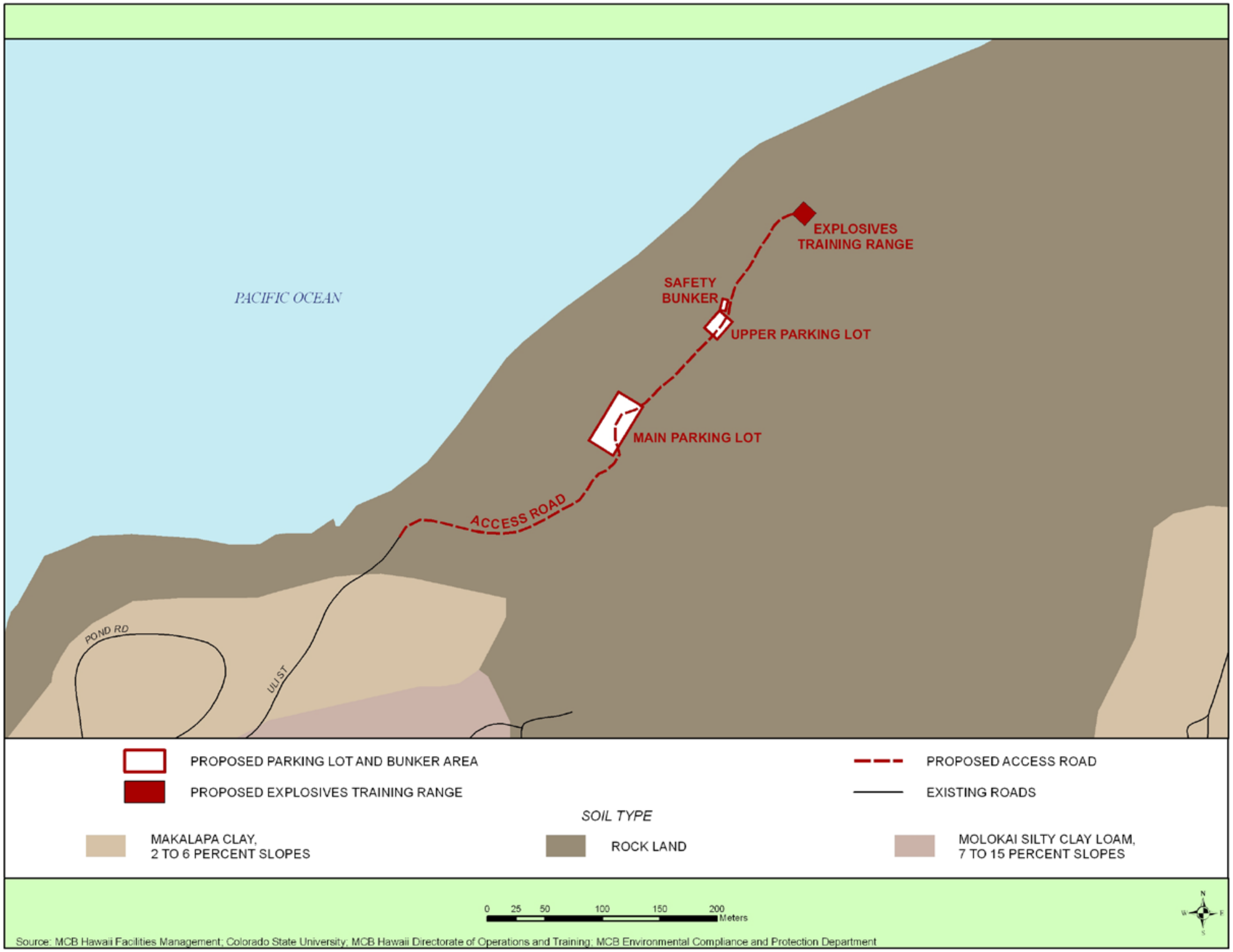

Figure 3-1. Soil types in the vicinity of the proposed action.

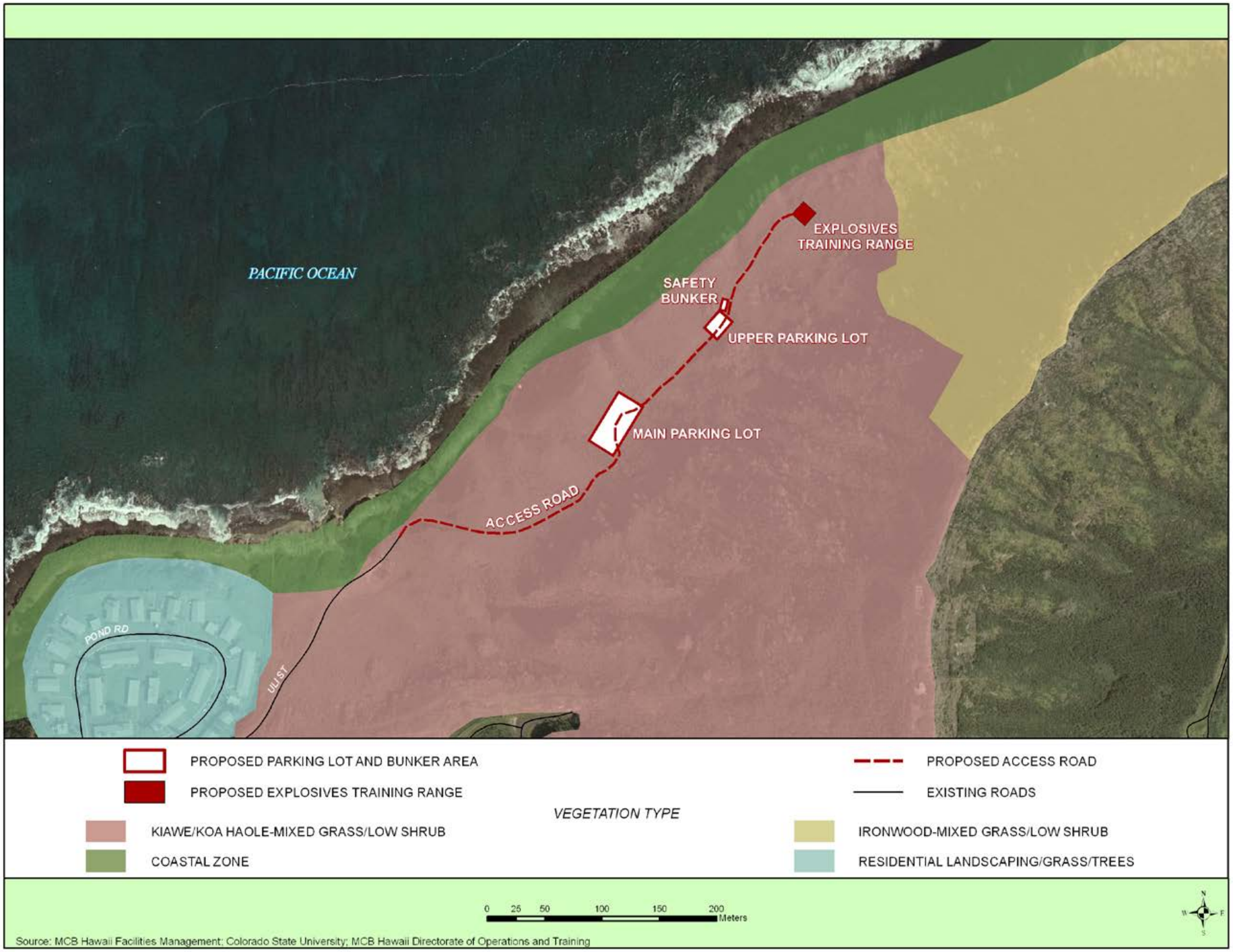

Figure 3-2. Vegetation types in the vicinity of the proposed action.

3.5.2 Environmental Consequences to Flora

Alternative 1: Proposed Action – Construction and Use of an Explosives Training Range at Ulupaʻu Crater

With the exception of the immediate construction area, minimal impacts to vegetation of a long-term nature would be expected to occur with implementation of the proposed action. All of the construction would occur in habitat with predominantly alien vegetation; no adverse impacts to rare plant species are expected. Vegetation impacts are anticipated to be localized and short-term in nature. Vegetation is currently dominated by non-native vegetation. Seeds of undesirable non-native species such as *Pennisetum* could be transported to the site attached to trucks, equipment and personal gear associated with training at the proposed ETR. The main pathways for introduction of invasive weed species into the Ulupaʻu Crater Wildlife Management Area to the east of the proposed project area are thought to be: 1) seeds found in organic mulch and soils utilized in weed suppression or revegetation projects, 2) weed seeds on tools and equipment used in vegetation control projects, and 3) natural seed dispersal by wind and birds (SRGII 2002). These vectors would likely be the most probable for invasive or noxious plant introductions within the proposed project area. Policies for importing soil would help ensure that no noxious plant species would be brought to the site where they could colonize and spread. For example, construction BMPs would require that vehicles used in construction be pre-washed and inspected prior to use at this site to avoid inadvertent transport of weed seeds from other areas. All plant species used for revegetation and soil stabilization would comply with guidance and species lists published in MCBH and SRGII (2006, Appendix D). Any plants considered for landscaping not identified on these lists would be reviewed and approved on a case-by case-basis by the Environmental Protection and Compliance Department prior to planting for suitability of use or introduction to MCB Hawaii properties and by the Facilities Department for maintenance concerns.

Alternative 2: No Action

Under no action, no additional impacts would occur to existing vegetation. The area would remain closed and vegetation communities would continue to be dominated by non-native vegetation in an unmanaged state.

3.6 FAUNA

3.6.1 Affected Environment: Terrestrial Fauna

Much of the terrestrial habitat at Ulupaʻu Crater is composed of highly degraded, predominantly secondary successional plant communities dominated by mixed grasses and shrub species. The north side of the Ulupaʻu Crater in the area of the historic 3.5-inch rocket range and the proposed explosive training range is predominantly non-managed landscape dominated by non-native koa haole (*Leucaena leucocephala*) shrubland. The sparse native vegetation, degraded nature of the existing vegetation, and lack of water in the proposed project area limits the use of the immediate area by terrestrial fauna and seabirds. The middle and upper slopes, including the immediate area of the proposed ETR and the access road, are densely vegetated with small trees and shrubs which probably prevents seabirds from landing and moving around on the ground. The shoreline along the north side of the Ulupaʻu Crater is potential habitat for migratory shorebird and seabird species (Drigot et al. 2001). Example species include wintering shorebirds such as Pacific golden plovers and ruddy turnstones along natural rocky shorelines and sanderlings along sandy shores (USFWS 2008). Seabird species potentially occurring and nesting along the north Ulupaʻu Crater shoreline include wedge-tailed shearwaters (*Puffinus pacificus*), Newell's shearwater (*Puffinus auricularis*), red-footed booby (*Sula sula*), white-tailed tropicbird (*Phaethon lepturus*), red-tailed tropicbird (*Phaethon rubricauda*), white terns (*Gygis alba rothschildi*), brown noddy (*Anous stolidus*), and black noddy (*Anous minutus*). These species have varying nesting habits, and nests could occur in a variety of locations, including burrows, rock cervices, rock ledges, tree branches, buildings or other man-made structures, or on the ground. Potentially suitable nesting habitat for several seabird species was found within and adjacent to the survey area on Mōkapu Peninsula, primarily along the shoreline on the northwestern edge of the survey area (VanderWerf 2008 - Appendix A).

The Newell's shearwater is the only federally threatened species that occurs in the area. Newell's shearwater are known to nest mainly on Kaua'i, with colonies also on Moloka'i and Hawai'i (Ainley et al. 1997, Reynolds and Ritchotte 1997, Day and Cooper 2002, Day et al. 2003). They may occur in very small numbers on O'ahu and Lehua Islet near Ni'ihau (VanderWerf 2003). They nest mostly at high elevations in remote locations, often on slopes greater than 65 degrees, and in areas of open native forest dominated by 'ohia (*Metrosideros polymorpha*) with a dense understory of 'uluhe fern (*Dicranopteris linearis*). They usually place burrows at the base of trees, in locations where excavation may be easier; however, they have also been documented using vertical cliffs on Kaua'i, where they probably nest in rock crevices rather than burrows (Wood et al. 2001). To date, the Newell's shearwater has not been reported nesting on O'ahu, nor is there any available preferred habitat in the proposed project area.

In support of this environmental assessment, a survey for seabird presence and habitat quality was conducted in May 2008 (VanderWerf 2008 – see Appendix A). The survey covered most of the western and northwestern outer slopes of the remnant Ulupa'u crater from the shoreline to the crater rim, with specific attention to the vicinity of the proposed ETR. The purpose of the survey was to document seabirds and potential seabird roosting and nesting habitat in the area. The area was searched extensively for burrows and nests in crevices, under rocks, and on overhung ledges; and for other signs of seabird use such as droppings, footprints, eggshells, feathers, or bones. The shoreline area and lower slopes immediately adjacent to the shoreline were searched most thoroughly because the areas contained the most probable seabird nesting habitat. The proposed ETR site and portions of the proposed access road were also surveyed. The dense grass and shrubs dominating the area generally provide poor habitat for these seabirds and shorebirds of interest.

The only seabird observed during the May 2008 survey was a single black noddy flying along the shoreline. There were three other species of indigenous birds observed foraging within the survey area, including a black-crowned night-heron, a Pacific golden-plover, and two ruddy turnstones. None of these species are expected to nest in the area (VanderWerf 2008). The survey found potential nesting habitat for several seabird species, primarily among rocks just above the shoreline, and on the more open lower slopes and coastal cliffs of the survey area. The survey area provides potential nesting seabird habitat for wedge-tailed shearwaters, red-footed boobies, white-tailed tropicbirds, red-tailed tropicbirds, and black noddies; and possibly Bulwer's petrel (*Bulweria bulwerii*), brown noddies, and white terns. However, the presence of predators, such as feral cats, mongoose, and rats makes it unlikely that most seabirds would attempt to nest in the area. Nesting by boobies would require the development of large roosting and nesting trees. A more detailed description of the potential nesting habitat of these species in the project area is presented in Appendix A.

3.6.2 Environmental Consequences to Terrestrial Fauna

A significant effect to biological components would consist of the loss or degradation of site quality of natural or sensitive areas, adverse effects to rare or sensitive species, or the introduction or increase of undesirable non-native species.

3.6.2.1 Alternative 1: Proposed Action – Construction and Use of an Explosives Training Range at Ulupa'u Crater

Construction and use of the explosives training range would have a minor or negligible effect on terrestrial mammals and birds. Given the disturbed nature of the site and the low quality of the existing vegetation, the terrestrial faunal species present are likely limited to invasive, non-native species (e.g., feral cats, mongoose, and rats); thus there would be no impact to native faunal communities.

Roosting and nesting seabirds using the shoreline along the north side of the Ulupa'u Crater could be negatively impacted by construction and use of the explosive training range. However no roosting or nesting seabirds were observed during the recent seabird habitat survey conducted in the project area. The area does contain potential habitat for possibly eight seabird species, but the presence of predators common throughout Oʻahu makes it unlikely that most seabirds would attempt to nest there. Increased human presence and noise levels during range construction and use might temporarily disturb the normal behavior of birds in the immediate vicinity of the proposed project.

Any outdoor lighting would be down-shielded to prevent attraction of birds such as Newell's or wedge-tailed shearwaters that could potentially be attracted to the lights.

3.6.2.2 Alternative 2: No Action

Under the no-action alternative there would be no change to current baseline conditions, and additional environmental effects to surrounding habitats and wildlife would not occur.

3.6.3 Affected Environment: Marine Fauna

Surface waters surrounding Mōkapu Peninsula are classified and regulated by the State of Hawaiʻi under Title 11, Hawaiʻi Administrative Rules, Department of Health, Chapter 54, Water Quality Standards. The outer portions of Kāneʻohe Bay are designated Class A marine waters, which has a management objective to protect the waters for recreational purposes and aesthetic enjoyment (Department of Navy 2006).

A variety of marine species and environmentally sensitive coral reef communities occurs in the waters surrounding the base. Live coral colonies, sponges, bryozoans, sabellid worms, tunicates, burrow-dwelling gobies, spiny balloon fish, and schools of transient fish such as jacks and sting rays have been documented in the Kāneʻohe Bay zone. The bay also supports a population of threatened green sea turtles, which feed on the abundant mats of sea grass occurring on the sand slopes of the lagoon in the transition zone. A marine survey was conducted in 2004 around Mōkapu Peninsula by state and federal resource managers and scientists with an emphasis on describing coral reefs that occur within the 500 yard security zone (USFWS 2008).

Offshore waters in the vicinity of MCB Hawaii Kaneohe Bay host several federally listed species, including the threatened green sea turtle (transition zone, above) and the endangered hawksbill turtle (*Eretmochelys imbricata*) that regularly feed in near shore water. Several "false nest" attempts have been reported for these species along Mōkapu shoreline beaches. The endangered Hawaiian monk seal (*Monachus schauinslandi*) occasionally uses the Mōkapu shoreline beaches for resting, and the endangered humpback whale (*Megaptera novaeangliae*) has been observed in the waters offshore of MCB Hawaii Kaneohe Bay. In addition, there are several islets located off the Mōkapu Peninsula that are restricted-access seabird sanctuaries, owned and controlled by the State (MCBH and SRGII 2006).

No specific erosion sources have been identified on the outer crater slopes associated with the proposed project area. Sediment discharges from residential areas and other areas on the installation do occur periodically, and have the potential to trigger compliance issues and harm marine life.

3.6.4 Environmental Consequences to Marine Fauna

<u>Alternative 1: Proposed Action – Construction and Use of an Explosives Training Range at Ulupaʻu Crater</u>

Soil disturbance associated with the proposed road, parking area, safety bunker, and explosive training range construction could result in temporarily increased erosion and runoff into the ocean, resulting in the generation of sediment plumes. These potential effects would be avoided through the implementation of proper facility design and BMPs. There is also a possibility that digging and construction could disturb existing soil contaminants linked to historic range usage. These disturbances could negatively affect coral reef community structure and lead to the loss of habitats and species. Sea turtles and other species that depend on coral habitat could have reduced foraging opportunities and limited habitat options as a result. Use of construction BMPs would avoid otherwise potentially adverse effects of runoff and sediment delivery to the ocean (Table 2-1). These areas would be regularly monitored for erosion during and after construction.

Human-generated sound has the potential to impact the health and well-being of animals as well as humans. These sounds could impact aquatic mammals, diving birds, fishes, amphibians, reptiles, and perhaps even invertebrates (Popper et al. 2004). Increased human presence and noise levels during range construction and use might temporarily disturb the normal behavior of sea turtles, monk seals and humpback whales on the shore and/or in off-shore habitats adjacent to the proposed project area. Marine mammals may also be affected indirectly when prey such as fish are affected by anthropogenic sound, which could reduce the foraging efficiency of marine mammals, and potentially compromise their growth, condition, reproduction, and survival.

Marine mammals and marine ecosystems are protected by a suite of environmental laws including the Marine Mammal Protection Act of 1972, which provides a general prohibition on activities that cause a “take” of marine wildlife, with limited exceptions including military activities deemed essential for national defense. The Endangered Species Act prohibits the taking of marine mammals listed as endangered or threatened, also with some exceptions. Harassment is one component of “taking”, and is defined by the Marine Mammal Protection Act as “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.” Two levels of harassment are defined:

- Level A Harassment: Action with the potential to injure marine mammals or marine mammal stock in the wild (e.g., ship strike, underwater explosion).
- Level B Harassment: Action with the potential to disturb marine mammals or marine mammal stock in the wild by causing disruption of behavioral patterns (e.g., sonar, aircraft overflight).

The National Environmental Policy Act (NEPA) requires that major federal actions that would have a significant impact on the environment (including those involving anthropogenic sound) be assessed to inform decision-makers about the consequences of such actions and alternatives to minimize impacts. Noise from explosions or concussive (impulse/shock) waves that originate on land could have short-term impacts on marine mammals if impulse waves penetrate the marine habitat. The possibility of transmission into the marine habitat is not known. The impact of anthropogenic sounds on marine life depends on the frequency, intensity, duration, and location of the sound. When introduced sound exceeds the adaptive capacity of marine mammals, it may cause physical injury or elicit physiological reactions, affect marine mammal behavior, mask important natural sounds they depend on, and alter their physiological function and physical well being, thereby posing a threat to individual animals or their populations. Noise levels from 115 to 180 decibels (dB) or 12 psi can cause a change in movement or behavior (harassment) for marine mammals (Richardson et. al 1995).

An acoustic analysis of potential impacts from detonations of high explosives on/near the beach of the Army’s Makua Military Reservation on O‘ahu was completed as part of the Final Environmental Impact Statement for Military Training Activities (Marine Acoustics 2005). Mission scenarios included on-land detonations up to 300 lbs, mortars up to 120 mm (high explosive) and artillery rounds up to 105 mm (high explosives). Sound levels were estimated at five receiver sites using acoustic propagation models for in-air and in-water transmission and utilizing the best available data from the Navy standard underwater acoustic databases. Metrics for impacts analysis were 190 dB re (1 µPa) for Level B harassment and 215 dB re (1 µPa) for Level A harassment. Similar comparison metrics were accepted by the National Marine and Fisheries Service for analysis in the Navy’s Virginia Capes Range Complex Final EIS (Department of the Navy 2009). At Makua, the estimated levels did not exceed, or even approach, the Level A or Level B harassment levels of marine mammals. The Makua EIS determined, therefore, that impacts to marine mammals potentially present offshore would be unlikely for the evaluated activities. While the scenarios evaluated at Makua do not exactly match the proposed action at the Ulupa‘u Crater, the levels of explosives proposed at Ulupa‘u Crater are more than one order of magnitude lower than the explosives included in the modeling effort at Makua. Preparers also consulted with marine animal experts from the University of

Hawaii, Naval Facilities Hawaii, and a private consulting firm (see Section 5.0 all of whom felt the noise/shock wave effects of the proposed action would be very minor. Available information indicates the potential for adverse impacts to marine wildlife from explosives training at Ulupaʻu Crater is minor or negligible.

Alternative 2: No Action

No additional effects to fauna would be expected from the no-action alternative.

3.7 COASTAL AND REEF SYSTEMS

3.7.1 Affected Environment

Live coral colonies, sponges, bryozoans, sabellid worms, tunicates, burrow-dwelling gobies, spiny balloon fish, and schools of transient fish such as jacks and sting rays have been documented in the Kāneʻohe Bay zone. Coral coverage is up to 50 percent in some places within the bay. In addition, there are abundant populations of 20 or more fish species. The marine community below the northern, outer Ulupaʻu Crater rim, known as habitat station #5, consists of a complex coral community with caves, overhangs, and crevices that provide suitable habitat for a diverse assemblage of reef fish, mollusks, and algae. Significant biological degradation is attributed to large numbers of the boring urchin, *Echinometra matthaei* (MCBH and SRGII 2006 Figure 9).

Although no specific erosion sources have been identified on the outer crater slopes associated with the proposed project area, erosion and overland flows from the outer crater slopes have the potential to create sediment plumes in the ocean and affect nearby coral. Sediment discharges from residential areas and other areas on the installation do occur periodically, and have the potential to trigger compliance issues and harm marine life.

3.7.2 Environmental Consequences to Coastal and Reef Systems

3.7.2.1 Alternative 1: Proposed Action – Construction and Use of an Explosives Training Range at Ulupaʻu Crater

Soil disturbance associated with the proposed road, parking area, safety bunker, and explosive training range construction could result in temporarily increased erosion and runoff into the ocean, resulting in the generation of sediment plumes. These potential effects could be minimized and confined to short-term effects through the implementation of proper facility designs and mitigation measures. There is also a possibility that digging and construction could disturb existing soil contaminants linked to historic range usage. These disturbances could negatively affect coral reef community structure and lead to the loss of habitats and species. Mitigation best management practices, monitoring, staff oversight, and agency permitting requirements would ensure that impacts associated with sediment and runoff are minimized. There would be no disturbance to the coastal strand or nearshore ocean bottom. Debris would be removed and no new UXO would be generated with potential to damage reef systems. The site would be regularly monitored for erosion during and after construction.

3.7.2.2 Alternative 2: No Action

No additional effects to reef systems would be expected from the no-action alternative.

3.8 CULTURAL AND ARCHAEOLOGICAL RESOURCES

3.8.1 Affected Environment

The proposed action would take place within an area of low archaeological sensitivity (U.S. Army Corps of Engineers, Honolulu District 2006: Figure B-1). Prior survey of this area (Anderson 1996) identified only recent military related surface finds, and none of the 52 recorded sites at MCB Hawaii Kaneohe Bay are within the project area. Marine Corps Base Hawaii Kaneohe Bay has upwards of 478 buildings and structures constructed prior to 1960, many of which are considered eligible for inclusion in the National Register of Historic Places (U.S. Army Corps of Engineers, Honolulu District 2006). However, none of these historic structures are located within the project area.

3.8.2 Environmental Consequences to Cultural and Archaeological Resources

3.8.2.1 Alternative 1: Proposed Action – Construction and Use of an Explosives Training Range at Ulupaʻu Crater

No known historic properties are expected to be impacted by the ETR construction and use. The area is considered to be of low archaeological sensitivity, and no historic structures or archaeological sites occur within the area of potential effect. A section 106 consultation was filed with the State Historic Preservation Office by MCB Hawaii staff in September 2009. The State concurred with the NHPA Section 106 Review that determined a finding of “no historic properties affected”. Letters describing the proposed action and potential effects on cultural resources were sent to native Hawaiian organization (NHO) claimants in September, 2010. No responses were received by MCB Hawaii from the claimants.

3.8.2.2 Alternative 2: No Action

Under the no-action alternative, the range would not be redesigned/constructed at Ulupaʻu, and no additional impacts to cultural resources would occur.

3.9 NOISE

Noise is defined as any unwanted sound. Defining characteristics of noise include sound level (amplitude), frequency (pitch), and duration. Each of these characteristics plays a role in determining the intrusiveness and level of impact of the noise on a receptor. The primary indicator is human annoyance. Annoyance is difficult to directly measure, but sound levels can help to predict how people would react to different noises and loudness. Individual responses depend on many factors, including intensity, duration, repetition, abruptness, time of day, fear and interference with activity. Noise complaints are often triggered by short-term increases in the average noise level or by single events that stand out as much noisier than typical conditions (U.S. Army Center for Health Promotion and Preventive Medicine [USACHPPM] 2005).

Munitions noise levels are strongly influenced by meteorological conditions (e.g., wind direction and speed, and cloud cover), and the peak noise level reaching a particular location after an explosion event may vary significantly. Thus, consideration of the climatic characteristics for the surrounding area is an important component of the environmental assessment of noise. Table 3-1 provides examples of the effect of atmospheric conditions on acoustics.

Table 3-1. Criteria for "good" and "bad" atmospheric conditions influencing noise associated with military munitions. (Source: University of Utah Explosives Research Group as cited in USACHHPM 2005).

“Good” Atmospheric Conditions	“Bad” Atmospheric Conditions
• Clear skies with billowy cloud formations, especially during warm periods of the year • A rising barometer immediately following a storm	• Days of steady winds of 5-10 mph with gusts of greater velocities (> 20 mph) in the direction of residences close by • Clear days on which “layering” of smoke or fog are observed • Cold hazy or foggy mornings • Days following a day when large extremes of temperature (about 68ºF) between day and night are noted • Generally high barometer readings with low temperatures

Based on the criteria presented above, atmospheric conditions at the proposed project site would generally be good, with the exception of windy days when noise could be elevated at residences downwind and to the west.

3.9.1 Noise Measurements and Guidelines

Noise levels are measured in decibels (dB), which reflect the relative way in which differences in sound energy levels are perceived. For context, normal speech has a noise level of approximately 50 to 60 dB and a gasoline-powered lawnmower has a noise level of approximately 90 dB. The threshold for human hearing damage and ear pain is 140 dB (Military Standard 1474D; Occupational Safety and Health Administration (OSHA) 1983; Kang and Kleiber 1991). Eardrum rupture can occur at 160 dB and above.

Noise resulting from the detonation of explosives is impulsive in nature and lasts less than a second. Although the duration of individual blasts is short, the rapid onset of such sounds can be startling and be a source of discomfort to many persons.

Different metrics are used to measure sound level, and each is appropriate for measuring a certain type of noise. The Department of Defense uses a widely accepted metric, the day-night sound level (DNL), to describe average daily acoustic energy over a given period (24 hours was used in this environmental assessment). This means that moments of quiet are averaged together with moments where loud noises are heard. Intense low-frequency noise (such as blasting) that can cause vibration in nearby homes is weighted to reflect what people actually feel (C-weighting). The C-weighted noise level is used to predict vibration and account for additional annoyance usually associated with lower-frequency sounds.

The day-night average level (DNL) noise measurements might understate the severity of a single-noise event by averaging out a noise peak. For example, the 24 hour average noise level is irrelevant to someone whose lunch is interrupted by explosives. To assess maximum noise levels during single-noise events (such as explosions), an unweighted peak measurement, with no time averaging, is also used to predict annoyance. The USACHPPM recommends supplementing time-weighted averages with peak decibel levels when assessing impulsive noise (USACHPPM 2005). The metric, “peak noise exceeded by 15 percent of firing events” (PK 15[met]) accounts for weather-influenced statistical variation in received single-event peak noise levels. PK 15(met) is a probability measurement of the peak noise level, without frequency weighting, expected to be exceeded by 15 percent of all firing events of that size. When multiple strength explosions could occur from the same location, the PK 15(met) level is based on the loudest weapon type.

<u>Department of Defense</u>

The Department of Defense defines three broad noise exposure zones as the basis for land use planning (Table 3-2). An average noise level of 62 dB, which predicts that less than 15 percent of the population would be highly annoyed, is acceptable for all land uses, including schools, hospitals and residences. Average noise levels from 62 to 70 dB are normally acceptable in Noise Zone II areas, but these zones generally are limited to activities such as industrial, manufacturing, and transportation and resource production, as opposed to noise-sensitive areas such as residential housing. For infrequent noise events, the military can determine if Zone II noise levels are acceptable in noise-sensitive areas to accomplish mission objectives.

A set of blast noise complaint risk criteria was developed by the Navy (Pater 1976, Pater et al. 2007) to guide decisions balancing the risk of noise complaints against the cost of canceling the training or testing activity. These criteria state that complaint risk is very low for peak levels below the 115 dB PK 15(met) contour and there is a high probability of receiving complaints at peak levels of 130 dB and higher. The DNL and PK 15(met) are used collectively to assess noise-related issues. DNL is utilized for land use compatibility and planning purposes and the PK 15(met) is used for determining the risk of complaints. The

Navy's complaint risk criteria were recently adopted by the Army as the best available interim blast noise management guidance (U.S. Army Regulation 200-1 2007).

The safe exposure limit for impulse noise in air as established by Navy Occupational Safety and Health Program (OPNAVINST 5100.23G 2005) is 140 dB. Hearing protection is required for any exposure noise decibel greater than 140 dB (DA PAM 40-501 U.S. Army 1998b). Army guidance establishes a hearing protection area of 300 m for a 2-lb shot and 500 m for a 10-lb shot (DA PAM 385-63 U.S. Army 2003).

Table 3-2. Noise zones for impulse noise sources defined in Army Regulation 200-1 (U.S. Army 2007).

Noise Zone Classification	Impulse Noise Sources C-Weighted DNL Range	Percent of Population Highly Annoyed	Acceptability for Noise-Sensitive Land Uses
Zone I	Up to 62 dBC	<15%	Acceptable
Zone II	62 to 70 dBC	15 to 39%	Normally Acceptable
Zone III	Over 70 dBC	>39%	Unacceptable

Notes:

- Noise from impulsive sources (such as armor, artillery, and demolition activities) is evaluated using C-weighted average day-night levels (DNL) reported as dBC.
- Noise-sensitive land uses include housing, schools, and medical facilities.
- Compatibility determinations for existing conditions and proposed actions should be supplemented by descriptions of projected noise increases and potential public reactions where:
  (1) the noise environment is determined by a few infrequent but very high level noise sources (such as blast events over 110 dB (C-weighted) sound exposure level);
  (2) single event noise levels from the proposed action are 10 dB or more than existing levels.

3.9.2 Affected Environment

The closest residences are military housing units along the shoreline of Kāneʻohe Bay, approximately 600 m southwest of the proposed explosives training range. The area is characterized by relatively low existing noise levels, except during periodic military aircraft overflights. Based on aircraft noise contours produced in the Air Installation Comparative Use Zone (AICUZ) study (Department of the Navy 2003) these residences are outside the lowest noise level with an associated risk of annoyance. Other noise sources within the area are onsite vehicular traffic and wind and ocean wave action.

3.9.3 Environmental Consequences of Noise

3.9.3.1 Alternative 1: Proposed Action – Construction and Use of an Explosives Training Range at Ulupaʻu Crater

This section briefly describes the methods used to assess noise impacts associated with the noise generated during the proposed training. Data required for munitions noise modeling was gathered from range operators and users. For all analyses, best available information was used as required by NEPA.

Two noise prediction metrics were evaluated: the C-weighted average day-night level (DNL) estimated during a 24-hour period, and the probable peak noise level (PK 15[met]) based on the largest (loudest) acceptable (resulting in less than 130 decibel peak [dBP]) size of explosive. The metrics were estimated using the predictive software BNOISE2, developed by ERDC-CERL to calculate noise levels. The model predicts noise levels statistically, and actual event levels may differ from predicted values by as much as 25 dB in either direction from the median level. The software includes consideration of type of weapon and ammunition, range attributes, weather, and assessment procedures and metrics. It also accounts for the effects of land-water boundaries and terrain.

Adverse noise impacts could include shaking, rattling, and structural damage to nearby residences. Additionally, an adverse noise impact could occur if peak noise levels were loud enough to cause annoyance to nearby residents and result in frequent noise complaints. Based on recommendations related to a high probability of complaints (Larry Pater personal comm. 2008), a peak acceptable level of 130 dB or less was established at the edge of the on-base residences. In keeping with guidance for noise Zone I (residential) (U.S. Army 2007), a DNL of 62-70 dB was also evaluated.

Using the BNOISE2 model, the largest charge that was predicted to result in less than 130 dBP at the residences was determined. This evaluation produced a maximum permissible charge size of 7.1 lb using a 1 m (3.3 ft) burial (Figure 3-3). While the 130 dBP contour is outside the residence area, many residences fall within the 115 dBP noise contour. The average of five shots of 7.1 lb charges combined with twenty-five 2.2-lb charges is shown in Figure 3-4, and the average DNL for ten separate 7.1-lb detonations is shown in Figure 3-5.

Noise control is typically achieved through a combination of management techniques including (1) adapting range hours to allow use only during times that are least likely to be objectionable, (2) locating the range so as to avoid sound sensitive locations, (3) using engineering techniques to control sound by reflecting, redirecting, absorbing, containing or isolating the sound, and (4) planting fast-growing vegetation that provides sound buffering capacity. Several of these mitigation measures would be applied and are described in Section 2.1.4 (*Mitigation Measures for Alternative 1*). Hearing protection would be worn by users of the range during all detonations and observation personnel would be positioned within or behind the bunker located approximately 100 m (330 ft) from the range.

3.9.3.2 Alternative 2: No Action

Under the no-action alternative the range would not be built and existing noise levels would not be changed.

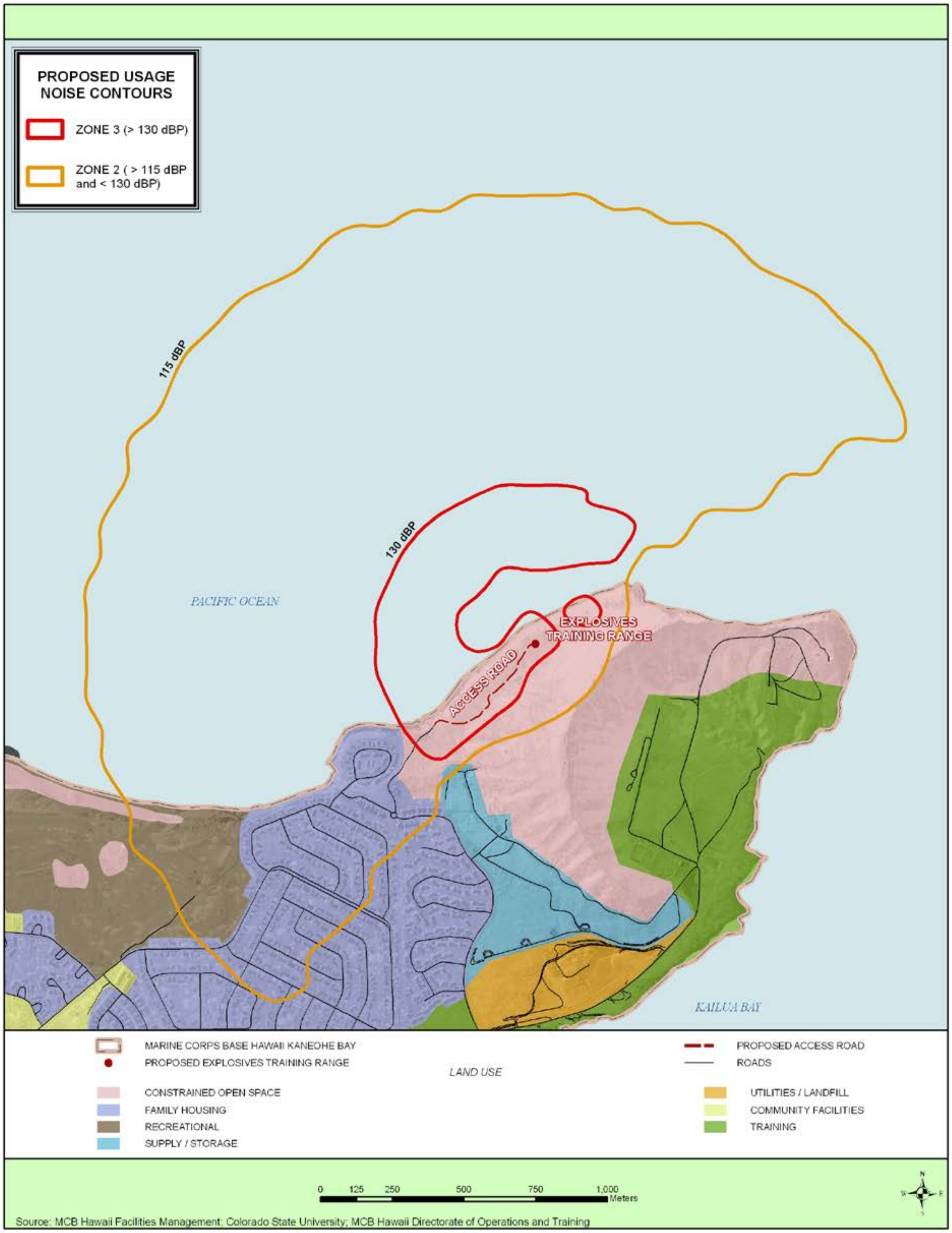

Figure 3-3. Peak atmospheric noise level (dBP) following detonation of a single 7.1-lb charge.

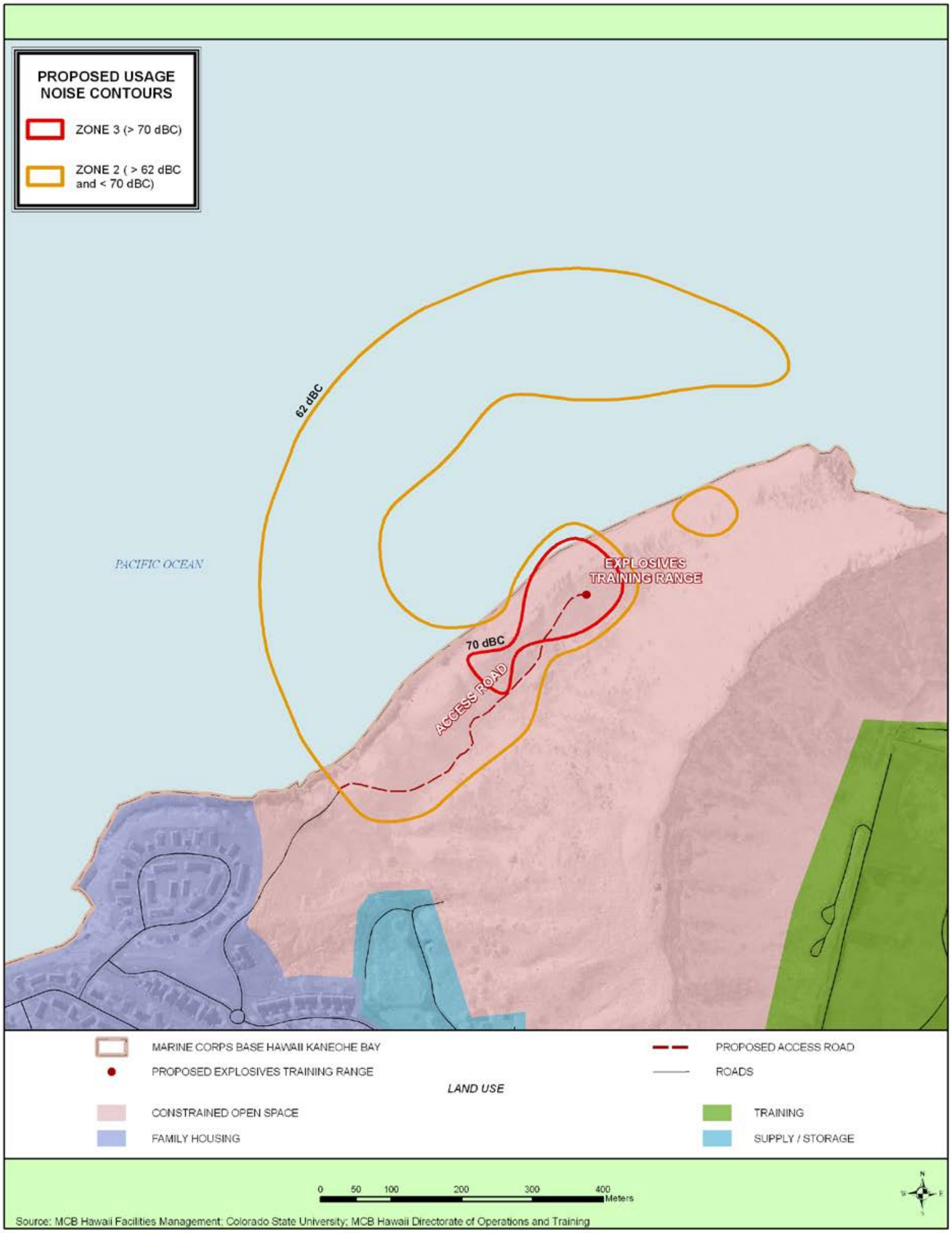

Figure 3-4. Average C-weighted day/night noise contours associated with detonation of five shots of 7.1-lb and twenty-five shots of 2.2-lb charges.

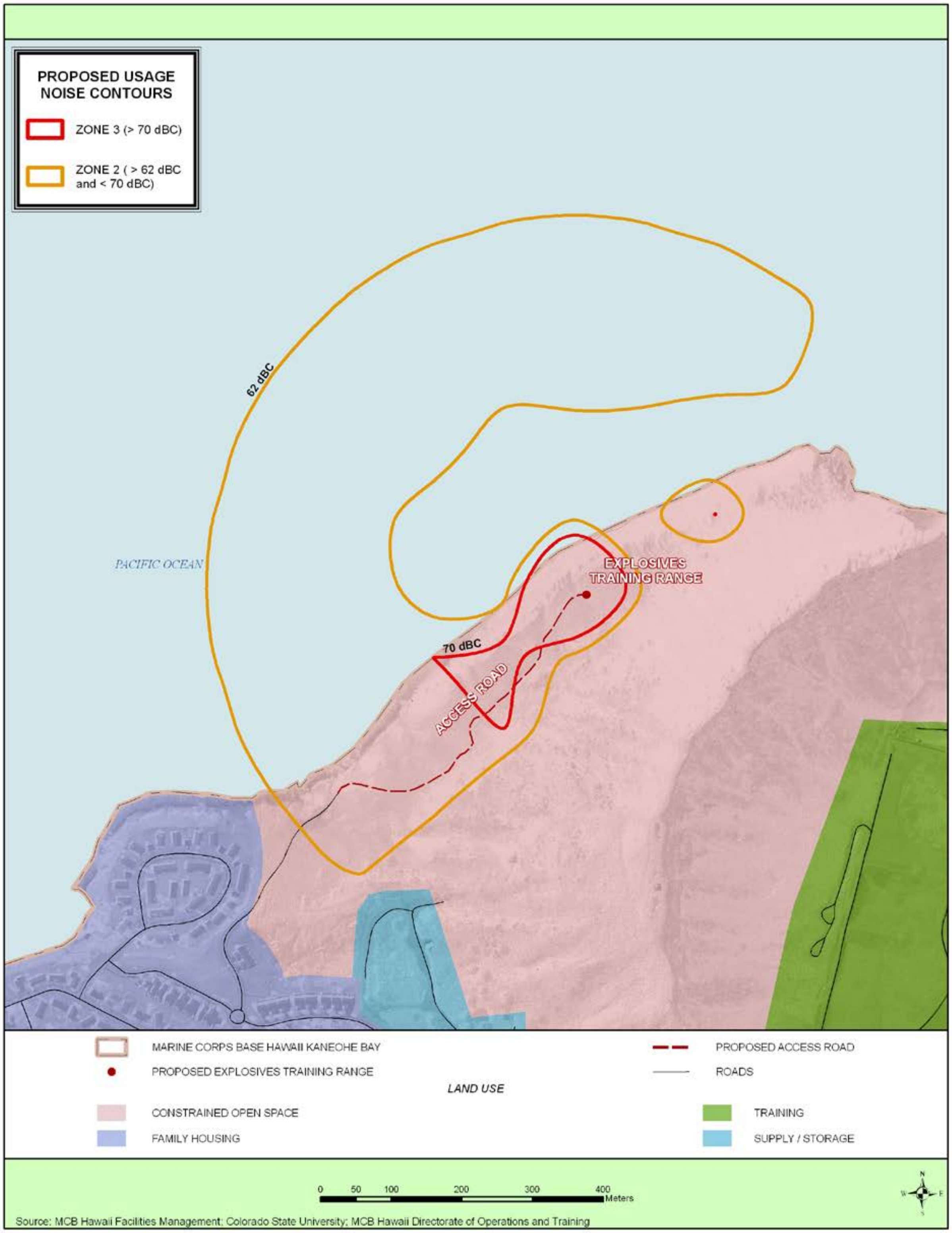

Figure 3-5. Average C-weighted day/night noise contours for ten 7.1-lb charges.

3.10 HAZARDOUS MATERIALS AND WASTE

Section 107 of the Federal Facilities Compliance Act of 1992 requires the U.S. Environmental Protection Agency (USEPA), in consultation with the Department of Defense and the states, to issue a rule identifying when conventional and chemical/military munitions become hazardous waste under the Resource Conservation and Recovery Act, and to provide for protective storage and transportation of that waste (as described in FM 5-250 (U.S. Army 1998a).The Military Munitions Rule (40 CFR, Part 266, Subpart M) clarifies when conventional and chemical/military munitions become a hazardous waste under the Resource Conservation and Recovery Act. The rule specifies that military munitions are not a solid waste for regulatory purposes when: 1) they are used for their intended purpose (training military personnel, research, development, testing, and evaluation) or are destroyed during range-clearance operations at active and inactive ranges; and 2) they have not been used or discharged (including their components), or are repaired, reused, recycled, reclaimed, disassembled, reconfigured, or otherwise subjected to materials recovery activities.

A consequence of military testing and training activities with munitions is the potential buildup of explosive compound residues on impact ranges, at firing points, and where explosives training and demolition operations are performed (Jenkins et al. 2006). The explosives residues frequently detected in surface soil samples from impact ranges are TNT, RDX, and HMX. In field detonations on snow where the primary charge was Comp B, the residues were primarily RDX and TNT with lesser amounts of NG, HMX, and DNTs. The study found a higher percentage of TNT was consumed upon detonation as compared to RDX or HMX. High-order (highly complete) detonations release very small amounts of material because the energetic compounds are essentially consumed completely in the explosion (Clausen et al. 2006). A field study of an impact area at an installation in Alaska concluded that properly functioning high explosives artillery leaves little residue (Walsh et al. 2001). The highest concentrations in soil are generally associated with low-order (incomplete) detonations. Residue sampled from seven Composition B-filled, fused 155-mm howitzer rounds, detonated using a C4 donor charge and the standard blow-in-place method at Eagle River Flats, Alaska (Pennington et al 2005) showed the detonations were all high order (>99.99 percent of filler consumed). The average mass of unreacted residues ranged between 0.0 and 1.7 mg for HMX (0.84 mg overall average), between 1.9 and 27 mg for RDX (14 mg average), and 0 mg for TNT. This suggests residues resulting from the blowing-in place of dud 155-mm HE rounds in impact ranges are small on a per-round basis, resulting in deposition rates in the milligram per kilogram range. Deposition rates would be much lower at the ETR.

Most military explosives are poisonous if ingested and would produce lethal gases if detonated in confined areas such as tunnels, caves, bunkers, and buildings. The USEPA classifies RDX as a possible human carcinogen; however no supporting data of the effects of RDX residues on humans are available. When ingested directly, RDX is toxic.

TNT is rapidly degraded in most soil and aquifer systems and, therefore, its presence is typically restricted to areas near its introduction to the environment. The major fate-and-transport processes for TNT in soil and groundwater are dissolution, adsorption, abiotic transformation, biotransformation, diffusion, advection, and hydrodynamic dispersion (Townsend and Myers 1996, McGrath 1995). Degradation to transformation products occurs sufficiently fast for TNT to be attenuated fully in the surface soil, thereby preventing contamination of the vadose zone or groundwater (Clausen et al. 2006).

RDX has a high affinity for organic matter (Maleh 2008), and has a low solubility in water, evaporating slowly from surface water. RDX degrades to nitrate, ammonia and formaldehyde in the environment, primarily by photolysis (1.1 to 12.5 day half-life) and hydrolysis (Shull et al. 1999).

3.10.1 Environmental Consequences of Hazardous Materials and Waste

3.10.1.1 Alternative 1: Proposed Action – Construction and Use of an Explosives Training Range at Ulupaʻu Crater

Detonation of explosives charges by themselves is typically an efficient process, with little residue (i.e., unexploded explosives) remaining. Previous studies and field experiments suggest little of the explosive material would remain to contaminate the soil in the detonation pits or to be dispersed from the site in the air. Sufficient time would be allowed for blast fumes, dust, and mists to clear before inspecting or occupying the blasting area.

The proposed range would only support explosives training using modern, highly efficient explosives. In general, detonations are very high order (i.e., virtually all of the explosive material combusts) and only very small quantities of residue are deposited on the soil surface. On military testing and training ranges, energetic residues are heterogeneously distributed on the ground surface as particles of various sizes, shapes, and compositions (Jenkins et al. 2001, Radtke et al. 2002, Taylor et al. 2004). Small amounts of explosives residues could accumulate in soil over a very long time and could be transported to Kāneʻohe Bay by runoff. However, steps would be taken during construction of the facility to prevent excessive runoff. The proposed action would not increase the risks associated with historic ordnance already exposed at the site. Therefore, the anticipated effects would be minor.

3.10.1.2 Alternative 2: No Action

Under no action, no additional material would be exploded on the northwest side of Ulupaʻu Crater, and the former explosives site would remain as it is currently. At this time, historic ordnance has been exposed by natural erosion processes and has been deposited downslope and onshore, as documented in the USFWS-led marine survey (USFWS 2008). The majority of the unexploded ordnance pieces are corroded and no longer contain explosives. Chemical or environmental hazards associated with the historic ordnance are unknown.

3.11 ENVIRONMENTAL COMPONENTS NOT EXAMINED IN DETAIL

The description of the affected environment focuses on variables that would be potentially affected if the proposed action or alternatives were implemented. The following issues were omitted from the detailed analysis: water quality, wetlands and floodplains, land use and recreation, public safety, socioeconomics and environmental justice, and wildland fire. These areas were deemed to be unaffected by implementation of the proposed action. The following sections describe variables not examined in detail.

3.11.1 Wetlands and Floodplains

No wetlands are present in the vicinity of the proposed action. No floodplains or flood hazard areas exist at Ulupaʻu Crater. Construction and activities described under the proposed action would not affect or alter the status or flow of floodways, drainage structures, or floodwaters.

3.11.2 Land Use and Recreation

Land uses would continue to be consistent with existing military land uses and military-related activities. The area offshore from Ulupaʻu is accessible by boat to the public and is used for recreational boating and fishing. Estimates of the amount of public use of the off-shore waters north of the Mōkapu Peninsula are not available. There is a 500-m (547-yd) security buffer zone extending offshore around the Mōkapu Peninsula. The surface danger zone for the proposed range would extend approximately 340 m (375 yd) from shore at its farthest extent, and would therefore not affect recreation access or recreational use outside the existing 500-m security zone. Visual aspects would remain consistent with existing conditions, although the access road, parking lots, and range facility may be visible from the ocean outside the 500-m (547 yd) buffer zone. Noise from explosive detonations would be audible for a significant distance from shore (reference Section

3.9). These intermittent noises may be louder than those affecting residences on shore due to the dynamics of noise travel over the ocean surface. The annoyance value might be lower or higher than the annoyance value experienced by residents on shore. Minor adverse impacts to recreation could therefore be associated with blast noise. Land use and visual aspects would be minimally affected under the proposed action.

The *MCB Hawaii Master Plan* (Department of the Navy 2006) provides a useful description of existing facilities, developmental constraints, and recommended land use. The MCB Hawaii Capital Improvements Plan (Department of the Navy 2006) provides an orderly strategy to satisfy existing facilities deficiencies. The plan is a primary tool to ensure compatibility of uses and for siting new projects. The proposed land use plan for the base generally retains the overall pattern of development that has evolved since the base was first established and incorporates the preservation of the limited open space available as dedicated training areas (Department of the Navy 2006). Therefore, in-depth analysis is not warranted.

3.11.3 Public Safety

The proposed action would occur within a secured area of MCB Hawaii that is not open to the public. There are no specific aspects of construction, operations, or maintenance that would create unique or extraordinary safety issues. All facilities would be contained within prescribed safety zones and would not endanger civilian populations. There should be no adverse effects to health from generation of hazardous materials because the proposed site is more than 500 m (1640 ft) from residential areas, explosives would be buried or contained in bunkers, no fragment-producing explosives would be used, air quality impacts would be short-term and limited to the immediate detonation location, and the site would be within a secured area that prohibits public access.

Military carriers are subject to regulations when transporting military explosives and other dangerous military materials. The transportation of explosives out to the ETR would adhere to AR 55-355 and minimum safety requirements outlined in *TM 9-1300-206 Ammunition and Explosives Hazards* (U.S. Army 1989). Mitigation measures to ensure public safety are described in Section 2.1.4.7.

3.11.4 Socioeconomics and Environmental Justice

The cost associated with the proposed alternative is not known, but the project would benefit local or regional workers and economies through purchase of materials and salaries. The proposed Ulupaʻu ETR is located on the northwestern tip of the peninsula, which provides a buffer between the non-military residential areas adjacent to the base. The proposed location is not located near any minority or low-income communities.

Although there may be short-term economic benefits associated with the project, the proposed action would not alter local employment patterns or population demographics. Reductions in travel currently required for explosives training might have minor local economic effects on transportation and services providers. Reduced travel associated with local training could reduce traffic associated with transporting troops to Schofield Barracks and other locations for explosives training.

3.11.5 Wildland Fire

Wildland fire risk would not increase significantly as a result of the proposed action. The increase in human traffic from none to up to 50 Marines per day, 100 days per year, would increase the possibility of an unintentional ignition from cigarettes or vehicles. This risk would be minimized by strict adherence to the training SOP which prohibits smoking in vegetated areas or in vehicles. Vehicles would be required to stay on paved or gravel surfaces at all times.

Fire risk from training usage would be negligible. None of the munitions proposed for use have a propensity for causing fires and they would be used in an area devoid of vegetation. Burial of explosives prior to detonation and use of a wood and steel-cutting bunker would keep hot fragments within the bermed range.

The berms would prevent any fragments that might escape the demo pit from falling into the vegetation while still hot enough to start a fire. For comparison, the demolitions range at Schofield Barracks Military Reservation has been in use for many years without a single documented fire, despite the wider variety of explosives and much larger charges authorized for use there.

Additionally, a Wildland fire Management Plan for MCB Hawaii Ranges is currently in development . This plan will incorporate and discuss fire prevention risks and procedures to be taken to reduce risk at a level of detail appropriate for this new range, prior to its development and implementation.

4.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVEABLE COMMITMENT OF RESOURCES

A cumulative effects analysis considers the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present and reasonably foreseeable further actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Assessing cumulative effects involves defining the scope of the other actions and their interrelationship with the proposed actions if they overlap in space and time. Cumulative effects are most likely to arise when a proposed action is related to other actions that could occur in the same location or at a similar time, however effects can also occur with actions across multiple locations and at different times. Actions geographically overlapping or close to the proposed actions would likely have more potential for a relationship than those farther away. Similarly, actions coinciding in time with the proposed actions could have a higher potential for cumulative effects.

To identify cumulative effects, the analysis addresses three questions:

1. Could affected resource areas of the proposed action interact with the affected resource areas of past, present and reasonably foreseeable actions?
2. If one or more of the affected resource areas of the proposed action and another action overlap, would the proposed action affect or be affected by impacts of the other action?
3. If such a relationship exists, are there any potentially significant impacts not identified when the proposed action is considered alone?

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the time in which the effects could occur. Actions not occurring in or near Ulupaʻu ETR are not considered in the analysis. Primary sources of this analysis were public documents prepared by MCB Hawaii and personal communication with MCB Hawaii personnel.

Past and present actions as well as reasonable foreseeable actions are shown in Table 4-1. Potential impacts to environmental variables associated with the actions are discussed below.

Table 4-1. Existing, recently constructed, and proposed/planned projects for MCB Hawaii Kaneohe Bay.

Project Location	Status	Description
MCB Hawaii Kaneohe Bay	In development	Integrated Wildland Fire Management Plan
MCB Hawaii Kaneohe Bay	Preliminary	Possible restationing of 1,800 Marines from Okinawa to MCB Hawaii Kaneohe Bay as early as 2014. Would involve increased range usage and maneuver activity, and construction of residential, operational, training, maintenance, and administrative facilities.
Ulupaʻu Crater	In progress	Grenade and shoot house construction
Ulupaʻu Crater	Environmental assessment in preparation	Range 1 conversion to unknown-distance range
Ulupaʻu Crater	Environmental assessment in preparation	Construction of three new unknown-distance square-bay ranges

Nonmilitary activities can also contribute to cumulative effects. These include public recreation, such as use of oceans and beaches, and other activities affecting MCB Hawaii lands such as construction projects. No planned projects affecting the project vicinity and environmental variables of interest are known.

4.1 CUMULATIVE EFFECTS BY ENVIRONMENTAL COMPONENT

4.1.1 Air Quality

The proposed action is not likely to add measurably to existing effects at the boundary of the facility due to the mitigation measures proposed and underground detonation of explosives.

4.1.2 Geology and Soils

Additional effects to soils may result from future reuse of Ulupaʻu Crater for demolition training, however, the proposed action is not likely to add measurably to existing effects due to the mitigation measures proposed, and the previously developed nature of the site.

4.1.3 Flora

Cumulative effects to vegetation from military land use can include impacts on federally listed species and their federally designated and critical habitats, impacts to sensitive species either by the loss or degradation of habitat, or by competition from non-native species in training areas (U.S. Army Corps of Engineers 2004). Reinstituting military use of the area would not increase the presence of non-native species and may reduce the abundance of non-native plants. The proposed action would have a very minor cumulative effect on flora present at the previously disturbed site. No endangered plant species are expected or known in the vicinity of the proposed action.

4.1.4 Fauna (terrestrial and marine)

Cumulative effects to terrestrial fauna from military land use can include impacts on federally listed species and their federally designated and critical habitats, impacts to sensitive species either by the loss or degradation of habitat or the spread and added competition from non-native species in training areas. The proposed action is not likely to contribute to cumulative impacts to fauna present at Ulupaʻu Crater. No threatened or endangered species are expected to be affected at the proposed action locations.

In the event a federally listed species is inadvertently encountered during use of the Ulupaʻu ETR, all activities in the area would be halted immediately, the sensitive areas would be protected from further damage, Range Control would be notified, and any damage caused would be reported. The MCB Hawaii Environmental Compliance and Protection Department would be contacted for advisement.

4.1.5 Reef Systems

The proposed action is not likely to add measurably to existing effects due to the mitigation measures and best management practices proposed. The proposed action may help reduce periodic sediment plumes in inshore areas due to better management of erosion and sediment-laden runoff. If conservation recommendations from Foster et al. (2008) are implemented, then abrading and scouring of adjacent reef systems may be reduced. While direct anthropogenic effects on reef systems may remain minimal or be reduced, the effects of natural and climate change-induced stresses in the long term are unknown.

4.1.6 Cultural and Archaeological Resources

The reconfiguration would take place within the confines of the preexisting Range area. No known archaeological sites would be affected by the activities. Archaeological monitoring of construction would minimize or eliminate impacts to cultural resources.

4.1.7 Noise

The Ulupaʻu ETR is removed from Kāneʻohe Bay's main residential areas. However, the re-opening of the range would result in associated noise during training. Predictions of noise levels on-base associated with the proposed explosive charges are below levels that would cause harm or are likely to result in noise complaints. No off-base residential areas would be adversely affected. Cumulative noise effects associated with the proposed action are therefore considered minor.

4.1.8 Hazardous Materials and Waste

The proposed range would only support explosives training using modern, highly efficient explosives. In general, detonations are very high order (i.e., virtually all of the explosive material combusts) and only very small quantities of residue would be deposited on the soil surface. Mitigation measures and best management practices would prevent transport of surface material to marine water. The proposed action would not be anticipated to add measurably to existing conditions at the site, and re-opening of the area would result in removal of some of the existing unexploded ordnance.

4.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

NEPA requires an analysis of significant, irreversible effects resulting from implementation of a proposed action. Resources that are irreversibly or irretrievably committed to a project are those that are typically used on a long-term or permanent basis; however, those used on a short-term basis that cannot be recovered (e.g., non-renewable resources) also are irretrievable. Irreversible commitments are those that cannot be reversed, except perhaps in the extreme long-term.

Most impacts associated with the proposed action would be short-term and temporary, or longer lasting but negligible. Implementation of the proposed action would result in the irreversible commitment and expenditure of human labor that could not then be expected in the service of other projects. These commitments of resources are neither unusual nor unexpected, given the nature of the action. Construction of the proposed facility could result in irreversible commitment of fuel for construction vehicles and equipment and irretrievable commitment of land. Construction would result in irreversible commitment and expenditure of human labor. However, the proposed action would not result in the destruction of environmental components such that the range of potential uses of the environment would be limited, nor would it significantly affect the biodiversity of the region.

4.3 CONCLUSION

Implementation of the proposed action would not result in significant unmitigable effects to any variables of environmental concern. Therefore, the proposed action, in conjunction with other actions on and in the vicinity of Ulupaʻu Crater, would not result in significant cumulative effects.

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Appendix A. Survey Report for Seabird Presence and Habitat Quality in the Area of the Proposed Explosives Training Range, Ulupaʻu Crater, Oʻahu.

Seabird Survey - Mokapu Peninsula, Marine Corps Base Kaneohe Bay, Hawaii

Final Report, 30 May 2008

Dr. Eric VanderWerf

Pacific Rim Conservation

3038 Oahu Avenue

Honolulu, HI 96822

ewerf@hawaii.rr.com

INTRODUCTION

This purpose of this project was to conduct a survey for seabirds and potential seabird nesting habitat in order to provide supporting documentation for an Environmental Assessment for a proposed explosives training range (ETR) on the north side of the Ulupa'u Crater on the Mokapu Peninsula, Marine Corps Base Kaneohe Bay, Hawaii (MCBH). The survey area encompassed most of the western and northwestern outer slopes of the remnant Ulupa'u crater from the shoreline to the crater rim, with specific attention to the vicinity of the proposed ETR site (Figure 1). Seabird species that potentially could nest in the area, especially along the shorelines, include Wedge-tailed Shearwater (*Puffinus pacificus*), Bulwer's Petrel (*Bulweria bulwerii*), Red-footed Booby (*Sula sula*), White-tailed Tropicbird (*Phaethon lepturus*), Red-tailed Tropicbird (*Phaethon rubricauda*), Black Noddy (*Anous minutus*), Brown Noddy (*Anous stolidus*), and White Tern (*Gygis alba*). These species have varying nesting habits, and nests could occur in a variety of locations, including burrows, rock cervices, rock ledges, tree branches, buildings or other man-made structures, or on the ground. The primary concern is that any seabirds using the vicinity might be injured or disturbed by the noise and percussion associated with the proposed explosives training range.

METHODS

With the assistance of MCBH range manager Dan Geltmacher, an escort of two Explosive Ordnance Demolition specialists was arranged for 23 May 2008 in order to safely access the survey area on foot. The survey was successfully completed on that date from 07:30 to 13:30 hrs by Dr. Eric VanderWerf and Todd Russell of the MCBH Environmental staff. The survey covered the entire shoreline area and portions of the lower and middle slopes on the outer side of Mokapu Crater (Figure 1). Waypoints along the survey route were taken with a GPS unit to provide a record of the area covered. Along the entire survey route an effort was made to search for burrows and nests in crevices, under rocks, and on overhung ledges. Other signs of seabird use were also searched for, such as droppings, footprints, eggshells, feathers, or bones. Survey effort was concentrated on the shoreline area and lower slopes immediately adjacent to the shoreline because that area contained the potentially most suitable seabird nesting habitat. The middle and upper slopes of the crater are covered in dense grass and brush that would make it difficult for seabirds to gain access, but an effort was made to survey the proposed ETR site and portions of the proposed access road. Binoculars were used to scan more distant areas on the upper slopes. Weather conditions were excellent during the survey, with few clouds and light winds, making it easy to see and hear birds. Seabird nests can sometimes be located by their distinctive fishy smell, and the light winds provided good conditions for detecting odors.

SURVEY RESULTS

One species of indigenous seabird, a single Black Noddy flying eastward along the shoreline, was observed during the survey at Mokapu Peninsula on 23 May 2008 (Table 1), but it did not land within the survey area. Potentially suitable nesting habitat for several seabird species was found within and adjacent to the survey area on Mokapu Peninsula, primarily along the shoreline on the northwestern edge of the survey area (see Figure 2 for an example of suitable habitat). These areas were searched thoroughly for any evidence of use by seabirds, such as burrows, droppings, footprints, feathers, bones, a fishy odor, and freshly disturbed soil, but no signs were observed. The presence of predators, such as feral cats (*Felis catus*), mongoose (*Herpestes auropunctatus*), and rats (*Rattus* spp.), which are common throughout Oahu, makes it unlikely that most seabirds will attempt to nest in the area unless predators are controlled. The middle and upper slopes, including the immediate area of the proposed ETR and the access road, are densely vegetated and the closely-spaced woody stems, particularly haole koa (*Leucaena leucocephala*), probably prevent seabirds from landing and moving around on the ground (see Figure 3 for an example of unsuitable habitat). Below is a brief discussion of potential nesting habitat for the species most likely to occur in the area. Information on nesting habits of seabirds was obtained from Harrison 1987, VanderWerf et al. 2007, and from personal experience.

Wedge-tailed Shearwater. This species nests in a variety of coastal locations, including burrows, rock crevices, and overhung rock ledges. Suitable soil for burrowing is present in some sites on the lowest portions of the slopes, and there are numerous rocks and eroded ledges that could also be used for nesting by shearwaters. Wedge-tailed Shearwaters are abundant on most the offshore islets of Oahu, and a colony of approximately 200 pairs is present on MCBH along the shoreline about 2.5 kilometers to the south of the survey area (USFWS 2002). This is the seabird most likely to nest in the survey area.

Bulwer's Petrel. This small seabird nests on some of the predator-free islets off the eastern coast of Oahu, but it is especially vulnerable to predation due to its small size, and it is unlikely to nest on Oahu itself, where there is an abundance of predators. It prefers rocky crevices that are too small for the larger Wedge-tailed Shearwaters to fit in. Near the tip of the peninsula there are a few areas with rock piles containing small crevices that are potentially suitable.

Red-footed Booby. There is a large Red-footed Booby nesting colony nearby on the eastern side of Mokapu Crater, where birds nest in kiawe (*Prosopis pallida*) and ironwood (*Casuarina*) trees and artificial nesting platforms built for them. The survey area contains some ironwood and other trees that might be suitable nest sites for Red-footed Boobies, though none were observed in the survey area.

White-tailed Tropicbird. This seabird nests on cliffs where it is safe from predators, including coastal cliffs and on steep mountainsides on most of the main Hawaiian Islands and on some offshore islets. Nests are difficult to see because they are usually concealed in a high rocky cave or ledge, but their presence is often revealed by white droppings below the nest, and by adult birds flying along the cliffs. The tip of Mokapu Peninsula contains steep, high cliffs that seem to be suitable nest sites for this species. A few lower cliffs are present along the western shoreline, but they are lower and thus possibly less suitable.

Red-tailed Tropicbird. There is a small nesting colony of this species in southeastern Oahu, and also one on Manana Island off the eastern coast of Oahu. In these areas Red-tailed Tropicbirds nest in small caves and on rocky ledges on cliffs and steep slopes, but elsewhere they also nest on the ground under vegetation. There are some small caves and overhung ledges on the northwestern shoreline of Mokapu Peninsula that are somewhat similar to nest sites elsewhere.

Black Noddy. This species nests on steep cliffs and in caves on several islets off the eastern coast of Oahu, including nearby Mokulea Islet and in a cave on the back side of Moku Manu. Black Noddies often forages in the Nuupia Ponds. They are not known to nest anywhere on MCBH, though potentially suitable nest sites are present on the steep cliffs on the northern face near the tip of Mokapu Peninsula.

Brown Noddy. This species nests in large numbers on Manana Island and Moku Manu, which is located just off the tip of Mokapu Peninsula. In these areas Brown Noddies nest on rocky ledges and nooks, but elsewhere they will nest on the ground or on low vegetation. Because they exhibit variation in nest location, a variety of areas may be suitable nest sites for this species, but because they nest in the open rather than in a cave or crevice it is unlikely they would nest anywhere on Oahu due to the abundance of introduced predators.

White Tern. Oahu is the only one of the main Hawaiian Islands that supports nesting White Terns, but they are restricted to urban and suburban areas around Honolulu and are not known to nest on the windward side (VanderWerf 2003). On Oahu this species nests primarily in large trees, but it will also nest on cliffs and on buildings and other man-made structures. The population of White Terns is growing on Oahu (VanderWerf 2003), and it is possible that the distribution may expand, though there is no reason to expect that MCBH in particular will be colonized any time soon.

Three other indigenous bird species were observed along the shoreline during the survey; a single adult Black-crowned Night-heron (*Nycticorax nycticorax*), a single Pacific Golden-Plover (*Pluvialis fulva*), and two Ruddy Turnstones (*Arenaria interpres*). The Black-crowned Night-heron is a common resident in the Hawaiian Islands, and forages and nests in a variety of sites near water. They are common at MCBH, with birds frequently sighted around the Nuupia Ponds. The Pacific Golden-Plover and Ruddy Turnstone are migratory shorebirds that visit the Hawaiian Islands during their non-breeding season, usually from August to April. By May most individuals of these species have returned to arctic breeding areas, but a few individuals remain in Hawaii during the summer, and these are often young birds that are not yet prepared to migrate north and nest. Larger numbers of these shorebirds likely use the shoreline area for foraging during the winter months, but none are expected to nest anywhere in the Hawaiian Islands.

Table 1. Summary of seabirds observed and presence of potential seabird nesting habitat on Mokpau Peninsula, Marine Corps Base Kaneohe Bay, Hawaii, on 23 May 2008.

Species	Number observed	Evidence of nesting observed?	Potential Nesting Habitat Present?
Wedge-tailed Shearwater	0	No	Yes
Bulwer's Petrel	0	No	Possible
Red-footed Booby	0	No	Yes
White-tailed Tropicbird	0	No	Yes
Red-tailed Tropicbird	0	No	Yes
Black Noddy	1	No	Yes
Brown Noddy	0	No	Possible
White Tern	0	No	Possible

A variety of alien bird species were also observed in the area during the survey:

Spotted Dove (*Streptopelia chinensis*)
Zebra Dove (*Geopelia striata*)
Barn Owl (*Tyto alba*) – roost only
Red-vented Bulbul (*Pycnonotus cafer*)
White-rumped Shama (*Copsychus malabaricus*)
Common Myna (*Acridotheres tristis*)
Japanese White-eye (*Zosterops japonicus*)
Northern Cardinal (*Cardinalis cardinalis*)

House Finch (*Carpodacus mexicanus*)
Common Waxbill (*Estrilda astrild*)
Nutmeg Mannikin (*Lonchura punctulata*)
Red Avadavat (*Amandava amandava*)

An apparent Barn Owl roost was observed in an overhung rock cleft near the northern tip of the point. No owl was present during the survey, but several rocks were covered in large white bird droppings, and below the rocks there were decomposing owl pellets and many loose bones (Figure 4). The vast majority of bones were from rodents, probably rats (*Rattus* spp.), but at least one bird skull was present, and appeared to be from a Spotted Dove. Barn Owls are known to be predators on a variety of seabirds in Hawaii (VanderWerf et al. 2007). The site was not disturbed in case there is interest in excavating the site in the future to investigate the prey of Barn Owls in the area.

PREVIOUS SURVEYS

There has been only one previous survey in the area for seabirds and other native bird species, conducted on 2 September 2004 by biologists from the U.S. Fish and Wildlife Service under contract from the U.S. Marine Corps. That survey was focused primarily on the marine environment and covered only the shoreline area, not the slopes where the proposed ETR is located. No seabirds or evidence of nesting by seabirds was found during that survey. It did not involve an assessment of potential seabird nesting habitat.

SUMMARY AND CONCLUSIONS

The only seabird observed during the survey was a single Black Noddy flying along the shoreline, but it did not land within the survey area. Three other species of indigenous birds were observed foraging within the survey area, a Black-crowned Night-heron, a Pacific Golden-plover, and two Ruddy Turnstones, but none of these species are expected to nest in the area. There is potential nesting habitat for several seabird species within the survey area, primarily among rocks just above the shoreline and on the more open lower slopes and coastal cliffs. However, the presence of predators, such as feral cats, mongoose, and rats, makes it unlikely that most seabirds will attempt to nest in the area. The middle and upper slopes, including the immediate area of the proposed ETR and the access road, are densely vegetated and the closely-spaced woody stems probably prevent seabirds from landing and moving around on the ground.

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Appendix B. Correspondence in Support of Historic and Cultural Resources Review

- National Historic Preservation Act Section 106 Review – Concurrence with Determination
- Cultural Consultation Letter Sent to Native Hawaiian Organization Claimants

National Historic Preservation Act Section 106 Review – Concurrence with Determination

9/10

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESEERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

September 13, 2009

Major D. M. Hudock
Director, Environmental Compliance and Protection Department
United States Marine Corps
Marine Corps Base Hawaii
Box 63002
Kaneohe Bay, Hawaii 96863-3002

LOG NO: 2009.3860
DOC NO: 0909NM12

Dear Major Hudock:

SUBJECT: **Section 106 (NHPA) Consultation**
Development of an Explosive Training Range (ETR) on the outer slope at Ulupau Crater
Marine Corps Base Hawaii,
Kaneohe *Ahupua'a*, Ko'olaupoki District, Island of O'ahu
TMK: (1)-4-4-09:003

Thank you for your submittal of September 1, 2009. There are no known archaeological resources located adjacent to the project area at slopes of Ulupau Crater and the ETA site 18 was previously used in the 1950s-60s but lacks integrity to be determined an historic site. The SHPD concurs with the Marine Corps' determination of **no historic properties affected** for the proposed undertaking.

Should you have any additional questions or concerns please do not hesitate to contact me, at 692-8015.

Sincerely,

Nancy McMahon
Deputy State Historic Preservation Officer

Cultural Consultation Letter Sent to Native Hawaiian Organization Claimants[2]

UNITED STATES MARINE CORPS
MARINE CORPS BASE HAWAII
BOX 63002 KANEOHE BAY, HAWAII 96863-3002

IN REPLY REFER TO:
5090
Ser LE/295-09
2 SEP 2009

XXXXXXXXXXX
XXXXXXXXXXXXXX
XXXXXXXXXXXXXX
XXXXXXXXXXXXXXXX

RE: Section 106, Marine Corps Base Hawaii
Development of an explosives training range at Marine Corps Base Hawaii, on the island of O'ahu, Ahupuaa of Kaneohe, TMK 1-4-4-09:003.

Dear Mr. XXXXXX

Marine Corps Base (MCB) Hawaii is consulting with your family in compliance with Section 106 of the National Historic Preservation Act regarding the proposed project to develop an explosive training range at Marine Corps Base (MCB) Hawaii. This letter initiates our Section 106 consultation for this project.

Project Description

The site for the proposed explosives training range (ETR) is on the northwestern (outer) slope of Ulupau Crater on the Mokapu Peninsula [Enclosures 1 and 2]. The proposed range would be used for to train Marines in the safe handling and use of explosives. The term "explosives training" is generally synonymous with demolitions training. Primary objectives include basic explosives detonation and use of explosive charges to cut timber and steel. Demolition of unexploded ordnance is not part of the proposed action.

The facility would consist of a main parking lot, a small upper parking lot, an access road, a safety bunker, and a bermed range enclosing three demolition pits [Enclosure 3]. Outdoor lighting may be installed at the facility and in parking areas. All lighting would have downward shades to minimize aesthetic and biological effects (e.g., attractive nuisance to seabirds). The proposed ETR range would be accessed via a new unpaved road that follows the general route of an existing unpaved road that extends from the gated end of Uli Street off Daly Road near the edge of a family housing area.

The area for the proposed ETR was used in the late 1950s and 1960s as a detonation site with a rocket range (3.5-inch hand-fired rockets), a hand grenade range, and a small arms munitions incinerator. The old detonation site is sometimes referred to as "Site 18" following an installation remediation site inventory performed in 1984 (Department of the Navy 1984).

Identification of Historic Property

The proposed project to develop an explosive training range on the back side of Ulupau Crater is located within a low archaeological sensitivity area and no traditional Hawaiian or historic archaeological sites or materials are known to be located within the proposed project area (U.S. Army Corps of Engineers 2006:Fig. B-1). The project area falls within Anderson's (1996) Survey Area 2, which included areas accessible by the "cutback" road presumably used to access the hand-fired rocket range that existed in the late 1950s and early 1960s. This same road approximates the alignment of the proposed access road. Anderson indicated that, "it was apparent that the majority of this survey area has been

[2] The list of NHO claimants contacted and enclosures are on file at MCB Hawaii Environmental Compliance and Protection Department, Kaneohe Bay, Hawaii

5090
Ser LE/295-08
2 SEP 2009

utilized and modified extensively by military activities" (1996:23). There are no known historic properties within the boundaries of the proposed ETR project area.

In addition, no historic buildings or structures have been identified within the proposed ETR project area. Although the former hand-fired rocket range is more than 50 years old, it lacks the criteria necessary to be eligible for the National Register of Historic Places (NRHP).

Area of Potential Effect

The area of potential effect (APE) has been determined to include the access road, main parking lot, upper parking lot, safety bunker, and explosive training range on the northwestern slope of Ulupau Crater aboard MCB Hawaii.

Determination of Affect

Based on the proposed project to develop an ETR on the northwestern slope of Ulupau Crater aboard MCB Hawaii, it is our determination that this undertaking will result in no historic properties affected in accordance with Section 106 Implementing Regulations at 36 CFR 800.4(d)(1) due to the following: 1) the proposed project area is located in a low archaeological sensitivity area that was archaeologically surveyed in the late 1990s (Anderson 1996); and 2) the proposed ETR was previously used as a detonation site in the late 1950s and 1960s.

We request your review and comments for the proposed project. Please provide comments within 30 days of receipt of this letter. A Section 106 letter about this project is being sent simultaneously to the following claimants: Diamond 'Ohana, Ortiz 'Ohana, Ka Lahui Hawaii, Paguyo 'Ohana, Prince Kuhio Hawaiian Civic Club, Boyd 'Ohana, Paoa Kea Lono 'Ohana, Office Of Hawaiian Affairs, Kekumano 'Ohana, Kekoolani 'Ohana, Oahu Island Burial Council, Koolauloa Hawaiian Civic Club, Hui Malama I Na Kupuna O Hawaii Nei, Temple Of Lono, and Olds 'Ohana.

Should you or your family have any questions or concerns please contact the MCB Hawaii Cultural Resources Management staff, Ms. June Cleghorn at 257-6920 extension 77 or via email at june.cleghorn@usmc.mil or Ms. Coral Rasmussen at 257-6920 extension 84 or via email at coral.rasmussen@usmc.mil.

Sincerely,

D. M. HUDOCK
Major, U. S. Marine Corps
Director, Environmental Compliance and
Protection Department
By direction of the Commanding Officer

5090
Ser LE/295-08
2 SEP 2009

Enclosures:

(1) Location of proposed Explosives Training Range (ETR) aboard MCB Hawaii.
(2) Location of the proposed action on MCB Hawaii.
(3) Layout of proposed explosives training range showing the access road, parking areas, and safety bunker.

References:

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SRGII
2005 *Erosion Control Design/Instructions for Range Berms Within Ulupa'u Crater*. Prepared for Environmental Compliance and Protection Department, Marine Corps Base Hawaii through the Naval Facilities Engineering Services Center.

U.S. Army Corps of Engineers
2006 *Integrated Cultural Resources Management Plan (ICRMP), Marine Corps Base Hawaii, O'ahu, Hawai'i.* Prepared for Installation Commander, Marine Corps Base Hawaii. U.S. Army Corps of Engineers, Honolulu Engineer District, Fort Shafter, Hawai'i.

Appendix C. Coastal Zone Management Correspondence and Determination

UNITED STATES MARINE CORPS
MARINE CORPS BASE HAWAII
BOX 63002 KANEOHE BAY, HAWAII 96863-3002

IN REPLY REFER TO:
5090
Ser LE/401
29 Nov 2010

MEMORANDUM

To: FILE – Construction of an Explosives Training Range at Ulupa'u Crater, Marine Corps Base Hawaii, Kaneohe Bay

From: Marine Corps Base (MCB) Hawaii

Subj: **DE MINIMIS ACTIVITIES WITHIN THE STATE COASTAL ZONE MANAGEMENT AREA**

Marine Corps Base Hawaii proposes to develop an explosives training range (ETR) and access road on the northwestern (outer) side of Ulupa'u Crater on Mokapu Peninsula, Kane'ohe Bay, O'ahu. The proposed ETR will be located in an area formerly occupied by a munitions detonation pit adjacent to a 3.5 inch rocket and hand-grenade range. The ranges have been inactive since the 1960'/1970's.

An Environmental Assessment (EA) was prepared for the proposed action. Construction and use of the ETR and access road would not alter the range surface danger zones (SDZ) and noise contours of the Ulupa'u RTF within Ulupa'u Crater, where explosives training is currently conducted. The EA determined there would be no significant impacts to cultural resources, geology and soils, flora and fauna, or water and air quality. Range SOPs which ensure environmental protection and safety will be implemented.

Pursuant to the Navy/Marine Corps De Minimis Activities under the Coastal Zone Management Act (CZMA), the proposed project is classified as a de minimis activity under the Proposed Action 1 - New Construction. The project will have insignificant direct or indirect effects on any use or resource of the State of Hawaii coastal zone. Therefore the project is categorized as de minimis in accordance with the Department of Commerce, National Oceanic and Atmospheric Administration, CZMA Federal Consistency Regulations 15 CFR part 930.33 (3). With the implementation and compliance with identified mitigation and conditions, the project is exempt from a negative determination or a consistency determination and is not subject to further review by the Hawaii CZM program.

D. R. GEORGE
Captain, U. S. Marine Corps
Director, Environmental Compliance
And Protection Department
By direction of the Commanding Officer