Final Environmental Protection Plan

Unexploded Ordnance (UXO) Model Cleanup
Kaho'olawe Island, Hawaii

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1.0 GENERAL INTRODUCTION

1.1 Purpose of Plan

The purpose of this Model UXO Cleanup Project is to conduct an unexploded ordnance (UXO) cleanup of a limited area on the island of Kaho'olawe in order to model:

- UXO cleanup procedures and technologies
- Coordination of UXO Cleanup
- Cleanup related protection of historical, cultural, and religious (HCR) sites
- Environmental protection efforts in areas affected by UXO cleanup

The Memorandum of Understanding (MOU) between the U. S. Navy and the State of Hawaii provides for commencement of a cleanup prior to completion of the land use plan, with the agreement of both parties. The areas included in the model cleanup are those which the Navy and the Kaho'olawe Island Reserve Commission (KIRC) jointly selected. Generally, the areas are those visited by the Protect Kaho'olawe Ohana (PKO) during religious and cultural accesses. A primary purpose of the model is to reduce the risk of bodily harm posed by the potential presence of unexploded ordnance to those accessing the island for cultural and religious purposes. Additional areas may be proposed by either the KIRC or Navy for future inclusion by joint agreement.

The purpose of this plan is to provide guidance to workers for the protection of environment and the historic, cultural, religious, and natural resources of Kaho'olawe Island and to limit impacts from the Model UXO cleanup operational phase to these resources. In addition, all personnel will utilize procedures and actions that will maintain the island's spirituality and enhance the restoration of the Islands environment.

1.2 Philosophy

The philosophy behind the development of this plan is rooted in the National Historic Preservation Act of 1966, Executive Order No. 11593. During 1990, the United States Navy, Protect Kaho`olawe `Ohana, and the County of Maui joined forces and moved forward to formalize a strategy for the Environmental Protection and Cultural and National Resource Management of the Island's water and land areas. The philosophy behind the strategy focuses on three main goals; removal of ordnance, preservation of cultural and religious areas combined with managed restoration and development of lands and education centers.

2.0 APPLICABLE REGULATIONS

The Model UXO Cleanup Project is also a pilot project to test the feasibility and effectiveness of utilizing a variety of procedures and technologies which can be implemented in the Omnibus UXO Cleanup. The KIRC and the Navy have agreed that the substantive requirements listed in Section 3.B of the Model Action Plan will be followed in the performance of the Model UXO Cleanup Project.

Other regulations include the Marine Mammals Protection Act, Endangered Species Act, National Historic Preservation Act of 1966, American Indian Religious Freedom Act, Archaeological Reservation Protection Act of 1979, Native American Graves Protection and Repatriation Act of 1990, and Chapter 6E of Hawaii Revised Statutes.

Guidance for the Model UXO Cleanup Project is the Memorandum of Understanding (MOU) between the United States Department of the Navy and the State of Hawaii concerning the island of Kaho'olawe, Hawaii as recorded with the State of Hawaii Bureau of Conveyances on 06 May 1994 as Document No. 94-075038 (MOU) in general describes a cleanup based on land uses identified by the Kaho'olawe Island Reserve Commission (KIRC) on behalf of the State. The MOU provides for commencement of a cleanup prior to completion of a State land use plan with the agreement of the State of Hawaii and the Navy. At a public meeting of May 18, 1995, the KIRC, on behalf of the State voted unanimously to approve the Hakioawa Model UXO Cleanup Project as described in the 'Model UXO Clearance Project' proposal dated May 2, 1995. The Navy and KIRC have agreed to proceed with this model effort in a collaborative manner.

3.0 PROJECT OVERVIEW

The island of Kaho'olawe has been recognized as a *wahi pana* and a *pu'uhonua*- a special place with unique and important cultural, archaeological, historical, and environmental resources of local, national, and international significance. The island's archaeological and historic resources are valuable treasures that provide insight into the island and its inhabitants past.

Kaho'olawe is an island. As such, its environment is fragile and sensitive to change. Changes have affected the island with ever increasing speed. First was the arrival of Polynesian voyagers, perhaps 1,000 years later, by voyagers from the East. In the later half of the 19th century, goats and other ungulates were introduced to the island as well as new plant species. Over the last two hundred years, man's activities on the island played a significant role in changing the landscape of this delicate environment. The processes involved with the UXO cleanup of Kaho'olawe will add another chapter of man's effect upon the natural environment.

On March 18, 1981, the entire island of Kaho'olawe was placed on the National Register of Historic Places because of its archaeological, cultural, and historic significance. It is the only entire island currently on the Register. Kaho'olawe's numerous unique and significant items include the well-preserved remains of settlements, religious and burial sites, petroglyph, numerous fishing shrines, and the states second largest ancient Hawaiian stone tool quarry site. Because of the island's listing on the National Historic Register, compliance with the provision of the State of Hawaii Historic Preservation Office will be followed as well as consultation with the Navy's archaeologist.

The protection of Kaho'olawe's historical and archaeological properties, cultural sites and natural resources is a extremely important concern to the overall scope of this project. Ensuring the continued protection of such resources during all stages of operation is considered an integrated step

of the UXO cleanup process. The extent of this protection plan includes guidance to protect and preserve Kaho'olawe's cultural, archaeological, biological and natural resources. Crucial to implementing this plan is the interface among the State, Navy and contractors to properly identify the island's fragile resources and evaluate the impact of each phase of work prior to conducting operations.

Activities to be conducted during the Model UXO Project will use **extreme care** to protect and minimize potential adverse impact to the environment and the historical and archaeological properties and cultural sites of the island. Upon completion of UXO removal and disposal, actions will be taken to minimize further damage to the environment created by the cleanup process.

3.1 Definitions

A "Site" is defined as a specific archaeological site as defined in the listings of the National Historic Register for the island of Kaho'olawe. A "Feature" is a specific archaeological object, structure or group of structures within a site. An area is defined as an arbitrarily selected geographic locality where UXO sweeps and disposal will be conducted.

An archaeological director and field archaeologist are defined as holding specific qualifications in accordance with Navy specifications. Specifications to be provided by the Navy. The Cultural Resources Team includes archeologists, cultural monitors, botanists, and biologists. Resumes included as attachment 1.

Natural resources include the flora and fauna of the area as well as the geological resources and cultural landscape.

Review Board is defined as consisting of an archaeologist, Natural Resource Specialist, UXO Supervisor, KIRC Culturalist and NTR as defined in Annex A.

3.2 Operations Concept

The integration of the Cultural Resources Team within each phase of the UXO cleanup process is a key element of the operation concept envisioned for this project. The protection of Kaho`olawe's cultural resources is integrated into the Model UXO Cleanup Plan (Annex A). The following section summarizes the concept of the UXO clearance procedure as it relates to the protection and preservation of Kaho'olawe's historical and archaeological properties, cultural sites and natural resources. Specific KIRC concerns for archaeological site protection in the context of UXO cleanup action can be found in the Site Protection Procedure of the KIRC, Section IV. The Site Protection Procedures of the KIRC have been reviewed by OHM and guidance from this document was used to develop these procedures. The procedure described here and in the Site Protection Procedure of the KIRC is intended to occur before any intrusive activities conducted by OHM including improvements of the Hanakanai'a base camp area. The delicateness of the island's environment and the cultural and historical significance of this island are emphasized during operations. Daily

operations will start with an appropriate cultural protocol, the morning 'pule', gathering or prayer.

3.2.1 Pre-investigation

The remediation process begins with a documentation review of the area to anticipate potential problem areas and to evaluate the cultural, archaeological and natural resources and potential UXO expected in the area of concern. During this phase the area will be defined and grids established on paper for actual establishment during the assessment phase. A packet of information will be assembled that includes; land use designation, cultural file search, archaeological file search, natural resource file search, potential and expected UXO data, and data coordination. These packets will be used during a pre-area coordination meeting and the area assessment to gain a comprehensive view of the area to be assessed.

3.2.2 "Kahea"

Based upon the determination of the KIRC, an appropriate cultural protocol may need to be conducted to open the area for an initial area walk through by an area assessment team.

3.2.3 Area Assessment

Upon completion of the above steps, the area will be field investigated by an area assessment team that consist of a UXO Supervisor, archaeologist, natural resource specialists, KIRC Culturalist and survey personnel. Prior to entering the area of assessment, an archaeological briefing concerning site protection will be given by the field archaeologist. The KIRC cultural monitor may provide a cultural briefing if appropriate. The area assessment team will then conduct reconnaissance and identify cultural, historical, religious, archaeological and environmental resources and potential UXO, if any, in the area. The survey personnel will establish the grid system previously designed on paper during the pre-investigation phase. The UXO Supervisor will evaluate the level and potential of UXO in the area and in conjunction with the rest of the team make recommendations to type of sweep preparation needed to prepare the area for the UXO sweeps (i.e., brush pruning, grass cutting). Notes, still photographs and video may be used to document these conditions. Any archaeological sites/features found in the area will be documented and located to the land survey specification of Annex C, Survey and Mapping Plan. Natural resources will be documented and any threaten or endangered species found in the area will be documented and located, as requested by the KIRC, per survey specifications of the Annex C. Cultural resources will be documents and located per survey specifications of Annex C. These documents, in addition to the pre-investigation packet will be passed to the Review Board, as defined in Section 3.1. If the assessment team evaluates that specific regions within the assessed area need further discussion or review, these regions may be bordered off with flagging tape, and the remaining area recommended to the Review Board as available for cleanup operations.

3.2.4 Review Board

The Review Board will review the results of the area assessment, discuss options for resolving any

problems, issues, or constraints and develop specific plans for carrying out ordnance sweeps. Logistic requirements for follow-on work will be discussed during these sessions. A review of the logistics aspect of the sweep and their potential impact on archaeological sites will also be made. Sites that require further discussion by the Review Board will be cordoned off and access restricted to these sites until a determination by the Review Board can be reached. If a resolution cannot be reached by the Review Board, this issue will be passed to a higher authority for discussions between the Navy and the KIRC. Areas where the UXO sweep operation will have no impact to any archaeological or historical properties, cultural site or natural resource as determined by Review Board will be turned over to field crews to conduct cleanup. The Review Board will evaluate the sensitivity of the site and determine allowed activities within this site for cleanup work. Specific HCR concerns within an area may require an additional cultural protocol, 'noa', to get permission to do intrusive work within a specific locality as specified by the KIRC. The remaining portion of the assessed area will be available for cleanup work. The Review Board will also pass to the Site Preparation crews a list of site preparation allowed in that specific area or grid and the type of additional monitoring (I. e. archaeological or cultural) required, if any. Additionally, the Review Board may stipulate special cleanup procedures.

3.2.5 Pre-sweep Preparation

Upon receiving the appropriate authorization to proceed, the area will be prepared for UXO sweeps by selective brush trimming to allow access to the area by surface and subsurface sweep personnel and equipment. Prior to personnel entering an area, an appropriate cultural protocol, as determined by the KIRC, will be conducted to allow work in the area. During the pre-sweep preparation phase additional monitoring by an archaeologist or cultural monitor, as previously determined by the Review Board, may be required in specific localities to ensure that the integrity of the sensitive historical and archaeological properties and cultural sites in the area are preserved in accordance with historic preservation law and cultural protocol. The monitors will also identify and locate any new archaeological or cultural features not found during the field assessment. Some areas without archaeological or cultural features and determined as not having any potential features may be an example of an area designated as not requiring archaeological or cultural monitoring. Upon completion of the pre-sweep preparation, a quick area assessment will determine if anything new is found. If anything new is found, a second area assessment and review meeting will be held before turning the area over to the sweep phase. If nothing new is found, then the area will be turned over to the sweep phase.

3.2.6 Surface UXO Sweep Phase

Surface UXO operations will be conducted in accordance with procedures described in Annex A, UXO Cleanup Plan. Archaeological and/or cultural monitors may be required during the sweeps based upon the Review Board's determination. Upon location of a surface UXO item during the sweep phase, a determination by UXO personnel will be made if the item is safe to move. If not, alternative options such as Blow in Place (BIP) or isolation the area will be evaluated. If a BIP is authorized in or near an archaeological site and an archaeological feature is potentially impacted,

protective works or a data recovery of the feature may be utilized. This determination will be made by the Review Board. If BIP is not allowed, then fencing and leave in place may be an alternative to protect people from the UXO hazard. Specific details on the UXO disposal procedures are found in Annex A.

3.2.7 Subsurface UXO Operation

Subsurface UXO sweeps will be conducted in accordance with Annex A, UXO cleanup Plan. Upon location of a potential subsurface UXO item, an evaluation by the Review Board and the Anomaly Review Board will be made prior to an excavation decision if the area has been previously determined to have no impact to any archaeological and historical properties, cultural site or natural resources. If an item is found to have an impact by the Review Board, steps approved by the Review Board will be taken to protect or record the site as summarized in Section 4.2, Archaeological and Cultural Site Protection and described in the Site Protection Procedures of the KIRC. A similar evaluation will be necessary if the determination is made that the item is unsafe for removal and requires in place disposal. Additional measures may be implemented for the protection of significant features in the vicinity of the disposal operation. During the excavation phase, if required by the Review Board, an archaeologist may be made available to investigate any discoveries found during excavation. Subsurface testing for site discovery as described in the Site Protection Procedure of the KIRC, Section III.B, may be required by the Review Board for any subsurface disturbance planned for an area during the cleanup and restorations actions and have a high probability of unrecorded subsurface sites. This testing should be conducted prior to the disturbance. This may be an addition to his current assigned duties. All decisions will be documented.

Upon completion of UXO remediation within an area, KIRC may determine an appropriate cultural protocol, 'pani', to close the site.

3.2.8 Reporting Requirements

Records of Area Assessment will include: location and limits (UTM); work area (M.A.P.) designation; previously recorded and newly identified HCR's within the search area; topography, texture and overgrowth characteristics; and other assessment results.

In addition, records will include: HCR location(s) (UTM), archaeological site number(s) for previously recorded sites, updated evaluation data for existing sites, record of new assessment data for unrecorded sites/features, and assessment of potential for buried deposits. The HCR protection measures accomplished for each site, if any, should be recorded.

Identify and record any threaten or endangered flora and fauna encountered during the Model Cleanup Project. Record protection or mitigation measures, if any.

Record all modifications to or adaptations of Cultural Protocols, if appropriate.

Record of UXO disposition.

All data will be submitted in form as requested by the Government. All archaeological work conducted on the island will include appropriate reports of professional quality that meets, at a minimum, the guidelines of the SHPD.

4.0 CULTURAL RESOURCES IMPACTS

The cleanup involves site preparation, brush removal, surface and subsurface UXO sweeps, and UXO removal and disposal. Generally, each step of this process could prove to be intrusive to the environment and the archaeological and historical properties and cultural sites. The physical presence of the work force in specific areas can also cause an impact on the island's resources. Walking, driving vehicles and equipment, dragging debris and any other evolution that disturb the surface of an archaeological or cultural site could cause an adverse impact to that site that would lessen the feature's cultural, religious, or archaeological importance. Care will be taken to avoid walking or driving over archaeological or cultural sites. The process of removing brush, necessary to expose areas for UXO inspection, could further cause damage to an archaeological or cultural site. During the UXO removal and disposal phase it will be necessary to present to the Review Board the available options for removal and disposal and its potential impact on an archaeological or cultural feature. Excavation and removal, BIP, or leave in place of the UXO item is a consideration required to be evaluated.

Selective pruning of brush is required to prevent excessive removal of vegetation. When in or near an archaeological or cultural site/feature, any brush that is cut must be lifted from the cut site to the chipper to prevent damage to archaeological sites located on the surface. Brush 2" in diameter or less will be chipped and bagged. Brush larger than 2" in diameter will be cut and stacked. Logs and bags of chips will be stocked piled at authorized locations. Care will be taken not to disturb these archaeological sites while working or walking near them to prevent damage.

4.1 Cultural Resources Management Issues and Concerns

Protection of Kaho'olawe's cultural treasures from physical as well as spiritual damage is the major consideration of this plan. Unique to this plan is the incorporation of a Hawaiian cultures sensitivity program that, in addition to the minimizing physical impact to the HCR site, creates a work atmosphere on island that is respectful to the traditional Hawaiian culture.

The various cultural resource management issues involved in the Model UXO Cleanup is site specific as well as general in nature. Generally, personnel involved in this project have to demonstrate a level of respect to the belief and traditional practices of the native Hawaiian associated with Kaho'olawe. Participation in traditional cultural events and practices will not required, but respect for these events and practices will be required by all members present. Site specific briefings by the Cultural Resource Team may be necessary to indoctrinate work crews to the cultural and spiritual importance of a particular UXO removal site. This introduction to the site will prepare the work crews to act

appropriately while working in or transiting through special cultural area and afford them a better understanding of the necessity to protect these valuable areas.

Specific sites have a special cultural protocol, as determined by the KIRC, for access to these areas. One such distinctive site is an area located along the northern cliff of Hakioawa Valley known as Hale o Papa. It has been found to be a traditional burial site for women and young children and believed to be, by members of the Protect Kaho'olawe Ohana, an important religious site for women. Associated with such traditional structures are traditional guidelines that limit access to women and therefore UXO removal in this area will have to utilize women crew members to maintain the sanctity of this cultural site.

The State of Hawaii, through the KIRC, has developed a Draft Land Use Plan for Kaho'olawe. Consideration to the long-term use of particular UXO removal sites will be incorporated into the cleanup of those sites. Areas designated for education or subsistence practices needs to be respected and activities involved in the cleanup process also must reflect the same concern. Prior approval is needed before intrusive activities are conducted in these sensitive areas.

The cleanup process is subject to independent monitoring by the KIRC, which may lead to temporary suspension of cleanup activities when those activities are deemed harmful to historical, cultural or religious sites. Work crews will be required to shift work sites should this occur. Special cultural/religious periods have been identified by the KIRC. During these periods, work crews will remain outside the areas designated and restrict operations agreed upon that could be obtrusive.

4.2 Archaeological and Cultural Site Protection

The Site Protection Procedures of the KIRC details specific action and treatments for archaeological sites. This section generalizes the information found in the Site Protection Procedures and discusses actions relating to the UXO Clearance process.

The following is a general list of methods that may be used to protect archaeological and cultural features from the effects of UXO disposal:

Protective covers - Protective covers include fragmentation blankets and blasting mats. Fragmentation blankets will cover the archaeological feature and protect the feature from fragment damage. This type of protection could be effective with stacked structures, such as terraces and house platforms, as well as deflated features, such as oven pits or midden scatters. Fragmentation blankets may be made of kevlar impregnated fibers or spun organic material such as CURLEX. Blasting mats are placed over the UXO and donor charge and minimize the amount of fragmentation release from the explosion.

Barriers - Barriers include CONEX boxes, barrels filled with rock or earth, dirt bags, and earthen berms. All these items may be placed between the BIP item and the feature to prevent damage to the feature.

Data Recovery - If data recovery is determined by the Review Board, it will be carried out under the general monitoring of a UXO specialist. Data recovery will follow standard archaeological procedures and adhere to the guidelines of the State Historic Preservation Office. Professional archaeological records will be maintained and a final report prepared. A generalized research designed and sampling strategy is summarized in the Site Protection Plan of the KIRC. However, if data recovery is required to mitigate adverse impacts to a site, then a research design specific to the site will need to be prepared.

4.3 Inadvertent Discovery of Archaeological Remains

In areas where subsurface testing, as described in the Site Protections Plan of the KIRC, is not carried out, there is the possibility of discovery of unrecorded buried sites whenever there is ground disturbance from detection or removal. Such discoveries will be considered inadvertent, and will be evaluated, documented and treated according as a Newly Discovered Archaeological Site and will follow the procedures prescribed by the Review Board.

4.4 Discovery of Human Remains or the Recognition of the Probability of Encountering Human Remains

As specified in the Site Protection Procedure of the KIRC, Section III.E., human remains located or recognized during any phase of the remediation process will be left in place with no additional investigation, handling, or photography. Immediate actions to protect the remains will be taken if uncovered during excavation. If found exposed, they will be left as is. Additional actions following discovery will be specified by the Cultural Protocol of the KIRC and the Review Board.

4.5 Clearance in Coastal Waters

Underwater clearance is beyond the scope of this project. Clearance between the Mean High Water (MHW) and the Mean Low Water (MLW) will follow the same procedure for all UXO clearance areas. Scheduling of MLW cleanup is to be timed with the published best low tide information available.

4.6 Historically Significant Objects

During the scrap removal process, non-ordnance metal objects may have historical significance for WWII and will be evaluated by a military historian. If objects are found and collected, the object will be located, documented, and field curated for the military historian to evaluate. Large metal objects such as crashed airplane parts or vehicular convoy targets will be left in place for a military historian to record and possibly arrange final deposition in a museum before moving.

5.0 LAND RESOURCES AND PROTECTION

Except for designated work areas, storage areas, and access routes specifically assigned for use

during the clearance phase, all land resources outside the limits of work will be preserved in their present condition. Site vehicles will remain on designated access roads only. During the cleanup activities on island, OHM and subcontractor personnel will be housed at the existing Honokanai'a base camp or be transported on and off of Kaho'olawe daily. The maximum number of OHM and subcontractor personnel accommodated at a time at this facility will be 50. Prior notification of the number of personnel will be provided to the NTR. No pets will be brought onto Kaho'olawe Island.

Transportation to and from the island will be provided by helicopter to avoid the need for pier construction and beach/marine protection procedures. To minimize the storage areas necessary, OHM, after sweeping and clearing the two designated magazine storage areas, will use these areas as temporary ammunition magazines and maintain them. Two portable explosives magazines will be utilized for the duration of the project for the storage of demolition and blasting caps to detonate UXO in place, if necessary.
The phases of field work will include a sweeping for anomalies, erosion control, revegetation, regulatory consideration, and protection of historical, cultural, and religious sites. After the sweep phase, OHM will maintain the road system for use during the Model UXO Project. Any temporary modifications to the road, to maintain it passable during this project, will incorporate appropriate erosion controls to insure the improvement do not contribute to soil erosion.

5.1 Reduction of Exposure of Unprotected Erodible Soil

OHM will take necessary measures to ensure that grading and excavation activities will be conducted in a timely manner so that building of roadway bases, pads, and trenches will be protected from erosion as soon as possible after exposure. When possible, OHM will improve the roadway drainage patterns to prevent any further erosion. If necessary, culverts will be installed to minimize erosion forces. Any stockpiles generated will be covered with polyethylene sheeting and backfilled soils will be compacted as specified. Navy approval is required prior to any excavation work.

5.2 Erosion and Sedimentation Control Devices

OHM will take all reasonable measures to insure that the cleanup activities do not result in a measurable increase in soil erosion. The Navy and Kaho'olawe Island Reserve Commission (KIRC) may experiment with different erosion control methods in cleared areas in order to determine the most effective methods to use during a full-scale cleanup. Prior to the disturbance of native vegetation and soils, temporary erosion/sediment control will be established. The following erosion control procedures may be used to mitigate or minimize soil erosion during the clearance activities: silt fences (see Figure D1)temporary soil berms, sand bags, and the use of sediment traps.

The historical perspectives with respect to the drastic changes that have affected the islands have typically resulted in degradation of the ecosystem; this is especially true with respect to the loss of a soil mantle as well as the disturbance of soil building mechanisms. (For more information see section 2.1 of the Environmental Conditions Report.)

Specific erosion control methods to be use depend upon the soil disturbance activity being conducted. For subsurface UXO removal that requires excavation, after the UXO has been removed, BIP or left in place, the soil will be returned to the excavation site as soon as possible and tamped to compact the soil. A mixture of corn starch and water, "hard tack" will be sprayed on the surface of the excavation to hold the soil till the first major rains. A mixture of native grass seeds or plant seedlings, if available, may be incorporated in the hard tack to assist in rooting the soil in place.

Limited improvements to present roads will be performed in order to model environmental protection and mitigate erosion. Modeling may include crushed rock base and sub-base in severely eroded sections, installation of culverts to control drainage and the improvement of discharge drainage patterns along the shoulders of the roads within the boundaries of the staked out areas. All drainage improvements will be engineered to minimize the erosive potential of any runoff. In addition, selected sections of roadway will be constructed to model gully control and stabilization strategies in existing gullies along the roadway. Examples of specific gully management procedures can be found in Annex J Specifications and Drawing, "Gully Development and Control: The Status of our Knowledge" Burchard H. Heede.

Construction of berms and earthwork requires source material. An approved site will be located prior to obtaining fill material for construction. To prevent the erosion of berms for construction, such as the explosive handling and storage area, techniques such as the use of geotextile fabric or sand bagging of the fill material may be used. Additional construction techniques may be used during this model project to evaluate the different construction technique's resistance to erosion.

Revegetation represents one method of erosion control and a means of enhancing the island. Revegetation in this plan will emphasis the need to prevent increased erosion during the cleanup. Emphasis will be placed upon using native plants and/or seeds when feasible to control erosion, the primary responsibility of this plan is to control erosion and may necessitate the use of commercially available exotic vegetation. This plan acknowledges the separate but linked interest of the Navy and KIRC in this aspect and will make all reasonable efforts to accommodate both parties under the guidance of the Navy.

5.3 Temporary Excavations and Embankments

Excavation activities will be conducted in a manner to reduce damage and protect adjacent areas from being disturbed. Temporary local erosion and sediment controls will be installed around areas of grading and trenching as necessary while the work is being executed. Investigation of the subsurface will initially be performed with non-intrusive metal detecting equipment. During the clearance procedures, excavation of anomalies detected will be held to a minimum. Use of appropriate sloping angles and stabilizing geotextile fabric will be used if necessary. In addition, culverts, drain pipes, and drainage swales will be considered during temporary excavation if surface drainage patterns and erosion would appear to be affected.

5.4 Protection of Trees and Shrubs

During site activities, every effort will be made to minimize the impact to site vegetation, especially trees and shrubs not identified for removal. OHM will not remove vegetation or injure trees with the use of ropes, cables, or guy wires without Navy authority. Protective stakes may be placed around sensitive vegetation to identify their presence. Any vegetation damaged during work efforts will be restored, if practical. No flora or fauna will be imported or exported without approval from the Contracting Officer.

Selective pruning of brush is required to prevent excessive removal of vegetation. When in or near an archaeological or cultural site/feature, any brush that is cut will be lifted from the cut site to the chipper to prevent damage to archaeological sites located on the surface. Dragging of brush along the ground could damage or disturb any archaeological sites in the area. Brush 2" in diameter or less will be chipped and bagged. Brush larger than 2" in diameter will be cut and stacked. Logs and bags of chips will be stacked near the work areas to avoid archaeological or cultural sites. Care will be taken when walking in or near these archaeological, during this process, to prevent further damage.

5.5 Soil Sampling

Visual surface soil characterization to confirm the Natural Resource Conservation Service Soil Report for Kaho'olawe of 1995 will be conducted throughout the project for areas in the Model UXO Cleanup Project.

For specific locations, such as the Open Storage Area (OSA), Open Burn / Open Detonation Pit (OB/OD), before and after all BIPs and as specified by the Navy, soil sampling will be taken in accordance with procedures listed in EPA 3380, TCLP and additional chemical analysis to be provided by the Navy. A specific Soil Quality Test Procedures will be included as a separate annex.

6.0 PROTECTION OF WATER RESOURCES

Construction and clearance activities will be conducted in a manner to prevent chemicals, fuels, and contaminated material from entering nearby surface water and to minimize infiltration of contaminants to ground water. Secondary containment will be provided for the liquid storage area. Surface drainage from disturbed areas will be managed according to the control measures described in Section 4.2 of this plan and will be designed to reduce peak runoff water from precipitation.

Climatic data is very limited for the island of Kaho'olawe, however, the rainfall is estimated to range from 10 to 25 inches per year, depending on the location on the island. Due to the minimal soil mantle, high percolation rates, and high pan evaporation rates, the island is considered arid. There are no perennial streams on the island and no sources of drinking water. Water is transported by storage container from other islands or is provided by a small desalinization plant. Therefore, the effect to surface waters internal to the island is not existent.

OHM plans to install small desalinization plants at Hakioawa and Hanakanai'a. The unit at Hanakanai'a will most likely be installed to replace the existing RO unit at the base camp and will utilize the present sea water intake system with modifications. The unit at Hakioawa will most likely be installed into the existing RO unit at the PKO camp site. The sea water intake system will be temporarily installed during use and removed and stored when not in use. Both systems produce a substantial quantity of brine discharge that must be disposed into a brine discharge pit. A brine discharge pit is defined as a pit or trench wider than deep and sized to allow the percolation of the brine discharge without overflowing the discharge pit. These pits will be located near the RO units for operational considerations, but need to ensure that there is no direct surface flow of brine into the ocean or to any surface water source without a State approved discharge permit. Additionally these pits will be sited to prevent damage to any archaeological, cultural or natural resource.

7.0 FISH AND WILDLIFE

7.1 Precautions

OHM will take precautions at all times during remediation activities to minimize any disturbance to fish and wildlife and their habitat adjacent to the project site. Any activities that gather any sea life from Kaho'olawe Island Reserve are governed by the Kaho'olawe Island Reserve Commission (KIRC). The waters around the island, particularly those of the Molokai Channel are breeding and calving grounds for the Humpback whale between the months of October and March. These animals are protected under the Marine Mammal Protection Act. Extreme care will be taken to avoid disturbing these mammals during calving season. All vessels must maintain a corridor of at least 300 feet.

OHM will be responsible for themselves and their subcontractors for ensuring that no threatened or endangered fauna is distributed during the Model UXO Cleanup Project. The Hawaiian Monk Seal and the Hawkbill Turtle are known to frequent the sandy beaches of Kaho'olawe. If monk seals are seen, the date, number and location of the seals are to be reported to the Navy's contracted Camp Manager. The Camp Manager will maintain a log recording those sightings which will be provided on a monthly basis to PACNAVFACENGCOM. The Monk Seal will not be disturbed and is protected under the Marine Mammal Acts and the Endangered Species Act. The Hawkbill Turtle is also protected under the Endangered Species Act. If a protected marine species, such as a monk seal or green sea turtle, is injured, Dan Moriarty or Tim Sutterfield at PACNAVFACENGCOM (471-9338) will be promptly notified of the circumstances of the injury.

OHM will have very limited activities in this project which may affect the marine life. Only approved docking\landing areas will be used to load and unload equipment. If during sweep and clearance activities monk seals or other wildlife is observed close by, work activities will be relocated until a time when they will not disrupt the marine life.

During the orientation to the island issues such as wildlife protection and natural resource conservation issues will be addressed to indoctrinate and raise the work crews sensitivity to the fragile

nature of the island's environment.

Fishing and gathering is for on-island subsistence only. Only the amount of fish which can be consumed on the island is to be harvested. Excessive harvesting is prohibited.

7.2 Natural Resources Management Issues and Concerns

Introduction of alien plants and animals can cause irreversible damage to the island's fragile ecosystem. Due care must be taken to prevent the importation of alien species to the island during the remediation process. No flora, nor fauna will be imported or exported without prior approval through OHM by the Navy Contracting Officer. Measures available include such simple procedures as scrubbing of work boots prior to arrival on island to fumigation or inspection of storage containers. No pets will be brought onto Kaho'olawe Island. Activities that gather any sea life from the Kaho'olawe Island Reserve are governed by KIRC rules.

7.2.1 Alien Plant Threat Management

Alien plants can represent serious threats to the survival of native organisms and natural communities. Some alien plants, if left uncontrolled, are capable of completely displacing the native vegetation. The most serious habitat altering weeds already well established on Kaho`olawe include kiawe (*Prosopis pallida*), and various alien grasses such as buffelgrass (*Cenchrus ciliaris*) and pitted beardgrass (*Bothriochloa pertus*). While alien plants are in some places important for erosion control, in native ecosystem areas the threat to native plants may outweigh their erosion control value.

Prevention: Measures should be taken to prevent the introduction and establishment of invasive weeds on the island. Plants known or suspected to have the potential of becoming weeds should not be intentionally brought to the island; this includes ornamentals or revegetation candidates whose invasiveness is unknown. Unintentional introductions should be minimized by ensuring that vehicle tires, tools, boots, and other gear brought to the island are free of seeds or soil which may contain seeds. Importantly, weeds new to the island should be eradicated when first noticed. Weeds that succeed in gaining a foothold on the island would be relatively easy and inexpensive to eliminate in the initial stages of infestation. Advanced infestations would be much more costly or even unfeasible to eradicate on an island-wide basis.

7.2.2 Alien Animal Threat Management

Aliens in Anchialine Pools: Alien fish and alien invertebrates are harmful to the anchialine pool biota. Any anchialine pools on the island should be guarded against the introduction and establishment of such animals.

Land Snail Predators: Endemic ground-dwelling snails may still exist on Kaho`olawe. There are no indications that the introduced predatory snails *Euglandina rosea* or *Oxychilus alliarius* (both serious threats to endemic ground-dwelling snails) are present on the island. It is, therefore, important to

ensure that all plantings and soil brought to the island are free of alien snails and/or their eggs. It is also important to control (if present) or exclude (if absent) other potential predators of native land snails such as rats (*Rattus* spp.) and mongooses (*Herpestes auropunctatus auropunctatus*).

Seabird Predators: Care must be taken to avoid introducing the mongoose to Kaho`olawe. The island of Kaho`olawe is noteworthy in its lack of alien animals that on the other main islands are beyond eradication or practical control. Preventing the introduction of potential animal pests to Kaho`olawe will be a high priority.

8.0 AIR RESOURCES PROTECTION

Kaho'olawe lies on the leeward side of Maui's Haleakala volcano. Haleakala's land mass deflects the northeast trade winds and sends persistent strong winds over Kaho'olawe from the east. The island is windswept and large areas are eroded and bare of vegetation. There exist a substantial quantity of dust naturally generated on Kaho'olawe. Years of erosion and the historic lost of the islands vegetative cover has contributed to Kaho'olawe's naturally dusty conditions. The expected quantity of dust to be generated by this project is insubstantial compared to existing conditions. To control additional dust generated from intrusive excavations, backfilling the excavation, compacting the site and spraying a mixture of hardtack on the surface to stabilize the surface as needed to prevent additional dust generation. Dependent upon availability, water will be used to spray down excavation to control dust. No specific air issues, i.e., fugitive dust, are anticipated to affect the air quality during the sweeping and clearance activities of this project.

9.0 HAZARDOUS MATERIAL CONSIDERATIONS

The site is not believed to be contaminated with any hazardous substance. However, in the event an unexpected situation is encountered, the possibility exists that hazardous substance may be present. The Safety Officer, in conjunction with the Health and Safety Manager will take the appropriate steps as described in Annex B, Site Health and Safety Plan, Section 3.11.1. Proposed hazardous material to be used in this project is listed with applicable MSDS' in Annex B, Site Health and Safety Plan. MSDS for any additional hazardous material brought to Kaho'olawe will be provided to the NTR and kept on site. Hazardous material will be stored in authorized containers and labeled accordingly.

Any waste generated by OHM (e.g., waste oil, spilled hydraulic liquid, rags soaked with petroleum-based produce) will be collected by OHM and turned over to the BOSS contractor for storage and disposal. Any spills of hazardous materials or waste will follow the provisions of Annex B, Site Health and Safety Plan, Section 3.11.1. Spills will be collected with absorbent material as well as any contaminated soils. All hazardous waste, generated by OHM, will be turned over to the BOSS Contractor for storage and disposal.

10.0 CORRECTIVE ACTIONS

Should any of the preceding provisions not satisfy the standards established in the scope of work,

OHM will take prompt action to correct the situation upon receipt of notification from the Navy Technical Representative (NTR) or OHM's Quality Control Personnel. All corrective measures will be proposed in writing to the NTR for review and approval prior to their initiation. Situations requiring immediate corrective action will be discussed with the NTR and implemented as soon as possible. Written documentation of the action will be submitted to the NTR within 24 hours of implementing the action. OHM Quality Control Personnel or the NTR may require that work be stopped to correct any violations of this plan.

11.0 TRAINING CONTRACTOR PERSONNEL

All OHM and subcontractor personnel will receive training in all aspects of working conditions on Kaho'olawe. Generally, the training will include methods of detecting and avoiding pollution, safety around unexploded ordnance, and cultural/religious sensitivity. Description of required training is specified in the Work Plan. All personnel will undergo an archaeological and natural resource briefing and KIRC cultural training.

12.0 QUALITY CONTROL

A comprehensive quality control plan for archaeological work and natural resources reporting is under development. The intent of this quality control plan is to ensure that the services being provided meet the needs and satisfy the customer's expectation and comply with applicable standards specified for this project. This plan will be attached as a separate annex.

13.0 REFERENCES

Soil survey of Island of Kaho'olawe, Hawaii, United States Department of Agriculture, Natural Resources Conservation Service, April 1995.

Final Report, Cultural Resource Management Plan for Kaho'olawe Archaeological District, Volumes 1 and 2, Ogden Environmental and Energy Services Co., Inc., January 1995.

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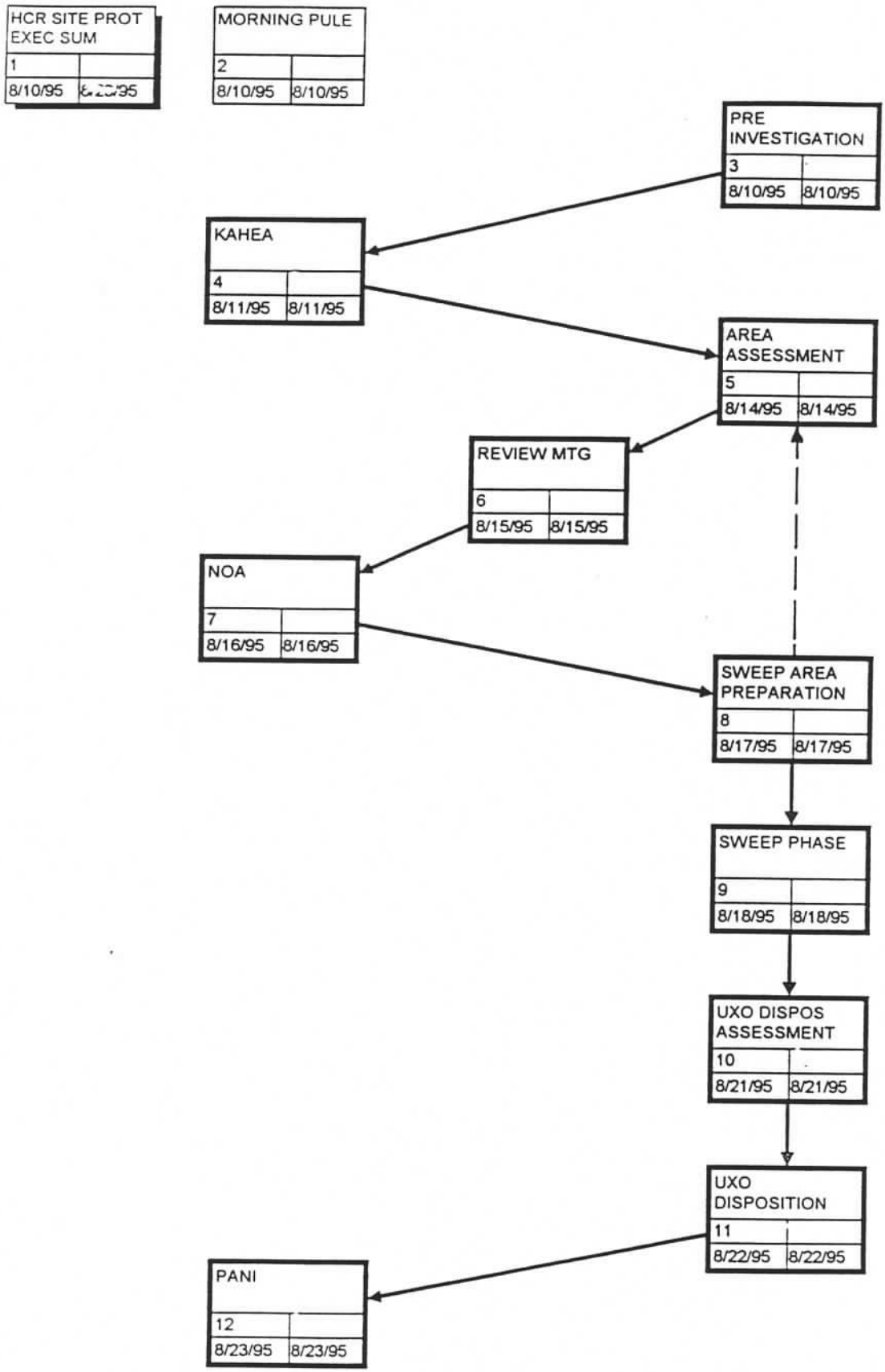
Gully Development and Control: The Status of Our Knowledge. Burchard H. Heede.

Draft Site Protection Procedures for the Protection of Archaeological, Historical, Cultural and Religious Sites During the Cleanup and Restoration of Kaho'olawe. H. D. and M.J. Tuggle 1995.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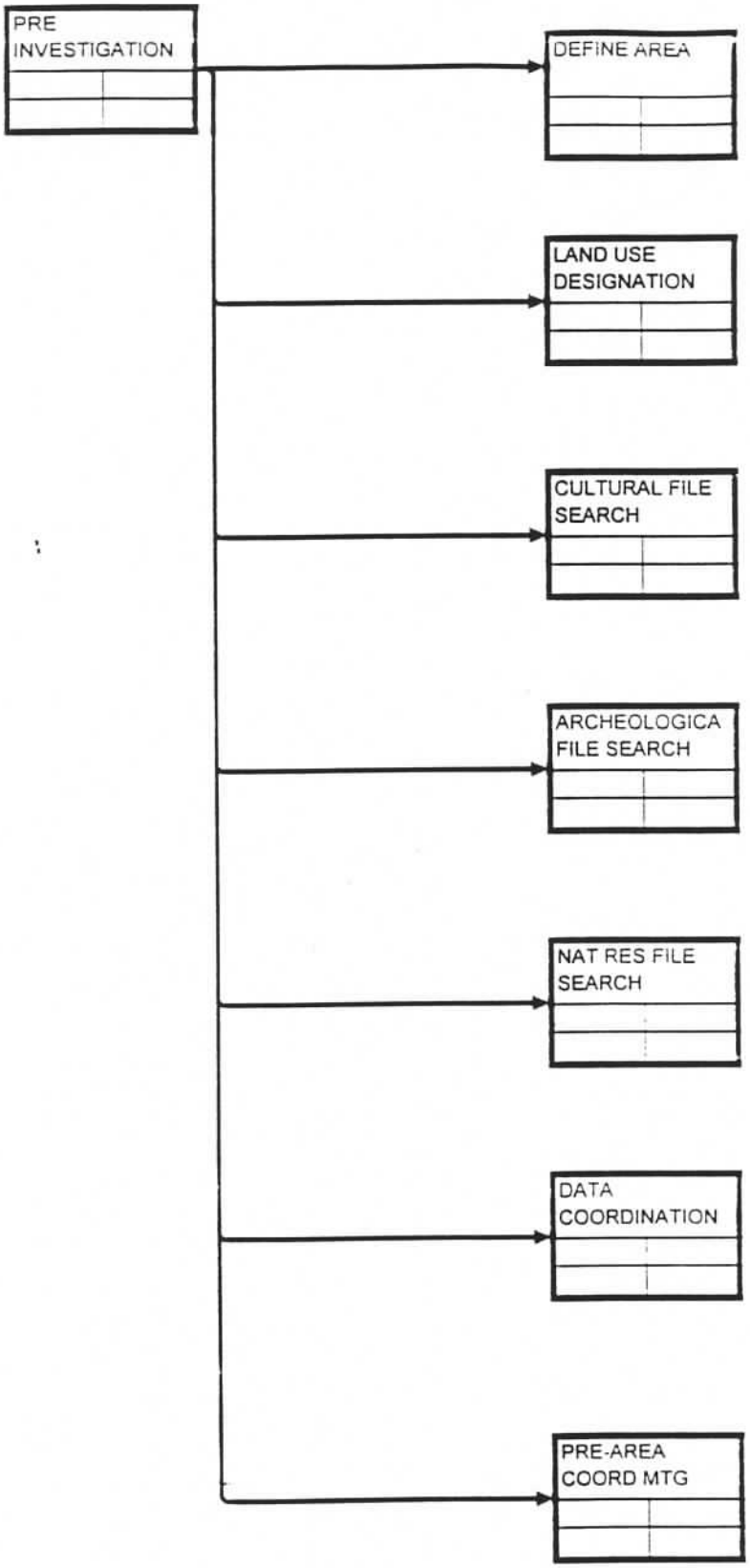
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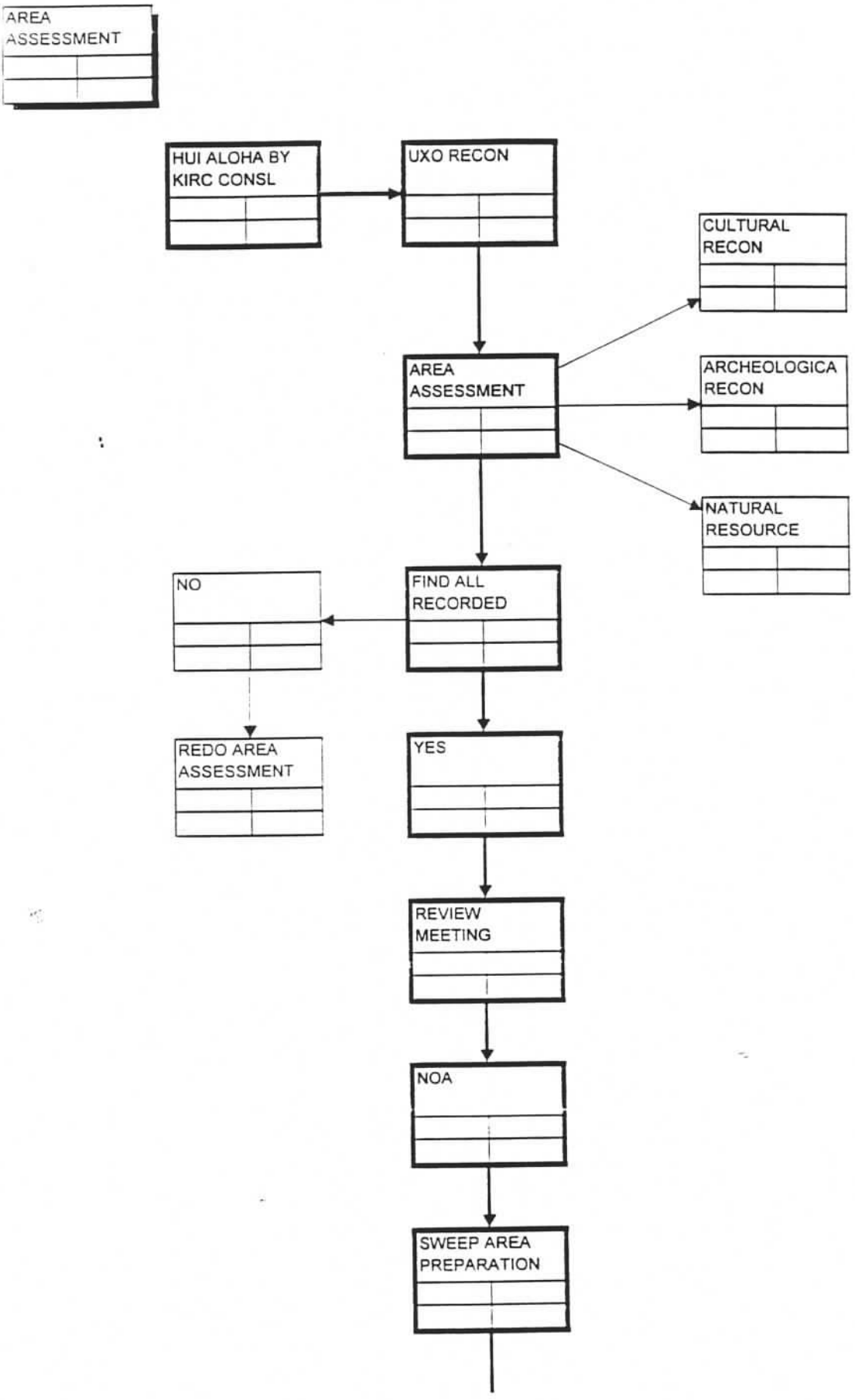
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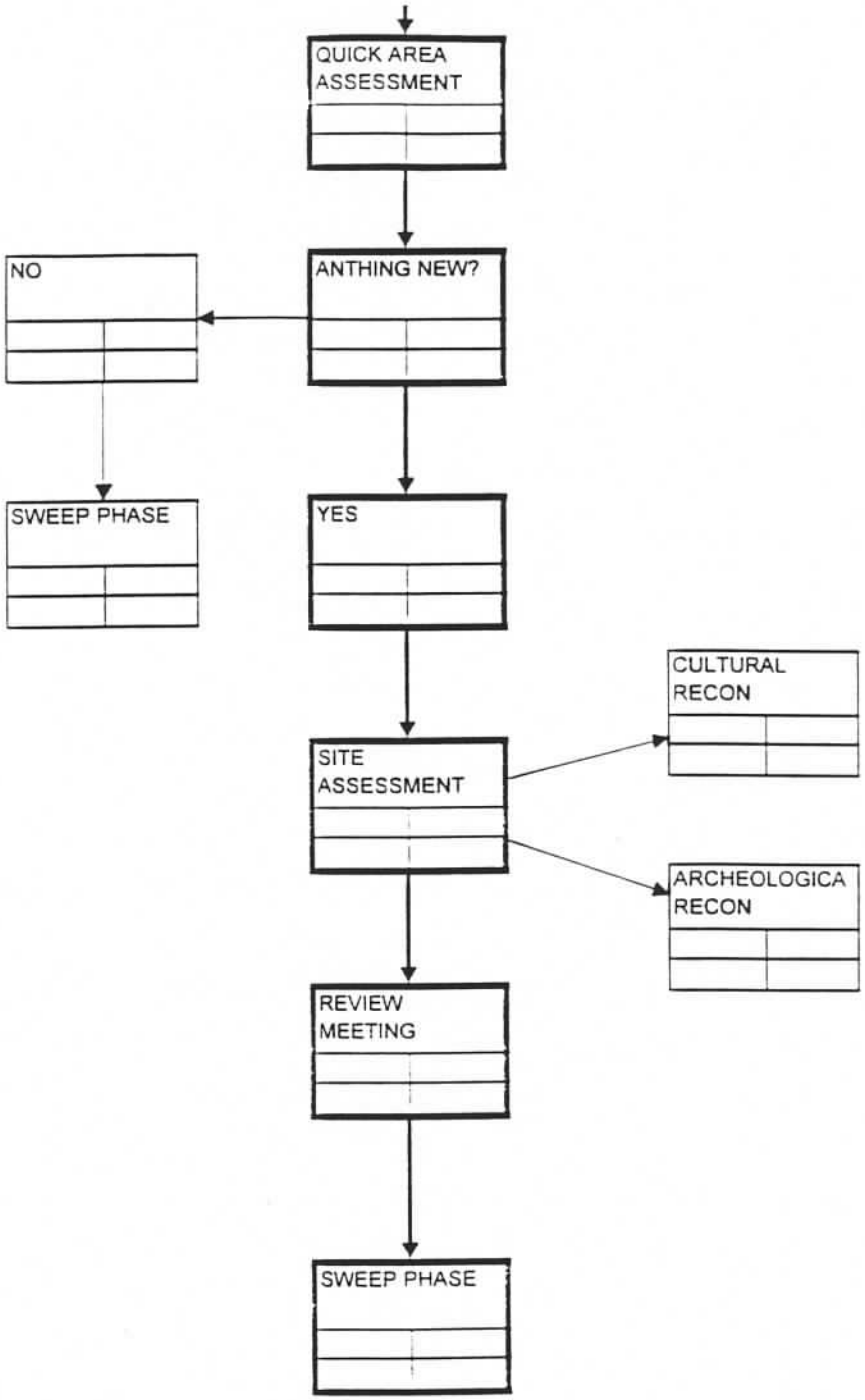
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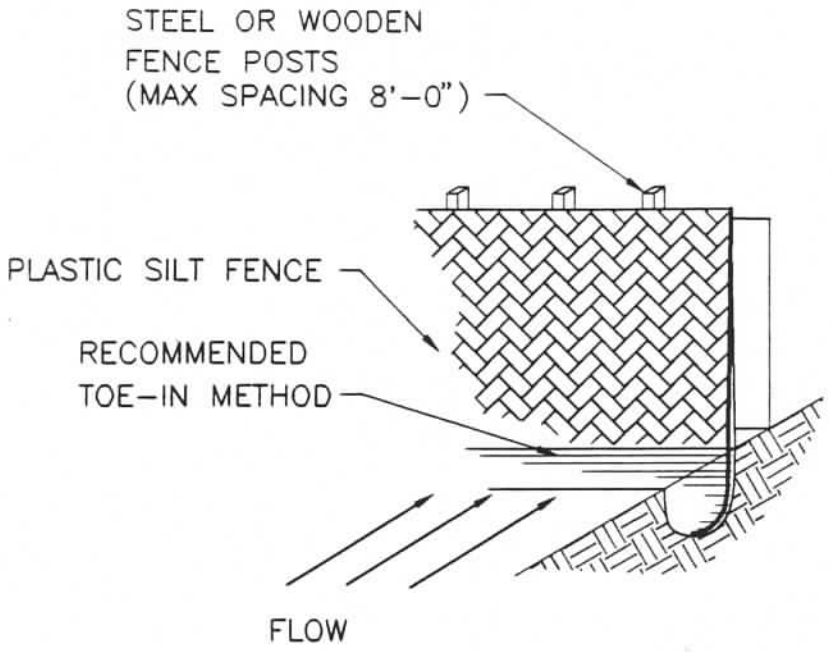

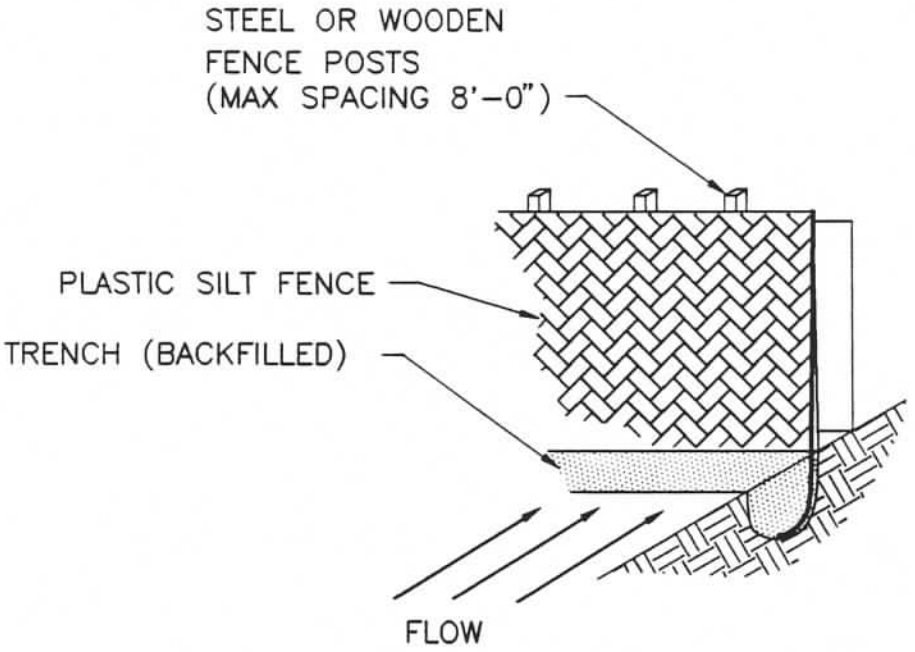

OPTIONAL SILT FENCE DETAIL

NOT TO SCALE

OHM Remediation Services Corp. PLEASANTON, CA.	SILT FENCE DETAIL KAHO'OLAWE ISLAND HAWAII, USA	DRAWN BY A.SUAREZ	DATE 8/2/95			
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		SCALE: NONE	PLOT SCALE 1=1			
	PROJECT PACDIV	OHM PROJECT NO. 17760	DRAWING NO. FIG D1	SHEET 1	OF 1	REV. –