REMEDIAL ACTION WORK PLAN

Emergency Generator Installation Site

Kekaha Road
Tax Map Key (TMK) Number: (4) 1-2-02:
Parcel 001(Portion)
Kekaha, Kauai, Hawaii

Prepared for:
Agribusiness Development Corporation (ADC)
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ACRONYMS AND ABBREVIATIONS

ADC	Agribusiness Development Corporation
bgs	below ground surface
BMP	Best Management Practice
CSM	Conceptual Site Model
DLNR	Department of Land and Natural Resources
DU	Decision Unit
EAL	Environmental Action Level
EHMP	Environmental Hazard Management Plan
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
ft	feet/foot
HDOH	State of Hawaii Department of Health
HEER	Hazard Evaluation and Emergency Response
HiOSH	Hawaii Occupational Safety & Health
KAA	Kekaha Agriculture Association
KSC	Kauai Sugar Company
lb	pound
mg/kg	milligrams per kilogram
ng/kg	nanograms per kilogram
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
SOP	Standard Operating Procedures
TEC	TEC Inc.
TEQ	Toxicity Equivalent
TMK	Tax Map Key

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1.0 INTRODUCTION AND PURPOSE

TEC Inc. (TEC) was retained by the Agribusiness Development Corporation (ADC), an agency administratively attached to the State of Hawaii Department of Agriculture, to prepare a Remedial Action Plan for 3.2 acres of land along Kekaha Road, Kekaha, Kauai, Hawaii located within a portion Tax Map Key (TMK) Number: (4) 1-2-02: Parcel 001 ("the project site").

The project consists of three containerized diesel-powered generator units on a single concrete pad that will be installed at the project site. The generators will provide emergency back-up power to operate the existing drainage and irrigation system for Kekaha Agriculture Associate (KAA). The construction activities associated with the installation of the emergency generators and associated components are referred to as "the project."

Due to elevated levels of arsenic and dioxins/furans, remedial action is required at the project site. The purpose of this Remedial Action Work Plan is to identify the final remedial activities and tasks associated with the project. It will include a soil management plan which will dictate how the soil will be managed on-site.

2.0 BACKGROUND

2.1 Site Description

The project site is located in the western Kauai town of Kekaha (Figure 2-1). The TMK parcel associated with the project site measures approximately 13,000 acres. The project site is a small portion of the parcel, measuring approximately 3.2 acres, as seen in Figure 2-2. The project site is located north of Old Kekaha Sugar Mill and consists of a flat, sparsely vegetated parcel triangular in shape, bordered by roads on two sides and an irrigation canal to the north.

The project site is easily accessed via Hukipo Road. It is directly across the street from a storage shed area, which is regularly accessed by Kekaha Agriculture Association management and contractors. The site is approximately 500 feet (ft) from Kekaha Road, the nearest main route. Kaumualii Highway is located approximately 1,500 ft south of the site.

2.2 Historic and Current Land Use

Prior to 1910, the entire parcel was used for sugar cane cultivation. Part of the project site was used as the Former Kekaha Sugar Company (KSC) Herbicide/Pesticide Mixing Facility. The Former KSC Office is located to the west. Soils associated with former sugarcane production facilities have been identified as areas with potential contamination of arsenic, lead, mercury, dioxins/furans, and pesticides such as pentachlorophenol (HDOH 2009).

Current land use is designated agricultural, which is considered a restricted use under State of Hawaii Department of Health (HDOH) guidelines (2009). The project site is currently not in use; however remnants of past activities are still visible on-site as described above, including an old shelter and piping material. The project site is bordered by an agricultural ditch plot to the north.

A carpenter shop and paint shop are located approximately 50 ft. east of the project site and fueling tanks are located approximately 100 ft. west of the project site (Figure 2-2).

2.3 Summary of Investigation History

In 2003 Clayton Group Services, Inc. performed a Phase I Environmental Site Assessment (ESA) on TMK (4) 1-2-02: Parcel 001 for State of Hawaii Department of Land and Natural Resources (DLNR). The ESA was conducted to document environmental conditions and history of agricultural use (which commenced in 1910), and investigate structures and irrigation systems on the parcel.

In response to an Environmental Assessment, HDOH, Hazard Evaluation and Emergency Response (HEER) Office identified the project site to have potential for soil contamination and requested a Phase II ESA. In October 2010, TEC performed a Phase II ESA at the project site. The Phase II consisted of multi-incremental surface soil sampling for arsenic and dioxins. The 3.2 acre project site was divided into three relatively equal DUs, each slightly larger than one (1) acre (Figure 2-3). The laboratory results identified arsenic and dioxins in the soil at levels greater than the HDOH Environmental Action Levels (EALs) for unrestricted use. Because the impacted media will remain on-site under restricted use, an Environmental Hazard Management Plan (EHMP) was required by HDOH prior to the initiation of construction activities at the project site. The Final EHMP was submitted to HDOH for review and approval March 1, 2011. The soil at the project site is classified as Category C soils and the site is restricted to land use for commercial/industrial uses in the absence of remediation or engineering controls.

In November and December 2010, the HEER office contracted Weston Solutions to perform additional soil sampling and analysis along the perimeter of the project site. This sampling effort was part of a Brownfield Grant. The sampling results identified that some areas of the project site boundary have bio-accessible arsenic and dioxins/furans at concentrations greater than the applicable HDOH EALs for unrestricted use. Based on these results, HDOH recommended removal of soil from two areas along the project site boundary. These two areas are referred to as "remedial action areas" and include decision units (DUs) FHMA-05 and FHMA-06. Figure 2-3 shows the two remedial action areas.

2.4 Conceptual Site Model for Potential Human/Ecological Receptors

A Conceptual Site Model (CSM) provides a framework regarding potential sources of contamination, types of contaminants, contaminated media, exposure and migration pathways, and receptors. The CSM presented in Table 2-1 was used in the preparation of the Phase II ESA. Based on the results of the site investigation, the following are identified as potential human receptors:

- On-site workers – including any personnel conducting work on-site for normal site operations;

- On-site workers (construction) – including personnel involved in any demolition or construction during future site activities; and
- On-site trespassers – including individuals that may access the site without permission.

The following potential exposure pathways have been identified:

- Incidental ingestion or dermal contact with soil;
- Inhalation of fugitive dust; and
- Incidental ingestion and dermal contact with surface water runoff and sediment.

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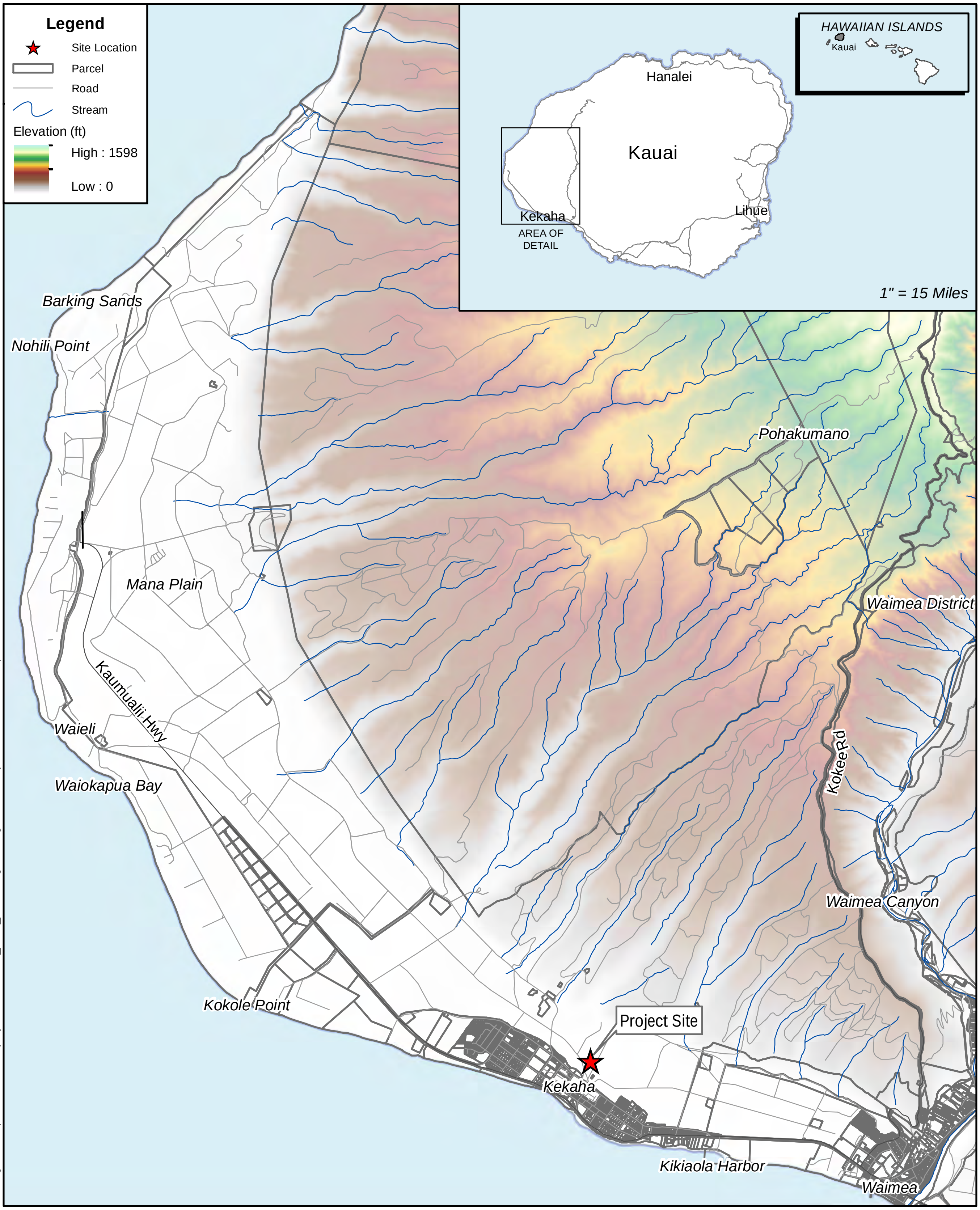

Printing Date: Apr 13, 2011, N:\projects\GIS\9536_ADC_EHMP\figures\Figure 2-1 Project Site Location Map.mxd

Feet
0 3,200 6,400
0 880 1,760
Meters

Figure 2-1
Project Site Location Map
Kekaha, Kauai, Hawaii

N W E S

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Printing Date: Apr 14, 2011, N:\projects\GIS\9536_ADC_EHMP\figures\RAWP\Figure 2-2 Aerial Overview of the Project Site.mxd

Feet
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0 40 80
Meters

Figure 2-2
Aerial Overview of the Project Site
Kekaha, Kauai, Hawaii

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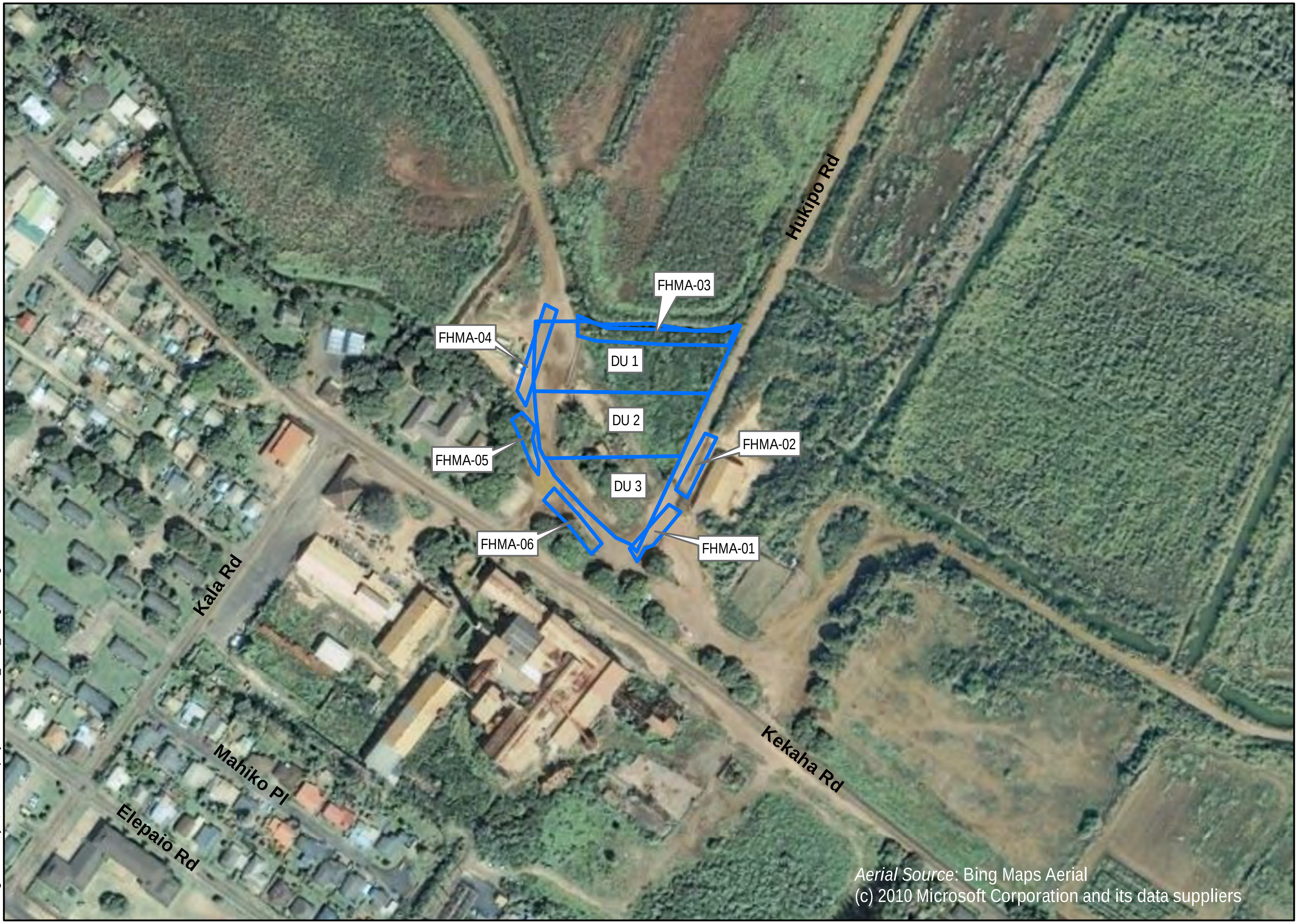

Printing Date: May 2, 2011, M:\projects\GIS\6766_ADC_EA\figures\Figure 2-3 Location of Remedial Action Areas.mxd

Figure 2-3
Location of Remedial Action Areas
Kekaha, Kauai, Hawaii

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Table 2-1. Conceptual Site Model, Kekaha, Kauai, Hawaii

Primary Sources	Primary Release Mechanism	Secondary Sources	Secondary Release Mechanism	Pathway	Exposure Route	Potential Receptors									
						Current Land Use				Future Land Use*				Current	
						On-site Workers	On-site Construction Workers	On-site Trespassers	Offsite Residents	On-site Workers	On-site Construction Workers	On-site Trespassers	Offsite Residents	Terrestrial Ecological	Aquatic Ecological
Pesticides, Herbicides, and other Agricultural Treatment Chemicals	Drips, leaks, and spills	Surface Soil	None	Surface Soil	Ingestion	◊	◊	◊		◊	◊	◊		◊	◊
					Dermal	◊	◊	◊		◊	◊	◊		◊	◊
			Dust	Ambient Air	Inhalation	◊	◊	◊		◊	◊	◊		◊	◊
			Surface Water Runoff	Surface Water and Sediments	Ingestion	◊	◊	◊		◊	◊	◊		◊	◊
					Dermal	◊	◊	◊		◊	◊	◊		◊	◊
			Leaching	Subsurface Soil	Ingestion		◊				◊			◊	
					Dermal		◊				◊			◊	
				Ground-water	Ingestion										
					Dermal										
					Inhalation										

Notes:
◊ - Potentially complete exposure pathway
* - No significant change to the land use is planned in the near future

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3.0 SUMMARY OF ENVIRONMENTAL HAZARD EVALUATION

Environmental hazard evaluation is the link between the discovery of environmental contamination and the response actions taken to address the contamination (HDOH 2008). The process used to conduct this environmental hazard evaluation is in accordance with the HDOH Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (2008, updated in 2009).

First, the presence or absence of potential environmental contaminants was determined. Potential environmental contaminants were compared with respective HDOH EALs. Once potential contaminants were confirmed, specific hazards posed by the contaminants were identified. Furthermore, the need for additional data for the site investigation was determined. Lastly, appropriate remedial actions can be recommended.

During the Phase II ESA (TEC 2010), arsenic and dioxins/furans were identified as exceeding their respective HDOH EALs. The site is not located over a drinking water resource and is greater than 150 meters from a surface water body. The applicable Tier 1 EALs are presented in Table 3-1.

Table 3-1. Individual Tier 1 EALs.

Individual Tier 1 EAL	Arsenic (mg/kg)	Dioxins/Furans (TEQ)
Gross Contamination	1000	1000
Ecological Toxicity	20.0	-
Leaching/Groundwater Protection	Use batch test	0.19
Direct Exposure Residential	0.43	4.5E-6
Direct Exposure Commercial/Industrial Workers	1.9	1.8E-5
Direct Exposure Construction/Trench Workers	1.9	1.8E-5
Final Tier 1 EAL	**20.0**	**4.5E-6**

Note: TEQ=Toxicity Equivalent Reference: HDOH 2009

If the above Final Tier 1 EALs are exceeded, the soil must then be classified to determine the appropriate land use type. Table 3-2 shows the HDOH soil categories, soil impacts, and the associated land use designation for both arsenic and dioxins/furans.

Table 3-2. HDOH Soil Categories for Arsenic and Dioxins/Furans.

HDOH Category	Soil Impact	Land Use Type	Arsenic Concentration	Dioxin/Furans Concentration
A	Natural Background	Unrestricted Land Use	<20 mg/kg[1]	<20 ng/kg
B	Minimally Impacted	Unrestricted Land Use	20-23 mg/kg[1]	20-240 ng/kg
C	Moderately Impacted	Commercial/Industrial Land Use Only	23-95 mg/kg[2]	240-1500 ng/kg
D	Heavily Impacted	Remedial Action Required	>95 mg/kg[2]	>1500 ng/kg

1. Total Arsenic, 2. Bio-accessible Arsenic (HDOH 2010a and HDOH 2010b)

Three soil samples were collected from the project site during the Phase II ESA. An additional six samples were collected along the perimeter of the project site during the Brownfield Investigation. Two of the perimeter samples were below the Tier 1 EALs for arsenic and dioxins/furans. Four of the perimeter samples had concentrations of arsenic and/or dioxins/furans greater than the Final Tier 1 EALs. Table 3-3 summarizes the sample results for the samples that exceeded the Final Tier 1 EALs. The project site is classified as HDOH soil Category C which is applicable to the intended use of the project site as commercial/industrial. The perimeter samples FHMA-05 and FHMA-06 were located along a dirt road which is frequently used which may be considered unrestricted use.

Table 3-3. Sample results for within and along the perimeter of the project site.

Sample	Arsenic (mg/kg)	Bio-accessible Arsenic (mg/kg)	Dioxin (ng/kg)	HDOH Soil Category
DU-1	21.2	None detected	1,225	C
DU-2	13.8	Not tested	265	C
DU-3	90.0	47.5	738	C
FHMA-01	<20.0	Not tested	<200	A
FHMA-02	22.7	Not tested	<200	B
FHMA-03	<20.0	Not tested	1,800	D
FHMA-04	<20.0	Not tested	<200	A

Sample	Arsenic (mg/kg)	Bio-accessible Arsenic (mg/kg)	Dioxin (ng/kg)	HDOH Soil Category
FHMA-05	97.5	47.3	620	C
FHMA-06	69.8	25.4	770	C

4.0 REMEDIAL ACTION ALTERNATIVES

The purpose of this Remedial Action Work Plan is to outline the details of the remedial action alternatives and final soil remedial action which will be implemented simultaneously with emergency generator construction activities. The goal of the final remedial action is to reduce the threat to human health and the environment with respect to arsenic and dioxins/furans. A Phase II Environmental Site Investigation (ESI) and Environmental Hazard Management Plan (EHMP) was prepared prior to the development of this Remedial Action Work Plan. Both these documents discuss the potential environmental hazards in detail. The EHMP provides general guidelines on how to manage in-place impacted soil within the project site. This Remedial Action Work Plan expands upon the EHMP and provides detailed management practices.

Due to the presence of arsenic and dioxins/furans at concentrations above the Final Tier 1 EALs along the roadway at the perimeter of the project site, HDOH initially suggested that soil from FHMA-05 and FHMA-06 be excavated to 1 ft below ground surface (bgs) and stored within the project site. Upon further discussion, managing the soil in-place was also considered as a feasible option and would provide a remedy and institutional controls without disturbing vegetation that is currently containing contaminated soil. Leaching of contaminants to groundwater is not an issue due to the relative immobility (i.e. binds strongly to soil particles) and insolubility of arsenic and dioxin. Direct exposure is likely the most detrimental environmental hazard to human health and the environment; therefore the two alternatives presented below are designed to contain the soil particles to prevent human exposure and soil erosion. No matter what alternatives are selected, having ADC and KAA become stewards for the management of this commercial/industrial site and providing institutional controls is more protective of human health and the environment than its current lack of use.

4.1 Alternative 1: Excavate Perimeter and Manage Soil In-place On-site

Alternative 1 will include excavating soil from the perimeter of the project site to a depth of 1 ft below ground surface (bgs). The excavated material will be transported and stored within the project site. After the soil has been removed, confirmation sampling will be conducted and the areas will be backfilled with clean fill and returned to the original grade. Access will be restricted to the project site by installing a cattle fence. Erosion control measures, including effective site grading, will be utilized to eliminate transfer of contaminated soil off site.

Scope of Work

The following work will be performed:

1. **Identify and Delineate Project Perimeter and Perimeter DUs:** DUs FHMA-05 and FHMA-06 will be identified and delineated using GPS data points and field notes obtained from HDOH. FHMA-05 and FHMA-06 will be located using a GPS device. FHMA-05 was documented to be approximately 121 ft. by 21 ft. FHMA-06 is documented to be 144 ft by 30 ft. The boundaries of each DU will be temporarily marked with flags or stakes prior to excavation. In addition, the project site will be delineated and marked prior to excavation.

2. **Excavate Soil**: Soil from both decision units will be excavated to a depth of at least 1 ft. The soil removed from the decision units will be relocated to the project site. Details regarding excavation procedures are presented in Section 5.1.

3. **Collect Confirmation Soil Samples**: One multi-incremental confirmation soil sample will be collected from each DU after the soil is excavated. Details regarding soil sampling procedures are presented in Section 5.4.

4. **Install Marker Tape**: Warning tape will be placed at the bottom of the DUs. The tape will read "Danger Hazardous Material Do Not Enter." The tape rows or columns will be spaced 2 ft apart.

5. **Backfill Excavated Areas**: The excavated area will be filled with clean soil or fill. The clean soil or fill will be compacted to match the existing surface.

6. **Install Perimeter Fence:** A fence will be installed along the perimeter of the project site except along the border of the canal. The fence and canal will restrict access to the project site as well as delineate the site. The fence type will be a cattle fence approximately 5 ft tall. A minimum of one egress location will be identified for vehicle use. A separate egress location will be designated for personnel. Figure 4-1 indicates the approximate position of the cattle fence installation.

7. **Site Work**: The soil excavated from FHMA-05 and FHMA-06 (approximately 260 cubic yards) will be used within the project site. The soil will first be used to prepare area where the concrete pad will be installed. The soil under the concrete slab will be compacted to the plan's specified compaction rate. The remaining soil will be used to fill in a natural depression.

8. **Grading:** Temporary grading practices will be used to minimize construction site erosion. These practices include, but are not limited to, **surface roughening** (directional tracking and tillage) and **temporary ditch sumps**. These practices shall be used in conjunction with other erosion control practices. The project site's current topography will be maintained, ensuring that the site is graded so the perimeter is at a

higher elevation than the surrounding area to prevent storm event waters from entering or leaving the project site. The soil will be compacted and covered with drought tolerant vegetation and/or grass seedlings to establish resilient ground cover and minimize erosion. Details regarding soil management procedures are presented in Section 5.2 and 5.3.

9. **Electrical Conduits**: Electrical conduits will be installed in the vicinity of the concrete pad location. The trench will be 3 feet below ground surface. The trench will be backfilled with excavated material and compacted. No big rocks, boulders, or hard to dig obstacles will be used as backfill.

10. **Concrete Work**: The concrete foundation and footings will be installed to contain three generators in steel containers, a 6,000-gallon fuel tank and a generator control panel. The concrete work will consist of installing two 12-in thick concrete slabs. The main slab will be 59.6 ft by 45.5 ft. The smaller slab will be 14.2 ft by 20.5 ft. The smaller slab is designed to hold the 6,000-gallon fuel tank and the larger slab is for the remaining components. Open fuel chase lines measuring 4-inches by 12 inches will also be formed in the concrete slabs.

11. **Install Roof (optional)**: A commercial deep ribbed corrugated metal roof will be installed per manufacture's specification. The roof will be supported by 6 x 6-inch posts. The roof will have a 12 to 1 pitch.

12. **Install Additional Fencing (optional):** A commercial grade chain link fence with barbed wire will be installed surrounding the concrete slabs and associated equipment. The fence will be seven feet in height.

4.2 Alternative 2: Manage Soil In-place at Perimeter and On-site

Alternative 2 will consist of managing the soil in-place both within the project site and along the southwestern perimeter (FHMA-05 and FHMA-06 DUs). ADC and KAA will become stewards for the site providing and managing the institutional controls to remedy the environmental concerns. These institutional controls will include:

- Ensuring that the ground is covered, and remains covered, with a gravel barrier at the FHMA-05 and FHMA-06 DUs along the perimeter of the site, along the access roads leading to the site and fueling station, and access roads through the project site.

- Vehicle access to the perimeter DUs will be restricted by enclosing the graveled area with boulders.

- Vegetation, if left on-site, will be maintained so that it provides natural soil binding and dust suppression practices.

- Access will be restricted to the project site by installing a cattle fence.

- KAAs administrative office is nearby and will monitor/provide added security for the site.

Scope of Work

1. **Identify and Delineate Project Perimeter and Perimeter Decision Unit Areas:** DUs FHMA-05 and FHMA-06 will be identified and delineated using GPS data points and field notes obtained from HDOH. FHMA-05 and FHMA-06 will be located using a backpack GPS device, with sub meter accuracy. FHMA-05 was documented to be approximately 121 ft by 21 ft. FHMA-06 is documented to be 144 ft by 30 ft. The boundaries of each DU will be temporarily marked with flags or stakes. In addition, the project site will be delineated and marked.

2. **Install Gravel and Boulders:** DUs FHMA-05 and FHMA-06 will be covered with approximately 3-4 inches of gravel. The gravel barrier will be extended well beyond the identified contaminated area. In addition, each DU will be enclosed by boulders (if not already present) to prevent vehicle traffic from entering the sites. The existing road through the project site will be graveled for trucks to gain access to the weigh station. Gravel will be spread around the perimeter of the concrete pad. In addition, the dirt access roads surrounding the site, including the road to the fueling station will also be graveled to prevent transfer of uncharacterized soil and dust from leaving the site.

3. **Install Perimeter Fence:** A fence will be installed along the perimeter of the project site except along the border of the canal. The fence and canal will restrict access to the project site as well as delineate the site. The fence type will be a cattle fence approximately 5 ft. tall. A minimum of one egress location will be identified for vehicle use during construction activities. A gated entrance and exit to allow trucks access to the weigh station is currently planned for long-term management of the site.. A separate egress location will be designated for personnel. Figure 4-1 indicates the approximate position of the cattle fence installation.

4. **Site Work**: The soil will be prepared in the area where the concrete pad will be installed. The soil under the concrete slab will be compacted to the plan's specified compaction rate.

5. **Grading:** Temporary grading practices will be used to minimize construction site erosion. These practices include, but are not limited to, **surface roughening** (directional tracking and tillage) and **temporary ditch sumps**. These practices shall be used in conjunction with other erosion control practices.

6. **Electrical Conduits**: Electrical conduits will be installed in the vicinity of the concrete pad location. The trench will be 3 feet below ground surface. The trench will be backfilled with the excavated material and compacted. No big rocks, boulders, or hard to dig obstacles will be used as backfill. Excess soil materials will be placed under the

concrete pad, although disposal at Kekaha Landfill, after required waste characteristic determination, is a feasible alternative.

7. **Concrete Work**: The concrete foundation and footings will be installed to contain three generators in steel containers, a 6,000-gallon fuel tank and a generator control panel. The concrete work will consist of installing two 12-in thick concrete slabs. The main slab will be 59.6 ft by 45.5 ft. The smaller slab will be 14.2 ft. by 20.5 ft. The smaller slab is designed to hold the 6,000-gallon fuel tank and the larger slab is for the remaining components. Open fuel chase lines measuring 4-inches by 12 inches will also be formed in the concrete slabs.

8. **Install Roof (optional)**: A commercial deep ribbed corrugated metal roof will be installed per manufacture's specification. The roof will be supported by 6 x 6-inch posts. The roof will have a 12 to 1 pitch.

9. **Install Additional Fencing (optional):** A commercial grade chain link fence with barbed wire will be installed surrounding the concrete slabs and associated equipment. The fence will be seven feet in height.

4.3 Final Interim Remedial Action Proposed

Based on the two alternatives examined, Alternative 2 is proposed as the final interim remedial action, if land use changes in the future, the remedial action will be revisited. This alternative was selected because it avoids and minimizes ground disturbance, including dust and erosion potential. Installing gravel as ground cover at FHMA-05 and FHMA-06 will control erosion, dust and limit human contact with soil. Long-term maintenance of the site will include ensuring the gravel and boulders remain in-place, and any vegetation left on-site is maintained.

In addition, KAA maintains these areas and has 24 hour security patrol restricting access to the site. Only members of the cooperative, contractors, or occupants of the office spaces are permitted to traverse through this area. Signage is present indicating access restrictions.

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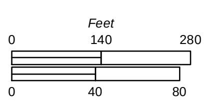

Figure 4-1
Managed Area Site Map
Kekaha, Kauai, Hawaii

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5.0 SOIL MANAGEMENT PLAN

The purpose of the Soil Management Plan (SMP) is to ensure that all aspects of the construction project are performed in a manner to minimize pollutant discharge and control site runoff. The information below establishes the minimal environmental protective measures required to properly manage contaminated soil pre- and post-construction activities. Please also refer to the HDOH-approved EHMP. The EHMP provides general guidelines on how to manage in-place impacted soil within the project site.

5.1 Health and Safety

As part of ADCs contract for the Installation of the Emergency Generators and associated Remedial Actions, all contractors will be required to follow Department of Labor and Industrial Relations, Hawaii State Occupational Safety & Health (HiOSH) requirements. Hawaii is one of 26 jurisdictions approved by the Federal Occupational Safety and Health Administration (OSHA) to operate its own state's safety and health program under Section 18(b) of the Occupational Safety and Health Act of 1970. HIOSH administers Hawaii's State Plan Program. This program has jurisdiction over most employment in the State in both the private and public sector, with some exceptions (such as domestic workers, U.S. Postal Service, maritime activity, e.g. shipbuilding, marine terminals and longshoring). While OSHA has jurisdiction over all Federal employment and private sector workers working in maritime activities, Hawaii has jurisdiction over private sector employment on Federal lands, including military bases, with the exception of any employment in any of the Hawaii National Parks. In addition, copies of this worklplan must be made available to all contractors for review and reference.

5.2 Excavation

While excavating soil at or around the project site the soil should be assumed to be contaminated with arsenic and dioxin/furans. Refer to Section 5.3 for how excavated soil will be handled, stockpiled and disposed of.

Erosion control measures will be evaluated and established prior to any excavation activities. Best Management Practices (BMPs) will be utilized to ensure all aspects of the project construction are performed in a manner to minimize erosion, pollutant discharge, and sediment transport during grading operations on construction sites.

In order to accurately remove the planned quantity of soil, an observer should be used when using a backhoe or excavator. The observer will direct the machine operator where to excavate and place the excavated material. All site workers should be positioned down-wind during excavation and be outfitted with proper Personal Protective Equipment (PPE).

Dust control BMPs should be implemented during excavation and handling of soil. At a minimum, **dust suppression** will be accomplished by spraying or wetting the excavation site and the stockpiled soil with a watering truck or by similar method. Care will be taken to ensure the soil is not over-wetted which may cause mud, puddles, or run-off. Work may need to be postponed due to extreme wind or rain.

5.3 Soil Management, Stockpile, and Disposal Procedures

All soil at or surrounding the project site will be managed from excavation to final placement of soil within the cattle fence boundary. The soil will be managed to ensure that no soil is removed or discharged from the site.

Erosion is a three-step process involving the detachment, transportation, and deposition particles. Common erosion types on the Mana Plane include sheet erosion, rill erosion, gully erosion, and wind erosion. Soil erosion and run-off will be minimized by implementing appropriate site grading and erosion control practices, along with construction BMPs.

1. For the protection of erodible soils, the earthwork will be planned and conducted in a manner as to minimize the disturbance to vegetative areas and duration of exposed soil. **Maintaining vegetative cover** during the construction process is the most effective erosion control practice because the roots of the vegetation bind soil. Temporary grading practices described above in Section 4.3 will be utilized to deter contaminated soil migration with stormwater. Upon completion of rough grading, side and back slopes will be protected, while earthwork is brought to a final grade. It is critical that the perimeter of the site is at a higher elevation than the surrounding area to contain any potentially contaminated soil on the project site.

2. Temporary protection of erodible soils will be accomplished by mechanically retarding and controlling rate of runoff from the construction site. These **sediment control practices** may include construction diversion ditches, berms, and use of silt fences and straw bales to retard and divert runoff. The goal of the silt fence is to serve as a secondary control and barrier to prevent migration of potentially contaminated soil particles during heavy rainfall.

3. **Erosion control measures** will be provided and maintained in accordance with the appropriate State and local regulations. Compost utilization controls erosion and reduces runoff, while mulch is used to protect the soil surface from the impact of raindrops or the erosive force of wind until vegetation cover is established. Adequate erosion and storm water control measures will be applied to prevent the runoff from onsite material staging and stockpiling areas offsite.

4. Materials will be stored and staged in a manner to prevent discharge offsite. Stockpiled soil needs to be secured with a plastic cover to prevent inadvertent removal of the covering in windy conditions and to prevent rain water from coming in contact with the potentially contaminated soil.

It is the intent of this plan to eliminate the need to stockpile altogether. If any soil is excavated from the project site boundary, it will be trucked within the project site. The soil will be stored temporarily until the site work is ready to be conducted. Any soil stored for more than 24 hours will be covered with plastic. Any excavated soil will be used during on-site construction of the concrete slab and to fill in the low areas or the project site. Once the soil is distributed over the area, the soil will be compacted. No soil will be removed or discharged via run-off from the site. All soil excavated from the adjacent areas will be store within the project site.

5.4 Vegetation Management and Disposal

Vegetation disturbances and/or removal will be minimized during the project. Except in areas to be cleared, trees and shrubs will not be removed.

5.5 Multi-Incremental Soil Sampling Approach

If soil sampling is necessary, multi-incremental sampling will be conducted. Multi-incremental sample collection requires the collection of a minimum of 30 small increments of soil from a decision unit and combining them into one soil sample. Thirty increments of an adequate mass (300 – 2,500 grams) will be representative of a decision unit, regardless of the size of the decision unit (HDOH 2009). Thirty increment samples will be taken at each of the DUs, FHMA-05 and FHMA-06. Surface soil will be collected from each increment at a depth between 0-3 inches bgs after 1 ft. of soil is excavated. Then the incremental sample will be combined into a single sample, called the bulk sample, for laboratory analysis.

The locations of the sample sites will be selected using a systematic random approach, with one in each of the 2 DUs. Each sample will be collected using a 20 lb. hammer to pound a 3-inch interior-diameter soil core to 3 inches bgs. Approximately 2 ounces of soil will be collected at each of the 30-increment sub-sample locations to make up the bulk sample. The bulk sample, weighing approximately 60 ounces total, will be placed in a dedicated plastic bag lining a five-gallon plastic bucket. The sample will be labeled and put in a cooler of ice to keep the samples at a temperature of 4° Celsius or lower. Field replicate samples will not be implemented for the confirmation sampling. Laboratory chain-of-custody procedures will be followed for each sample sent to the laboratory.

A list of sampling equipment and supplies are summarized below.

Sampling Equipment

- Slide hammer with soil coring capabilities
- Disposable nitrile gloves
- Stainless steel bowls
- Stainless steel trowels

Sampling Containers

- Large top lock bags

5.6 Laboratory Analytical Procedures

5.6.1 Sub-Sampling for Laboratory Analysis

The bulk sample for each DU will be approximately 5 lbs. of soil. Upon receipt of the sample, the laboratory will reduce the bulk sample down to an analytical sample by drying the bulk sample and putting it through a 2 mm sieve. Pebbles and sticks greater than 2 mm will be removed from the analytical sample.

5.6.2 Laboratory Sample Preservation Procedures

The samples will be collected using containers and preservation techniques deemed appropriate by the sampling and preservation guidelines of the United States Environmental Protection Agency (EPA). All sample containers and preservatives will be provided by the contracted laboratory.

5.6.3 Laboratory Analytical Procedures

The samples will be analyzed by Test America, in Aiea, Hawaii, or a similar qualified analytical laboratory. The following analysis will be performed on each MISC:

- Dioxins/Furans by EPA Method 8290
- Chlorinated Herbicides by EPA Method 8151A
- Heavy Metals by EPA Methods 6010b & 7471
  - Should total arsenic exceed 20 mg/kg, analysis for bioaccessible arsenic will follow.

The Quality Assurance/Quality Control (QA/QC) measures will follow standard approved laboratory protocols.

5.6.4 Sample Chain-of Custody and Transportation

All samples will be labeled using sample labels provided by the contracted laboratory. Each sample will be assigned a unique sample identification number that will be included on each label with the date and time of collection and the sampler’s initials. Once the sample is collected it will be isolated in a self-sealing plastic bag and placed in a portable cooler on ice in preparation for shipment to the laboratory.

Samples will be shipped under appropriate chain-of-custody procedures. A preprinted chain-of-custody form will accompany samples from their time of collection and processing in the field through submittal to the analytical laboratory. Chain-of-custody forms to accompany the samples during shipment to the analytical laboratory will be placed in a sealed plastic bag and included inside the shipping container. To document the transfer of samples from the field to the receiving laboratory, a representative of the laboratory will sign the accompanying chain-of-custody form upon arrival of the shipping container at the laboratory.

Chain-of-custody forms will include the following information:

- Project name and number
- Sampling location, date, and time
- Sample identification
- Number of unique sample containers for a sample
- Type of sample containers
- Sample preservative (if any)
- Number of samples addressed on the chain-of-custody form
- Type of analysis required for each sample
- Special instructions (if any)
- Signatures indicating sample relinquishment and receipt

Following sample collection all samples will be kept in insulated coolers with ice, or taken to a secured located and transferred from the insulated cooler to a refrigerator or freezer (as appropriate) until shipment. All samples will be repacked for next-day shipment to the contracted laboratory via Federal Express or an equivalent carrier. Samples will be received and analyzed within the appropriate holding times and temperature requirements.

5.6.5 Quality Assurance/Quality Control

Quality assurance (QA) requirements will be conducted according to the referenced analytical method. Both the analyst and experienced data reviewer will review the analytical data at the laboratory; as a result, a complete and user-friendly database will allow an external data auditor to easily reconstruct the analytical process.

The analyst ensures that:

- Sample preparation and analysis information is correct and complete
- Appropriate standard operating procedures were followed during analysis
- Analytical results are correct and complete
- Quality control (QC) samples were within established control limits
- Documentation, including the case narrative, is complete

The data reviewer ensures that:

- Calibration data are scientifically sound and method compliant

- QC samples were within established guidelines
- Qualitative and quantitative results are correct
- Documentation and the case narrative are complete
- The database is complete and ready for document archiving

5.6.6 Quality Assurance/Quality Control Data Objectives

Field and laboratory QA/QC procedures will be implemented to ensure that the data gathered during the field investigation will meet the needs of the project objectives. Field activities will be performed as previously described.

Analytical data generated will follow EPA methods (SW-846 protocols), and laboratory Standard Operating Procedures (SOPs) and QA/QC guidelines for sample analysis. Adequate reporting levels of the chemicals of concern are dependent on the sample matrix, naturally occurring background concentrations, and laboratory instrumentation.

5.7 Decontamination Procedures

Disposal equipment to be used will be dedicated to each specific sample. Such equipment will be disposed of following each sample collection and will be used as much as possible to prevent cross-contamination. When use of disposable equipment is not possible, sampling equipment that comes in contact with the soil during sample collection will be decontaminated between DUs. Decontamination will require the use of Alcanox™ (or a similar biodegradable non-phosphate detergent), steam distilled water, nylon bristled scrub brushes, 5-gallon plastic bucket, plastic sheeting, and individually packaged absorbent paper towels. Decontamination procedures will be conducted according to the following steps:

1. Large clumps of soil or organic matter will be removed from reusable sampling equipment
2. Thorough scrubbing of sampling equipment with Alcanox™ (or a similar biodegradable non-phosphate detergent) to remove smaller particles and residual contaminants
3. First rinse with tap water
4. Second and third rinse with distilled water
5. Dry thoroughly with absorbent paper towel

5.8 Investigation Derived Waste

Waste such as disposable equipment and PPE will be sealed in plastic bags and disposed of in a municipal waste receptacle. All re-usable equipment will be decontaminated as described above. The decontamination water will be collected in a bucket and re-infiltrated within the project boundary. All soil will remain with the project site boundary.

6.0 REFERENCES

Clayton Group Services (Clayton). 2003. Phase I Environmental Site Assessment. TMK: (4)1-2-02: Parcel 01. Kekaha, Kauai, Hawaii. August 7.

Hawaii Department of Health (HDOH). 2008. Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater. Prepared by the Environmental Management Division. Summer 2008 (Updated March 2009).

HDOH. 2009. Technical Guidance Manual for the Implementation of the Hawaii State contingency Plan. Interim Final. June 21.

HDOH. 2010a. Update to Soil Action Levels for Arsenic and Recommended Soil Management Practices. Memo from Roger Brewer, Ph.D., Environmental Risk Assessor, HEER through Barbara Brooks, Ph.D., Toxicologist, HEER. October.

HDOH. 2010b. Update to Soil Action Levels for TEQ Dioxins and Recommended Soil Management Practices. Memo from Roger Brewer, Ph.D., Environmental Risk Assessor, HEER, through Barbara Brooks, Ph.D., Toxicologist, HEER. June.

TEC, Inc (TEC). 2010. Sampling and Analysis Plan Phase II Environmental Site Assessment, Portion of TMK No.: (4) 1-2-02:001, Kekaha, Kauai, Hawaii. Prepared for Agribusiness Development Corporation, 235 South Beretania Street, Room 205, Honolulu, HI 96813. October.