U.S. Army Corps of Engineers
South Atlantic Division

Final
Technical Project Planning (TPP) Meeting No. 1 Memorandum
Former Richmond Naval Air Station
Former Incinerator
Remedial Investigation / Feasibility Study
Miami, Miami-Dade County, Florida
FUDS Project No. I04FL003806

In Support of

FUDS Program Category: HTRW Remedial Investigation / Feasibility Study Project

Prepared for:

U.S. Army Corps of Engineers, Jacksonville District
701 San Marco Boulevard
Jacksonville, Florida 32207

Contract: W91278-14-D-0017
Task Order: CS04

October 2015

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LIST OF ACRONYMS

Aerostar	Aerostar SES LLC
BaPE	Benzo(a)Pyrene Equivalent
BDDR	Building Demolition and Debris Removal
BLS	Below Land Surface
BoP	Federal Bureau of Prisons
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COCs	Contaminants of Concern
CRP	Community Relations Plan
CSM	Conceptual Site Model
DERM	Department of Environmental Resources Management
DERP-FUDS	Defense Environmental Restoration Program-Formerly Used Defense Site
DoD	Department of Defense
EM	Engineering Manual
EPA	Environmental Protection Agency
FAC	Florida Administrative Code
FDEP	Florida Department Of Environmental Protection
GCAL	Gulf Coast Analytical Laboratories, Inc.
GCTL	Groundwater Cleanup Target Level
HTRW	Hazardous Toxic and Radioactive Waste
LOQ	Limits Of Quantitation
MFR	Memorandum for Record
mg/kg	Milligrams per kilogram
MNA	Monitored Natural Attenuation
NAS	Naval Air Station
NDAI	No Department of Defense Action Indicated
NELAP	National Environmental Laboratory Accreditation Program
PAHs	Polynuclear Aromatic Hydrocarbons
PA/SI	Preliminary Assessment/Site Investigation
PQL	Practical Quantitation Limit
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
SCTL	Soil Cleanup Target Level
SVOCs	Semi-volatile Organic Compounds
TPP	Technical Project Planning
USACE	United States Army Corps Of Engineers
VOCs	Volatile Organic Compounds

INTRODUCTION

Aerostar SES LLC (Aerostar) has prepared this Technical Project Planning (TPP) Meeting No. 1 Memorandum for the Former Richmond Naval Air Station (NAS), Former Incinerator Remedial Investigation/Feasibility Study (RI/FS) in Miami, Miami-Dade County, Florida. The TPP Meeting was held at the Best Western Plus Kendall Airport Hotel and Suites on December 10, 2014. The meeting started at approximately 9:00 am and concluded at approximately 10:30 am. Participants included representatives from the United States Army Corps of Engineers (USACE), Miami-Dade County Department of Environmental Resources Management (DERM), Federal Bureau of Prisons (BoP), Miami Zoo (part of the Miami-Dade County Department of Parks and Recreation), and Aerostar. The purpose and objectives of the TPP activities, the meeting attendees, the documentation reviewed during the TPP meeting, the discussion items, and the final outcomes of the meeting are detailed below.

PURPOSE AND OBJECTIVES

The purpose of the TPP Meeting (#1) was to bring together decision makers and technical personnel to determine both short- and long-term project objectives through completion of all fieldwork at the site, to identify the current project focus for the site, and to determine a data collection program to obtain short- and long-term goals for the site. This memorandum provides a record of the TPP Meeting #1.

Meeting objectives included:

- Introduce the Project Delivery Team members, their responsibilities and roles.
- Review of the existing site information and data.
- Identification of the RI/FS objectives.
- Presentation of the proposed technical site approach, and sampling and analysis plan to the property owners, state regulators, and other stakeholders.
- Obtaining feedback on the project goals, objectives, and proposed data acquisition plan from the team members.
- Determine a data collection program for the RI/FS.

IDENTIFY CURRENT PROJECT

1.1 TEAM INFORMATION PACKAGE

1.1.1 TPP Team Members

During the TPP Meeting the Project Delivery Team members were introduced. The Project Delivery Team members include the USACE – Lead Agency, Aerostar – USACE's Contractor, Florida Department of Environmental Protection (FDEP) and DERM – Regulators, BoP – Property Owner, and Miami Zoo (Miami-Dade County Department of Parks and Recreation) – Stakeholder. A copy of the TPP Meeting Sign-in sheet is included in **Appendix A**. The TPP Memorandum for Record Worksheet is included in **Appendix B**.

Name	Organization	Project Role	Phone Number	Email Address
Diana Martuscelli	USACE	Project Manager	904-232-3432	Diana.M.Martuscelli@usace.army.mil
Frank Zepka	USACE	Technical Manager	904-232-2799	Frank.P.Zepka@usace.army mil
Marie C. Lopez	USACE	Project Chemist	904-232-3484	Marie.C.Lopez@usace.army.mil
Tom Kux	DERM	Regulator	305-372-6700	Kuxt@miamidade.gov
Marlon Moreira	BoP	Property Owner	305-259-2217	MaMoreira@BOP.gov
Chad Douglas	Zoo Miami	Stakeholder	305-343-9265	chadd@miamidade.gov
Scott Hughes	Aerostar	USACE Contractor	904-565-2820	shughes@aerostar net
Robert Young	Aerostar	USACE Contractor	904-565-2820	ryoung@aerostar net
Amanda Parker	USACE*	Public Affairs	904-232-1576	Amanda.D.Parker@usace.army.mil

Note: * Participated by telephone

1.1.2 Lead Agency Goals

The goal of the USACE is to obtain is to obtain Regulatory approval of the RI/FS.

1.1.3 Existing Site Information

The Former Richmond NAS has been evaluated under the requirements of the Defense Environmental Restoration Program (DERP), for Formerly Used Defense Sites (FUDS). Based on that evaluation, the Former Richmond NAS has been determined to have been formerly used by the Department of Defense (DoD); therefore, is eligible for site investigation and remediation, as necessary, under the FUDS program. A Hazardous Toxic and Radioactive Waste (HTRW) project was identified in a Site Inspection (SI) Report completed by the FDEP in July 2011. The SI Report revealed contamination at a former DoD site: former Incinerator (Project 06) located on BoP property. Under the FUDS program, the USACE evaluated the SI Report and initiated the RI/FS. A site location map is provided as **Figure 1**.

FDEP conducted assessment activities at the approximate five-acre site and identified soil contamination at the incinerator. During the SI at the former incinerator, FDEP advanced soil borings, collected soil samples, installed one monitor well and collected a groundwater sample in the area of the incinerator. FDEP collected eight surface (0-2 feet below land surface [BLS]) soil samples and five subsurface soil samples (2-4 feet BLS). The soil samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), eight Resource Conservation and Recovery Act (RCRA) metals,

and dioxins/furans. FDEP installed one shallow temporary monitor well to 14 feet BLS southeast of the incinerator building. A groundwater sample was collected from the well and analyzed for VOCs, SVOCs, 8 RCRA metals, and dioxins/furans. **Figure 2** shows the previous soil and groundwater sample locations during the FDEP SI and proposed soil and groundwater sampling locations during the RI.

The soil sampling conducted as part of the SI identified three polynuclear aromatic hydrocarbon (PAH) compounds, benzo(a)anthracene, benzo(b)fluoranthene, and benzo(a)pyrene, in one soil sample above the Soil Cleanup Target Levels (SCTLs) established in FDEP Chapter 62-777, FAC. Benzo(a)Pyrene Equivalent (BaPE) concentrations, arsenic, chromium, and silver were detected in soil samples above the FDEP Chapter 62-777, FAC SCTLs. Laboratory analysis detected eight surface soil samples and five subsurface soil samples with dioxin/furan concentrations above the Residential SCTL; however, the dioxin/furan concentrations in the five subsurface soil samples analyzed were below the dioxin/furan concentrations detected in the background soil samples collected by FDEP during the SI. No contaminants of concern (COCs) were detected in the groundwater above the Groundwater Cleanup Target Levels (GCTLs) established in FDEP Chapter 62-777, FAC.

1.1.4 Meeting Discussion

A Power Point presentation was used as the basis of discussion during the meeting. A copy of the Power Point presentation is included in **Appendix C**. During the TPP Meeting (#1) team members provided additional information regarding the site and area surrounding the site as detailed below:

- A brief history of the Richmond NAS indicated that the incinerator was active during military activities, and the incinerator was located on the BoP property. The presentation indicated that the RI/FS would be performed under the Formerly Used Defense Sites (FUDS) program. Mr. Zepka gave a brief explanation of the FUDS program and how sites followed the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) program to achieve closure.

- The potential DoD COCs in the soil at the incinerator site are PAHs, BaPE, dioxins/furans, arsenic (As) chromium (Cr), and silver (Ag). Mr. Kux suggested that the USACE keep barium (Ba) and lead (Pb) in the soil and groundwater sampling program because they are key indicator parameters to identify incinerator material. Ms. Martuscelli said the USACE would evaluate the need to keep Ba and Pb in the sampling program. Mr. Young added that the Ba and Pb were not detected in the soil samples analyzed during the FDEP SI Report. Mr. Kux added information on the DERM Background Study on anthropogenic (caused by humans) arsenic levels in the soil. Mr. Kux stated that surface (0-0.5 feet BLS) soil sample concentrations for As were 7.0 milligrams per kilogram (mg/kg) and subsurface (0.5-2 feet BLS) soil sample concentrations for As were 5.0 mg/kg. The study found that the background concentration for arsenic for depths up to 2 feet BLS is 5.2 milligrams per kilogram (mg/kg). Therefore, 5.2 mg/kg will be the concentration used to determine if additional soil samples will be collected for arsenic analysis at depths up to 2 feet BLS. Aerostar added that the number of proposed As samples may change based on the information provided in the DERM As background study. Aerostar will use the DERM Anthropogenic Background Study arsenic concentration of 5.2 mg/kg as the alternative SCTL at depths of 0-0.5 feet BLS and 0.5-2 feet BLS. The default arsenic SCTL (2.1 mg/kg) and the existing background concentration detected in soil sample RNA-SB01 (2-4 feet BLS) will be evaluated for soil samples at depths of 2-4 feet BLS and 4-6 feet BLS. The USACE will add barium (Ba) and lead (Pb) to the soil sampling plan at the former incinerator. Ba and Pb will be

collected at depths of 0-0.5 foot BLS and 0.5-2 feet BLS at each sampling location. Aerostar does not anticipate collecting soil samples from 2-4 feet BLS at this time.

- During the Power Point presentation, Slide #9 was labeled Conceptual Site Model. It was noted from Ms. Lopez that the title of the slide should be "Preliminary" Conceptual Site Model because data collected during the RI may change exposure pathways and current and future receptors. Mr. Kux explained the different site cleanup options based on commercial cleanup levels vs. residential cleanup levels. He stated that the intended use of the property would determine the cleanup criteria. If the property may have residential development in the future, the site would have to be cleaned up to residential levels. If the property was intended to remain commercial, it was possible to obtain closure status with deed restrictions to commercial levels, but if the property is not cleaned up to residential levels, the property owner was responsible for maintaining the deed restrictions. Mr. Kux stated that a commercial closure limits the use of the property. Mr. Kux stated that it was DERM's role to inform the current property owners of the different cleanup options and responsibilities. Ms. Martuscelli added that the USACE had to use the FUDS funding following specific guidelines outlined by the DoD, and USACE would have to explore the option of cleaning up the site to residential levels and see what kind of specifics it entails. She added that cleanup to the residential level was more costly and involved a long term commitment. Also, it was possible to obtain funds from other sources. Mr. Hughes asked if the prisoners were considered residents. Mr. Moreira stated that the prisoners do not go in the area of the former incinerator and there were no plans to expand the prison into the area of the incinerator. The USACE will determine closure criteria after the remedial investigation is completed at the site.

- During the Power Point presentation, Slide #16 illustrated the proposed soil sample locations surrounding the incinerator. Mr. Kux asked several question regarding the deposition of incinerator ash. Did the USACE considered atmospheric deposition over time? Was the incinerator ash used as fill? Was the ash deposited somewhere else on the base? Mr. Kux asked if the USACE were aware of any institutional knowledge regarding the deposition of the ash. He stated that there was a significant amount of military installation activity in the Miami area starting as far back as the 1920s. He stated that the installations were typically self-contained, all activities were performed on site and very little was taken off site. If that was the case, where did the ash go? Did anyone have knowledge of the incinerator operations? He stated that Mr. Jim McCarthy with FDEP interviewed several people during the SI to obtain knowledge of past operations. Mr. Kux again emphasized the need to keep barium and lead in the sampling list in case those two constituents were detected in isolated areas where Aerostar was collecting samples. The USACE and Aerostar will conduct historical research into the incinerator use during the RI/FS.

- Mr. Kux asked what the USACE was going to do with the stack. He stated that the incinerator building/stack may have the highest concentrations of dioxin/furans, and PAHs. He also stated that DERM would consider the building/stack a source area and that DERM would not approve a site closure report without the building/stack being investigated or removed. Ms. Martuscelli stated that the demolition of the building was not part of the current project scope. She stated that the demolition of structures was performed under another program category. Mr. Kux stated that the building/stack should be investigated as part of the RI and samples should be collected from within the building and stack for analysis. He stated that the building can still be accessed and used. Ms. Lopez stated that the building was not used and no one had access to the building. Mr. Zepka stated that the USACE could take a closer look to see if a program called Building Demolition and Debris Removal (BDDR) can be used to remove the building. Mr. Kux also

stated lead-based paint and asbestos testing would be required during the evaluation of the building. Ms. Lopez stated that the building was not considered a source based on the SI Report.

- During the Power Point presentation, Slide #19 illustrated the number of proposed soil and groundwater samples analyzed for PAHs, Dioxin/Furans, As, Cr, and Ag. Aerostar stated that the number of soil samples analyzed for As may change based on the DERM background study. Aerostar stated that they would only be analyzing samples for As that exceeded the DERM background study.

- Ms. Parker described the communication tools that the USACE will use to notify the public of ongoing RI/FS activities as required by the CERCLA process. Ms. Parker discussed the methods of communications that the core would implement at the site. She stated that the USACE would prepare a Community Relations Plan (CRP) to communicate the methods used to conduct the RI. The USACE would provide a notice to the public in the local newspaper. She also stated that one public meeting was required, but the USACE would hold additional meetings if needed. Ms. Parker stated that the USACE would set up an Administrative Record at a local library near the site for public access. The Administrative Record would have a copy of all of the documents produced for the site RI/FS. She also stated that the information would be on the USACE website. Ms. Parker stated that a Restoration Advisory Board (RAB) made up of stakeholders, public representatives, and regulators would be formed if there was enough interest. She stated that at least 50 people must express written interest in being a part of the board. Ms. Parker asked if any of the stakeholders in attendance wanted to be part of the RAB that they should contact Ms. Martuscelli after the meeting. Ms. Parker added that the USACE would publicize the RAB in the local newspaper.

- Aerostar presented the schedule to complete the Draft Final Work Plan, Final Work Plan, and field activities. Ms. Martuscelli stated that this schedule was tentative. It was stated that the project was expected to be completed in 30 months. A copy of the revised schedule is in **Appendix B**.

- **Action Items**: DERM to provide a copy of the Arsenic and PAHs studies completed by Miami-Dade County. Mr. Kux stated that the USACE can use these studies without restrictions.

1.2 SITE APPROACH

Aerostar proposes to collect soil samples in the area of previously identified impacted soil at multiple depths (0-0.5 feet BLS, 0.5-2 feet BLS, 2-4 feet BLS, and 4-6 feet BLS [specific areas only]) to delineate the areas of impacted soil. Aerostar proposes to step out 40 feet from each of the eight soil sample locations where impacted soil was identified during the SI and collect representative soil samples at multiple depths. In addition, Aerostar will step out another 40 feet from each location and collect another round of soil sample for laboratory analysis. Aerostar will have the laboratory hold these samples until the first round of samples are analyzed. If exceedances are detected in the first set of samples, the second round of samples will be analyzed. If exceedances exist during the second step out sampling event, a third step out event will be conducted under a separate mobilization event. Aerostar will install four shallow monitor wells to further evaluate the groundwater at the site. The soil and groundwater samples will be submitted to a certified National Environmental Laboratory Accreditation Program (NELAP) and DoD

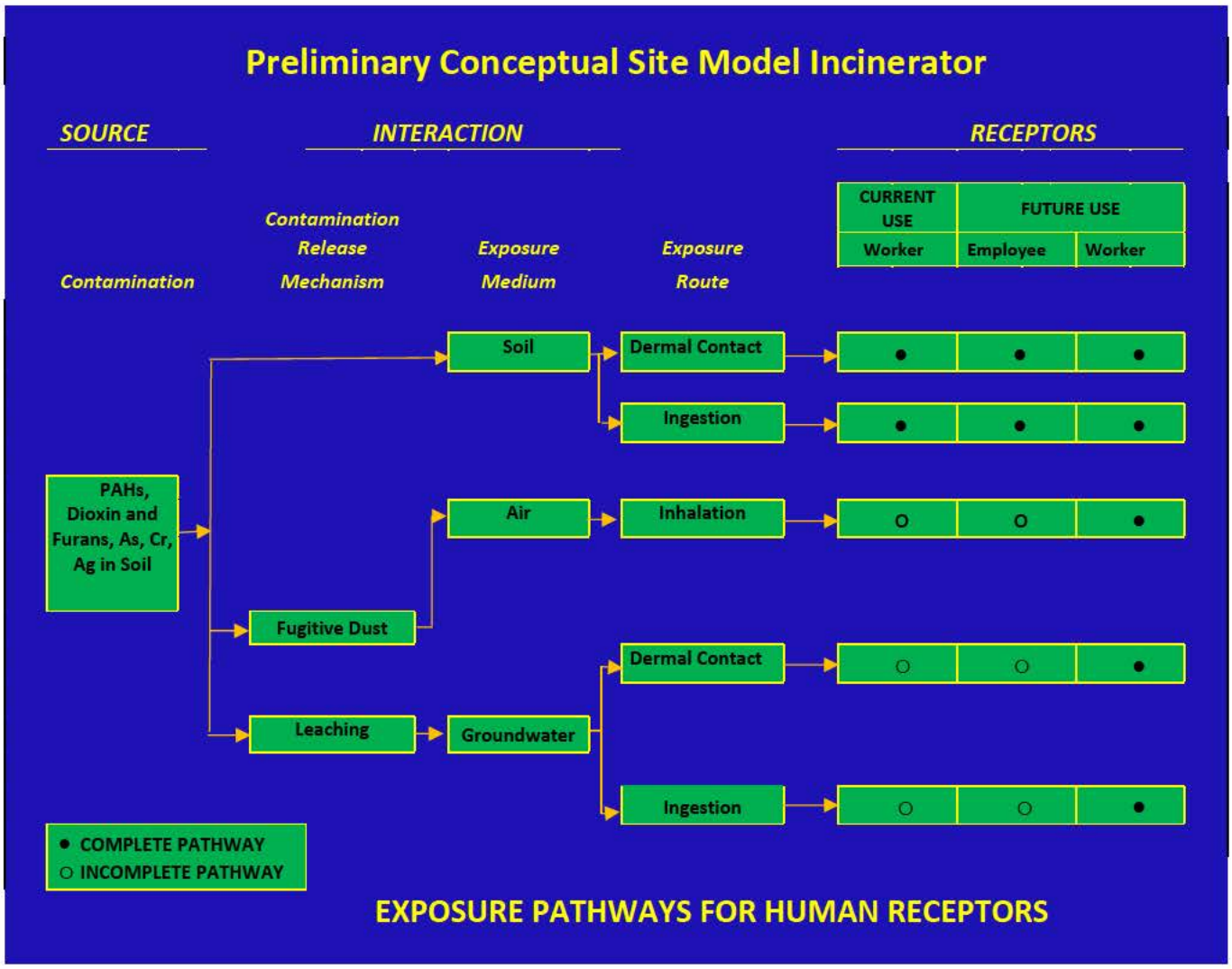
Environmental Laboratory Accreditation Program (ELAP) laboratory, Gulf Coast Analytical Laboratories, Inc. (GCAL) for analysis.

1.2.1 Evaluation of Site Information and Data

Data collected during the SI indicated that PAHs, BaPE, Dioxins/Furans, As, Cr, and Ag were detected in the soil at depths of 0-2 feet BLS and 2-4 feet BLS at multiple locations surrounding the incinerator. These COCs are related to DoD activities at the site. No documentation exists to indicate that the incinerator has been used since DoD activities ceased. Workers performing activities in the top six inches of ground surface could be exposed to the COCs. According to the Miami-Dade County DERM arsenic background study, most arsenic concentrations detected at this site are not above the arsenic concentrations observed in the county-wide background study. The DERM representative at the TPP Meeting stated that the arsenic concentrations found during the DERM anthropogenic background study conducted between 2011 and 2014 could be used to establish assessment and remediation options for arsenic during this RI. A copy of the Miami-Dade County Anthropogenic Background Study is included in **Appendix D**. Chromium was detected at two locations at a depth of 0-2 feet BLS and silver was detected at one location at a depth of 0-2 feet BLS. **Table 1** shows the analytical results of the soil samples collected during the SI that exceeded the FDEP Chapter 62-777, FAC SCTLs. **Figure 2** is a Site Map that shows the previous soil and groundwater sampling locations and the proposed soil and groundwater sampling locations. The soil and groundwater laboratory analytical results from the SI were used to identify the additional soil and groundwater sampling locations required to further define the lateral and vertical extent of the impacted soil.

Laboratory analysis of a groundwater sample collected during the SI did not detect COCs above the FDEP Chapter 62-777, FAC GCTLs. Aerostar proposed to install four shallow monitor wells adjacent to soil samples analyzed during the SI that detected COCs above the FDEP Chapter 62-777, FAC SCTLs. Please see the Preliminary Conceptual Site Model below.

Preliminary Conceptual Site Model



1.2.2 Project Objectives

Basic Project Objectives

- Define the extent of DoD contaminants in soil and groundwater
- Collect "basic" soil and groundwater analytical data required to complete the RI
- Obtain Regulatory approval of the RI

The primary objective of the USACE is to receive Regulatory approval of the RI/FS. In order to achieve the objective, the USACE will evaluate the soil and groundwater analytical results from the RI in accordance with Chapter 62-780, FAC. The soil and groundwater analytical data collected must be reliable and defensible to make a decision to enable the USACE to complete the RI and select a remedy to achieve their objective.

Optimum Project Objectives

- Collect "optimum" soil and groundwater analytical data required to complete the FS
- Prepare the Decision Document
- Obtain Regulatory approval of FS and Decision Document

1.2.3 Regulator and Stakeholder Perspectives

The Regulators require the soil and groundwater at the site to meet the SCTLs and GCTLs established in FDEP Chapter 62-777, FAC*. The Regulators require that the soil and groundwater impacted media be delineated and the samples collected are usable and defensible. The Stakeholders want the RI work performed with the least amount of interruption to their current business operations. The Stakeholders also want the site cleaned-up to eliminate potential risks to their on-site employees and workers.

1.2.4 Define Probable Remedies

At this time, probable remedies include soil excavation and disposal at an approved Class I Landfill, in-situ biological or chemical treatment, or long-term monitored natural attenuation (MNA).

1.2.5 Identify Executable Stages to Site Closeout

Complete the RI to define the extent of the impacted media due to DoD activities. Prepare a FS. Evaluate the remediation technologies available to clean-up the site if necessary. Prepare a Decision Document using the most appropriate remedy to achieve project goals.

*For some contaminants, the CTLs may be below available laboratory method PQLs/LOQs. The FDEP guidance document "Guidance for the Selection of Analytical Methods and for the Evaluation of Practical Quantitation Limits (PQL)," dated October 12, 2004, as referenced in Chapter 62-780.100(5), provides target PQLs that a laboratory should be able to meet under optimal conditions. The PQL is defined as "the lowest level that can be reliably measured during a routine laboratory operation." As listed in Table C of this guidance document, the target PQLs/LOQs for contaminants that have CTLs below any achievable laboratory method PQL/LOQ, will have defined action limits equivalent to the PQLs listed in Table C; thereby meeting the quality objective established by FDEP for these parameters.

1.3 CURRENT PROJECT

The current project includes the collection of additional soil and groundwater samples to further evaluate the extent of the impacted soil and groundwater in the area of the incinerator. Develop a plan to collect soil and groundwater samples that will evaluate the DoD contaminants of concern (COCs) related to former DoD activities identified during the SI. Collect the appropriate number of soil samples to further evaluate the impacted soil at up to three depths of 0-0.5 feet BLS, 0.5-2 feet BLS, and 2-4 feet BLS. Aerostar proposes to step out 40 feet from each of the eight soil sample locations where impacted soil was identified during the SI and collect representative soil samples at multiple depths. In addition, Aerostar will step out another 40 feet from each location and collect another round of soil sample for laboratory analysis. Aerostar will have the laboratory hold these samples until the first round of samples are analyzed. If exceedances are detected in the first set of samples, the second round of samples will be analyzed. If exceedances exist during the second step out sampling event, a third step out event will be conducted under a separate mobilization event. Aerostar will install four shallow monitor wells to further evaluate the groundwater at the site. Aerostar will collect groundwater samples from shallow monitor wells. Collect the appropriate amount of soil and groundwater analytical data to define the extent of the impacted soil and groundwater and complete the RI and prepare the FS.

1.3.1 Site Constraints

Site constraints around the current incinerator include mobilizing a track-mounted direct-push rig onto the BoP property and working within the scheduled time period allowed by the BoP. A prison escort will be required for all field work conducted around the incinerator building. An additional constraint may include the laboratory completing the analyses within the specified hold time on the first set of step-out samples to determine if the second step-out samples require analysis.

APPENDIX A

TPP Meeting Sign-In Sheet

DEC 10, 2014 TPP MEETING - INCINERATOR

FRANK ZEPKA	USACE	904-232-2799	frank.p.zepka@usace.army.mil
CHAD DOUGLAS	ZOO MIAMI	305-343-9265	chadd@miamidade.gov
Scott Hughes	Aerostar SES	904-565-2820	shughes@aerostar.net
Diana Mortuscelli	USACE	904-232-3432	diana.m.mortuscelli@usace.army.mil
Marie C. Lopez	USACE	904-232-3484	Marie.C.Lopez@usace.army.mil
MARLON MOREIRA	BOP	305-259-2217	mamoreira@bop.gov
TOM KUX	DERM	305-372-6700	Kuxt@miamidade.gov

APPENDIX B

TPP Memorandum for Record Worksheet

Memorandum for Record Worksheet

Author(s): Aerostar
Latest Revision Date: 5/4/2015

Location: Richmond NAS, Miami, Miami-Dade County, Florida
Site(s): Incinerator
Project: RI/FS

TPP Team		**EM 200-1-2, Paragraph 1.1.1**
Decision Maker		
Responsible Party	USACE	
Project Manager	Diana Martuscelli – USACE, Robert H. Young, P.G. – Aerostar	
Regulators	Miami-Dade County Department of Environmental Resources Management (DERM) and FDEP	
Stakeholders	Federal Bureau of Prisons (BoP), Miami-Dade Department of Parks and Recreation	
Data Types	**Data User**	**Data Gatherer**
Compliance / Regulatory (CR)	USACE, Regulator	Aerostar
Demographics/Land Use (LU)	Stakeholders	Aerostar
Site Conditions	Aerostar (Remedy)	Aerostar
COCs	Aerostar (Risk/Remedy), USACE, DERM (risk/compliance)	Aerostar

CUSTOMER'S GOALS			**EM 200-1-2, Paragraph 1.1.2**
Areas of Concern (AOC)	**Contaminant Issues**	**Future Land Use**	**Site-specific Closeout Goal (if applicable)**
Incinerator Area	Soil and groundwater	BoP Property.	See below
			See below

Site Closeout Statements
Meet Cleanup Goals in FDEP Chapter 62-780 FAC. Ensure COCs meet SCTLs and GCTLs established FDEP Chapter 62-777, FAC. Achieve NDAI.

Customer's Schedule Requirements
Conduct Remedial Investigation/Feasibility Study as defined in the Performance Work Statement.

Customer's Site Budget
Budget based on Guidelines established in the FUDS program.

Memorandum for Record Worksheet

IDENTIFY SITE APPROACH		
EXISTING SITE INFORMATION & DATA	**EM 200-1-2, Paragraph 1.1.3 and 1.2.1**	
Attachment(s) to Phase I TPP Memorandum	**Located at Repository**	**Preliminary Conceptual Site Model**
Power Point Presentation	Yes	A preliminary CSM was developed during the preparation of the TPP Meeting and revised as part of the Draft Memorandum for Record
Site maps and aerial map showing the location of existing and proposed soil sampling locations	Yes	
POTENTIAL POINTS OF COMPLIANCE		**EM 200-1-2, Paragraph 1.2.1.3**
Determine the absence or presence of DoD COCs in soil and groundwater.		
MEDIA OF POTENTIAL CONCERN		**EM 200-1-2, Paragraph 1.2.1.4**
Soil and groundwater		
SITE OBJECTIVES		**EM 200-1-2, Paragraph 1.2.2**
Define the extent of DoD COCs in soil and groundwater.		
REGULATOR AND STAKEHOLDER PERSPECTIVES		**EM 200-1-2, Paragraph 1.2.3**
Regulators	**Community Interests**	**Others**
Soil and groundwater impacts	Land and groundwater are safe	
Potential receptors	for intended use	
	Minimal disruptions to business	
PROBABLE REMEDIES		**EM 200-1-2, Paragraph 1.2.4**
Soil excavation and disposal at a Class I Landfill, in-situ biological treatment or long term MNA.		
EXECUTABLE STAGES TO SITE CLOSEOUT		**EM 200-1-2, Paragraph 1.2.5**
Develop and receive approval of RI Work Plan to define the extent of the impacted soil and groundwater		
Define the extent of the impacted soil and groundwater during the fieldwork phase		
Evaluate the remediation technologies available to clean-up the site to SCTLs and GCTLs		
Prepare Draft RI/FS and conduct TPP Meeting #2		
Conduct TPP Meeting #3 in support of FS and Proposed Plan		
Select the most appropriate remedy to achieve Lead Agency goals		
Implement the most effective remediation technology to meet the Lead Agency's goal		

Memorandum for Record Worksheet

IDENTIFY CURRENT PROJECT	
SITE CONSTRAINTS AND DEPENDENCIES	**EM 200-1-2, Paragraph**
Administrative Constraints and Dependencies	
Funding	
Scheduling	
Technical Constraints and Dependencies	
Work schedule and escort determined by the Federal Bureau of Prisons (BoP)	
Depth to limestone across the site and the ability to collect soil samples at the appropriate depths	
Legal and Regulatory Milestones and Requirements	
Consistent with CERCLA – Public, stakeholder, and regulatory involvement and document review	
Compliance with all applicable Federal and State regulations and requirements	
CURRENT EXECUTABLE STAGE	**EM 200-1-2, Paragraph 1.3.3**
Remedial Investigation	
Feasibility Study	

Basic (For Current Projects)	**Optimum** (For Future Projects)	**Excessive** (Objectives that do not lead to site closeout)
See Phase I Project Objectives Worksheet	See Phase I Project Objectives Worksheet	

APPENDIX C

Power Point Presentation

Technical Project Planning (TPP) Meeting #1

Richmond Naval Air Station

RI/FS for Incinerator

FUDS ID No.
I04FL003806
Miami, Florida

Prepared by:
Aerostar SES LLC

December 10, 2014

Meeting Agenda

- Introduce Project Delivery Team
- Team Roles and Responsibilities
- TPP Process
- Discuss Site Background, History and Reports
- Define the Problem and Present the Conceptual Site Model
- Discuss Remedial Investigation/Feasibility Study Objectives
- Present Technical Approach
- Discuss Data Needs and *REACH CONSENSUS* on Data Objectives
- Discuss Next Steps and Schedule
- Questions and Answers
- Conclude TPP Meeting #1

Introductions

U.S. Army Corps of Engineers

- Ms. Diana Martuscelli, Project Manager
- Mr. Frank Zepka, Technical Manager
- Ms. Marie Lopez, Project Chemist
- Ms. Amanda Parker, Public Relations

Miami-Dade County

- Mr. Tom Kux

Florida Department of Environmental Protection

- Mr. Paul Wierzbicki, Bureau of Waste Cleanup

Introductions (continued)

Local Stakeholders

- Mr. Gerald Salter – Facility Manager, Federal Bureau of Prisons
- Mr. Marlon Moreira, Mr. Kaelin – FBP
- Mr. Chad Douglas – Miami Zoo

Aerostar SES LLC

- Mr. Scott Hughes, Program Manager
- Mr. Bob Young, PG, Project Manager

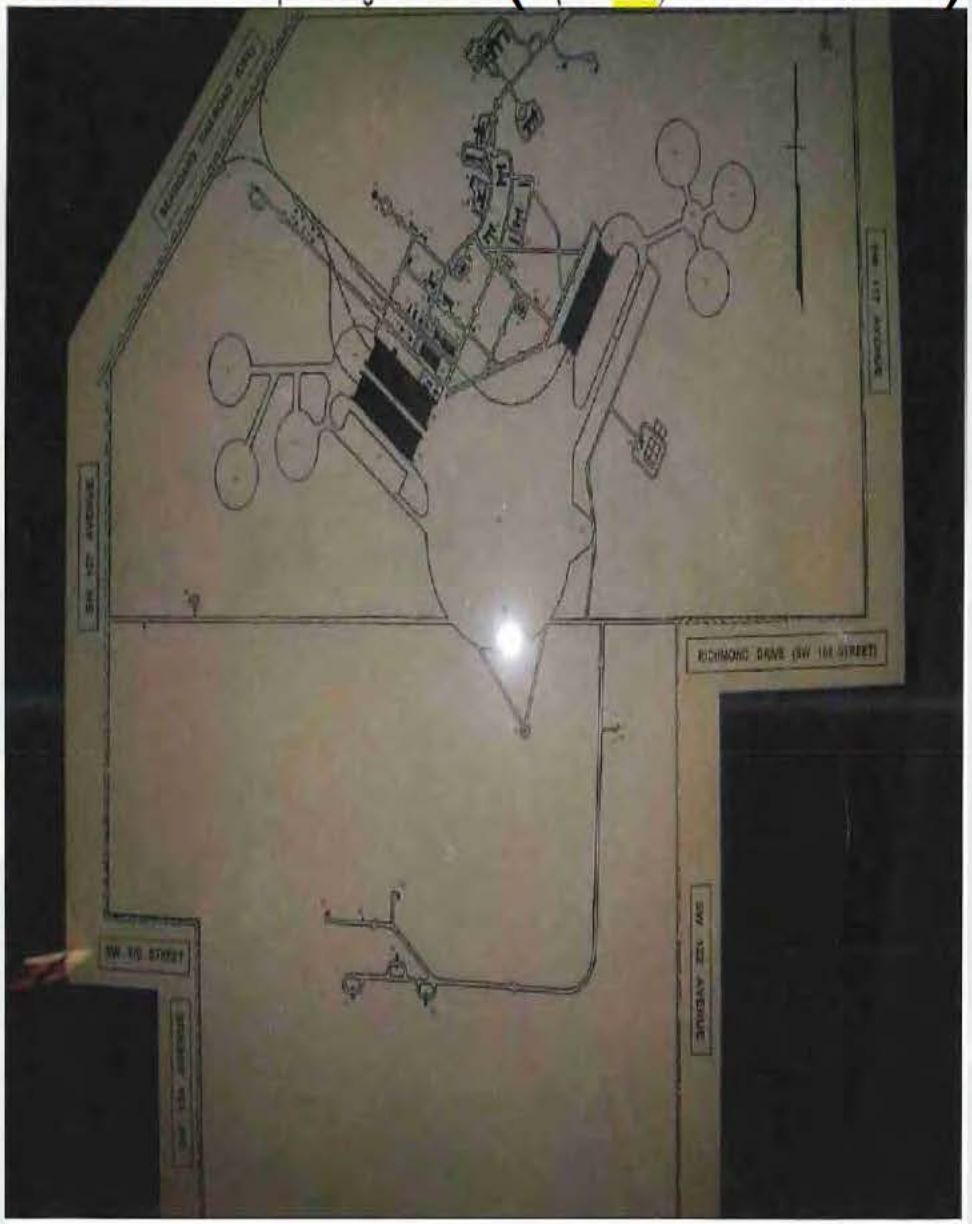
Other Aerostar personnel:

- Tim Cullen, Paul Kirk, Steve Gary, Field Team Leaders
- Rick Levin, PG, Quality Control Manager
    - Allyson Charbonnet, Chemist
    - Frank Redway, Technical Review

FIGURE 1 – SITE LOCATION MAP

AerostarSES LLC	Former Richmond Naval Air Station Hangars 1 & 2 and Maintenance Buildings 12450 SW 152nd Street Miami, Miami-Dade County, Florida	Drawn By: BY Reference: Google Maps

Richmond NAS (Circa 1945)



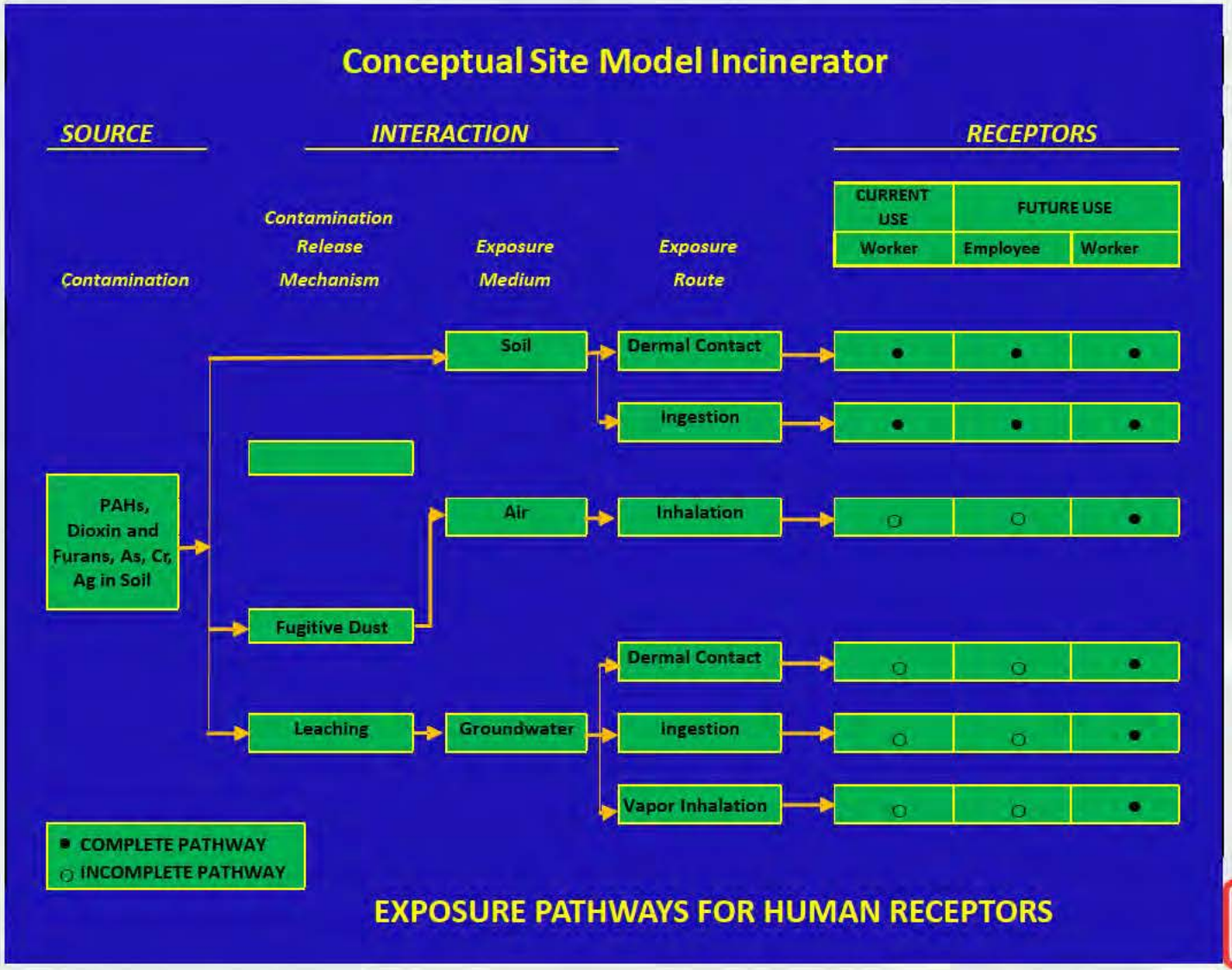
Site and Project History

- Richmond NAS was a complete air training facility, including housing and support facilities built in the early 1940s, utilized for air training
- Incinerator believed to be active on military facility, not used by others, and located on the Federal Bureau of Prisons property
- Richmond NAS remained active until early 1960s
- Between 1959 and 1985 base acreage transferred
- 2011 – FDEP conducted a Site Inspection at the former incinerator
- Remediation under FUDS program

Potential DoD Contaminants of Concern

- Soil – Polynuclear Aromatic Hydrocarbons (PAHs), Benzo(a)pyrene Equivalent (BaPe), Dioxins & Furans, Arsenic (As), Chromium (Cr), and Silver (Ag)
- Groundwater – PAHs, Dioxins & Furans, As, Cr, Ag

Conceptual Site Model



Project Objectives

Project Objective[a]					Data User(s)		Project Objective Classification[d]	
Number	Executable Stage[b]		Description	Source[c]				
	Current	Future						
1	X		Collect the appropriate number of soil and groundwater samples to further evaluate the extent of impacted soil and groundwater in the area of former incinerator.			Risk	x	Basic
					x	Compliance		Optimum
						Remedy		Excessive
						Responsibility		
2	X		Determine the risk to human health of the chemicals of concern identified during the SI and RI.		x	Risk	x	Basic
						Compliance		Optimum
						Remedy		Excessive
						Responsibility		
3	X		Collect defensible soil and groundwater analytical data to complete the Remedial Investigation (RI).			Risk	x	Basic
					x	Compliance		Optimum
						Remedy		Excessive
						Responsibility		
4		X	Collect appropriate amount of analytical data to determine the most effective remediation technology to achieve Site Closure.			Risk	x	Basic
						Compliance		Optimum
					x	Remedy		Excessive
						Responsibility		
5		X	Prepare a Decision Document selecting the best remedy for the site.			Risk	x	Basic
						Compliance		Optimum
					x	Remedy		Excessive
						Responsibility		

TPP Worksheet

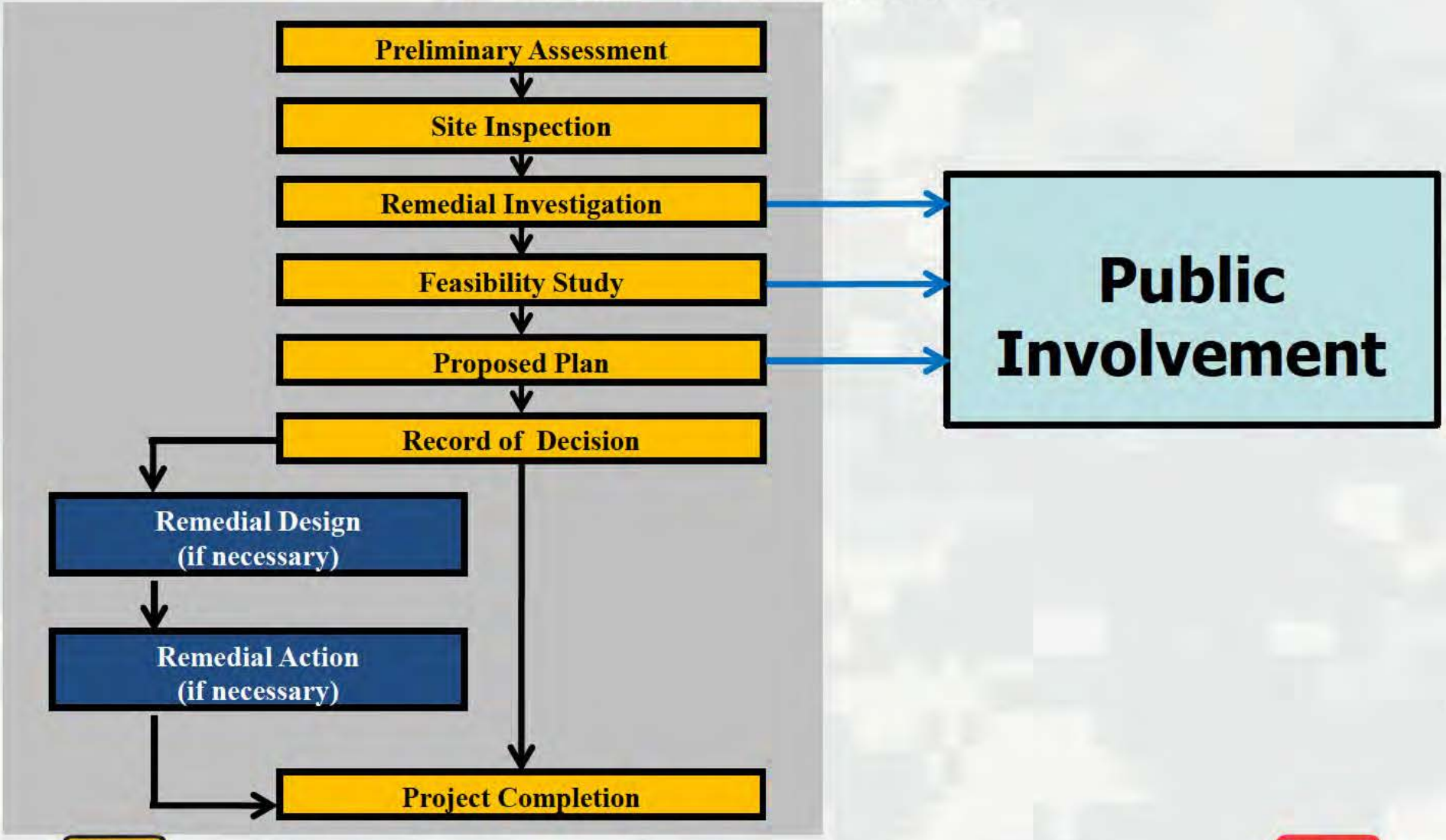
Author(s): Aerostar Latest Revision Date: 12/4/2014 Location: Richmond NAS, Miami, Miami-Dade County, Florida Site(s): Incinerator Project: RI/FS		
TPP Team		**EM 200-1-2, Paragraph 1.1.1**
Decision Maker		
Customer	USACE	
Project Manager	Diana Martuscelli – USACE, Robert H. Young, P.G. – Aerostar	
Regulators	Miami-Dade County Department of Environmental Resources Management (DERM) and FDEP	
Stakeholders	Federal Bureau of Prisons, Miami-Dade Department of Parks and Recreation	
Data Types	**Data User**	**Data Gatherer**
Contaminants of Concern	Aerostar (Risk/Remedy), USACE, Miami-Dade County (Risk/Compliance)	Aerostar
Compliance / Regulatory (CR)	USACE, Miami-Dade County, FDEP	Aerostar
Demographics/Land Use (LU)	Aerostar (Risk/Remedy), USACE, Miami-Dade County (Risk/Compliance)	Aerostar
Site Conditions	Aerostar (Remedy)	Aerostar

TPP Worksheet

CUSTOMER'S GOALS		EM 200-1-2, Paragraph 1.1.2	
Contaminant Issues	Future Land Use	Site-specific Closeout Goal (if applicable)	
Soil – PAHs, BaPe, Dioxin/Furans, As, Cr, Ag	Federal Bureau of Prisons	See below	
Groundwater – PAHs, Dioxin/Furans, As, Cr, Ag	Federal Bureau of Prison	See below	

Site Closeout Statements
Satisfy the FDEP cleanup requirements, including the possible use of risk-based alternative CTLs, per Chapter 62-780 FAC, and/or ensure that the Chemicals of Concern (COCs) meet SCTLs and GCTLs established FDEP Chapter 62-777 FAC. Manage the potential contaminated media to lower the risk through a combination of remedial actions thereby rendering the site as safe as reasonably possible to humans and the environment, and conducive to the anticipated land use.
Customer's Project Goals
Conduct Remedial Investigation/Feasibility Study and select most effective remedy to achieve no further action status.
Customer's Site Budget
RI/FS and Reporting fully funded through the Formerly Used Defense Sites (FUDS) Program

CERCLA Process



Remedial Investigation/Feasibility Study (RI/FS) Objectives

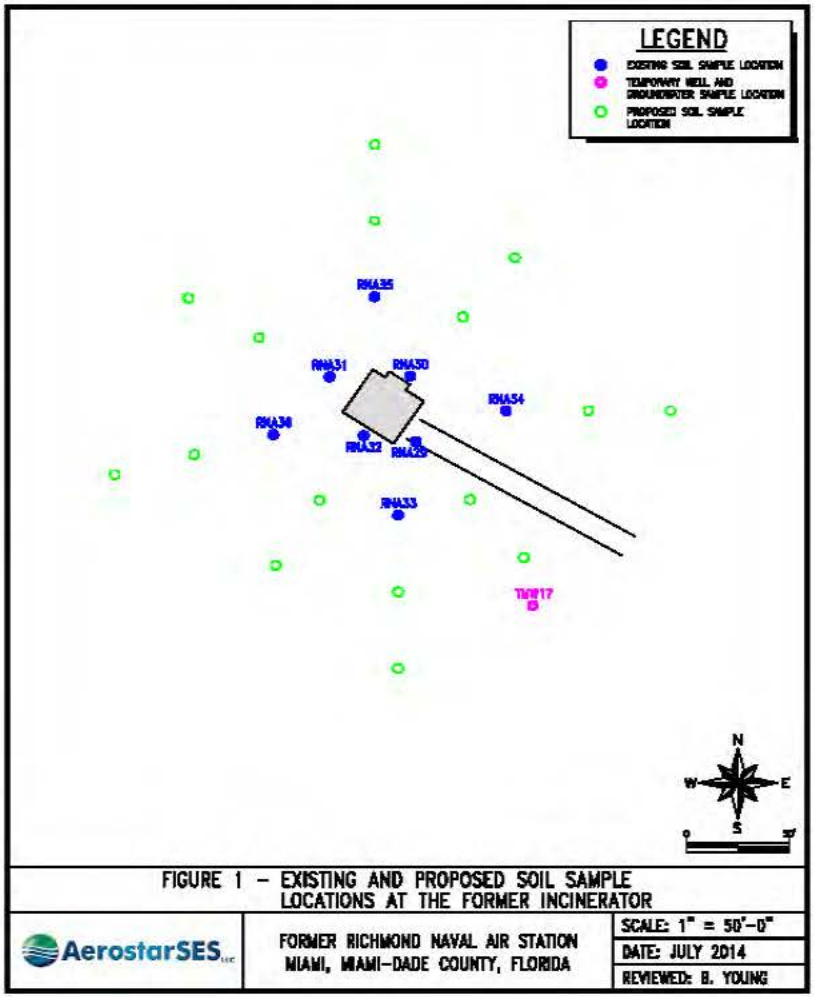
- Investigate former Incinerator in coordination with stakeholders
- Characterize the nature and extent of risks posed by the DoD contaminants of concern
- Evaluate potential remedial options

Remedial Investigation
Proposed Soil Sampling

- Collect approximately 50 soil samples to characterize the impacted soil around the former Incinerator
- Collect soil samples at 0-0.5 ft BLS, 0.5-2 ft BLS, 2-4 ft BLS (if needed 4-6 ft BLS) using a stainless steel hand auger and direct-push rig
- Analyze 48 soil samples for PAHs, BaPe, and As
- Analyze 56 samples for Dioxins & Furans
    - Analyze 12 samples for Cr and 6 samples for Ag

Remedial Investigation

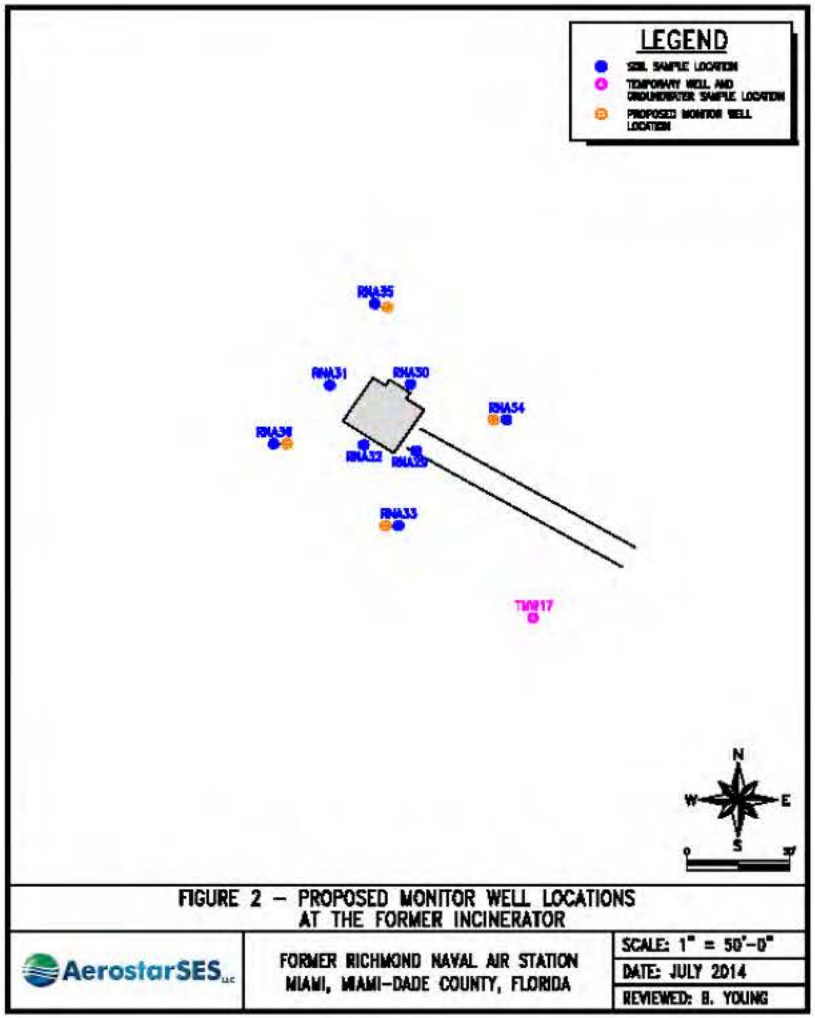
Soil Sample Locations



Remedial Investigation
Proposed Groundwater Sampling

- Collect four groundwater samples (5-15' BLS)
- Analyze four groundwater samples for PAHs, Dioxins & Furans, and As, Cr, and Ag
- Four Monitor wells will be installed with Direct-push rig to 15 feet BLS. The wells will be constructed with 10-feet of one-inch diameter screen threaded to 7-feet of 1-inch diameter riser. The well will stick-up 2 feet ALS.

Remedial Investigation
Proposed Monitor Well Locations



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Remedial Investigation Summary

Media	Arsenic	Polynuclear Aromatic Hydrocarbons	Dioxin & Furans	Chromium	Silver
SOIL	48	48	56	12	6
GROUNDWATER	4	4	4	4	4

Soil – Cleanup to FDEP Soil Cleanup Target Levels (SCTLs), or appropriate risk-based Alternative CTLs

Groundwater – Cleanup to FDEP Groundwater Cleanup Levels (GCTLs)

Data Quality Objectives - Soil

DQO Element Number[a]	DQO Element Description[a]	Site-Specific DQO Statement
Intended Data Use(s):		
1	Project Objective(s) Satisfied	Collect appropriate number of soil samples to complete RI/FS, including the risk assessment. Select most effective remediation technology to obtain site closure
Data Need Requirements:		
2	Data User Perspective(s)	Provide defensible analytical data to complete RI/FS and justify remedy selected to achieve No Further Action w/o conditions
3	Contaminant or Characteristic of Interest	PAHs, BaPe, dioxin/furans, As, Cr, Ag
4	Media of Interest	Soil
5	Required Sampling Locations or Areas and Depths	Surface 0-0.5' BLS; SS 0.5-2' BLS. 2-4' BLS. 4-6' BLS in area of incinerator.
6	Number of Samples Required	50
7	Reference Concentration of Interest or Other Performance Criteria	SCTLs established Chapter 62-777 FAC
Appropriate Sampling and Analysis Methods:		
8	Sampling Method	Hand Auger or Macro Core and DPT rig
9	Analytical Method	EPA Methods 8270, 1613B, and 6020

Data Quality Objectives - Groundwater

DQO Element Number[a]	DQO Element Description[a]	Site-Specific DQO Statement
Intended Data Use(s):		
1	Project Objective(s) Satisfied	Collect appropriate number of GW samples to complete RI/FS. Select most effective remediation technology to obtain site closure
Data Need Requirements:		
2	Data User Perspective(s)	Provide defensible analytical data to complete RI/FS and justify remedy selected to achieve No Further Action
3	Contaminant or Characteristic of Interest	PAHs, Dioxin/Furans, As, Cr, Ag
4	Media of Interest	Groundwater (GW)
5	Required Sampling Locations or Areas and Depths	Four shallow monitor wells installed across the area of the former incinerator
6	Number of Samples Required	Four
7	Reference Concentration of Interest or Other Performance Criteria	GCTL established in Chapter 62-777 FAC
Appropriate Sampling and Analysis Methods:		
8	Sampling Method	Peristaltic Pump and dedicated polyethylene tubing
9	Analytical Method	EPA Method 8270, 1613B, and 6020

Data Analysis/Evaluation

- Quality Assurance/Quality Control samples
  - ►Field Duplicate (5% of samples)
  - ►Equipment Blank (one per media)
- SEDD 2A validation on laboratory data
- Results compared to the FDEP: SCTLs, GCTLs,
- Determine if additional soil or groundwater samples are needed

Standard Operating Procedures (SOPs)

- Aerostar will follow the Florida Department of Environmental Protection SOPs for soil (FS3000) and groundwater sampling (FS2200) and general field activity SOPs.
- The soil and groundwater samples will be submitted to an Environmental Laboratory Accreditation Program (ELAP) certified laboratory for all matrices and analytes
- Aerostar chemist to validate laboratory analytical data.

Communication Tools:

- TPP Meetings
- Community Relations Plan
- Public Meetings
- Newspaper Notices/Emails
- Restoration Advisory Board

RI/FS Next Steps and Timeline

- Technical Project Planning: December 2014
- Draft Work Plan: January 2015
- Internal Review on Draft Work Plan: January 2015
- Revise Work Plan: February 2015
- Regulatory/Stakeholder Review of Draft Final Work Plan: March 2015
- Final Work Plan: March 2015
- Fieldwork: April 2015

RI/FS Next Steps and Timeline

- Draft Remedial Investigation Report: May 2015
- Internal Review of Report: May 2015
- Revise Report: Draft Final June 2015
- Regulatory/Stakeholder Review: June 2015
- Final Remedial Investigation Report: July 2015
- Prepare Proposed Plan for Public Input: August 2015

Richmond NAS (Circa 1945)

Questions?

Other Discussion Topics?

Action Items ...

APPENDIX D

Miami-Dade County Anthropogenic Background Study

Memorandum

MIAMI-DADE COUNTY

Date: April 3, 2014

To: Environmental Monitoring and Restoration Division (EMRD) Staff

From: Wilbur Mayorga, P.E., Chief
EMRD-DERM

Subject: Miami-Dade County Anthropogenic Background Study

Contaminant concentrations attributable to natural processes or regional or subregional anthropogenic impacts are an important consideration for responsible parties and personnel involved in the restoration of contaminated sites. There are only a few studies targeting background soil concentrations at the national, state or local level. Often the data from national or state-wide studies cannot be directly applied at the county or subregional level. In 2011, the EMRD initiated a study to determine anthropogenic background concentrations of several contaminants (including inorganic chemicals which occur naturally) commonly encountered in soil at contaminated sites in Miami-Dade County. The anthropogenic background study is intended to complement the two studies, previously conducted by the Division, which evaluated naturally occurring background soil concentrations (DERM 2002 and 2004) and to assist responsible parties and environmental restoration contractors.

Between 2011 and February 2014, the EMRD sampled surficial soils at over 160 locations throughout the urban corridor (inside the 2015 UDB) of the county. The locations were selected to be representative of county-wide heterogeneity with respect to development history (older urban centers as well as newer suburban areas), land use (public buildings-libraries, residents and public parks), geology (coastal ridge versus low lying areas to the south and west, etc.). Samples were collected as composites, each consisting of 5 to 9 subsamples. Where feasible, samples were obtained from the 0-6 inch and the 6-24 inch intervals at each location. The samples were analyzed for fourteen inorganic chemicals and the carcinogenic polycyclic aromatic hydrocarbons (PAHs) represented by benzo(a)pyrene toxicity equivalents. In addition, 10% of the samples were analyzed for polychlorinated biphenyls (PCBs) as well as organochlorine pesticides.

The study results are presented in the attached tables and figures. The statistical descriptors evaluated include the Minimum Variance Unbiased Estimate (MVUE) and the 95% Upper Confidence Limit (95% UCL). In most cases the data is not normally distributed; therefore, the mean is provided for illustration only.

The results indicate arsenic as the most significant contaminant. To further assist data users, historical on-file data for muck soils/organic soils typical of western, southeast and south Miami-Dade County was reviewed and evaluated and summary statistics with respect to arsenic concentrations for these muck soils are also presented. Additionally for completeness, the data summary for the previously published naturally occurring background concentrations for the barrier islands (DERM 2004) is also presented.

If you have any questions concerning the above please contact me.

pc: Lee Hefty, DERM Director
Jose Gonzales P.E., Director's Office
DERM Division Chiefs

Table 1: MIAMI-DADE COUNTY ANTHROPOGENIC BACKGROUND STUDY
SUMMARY STATISTICS

Contaminants with no exceedence of residential Soils Cleanup Target Levels

	Al			Ba			Cd			Cr		
	0 - 6"	6 - 24"	0-2ft*	0 - 6"	6 - 24"	0-2ft*	0 - 6"	6 - 24"	0-2 ft*	0 - 6"	6 - 24"	0-2 ft*
Number of Samples	148	140	140	153	140	140	148	141	141	150	140	140
Minimum	84	81.0	95.0	2.1	0.6	2.5	0.1	0.1	0.1	1.3	0.6	0.7
Maximum	9240	8780	8327	42.3	52.2	49.7	1.0	0.7	0.7	37.8	38.5	38.0
Mean	2320	2092	2129	11.6	8.6	9.3	0.3	0.1	0.2	12.0	9.6	10.2
MVUE	2372	2188	2179	11.6	8.6	9.2	0.3	0.1	0.2	12.1	9.9	10.4
95% UCL	2935	2548	2484	12.5	9.8	10.2	0.3	0.2	0.2	13.2	11.1	11.4

	Cu			Pb			Fe			Hg		
	0 - 6"	6 - 24"	0-2 ft*	0 - 6"	6 - 24"	0 -2 ft*	0 - 6"	6 - 24"	0-2 ft*	0 - 6"	6 - 24"	0-2 ft*
Number of Samples	143	140	140	152	141	141	147	141	141	145	139	139
Minimum	1.2	0.2	0.5	0.3	0.3	0.3	119	56	86	0.02	0.02	0.02
Maximum	32.5	29.6	33.8	129	141	133	10900	10100	7892	0.8	0.8	0.8
Mean	9.2	5..7	6.6	24.3	16.1	18.4	2446	2019	2125	0.3	0.4	0.4
MVUE	9.2	6.2	6.7	25	16	17.6	2499	2111	2176	0.4	0.4	0.4
95% UCL	10.3	7.7	7.7	33.2	20.1	21.5	3014	2447	2455	0.4	0.4	0.4

	Mn			Ni			Zn			Ag		
	0 - 6"	6 - 24"	0-2 ft*	0 - 6"	6 - 24"	0-2 ft*	0 - 6"	6 - 24"	0-2 ft*	0-6"	6-24"	0 -2 ft*
Number of Samples	140	139	139	142	139	139	140	138	138	148	136	136
Minimum	5.9	1	2.2	0.5	0.5	0.5	4	1	1.7	0.1	0.1	0.1
Maximum	243	196	206	8.9	5.9	5.9	168	154	143	5.1	5.1	5.1
Mean	15	31.6	36.3	2.1	1.9	1.9	37.2	21.6	25.5	1.0	0.9	1.0
MVUE	50.6	33.5	36.9	2.1	2	1.9	37.3	21.0	25.0	1.2	1.0	1.1
95% UCL	57.1	40.3	47.9	2.6	2.3	2.3	41.2	26.0	29.0	1.4	1.3	1.3

Concentrations in mg/kg

* weighted concentration

Outliers removed for data analysis

Data for Selenium not analyzed -94% of values below detection limit

PCB and Organochlorine pesticide data not analyzed statisticaly due to limited detections

Table 2: MIAMI-DADE COUNTY ANTHROPOGENIC BACKGROUND STUDY
ARSENIC SUMMARY STATISTICS

	Arsenic- County-Wide			Arsenic-North of SW 88 Street			Arsenic-South of SW 88Street		
	0 - 6"	6 - 24"	0-2 ft*	0 - 6"	6 - 24"	0-2 ft*	0 - 6"	6 - 24"	0-2 ft*
Number of Samples	153	142	142	111	100	100	40	39	39
Minimum	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Maximum	27.3	14.5	16.2	24.8	10.0	13.7	27.3	14.5	16.2
Mean	3.9	2.6	2.9	3.3	1.9	2.2	5.9	4.2	4.7
MVUE	4.2	2.9	3.0	3.5	2.1	2.3	7	5	5.2
95% UCL	5.6	3.5	3.7	4.8	2.6	2.8	10.6	7.1	7.9

Concentrations in mg/kg

Outliers removed for data analysis

* Weighted Concentration

Table 3: MIAMI-DADE COUNTY ANTHROPOGENIC BACKGROUND
BaPTE SUMMARY STATISTICS

	BaPTE		
	0 - 6"	6 - 24"	0-2 ft*
Number of Samples	146	143	140
Minimum	0.01	0.01	0.01
Maximum	1.38	1.79	1.5
Mean	0.13	0.09	0.1
MVUE	0.14	0.07	0.11
95% UCL	0.2	0.13	0.13

Concentrations in mg/kg

Outliers removed for data analysis

* Weighted Concentration

Table 4: Anthropogenic Background Study Data

Soil Concentrations mg/kg (0 to 6 inches and 6 to 24 inches)

Site	Silver (Ag)		Aluminum (Al)		Arsenic		Barium		Cadmium (Cd)		Chromium (Cr)		Copper (Cu)		Iron (Fe)		Mercury (Hg)		Manganese (Mn)		Nickel (Ni)		Lead (Pb)		Selenium (Se)		Zinc		BaPTE	
Number	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24
1	0.4	0 8	1280	1780	0 8	1 0	8 3	14.9	0.1	0.1	5.7	7.5	4.0	3.3	1050	1440	0.3	0.4	25 0	22 0	1.3	1.7	5.4	3.3	0.5	0.5	44 0	28 0	0.02	0.01
2	0.4	0 6	839	1080	0 9	0 8	7.7	5.1	0 2	0.1	4.4	4.8	3.0	0.3	1230	772	0.3	0.4	14 0	6.0	1.1	1.4	25 9	9.6	0.5	0.5	37 0	15 0	0.25	0.17
3	0 5	0.4	733	844	3.4	1.7	14.3	5.7	0 3	0.2	10.1	5.1	7.5	0.6	3330	674	0.3	0.3	56 0	12 0	2.0	1.1	61 8	15.1	0.5	0.5	47 0	15 0	1.38	0.23
4	0.7	0.4	911	571	2 6	1 0	12.8	22.3	0 6	0.4	11 0	5.2	11.7	23 5	2730	2460	0.3	0.3	42 0	24 0	2.6	1.2	154.0	126.0	0.5	0.5	88 0	103.0	0.16	0.06
5	0.4	0 8	1370	2030	3.1	2 6	11.0	17.9	0 2	0.3	5.7	8.6	10 2	8.8	2470	2120	0.3	0.3	65 0	53 0	2.0	4.4	58 5	86 3	0.5	0.5	42 0	53 0	0.22	0.09
6	0 8	0 6	1030	998	1.4	1 8	10.1	10.6	0 3	0.2	6.4	6.0	10 8	12 2	1880	3290	0.3	0.3	33 0	35 0	1.7	1.7	90.1	141.4	0.5	0.5	64 0	62 0	0.07	0.05
7	0.4	0 5	3210	2980	1 3	1 2	5 8	3 6	0.1	0.1	9.6	9.0	3.3	0.7	2540	2170	0.3	0.3	45 0	43 0	2.2	2.0	6.3	2.9	0.5	0.5	19 0	6.0	0.70	0.03
8	0 2	0 2	1230	1430	1 8	2 2	12.9	6 9	0.1	0.1	8.0	7.9	16 6	8.2	2050	1520	0.0	0.3	55 0	36 3	1.5	1.4	14.4	6.9	0.5	0.5	42.4	22 5	0.17	0.16
9	0 2	0 2	1280	1320	2 2	2.7	8 3	8.4	0.1	0.2	7.7	8.1	10 5	10 0	1490	2550	0.0	0.3	34 6	33 2	1.4	1.8	22.4	26 8	0.5	0.5	48.7	136.0	0.06	0.01
10	0.1	0 2	2440	3050	2.4	2 6	18.1	18.2	0.1	0.1	9.8	11.7	7.1	8.2	2940	3490	0.0	0.3	106.0	96 9	1.9	2.3	10 5	11 2	0.5	0.5	20 0	21.1	0.50	1.20
11	0.1	0 2	1050	1010	1 9	1.4	11.4	11.3	0 2	0.2	8.9	8.0	7.9	5.9	1430	1260	0.3	0.3	19 3	21 5	1.4	1.5	22 5	34.1	0.6	0.5	36 3	48 8	0.71	0.38
12	0.1	0 2	528	361	2 2	0.4	11.8	2.1	0 3	0.0	3.5	1.9	9.2	2.1	3050	518	0.1	0.3	47.1	6.8	1.2	0.4	67 0	7.3	0.5	0.5	68.1	8.0	0.41	0.03
13	0 2	0 2	746	322	0.4	0 3	6 5	3 3	0.1	0.0	5.3	2.4	5.1	2.2	830	404	0.0	0.3	17.4	11 2	1.2	0.7	8.7	4.2	0.5	0.5	20 9	7.9	0.09	0.01
14	0 2	0 2	1610	1030	2.7	1 6	13.4	7 0	0 2	0.1	13 5	9.2	13 0	5.1	1670	967	0.3	0.3	41 6	18.4	1.5	0.9	30 5	17 6	0.5	0.5	53.4	24 9	0.80	0.25
15	0 2	0 2	431	240	1 0	0.4	5.4	2 3	0 5	0.1	16 0	3.3	7.3	1.5	1090	443	0.2	0.3	24.7	6.3	1.8	0.8	42.1	9.1	0.6	0.5	78.1	16.1	0.02	0.11
16	0.7	1 3	1920	2200	2 2	2.7	12.3	7.4	0.1	0.1	7.5	8.5	11 3	4.8	2350	1830	0.4	0.7	33 0	18 0	1.6	1.7	4.9	2.8	0.5	0.5	12 0	6.0	0.02	0.01
17	5 0	4 0	6180	5280	3 5	2 5	17.7	14.3	0.1	0.1	15 9	13 6	4.2	1.8	2160	1260	0.4	0.4	16 0	7.4	3.4	3.4	5.4	2.8	0.5	0.5	9.7	5.2	0.08	0.01
18	0 6	0.7	2300	2590	2 6	2 9	8 0	7.1	0 2	0.2	8.0	9.9	6.0	5.1	2080	2370	0.4	0.5	29 0	24 5	1.4	2.0	31 0	35.4	0.5	0.5	61.1	42 8	0.04	0.02
19	0 3	0 2	1830	844	1 6	0 6	11.4	4 3	0 3	0.1	8.6	3.4	7.9	1.9	2230	797	0.4	0.3	20 0	6.0	1.8	0.8	24 0	8.7	0.5	0.5	40 0	18 0	0.02	0.01
20	0 8	1 0	1690	1710	5 2	6.1	25.6	42.0	0 8	0.7	13 3	17.4	19 8	18.4	5580	4500	0.6	0.6	41 6	42.1	3.1	4.5	96 2	67 3	0.5	0.5	154.0	126.0	0.77	1.79
21	2 3	1 8	2300	3150	5.7	4.1	11.0	8.4	0 5	0.2	20 2	12 9	6.9	2.9	4080	3240	0.8	0.6	55 0	31 0	1.7	1.8	13 8	4.5	0.5	0.5	20 0	10 0	0.04	7.27
22	0.4	0.4	1270	1980	3 0	2 2	15.0	11.1	0.4	0.1	7.0	9.2	7.1	3.9	4480	4310	0.6	0.5	36 5	20 3	1.2	1.3	61 0	23 3	0.5	0.5	113.0	35 8	0.10	0.06
23	0.1	0 2	1040	759	1 0	0 6	8.4	5 3	0.1	0.1	5.6	4.0	5.8	3.1	861	421	0.0	0.0	21 6	7.8	1.4	1.1	5.5	7.7	0.5	0.5	25.1	20.1	0.03	0.03
24	0 2	0 2	666	608	0 3	0 3	5.1	2 8	0 2	0.1	3.9	2.8	2.9	0.8	751	252	0.6	0.3	6.6	1.1	0.9	0.6	15 3	2.0	0.5	0.5	40 2	5.7	0.02	0.01
25	0 9	0 6	1260	848	8 9	4 2	93.5	60.9	0 8	0.4	17.4	9.0	25.4	11.7	3230	1580	0.5	0.4	63 0	30 0	3.4	1.8	105.0	56.4	0.5	0.5	249.0	137.0	0.01	0.03
26	0.1	0 2	764	493	2.1	1 2	6 0	2 5	0 3	0.0	11 9	3.0	9.5	1.6	1440	397	0.1	0.0	36 5	6.2	1.1	0.5	23 0	6.1	0.5	0.5	32.1	8.8	0.02	0.02
27	0.4	0 3	3680	3090	1.7	1 3	3 9	2 2	0.1	0.1	10 9	11 0	1.7	0.5	2000	1660	0.4	0.4	20 0	6.0	1.5	1.5	5.1	1.6	0.5	0.5	4.0	1.0	0.01	0.01
28	0.1	0 2	2360	2810	1 9	1.4	11.6	9 9	0 3	0.2	27 2	19.1	25 5	17 9	2090	1850	0.1	0.0	154.0	108.0	2.6	2.2	12 6	8.4	0.7	0.7	27 6	13 8	0.01	0.01
29	1.1	1 3	2980	3680	25.0	13.3	10.3	8 6	0.7	0.4	10 0	11 2	11 8	7.4	2920	2770	0.5	0.6	51 0	42 0	2.1	2.7	10 5	12 8	0.5	0.5	49 0	36 0	0.07	0.05
30	0.4	0 5	3740	4420	2 6	2.7	14.6	11.8	0 2	0.2	13 6	16.4	13 3	10 0	3250	3090	0.4	0.4	50 0	43 0	3.0	3.2	30.4	29 2	0.5	0.5	61 0	45 0	0.09	0.06
31	0.1	0 2	971	517	29.7	10.3	5 9	5 2	0.1	0.0	14 6	45 0	7.7	1.4	945	277	0.1	0.3	30 5	5.6	1.2	1.1	38 8	6.7	0.5	0.5	26 9	4.8	0.03	0.01
32	0 2	0 2	902	1360	1 3	1 2	6 5	10.8	0.1	0.1	2.4	3.3	2.9	7.3	959	1760	0.3	0.3	22 6	30.1	0.7	1.4	3.7	7.4	0.5	0.5	8.4	4.1	0.02	na
33	0 9	1 0	3820	3800	2.4	2 6	6 2	5.7	0.4	0.3	19 9	16 6	11 6	9.6	3280	3170	0.4	0.5	82 0	71 0	2.2	2.1	7.4	4.9	0.5	0.5	17 0	11 0	0.05	0.02
34	0 2	0 2	3120	2120	6 6	2.1	10.2	6 2	0 2	0.1	14.7	10.7	58 9	25 5	3900	2280	0.1	0.0	61.7	28.4	2.1	2.0	14 2	7.1	0.5	0.5	53 9	20.1	0.18	0.14
35	0 2	0 2	1510	861	2.4	1.7	15.0	7 6	0.1	0.2	5.6	4.3	13.4	6.5	2900	1360	0.1	0.0	17.7	9.2	1.8	1.0	29 6	20 0	0.5	0.5	34 6	22.1	0.12	0.19
36	1 5	2.1	1570	1010	16.2	14.5	8 6	6 3	0 5	0.4	15 2	6.9	5.3	2.9	703	576	0.8	0.7	35 0	39 0	1.5	0.9	18 8	8.3	0.5	0.5	29 0	11 0	0.03	0.13
37	1 3	0 3	1140	688	2.7	1.7	6.1	3 0	0.1	0.1	4.9	5.6	1.9	1.7	807	658	0.5	0.4	10.7	7.3	1.6	1.0	11 2	10 2	0.5	0.5	8.7	8.6	0.03	0.03
38	0.4	0 2	3490	2870	1 8	1 0	6.4	4 6	0.1	0.1	11 8	9.7	3.4	1.1	1760	1310	0.3	0.3	15 0	7.0	2.1	1.8	7.6	5.0	0.5	0.5	12 0	3.0	0.02	0.01
39	0 2	0 2	137	81	0 3	0 3	22.0	0 6	0.1	0.1	1.3	0.6	2.3	0.8	176	56	0.3	0.3	5.9	1.0	0.5	0.5	17.7	3.3	0.5	0.5	30 6	3.2	0.02	0.01
40	0 6	1 5	1100	1390	29.2	29.1	7 6	23.3	1.1	1.2	4.4	7.4	9.5	21 5	1820	2720	0.3	0.5	44 3	29 3	1.4	2.7	40 3	131.0	0.5	0.5	29 6	75 8	0.04	0.11
41	2 9	1 8	3520	3660	4 5	3 3	19.4	10.9	0 2	0.1	12 2	11 2	5.8	1.7	3010	3000	0.7	0.6	38 0	28 0	2.3	2.0	57.4	40 0	0.5	0.5	34 0	16 0	0.38	0.07
42	2 3	2.7	1980	2020	4 8	4 6	12.4	10.6	0 2	0.2	9.5	9.5	5.2	3.7	2030	1730	0.8	0.8	25 0	23 0	2.2	1.9	7.7	7.4	0.5	0.5	29 0	23 0	0.05	0.06
43	1 3	0 6	3090	1420	4 0	1 6	18.5	4 9	0 2	0.1	10.4	5.3	6.0	1.2	4170	894	0.4	0.3	34 9	7.0	2.6	1.1	13 6	3.0	0.5	0.5	38 0	4.8	0.07	0.01
44	0 6	0.7	1150	981	2 2	2.4	5 0	5 0	0.1	0.1	5.8	5.4	3.9	4.0	701	562	0.4	0.4	20 8	19 3	1.1	1.2	6.8	5.4	0.5	0.5	34 3	34.1	0.09	0.20
45	0 5	0 8	1270	1360	2.7	1 6	11.0	6 3	0 2	0.1	5.1	5.9	6.6	4.4	1270	10100	0.3	0.4	17 0	45 0	1.1	2.0	76 0	49 9	0.5	0.5	38 0	19 0	na	na
46	0 2	0.4	1670	484	2.1	0 6	4.1	1 9	0.1	0.1	6.2	2.1	3.0	2.6	1650	337	0.4	0.4	9.6	3.1	0.8	0.5	7.8	5.4	0.5	0.5	10 2	4.9	0.07	0.06
47	1.4	1 5	5560	5750	3 2	3 2	8 9	8 2	0 3	0.2	25.1	24 2	8.0	4.5	3770	3820	0.5	0.6	28 0	20 0	3.2	3.1	24 2	15 2	0.5	0.5	60 0	31 0	0.03	0.01
48	1 5	1 8	2880	1200	5 6	6 9	20.0	26.2	0.1	0.1	10.1	5.9	10.1	2.3	4120	3650	0.8	0.8	33 6	54 2	2.3	1.5	21 6	7.1	0.5	0.5	19.1	8.1	0.10	0.04
49	0.1	0 2	597	1590	0.4	0 9	6 9	4 2	0 2	0.1	9.3	7.6	9.0	4.5	685	1460	0.0	0.0	83 6	10.7	0.7	1.1	17 5	4.2	0.5	0.5	18.4	4.5	0.01	0.01
50	0 2	0 2	833	568	2 0	1 6	42.3	52.2	0 6	0.3	6.8	7.2	16 5	17 0	1750	1150	0.2	0.1	37 9	43.1	1.9	1.5	115.0	49 6	0.8	0.5	192.0	91 8	0.07	0.04
51	1.4	0 2	615	556	8.4	1 0	10.4	2.1	0 6	0.1	22 3	3.9	7.3	1.0	5760	712	0.6	0.3	69.7	6.8	1.1	0.6	25 3	4.0	0.5	0.5	22 5	2.0	0.42	0.01
52	0 2	na	1370	1000	7.1	3 2	21.1	15.7	0.7	0.3	16 0	8.9	25 5	12 6	7390	3690	0.2	0.1	46 2	24.1	3.6	2.2	129.0	63 0	1.2	0.9	125.0	67 0	0.43	0.30
53	5.1	5.1	1870	874	9.7	2 3	7 5	4 9	0 3	0.1	7.8	5.0	7.3	2.7	5510	865	0.3	0.5	24 9	9.1	2.0	1.0	18.7	6.7	0.5	0.5	26 6	6.6	0.01	0.00
54	1.4	0 9	2390	2090	10.7	9 3	6 9	3.7	0 5	0.3	20.4	8.9	7.9	4.3	3530	4040	1.0	0.5	46 0	34 0	1.9	1.3	30 5	12 0	0.5	0.5	28 0	4.0	0.11	0.01
55	0 2	0 2	4330	5000	16.2	13.4	9 6	10.3	0 2	0.3	15.1	17 5	10 3	14.4	3940	4700	0.0	0.0	126.0	140.0	2.8	3.1	14 3	14 8	0.9	1.0	57 6	61 8	0.14	0.08
56	0.1	0 2	1150	408	2.4	1.1	15.9	9 0	0 2	0.1	7.3	5.2	10.4	2.2	2030	617	0.1	0.0	43.7	24 2	2.3	1.4	20 8	4.9	0.6	0.5	69 3	9.9	0.44	0.06
57	0 6	0 3	1270	965	8 0	4.1	24.7	11.3	0 9	0.3	19 0	10 3	30 2	9.9	4820	2280	0.2	0.1	71 3	27 5	5.6	1.9	84 3	22 9	1.5	0.9	162.0	39.1	0.08	0.01
58	2 3	3 0	909	294	14.3	11.2	8 0	7 0	0.4	0.3	6.6	3.4	4.3	2.2	1110	1370	0.7	0.8	71 0	83 0	0.8	0.5	3.3	0.3	0.5	0.5	6.0	4.0	0.01	0.01
59	5 0	4 2	2020	1110	0 5	1.1	10.1	5 8	0 3	0.1	12 8	6.6	7.3	4.1	1600	1520	0.3	0.3	47.7	21.4	1.5	1.2	13 2	4.3	0.5	0.5	19 0	5.0	0.04	0.01
60	0 3	0 2	734	656	2 8	1.7	6.7	3.1	0 2	0.1	14 0	4.8	6.6	2.5	869	346	0.3	0.3	19 0	7.2	1.1	0.9	31 6	8.7	0.5	0.5	28.1	7.3	0.02	0.01
61	1 6	2 2	3180	2570	5.1	9 6	9.1	10.4	0 2	0.4	14 0	16 0	17.7	27 3	3880	3340	0.7	0.7	57 0	50 0	3.2	3.1	20 2	43 0	0.5	0.5	44 0	58 0	0.58	0.34
62	2 0	na	8230	na	5 2	na	12.1	na	0.4	na	37 8	na	20.7	na	4370	na	0.7	na	243.0	na	5.0	na	15 6	na	0.5	na	32 0	na	0.06	na

Table 4: Anthropogenic Background Study Data

Soil Concentrations mg/kg (0 to 6 inches and 6 to 24 inches)

Site	Silver (Ag)		Aluminum (Al)		Arsenic		Barium		Cadmium (Cd)		Chromium (Cr)		Copper (Cu)		Iron (Fe)		Mercury (Hg)		Manganese (Mn)		Nickel (Ni)		Lead (Pb)		Selenium (Se)		Zinc		BaPTE	
Number	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24
63	1.9	1.8	3100	2990	5.6	4.5	7.0	5.2	0.2	0.1	13.0	10.8	4.4	2 9	1630	1670	0.7	0 6	54.0	45 0	2.6	2.1	14 6	7.0	0.5	0.5	28.0	14.0	0 02	0 01
64	0.2	0.2	1290	1630	1.2	1.5	12.6	10.1	0.2	0.1	9.0	8.3	8.4	5 9	1250	1500	0.1	0 6	29.6	27 9	1.6	2.2	87 0	22 9	0.5	0.5	45.0	28.0	0.15	0 31
65	0.8	1.1	3060	4950	3.0	3.3	8.0	5.3	0.2	0.1	10.6	16.8	5.7	2.7	2390	3530	0.4	0 6	25.0	23 0	5.6	4.4	25 9	13.4	0.5	0.5	20.0	9.0	0 04	0 01
66	0.1	0.2	1650	1370	2.3	1.1	7.6	4.6	0.3	0.2	15.4	11.8	8 3	4 5	2560	1380	0.1	0 3	22.7	11.4	1.1	1.1	25 2	17 2	0.5	0.5	65.6	99.2	0 27	0.14
67	0.6	1.0	7150	6200	4.2	4.4	5.6	5.1	0.4	0.3	25.3	24.2	10.4	9.4	4740	4000	0.4	0 5	161.0	137.0	4.6	4.1	10 9	8.5	0.5	0.5	16.0	15.0	0 02	0 02
68	0.6	1.1	3200	3320	2.5	2.2	6.0	3.6	0.3	0.1	19.6	12.3	4.1	0.4	3610	1900	0.4	0.4	35.0	9.0	2.1	1.6	10 0	2.3	0.5	0.5	16.0	3.0	0 55	0.10
69	0.3	0.2	862	377	1.0	0.3	37.1	12.3	0.8	0.2	6.4	2.6	31.0	11.3	1440	511	0 3	0 3	25.0	6.0	1.9	0.6	68.4	21 5	0.5	0.5	168 0	54.0	0 05	0 09
70	1.5	0.9	1370	1690	2.6	1.8	14.7	8.3	0.1	0.1	4.9	5.3	1 6	1.1	1340	719	0 5	0.4	28.0	12 0	1.1	1.1	2.5	2.2	0.5	0.5	9.0	5.0	0 02	0 02
71	1.6	1.1	8530	10050	5.4	3.9	8.6	8.1	0.4	0.2	35.4	33.7	8 2	4.4	4920	4840	0 5	0.4	89.0	50 0	4.7	5.4	3.9	2.8	0.5	0.5	15.0	7.0	0 02	0 01
72	1.5	1.4	24700	27600	6.0	5.7	25.2	29.1	0.2	0.1	55.5	62.9	10.3	2.4	13100	16100	0 5	0 5	258.0	273.0	11 5	12.7	23 6	11 2	0.5	0.5	45.0	9.0	0.14	0 03
73	0.1	0.2	3850	3120	9.2	5.7	11.4	9.1	0.2	0.1	19.2	16.1	11.6	7 8	3970	3320	0 0	0 3	43.5	32.1	3.7	3.1	22 6	14 3	0.5	0.5	30.8	19.2	0 01	0 02
74	0.2	0.3	4680	1780	1.8	2.8	10.9	5.9	0.2	0.1	13.6	10.4	6 6	4 6	4690	2040	0 3	0 3	25.2	14 9	1.6	2.6	17.7	14 6	0.5	0.5	32.4	25.0	0 09	0 05
75	0.7	0.3	5360	5520	2.4	1.9	10.8	11.2	0.1	0.1	22.4	22.8	3 3	1 5	1990	2210	0 5	0.4	18.0	19 0	3.7	3.5	9.9	4.2	0.5	0.5	12.0	3.0	0 08	0 01
76	0.5	0.4	3570	4640	2.5	2.1	4.4	3.3	0.1	0.1	12.6	15.7	3 5	1 2	3080	3440	0.4	0 3	25.0	16 0	2.2	2.8	14.4	6.2	0.5	0.5	14.0	5.0	0 06	0 03
77	2.5	2.9	2160	2170	6.1	5.2	16.1	14.0	0.2	0.1	8.7	8.7	2.4	1.4	3010	2290	0 8	0 8	45.0	39 0	1.6	1.7	3.0	1.7	0.5	0.5	10.0	7.0	0 02	0 01
78	1.2	0.7	6670	4090	3.3	1.2	16.0	6.6	0.2	0.1	19.2	14.3	4.1	0 5	5400	2580	0 3	0.4	19.0	8.0	3.5	2.1	12 6	3.1	0.5	0.5	15.0	3.0	0 02	0 01
79	1.8	na	1830	na	3.3	na	10.2	na	0.1	na	8.3	na	3.4	na	1250	na	0 5	na	26.0	na	2.1	na	9.0	na	0.5	na	18.0	na	0 03	na
80	2.8	1.8	4570	7140	16 2	5.8	17.5	17.8	0.6	0.2	14.9	21.0	7.4	3 2	10900	6810	0 6	0 5	68.0	34 0	2.6	2.8	79.4	53 9	0.5	0.5	40.0	17.0	0 00	0 01
81	0.1	0.2	774	1130	1.1	1.4	10.8	16.0	0.2	0.3	5.6	7.5	24.7	29.6	1400	2000	0.1	0 3	17.4	23 2	2.4	2.4	44 2	72 2	0.5	0.5	47.6	68.0	0 02	0 02
82	0.7	0.6	3020	3060	2.8	2.6	4.4	3.4	0.1	0.1	10.3	10.9	2 9	1 5	2240	2170	0 5	0.4	30.0	24 0	2.2	2.2	30 8	20 2	0.5	0.5	17.0	11.0	0 01	0 01
83	0.7	1.2	3820	4340	2.8	3.1	9.2	6.9	0.2	0.1	14.3	16.5	9 8	6 0	3010	2790	0.4	0 5	34.0	27 0	2.3	2.2	8.4	4.1	0.5	0.5	23.0	11.0	0 05	0 02
84	0.2	na	2660	2610	20.1	5.7	19.5	13.3	1.0	0.4	25.5	13.9	32.5	10.8	14600	3720	0 3	0 3	146.0	105.0	8.9	2.6	106.0	48 0	1.0	0.5	144 0	77.0	0 01	0 01
85	1.4	1.4	1460	2070	8.6	5.7	12.4	10.4	0.5	0.2	13.1	9.4	6.4	2 0	1830	1890	0 8	0 6	38.0	25 0	1.5	1.5	11.4	4.2	0.5	0.5	34.0	9.0	0 02	0 02
86	0.1	0.2	328	964	0.9	1.0	13.2	6.7	0.2	0.2	5.6	3.3	9 0	3 6	827	772	0.1	0 3	58.7	21 0	1.1	0.7	54 8	37 5	0.5	0.5	61.7	72.2	0 01	0 05
87	0.7	1.2	3820	4340	2.8	3.1	9.2	6.9	0.2	0.1	14.3	16.5	9 8	6 0	3010	2790	0.4	0 5	34.0	27 0	2.3	2.2	8.4	4.1	0.5	0.5	23.0	11.0	0 05	0 01
88	0.2	0.4	1390	1050	2.0	1.8	24.8	79.5	0.4	0.5	6.9	7.6	11.6	25.6	2290	2250	0 2	0 3	44.0	52 0	2.0	2.2	55.4	176.0	0.5	0.5	135 0	231 0	0 01	0 02
89	0.5	na	na	na	21 8	na	8.4	na	0.1	na	7.4	na	16.0	na	na	na	na	na	na	na	na	na	3.3	na	0.5	na	97.8	na	na	na
90	0.1	0.2	1460	169	7.6	0.9	13.1	2.4	0.2	0.1	15.4	1.4	7.7	1 8	2200	414	0.1	0 3	58.5	11 9	1.1	0.2	16 8	2.0	0.5	0.5	51.8	3.1	0 01	0 01
91	1.5	1.5	1330	1030	2.6	2.2	12.8	9.3	0.2	0.2	6.4	6.6	12.5	5 6	1810	1250	0 3	0.4	76.0	24 0	2.0	1.9	17 0	14 5	0.5	0.5	30.0	23.0	0 06	0 06
92	1.1	0.8	1510	988	3.1	0.8	6.1	1.9	0.1	0.1	5.5	3.2	1 5	0.4	1400	599	0.4	0 3	na	3.0	1.4	0.9	7.0	5.8	0.5	0.5	8.0	1.0	0 01	0 01
93	0.2	0.2	652	319	0.4	0.4	4.4	1.9	0.1	0.1	3.7	1.6	2.4	0 8	959	654	0 3	0 3	12.0	4.0	0.7	0.5	17 0	5.1	0.5	0.5	15.0	3.0	0.47	0 01
95	1.4	1.5	1930	2289	1.5	1.6	9.9	22.9	0.1	0.1	na	7.9	7 0	na	896	1740	na	0 3	na	na	na	na	10 5	20 0	0.5	0.5	na	na	0 03	0 03
96	0.7	na	3200	na	1.2	na	11.3	na	0.1	na	9.5	na	na	na	2680	na	0 3	na	na	na	na	na	27 2	na	0.5	na	na	na	0.12	0 04
97	1.6	na	2040	na	2.9	na	15.4	na	0.2	na	8.2	na	na	na	2580	na	0 3	na	na	na	na	na	38.4	na	0.5	na	na	na	0 06	0 03
98	3.8	na	2190	na	5.0	na	16.1	na	0.8	na	22.8	na	na	na	3250	na	0.4	na	na	na	na	na	49 6	na	0.5	na	na	na	0 06	0 03
99	1.3	1.3	2190	1990	3.7	1.5	9.8	8.4	0.2	0.1	12.4	8.7	5 3	1 6	1920	1840	0 3	0 3	37.0	28 0	1.8	1.5	9.8	3.2	0.5	0.5	24.0	6.0	0 02	0 01
100	0.5	0.4	1640	1580	1.8	1.0	5.1	2.5	0.2	0.1	10.7	5.6	4 8	0 6	2100	1850	0 3	0 3	49.0	8.0	1.8	1.4	34.1	5.9	0.5	0.5	26.0	7.0	0.17	0 04
101	2.3	0.9	2780	3300	27 3	8.4	10.5	8.3	0.7	0.3	10.2	6.4	2 2	5 5	1770	2610	0 3	0 3	24.0	19 0	2.0	2.5	0.3	1.4	0.5	0.5	4 i	4.0	0 01	0 01
102	2.3	2.4	9240	1100	3.2	1.6	17.3	13.4	0.5	0.4	36.6	38.5	36.7	37.6	6710	7910	0 3	0 3	238.0	196.0	5.8	5.9	7.4	5.8	0.5	0.5	41.0	31.0	0 09	0.13
103	0.2	0.4	1080	954	7.4	1.7	7.4	3.9	0.2	0.1	6.2	4.8	4.1	4.4	1220	592	0 3	0 3	51.0	12 0	1.1	1.2	5.4	2.7	0.5	0.5	21.0	7.0	0 03	0 01
104	0.2	0.2	1270	1050	0.6	0.4	2.1	1.0	0.1	0.1	4.4	3.9	1 2	0 3	1050	839	0 3	0 3	10.0	3.0	0.9	0.8	7.9	1.8	0.5	0.5	15.0	7.0	0 01	0 01
105	3.4	3.2	875	868	8.1	7.6	12.6	10.8	0.3	0.3	8.5	3.5	3 9	1 8	7130	7090	0 3	0 3	61.0	48 0	1.1	0.5	7.6	3.7	0.5	0.5	na	1.0	na	0 01
106	0.9	0.3	1460	1050	0.7	0.4	8.9	3.4	0.3	0.1	11.5	5.3	5.4	1 5	1250	434	0 3	0 3	33.0	9.0	1.6	1.0	14.7	5.4	0.5	0.5	49.0	11.0	0 01	0 01
107	na	na	1660	1730	1.4	1.2	32.9	34.0	0.2	0.2	13.6	13.5	14.5	9 3	1530	1340	0 3	0 3	42.7	39 0	1.6	1.7	95 2	74 3	0.5	0.5	74.0	64.1	0 24	0.18
109	1.2	0.6	864	633	0.8	0.4	7.5	6.2	0.2	0.1	5.1	3.4	4 6	2 9	1290	943	0 3	0 3	17.0	9.0	1.2	1.0	21 3	12 9	0.5	0.5	32.0	13.0	0 34	0 09
111	0.8	0.8	3030	3590	1.0	0.8	5.8	4.3	0.1	0.1	16.1	16.0	5 3	2 3	2800	2570	0 3	0 3	19.0	2.6	2.7	12 0	14 3	6.5	0.5	0.5	18.0	5.0	0 09	0 05
112	4.0	3.3	84	1150	2.0	0.3	13.4	15.3	0.4	0.3	7.4	7.2	7.4	7 5	119	1800	0 3	0 3	22.0	17 0	2.0	2.2	31 5	51 9	0.5	0.5	54.0	59.0	0.13	0 06
113	1.4	2.0	2310	2370	2.0	0.3	16.0	6.4	0.1	0.1	7.0	10.7	4.7	1.7	3420	2820	0 3	0 3	37.0	28 0	1.8	2.4	5.4	2.4	0.5	0.5	12.0	7.0	0 07	0 02
114	0.4	0.3	6970	8780	8.5	6.5	3.6	3.6	0.1	0.1	14.0	15.0	4.1	2.4	4970	5630	0 3	0 3	74.0	54 0	3.1	3.7	6.3	4.9	0.5	0.5	13.0	9.0	0 01	0 01
115	0.7	0.6	2710	3310	2.2	1.1	10.1	4.4	0.1	0.1	12.2	12.6	8.1	2 2	3470	3130	0 3	0 3	56.0	32 0	2.5	2.5	34 2	11 5	0.5	0.5	27.0	9.0	0 04	0 02
116	0.8	1.7	2950	3150	0.3	0.6	5.1	6.3	0.1	0.1	4.5	10.2	2 5	6 9	1470	1460	0 3	0 3	10.0	29 0	1.3	3.9	10 3	4.5	0.5	0.5	14.0	16.0	0 04	0 01
117	2.5	2.6	6200	6590	7.1	3.6	11.9	9.7	0.3	0.1	29.8	26.9	9.4	4 2	3890	3850	0 3	0 3	108.0	108.0	5.4	5.3	10 0	6.2	0.5	0.5	49.0	20.0	1 07	0 61
118	1.3	9.0	1370	842	0.3	0.5	14.8	18.2	0.2	0.2	9.5	13.2	8 9	9 3	1370	944	0 3	0 3	28.0	19 0	2.0	2.7	22 9	31 5	0.5	0.5	48.0	89.0	0.14	1.74
119	0.7	0.4	1010	1220	0.3	0.3	4.4	2.6	0.1	0.1	3.9	4.6	2.1	1 0	705	776	0 3	0 3	8 0	4.0	1.1	1.1	8.9	3.4	0.5	0.5	12.0	6.0	0.11	0 01
120	1.5	1.1	5190	4070	0.3	0.3	18.0	2.3	0.2	0.1	14.1	8.6	17.7	10.1	3680	2770	0 3	0 3	366.0	28 0	2.2	1.3	2.8	1.7	0.5	0.5	13.0	5.0	0 06	0 03
121	1.5	1.1	3730	3960	0.3	0.3	3.9	2.9	0.2	0.1	18.0	16.4	16.9	5 2	2740	3480	0 3	0 3	68.0	24 0	2.4	2.7	2.4	1.4	0.5	0.5	10.0	3.0	0 01	0 01
123	4.4	7.4	1370	1230	4.0	0.5	12.1	9.2	0.3	0.1	8.6	6.7	8 3	3 6	1810	1230	0 3	0 3	69.0	46 0	1.5	1.5	7.4	1.7	0.5	0.5	16.0	8.0	0.10	0 05
125	2.4	3.1	2020	2080	0.3	0.3	12.9	16.2	0.1	0.2	15.9	16.8	5.7	5.7	1290	1180	0 3	0 3	69.0	101.0	2.5	2.7	5.6	5.8	0.5	0.5	15.0	14.0	0.17	0.15

Table 4: Anthropogenic Background Study Data
Soil Concentrations mg/kg (0 to 6 inches and 6 to 24 inches)

Site	Silver (Ag)		Aluminum (Al)		Arsenic		Barium		Cadmium (Cd)		Chromium (Cr)		Copper (Cu)		Iron (Fe)		Mercury (Hg)		Manganese (Mn)		Nickel (Ni)		Lead (Pb)		Selenium (Se)		Zinc		BaPTE	
Number	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24	0to6	6to24
126	1.4	1 0	3280	4280	31.9	9.4	11.6	7.3	1.4	0.4	23 2	19.9	31.6	15 6	1920	2870	0 3	0.3	182.0	103.0	2.5	2.7	40.5	18 5	0 5	0.5	35.0	15.0	0.08	0.01
128	1.4	1 5	1870	2070	0 3	0.7	6.4	6.9	0.1	0.1	6.4	7 9	4.8	5.5	1380	1650	0 3	0.3	19 0	37.0	1.4	1.4	6.8	6.3	0 5	0.5	14.0	6.0	0.01	0.01
129	1.1	0 8	3300	4550	1 8	0.3	7.7	4.7	0.2	0.1	17 5	15.4	9.7	2.7	2500	3180	1 2	0.3	49 0	25.0	2.8	3.4	18.4	5.7	0 5	0.5	44.0	5.0	0.02	0.02
130	1.0	1.1	5480	4970	1 8	1.2	8 8	7.0	0.2	0 2	22.7	20.0	13.5	12.4	3610	3170	0 3	0.3	190.0	65.0	4.0	3.7	6.0	4.6	0 5	0.5	19.0	12.0	0.02	0.02
132	0.4	0.4	882	832	24.8	10 0	4.4	3.4	0.5	0 2	2.9	2.7	3.4	1.7	1190	974	0 3	0.3	47 0	9 0	0.9	0 8	16.6	2.5	0 5	0.5	10.0	3.0	0.01	0.01
133	0.6	0.4	3990	3080	2 2	1.7	17.8	28.0	0.2	0.4	12 2	12.9	13.7	28 6	4330	3720	0 3	0.3	33 0	44.0	2.7	3.4	40.9	73.4	0 5	0.5	111.0	154 0	0.55	0.38
134	0.7	0 9	2480	2290	0 3	0.3	4.7	2.9	0.1	0.1	12.4	9.7	12.0	5.3	2080	2070	0 3	0.3	52 0	22.0	1.3	1 6	3.6	1.4	0 5	0.5	6 0	2.0	0.01	0.01
135	0.2	0 2	1350	1500	0 9	0.7	9 6	2.8	0.3	0.1	9.7	6 0	9.4	0.8	1320	586	0.4	0.3	23.4	2 6	1.8	1 5	34.5	3.1	0 5	0.5	34.1	3.3	0.03	NA
136	0.2	0 2	1680	201	1 6	0.3	15.3	2.0	0.3	0.1	16 9	2 6	21.4	2.7	2810	411	0 3	0.3	71 0	8.7	1.8	0 5	34.3	4.5	0 5	0.5	44.0	5.9	0.17	0.03
137	4.5	4 3	915	537	1 2	0.6	5 0	2.7	0.1	0.1	5.4	2.7	8.4	5.9	673	472	0 3	0.3	207.0	19.4	1.7	0.7	10.6	4.6	0 5	0.5	44.0	13.0	na	na
138	5.9	5 6	1100	1200	3 3	3.0	15.6	8.3	0.2	0 2	7.0	6 8	4.8	4.5	983	1250	0 5	0.6	25 2	27.2	1.6	1 3	18.0	18 8	0 5	0.5	23.4	31.4	na	0.01
139	0.4	0 2	2000	546	1.7	0.4	17.9	5.6	0.1	0.1	9.2	3 2	18.8	4.2	1920	562	0.4	0.3	49.1	13.7	5.5	1.1	15.4	6.4	0 5	0.5	29.8	8.0	0.05	na
140	2.9	2.7	801	506	0 3	0.3	7.4	2.2	0.2	0.1	5.9	2 8	3.9	0.9	695	240	0 3	0.3	21.4	4.4	0.9	0 5	11.2	2.1	0 5	0.5	19.6	4.3	0.01	0.01
141	0.2	0 2	1970	1620	2.1	1.2	13.8	10.8	0.2	0 2	14.1	11.9	14.6	9.3	1630	947	0 0	0.3	89 6	59.7	1.9	1.7	7.7	4.3	0 5	0.5	31.9	18.8	0.04	0.02
142	1.9	0 2	1140	500	3.7	2.8	15.1	7.6	0.4	0.1	7.5	5.7	7.4	1.4	1680	550	0 0	0.3	62 0	28.4	2.0	1.4	5.7	2.8	5 6	4.2	65.4	6.1	0.39	0.09
143	0.2	0 2	1380	1370	4.1	1.9	15.2	9.0	0.3	0.1	29.1	10.1	16.0	4.5	1370	1040	0.1	0.3	47 8	37.3	2.2	1 9	5.3	1.5	0 5	0.5	47.7	7.3	0.05	0.02
144	0.2	0 2	1350	685	1 9	2.7	15.0	8.1	0.2	0.1	15 9	6.7	8.2	1.6	1510	653	0.1	0.3	39 6	26.8	2.0	1.4	7.9	3.1	0 5	4.1	23.1	5.5	0.01	0.01
145	1.9	1.7	3070	2300	3.1	2.1	12.9	7.8	0.5	0.1	13.4	9 0	14.7	2.7	1960	1570	0 6	0.6	53 2	25.1	2.3	1 8	17.6	3.8	0 5	0.5	22.7	3.6	0.10	0.03
146	1.3	1 2	1230	2570	3 5	2.4	6 0	2.5	0.3	0.1	11.4	7 9	11.2	2.0	1100	1400	0 6	0.5	70 9	11.0	1.2	1 6	12.5	2.7	0 5	0.5	26.5	6.2	0.01	na
147	2.3	3 2	2840	1630	5.1	2.8	29.0	14.5	0.2	0.1	10 0	7 9	10.2	3.7	3900	1880	0 6	0.6	138.0	62.0	2.8	2 2	4.7	0.4	0 5	0.5	30.0	16.0	0.06	0.02
148	0.4	0.4	2220	2940	1 0	1.1	7 5	6.2	0.2	0.1	9.3	9 9	8.9	7.8	1860	1970	0 3	0.3	57 0	54.0	2.6	2 2	7.0	21 2	0 5	0.5	77.0	49.0	0.06	0.01
149	0.9	1.1	1230	1860	1.4	1.8	6 2	4.8	0.3	0.1	15.1	8 9	4.4	0.3	1140	1520	0.4	0.4	38 0	22.0	1.8	2 2	11.6	0.7	0 5	0.5	29.0	5.0	0.01	0.04
150	0.3	0 2	2160	1120	1 3	0.6	15.0	4.7	0.2	0.1	6.9	4 0	6.6	1.1	2800	1180	0 3	0.3	57 0	21.0	2.2	0 9	46.8	10 9	0 5	0.5	46.0	10.0	0.03	na
151	0.4	0 2	5120	4420	1.1	1.0	8.7	3.8	0.1	0.1	15 9	12.8	4.6	1.8	2940	3320	0 3	0.3	49 0	33.0	3.2	2 8	11.3	7.0	0 5	0.5	22.0	9.0	0.13	0.01
152	1.5	2.1	1570	1010	16.2	14 5	8 6	6.3	0.5	0.4	15 2	6 9	5.3	2.9	703	576	0 8	0.7	35 0	39.0	1.5	0 9	18.8	8.3	0 5	0.5	29.0	11.0	0.03	0.13
153	0.3	0 3	1930	3750	1.4	2.9	7 2	7.6	0.1	0 2	8.2	16.0	8.2	14 6	2720	2830	0 3	0.5	60.4	71.0	1.7	3.1	8.1	11.4	0 5	0.5	21.3	18.0	0.43	0.22
154	0.9	1.1	1230	1860	1.4	1.8	6 2	4.8	0.3	0.1	15.1	8 9	4.4	0.3	1140	1520	0.4	0.4	38 0	22.0	1.8	2 2	11.6	0.7	0 5	0.5	29.0	5.0	0.10	0.04
155	0.9	1 0	4440	4010	3.1	2.7	10.3	7.0	0.4	0 3	23 8	23.0	20.4	14 0	3410	2720	0 3	0.3	145.0	103.0	3.4	3 0	4.8	2.3	0 5	0.5	28.0	15.0	0.03	0.01
156	1.8	na	1260	na	0 9	na	8 8	na	0.2	na	9.7	na	na	na	1260	na	0 3	na	na	na	na	na	37.4	na	0 5	na	na	na	na	na
157	0.9	na	2590	na	2 0	na	14.4	na	0.1	na	8.4	na	na	na	2230	na	0 3	na	na	na	na	na	5.0	na	0 5	na	na	na	na	na
158	na	na	na	na	2 0	na	26.0	na	na	na	6.0	na	na	na	na	na	na	na	na	na	na	na	158 0	na	na	na	na	na	na	na
159	na	na	na	na	2 0	na	15.0	na	na	na	8.0	na	na	na	na	na	na	na	na	na	na	na	12.0	na	na	na	na	na	na	na
160	na	na	na	na	1.4	na	6.7	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	17.0	na	na	na	na	na	na	na
161	na	na	na	na	0.7	na	11.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	13.0	na	na	na	na	na	na	na

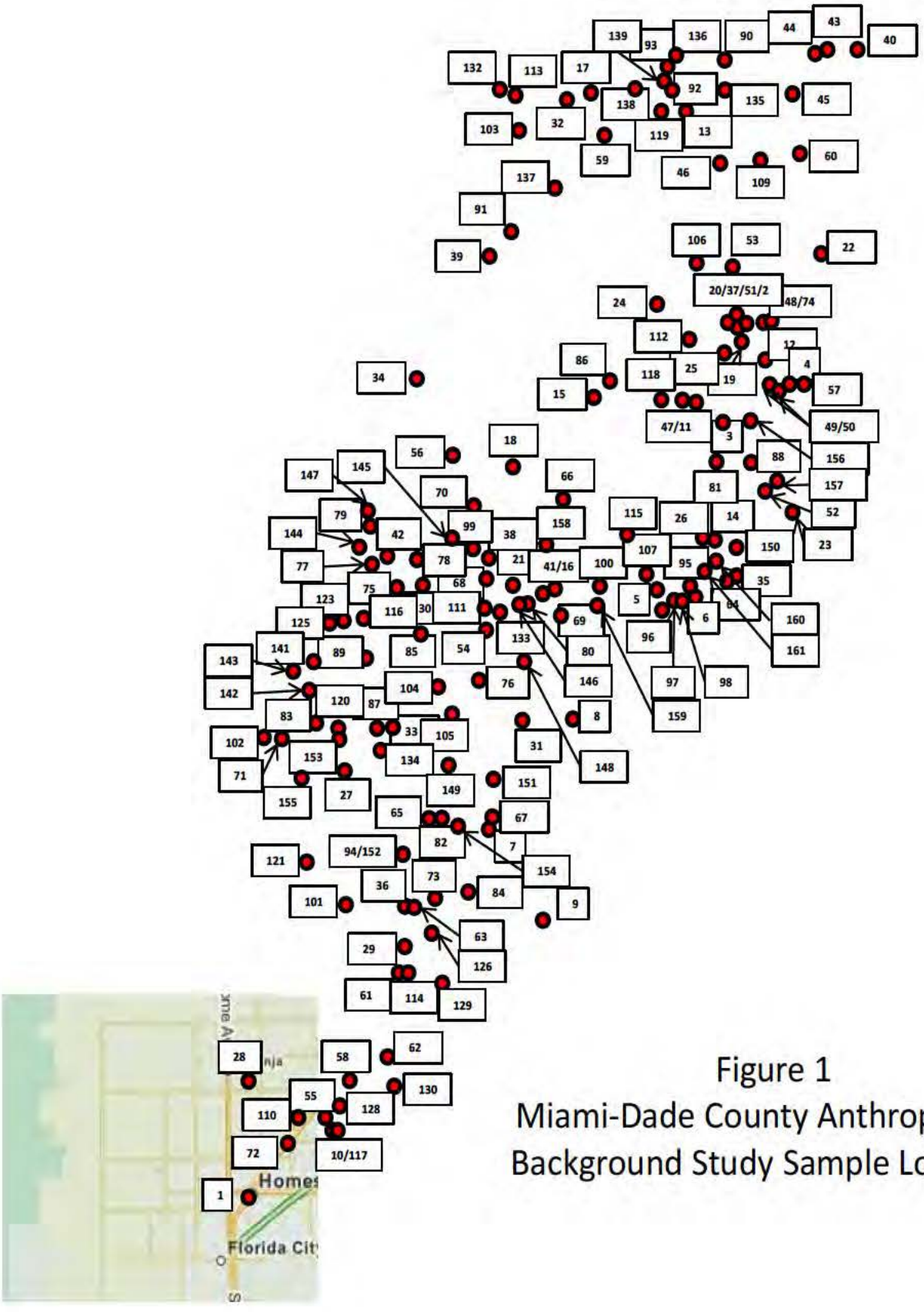

Figure 1
Miami-Dade County Anthropogenic Background Study Sample Locations

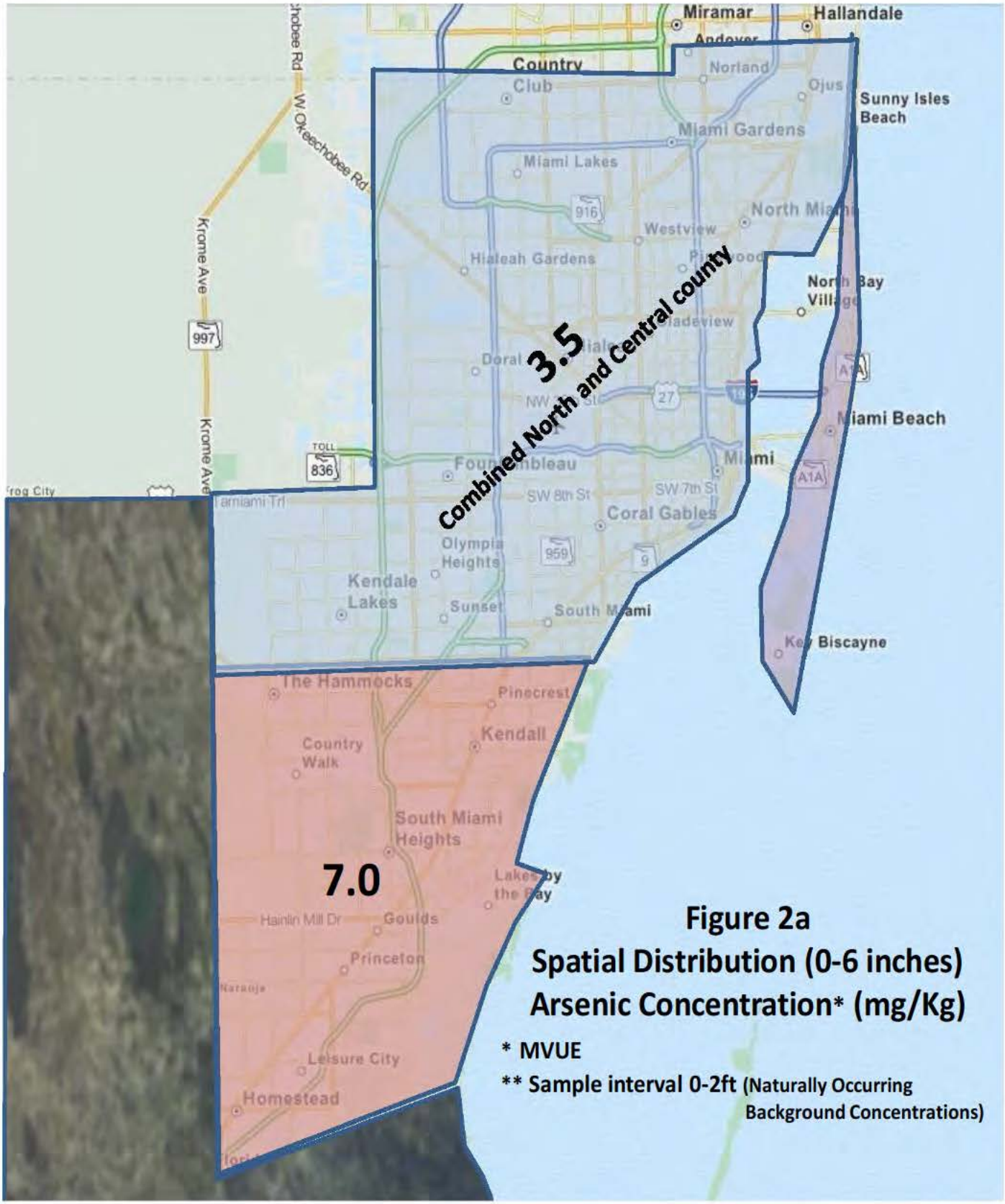

Figure 2a
Spatial Distribution (0-6 inches)
Arsenic Concentration* (mg/Kg)

* MVUE

** Sample interval 0-2ft (Naturally Occurring Background Concentrations)

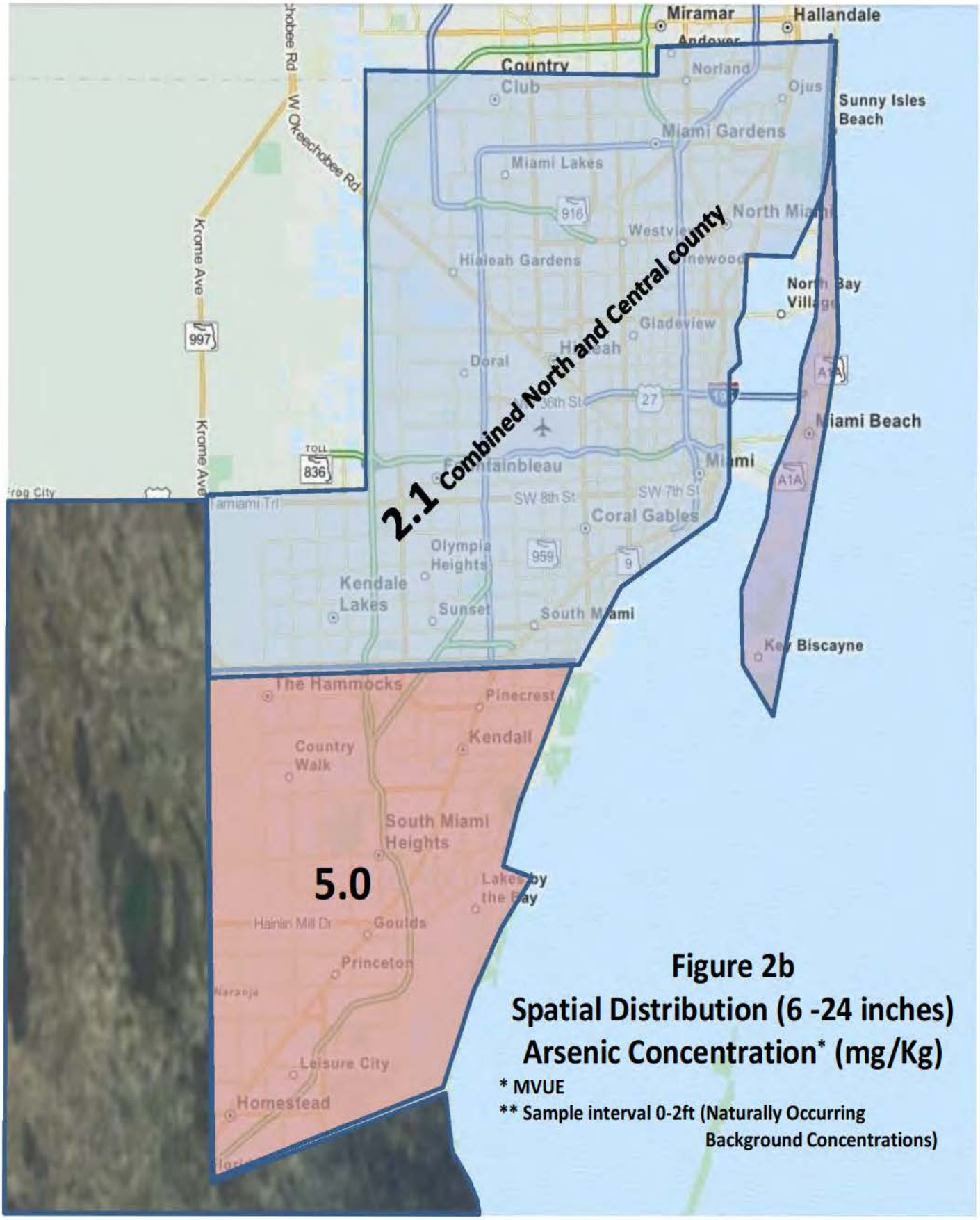

Figure 2b
Spatial Distribution (6 -24 inches)
Arsenic Concentration* (mg/Kg)

* MVUE
** Sample interval 0-2ft (Naturally Occurring Background Concentrations)

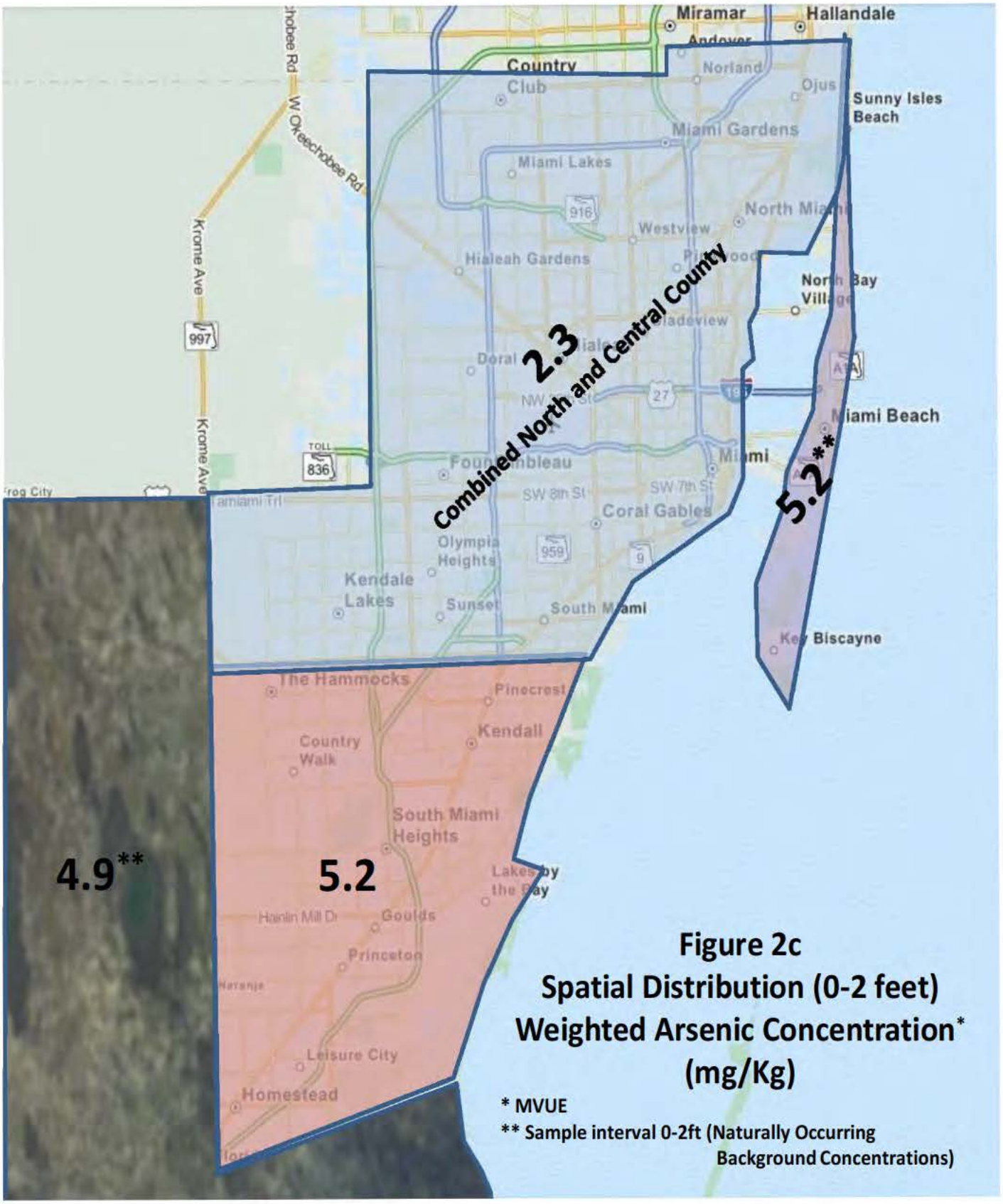

Figure 2c
Spatial Distribution (0-2 feet)
Weighted Arsenic Concentration* (mg/Kg)

* MVUE

** Sample interval 0-2ft (Naturally Occurring Background Concentrations)

Table 5a: MIAMI-DADE COUNTY MUCK SOILS	
	Arsenic (mg/kg)
	0 - 2ft
N	98
Minimum	0.7
Maximum	29
Mean	4.9
MVUE	4.9
95% UCL	5.5

Table 5b: BARRIER ISLANDS NATURALLY OCCURING BACKGROUND CONCENTRATIONS (mg/kg)		
Chemical Name	0-2 ft interval	
Arsenic	5.2	
Aluminum	798.7	
Cadmium	0.3	
Iron	2050.7	
Selenium**	<0.5	
Zinc	13.1	
Silver*	0.4	
	0-1 ft interval	1-2 ft interval
Barium	8.1	5.9
Chromium	7.9	5.7
Copper	5.4*	2.3*
Lead	15	5.2*
Mercury	0.054	0.026*
Nickel	1.08*	0.66*

* Represents censored data sets. The data from these populations were censored to fit a lognormal distribution

** The data for selenium were not analyzed statistically because all results were below the detection limit

FIGURES

FIGURE 1. RI/FS INCINERATOR SITE LOCATION MAP

AerostarSES LLC

RI/FS INCINERATOR SITE
MIAMI-DADE COUNTY, FLORIDA
FOLIO #: 30-5926-000-0010

Feet
0 400 800
1 inch = 800 feet

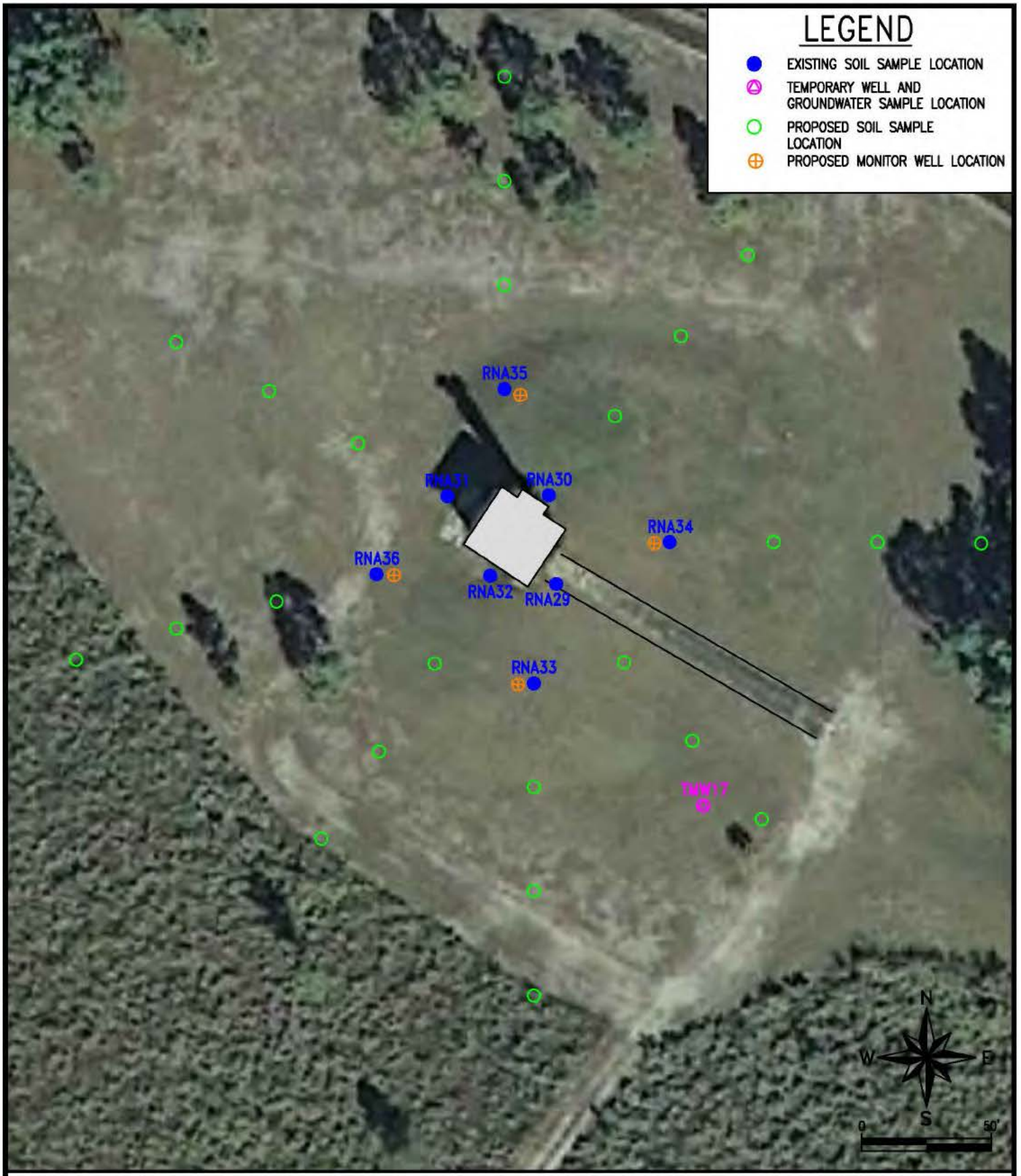

FIGURE 2 – SITE MAP

AerostarSES LLC

RI/FS INCINERATOR SITE
FORMER RICHMOND NAVAL AIR STATION
MIAMI, MIAMI-DADE COUNTY, FLORIDA

SCALE: 1" = 50'-0"
DATE: JULY 2014
REVIEWED: B. YOUNG

TABLE

TABLE 1: SOIL ANALYTICAL SUMMARY (FDEP SI REPORT)

Facility Name: Former Richmond Naval Air Station RI/FS Former Incinerator
Facility Address: Federal Bureau of Prisons, Miami, Florida

Site concentrations for carcinogenic polycyclic aromatic hydrocarbons must be converted to Benzo(a)pyrene equivalents before comparison with the direct exposure SCTL for Benzo(a)pyrene.

* Leachability values may be derived using the SPLP Test to calculate site-specific SCTLs

SCTL = Soil Cleanup Target Level
mg/kg = milligrams per kilograms
fbls = feet below land surface
SF = Surface Sample
SB = Subsurface Sample
Bolded values exceed SCTL

U = Not detected
J = Estimated value
Note: Analytical data collected by FDEP

Sample ID	Sample Interval (fbls)	Arsenic (mg/kg)	Silver (mg/kg)	Chromium (mg/kg)	Dioxins/Furans TEQ (mg/kg)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) flouranthene (mg/kg)	Benzo(a) pyrene Equivalent (mg/kg)
SCTL Residential Direct Exposure		**2.1**	**410**	**210**	**0.000007**	**#**	**0.1**	**#**	**0.1**
SCTL Commercial Direct Exposure		**12.0**	**8,200**	**470**	**0.000030**	**#**	**0.7**	**#**	**0.7**
SCTL Leachability Groundwater		*****	**17**	**38**		**0.8**	**8**	**2.4**	**8**
DERM County-wide Study	**0-2**	**5.2**							
FDEP SI Background Sample RNA-SF01	**0-2**	**3.6**	**1.1 U**	**22 J**	**0.000401**				
FDEP SI Background Sample RNA-SB01	***2-4***	***5***	***1.1 U***	***4.2 J***	***0.0008327***				
FDEP SI Background Sample RNA-SF02	**0-2**	**4.3**	**1 U**	**7 J**	**0.000578**				
RNA-SF29	0-2	3.4		**41 J**	**0.000801**				
RNA-SB29	*2-4*	*2.9*			*0.000351*				
RNA-SF30	0-2	5.1			**0.002602**				**0.158**
RNA-SB30	*2-4*	*3.4*			*0.000409*				
RNA-SF31	0-2	2.9			**0.000864**				**0.216**
RNA-SF32	0-2	3.2			**0.000851**				
RNA-SF33	0-2	3.6			**0.001002**	**2.4**	**2.2**	**4.1**	**3.5**
RNA-SB33	*2-4*	*4*			*0.000410*				
RNA-SF34	0-2	**19**	**93**	**46 J**	**0.022392**				**0.275**
RNA-SB34	*2-4*	*4.1*			*0.000427*				
RNA-SF35	0-2	3.4			**0.004900**				**0.23**
RNA-SB35	*2-4*	*4*			*0.000467*				
RNA-SF36	0-2				0.000278				