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**VIETNAM**

# ENVIRONMENTAL REMEDIATION AT DA NANG AIRPORT

## Final Remediation Work Plan

**USAID**

**March 18, 2011**

# Contents

## **SECTION I INTRODUCTION**

1.1	Background.....	1-1
1.2	Project Description.....	1-4
1.3	Remediation Objectives.....	1-5
1.4	Regulatory Requirements.....	1-5

## **SECTION 2 ROLES AND RESPONSIBILITIES**

2.1	Project Stakeholders.....	2-1
2.2	USAID Construction Management Contractor.....	2-2
2.3	Dig and Haul Contractor.....	2-2
2.3.1	Submittals.....	2-4
2.4	In-Pile Thermal Desorption Contractor.....	2-4
2.4.1	Submittals.....	2-5

## **SECTION 3 CONSTRUCTION AND OPERATION ACTIVITIES**

3.1	Pre-Work Activities.....	3-1
3.1.1	Site Access and Permits.....	3-1
3.1.2	Site Clearance.....	3-1
3.1.3	Kick-Off Meeting.....	3-1
3.1.4	Pre-Work Conference.....	3-1
3.1.5	Component-Specific Pre-Mobilization and Equipment Layout Plans.....	3-2
3.1.6	Component-Specific Implementation Plans.....	3-2
3.1.7	Component-Specific Health and Safety Plan.....	3-3
3.1.8	IPTD Treatment-Specific Sampling and Analysis Plan/Quality Assurance Project Plan.....	3-4
3.1.9	Site-Wide Traffic Control Plan.....	3-5
3.1.10	Site-Wide Environmental Protection Plan.....	3-5
3.2	Work Activities.....	3-7
3.2.1	Mobilization and Site Preparation.....	3-7
3.2.2	Construction and Operation Implementation.....	3-8
3.2.3	Progress Meetings.....	3-11
3.2.4	Progress Reports.....	3-12
3.2.4.1	Monthly Reports.....	3-12
3.2.4.2	Quarterly Reports.....	3-12
3.2.5	IPTD Operations and Maintenance Manual.....	3-12
3.2.6	As-Built Records and Drawings.....	3-13
3.2.7	Daily Housekeeping.....	3-14
3.2.8	Temporary and Seasonal Shutdown.....	3-14

3.3	Post-Work Activities.....	3-14
3.3.1	Post-Construction Clean-Up .....	3-14
3.3.2	IPTD Decommissioning and Demobilization.....	3-14
3.3.3	Final As-Built Records and Drawings .....	3-15
3.3.4	Final Report.....	3-15
<b>SECTION 4</b>	<b>PROJECT SCHEDULE .....</b>	<b>4-1</b>
<b>SECTION 5</b>	<b>REFERENCES.....</b>	<b>5-1</b>

## FIGURES

Figure 1	Dioxin Hotspots Identified at Da Nang Airport.....	1-3
Figure 2	Project Organizational Chart.....	2-2

## TABLES

Table 1	Volume and Area of Contaminated Material .....	1-4
Table 2	Maximum and Average Concentrations of Contaminated Material .....	1-4
Table 3	Phase I Excavation Locations and Adjusted Volumes.....	3-9
Table 4	Phase II Excavation Locations and Adjusted Volumes.....	3-9

## ACRONYMS AND ABBREVIATIONS

ACI	American Concrete Institute
Airport	Da Nang Airport
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
BMP	best management practice
°C	degrees Celsius
CAAV	Civil Aviation Administration of Vietnam
CFR	Code of Federal Regulations
CM	Construction Management
D&H	Dig and Haul
DQO	data quality objective
EPP	Environmental Protection Plan
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
GAC	granular activated carbon
GVN	Government of Vietnam
ha	hectare
H&S	health and safety
HASP	Health and Safety Plan
Hatfield	Hatfield Consultants
IBC	International Building Code
IDW	investigation-derived waste
IEEE	Institute of Electric and Electronic Engineers
IPTD	In-Pile Thermal Desorption
km <sup>2</sup>	square kilometer
m <sup>2</sup>	square meter
m <sup>3</sup>	cubic meter
MAA	Middle Airports Authority
MAC	Middle Airports Corporation
MLA	former Mixing and Loading Area
MND	Vietnamese Ministry of National Defense
MOI	Memorandum of Intent
MoNRE	Ministry of Natural Resources and Environment
MSDS	Material Data Safety Sheet
MUTCD	Manual on Uniform Traffic Control Devices
NEMA	National Electric Manufacturers Association
NESC	National Electric Safety Code

NIST	National Institute of Standards and Technology
NTP	Notice to Proceed
Office 33	Office of the National Steering Committee 33
O&M	Operations and Maintenance
OSHA	United States Occupational Safety and Health Administration
PISA	former Pacer Ivy Storage Area
PMP	Performance Monitoring Plan
PPE	personal protective equipment
ppt	parts per trillion
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RWP	Remediation Work Plan
SA	former Storage Area
SAP	Sampling and Analysis Plan
TCDD	tetrachlorodibenzo-p-dioxin
TCP	Traffic Control Plan
TCVN	Vietnam National Standard
TEQ	toxicity equivalent
TTZ	Thermal Treatment Zone
UCL	upper confidence limit
UL	Underwriters Laboratories, Inc.
U.S.	United States
USAID	United States Agency for International Development
USG	United States Government
USEPA	United States Environmental Protection Agency
UXO	unexploded ordnance
VAST	Vietnam Academy of Science and Technology

# Section I

## Introduction

Areas within the Da Nang Airport (Airport) property have been referred to as dioxin "hotspots" due to investigations revealing high dioxin concentrations remaining decades after large volumes of Agent Orange and other defoliants were handled at these sites. The Government of Vietnam (GVN) has requested assistance from the United States Government (USG) to remediate dioxin-contaminated soil and sediment at the Airport.

The purpose of this Remediation Work Plan (RWP) is to provide a framework for planned remediation and to define the roles and responsibilities of all project entities and personnel. The RWP will serve as a guidance document as remediation proceeds.

### 1.1 Background

Da Nang City has a population of approximately 825,000 persons as of 2008, with an average population density of about 640 persons per square kilometer (km<sup>2</sup>). The Airport property is located within the urban part of Da Nang City and is surrounded by three urban districts: Hai Chau on the northeast and east; Thanh Khe on the northwest and west, and Cam Le on the southwest, south, and southeast. The three districts are densely-populated, with most of the land in these districts used for housing, industrial facilities, transportation, and other facilities. A number of people reside on the western edge of the Airport property, between the western boundary and the active runways. These are likely military personnel and their families (United States Agency for International Development [USAID] 2010a).

The Airport property is located within Da Nang City and is used by both the Vietnamese Ministry of National Defense (MND) and the Middle Airports Corporation (MAC) under the Civil Aviation Administration of Vietnam (CAAV). It has a total area of 820 hectare (ha), of which 150 ha are allocated to civil aviation, and the remaining 670 ha are under the jurisdiction of the MND. It is an international airport, with flights arriving from and departing to cities such as Bangkok, Vientiane, Hong Kong, Phnom Penh, and Taipei. MAC is currently expanding the Airport and requires dioxin removal from the northern area of the airport property to allow for extension of the runway and expanded taxiways (USAID 2010a).

Dioxin is a toxic chemical associated with a range of health effects. 2,3,7,8- tetrachlorodibenzo-p-dioxin (TCDD) is the most toxic form of dioxin, and was the main congener present in the Agent Orange mixture. In the main hotspot areas of the Airport, TCDD comprises greater than 90 percent of the toxicity equivalent (TEQ), indicating Agent Orange as the source of contamination. GVN has established a national cleanup standard for dioxin of 1,000 parts per trillion (ppt) TEQ in soil and 150 ppt TEQ in sediment (USAID 2010a).

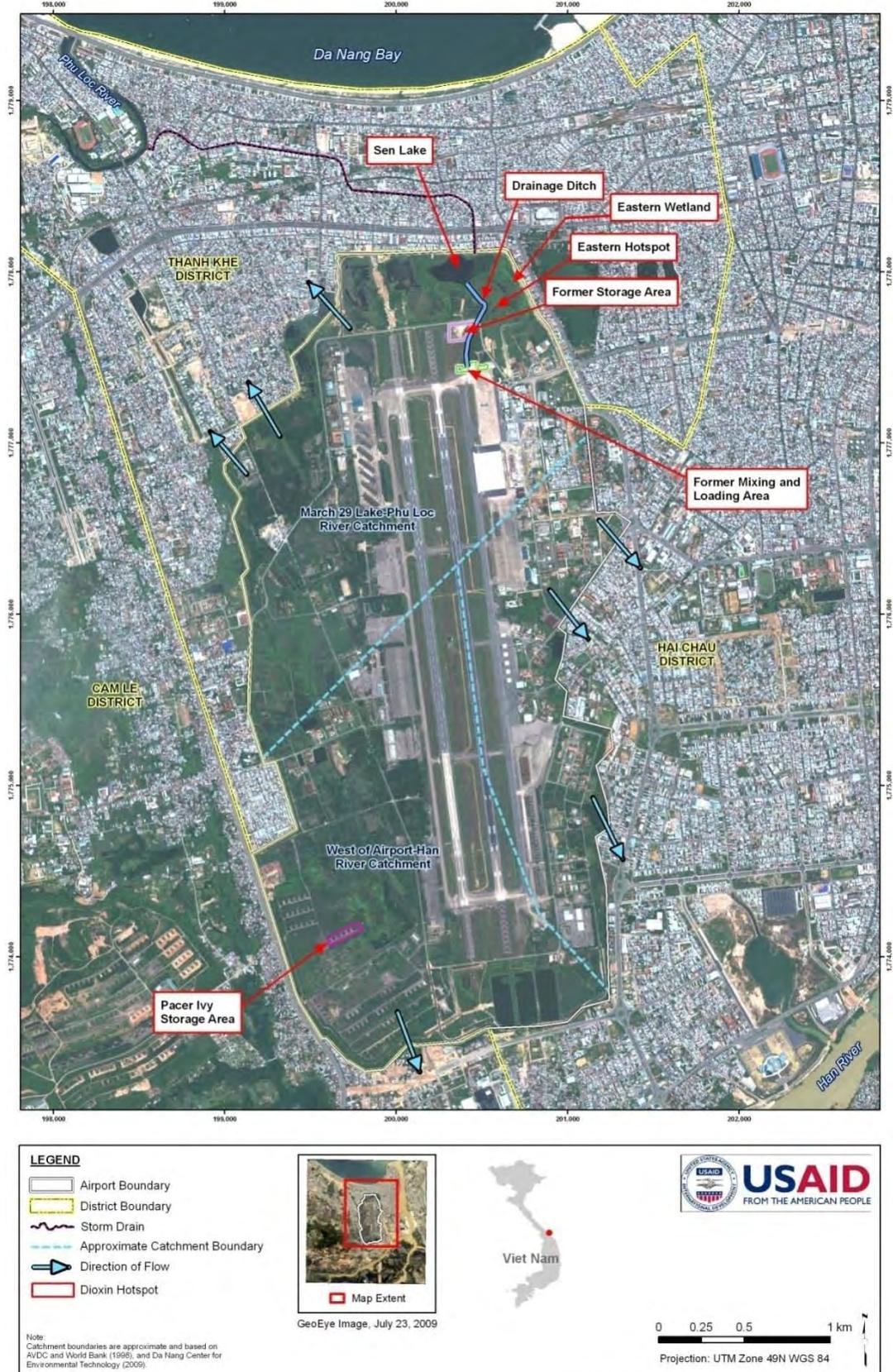
Data from studies conducted from 1997 to 2010 by the 10-80 Division of the Ministry of Health, the Vietnam Academy of Science and Technology (VAST), the Ministry of Natural Resources and Environment (MoNRE), MND, Office of the National Steering Committee 33 (Office 33), the United States Environmental Protection Agency (USEPA), Hatfield Consultants (Hatfield), and USAID have been used to characterize the level and extent of dioxin contamination at the Airport. Dioxin hotspots

identified at the Airport are primarily located in the northern portion of the Airport property (Figure 1) and include the following areas:

- 1.1 ha former Mixing and Loading Area (MLA)
- 1.8 ha former Storage Area (SA)
- 3.3 ha Drainage Ditch
- 1.9 ha Area between Eastern Wetland and Drainage Ditch (including the Eastern Hotspot)
- 10.8 ha Sen Lake and Eastern Wetland
- 0.3 ha former Pacer Ivy Storage Area (PISA)

Using the GVN dioxin cleanup goals for soil and sediment, the remediation effort will need to address an approximate volume of 72,900 cubic meters (m<sup>3</sup>) of contaminated material in the six hotspots at the Airport. Table 1 provides the minimum estimated excavation volume (m<sup>3</sup>) and footprint (square meters [m<sup>2</sup>]) for each hotspot (not including unforeseen allowances). Table 2 provides the maximum and average dioxin concentrations for each hotspot.

Figure I: Dioxin Hotspots Identified at Da Nang Airport



K: Data Project USAID/151 GIS\_MXD/EA/USAID/151\_EA\_Map\_0\_Project/revrview\_2010/0528.mxd

**Table 1. Volume and Area of Contaminated Material**

<b>Hotspot</b>	<b>Minimum Volume (m<sup>3</sup>)</b>	<b>Area (m<sup>2</sup>)</b>
Former Mixing and Loading Area	13,200	11,000
Former Storage Area	10,700	17,500
Drainage Ditch (soil)	6,700	24,600
Drainage Ditch (sediment)	3,700	8,300
Area between Eastern Wetland and Drainage Ditch	6,000	18,700
Sen Lake and Eastern Wetland	31,100	107,900
Former Pacer Ivy Storage Area	1,500	3,400
<b>Total</b>	<b>72,900</b>	<b>191,400</b>

Reference: USAID 2010b.

**Table 2. Maximum and Average Concentrations of Contaminated Material**

<b>Hotspot</b>	<b>Maximum 2,3,7,8-TCDD (as TEQ) Concentration (ppt)</b>	<b>Average 2,3,7,8-TCDD (as TEQ) Concentration (ppt)</b>
Former Mixing and Loading Area	365,000	17,500
Former Storage Area	106,000	9,000
Drainage Ditch	13,100	5,600 (soil), 3,700 (sediment)
Sen Lake, Eastern Wetland, and Area between Eastern Wetland & Drainage Ditch	6,820	1,400
Former Pacer Ivy Storage Area	20,600	1,300

Reference: USAID 2010b.

## 1.2 Project Description

In-Pile Thermal Desorption (IPTD) will be implemented to treat the soil and sediment contaminants of concern (i.e., TCDD) that is present at the Airport due to handling of Agent Orange in Vietnam. The remediation project is separated into three primary components:

- Dig and Haul (D&H)
- IPTD pile structure
- IPTD treatment system

The D&H contractor shall be responsible for the first two components, which include the excavation, handling, and transportation of contaminated soil as well as the construction of the IPTD pile structure.

The IPTD contractor shall be responsible for the installation, operation, and maintenance of the thermal system in the IPTD pile structure.

In order to treat the large volume of contaminated sediment and soils identified at the Airport, a two-phased approach will be implemented to incrementally treat the contaminated soils and sediments. For Phase I, approximately one-half of the contaminated soil/sediment will be excavated, an IPTD structure will be built and filled with the excavated soil/sediment (sediments will be stockpiled outside the IPTD structure and allowed to undergo free drainage prior to being placed into the IPTD structure), and the soils/sediments will be treated using IPTD. Following completion of the Phase I treatment, the treated

soils/sediments will be removed from the IPTD pile structure and placed in designated areas by the D&H contractor. For Phase II, the remaining soil/sediment will be excavated and used to refill the IPTD structure, treated, and removed.

### **1.3 Remediation Objectives**

The GVN has established a national cleanup standard for dioxin of 1,000 ppt TEQ in soil and 150 ppt TEQ in sediment per Vietnam National Standard (TCVN) 8183:2009 (National Standard 8183: Dioxins threshold in the soil and sediment). The overarching remedial goal is to achieve concentrations of dioxin in soils and sediment less than the GVN national cleanup standards using the 95percent upper confidence limit (UCL) of the mean for the IPTD-treated piles.

### **1.4 Regulatory Requirements**

All contractors shall comply with the following Vietnamese laws, regulations, codes, and standards presented below.

- Circular 04/2007/TT-BKH: Guiding the Implementation of the Regulation on Management and Utilization of Official Development Assistance (to be used in conjunction with Decree 131/2006/ND-CP).
- Decree 131/2006/ND-CP: Issuance of Regulation on Management and Utilization of Official Development Assistance.
- Circular 03/2007/TT-BKH: Guiding the Organizational Structure, Functions, and Responsibilities of ODA Program or Project Management Units.
- Law No. 52-2005-QH11: Law on Protection of the Environment.
- Decree No. 80/2006/ND-CP: Detailing and Guiding the Implementation of the Law on Environmental Protection.
- Decree No. 21/2008/ND-CP: Amending Law on Environmental Protection.
- Law No. 16-2003-QH11: Law on Construction.
- Decree No. 209/2004/ND-CP: Quality Management of Construction Works.
- Decree No. 49/2008/ND-CP: Amending Quality Management of Construction Works.
- Circular No. 12/2006/TT-BTNMT: Guiding the Practice Conditions, Procedures for Documentation, Registration and Licensing of Practice and Hazardous Waste Management Identification Numbers.
- Decision No. 155/1999/QĐ-TTĐ: Regulation on Management of Hazardous Wastes.
- Circular No. 04/2008/TT-BTNMT: Guiding the Formulation and Approval or Certification of Environmental Protection Schemes and the Examination and Inspection of Implementation of Environmental Protection Schemes.
- Decree No. 81/2010/ND-CP: Civil Aviation Security Requirements for Airport Work.
- Decree No. 68/2005/ND-CP: On Chemical Safety.
- TCVN 8183:2009: National Standard for Dioxins Threshold in Soil and Sediment.

- QCVN 03:2008/BTNMT: National Technical Regulations on the Allowable Limits of Heavy Metals in Soils.
- QCVN 06:2009/BTNMT: National Technical Regulation on Concentration of Hazardous Substances in Air.
- QCVN 20:2009/BTNMT: National Technical Regulation on Industrial Emission of Organic Substances.
- QCVN 08:2008/BTNMT: National Technical Regulation on Surface Water Quality.

Each contractor, along with all equipment, components, and auxiliaries, shall be in conformance with all applicable laws and applicable industry codes and standards in effect as of the date of submission of the contractor's proposal. The following list of organizations that maintain international and U.S. codes and standards is provided for reference purposes only:

- American Concrete Institute (ACI)
- American National Standards Institute (ANSI)
- American Society of Civil Engineers (ASCE)
- American Society of Mechanical Engineers (ASME)
- American Society of Testing and Materials (ASTM)
- Code of Federal Regulations (CFR of USEPA)
- Federal Aviation Administration (FAA)
- Institute of Electric and Electronic Engineers (IEEE)
- International Building Code (IBC)
- National Electric Manufacturers Association (NEMA)
- National Electric Safety Code (NESC)
- National Institute of Standards and Technology (NIST)
- Underwriters Laboratories, Inc. (UL)

# Section 2

## Roles and Responsibilities

The following section outlines the roles and responsibilities of all parties responsible for implementation of each component of dioxin remediation at the Airport. The goal of this section is to establish and define the role and relationship between government and contractor to facilitate site communications, enable more effective implementation of construction and operations, and avoid work activity redundancies.

### 2.1 Project Stakeholders

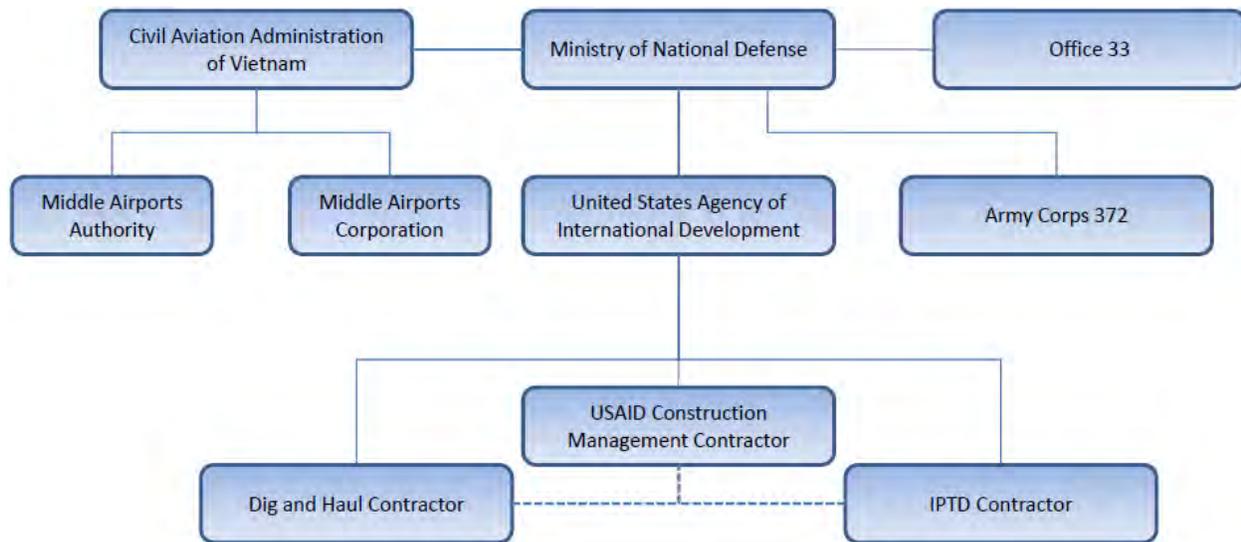
GVN has requested assistance from the USG to remediate dioxin-contaminated soil and sediment at the Airport. This assistance is being provided by the USAID with funding and technical support to design and implement IPTD to reduce dioxin concentrations in the Airport soil and sediment below GVN cleanup goals.

In December 2010, MND and USAID signed a Memorandum of Intent (MOI) to confirm their mutual desire to cooperate on efforts to remediate the effects of dioxin contamination at the Airport. The MOI identifies MND's Department of Science, Technology and Environment as the department responsible for coordinating implementation and assessment of the Airport remediation project and establishes USAID's intent to collaborate with authorized MND and Vietnamese entities to provide technical assistance, design, and construction services necessary to implement the project.

MND is the Project Owner and the responsible GVN ministry for remediation. MND and USAID will work closely with other GVN entities to coordinate and implement the remediation project. Other GVN project stakeholders are listed below, and Figure 2 provides an organizational chart identifying the lines of authority and communication between the project stakeholders.

- Office 33 is responsible for the implementation of the GVN dioxin policy for Vietnam and will provide technical assistance during construction and operations to ensure that GVN dioxin policy is properly implemented.
- Army Corps 372 is subordinate to MND and responsible for military property/activities at the Airport. All onsite project activities must be coordinated through Army Corps 372, including but not limited to, gaining the appropriate access permissions for personnel and equipment, storing equipment, site layout plans, and site security.
- The CAAV is responsible for all civil airports in Vietnam. MAC and the Middle Airports Authority (MAA) are the designated agencies under CAAV that are responsible for civilian property activities at the Airport. All onsite project activities must be coordinated through MAC and MAA, including but not limited to, gaining the appropriate access permissions for personnel and equipment, storing equipment, site layout plans, and site security.

**Figure 2: Project Organizational Chart**



## 2.2 USAID Construction Management Contractor

The USAID Construction Management (CM) contractor shall provide technical and health and safety (H&S) oversight of each contractor's activities.

The USAID CM contractor is responsible for the following site-specific tasks:

- Provide oversight of all construction and operational activities performed by the D&H and IPTD contractors to ensure compliance with approved project plans (e.g., contract drawings technical specifications, environmental protection plans, health and safety plans) and project remedial criteria.
- Document oversight and H&S activities as necessary.
- Evaluate engineering controls (e.g., stormwater controls, dust suppression techniques) and traffic management controls and recommend modifications to work practices as necessary. Notify the D&H contractor if deficiencies exist.
- Implement the site-wide Sampling and Analysis Plan (SAP) that includes dust and air monitoring, soil and sediment confirmation sampling, post-treatment soil/sediment confirmation sampling, decontamination water sampling, and dewatering discharge sampling.

## 2.3 Dig and Haul Contractor

The D&H contractor shall provide all site controls and construction services related to the D&H and IPTD pile structure components and their associated tasks.

The D&H contractor is responsible for the following site-specific tasks:

### **Pre-Work Responsibilities**

- Attend pre-work meetings;
- Develop and submit a D&H-specific Pre-Mobilization and Equipment Layout Plan;
- Develop and submit a D&H-specific Implementation Plan;
- Develop and submit a D&H-specific Health and Safety Plan (HASP);
- Develop and submit a site-wide Traffic Control Plan (TCP) and a site-wide Environmental Protection Plan (EPP); and,
- Develop and submit any additional documents required by the contract drawings and specifications (USAID 201 Ia).

### **Work Responsibilities**

- Mobilize necessary personnel and equipment to the site.
- Implement necessary elements of the submitted pre-work activity plans.
- Responsible for implementing TCP and EPP at all times, including during seasonal shutdown periods.
- Implement construction of the D&H and IPTD pile structure components in accordance with contract drawings and specifications (USAID 201 Ia). These activities generally include, but are not limited to:
  - Construct site access roads;
  - Clear and grub
  - Excavate and haul soils and sediments;
  - Dewater sediments;
  - Construct an IPTD pile structure for the IPTD contractor's use;
  - Place soils/sediments in the IPTD pile structure;
  - Remove soils/sediments from the IPTD pile structure following treatment by the IPTD contractor; and
  - Dismantle the IPTD pile structure at the completion of the project.
- A borrow source for clean fill is not available on the airport property. The D&H contractor shall identify a borrow source that meets the specification requirements and haul the material to the site.
- Maintain as-built record drawings throughout all stages of construction and operation activities.
- Participate in progress meetings.

### **Post-Work Responsibilities**

- Restore all temporarily disturbed areas (i.e., temporary facility pads, equipment storage areas, etc.) to their original condition;
- Provide a final set of as-built records and drawings; and,
- Demobilize from site.

### 2.3.1 Submittals

The D&H contractor shall be required to submit the following documents to USAID:

- D&H-specific Pre-Mobilization and Equipment Layout Plan (see Section 3.1.5)
- D&H-specific Implementation Plan (see Section 3.1.6)
- D&H-specific HASP (see Section 3.1.7)
- Site-wide TCP (see Section 3.1.9)
- Site-wide EPP (see Section 3.1.10)
- D&H as-built records and drawings (see Section 3.3.3)
- D&H final report (see Section 3.3.4)
- Additional documents as required by the contract drawings and specifications.

## 2.4 In-Pile Thermal Desorption Contractor

The IPTD contractor shall provide all construction services related to the IPTD treatment system component and its associated tasks.

The IPTD contractor is responsible for the following site-specific tasks:

### **Pre-Work Responsibilities**

- Attend Pre-Work Meetings;
- Develop and submit an IPTD treatment-specific Pre-Mobilization and Equipment Layout Plan; Coordinate with the D&H contractor to minimize the footprint of equipment laydown/staging areas;
- Develop and submit an IPTD treatment-specific Implementation Plan;
- Develop and submit an IPTD treatment-specific SAP/Quality Assurance Project Plan (QAPP);
- Develop and submit an IPTD treatment-specific HASP; and,
- Develop and submit any additional documents required by the contract documents (TerraTherm 2011).

### **Work Responsibilities**

- Mobilize necessary personnel and equipment to the site;
- Implement necessary elements of the submitted pre-work activity plans;
- Implement construction, operation, and maintenance of the IPTD treatment system in accordance with contract drawings and specifications (TerraTherm 2011). These activities generally include, but are not limited to:
  - Installation of heaters, temperature monitoring points, etc.;
  - Installation of wells and piezometers; and,
  - Monitoring and operation of treatment system performance.
- Maintain as-built record drawings throughout all stages of construction and operation activities; and,

- Participate in progress meetings.

**Post-Work Responsibilities**

- Restore all temporarily disturbed areas (i.e., temporary facility pads, equipment storage areas, etc.) to their original condition;
- Provide a final set of as-built records and drawings; and,
- Develop and submit the IPTD Operations and Maintenance (O&M) Manual
- Demobilize from site

**2.4.1 Submittals**

The IPTD contractor shall be required to submit the following document to USAID:

- IPTD treatment-specific Pre-Mobilization and Equipment Layout Plan (see Section 3.1.5)
- IPTD treatment-specific Implementation Plan (see Section 3.1.6)
- IPTD treatment-specific HASP (see Section 3.1.7)
- IPTD treatment-specific SAP/QAPP (see Section 3.1.8)
- IPTD O&M Manual (see Section 3.2.5)
- IPTD as-built records and drawings (see Section 3.3.3)
- IPTD final report (see Section 3.3.4)
- Additional documents as required by the contract drawings and specifications

# Section 3

## Construction and Operation Activities

### 3.1 Pre-Work Activities

#### 3.1.1 Site Access and Permits

Each contractor shall provide a list of personnel and equipment to USAID prior to arriving onsite. USAID will coordinate with MND, CAAV (including MAC and MAA), and other appropriate GVN representative(s) to obtain site access permission. Specific instructions for site access shall be coordinated between all parties during the Pre-Work Conference.

The USAID CM contractor shall identify what permits are required (e.g., stormwater runoff, construction, electrical, discharge) and each contractor may be responsible to provide the USAID CM contractor with backup/specifications needed to prepare and submit permit applications to the relevant Vietnamese agency. Each contractor must meet substantive requirements of all permits if NOT required.

At this time, the specific permits that shall be required to perform this work are unknown. USAID is currently discussing permit requirements with the GVN and will provide this information as soon as available.

#### 3.1.2 Site Clearance

Prior to the D&H contractor's site mobilization, unexploded ordnance (UXO) and site utilities shall be cleared. UXO and utility clearance activities shall be coordinated by USAID and MND. If the entire site is not cleared before work activities are scheduled to begin, then USAID will coordinate with each contractor to delineate areas not yet cleared and considered "off-limits." Each contractor shall be made aware by USAID when final portions of the site have been cleared. Clearance priority will be given to Phase I excavation areas (i.e., MLA, SA, south end of drainage area, and south end of eastern wetland) and IPTD pile structure location.

#### 3.1.3 Kick-Off Meeting

Shortly after issuance of the Notice to Proceed (NTP) to each contractor, a Kick-Off Meeting will be held between each contractor and USAID, USAID CM contractor, the Airport Authorities, and other appropriate GVN representative(s) to discuss project schedules and site mobilization, including anticipated site personnel and equipment to be used. Procurement of required materials will also be discussed to avoid potential delays with the procurement process. USAID and USAID's CM contractor shall assist the IPTD contractor (and others if necessary) with the customs clearance process. Questions concerning administrative requirements or any other aspect of the project will be addressed at this time.

#### 3.1.4 Pre-Work Conference

Prior to the start of construction and after issuance of the NTP, a Pre-Work Conference will be held between each contractor and USAID, USAID CM contractor, MND, CAAV (including MAC and MAA), and other appropriate GVN representative(s). Attendance by the responsible contractor's project manager, quality control (QC) personnel, site H&S personnel, and others as deemed necessary, will be required.

The purpose of the Pre-Work Conference is to review site access requirements, submittals, safety, payrolls and labor relations, environmental protection, project schedules and payment, and procurement of materials. A brief overview on safety shall be conducted that includes: work procedures; identified hazards; hazard controls; heavy equipment to be used; identification of task-specific training for employees; decontamination procedures, and self-monitoring of safety compliance (e.g., regular safety inspections). Employee H&S training shall be completed before work begins.

Each contractor shall submit four copies of the required plans (excluding the O&M Manual, as-built and record drawings, and final report), as listed in Section 2.3.1 (D&H contractor) and 2.4.1 (IPTD contractor), for USAID review prior to the Pre-Work Conference.

Deficiencies in the project schedule or any of the plans will be discussed at the Pre-Work Conference. Each contractor shall make all necessary amendments required and resubmit for approval. This procedure will continue until final written approval from USAID is received. The contractor shall make necessary effort so that only one submittal is required.

**Plans must be approved and accepted by USAID prior to commencing onsite work.**

### **3.1.5 Component-Specific Pre-Mobilization and Equipment Layout Plans**

Each contractor shall develop a Pre-Mobilization and Equipment Layout Plan for their specific component(s) that will include specifications of all equipment and materials that will be imported into Vietnam for the construction and operation activities. All imported equipment and materials must receive customs clearance prior to being transported to Vietnam. USAID and USAID's CM contractor shall assist the IPTD contractor (and others if necessary) with the customs clearance process.

The Equipment Layout portion of this plan will show, at a minimum, the location and dimensions of temporary facilities (including layouts and details, equipment and material storage area [onsite and offsite]), and access and haul routes, avenues of ingress/egress to the fenced project area, and details of the fence installation.. The plan will also identify if a supplemental or secondary equipment storage area is desired. It is required that the locations of safety and construction fences, site trailers, construction entrances, and worker parking areas be illustrated in this plan.

### **3.1.6 Component-Specific Implementation Plans**

Each contractor shall develop an Implementation Plan for their specific component(s) for construction and operation activities that addresses the following:

- Proposed accomplishments
- Implementation schedule
- Implementation approach
- Coordination mechanisms among project entities
- Contractor organizational structure and onsite/offsite personnel
- Approach to collaboration with counterparts
- Performance Monitoring Plan (PMP)

- Quality Assurance (QA) /QC Plan

The PMP will establish project objectives and indicators of success and describe how the contractor will ensure achievement of the objectives. It will establish specific and interim monitoring points (or milestones) within the project tasks to measure performance against the objectives.

The QA/QC Plan element of the Implementation Plan will address the procedures used by the contractor to monitor the quality of their work. It will include a description of the QA organization; names, qualifications, duties, responsibilities, and authorities of each person assigned to QA functions; procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors; control, verification, and acceptance of testing procedures for each specific test to be performed; and, reporting procedures.

Details and procedures associated with the QA/QC Plan may be included in other project deliverables when appropriately cross-referenced; for example, performance and operational monitoring procedures may be included in the IPTD Treatment-Specific SAP/QAPP, described further in Section 3.1.8.

### **3.1.7 Component-Specific Health and Safety Plans**

Each contractor shall develop a HASP for their specific component(s) that addresses all occupational safety and health hazards (traditional construction as well as contaminant-related hazards) associated with work activities. The HASPs will be dynamic documents, subject to change as project operations/execution change, as well as modification to address changing and/or previously unidentified health and safety conditions.

The HASPs will provide sufficient detail and methodology to adequately address the requirements and criteria of the site HASP (USAID 201 Ib), as well as component-specific requirements identified by each contractor. The major elements of the site-wide HASP include the following:

- H&S education and training
- Hazard communication
- Planning and hazard control
- Personal protective equipment (PPE)
- Respiratory protection
- Safety program management
- Work practices and guidelines
- Heat stress
- Hearing protection
- Emergency response plan
- Accident reporting

Each contractor shall provide qualified and experienced personnel to serve as H&S staff for this work. The USAID CM contractor reserves the right to review the qualifications and performance of such H&S personnel, and to oversee work activities to ensure compliance with regulatory and contractual requirements. Contractors shall be aware that USAID, USAID CM contractor, MND, and CAAV

(including MAC and MAA) shall have full authority to shut down field operations for any observed H&S compliance issues.

Each contractor shall be responsible for procuring all required H&S supplies and equipment for its employees and subcontractors as necessary.

### **3.1.8 IPTD Treatment-Specific Sampling and Analysis Plan/Quality Assurance Project Plans**

The IPTD contractor shall develop a SAP/QAPP that outlines methods and procedures to be followed during operation and performance monitoring of the IPTD treatment system. The plan shall include all elements required for both a field sampling plan and QAPP in accordance with the *Environmental Protection Agency Requirements for Quality Assurance Project Plans, EPA QA/R-5 (USEPA 2006a)*, and the *Guidance on Systematic Planning Using the Data Quality Objectives Process, EPA QA/G-4 (USEPA 2006b)*.

The side-wide SAP/QAPP (USAID 2011c) will be implemented by the USAID CM contractor and covers sampling and monitoring activities associated with the soil and sediment excavation such as air and dust monitoring, soil and sediment confirmation sampling, post-treatment soil confirmation sampling, decontamination water sampling, and dewatering discharge sampling.

The purpose of the IPTD treatment-specific SAP/QAPP is to describe the sampling objectives, locations, measurement methods, and data quality objectives (DQOs) for the thermal treatment system's operation and performance monitoring activities.

Elements of the IPTD treatment-specific SAP/QAPP shall include, at a minimum, the following:

- Introduction and purpose
- DQOs
- Sampling collection procedures
- Equipment/instrument maintenance and calibration
- Decontamination procedures
- QC samples
- Field documentation
- Sample handling, management, and control
- Laboratory analysis and requirements
- Assessment and oversight
- Nonconformance and corrective action
- Data review and validation
- Records management

### 3.1.9 Site-Wide Traffic Control Plan

The D&H contractor shall develop a site-wide TCP that details the proposed controls, signage, routing, and integration of traffic movement throughout the project, including during temporary shutdown periods. The D&H contractor shall ensure that their traffic control plan has been coordinated with airport and IPTD contractor activities in order to maintain safe operations by all parties during traffic movement and to implement specific requirements of each party. The D&H contractor shall also ensure that their plan has been reviewed and approved by the applicable Airport authorities prior to conducting site activities.

Elements of the site-wide TCP shall include, but are not limited to:

- Maps and diagrams illustrating the location of access to excavation areas, haul routes, and access to the IPTD pile structure.
- An evaluation of the adequacy of existing roads and their allowable load limit.
- Plans to minimize obstruction of traffic and maintain traffic on at least half of the roadway width at all times.
- Procedures to provide, erect, and maintain, lights, barriers, signals, passageways, detours, and other items, that may be required.
- Procedures to maintain and protect traffic on all affected roads during the construction and seasonal shutdown periods.
- Measures for the protection and diversion of traffic in accordance with Part VI of the Manual on Uniform Traffic Control Devices (MUTCD) as referenced in the site-wide HASP (USAID 2011b), including but not limited to: the provision of watchmen and flagmen; erection of barricades; placing of lights around and in front of work equipment; and the erection and maintenance of adequate warning, danger, and direction signs.
- Procedures to minimize the interference with public traffic on roads selected for hauling material to and from the site, and for protecting the public from damage to person and property.
- Measures for compliance with all local traffic and airport regulations.

### 3.1.10 Site-Wide Environmental Protection Plan

The D&H contractor shall develop a site-wide EPP that provides a comprehensive overview of known or potential environmental issues that must be addressed during remediation and construction activities, including for each rainy season (i.e., seasonal shutdown periods). Environmental protection is the prevention/control of pollution that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste as well as other pollutants.

Specific requirements of the IPTD treatment system, not included in the site-wide EPP, shall be captured in the IPTD contractor's component-specific HASP and IPTD treatment-specific SAP/QAPP.

The purpose of the site-wide EPP shall be to minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work must be protected during the entire

duration of the project. The site-wide EPP must comply with all applicable local environmental laws and regulations. Any delays resulting from failure to comply with environmental laws and regulations will be the contractor's responsibility. The site-wide EPP must be current and maintained onsite at all times.

Content of the site-wide EPP shall include, but is not limited to:

### **Erosion, Sediment, and Storm Water Control.**

- An erosion and sediment control plan shall be developed that identifies the type and location of the erosion and sediment controls to be provided. The plan must include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, local laws, and regulations.
- The selected erosion and sediment controls will include temporary or permanent erosion control and sediment best management practices (BMPs) such as, but not limited to: vegetation cover; bank stabilization; slope stabilization; silt fences; construction of terraces; interceptor channels; sediment traps; inlet and outlet protection; diversion channels; temporary dikes, and sedimentation basins.
- All temporary measures shall be removed after the affected area has been stabilized. The site-wide EPP shall include drawings or schematic sketches of proposed erosion and sediment controls.

### **Air Pollution Control.**

- An air pollution control plan shall be developed that details provisions to assure that dust, debris, materials, trash, etc., do not become airborne and travel off the project site.
- The plan shall detail methods to maintain excavations, stockpiles, haul and access roads, borrow areas, and other work areas within or outside the project boundaries free from visible particulates. Visible dust emissions shall be strictly prohibited at all times. Activities are also not permitted which violate U.S. Occupational Safety and Health Administration (OSHA) or Vietnamese air pollution standards or which create a hazard or nuisance.

### **Hazardous Materials Management.**

- A hazardous materials plan will be developed that identifies potentially hazardous substances that will be used on the job site. The plan shall identify the intended actions to prevent introduction of such materials into the air, water, or ground and detail provisions for compliance with local laws and regulations for storage and handling of these materials. The plan shall include copies of the Material Safety Data Sheets (MSDSs) and the maximum quantity of each hazardous material to be onsite at any given time. The D&H contractor shall update the site-wide EPP as new hazardous materials are brought onsite or removed from the site. All shipping documentation for investigation-derived waste (IDW) disposal (e.g., manifests, analytical reports, certificates of disposal) shall be filed by shipment and in chronological order. Waste management inspections, monitoring, and effluent monitoring records and reports will be accessible and compliant.
- Each contractor is responsible for identifying the anticipated type and quantity of all waste generated as a direct result of construction, operation, and decommissioning including IDW, soil/sediment cuttings, extracted water and soil vapor, and waste generated as a result of treatment processes (e.g., granular activated carbon [GAC]). The USAID CM contractor shall assist with the coordination for disposal of this waste within the regulatory timeframe requirements.
- Spill control procedures, instructions, and reports shall be included in the site-wide EPP and implemented in the event of an unforeseen spill of a regulated substance. Any minor spill or release

shall be reported to USAID and USAID's CM contractor who, in turn will report to MND, and CAAV immediately. An environmental compliance incident report shall be filed for all spills and a corrective action described to serve as a continuous improvement tool. Large spills or releases shall be managed in accordance with H&S occurrence reporting requirements at no cost to USAID or GVN.

### **Historical, Archaeological, and Cultural Resource Management.**

- A resource management plan shall define procedures for identifying and protecting historical, archaeological, and cultural resources, known to be on the project site. The site-wide EPP shall also define procedures to be followed if historical, archaeological, and cultural resources, not previously known to be onsite or in the area are discovered during construction. The plan shall include methods to assure the protection of known or discovered resources, identifying lines of communication between contractor personnel, USAID, and GVN.

## **3.2 Work Activities**

### **3.2.1 Mobilization and Site Preparation**

The following provides a general description of tasks that are required during the mobilization and site preparation stage. These tasks include, at a minimum:

#### **General**

- Each contractor shall maintain a copy of all applicable planning documents at each work location throughout all stages of construction and operation activities.
- Each contractor is required to complete all aspects of work in accordance with all contract drawings, technical specifications, planning documents, and applicable laws and regulations. Each contractor shall use trained, qualified, and professional craftsmen to perform all construction work and their disciplines shall be related to the task performed.
- Equipment and services shall be of professional quality so as to minimize downtime during remediation. Spare parts for all key components, except transformers, shall be available so that downtime due to equipment failure does not exceed 1 week.

#### **Temporary Facilities**

- Prior to mobilizing equipment, each contractor shall coordinate equipment placement and utility needs with USAID and USAID CM contractor.
- Each contractor shall provide an office trailer for their use during onsite remediation activities and all other temporary structures and facilities needed for completion of the work. Each contractor shall maintain all temporary facilities in a clean, safe, and sanitary condition at all times during onsite activities.
- Electricity and water are not currently available to fully support the remediation activities. The USAID CM contractor shall be responsible for coordinating the delivery of a water source and infrastructure to provide a power source to the limits of the work zone. Three-phase electrical power shall be coordinated with Da Nang Power Company and the water shall be coordinated with the MND and CAAV.
- The IPTD contractor shall provide distribution panel(s) and make all connections for the IPTD system (including temporary facilities and IPTD system components) to the provided water and power source in the work zone.

- Each contractor shall arrange for their own communication needs for telephone, internet, etc. assuming that no fixed lines will be available.
- The USAID CM contractor shall coordinate delivery and pickup of non-hazardous material during onsite activities. Each contractor shall inspect the site daily and remove trash and debris that accumulates and properly dispose of it; this shall not be the responsibility of the USAID CM contractor. The fees associated with the services shall be the responsibility of each contractor.
- The USAID CM contractor shall coordinate the supply of toilet and potable drinking water facilities for each contractor's personnel. Each contractor shall be required to provide the USAID CM contractor an estimate of personnel onsite in order to obtain an adequate supply of portable facilities. The fees associated with the services shall be the responsibility of each contractor.
- The USAID CM contractor shall erect a project sign board near the entrance to the site, installed at a location approved by USAID, MND, and the Airport authorities. The information on the sign board shall be legible at all times during the project and installed for the duration of the project. The information placed on the sign board will be consistent with USAID's branding and marking requirements.
- Each contractor shall work with the USAID CM contractor to identify all measures necessary to ensure security of mobilized equipment and property. The USAID CM contractor shall work with MND and CAAV officials to provide for the required security measures. Personnel and visitors will sign in on a site access log and receive safety briefings, as appropriate.
- The IPTD contractor shall procure, mobilize, and stage all equipment (e.g., heaters, temperature monitoring points) required for the IPTD remediation. Drilling will not start until the locations of all holes have been laid out and approved by the USAID CM contractor.

### **Health and Safety**

- Each contractor shall implement appropriate safety precautions and procedures in accordance with applicable U.S. and Vietnamese health and safety regulations.
- Each contractor shall comply with the requirements of both the site-wide (USAID 2011b) and component-specific HASPs.

### **Site Controls**

- Each contractor shall implement and maintain all site controls in accordance with approved plans and setup of these controls will be verified and approved by the USAID CM contractor.
- The D&H contractor shall be responsible for the implementation of environmental and traffic control plans at all times, including during the seasonal shutdown periods.

### **3.2.2 Construction and Operation Implementation**

Each contractor shall attend the daily tailgate meeting prior to the start of each day's work activities, with site employees and necessary subcontractor personnel in attendance, to review planned activities. Additionally, hazards identified shall be evaluated by the contractor to determine if corrective actions are necessary, and control actions shall be discussed with employees.

The D&H contractor shall be responsible for the excavation activities associated with each phase of treatment. The hotspot locations and anticipated volumes to be excavated during each phase are presented in Tables 3 and 4. The volumes listed in these tables have been adjusted from the minimum

excavation volume estimates presented in Table 1 and Tables 3 and 4 to include a 10 percent increase to account for unforeseen pockets of contamination that may be encountered during excavation. Also, an additional volume has been added to take into consideration construction tolerances, accuracies of equipment, and simplified excavation plans in areas with varying ground surface. These factors contributed to additional increases of approximately 9 percent.

**Table 3. Phase I Excavation Locations and Adjusted Volumes**

<b>Location</b>	<b>Minimum Volume (m<sup>3</sup>)</b>	<b>Adjusted Volume (m<sup>3</sup>)</b>
Former Mixing and Loading Area	13,200	15,100
Former Storage Area	10,700	12,700
South End of Drainage Ditch	5,700	7,200
South End of Eastern Wetland	3,700	4,600
Former Pacer Ivy Storage Area	1,500	1,900
<b>Total</b>	<b>34,800</b>	<b>41,500</b>

**Table 4. Phase II Excavation Locations and Adjusted Volumes**

<b>Location</b>	<b>Minimum Volume (m<sup>3</sup>)</b>	<b>Adjusted Volume (m<sup>3</sup>)</b>
Sen Lake	22,600	26,200
North End of Drainage Ditch	4,800	5,900
North End of Eastern Wetland	4,700	6,000
Area Between Eastern Wetland and Drainage Ditch	6,000	7,500
<b>Total</b>	<b>38,100</b>	<b>45,600</b>

Excavation sequencing for each phase of remediation shall be performed at contaminated locations that are higher in elevation prior to those at lower elevations in order to prevent recontamination from sediment laden stormwater runoff. Specifically, the required orders of excavation include the following:

**Phase I**

- MLA before the Drainage Ditch
- SA before the Drainage Ditch

**Phase II**

- Area between Eastern Wetland and Drainage Ditch before the Drainage Ditch, Eastern Wetland, and Sen Lake
- Eastern Wetland before Sen Lake
- Drainage Ditch before Sen Lake

It shall be necessary to adequately drain the sediments such that they can be handled more easily and be placed and compacted in the IPTD pile structure. The sediments shall be temporarily stockpiled and allowed to gravity drain. Water drained from the sediments shall be captured, sampled in accordance with the site-wide SAP (USAID 2011c), treated if required, and discharged back into the adjacent water body from which they were removed (i.e., Sen Lake/Eastern Wetland). The contaminated soils and sediments (once adequately drained) shall be transported to the IPTD pile structure.

Material being hauled from the PISA shall be transported along the existing airport service roads on the west side of the property and on the ring road around Sen Lake.

Excess soil and sediment not used during Phase I shall be locally stockpiled and protected in accordance with the site-wide EPP. These stockpiled soils and/or sediments shall be placed in the IPTD pile structure during Phase II.

Once excavation at all site areas has reached the desired depth, confirmation sampling shall be conducted in accordance with the site-wide SAP (USAID 2011c). Backfilling shall occur only after results from the confirmation soil sampling have indicated that removal criteria have been met. No backfilling is required at the Drainage Ditch, Sen Lake, and Eastern Wetland areas.

Approximately 45,000 m<sup>3</sup> of fill shall be required for backfilling of designated excavation areas. Since the Airport will be developing this area in the future, the fill material will need to meet physical properties and placement criteria. A borrow source is not available on the Airport property; therefore, an approved offsite fill material source is required. The D&H contractor shall be required to determine the location of this borrow source and provide testing data to support that backfill material is suitable for use onsite. These requirements are provided in the technical specifications. The D&H contractor shall develop a grading plan so as to provide positive drainage throughout the affected area. Each area shall be vegetated with native plants to protect the soil surface from erosion.

For each treatment phase, the D&H contractor shall be responsible for the construction of the IPTD pile structure, as shown on the contract drawings, and for placing the soil in lifts and compacting, in accordance with the technical specifications, to provide adequate structural support to withstand vehicular traffic and wind and rain. Once the soil has been leveled to the final desired height with a slight crown to aid runoff, the permanent surface cover (installed by the IPTD contractor) shall be installed over the pile. The surface cover shall have three functions: (a) serve as a vapor barrier to prevent fugitive emissions; (b) provide insulation to reduce heat losses; and (c) shed rainfall.

Pile construction and loading is scheduled to begin before the start of the rainy season; however, it may not be fully completed before the start of the rainy season. There may be a temporary work stand-down during the rainy season during which time the pile will require waterproofing to protect the completed or partially completed pile structure from rainwater infiltration. In the event that the pile construction/loading is not completed before the start of the rainy season, a temporary protective cover (e.g., a waterproof tarp) may be utilized over all or part of the pile.

Following construction of the IPTD pile structure, the IPTD contractor shall install all equipment (e.g., heaters, temperature monitoring points) in accordance with technical specifications and contract drawings, required for the IPTD remediation.

The general operational phases of the IPTD treatment system include the following:

- **Start-up Phase.** The vacuum system will be turned on by simply starting the vacuum blower and opening the air inlet manifold, allowing atmospheric air to enter through the air inlet wells. The initial start-up phase is expected to last several days.
- **Heat-up Phase.** Heating will begin by switching the electrical heater circuits on one at a time, starting with low power settings and ramping up to full power over a period of 3 to 7 days. Once at

full operation, the heaters will raise the average temperature to around 100°C, and steam will be extracted in relatively large quantities as the pile heats, the soil dries, and water evaporates.

- **Evaporation Phase.** After the pile has reached 100°C (212°F), the soil will dry as the pore water boils and leaves the pile as steam. The dry zones around the heaters will grow, until all the water has been vaporized and the entire pile is dry.
- **Heat to Target Temperature.** After removal of the water, the dry soil will heat to the target treatment temperature of 335°C (635°F), while vacuum is being applied and all vaporized contaminants are captured and treated in the off-gas treatment system. This stage will end when the thermocouple monitoring shows that the target temperatures have been reached in the coolest locations within the TTZ, and the interim soil sampling confirms that the treatment goals have been met.
- **Cool-Down and Pile Disassembly.** After completion of IPTD treatment, cool air and/or water will be added to the heated soil via the screened wells to begin the cooling process. After the heaters have been removed, the insulating cover will be taken off, and soil removal will be undertaken in increments from the top down with the soil being taken to designated stockpile areas on-site. Each tier of soil removal will be preceded by a short period of water sprinkling, which will cool the upper layer of treated soil.
- **Phase II Treatment.** The second year of treatment will involve refilling the pile structure and repeating the steps described above.

Following treatment of soils and sediment, the D&H contractor shall stockpile the treated material locally and protect these piles in accordance with the site-wide EPP. The material shall be stockpiled for future airport use and at a location that does not negatively impact airport operations.

At the completion of Phase II and following removal of treated soils and sediments, the IPTD pile structure shall be completely dismantled by the D&H contractor and the pile footprint regraded and restored to match original condition or better. All temporary site facilities shall be removed and their footprints also regraded and restored to match original condition or better. Additional demobilization procedures are provided in Section 3.3.

### 3.2.3 Progress Meetings

The designated contractor's project manager(s) shall attend the progress meetings, as listed below. The non-designated contractor may also attend if necessary. The minimum number of anticipated progress meetings that will be held during this project are listed below. In addition, other key personnel may attend the meetings, as necessary.

#### Phase I

- Weekly Construction Progress Review – Phase I Soil and Sediment Excavation (D&H contractor)
- Weekly Construction Progress Review – Phase I Pile Structure (D&H contractor)
- Single Event Operations Readiness Review – Phase I Treatment System (IPTD contractor)
- Weekly Operations Review – Phase I Treatment System (IPTD contractor)
- Demobilization Planning – Phase I Treatment System and Pile Structure (both contractors)

#### Phase II

- Weekly Construction Progress Review – Phase II Pile Structure Re-Fill (D&H contractor)

- Single Event Operations Readiness Review – Phase II Treatment System (IPTD contractor)
- Weekly Operations Review – Phase II Treatment System (IPTD contractor)
- Demobilization Planning – Phase II Treatment System and Pile Structure (both contractors)
- Final Report Presentation (both contractors)

In addition, weekly conference calls by both contractors shall be held with USAID and its designated representatives to discuss progress.

### **3.2.4 Progress Reports**

Each contractor shall prepare daily reports during construction, operations, and decommissioning to document onsite personnel, health and safety, and log all field activities completed.

Each contractor shall be responsible for providing weekly, written updates to USAID and its designated representatives on progress during the remedial design, construction and operation of Phase I and II, and decommissioning/demobilization activities.

Each contractor shall be responsible for uploading all information relevant to construction, operation, and decommissioning to a project information management portal managed by USAID's CM contractor. This includes, but is not limited to, real time field data, performance and operational monitoring data, electrical input and usage, waste generation information, and daily and weekly reports.

#### **3.2.4.1 Monthly Reports**

Each contractor shall prepare a brief monthly highlights report that list accomplishments, issues encountered, and outlines constraints and obstacles to success.

#### **3.2.4.2 Quarterly Reports**

Each contractor shall produce quarterly reports that must contain the following information:

- Summary of progress on implementation tasks and reporting against PMP targets and indicators
- Summary of relationship of task completion to original schedule
- Issues and constraints
- Summary of how issues and constraints of prior quarter were addressed in present quarter
- Activity plans and events for the following quarter
- Pipeline analysis

### **3.2.5 IPTD Operations and Maintenance Manual**

The O&M Manual shall be completed by the IPTD contractor prior to the readiness review for operations. The O&M Manual will describe activities and procedures to be performed during operations. The O&M Manual will list the phases of the operation, strategy for each phase, decision points, criteria for proceeding to the next phase, and guidelines for the remediation. Procedures from the IPTD contractor and their subcontractors shall be included in the same O&M Manual.

The O&M Manual will include the manufacturer's product information for mechanical equipment (such as power supplies, controls, etc.) and materials used in the IPTD remediation. Where appropriate, the product information will include installation, maintenance, and operation instructions. Where contents

of submitted literature from manufacturers include data not pertinent to the submittal, clearly show those portions of the contents. The IPTD contractor shall submit copies of product data to identify applicable products, models, options, and other data. Manufacturer's standard data will be supplemented to provide information unique to the work.

The IPTD contractor shall submit manufacturer's specific instructions for delivery, storage, shelf life, assembly, installation, adjusting, and finishing. The IPTD contractor shall submit manufacturer's instructions as required in relevant sections of these specifications.

Any and all chemicals brought onsite will include the MSDS, which will be compiled in the O&M Manual and be accessible at all times to workers at the site. Hazardous materials management shall be in accordance with the site-wide EPP.

### **3.2.6 As-Built Records and Drawings**

Two complete sets of the contract plans shall be maintained at the project field office for each contractor's (D&H, IPTD, and CM) use. During construction, both sets of prints will be marked to show the as-built conditions during the execution of the project. Changes from the plans or additional information that might be uncovered in the course of construction will be accurately and neatly recorded by each contractor as they occur by means of details and notes. The color red will be used to indicate all additions and green to indicate all deletions. The drawings will show the following information but not be limited thereto:

- Correct grade, elevations, cross-section, or alignment of roads, or earthwork if any changes were made from contract plans.
- Correct location of all existing site features, including buildings, trees, and stumps to remain; fence lines, if different from original plans.
- The topography and grades of all drainage affected or altered as part of the project construction.
- Changes or modifications that result from the final inspection.
- Where contract drawings or specifications present options, only the option selected for construction will be shown on the final as-built prints.
- Features designed or enhanced by the contractor.
- Miscellaneous changes or modifications from the original design and layout of work.

These deviations will be shown in the same general detail utilized in the contract drawings. These working as-built marked drawings will be kept current on a weekly basis and at least one set will be available on the jobsite at all times. Additional drawing sheet(s) will be provided as required to explain all work performed and will be in the same format and detail utilized in the contract drawings. The resulting field-marked prints and data will be referred to and marked as "As-Built Field Data," and will be used for no other purpose. They will be made available for inspection by USAID, USAID CM contractor, MND, and/or CAAV whenever requested during construction and will be jointly inspected for accuracy and completeness by a responsible representative of the contractor prior to submission of the Contract records.

### **3.2.7 Daily Housekeeping**

Each contractor shall remove from the work site daily, construction debris, waste materials, packaging material, and the like. Any dirt or mud that is tracked onto paved or surfaced roadways will be cleaned immediately. Materials shall be neatly stacked and stored in trailers when appropriate.

### **3.2.8 Temporary and Seasonal Shutdown**

During periods of high wind or rain, typically during the rainy season months of September to December, each contractor shall take precautions to minimize danger to persons, and protect the work and nearby Government property. Precautions must include, but are not limited to; removing loose materials, tools and equipment from exposed locations; and removing or securing temporary facilities and other temporary work.

The D&H contractor shall be responsible for implementation of environmental and traffic control duties during the seasonal shutdown period. These controls will be continuously monitored throughout the rainy season to ensure that they remain in place and are functioning as required.

It is assumed that the IPTD treatment system will not be in operation and will be in a shutdown mode during rainy seasons. The IPTD contractor shall evaluate this assumption during the design phase of the project and if shutdown is determined to be necessary, the IPTD contractor shall provide requirements (e.g., staffing for emergencies, frequencies of routine checks/visits, equipment shutdown procedures) for the shutdown periods in the design and O&M Manual.

## **3.3 Post Work Activities**

### **3.3.1 Post-Construction Clean-Up**

At the conclusion of construction activities, each contractor shall remove their respective temporary products from the site including, but not limited to, the following: trailers, equipment, bulletin boards, signs, barricades, haul roads, and any other temporary products. Following the removal of materials from each fenced area, each contractor shall remove any staging area or temporary fencing.

Each contractor shall restore their respective work areas to their original condition or better, including those areas used by each contractor for the storage of equipment or material. Gravel and such materials used to traverse grassed areas must be removed and the area restored as necessary.

### **3.3.2 IPTD Decommissioning and Demobilization**

The IPTD contractor shall demobilize all construction equipment, temporary facilities, remediation components, materials, and supplies from the site at the completion of operations and performance monitoring for the Phase II treatment pile. All temporary facilities and utilities installed as part of the remediation shall be dismantled, demolished, removed, or otherwise disposed, as appropriate. All buried utilities installed by the IPTD contractor shall be properly abandoned.

In addition, the IPTD contractor shall abandon, in accordance with applicable regulatory requirements, all borings that they have installed. During demobilization activities, the IPTD project manager and/or USAID CM contractor shall be onsite to direct activities.

All demobilization activities that result in recycling, reusing, reprocessing, or salvaging activities will be reported to the USAID CM contractor, such that source reduction and waste minimization volumes can be documented.

### **3.3.3 Final As-Built Records and Drawings**

Each contractor shall submit final as-built record drawings after completion of all work and acceptance by USAID and no later than 30 calendar days after completion of the final inspection. All drawings from the original contract drawings set will be included, including the drawings where no changes were made. USAID shall review all final as-built record drawings for accuracy and conformance to the drafting standards. The drawings will be returned to the contractor if corrections are necessary. Within 7 calendar days, each contractor shall revise the drawings accordingly and return the drawings to the same office. Paper prints, drawing files, and storage media submitted will become the property of USAID upon final approval.

As-built drawings for the IPTD treatment system will be completed for each treatment phase before the start of operations. The as-built drawings will be based on the design drawings, approved changes to the design drawings, and as-built conditions of the site. The as-built drawings will be submitted as part of the final report.

### **3.3.4 Final Report**

Each contractor shall, no less than 45 days prior to the completion date of all work, submit a final report that describes all aspects of the project activities. The final report shall describe all aspects of the remediation, including final removal volumes, pile structure as-built design and dismantle procedures, borrow source material, presentation of data collected for monitoring systems, data interpretation, and comparison of actual conditions to design parameters.

Additionally, any lessons learned during the remediation shall be discussed. The Final Report will also provide an assessment of the project's success at implementing the project activities. The report will provide details on at least the following elements:

- Measurement and evaluation of project indicators.
- Details on any impediments faced in implementing the strategies developed.
- An assessment of the sustainability of any activities supported through this project.
- An assessment of current conditions in each of the key component areas.

One copy of the final report will be sent to the USAID Development Experience Clearinghouse, ATTN: Document Acquisitions, 1611 Kent Street, Suite 200, Arlington VA 22209-2111 or email: [docsubmit@dec.cdie.org](mailto:docsubmit@dec.cdie.org).

# **Section 4**

## **Project Schedule**

At this time the schedule is continuing to be developed with the use of additional data and will be included at a later date.

## Section 5 References

TerraTherm. 2011. Draft IPTD Design Package. Environmental Remediation Project Da Nang Airport. TBD. (not yet developed)

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