



NASA AREA OF INVESTIGATION 14
INTERIM CORRECTIVE ACTION MEASURES
WORK PLAN

FORMER SOIL FILL AREAS

**NASA Ames Research Center
Moffett Field, CA**

October 2013



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1.0 INTRODUCTION

At the request of the National Aeronautics and Space Administration (NASA) Ames Research Center (NASA Ames) Environmental Management Division (EMD), Earth Resources Technology, Inc. (ERT) has prepared this Area of Investigation 14 (AOI 14) Interim Corrective Action Measures (ICAM) Work Plan (WP) for the Former Soil Fill Areas (FSFA). As described in the Environmental Protection Agency (EPA) March 15, 2013 Unilateral Administrative Order, the FSFA includes the larger 8-acre fill peninsula area, and the two other, smaller fill areas, N217 and N217A.

The wetlands area surrounding the FSFA, designated Navy Installation Restoration (IRP) Site 25, had previously been determined to contain toxic chemicals, particularly polychlorinated biphenyls (PCBs, including Aroclor 1268), above site ecological cleanup levels. The source for the PCB 1268 had previously been determined to be Hangar 1. Previous surface and near-surface soil sampling activities adjacent to and within the FSFA fill peninsula areas indicated the presence of chemicals of concern (COCs), primarily PCBs, total DDT, lead, and zinc in excess of site-specific soil action levels (refer to Table 1). Additional subsurface soil sampling revealed the presence of these COCs, as well as other metals, above site cleanup levels within two of the three FSFA peninsulas.

Based on the current conditions within the greater FSFA, COCs above site cleanup levels are present primarily within the surface soils of the larger 8-acre fill peninsula. In the N217 and N217A fill areas, additional surface soil sampling will be completed to verify and augment previous sampling results to determine if silt fencing is appropriate for these two areas. If EPA determines silt fencing is required around all three fill areas, required actions as described in the following will apply to all three areas.

2.0 SITE DESCRIPTION

2.1 FACILITY LOCATION

NASA Ames is a federal aerospace research facility located 35 miles southeast of San Francisco, California, and 10 miles northwest of San Jose, California. Figure 1 presents the location of NASA Ames. NASA Ames is located at the southern end of the San Francisco Bay in Santa Clara County, adjacent to the cities of Mountain View and Sunnyvale.



Figure 1
NASA Ames Site Location

3.0 AREAS OF INVESTIGATION

In order to assess potential releases of hazardous materials to the environment, NASA Ames was originally divided into 12 AOIs (EKI, 1995). Based on subsequent investigations, additional AOIs were added, including the AOI 14 8-acre FSFA and adjacent N217 and N217A areas. Figure 2 illustrates the various AOIs at NASA Ames, in addition to presenting the location of AOI 14 with respect to the other AOIs and Navy Site 25.

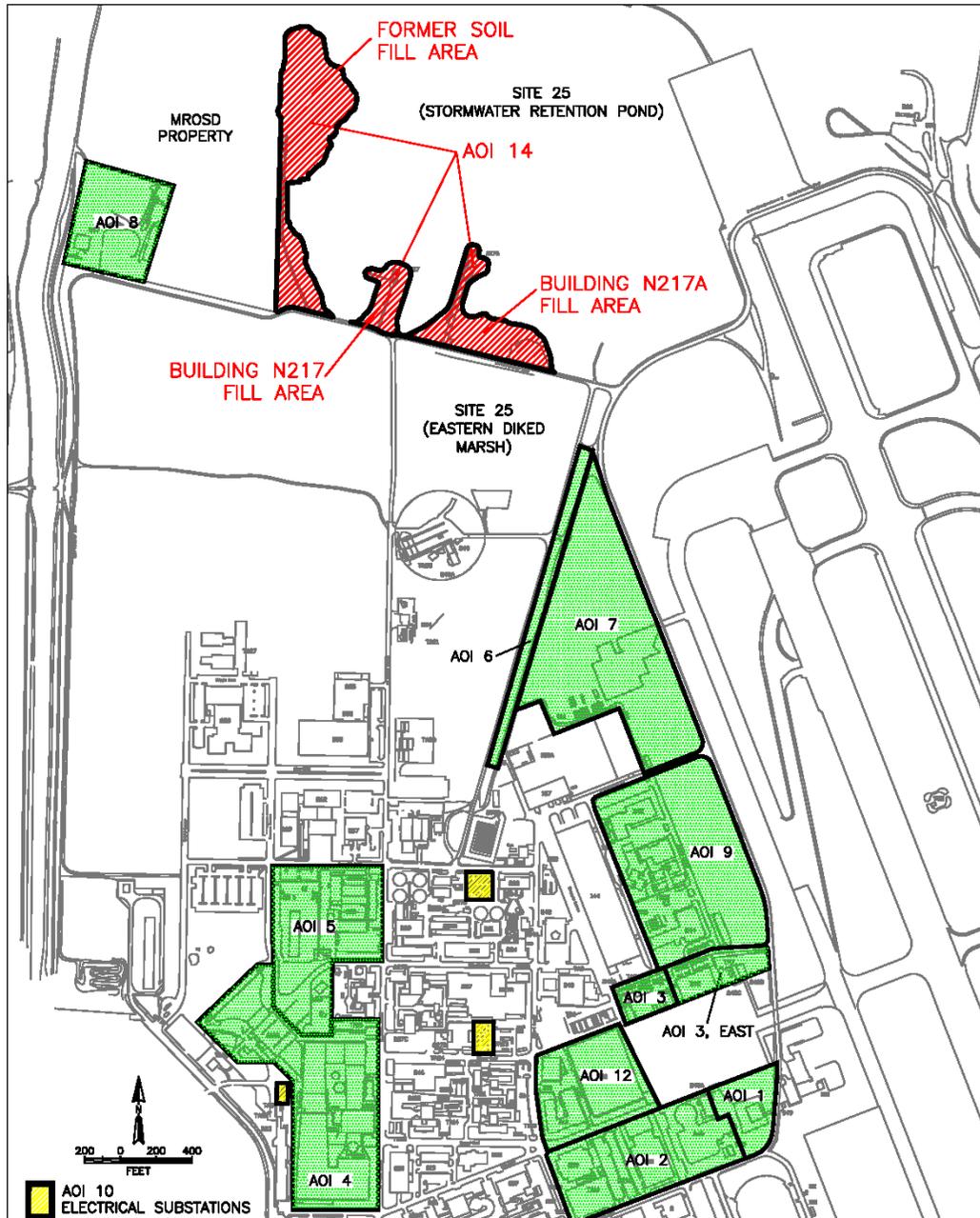


Figure 2
NASA Ames Areas of Investigations and AOI 14 Site Location

3.1 Regulatory Oversight

EPA maintains regulatory oversight because AOI 14 fill peninsulas areas are located adjacent to Navy IRP Site 25, the stormwater retention pond, and wetlands. Navy Site 25 is part of the Moffett Field Superfund Site, which is regulated by the EPA. To maintain consistency with Navy Site 25, AOI 14 was placed under EPA oversight. In April 2013, EPA issued a Unilateral Administrative Order (UAO) requiring NASA Ames to take interim and long-term response actions at AOI 14 in order to stabilize and address existing soil contamination (EPA Region IX, 2013). The UAO combined the existing three fill peninsula areas, the original AOI 14 8-acre Former Soil Fill Area (FSFA), and the N217 and N217A fill areas, into one area, entitled "FSFA".

4.0 AREA OF INVESTIGATION 14

Table 1 presents ecological soil cleanup levels for the AOI 14 and surrounding Navy Installation Restoration Program (IRP) Site 25 areas; these remediation levels are based on remediation levels presented in the Revised Draft Addendum to *Revised Final Site-Wide Feasibility Study, Site 25, Former NAS Moffett Field, Santa Clara County, California* (SulTech and Tetra Tech EMI, December 12, 2005).

Table 1
Chemicals of Concern and
Site-Specific Soil Action Levels

Chemical of Concern	Site-Specific Soil Remediation Level (mg/kg)
PCBs (total) ²	0.210 ¹
DDT (total) ³	0.109 ¹
Lead	93.8 ¹
Zinc	314 ¹

mg/kg = milligrams per kilogram or parts per million (ppm)

PCB = Polychlorinated Biphenyl

DDT = Dichlorodiphenyltrichloroethane

¹ source: Revised Draft Addendum to *Revised Final Site-Wide Feasibility Study, Site 25, Former NAS Moffett Field, Santa Clara County, California* (SulTech and Tetra Tech EMI, December 12, 2005)

² includes Aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260, and 1268

³ includes DDT, DDD, and DDE

5.0 BACKGROUND

5.1 Former Soil Fill Areas

The FSFA soil fill peninsula areas are located on the northern portion of NASA Ames (see Figure 2). Figure 3 presents an aerial view of fill areas and the surrounding wetland areas including the original 8-acre Former Soil Fill Area (8-acre FSFA), the two other fill peninsula areas, N217 and N217A, Navy Site 25 area and Mid-Peninsula Regional Open Space District (MROSD). The larger 8-acre FSFA is composed of imported soil material, as are the two smaller peninsula areas. The source(s) of the soil import material are unknown; however, some of this soil material may have originated from construction activities for the National Full Scale Aerodynamics Complex (NFAC) 80-foot by 120-foot wind tunnel test section (Building N221B at NASA Ames). In addition, soil materials from other sources were likely added to the FSFA fill peninsulas over time.

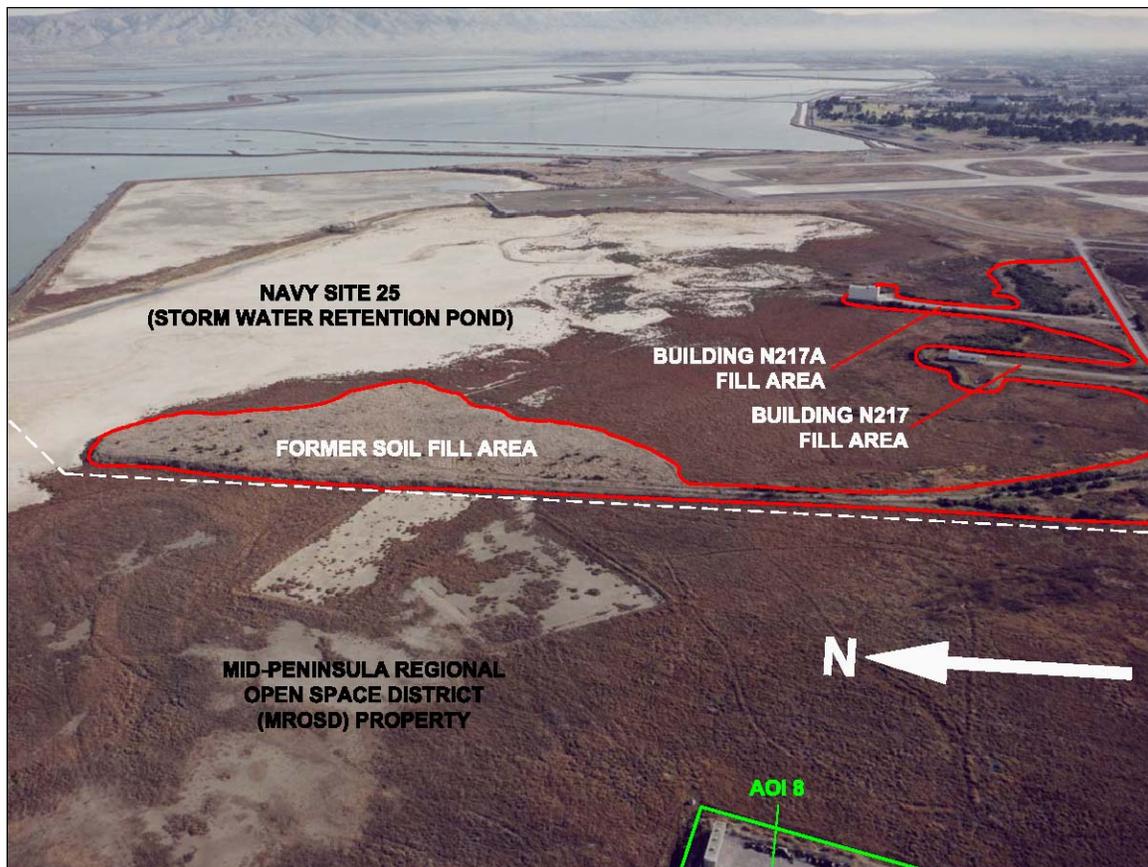


Figure 3
FSFA Aerial View (1991 Photograph)

The thickness of the 8-acre FSFA varies from two feet to four feet at the southern end and from eight feet to 16 feet at the northern end, while the smaller N217 and N217A areas vary from approximately four feet at the southern end to 10 feet at the northern end. Groundcover across the three peninsulas varies and includes tall grasses and low-lying brush.

Previous soil investigations have identified the presence of COCs above site cleanup levels within the FSFA and Navy IRP Site 25 areas. These previous investigations are summarized in the Phase I investigation *Report of Findings, Former Soil Fill Area, Summer 2005 Soil Investigation, NASA Ames Research Center, Moffett Field, California* (ISSi, 2005)(Phase I ROF); the Phase II investigation *Report of Findings, Area of Investigation 14, Phase II Soil Investigation, Former Soil Fill Area, Building 214 Fill Area and Building 217A Fill Area* (ISSi, 2007)(Phase II ROF); the *Listing Site Inspection for NASA Ames Research Center, Moffett Field, California* (EKI, 1992); the *Revised Final Site-Wide Feasibility Study, Site 25, Former NAS Moffett Field, Santa Clara County, California* (SulTech and Tetra Tech EMI, 2005); and the *Final Data Summary Report for Pre-Design Investigation of Sediment at IR Site 25* (KCH, 2011).

As described in the 2005 Phase I ROF, soil samples collected on a 200-foot grid indicated the presence of PCBs, DDT, lead and zinc above site soil cleanup levels. During the subsequent Phase II investigation, surface, near-surface, and subsurface soil samples were collected on a 100-foot grid at a total of 38 locations across the 8-acre FSFA plus seven locations in the N217 and N217 fill areas. As presented in the Phase II ROF, and shown on Figure 4, the primary COCs, PCBs, DDT, lead, and zinc, were detected above soil cleanup levels both horizontally and vertically throughout the northern portion of the 8-acre FSFA (see Phase II ROF for additional detail maps of COC concentrations). In addition, as shown on Figure 5, historical analytical results indicated the presence of PCBs above site soil cleanup levels around the periphery of the 8-acre FSFA.

6.0 INTERIM MEASURES OBJECTIVES

Under EPA oversight, the IRP Site 25 wetlands area was remediated by the Navy in 2012, during which time temporary silt fencing was installed by the Navy along selected portions of the FSFA boundary. The temporary silt fencing, as shown in Attachment 1, was installed along those portions of the 8-acre FSFA adjacent to Navy Site 25 remediation polygons A4.2 through A4.5. In 2012 NASA proposed and scheduled installation of a silt fence around the entire 8-acre FSFA; however, after the Navy Site 25 remediation, early heavy fall rains which created high water levels within the Site 25 area precluded FSFA silt fencing installation in 2012.

The objectives of the FSFA ICAM WP are to control and monitor potential runoff from the existing 8-acre FSFA fill peninsula into the surrounding wetlands area.

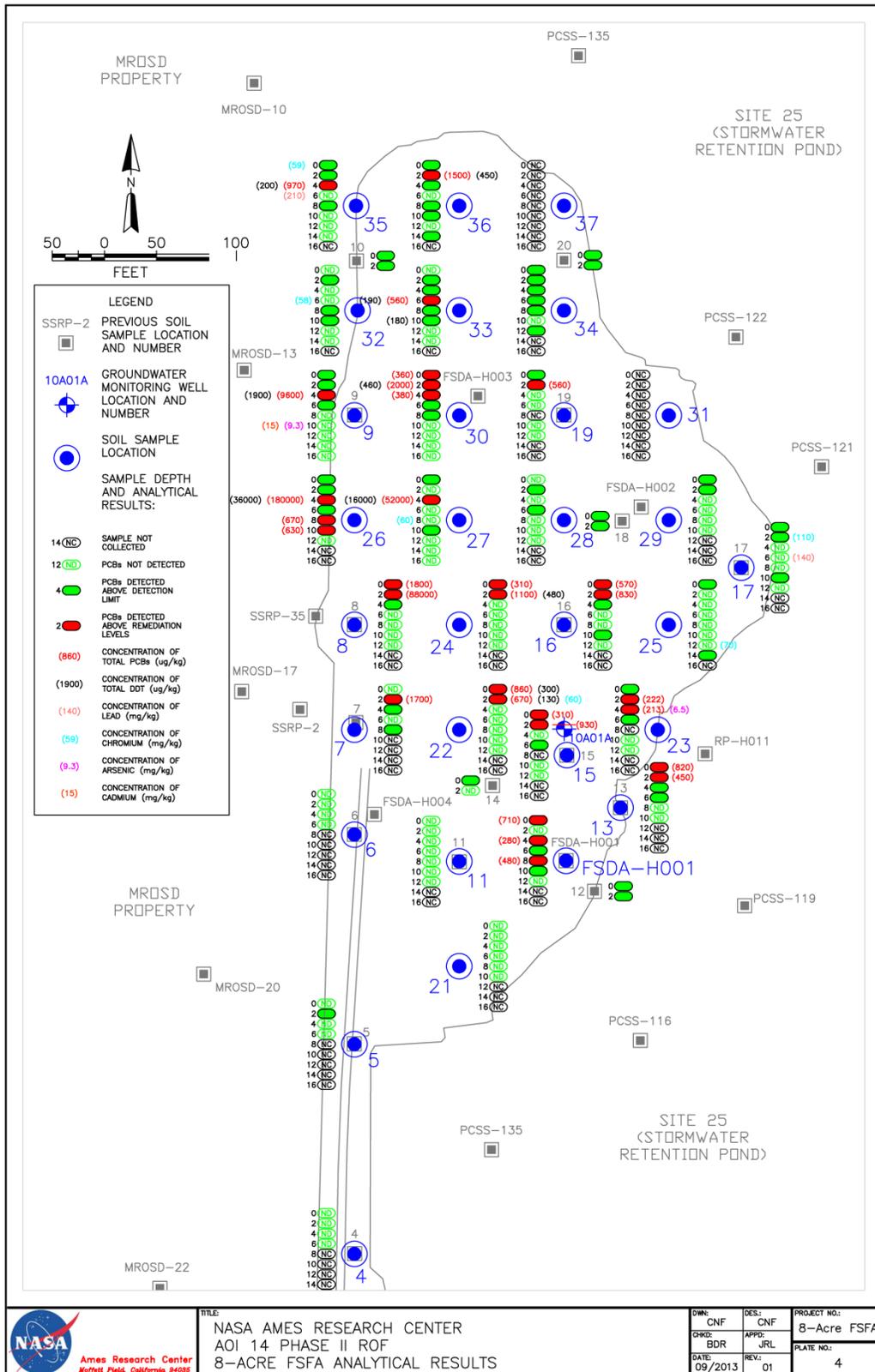


Figure 4
8-Acre FSFA 2007 Analytical Results

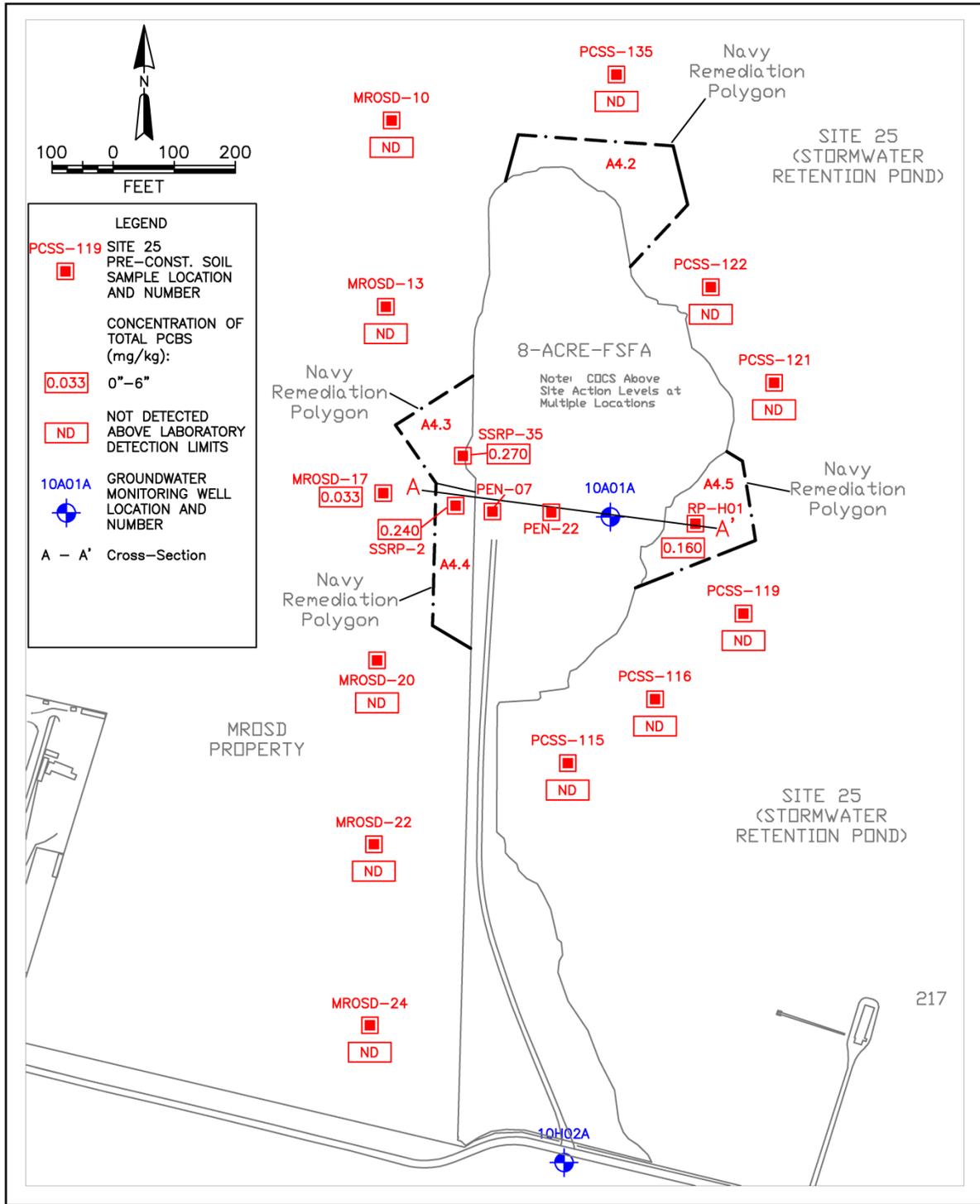


Figure 5
Navy Site 25 Historical PCB Analytical Results

Based on analytical results from the 8-acre FSFA and other adjacent wetlands indicating the presence of COCs and specific metals above site cleanup levels in surface soils and sediments, NASA intends to install an erosion control measure to prevent the migration of COC-contaminated surface soils from the larger, northern portion of the 8-acre FSFA into the surrounding wetlands areas.

Implementation of the proposed ICAM WP will ensure that erosion control measures are maintained and monitored in a sufficient manner to prevent runoff from the 8-acre FSFA until such time as a final corrective measure is completed at the FSFA. The Attachment 2 drawing shows the location of the proposed silt fencing around the FSFA.

Due to the limited presence of detected COCs above site cleanup levels in surface soils, erosion control and monitoring measures are not currently proposed for the N217 and N217A fill areas. However, based on the presence of chromium slightly above the site cleanup level at one surface location, PCBs and lead at depth at one location, and DDT detection limits above site cleanup levels, additional soil sampling and analysis will be completed to determine the need for silt fencing in these areas. Attachment 2 also includes a figure showing proposed silt fencing locations around the N217 and N217A fill areas.

To present the current conditions of the two fill areas, a short description of the Phase II soil sampling and analyses at the N217 and N217A fill areas is included in the following Section 6.1. Additional N217/N217A fill area information and data are included in Attachment 3.

6.1 N217 & N217A Fill Peninsulas

Based on the presence of chemicals of concern (COCs) from historical soil investigations, an initial Phase I screening soil investigation was conducted in 2005 on a 200-foot grid spacing at the NASA designated AOI 14 fill areas to determine the extent of PCBs, DDT, lead, and zinc. Soil samples were collected from the top six inches of exposed soil and at two-foot intervals starting at two feet below ground surface (bgs). Site-specific COC cleanup levels are shown in Table 1. The sampling locations for the Building N217 and N217A Fill Areas are shown in Figure 6.

The six samples collected from the two Phase I sample locations within the N217 Fill Area (N217-1 and N217-2) did not yield any detectable concentrations of Total PCBs, Total DDT, or lead; however, the <150 µg/kg and <300 µg/kg detection limits reported for DDTs at N217-2 were above the site cleanup level of 109 µg/kg. Concentrations of all other N217 Fill Area COCs and additional analytes were well below site cleanup levels.

Of the 32 samples collected from the five Phase I sample locations within the N217A Fill Area (N217-3 through N217-7), one sample (N217-6-8') contained Total PCBs (450 ug/kg) and lead (280 mg/kg) above site cleanup levels. Based on these results, follow up soil samples were collected on November 20, 2007 from locations bracketing sample location N217-6 to the west, east, and south at 100-foot spacing. A northern bracketing sample location was not selected because of the proximity of

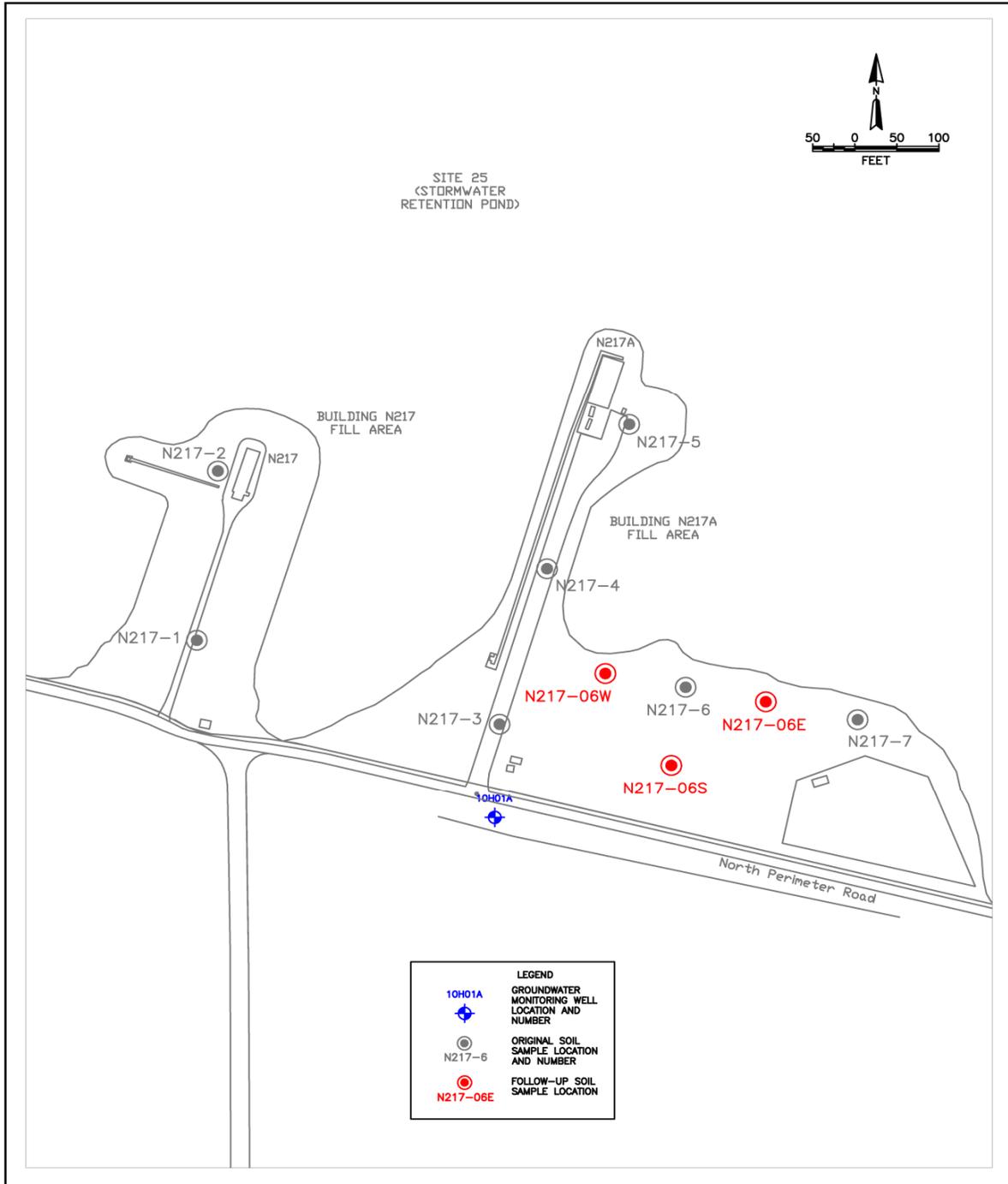


Figure 6
N217 and N217A Fill Areas Soil Sample Locations

Table 2
N217A Fill Area Soil Sample Analytical Results
Follow-Up Sampling

Sample Location	Depth (bgs)	Aroclor 1260 (µg/kg)	Aroclor 1268 (µg/kg)	Total PCBs (µg/kg)	Total DDT (µg/kg)	Lead (mg/kg)	Zinc (mg/kg)
N217-6-6"	0-6"	26 ⁽¹⁾	<20	26	<150 ⁽³⁾	14	68
N217-6-2'	2'	27	<20	27	<150	9.3	59
N217-6-4'	4'	<20	<20		<300	<7.5	57
N217-6-6'	6'	<20	<20		<150	13	48
N217-6-8'	8'	450 ⁽²⁾	<20	450	<150	280	53
N217-6-10'	10'	<20	<20		<75	<7.5	36
N217-6-12'	12'	<20	<20		<150	<7.5	38
N217-06W-6"	6"	<20	<20		<75	13	46
N217-06W-2'	2'	<20	<20		<75	7.9	43
N217-06W-4'	4'	<20	<20		<75	6.0	44
N217-06W-6'	6'	<20	<20		<75	4.4	35
N217-06W-8'	8'	<20	<20		<75	25	25
N217-06W-10'	10'	<20	<20		<75	4.8	31
N217-06W-12'	12'	<20	<20		<75	8.9	22
N217-06E-6"	6"	25	<20	25	<75	11	55
N217-06E-2'	2'	<20	<20		<75	12	47
N217-06E-4'	4'	<20	<20		<75	4.4	25
N217-06E-6'	6'	<20	<20		<75	13	28
N217-06E-8'	8'	<20	<20		<75	8.2	32
N217-06E-10'	10'	<20	<20		<75	3.4	31
N217-06E-12'	12'	<20	<20		<75	3.3	30
N217-06S-6"	6"	<20	<20		<75	9.6	50
N217-06S-2'	2'	<20	<20		<75	7.6	38
N217-06S-4'	4'	<20	<20		<75	7.3	48
N217-06S-6'	6'	<20	<20		<75	6.1	37
N217-06S-8'	8'	<20	<20		<75	3.9	34
N217-06S-10'	10'	<20	<20		<75	96	120
N217-06S-12'	12'	<20	<20		<75	<2.5	26
Soil Cleanup Level		210	210	210	109	93.8	314

Note 1: Bold **black** data represent detected analytes.

Note 2: Bold **red** data represent detected analytes above site cleanup levels.

Note 3: **Red** data represent detection limits above site cleanup levels.

the edge of the fill area within 50 feet of original sample location N217-6. These locations are also shown on Figure 6 and were designated as N217-06W, -06E, and -06S. Analysis of soil samples included Total PCBs (including Aroclor 1268), Total DDT (including DDD, DDE, and DDT), lead and zinc. The results of the follow-up sampling are provided in Table 2, along with the original analytical results from location N217-6.

With the exception of a lead concentration of 96 mg/kg (cleanup level 93.8 mg/kg) reported at 10' in sample N217-06S at 10 feet, all other COCs were not detected or were present at concentrations well below cleanup levels. As with the N217-2 DDT sample analysis, however, the detection limits reported for DDTs at N217-3 through N217-7 were also above the 109 µg/kg site cleanup level for DDTs.

In previous sampling, one isolated occurrence of chromium at 61 mg/kg (NASA Ames cleanup level 58 mg/kg) was detected in the surface soil at location N217-7.

As indicated in Section 6.0, additional surface soil sampling and analysis will be completed in the two smaller fill areas to address the need for silt fencing in these areas as follows:

- Locations N217-2 through N217-7 to address the elevated detection limits for DDTs in previous sample analyses;
- At a location north of N216-6 to provide COC and metals analytical data adjacent to the northern limit of the N217A fill area; and
- At the N217-7 location for Cr III and Cr VI analysis due to the slightly elevated chromium concentration in the original surface soil sample.

To expedite this additional sampling effort, an abbreviated sampling plan will be submitted to EPA.

If EPA subsequently determines silt fencing is required for the entire perimeter of all three fill peninsulas, NASA will install silt fencing at all three fill areas. Additional information regarding silt fence installation is included in the following sections.

6.2 EROSION CONTROL INSTALLATION

Based on the presence of contaminated soils located within and near the boundaries of the 8-acre FSFA, NASA proposes to install an erosion control barrier along the base of the larger, northern portion of the FSFA to prevent the release of known COC- contaminated sediments into the surrounding wetlands area. This surrounding area, the Storm Water Retention Pond, designated as Navy IRP Site 25, was remediated in selected areas in 2012. Remediation of sediments within specific portions of Site 25 area was based on polygons that were represented by analytical results for the designated polygons. As shown on Figure 5, four of the Site 25 polygons remediated in 2012 are located adjacent to the AOI 14 FSFA (Note: Western most polygon comprised of two polygons).

The proposed erosion control measure will consist of double layer silt fence sediment barrier placed along the base of the larger portion of the 8-acre FSFA. Attachment 2 shows the outline of the 8-acre FSFA around which the proposed sediment barrier will be installed. Figure 7 depicts a cross-sectional view of the FSFA that shows the silt fencing location adjacent to the toe of the FSFA (Refer to Section 8 for silt fence specifications). The narrowest, southern portion of the 8-acre fill peninsula is not known to contain COC above site action levels, so will therefore not have silt fencing installed in that area as part of this task.

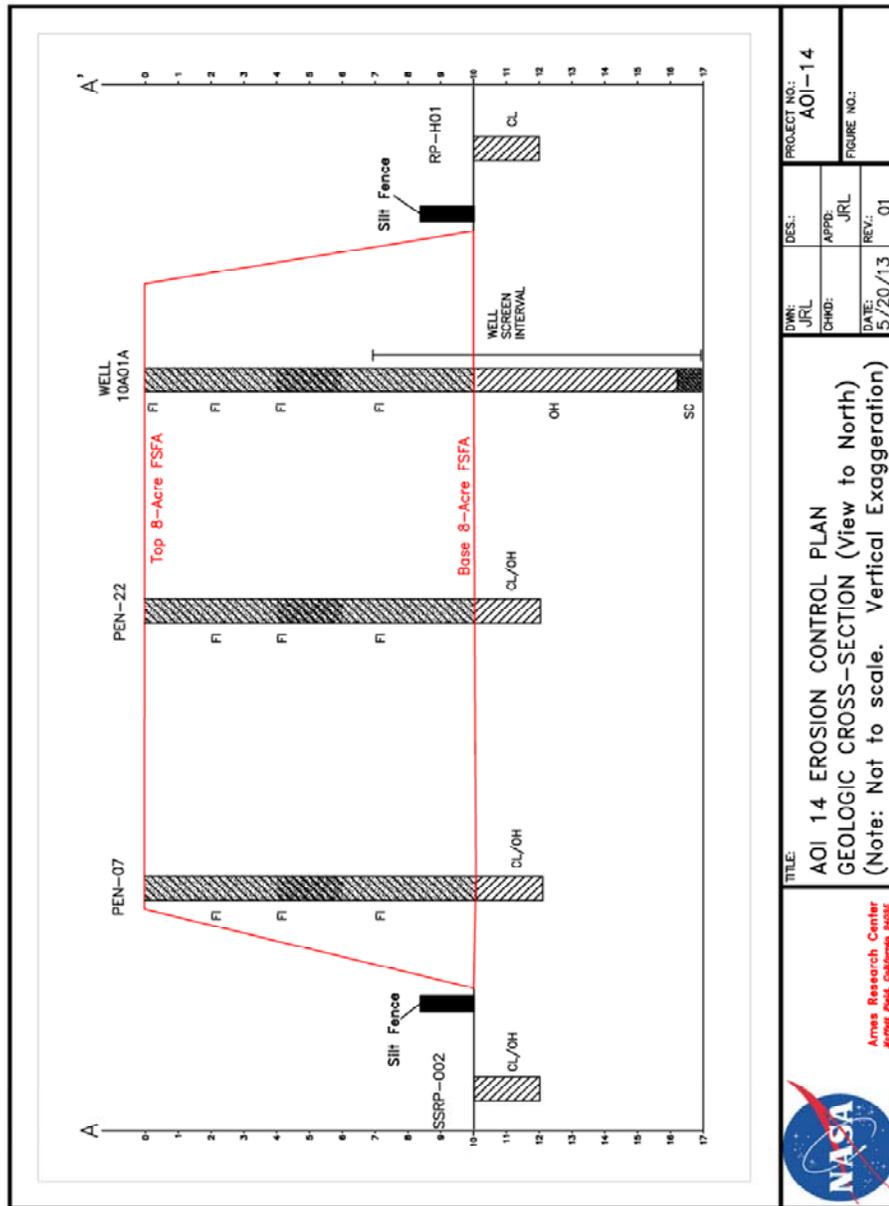


Figure 7
AOI 14 Lithologic Cross-Section A-A'
 (see Figure 5 for A-A' location)

Note: FL = Fill material; CL = Clay; OH = Highly Organic Clay; SC = poorly sorted sand.

As previously indicated in Section 6.1, if EPA subsequently determines silt fencing is required for the entire perimeter of all three fill peninsulas, NASA will install silt fencing at all three fill areas as shown in the NASA figure included in Attachment 2.

ITSI Gilbane of Walnut Creek will provide equipment, material and personnel for the installation and maintenance of the silt fence control measure. ITSI is the subcontractor that completed the Navy Site 25 removal action in 2012, including the silt fence installation and maintenance required for the Site 25 project.

Natural resource trustees consulted for this action included US and California Fish and Wildlife, US Army Corp of Engineers, Bay Conservation Development Commission (BCDC), and as an adjacent property owner, Mid-Peninsula Regional Open Space District (MROSD). As per US Fish & Wildlife, NASA completed an Emergency Consultation to mitigate impacts to sensitive species and habitat. A copy of the signed Emergency Consultation is included as Attachment 5.

6.3 Sediment Sampling

To ensure that the proposed erosion control barrier is functioning as designed, annual sediment samples will be collected around the larger portion of the 8-acre FSFA where COCs above ecological cleanup levels are known to be present. Sediment samples will be collected around the perimeter of the larger portion of the 8-acre FSFA along an approximate linear distance of 1,700 feet. Sediment samples will be collected, depending on site conditions, every 150 linear feet or less at predetermined, static locations. Based on the 1,700 linear feet distance, 16 sample locations are proposed for sediment sampling. At each sample site a metal fence post will be installed to ensure repeatable sample collections. Sediment sample locations will be approximately 5-feet outboard of the proposed silt fencing. Baseline sediment samples will also be collected immediately post silt fence installation at the proposed locations. Additional sediment sample locations may be proposed as part of the subsequent RCRA Facility Investigation (RFI) as specified in the EPA UAO for the FSFA.

If EPA subsequently determines silt fencing is required for the entire perimeter of all three fill peninsulas, as stated in the preceding, sediment samples will be collected every 150 linear feet around the perimeter of all three fill areas. Approximately 2,300 linear feet of silt fencing will be installed under this scenario. Baseline and annual sediment samples will be collected approximately 5-feet outboard of the proposed silt fencing post installation.

PCBs, total DDT, and Priority Pollutant Metals analysis, including cadmium, chromium, lead, and zinc, will be performed on the annual samples. The annual sampling is proposed for the month of September, prior to the beginning of fall rain events, when the water levels are normally at the lowest yearly level.

Sediment samples will be collected from the surface to a depth of 6-inches below sediment surface level. These samples will be collected using a disposable scoop or

other similar equipment. Samples will be placed on iced, cold storage prior to and during shipment under Chain-of-Custody via courier for analysis to CLS of Rancho Cordova, California.

6.4 Control Measure Installation Schedule

The proposed erosion control measure is planned for installation in early November 2013, Site 25 water levels and weather permitting.

6.5 Control Measure Installation Oversight Personnel

The AOI 14 FSFA silt fence control measure installation project lead is Kimberly Finch, NASA Ames Environmental Protection Specialist. Ms. Finch will provide overall project management oversight, including final review and signoff on all project documentation and reports.

The U.S. EPA Region IX Project Coordinator for the AOI 14 FSFA is Yvonne Fong. The Regional Water Quality Control Board lead for this project is Elizabeth Wells. All project deliverables will be submitted to both Ms. Fong and Ms. Wells for review and comment. The onsite environmental support contractor, Earth Resource Technology Corporation (ERT) with contract partner SAIC, will provide support by assigning Joseph Lukas (CA PG) and Garrett Turner (CA PE) as project personnel. Mr. Lukas will be responsible for day-to-day implementation of project activities, including data collection and management, while Mr. Turner will provide review of project status and overall technical review support.

6.6 Community Relations Plan

NASA will prepare and distribute Fact Sheets and other appropriate information related to FSF actions implemented under the UAO through direct public mailings, internal Ames emails and at the quarterly Restoration Advisory Board (RAB) meetings. The mailing list will be compiled from the NASA Restoration Program and the RAB mailing lists. At a minimum, NASA will provide public and internal updates of the FSFA ICAM status on an annual basis.

7.0 INTERIM MEASURES ASSURANCE

To ensure the effectiveness of the ICAM, sediment samples will be collected when the silt fence is installed and thereafter annually. At a minimum, annual sediment samples will be collected around the periphery of the larger portion of the 8-acre FSFA where COCs above ecological cleanup levels are known to be present in adjacent surface soils. Sediment samples will also be collected outboard of any additional silt fencing installed around the remaining perimeter of the larger 8-acre fill area and the perimeters of the two nearby fill areas, N217 and N217A. Data assurance and management will be ensured as specified in the following sections. Monthly and post-storm event inspections of the silt fence will also be completed and are detailed in Section 9.0.

7.1 Data Collection Quality Assurance/Quality Control

The objective of the ICAM Data Collection Quality Assurance (DCQA) is to detail the quality assurance/quality control (QA/QC) procedures required to ensure that data generated during the implementation of the ICAM are of sufficient quantity and are of known and appropriate quality to determine if the overall ICAM objective is being accomplished. This data will also be utilized to determine if any additional remedial efforts may be necessary beyond the FSFA footprint.

Approved regulatory guidance documents reviewed for the quality assurance/ quality control measures proposed in this Plan include the “*California Code of Regulations, Title 22, Division 4, Chapter 19. “Certification of Environmental Laboratories, Environmental Laboratory Accreditation Program Branch, Environmental Laboratory Accreditation Program”*”; the “*Uniform Federal Policy for Quality Assurance Project Plans*” (UFP-QAPP)(U.S. Environmental Protection Agency [EPA] 2005); the “*EPA Guidance for Quality Assurance Project Plans, EPA Quality Assurance (QA)/G-5, Quality Assurance Manual*” (QAM)(U.S. EPA 2002); and the “*Unified Quality Assurance Project Plan, Middlefield-Ellis-Whisman Study Area, Mountain View and Moffett Field, California*” (Canonie Environmental, 1991) (MEW UQAPP). These documents provide the acceptable protocols for implementing sample collection and quality control procedures, sample custody procedures, analytical procedures, and data quality management procedures.

As presented in Section 4, Table 1, “Chemicals of Concern and Site-Specific Soil Remediation Levels”, the soil ecological action levels for PCB is 0.210 mg/kg, pesticides/DDT is 0.109 mg/kg, lead is 93.8 mg/kg, and zinc is 314 mg/kg. Laboratory detection limits (DL) for the COCs are all below the site-specific remediation levels, with DLs as follows:

- PCBs DL = 20 µg/kg
- DDTs DL = 75 µg/kg
- Lead DL = 12 mg/kg
- Zinc DL = 50 mg/kg

Previous soil sampling in areas adjacent to the 8-acre FSFA indicates the presence of PCB, pesticides/DDT, lead and zinc above the Site 25 ecological cleanup levels. Due to the limited presence of detected COCs above site cleanup levels in surface soils, erosion control and monitoring measures are not currently proposed for the N217 and N217A fill areas. However, based on the presence of chromium slightly above the site cleanup level at one surface location, PCBs and lead at depth at one location, and DDT detection limits above site cleanup levels, additional soil sampling and analysis will be completed to determine the need for silt fencing in these areas.

Based on the historical occurrence of the primary COCs and metals in both the Site 25 sediments and the 8-acre FSFA soils, sediment samples will be collected and analyzed for PBCs (total), pesticides/DDT(total), and Priority Pollutant metals,

including cadmium, chromium, lead, and zinc. COC analyses will include Total PCBs (including Aroclor 1268) by EPA Method 8082, Total DDT by EPA Method 8081A, and lead and zinc plus cadmium and chromium by EPA Method 6010B/7000.

California Laboratory Services (CLS) of Rancho Cordova, California will provide the analytical support services for all project sampling. CLS is the analytical laboratory that provided chemical analyses for all previous FSFA soil sampling events, a California certified Environmental Laboratory Accreditation Program (ELAP) analytical laboratory, Certificate Number 1233. CLS is located at 3249 Fitzgerald Road in Rancho Cordova, CA. 95742.

7.2 Data Management

As specified in Section 6.3 (Sediment Sampling), baseline and annual sediment samples will be collected around the larger portion of the 8-acre FSFA where COCs above ecological cleanup levels are known to be present. As detailed in Section 6.3, sediment samples will be collected approximately every 150 feet linear feet or less at predetermined, static locations, for a total of 16 sediment sample locations. Additional sediment sample locations may be proposed as part of the subsequent RCRA Facility Investigation (RFI) as specified in the EPA UAO for the FSFA.

As also indicated in Section 6.3, if EPA subsequently determines silt fencing is required for the entire perimeter of all three fill peninsulas, sediment samples will be collected every 150 linear feet around the perimeter of all three fill areas. Baseline and annual sediment samples will be collected approximately 5-feet outboard of the proposed silt fencing post installation.

Collected sediment samples will be subsequently submitted to CLS. These samples will be analyzed as per Section 7.1 criteria. As a California Department of Public Health ELAP certified analytical laboratory CLS routinely calibrates the laboratory instruments utilized for chemical analysis by using approved standards for instrument calibrations. CLS also utilizes laboratory blanks plus surrogates in the laboratory control samples (LCS), LCS duplicates, and matrix spikes and matrix spike duplicates (MS/MSD) as part of their quality assurance/quality control (QA/QC) process. These QA/QC analyses are included in each analytical data set as supporting documentation for completed chemical analysis.

For data validation of confirmation sample results, 20% of the analytical data will be evaluated for adherence to data quality criteria. Evaluation of data quality criteria will include, at a minimum, adherence to Chain-of-Custody requirements, sample holding times, sample ID consistencies, and laboratory QA/QC accuracies, repetitiveness and precision.

The circumstances that may cause data to be rejected during data validation include, but are not limited to the following:

- Lack of adherence to Chain-of-Custody requirements;

- Incorrect calculation of accuracy, precision, or completeness of chemical data;
- Data that exceed the Laboratory Control Sample (LCS) or the LCS duplicate;
- Matrix spikes and matrix spike duplicates (MS/MSD) outside QC criteria;
- Data that were obtained outside the working calibration range of the given instrument or from samples diluted to concentrations outside of the calibration range;
- Samples that were extracted and/or analyzed after the holding times specified by the EPA test method.
- Discrepancies of field notes to sampling or laboratory data IDs
- Deviations from the proposed ICAM soil sample collections

8.0 DESIGN PLANS AND SPECIFICATIONS

The FSFA silt fence design plans and specifications were developed such that they meet the requirements as specified in the ICAM. Both the short and long-term objectives of the silt fence installation, as well as the key factors considered for the effective design of the silt fence, as discussed in the following.

8.1 Short and Long Term Silt Fence Objectives

Both the short term and long term objectives of the protective silt fencing installation is primarily to protect the surrounding wetland areas from being contaminated via surface runoff from the 8-acre FSFA. Since the 8-acre FSFA is located on the northern portion of NASA Ames and is accessible via a locked, security controlled gate, potential human exposure is limited. Installation of a silt fence around the northern, larger portion of the 8-acre FSFA footprint will reduce the potential for surface runoff from the contaminated adjacent portion of the 8-acre FSFA from entering the Site 25 wetlands area. As previously indicated, If EPA subsequently determines silt fencing is required for the entire perimeter of all three fill peninsulas, approximately 2,300 feet of silt fencing will be installed around all three fill areas.

8.2 Silt Fence Key Factors

As previously described in Section 6.3 (Sediment Sampling) and Section 7.2 (Data Management), baseline and annual sediment samples will be collected around the larger portion of the 8-acre FSFA where COCs above ecological cleanup levels are known to be present. The proposed erosion control measure will consist of double layer silt fence sediment barrier placed around the larger, northern portion of the 8-acre FSFA. If fencing is required around all three fill areas, baseline and annual sediment samples will be collected around all three fill peninsulas as specified in Section 6.3.

A complete set of silt fence drawings were submitted in December 2012 to EPA and the Regional Water Quality Control Board (RWQCB) for informational purposes only since the silt fence installation was to occur under a voluntary cleanup action.

Due to early fall 2012 rain events; however, installation of the proposed silt fencing was delayed due to high water levels in the Site 25 wetlands area. This area is the Storm Water Retention Pond for surface water runoff from the upland areas which include the NASA Ames campus and the former Naval Air Station Moffett Field.

Approximately 1,700 feet of double-layer silt fencing will be installed by ITSI Gilbane as shown in the silt fence design drawings included as Attachment 2. An additional map showing silt fencing for all three fill areas is also included in Attachment 2. The maximum proposed set back is 3'0". To ensure correct installation of the ICAM silt fence, both ITSI and NASA personnel will oversee the installation of the silt fencing.

8.3 Confirmation and Monitoring Sediment Sampling Collections

As specified in pervious sections, baseline and annual sediment samples will be collected around the larger portion of the 8-acre FSFA where COCs above ecological cleanup levels are known to be present. Sediment samples will be collected, depending on site conditions, every 150 feet linear feet or less at predetermined, static locations.

As stated in previous sections, If EPA subsequently determines silt fencing is required for the entire perimeter of all three fill peninsulas, sediment samples will be collected every 150 linear feet around the perimeter of all three fill areas. Approximately 2,300 linear feet of silt fencing will be installed under this scenario. Baseline and annual sediment samples will be collected approximately 5-feet outboard of the proposed silt fencing post installation.

Sediment samples will be collected and analyzed for PCBs, DDTs, and Priority Pollutant metals, including lead and zinc. These contaminants and their respective action levels are listed in Table 1 of Section 4. As previously stated in Section 6.3 (Sediment Sampling), additional sediment sample locations will be proposed as part of the subsequent RCRA Facility Investigation (RFI) as specified in the EPA UAO for the AOI 14 FSFA.

Subsequent to the silt fence installation, additional sediment samples will also be collected in areas where the silt fencing has been damaged or breached such that sediments may have migrated into the adjacent Site 25 wetlands. These samples will be analyzed for the four COCs plus Priority Pollutant metals. Sediment sample collections, analyses and QA/QC criteria are presented in Sections 7.1 and 7.2.

If the silt fencing is breached, a sediment sample will be collected immediately outboard of the center of breached silt fence section. If a breached section is greater than 50 feet in length, additional sediment samples will be collected laterally in 20-foot increments to a point where silt fencing is sufficiently intact to prevent migration of sediments. If less than 50-feet in length, no additional samples will be collected along the breached section other than the original center breach sample. Weather permitting, sediment samples will be collected within five working days of observation

of silt fence breaches. If a section of silt fencing is damaged (i.e.: leaning) but not breached, sediment samples will not be collected.

9.0 INTERIM MEASURES INSPECTIONS, OPERATION & MAINTENANCE

To ensure the continued environmental protective integrity of the silt fencing, monthly inspections will be completed of the entire silt fence. A log book of these inspections will be maintained and will be included in a quarterly letter report submitted to the EPA indicating the current condition of the silt fencing and any necessary repairs and/or replacement efforts and sample collections. Quarterly letter reports of silt fence integrity inspections and conditions, including post rainy events inspections, will be submitted by close of business January 31, April 30, July 31, and October 31 during the calendar year. Monthly inspections will include, but not be limited to, the following:

- Date and time of site inspection
- Personnel performing inspection
- Weather condition during inspection
- Erosional evidence such as soil/sediment deposited against silt fencing, or evidence of stormwater flow channels
- Physical condition of the fencing
- Integrity of the fence support posts
- Condition of the fencing joints
- General water level of the surrounding wetlands area
- General condition of the FSFA surface soils and vegetation
- Photographic documentation with descriptions, including areas where fencing has been damaged or breached

An inspection of the silt fencing will also be post significant rainy events to ensure the integrity of the protective measure. Such inspections will occur during normal work hours. These inspections will include the above recorded documentation, including pictures, which will be forwarded to the EPA via email for review and comment within 10 working days. Based on the condition of the protective measure, the following actions are proposed:

- Photographic documentation will be recorded and submitted for breached or damaged silt fencing areas/sections
- If breached, repair efforts will be completed within 10 working days of approval, weather permitting
- If a section of silt fencing is damaged (i.e.: leaning) but not breached, repair efforts will be completed within 15 working days of approval, weather permitting
- Silt fencing and fencing stakes will be replaced where damaged beyond functional conditions, such as broken stakes and/or torn fencing
- If determined to be in satisfactory condition for reuse, not replacement, silt fencing and fencing stakes will be reset to original installation specifications

10.0 INTERIM MEASURE CONSTRUCTION QUALITY ASSURANCE

As stated previously in Section 8.0, to ensure the correct installation of the ICAM silt fence, both ITSI and NASA personnel will oversee the installation of the silt fencing, including a final post-installation job walk. All identified inadequacies will be documented in the project log book and corrected at this time. This information will also be included in the post-installation completion report.

11.0 REPORTING REQUIREMENTS

Upon completion of the silt fence installation, an Interim Corrective Action Measures Completion Report documenting actions taken will be submitted to the EPA and for review and comment.

As stated in Section 9, quarterly O&M letter reports will also be submitted to the EPA detailing observations, status and conditions of the 8-acre FSFA silt fencing and surrounding areas.

12.0 SUMMARY AND CONCLUSION

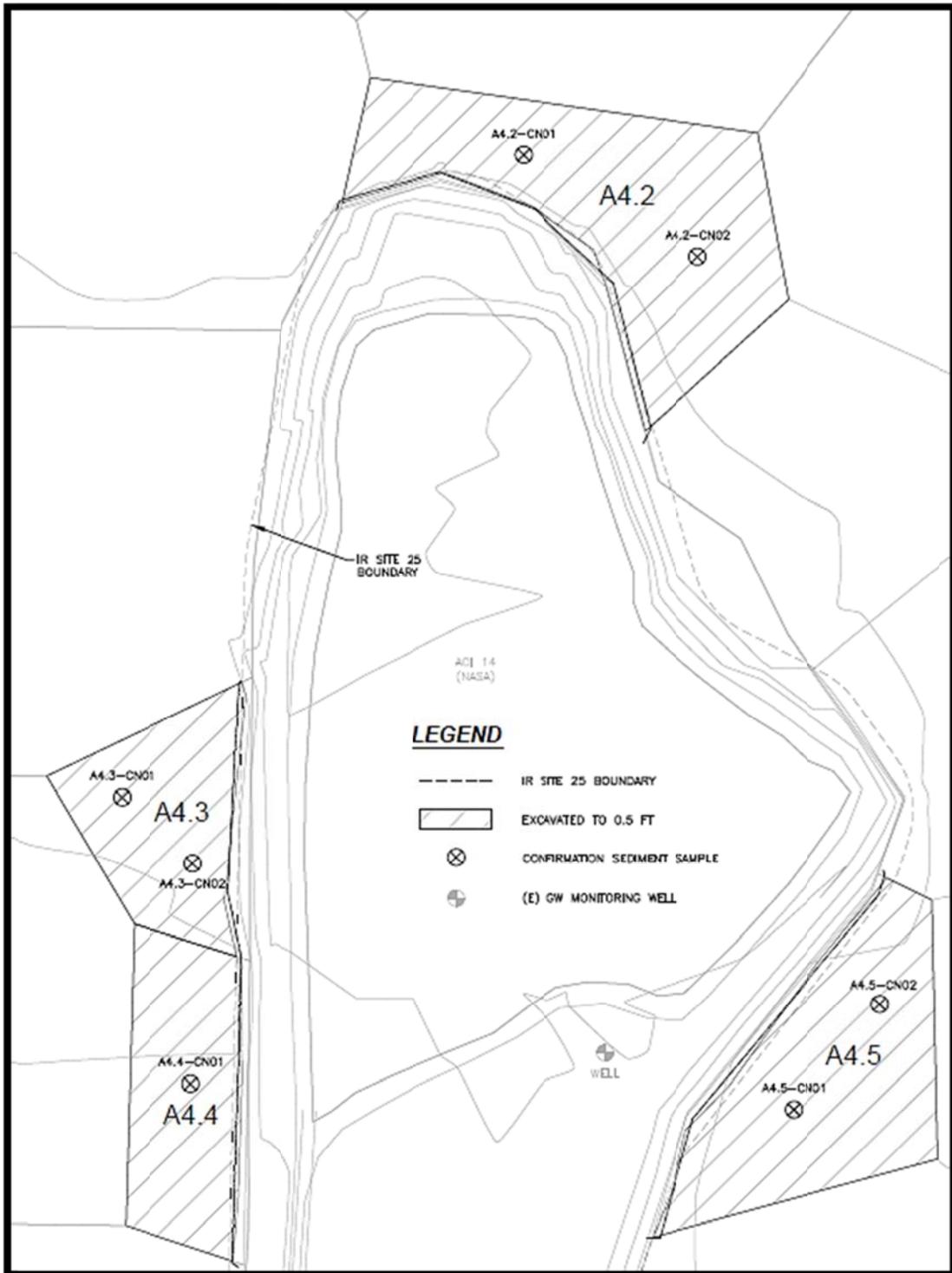
Installation of the proposed sediment control barriers, supplemented with baseline and annual sediment sampling, will ensure the effectiveness of the installed corrective action sediment barriers. Monthly field review will also be completed to ensure that the sediment barriers are in place and functioning as designed. Additional steps to repair or reinforce the sediment barriers will be implemented if it is determined that such actions are required. EPA will be notified of such required actions and will be included in the quarterly letter reports.

13.0 REFERENCES

- California State, 1989 (draft update March 2010). *California Code of Regulations, Title 22, Division 4, Chapter 19. "Certification of Environmental Laboratories"*, Environmental Laboratory Accreditation Program Branch, Environmental Laboratory Accreditation Program.
- Canonie Environmental, 1991. *Unified Quality Assurance Project Plan, Middlefield-Ellis-Whisman Study Area, Mountain View and Moffett Field, California*. December, 1991.
- EPA, 2002. *USEPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, QAMS*.
- EPA, 2005. *Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP)*.
- EPA, 2013. *USEPA Region IX, Unilateral Administrative Order, U.S. EPA Docket No. RCRA-7003-09-2013-0002, Former Soils Fill Area, NASA Ames Research Center, Moffett Field, California*.
- Erler and Kalinowski, Inc. (EKI), 1992, *Listing Site Inspection for NASA Ames Research Center, Moffett Field, California*
- ISSi, 2005, *Report of Findings, Former Soil Fill Area, Summer 2005 Soil Investigation, NASA Ames Research Center, Moffett Field, California*
- ISSi, 2006, *Sampling and Analysis Plan, Area of Investigation 14, Former Soil Fill Area, Building N217 Fill Area, and Building N217A Fill Area, NASA Ames Research Center, Moffett Field, California*
- ISSi, 2007, *Report of Findings, AOI 14 Phase II Soil Investigation, Former Soil Fill Area, Building N217 Fill Area and Building N217A Fill Area, NASA Ames Research Center, Moffett Field, California*
- ISSi, 2011, *Draft Area of Investigation 14 Erosion Control Operations and Maintenance Plan. NASA Ames Research Center, Moffett Field, California*
- ITSI Gilbane, February 2013, *Draft Remedial Action Completion Report, Former Naval Air Station Moffett Field, Moffett Field, California*.
- KCH, 2011, *Final Data Summary Report for Pre-Design Investigation of Sediment at Installation Restoration Site 25, Former Naval Air Station Moffett Field, Santa Clara County, California*. March
- SulTech and Tetra Tech EMI, December 12, 2005, *Revised Final Site-Wide Feasibility Study, Site 25, Former NAS Moffett Field, Santa Clara County, California*

ATTACHMENT 1

ITSI Gilbane
Detail Site Plan (4)
AOI 14 FSFA Adjacent Navy Site 25 Polygon 2012
Remediation Areas



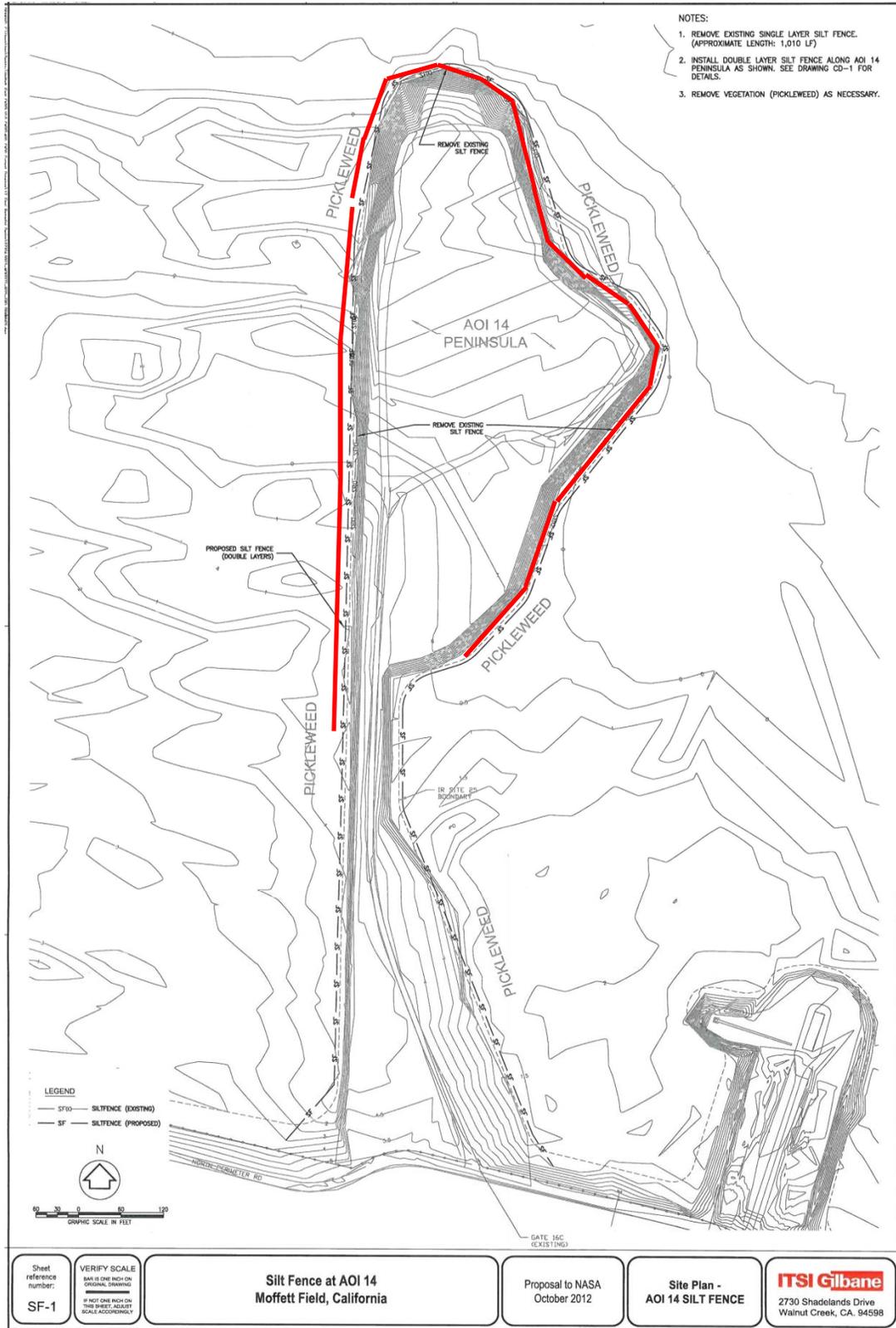
Attachment 1: ITSI Gilbane Detail Site Plan (4)
 AOI 14 FSFA Adjacent Navy Site 25 Polygon Remediation Areas
 (includes post-remediation confirmation sample locations)

ATTACHMENT 2

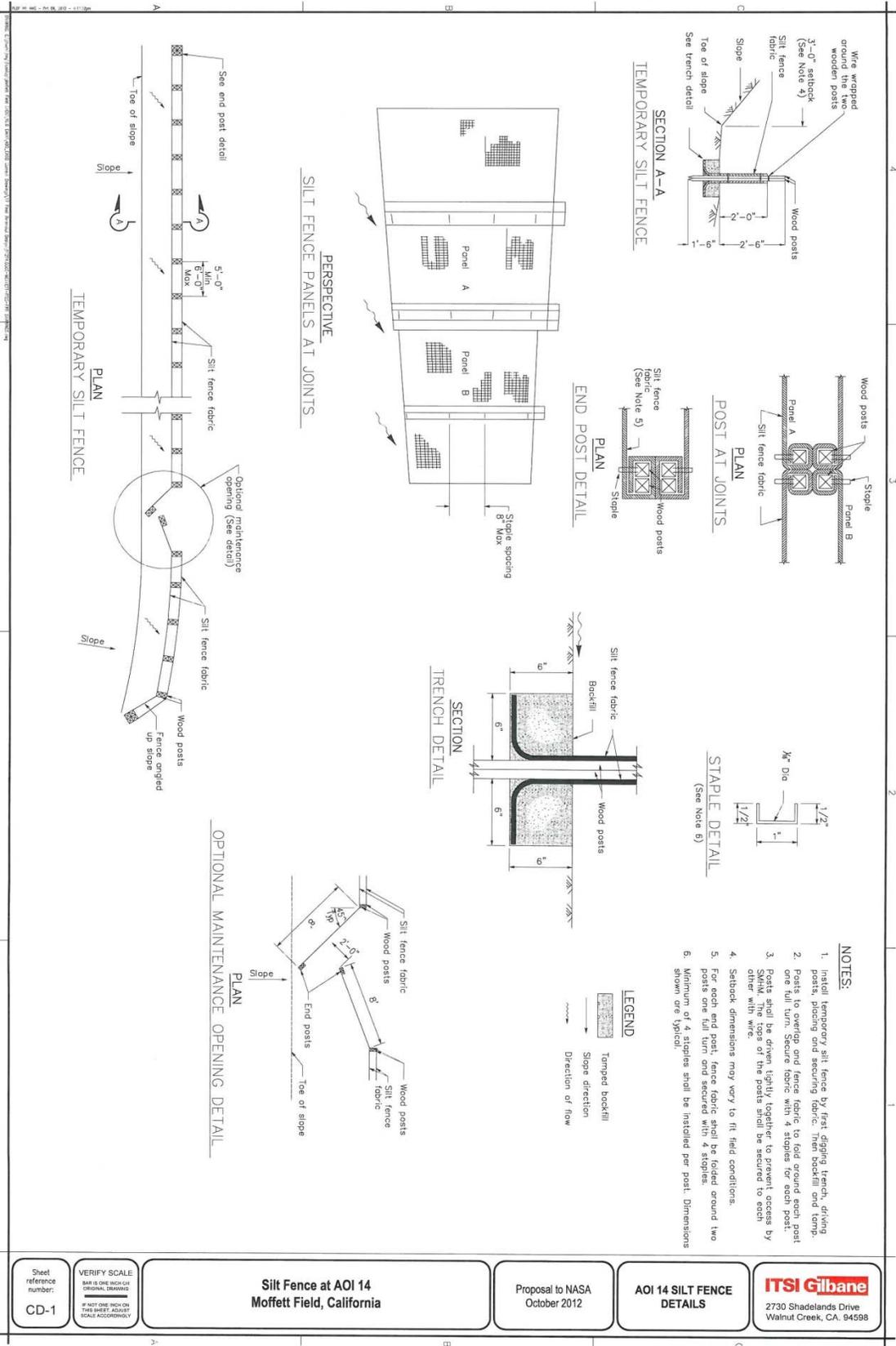
ITSI Gilbane Silt Fence Design Drawings

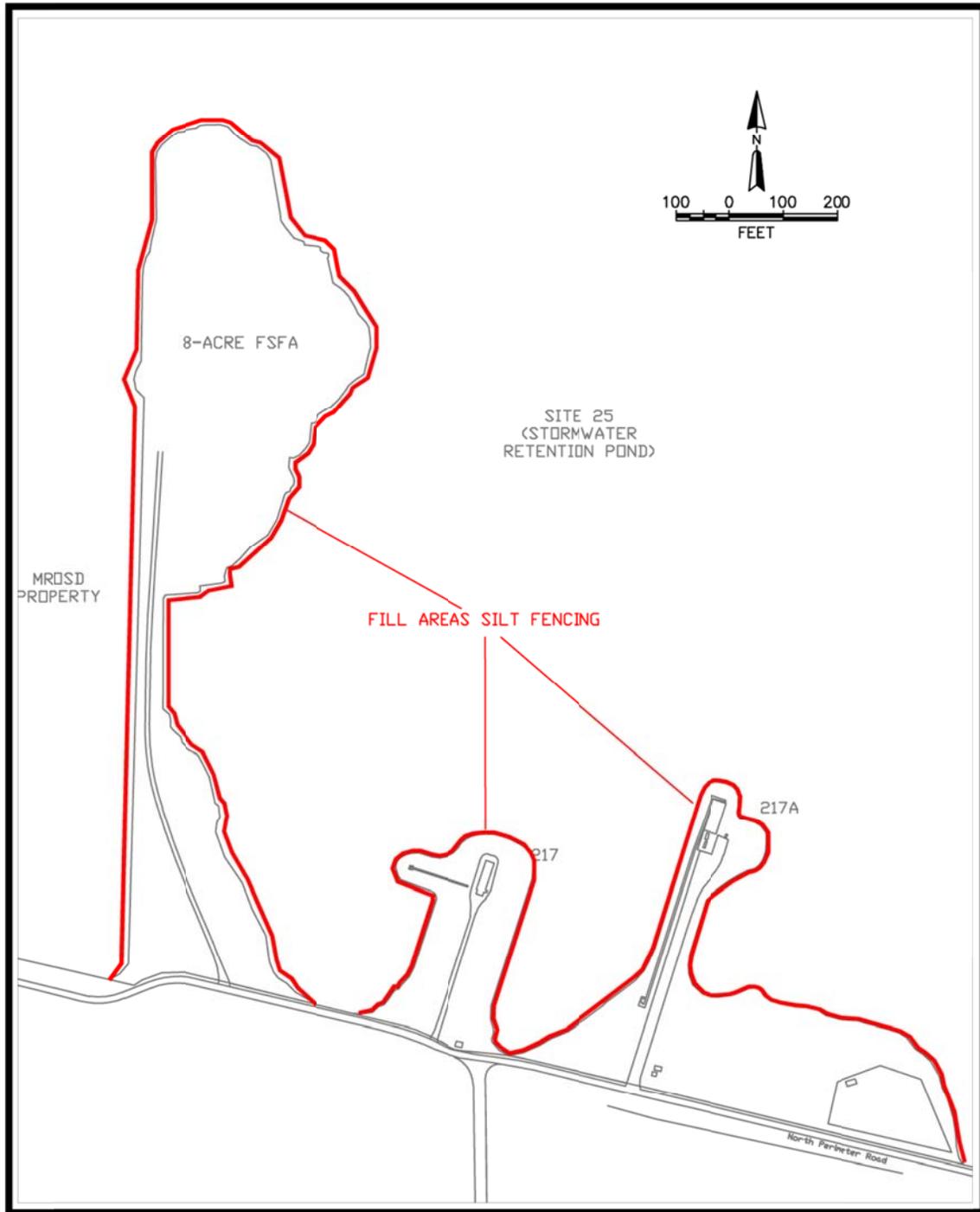
Note 1: The 3'0" set back specified in Sheet Reference CD-1, Note #4, is the proposed maximum silt fence setback.

Note 2: The proposed silt fencing is shown in **red**.



Proposed Silt Fencing for Larger Portion of the 8-Acre FSFA





Proposed Silt Fencing for all Three Fill Areas
 (pending EPA determination)

ATTACHMENT 3

AOI 14 N217 & N217A Fill Areas Soil Contamination

(Technical “White Paper” for discussion purposes)



AREA OF INVESTIGATION 14

N217 & N217A FILL AREAS SOIL CONTAMINATION

**NASA Ames Research Center
Moffett Field, CA**

August 2013



AREA OF INVESTIGATION 14
N217 & N217A FILL AREAS
SOIL CONTAMINATION

August 2013

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1.0 INTRODUCTION

This document summarizes the current soil conditions at the Building N217 and N217A Fill Areas within Area of Investigation 14 (AOI 14) at National Aeronautics and Space Administration (NASA), Ames Research Center (NASA Ames), Moffett Field, California. This information is presented to support NASA's determination that additional soil or sediment sampling and installation of silt fencing barriers at both the N217 and N217A Fill Areas are not justified based on the lack of soil contamination above site cleanup levels in surface soils at these sites.

2.0 BACKGROUND

2.1 SITE DESCRIPTION

AOI 14 is located on the northern portion of NASA Ames. AOI 14 includes the Former Soil Fill Area (8-acre FSFA), the Building N217 Fill Area, and the Building N217A Fill Area. Each of these areas is composed of imported soil materials built up above the surrounding Storm Water Retention Pond to a thickness of two feet to 16 feet. Figure 1 presents an aerial view of the AOI 14 fill areas.

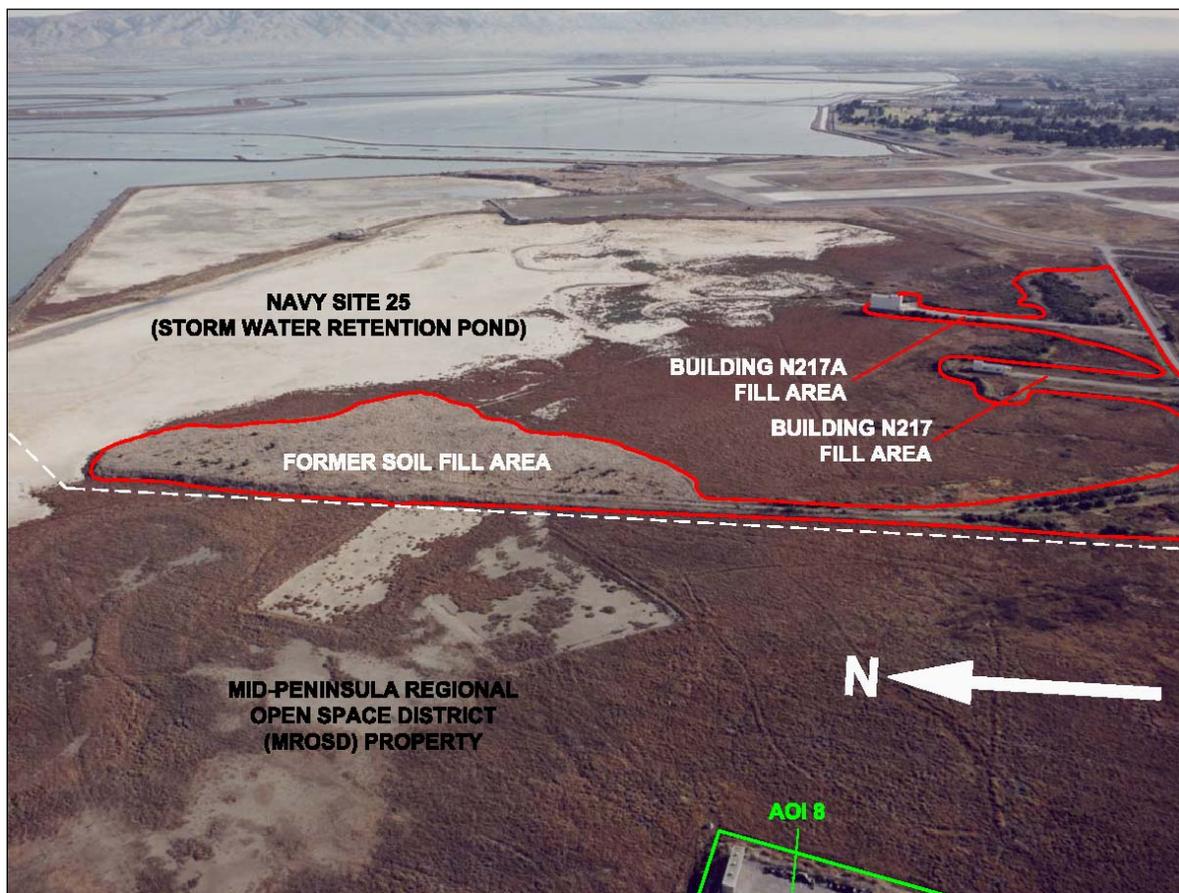


Figure 1
AOI 14 Aerial View (1991 Photograph)

As shown in Figure 1, the Building N217 and N217A fill areas are located to the east of the 8-acre FSFA. The N217 and N217A Fill Areas each include a building on their northern portions, Building N217 and Building N217A, respectively. The thickness of these fill areas varies from two feet to 12 feet above the surrounding base elevation of the Storm Water Retention Pond. The origin of N217 and N217A Fill Area materials is unknown. Groundcover across the fill areas currently consists of low grasses and shrubs.

2.2 RELEVANT INVESTIGATIONS

Based on the presence of chemicals of concern (COCs) from previous soil investigations, an initial screening soil investigation was conducted in 2006 on a 200-foot grid spacing at the AOI 14 fill areas to determine the extent of Polychlorinated Biphenyls (PCBs), total Dichlorodiphenyltrichloroethane (DDT), lead, and zinc across the 8-acre FSFA, and the Building N217 and N217A Fill Areas. Soil samples were collected from the top six inches of exposed soil and at two-foot intervals starting at two feet below ground surface (bgs). Site-specific COC cleanup levels are shown in Table 1. The sampling locations for the Building N217 and N217A Fill Areas are shown in Figure 2.

Table 1
Chemicals of Concern and
Site-Specific Soil Cleanup Levels

Chemical of Concern	Site-Specific Soil Cleanup Level ¹ (mg/kg)
PCBs (total) ²	0.210
DDT (total) ³	0.109
Lead	93.8
Zinc	314

mg/kg = milligrams per kilogram or parts per million (ppm)

PCB = Polychlorinated Biphenyl

DDT = Dichlorodiphenyltrichloroethane

¹ source: Revised Draft Addendum to *Revised Final Site-Wide Feasibility Study, Site 25, Former NAS Moffett Field, Santa Clara County, California* (SulTech and Tetra Tech EMI, December 12, 2005)

² includes Aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260, and 1268

³ includes DDT, DDD, and DDE

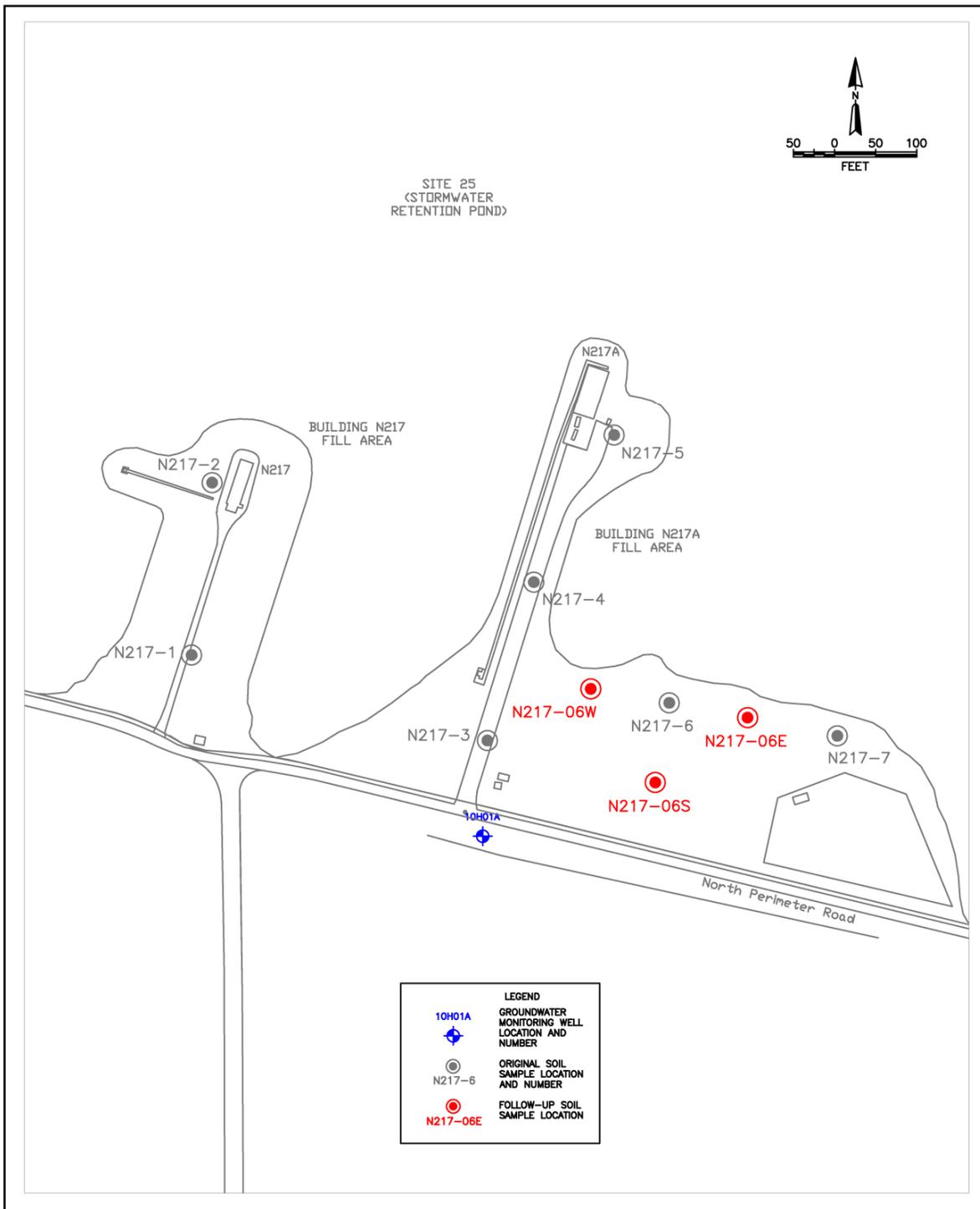


Figure 2
N217 and N217A Fill Area Soil Sample Locations

Soil sampling on the N217 and N217A Fill Areas was conducted on June 22 and June 23, 2006. Analysis of soil samples included Total PCBs (including Aroclor 1268), Total DDT (including DDD, DDE, and DDT), lead, and zinc. Additionally, three soil samples were analyzed for Total Petroleum Hydrocarbons (TPH) as Diesel (TPH-D), TPH as Gasoline (TPH-G), TPH as Jet Propulsion fuels numbers 4, 5, and 8 (TPH-JP4/5/8), TPH as Motor Oil (TPH-MO), Total Oil and Grease (TOG), Volatile Organic Compounds (VOCs), and Priority Pollutant Metals.

Within the Building N217 Fill Area, soil samples were collected on 200-foot spacings at two locations, N217-1 and N217-2 (Figure 2). All contaminants of concern and additionally-analyzed compounds were non-detect or below site cleanup levels. The analytical results for the contaminants of concern and additionally-analyzed compounds are summarized in Table 2 and Table 3, respectively.

Within the Building N217A Fill Area, soil samples were initially collected on 200-foot spacings from five locations, N217-3 through N217-7 (Figure 2). PCB and lead contamination above site action levels was present at one location, N217-6; however, at a depth of 8 feet bgs. Chromium was detected in the surface soil sample at location N217-7 at a concentration of 61 mg/kg, slightly above the NASA cleanup level of 58mg/kg. All other results were non-detect or below cleanup levels. The analytical results for the contaminants of concern and additionally-analyzed compounds are summarized in Table 2 and Table 3, respectively.

Analytical results of soil samples collected at the Building N217A Fill Area indicated the presence of PCBs, lead, zinc, arsenic, chromium, copper, mercury, nickel, and TPH-MO. The remaining analyzed compounds were not detected above applicable Laboratory Detection Limits.

The PCB Aroclor 1260 was detected in six samples collected at the Building N217A Fill Area. Of those six soil samples, only one (N217-6-8') contained Aroclor 1260 in excess of NASA's soil cleanup level of 210 µg/kg. The reported Aroclor 1260 concentration in this sample was 450 µg/kg.

Lead was present in sample, N217-6-8' at a concentration of 280 mg/kg, exceeding NASA's 93.8 mg/kg soil cleanup level.

The maximum detected zinc concentration was 81 mg/kg, below its 314 mg/kg soil cleanup level.

Chromium was detected in each of the three samples for which it was analyzed. One sample (N217-7-6") contained chromium at a concentration of 61 mg/kg, slightly exceeding NASA's 58 mg/kg soil cleanup level.

Arsenic, copper, mercury, nickel, and TPH-MO were all detected in one or more soil samples; however, none of these compounds were present in excess of its respective soil cleanup level.

Table 2
N217 and N217A Fill Areas Soil Sample Analytical Results
Contaminants of Concern

Sample Location	Depth (bgs)	Aroclor 1260 (µg/kg)	Aroclor 1268 (µg/kg)	Total PCBs ¹ (µg/kg)	Total DDT ² (µg/kg)	Lead (mg/kg)	Zinc (mg/kg)
N217-1-6"	0-6"	<20	<20	---	<75	<7.5	49
N217-1-2'	2'	<20	<20	---	<75	<7.5	39
N217-1-4'	4'	<20	<20	---	<75	<7.5	37
N217-2-6"	0-6"	<20	<20	---	<150	<7.5	37
N217-2-2'	2'	<20	<20	---	<150	<7.5	24
N217-2-4'	4'	<20	<20	---	<75	<7.5	42
N217-3-6"	0-6"	<20	<20	---	<300	<12	55
N217-3-2'	2'	<20	<20	---	<150	14	52
N217-3-4'	4'	<20	<20	---	<150	<7.5	27
N217-3-6'	6'	<20	<20	---	<150	<7.5	67
N217-3-8'	8'	<20	<20	---	<150	<7.5	48
N217-3-10'	10'	<20	<20	---	<150	<7.5	40
N217-4-6"	0-6"	<20	<20	---	<150	<7.5	36
N217-4-2'	2'	<20	<20	---	<75	<7.5	63
N217-4-4'	4'	<20	<20	---	<150	<7.5	34
N217-4-6'	6'	<20	<20	---	<150	<7.5	45
N217-4-8'	8'	<20	<20	---	<150	<7.5	47
N217-4-10'	10'	<20	<20	---	<150	<7.5	40
N217-5-6"	0-6"	22	<20	22	<150	<12	54
N217-5-2'	2'	<20	<20	---	<150	<7.5	49
N217-5-4'	4'	<20	<20	---	<150	<7.5	58
N217-5-8'	8'	<20	<20	---	<150	<7.5	49
N217-5-10'	10'	<20	<20	---	<150	10	81
N217-5-12'	12'	<20	<20	---	<150	<7.5	35
N217-6-6"	0-6"	26	<20	26	<150	14	68
N217-6-2'	2'	27	<20	27	<150	9.3	59
N217-6-4'	4'	<20	<20	---	<300	<7.5	57
N217-6-6'	6'	<20	<20	---	<150	13	48
N217-6-8'	8'	450	<20	450	<150	280	53
N217-6-10'	10'	<20	<20	---	<75	<7.5	36
N217-6-12'	12'	<20	<20	---	<150	<7.5	38
N217-7-6"	0-6"	<20	<20	---	<150	<7.5	56
N217-7-2'	2'	90	<20	90	<150	9.6	58
N217-7-4'	4'	80	<20	80	<750	11	48
N217-7-6'	6'	<20	<20	---	<750	<7.5	56
N217-7-8'	8'	<20	<20	---	<300	<7.5	66
N217-7-10'	10'	<20	<20	---	<300	7.6	61
N217-7-12'	12'	<20	<20	---	<150	9.3	68
Soil Cleanup Level⁸		210	210	210	109	93.8	314

bgs = below ground surface

µg/kg: micrograms per kilogram, parts per billion (ppb)

mg/kg: milligrams per kilogram, parts per million (ppm)

PCB = Polychlorinated Biphenyl

DDT = Dichlorodiphenyltrichloroethane

¹ includes Aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260, and 1268

² includes DDT, DDD, and DDE

³ source: *Addendum to Revised Final Site-Wide Feasibility Study, Site 25, Former NAS Moffett Field* (SulTech, 2005)

26 = Compound detected above applicable Laboratory Detection Limit, compound concentration does not exceed site soil cleanup level.

480 = Compound Detected above applicable Laboratory Detection Limit, compound concentration exceeds site soil cleanup level.

<20 = Compound not detected above applicable Laboratory Detection Limit. Laboratory Detection Limit provided.

<150 = Compound not detected above elevated Laboratory Detection Limit. Laboratory Detection Limit exceeds site soil cleanup level.

Table 3
N217 and N217A Fill Areas Soil Sample Analytical Results
Additional Compounds

Sample Location	Depth (bgs)	Arsenic (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)	TPH-MO (mg/kg)
N217-2-2'	2'	2.6	20	9.3	<0.10	30	33
N217-4-6"	0-6"	1.7	22	17	<0.10	27	80
N217-7-6"	0-6"	3.9	61	30	0.25	62	<1.0
Soil Cleanup Level¹		5.5	58	230	3.7	150	1000

bgs = below ground surface

mg/kg: milligrams per kilogram, parts per million (ppm)

¹ source: Environmental Screening Levels (California Regional Water Quality Control Board, February, 2005)

0.43 = Compound detected above applicable Laboratory Detection Limit, compound concentration does not exceed site soil cleanup level.

6.5 = Compound Detected above applicable Laboratory Detection Limit, compound concentration exceeds site soil cleanup level.

<0.50 = Compound not detected above applicable Laboratory Detection Limit. Laboratory Detection Limit provided.

Based on the presence of PCBs and lead above site cleanup levels, location N217-6 was bracketed to the west, east, and south by surrounding sampling locations at 100-foot spacings. A northern bracketing sample location was not selected because of the proximity of the edge of the fill area to the original sample location (N217-6). These locations are also shown on Figure 2 and were designated as N217-06W, -06E, and -06S.

Soil samples were collected from the three follow-up locations on November 20, 2007. Analysis of soil samples included Total PCBs (including Aroclor 1268), Total DDT (including DDD, DDE, and DDT), lead, and zinc. The results of the follow-up sampling are provided in Table 4, along with the original analytical results from location N217-6.

3.0 Summary and Conclusions

Based on the absence of significant concentrations of the COCs at the N217 and N217A Fill Areas, it appears that the source material for those two areas is different than that of the larger 8-acre FSFA.

The six samples collected from the two sample locations at the N217 Fill Area (N217-1 and N217-2) did not yield any detectable concentrations of Total PCBs, Total DDT, or lead (Table 2). Concentrations of all other COCs and additional analytes were well below site cleanup levels (Tables 2 and 3).

Of the 32 samples collected from the original five sample locations at the N217A Fill Area (N217-3 through N217-7), one sample (N217-6-8') contained the COCs Total PCBs (450 µg/kg) and lead (280 mg/kg) above site cleanup levels (Table 2). The contamination at this location was bracketed through the collection of an additional 21 samples at three follow-up sampling locations (Figure 2 and Table 4). With the exception of the lead concentration of 96 mg/kg (cleanup level 93.8 mg/kg) reported in sample N217-06S-10', all other COCs were not detected or were present at concentrations well below cleanup levels.

The isolated detection of chromium at 61 mg/kg (cleanup level 58 mg/kg) in the surface soil at location N217-7 is of little significance, especially when considering that this area was removed as part of the Navy's Site 25 wetlands remediation.

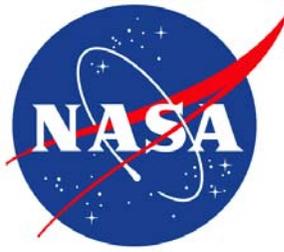
Based on the absence of soil contamination in the upper six inches of exposed soil above site cleanup levels, along with the limited area of deeper soils containing contamination above site cleanup levels, NASA does not believe that additional sediment/soil sampling or silt fence installation is justified at the N217 and N217A Fill Areas.

**Table 4
N217A Fill Areas Soil Sample Analytical Results
Follow-Up Sampling**

Sample Location	Depth (bgs)	Aroclor 1260 (µg/kg)	Aroclor 1268 (µg/kg)	Total PCBs (µg/kg)	Total DDT (µg/kg)	Lead (mg/kg)	Zinc (mg/kg)
N217-6-6"	0-6"	26	<20	26	<150	14	68
N217-6-2'	2'	27	<20	27	<150	9.3	59
N217-6-4'	4'	<20	<20		<300	<7.5	57
N217-6-6'	6'	<20	<20		<150	13	48
N217-6-8'	8'	450	<20	450	<150	280	53
N217-6-10'	10'	<20	<20		<75	<7.5	36
N217-6-12'	12'	<20	<20		<150	<7.5	38
N217-06W-6"	6"	<20	<20		<75	13	46
N217-06W-2'	2'	<20	<20		<75	7.9	43
N217-06W-4'	4'	<20	<20		<75	6.0	44
N217-06W-6'	6'	<20	<20		<75	4.4	35
N217-06W-8'	8'	<20	<20		<75	25	25
N217-06W-10'	10'	<20	<20		<75	4.8	31
N217-06W-12'	12'	<20	<20		<75	8.9	22
N217-06E-6"	6"	25	<20	25	<75	11	55
N217-06E-2'	2'	<20	<20		<75	12	47
N217-06E-4'	4'	<20	<20		<75	4.4	25
N217-06E-6'	6'	<20	<20		<75	13	28
N217-06E-8'	8'	<20	<20		<75	8.2	32
N217-06E-10'	10'	<20	<20		<75	3.4	31
N217-06E-12'	12'	<20	<20		<75	3.3	30
N217-06S-6"	6"	<20	<20		<75	9.6	50
N217-06S-2'	2'	<20	<20		<75	7.6	38
N217-06S-4'	4'	<20	<20		<75	7.3	48
N217-06S-6'	6'	<20	<20		<75	6.1	37
N217-06S-8'	8'	<20	<20		<75	3.9	34
N217-06S-10'	10'	<20	<20		<75	96	120
N217-06S-12'	12'	<20	<20		<75	<2.5	26
Soil Cleanup Level		210	210	210	109	93.8	314

ATTACHMENT 4

NASA Response to EPA comments

COMMENTS BY Joe Lukas, ERT Corporation	CODE JQ	PHONE 650-604-2057	DATE October 29, 2013
PROJECT TITLE AND LOCATION Environmental Protection Agency (EPA), Region IX, Comments on the “Draft AOI 14 Interim Corrective Action Work Plan, NASA Ames Research Center, Moffett Field, submitted June 19, 2013			

ERT has reviewed the EPA comments on the Draft AOI 14 Interim Corrective Action Work Plan (ICA WP), NASA Ames Research Center, Moffett Field, submitted June 19, 2013 and has attempted to address each comment/question with the following responses, which will also be included in the final draft of the WP.

EPA GENERAL COMMENTS

Comment 1.

Scope of the Planned Corrective Measures: *The WP appears to describe actions only at the largest of the three peninsulas located at the northern end of Moffett Field. Although AOI 14 is shown in Figure 2 to include all three peninsulas, the WP does not include any measures (silt fencing) or sampling around the two smaller peninsulas, N217 and N217A. The March 15, 2013, Order requires response actions at the FSFA, which was described in Paragraph 13 of the Order as being comprised of three peninsulas: AOI 14, N217 and N217A. As there is known contamination at all three peninsulas, the WP must address the potential release of contaminants from all three peninsulas into the surrounding area. In addition, the planned actions appear to only be directed at preventing the possible recontamination of areas previously remediated by the Navy as part of its CERCLA action at the Navy IRP Site 25 (Site 25). The WP does not address the releases from the FSFA into areas that have not previously required remedial action. Without corrective measures, confirmation sampling, and monitoring around all three peninsulas, contaminants from the FSFA may also be released into areas that were not included in the Navy cleanup. Revise the WP to include interim corrective measures for all three peninsulas, not just the largest of the three, and revise the WP to also include sediment sampling and monitoring in areas that did not require remediation by the Navy.*

NASA Response

- NASA originally applied the FSFA nomenclature to the larger 8-acre fill peninsula; however, in the Order, EPA has redefined the FSFA to include all three fill peninsulas. Workplan text has been modified to indicate all three fill areas as AOI 14 soil fill peninsula areas.
- N217 and N217A fill areas were included in subsequent sampling events to determine presence or absence of chemicals of concern (COCs).
- Surface and subsurface analytical data indicate the presence of soils contamination above action levels at only one of the two other peninsula areas, at sample sites

N217-6 and N217-7, which is located on the N217A fill area. The detection level for DDT was, however, above the 109 ug/kg cleanup level for DDTs at all but one location, N217-1.

- PCB 1260 at 450 ug/kg and lead at 280 mg/kg were present in the N217A fill area at sample site N217-6 at 8-feet below ground surface (bgs). This sample location was subsequently bracketed vertically and horizontally on a 100-foot grid to the west, east and south. A northern bracketing sample location was not selected because of the proximity of the edge of the fill area within 50 feet of the original sample location (N217-6).
- At these three locations, lead was the only COC detected in N217-06S at 10 feet at 96 mg/kg, slightly above the ecological cleanup level of 93.8 mg/kg.
- An isolated detection of chromium at 61 mg/kg (cleanup level 58 mg/kg) was present in surface soil at location N217-7.
- Workplan text in Sections 6.0 and 6.1 have been modified to include:
 1. Additional surface soil sampling and analysis at locations N217-2 through N217-7 to address the elevated detection limits for DDTs in previous sample analyses.
 2. An additional surface soil sample location to the north of N217-6 to provide COC and metals analytical data adjacent to the northern limit of the fill area.
 3. A resampling of the surface soil at the N217-7 location for Cr III and Cr VI analysis due to the slightly elevated chromium concentration in the original surface soil sample.
- Workplan text has also been modified to include information on additional sediment sampling around the larger 8-acre fill area.

a. Site and Report Nomenclature: *The nomenclature used to describe the site and the report is somewhat inconsistent and creates confusion with regard to the scope of the actions proposed in the WP. The title of the document indicates that it pertains to AOI 14; however, Section 1.0, Introduction, uses both the "AOI 14" and "FSFA" terms. Furthermore, the WP is referred to as the "Interim Corrective Action Work Plan" in the transmittal letter and the "Interim Corrective Action Measures Work Plan" on the document cover page. Please revise the report nomenclature to be consistent throughout and consistent with the terms used in the Order (e.g. "Interim Corrective Action Measures Work Plan").*

NASA Response:

- Workplan text has been revised to clarify site nomenclature and report titles.

2. Sediment Sampling: *Six sediment locations are proposed for sampling prior to and following the installation of the silt fencing. The proposed sampling is not sufficient as the proposed locations are not representative of the full perimeter of the largest peninsula. Furthermore, no sediment sampling is proposed for the two smaller peninsulas. Please revise the WP to include additional sediment sampling locations.*

NASA Response:

- Workplan text has been modified to indicate sediment samples will be collected around the larger portion of the 8-acre FSFA where COCs above ecological cleanup levels are known to be present.

- Sediment samples will be collected around the perimeter of the larger portion of the 8-acre FSFA along an approximate linear distance of 1,700 feet.
- Sediment samples will be collected every 150 feet linear feet or less, depending on site conditions.
- Sediment samples locations will be approximately 5-feet outboard of the proposed silt fencing.

3. Sensitive Habitat and Species: *The WP includes work in areas known to be inhabited by the Salt Marsh Harvest Mouse, a federal and state endangered species. In addition, Attachment 2 Sheet Reference SF-1 notes that removal of pickleweed, habitat for the Salt Marsh Harvest Mouse, may be necessary as part of the action. Please revise the WP to include a description of which natural resource trustees will be consulted and what actions will be taken to limit impacts to sensitive species and habitat.*

NASA Response:

- Fish & Wildlife (CAFW), US Army Corp of Engineers (USACorp), BCDC, and as an adjacent property owner, Mid-Peninsula Regional Open Space District (MROSD), have been consulted on potential impacts to the surrounding wetlands habitat and wildlife.
- A biological assessment has been completed and submitted for review, comment and approval by the CAFW.
- The biological assessment includes actions proposed to mitigate impacts to sensitive species and habitat.
- The silt fencing will be installed such that minimal areas of pickleweed will be affected. Pickleweed will be replaced from areas where removed.
- Workplan text has been modified to include the preceding.

SPECIFIC COMMENTS

1. Section 1.0, Introduction: *The second paragraph of this section describes Navy-related contamination that originated from Hangar 1 and was formerly located in the wetland areas adjacent to the FSFA. This paragraph is somewhat out of place in the Introduction without a related description of the contamination found in the fill material of each of the three peninsulas of the FSFA and their source(s). While this information about the FSFA is found in Section 5.1, Former Soil Fill Area, it should either replace or be added to the information in Section 1.0 related to Site 25.*

NASA Response:

- WP text revised to include additional information regarding COCs found in two of the three fill peninsula areas above site-specific soil action levels. Relevant information is provided in both Section 1.0 and Section 5.0.

2. Section 3.0, Areas of Investigation: *This section states that 12 AOIs were originally identified at NASA Ames and four more AOIs were added after subsequent investigations. The stated number of AOIs appears to conflict with other documents which include as many as 17 AOIs at NASA Ames. Please clarify the number of AOIs.*

NASA Response:

- Workplan text has been revised to include clarification regarding NASA AOIs.

3. Section 3.1, Regulatory Oversight: *This section states that AOIs over the regional groundwater plume fall under EPA oversight, while other AOIs are under the oversight of DTSC (with the exception of AOI 14). These statements do not appear to be consistent with the historic extent of the regional groundwater plume. NASA AOIs 4, 5 and 10 appear to overlie the regional groundwater plume; however, they are under DTSC oversight. Please delete or clarify these statements regarding regulatory authority.*

NASA Response:

- The WP text has been revised to indicate that the “EPA maintains regulatory oversight because the AOI 14 fill peninsula areas are located adjacent to Navy IRP Site 25, the stormwater retention pond and wetlands. Navy Site 25 is part of the Moffett Field Superfund Site, which is regulated by the EPA. To maintain consistency with Navy Site 25, AOI 14 was placed under EPA oversight”.

4. Sections 6.0 and 7.1, Interim Measures Objectives and Data Collection Quality Assurance/Quality Control: *The third paragraph of Section 6.0 and the fourth paragraph of Section 7.1 describe the results of sampling conducted at “38 locations across the AOI 14 FSFA.” In addition, Section 6.0 states that “Figure 4 presents the analytical results of soil samples around the periphery of the AOI 14 FSFA.” The results for the two smaller peninsulas which include detections of chromium, PCBs, and lead above remediation levels are not provided. In addition, the PCB results reported in Figure 4 are not representative of the overall PCB contamination at the site. PCB detections at the FSFA have ranged from 0.022 to 88 mg/kg. Please include the maximum detected PCB concentrations from all historic investigations in Figure 4 as well as a summary of the results for N217 and N217A in Sections 6.0 and 7.1.*

NASA Response:

The WP text has been revised to indicate that the primary area of COC contamination in the greater FSFA area is present within the larger 8-acre fill peninsula. Due to the fact that COC contamination above site action levels is prevalent throughout the northern portion of the 8-acre fill peninsula in both surface and subsurface soils, an additional figure, Figure 4, which includes all COC detections within the 8-acre fill peninsula, has been added to the WP. Figure numbers 4 through Figure 6 have been revised to reflect addition of new Figure 4.

The following information regarding the N217 and N217A fill areas has also been included in the revised text, plus a sample location map and results table for the N217A fill area. A short technical document including additional data for these areas will be included as Attachment 3. Section 6.1 N217 & N217A Fill Peninsulas, was added to the WP text, and includes the following information:

- N217 PCBs: 1260 detected in one sample N217-6-8' at 450 ug/kg (above 210 ug/kg)
- N217A Lead: detected in two samples above action levels = N217-6-8' at 280 mg/kg, and at N217-06S-10' at 96 mg/kg, but both at 8' or deeper.
- N217 & N217A Chromium: detected in three samples; however, in only one surface soil sample slightly above the Ames 58 mg/kg cleanup level, at N217-7-6" at 61

mg/kg. A surface soil sample will be collected at this location for Cr III and Cr VI analysis.

- N217A sample location N217-6 was subsequently bracketed both horizontally and vertically via sample locations N217-6W, -6E, and -6S, from which soil samples were collected starting at the surface and below in 2-foot increments. A surface soil sample for COC and metals analysis will be collected due north of original sample location N217-6 to provide a northern N217-6 location COC data point.

5. Sections 6.2 and 7.1, Sediment Sampling and Data Collection Quality

Assurance/Quality Control: *According to these sections, sediment samples will be analyzed for PCBs, DDT, and metals, including lead and zinc. Please clarify if the metals analysis will include cadmium and chromium, two contaminants known to be present at the FSFA. If cadmium and chromium are not included in the metals analysis, provide the rationale for eliminating these metals as contaminants of concern.*

NASA Response:

- Sediment sample analyses will include cadmium and chromium as part of the Priority Pollutant Metals analytical method which will be utilized for this task. Workplan text has been modified to include such information.

6. Sections 6.2, 7.0, and 12.0, Sediment Sampling and Interim Measures Assurance:

The third paragraph of Section 6.2, the first sentence of Section 7.0, and Section 12.0 describe the collection of soil samples. Please clarify if these WP sections were intended to describe sediment samples, as it is not clear what would be the purpose of soil sampling. If soil sampling is intended, please describe the planned locations and analysis.

NASA Response:

- WP text will be modified to clarify that sediment samples will be collected, not soil samples.

7. Section 6.5, Community Relations Plan: *This section states that NASA will issue direct public mailings. Please describe the type and number or frequency of these direct mailings and how NASA intends to generate the list of people to which the mailings will be sent.*

NASA Response:

- WP text will be modified to state that NASA will generate and direct mail Fact Sheets related to the FSFA actions implemented as specified in the UAO.
- Final work plans and reports will also be provided.
- The mailing list will be generated from past community mailing lists, including Restoration, wildlife and NEPA programs mailing lists.

8. Section 7.1, Data Collection Quality Assurance/Quality Control: *For the contaminants of concern for Site 25 (PCBs, DDT, lead, and zinc), confirm the laboratory detection limits are at or below the site-specific soil remediation levels presented in Table 1.*

NASA Response:

- WP text will be modified to verify that laboratory detection limits (DL) for COCs are at or below site-specific soil remediation levels as follows:
 1. PCBs DL = 20 ug/kg
 2. DDTs DL = 75 ug/kg
 3. Lead DL = 12 mg/kg
 4. Zinc DL = 50 mg/kg

9. Section 7.2, Data Management: *This section states that sediment will be collected from three predetermined Site 25 locations, sample locations SSRP-002, and RP-HO1, and subsequently submitted to CLS. This statement is inconsistent with Section 6.2, which describes six sample locations. Furthermore, Section 7.2 lists only two locations, not the stated three and the nomenclature for the locations do not appear to correspond to any of the figures in the WP. Please clarify the number and location of the planned samples.*

NASA Response:

WP text has been modified in Section 6.3 Sediment Sampling, to state that “sediment samples will be collected around the larger portion of the 8-acre FSFA where COCs above ecological cleanup levels are known to be present. Sediment samples will be collected around the perimeter of the larger portion of the 8-acre FSFA along an approximate linear distance of 1,700 feet. Sediment samples will be collected, depending on site conditions, every 150 feet linear feet or less at predetermined, static locations. At each sample site a metal fence post will be installed to ensure repeatable sample collections. Sediment sample locations will be approximately 5-feet outboard of the proposed silt fencing. Baseline sediment samples will also be collected immediately post silt fence installation at the proposed locations. Additional sediment sample locations may be proposed as part of the subsequent RCRA Facility Investigation (RFI) as specified in the EPA UAO for the FSFA.

Due to the creation of a new Section 6.1, original Section 6.2 Sediment Sampling, has been renumbered as Section 6.3 Sediment Sampling. Section 7.2 Data Management, has also been modified to include the revised number of sample locations.

10. Section 8.1, Short and Long Term Silt Fence Objectives: *The stated objective is to protect the surrounding wetland areas from being re-contaminated. As noted in General Comment 1, the WP should be revised to also address the potential for releases from the FSFA into areas of Site 25 that have not previously required remedial action. Please revise the WP to include this objective.*

NASA Response:

- WP text has been modified to include sediment sample collections around the larger portion of the 8-acre fill peninsula. Historical and more recent analytical results indicate that the two smaller fill peninsulas do not appear to be a potential source of COCs or other metals contamination to the surrounding wetlands sediments; however additional surface soil sampling will be completed to address remaining COC issues in the N217 and N217A fill areas.

- A new section, Section 6.1 N217 & N217A Fill Peninsulas, was added to the WP text which presents the limited potential for release of COCs to the adjacent Site 25 wetland areas plus additional proposed sampling to address remaining COC issues.
- As specified in EPA Comment #4, a new figure, Figure 4, has been added to the WP which shows the concentrations of COCs plus other metals.

11. Section 8.2, Silt Fence Key Factors: *This section states that design drawings were submitted to EPA and the Regional Water Board in December 2012. The drawings were not approved by the regulatory agencies and it is not clear if some or all of those drawings are included in this WP. Please include any relevant design drawings in a future revision to the WP for review and approval.*

NASA Response:

- The silt fence drawings were submitted to EPA and the RWQCB for informational purposes only since at the time the silt fence installation would occur under a voluntary cleanup action.
- The WP text does not state that the silt fence drawings were submitted to EPA and RWQCB for approval.
- All of the silt fence drawings provided by ITSI Gilbane were included in the WP submitted to the agencies.
- Revised silt fence drawings will be submitted as Attachment 2.
- Workplan text has been revised to include the preceding information.

12. Section 8.3, Confirmation and Monitoring Sediment Sampling Collections: *The second paragraph states that additional sediment samples will be collected in areas where silt fencing becomes damaged or breached; however, very little information is included in the WP about this additional sampling. Please explain how many and when these samples will be taken after damage or breaches in the silt fencing.*

NASA Response:

- WP text will be modified to state that one sediment sample will be collected immediately outboard of the center of a breached silt fence section.
- If a breached section is greater than 50 feet in length, additional sediment samples will be collected laterally in 20-foot increments to a point where silt fencing is sufficiently intact to prevent migration of sediments.
- If less than 50-feet in length, no additional samples will be collected along the breached section other than the original center breach sample.
- Sediment samples will be collected within five working days of observation of silt fence breaches.
- Sediment samples will be submitted for COCs plus metals analysis.
- If a section of silt fencing is damaged (i.e.: leaning) but not breached, sediment samples will not be collected.

13. Section 9.0, Interim Measures Inspections, Operation and Maintenance: *Monthly inspections are included in the ongoing operation and maintenance of the silt fencing, along with quarterly reporting. There are no provisions for inspections specifically following rain events and the schedule for submission of the quarterly reports is not specified. Please revise the WP to include inspections following individual rain events*

and dates/months for the quarterly reports.

NASA Response:

- WP text will be modified to indicate that silt fencing will be inspected immediately following a rainy event, such inspections to occur during normal work hours.
- Quarterly letter reports of silt fence integrity inspections and conditions, including post rainy events inspections, will be submitted close of business (COB) January 31, April 30, July 31, and October 31 during the calendar year.

14. Section 9.0, Interim Measures Inspections, Operation and Maintenance: *The WP states that the quarterly reports will indicate the current condition of the silt fencing and any necessary repairs and/or replacement efforts; however, there is no information on how repairs and replacement efforts will be carried out. Please describe the approach, timeframe, and review process for addressing any necessary repairs to or replacement of the interim corrective measures.*

NASA Response:

- Pictures of breached or damaged silt fencing will be forwarded to the EPA and RWQCB via email for review and comment within 10 working days.
- If breached, repair efforts will be completed within 10 working days of approval, weather permitting.
- If a section of silt fencing is damaged (i.e.: leaning) but not breached, repair efforts will be completed within 15 working days of approval, weather permitting.
- Silt fencing and fencing stakes will be replaced where damaged beyond functional conditions, such as broken stakes and/or torn fencing.
- If determined to be in satisfactory condition for reuse, not replacement, silt fencing and fencing stakes will be reset to original installation specifications.

15. Section 9.0, Interim Measures Inspections, Operation and Maintenance: *The last bullet in the list includes photographic documentation in the monthly inspections. Please revise the last bullet to ensure that photographic documentation is recorded and submitted, particularly for any areas of damaged or breached silt fencing.*

NASA Response:

WP text will be revised to ensure that photographic documentation will be recorded and submitted, particularly for any areas of damaged or breached silt fencing.

16. Section 9.0, Interim Measures Inspections, Operation and Maintenance: *The monthly inspections do not appear to include any observations or reporting of possible erosion such as soil/sediment piled against the silt fencing or evidence of stormwater flow channels. Please revise the WP to ensure these items are documented during regular inspections.*

NASA Response:

WP text has been revised to include any observations or reporting of possible erosion such as soil/sediment piled against the silt fencing and/or evidence of “stormwater flow channels”.

17. Attachment 2, Sheet Reference CD-1: *Sheet Reference CD-1 notes that the setback dimensions for the silt fencing will vary to fit site conditions. A 3'0" set back is shown in the figure. Please clarify if this is a maximum or minimum set back.*

NASA Response:

- WP text and Attachment 2 cover page will be revised to indicate that 3'0" is the proposed maximum silt fence setback, depending on surface composition (i.e.; demolition rubble interference).

EPA MINOR COMMENTS

1. Sections 6.0 and 6.4, Interim Measures Objectives and Control Measure Installation Oversight Personnel: *There are typographical errors at the beginning of the second paragraph of Section 6.0 and the title and first paragraph of Section 6.4. Please replace "oversite" with "oversight."*

NASA Response:

- WP text has been revised to replace "oversite" with "oversight" where ever present in the document.

2. Section 6.0, Interim Measures Objectives: *The third paragraph cites the AOI 14 Phase II IR. It would appear that the citation should be to the 2006 Report of Findings, Area of Investigation 14, Phase II Soil Investigation, Former Soil Fill Area, Building 217 Fill Area and Building 217A Fill Area. Furthermore, the IR abbreviation is not explained. Please clarify the citation.*

NASA Response:

- WP text revised to clarify citation in question and remove the IR abbreviation.

3. Figure 4: *Please include the names of the polygons that have been remediated by the Navy in the figure.*

NASA Response:

- WP Figure 4 (renamed Figure 5) has been revised to include names of Navy remediated polygons.

4. Figures 4 and 5: *The text in these figures in not legible when printed out on paper due to loss of resolution from copying pdf files. Please include the original figures.*

NASA Response:

- Original copies of Figures 4 and 5 (now renamed Figures 5 and 6) plus new Figure 4 will be provided in the revised WP.

5. Figure 5: *The figure includes some unexplained abbreviations. Please include a key or notes explaining them. In addition, please label each of the borings on the cross section; three of the borings have no identifying number.*

NASA Response:

- Figure 5 (now Figure 6) footnotes will be included on the figure to explain standard soil classification abbreviations included on the cross-section.
- The borings on the cross-section are representative of the 8-acre FSFA fill materials (FL) and underlying native clay (CL) sediment encountered in all borings. Borings located immediately adjacent to the cross-section line were utilized in the generation of this figure and include PEN-07 and PEN-22.

6. Section 6.4, Control Measure Installation Oversight [sic] Personnel: *The second paragraph refers to EPA Region IV. The reference should be to Region IX.*

NASA Response:

- WP text revised to correct EPA Region IX reference.

7. Attachment 2: *The version of Attachment 2 of the WP submitted via the pdf file fails to print. Please ensure all submissions are complete versions of the document.*

NASA Response:

- A printing test of the included Attachment 2 documents in pdf format was successfully completed per and post submission to the regulatory agencies; however, NASA will ensure EPA is able to print included copies of the pdf Attachments. If EPA unable to print pdf copies of included Attachments, NASA will forward electronic versions of the silt fence design figures included in Attachment 2.

ATTACHMENT 5

Signed copy of US Fish & Wildlife
Emergency Consultation



Reply to Attn of:

JQ:204-15

SEP 25 2013

Mr. Ryan Olah
Division Chief
Coast Bay/Forest-Foothills Division
U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way, W-2605
Sacramento, CA 95825

Dear Mr. Olah:

In October of 2013, NASA Ames Research Center is planning to install up to 5,300 linear feet of silt fencing around portions of NASA's Area of Investigation (AOI) 14 in response to emergency conditions at the site. If fencing is not in place before the first rains of the season, then contamination of surrounding areas by eroded soils and sediments will degrade habitat for wildlife such as the Federally Endangered salt marsh harvest mouse. This evaluation is supported by the fact that the work is pursuant to Unilateral Administrative Order (Docket No. RCRA-7003-09-2013-0002) from the U.S. Environmental Protection Agency (EPA), which states that current unfenced conditions pose an "imminent and substantial endangerment to the environment."

Due to these emergency conditions, NASA is requesting an emergency formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) for the federally listed endangered salt marsh harvest mouse (*Reithrodontomys raviventris*) on these interim measures to install silt fencing around the site. This letter serves to initiate emergency formal consultation. Pending confirmation of receipt of this letter, NASA will then undertake the project, including avoidance and minimization measures outlined below, and keep the Service informed of the status and schedule of work at the site.

NASA's AOI 14 consists of three fill peninsulas in a Storm Water Retention Pond (SWRP). The peninsulas and surrounding area includes mud flats, wetlands, pickleweed habitat, and upland refugia for the salt marsh harvest mouse. NASA is currently finalizing plans for the interim measure of silt fence installation around AOI 14 ("Phase 1"). Depending on the EPA's response to NASA's proposed work plan, Phase 1 will be limited to fencing around the northern portion of the western most peninsula ("Option 1") and require up to 2,300 linear feet of fencing. If the EPA requires fencing around all three peninsulas, Option 2 would be to include installation of fencing around the two eastern peninsulas as well, requiring up to 5,300 linear feet of fencing. In the event that NASA is

required to install Option 2 fencing, NASA will initiate a separate emergency formal consultation with the Service for the additional fencing.

Option 1 could affect up to one-sixth of one acre of pickleweed habitat, out of approximately 44 acres of total pickleweed within the SWRP, and up to 5.4 acres of upland refugia, out of a total of 32.2 acres. Option 2 could affect up to one-third of one acre of pickleweed habitat and up to 11.6 acres of upland refugia.

In either case, NASA will implement the following avoidance and minimization measures:

- Pickleweed will be removed by hand where necessary for fence installation under the supervision of a Service-approved biologist.
- To limit barriers to salt marsh harvest mouse dispersal across the site, the silt fencing will be made of a fabric material that salt marsh harvest mice can climb, and;
- Fabric or corrugated plastic bridges will be placed every 50 ft. over those lengths of fence running through pickleweed.
- To prevent raptor perching, the silt fencing and bridges will be less than 4 feet high.
- A Service-approved biologist will monitor the site's fencing and salt marsh harvest mouse bridges to ensure that they do not serve as raptor perches. If found to act as perches, the biologist will inform NASA and NASA will in turn inform the Service.
- In the event that a salt marsh harvest mouse nest is found, a 50 ft. buffer will be maintained around the nest and work will stop until a Service-approved biologist has determined that the mice have weaned (typically 25 days).
- Construction equipment, including worker's boots, will be cleaned of soil, seeds, and plant material before entering the work site to prevent introduction of pepperweed (*Lepidium latifolium*). Workers will avoid walking through patches of pepperweed to the extent feasible.
- Site will be monitored by a Service-approved wildlife biologist to identify and remove pepperweed, if it is found within the Storm Water Retention Pond (SWRP).
- NASA will compensate for temporary effects to pickleweed and upland habitat for the salt marsh harvest mouse at a 1:1 ratio by controlling pepperweed and/or creating additional pickleweed habitat under a Service-approved plan.
- A pre-construction survey focused on the federally endangered California seablite (*Suaeda californica*) in the project footprint will be conducted prior to construction of the silt fence.
- Installation will occur outside the breeding and nesting season for the federally endangered California clapper rail (*Rallus longirostris obsoletus*) and threatened

Pacific coast population of the western snowy plover (*Charadrius alexandrinus nivosus*).

- A Service-approved Biological Monitor will be on-site for the duration of the project.
- The Service-approved Biologist shall conduct a pre-construction survey focused on Federally Threatened or Endangered species as well as daily surveys of the project footprint and action area, report findings to NASA.
- During silt fence installation, the biological monitor will be present. Areas to have silt fence installed will be flushed by the biological monitor prior to pickleweed removal, trenching, and silt fence installation. Silt fencing will be installed with 5 ft. gaps every 100 ft. until biologist walks through any remaining pickleweed on the peninsula side to flush any salt marsh harvest mice out the gaps. Gaps will have silt fence installed when the biologist verbally clears it.

Since the project to install silt fencing is an interim measure until the long-term cleanup resolves conditions at the site, NASA will continue coordination with the Service and reinitiate formal consultation in planning and implementing the long-term action (“Phase 2”). For Phase 2 cleanup, which requires removal of soil from the fill peninsulas, NASA will implement the following mitigation measures:

- NASA will coordinate with the Service on the work plan and reinitiate consultation to cover Phase 2.
- NASA will restore of all areas temporarily disturbed under a Service-approved revegetation and monitoring plan with success criteria.
- In addition to restoring all areas temporarily disturbed, NASA will compensate at a 3:1 ratio for effects to pickleweed and upland habitat by restoring/creating three times as much pickleweed habitat onsite under a Service-approved plan including conversion of uplands to pickleweed habitat and controlling pepperweed onsite.
- Visqueen (or equivalent) fencing will be placed on outside of fencing to prevent salt marsh harvest mice from entering work site.

In both Phases, the NASA will implement the following:

- The footprint of work within pickleweed will be kept to absolute minimum.
- The on-site biologist will have stop work authority, should any listed species be encountered.
- Construction crew will be briefed on the Listed Species concerns and procedures for reporting wildlife sightings.
- If a salt marsh harvest mouse or other federally listed species is observed during project, the onsite biological monitor has stop work authority and work will not continue in the immediate area until deemed clear by biologist and the Service has been contacted.

Attached to this letter is a copy of our Interim Corrective Action Work Plan for the site. Also attached is the resume of Chris Alderete who will be the wildlife biologist for the project.

If you have any questions, please contact Hugo Hoffman on my staff: 650-604-6787 or e-mail at hugo.a.hoffman@nasa.gov or me at 650-604-0237, e-mail at donald.m.chuck@nasa.gov.

Cordially,



Donald M. Chuck
Chief, Environmental Management Division

Attachments

cc: (electronically)

Ms. Yvonne Fong, UD EPA
Ms. Bethany Dreyfus, US EPA
Ms. Elizabeth Wells, RWQCB
Michael Green, NASA HQ
Mr. Joseph Terry, USFWS
204-15\H. Hoffman
T20G-4\J. Lukas
T20G-4\C. Alderete
T20G-4\A. Martin

CHRISTOPHER S. ALDERETE.
Wildlife Biologist/Environmental Specialist

Education

B.S. Wildlife Management, Humboldt State University, 1997

Experience Summary

Mr. Alderete is a wildlife biologist with over fifteen years experience as a wildlife researcher and manager. He has broad experience in wildlife surveys and studies including training and experience in botany and ichthyology. He has received official training in CPR, coldwater rescue, fire-arms safety and use, marbled murrelet surveying, Monitoring Avian Productivity Survey (MAPS) banding of avian species, Emergency Response level A entry and decon, electro-fishing surveys, and salmonid direct dive surveys. He has extensive experience in project consulting for listed species for large and small projects including ongoing land use activities and large projects such as U.S. Environmental Protection Agency (EPA) Superfund sites and Environmental Impact Statement (EIS) reports for large development projects. He has well versed skills in technical scientific writing of reports and National Environmental Policy Act (NEPA) documentation pertaining to listed species and habitat.

Surveys conducted include:

- MAPS bird banding (over 2,000 birds banded)
- Raptor feeding habit survey
- Mammalian track plate survey
- Point count and line transect bird survey
- Songbird productivity study
- Waterfowl survey
- Stream habitat analysis
- Shorebird count survey
- Salmonid survey by direct observation snorkeling method
- Electro-fishing population estimate of salmonids
- Spotted owl banding and survey
- Culvert migration barrier analysis for salmonids
- Small mammal trapping survey
- Kodiak trawl salmonid survey
- Pinniped/salmonid predation study
- Marbled murrelet survey
- Burrowing owl monitoring and banding
- Western pond turtle surveys and trapping
- California clapper rail survey
- Vegetation survey
- Rock dove survey
- Cliff Swallow survey
- California red-legged frog survey
- Dusky-footed wood rat survey
- Stealhead stream survey

Professional Experience:

Burrowing Owl Monitoring and Protection

For NASA-Ames Research Center conducted site-wide monitoring of burrowing owl population, which is part of larger California-wide Demography Study gaining productivity and survival rates of species. Owls are located and banded yearly to keep track of movements and location for protection from on-going projects and activities that could result in take of individuals or impacts to population and habitat they utilize. Study is done in conjunction with San Jose State University Professor and burrowing owl expert Lynne Trulio and a crew of Biologists. Birds and their nest burrows are protected during the breeding season and any lost historic burrows are mitigated through consultation with project leaders. NEPA documentation and mitigation recommendations are required for any impacts to burrowing owls. Projects are funneled through construction review board and brought directly to biologist. Protection of burrowing owl habitat preserves obtained as mitigation for Ames Research Park development is done along with enhancement of these areas using a mowing contract and rotational grazing of goats. Airfield BASH program including managing for owls away from airfield. Abatement of California ground squirrels and passive relocation of burrowing owls on airfield to reduce bird strike hazard to aircraft.

Endangered Species Protection

Incidental monitoring of endangered species along with specific surveys to provide knowledge of on-site use of habitat and protection from any non-essential disturbance to these habitats. Federally listed species include least tern, snowy plover, California clapper rail, and salt marsh harvest mouse. Consultation with proponents of large cleanup projects such as Superfund Site 25 to protect effected species during remediation activities. Clapper rails have recently been surveyed at Navy Site 27 for protection during clean up. Assisted NASA planning department and U.S. Fish and Wildlife service (FWS) on Biological Assessment for Ames Research Park protection and impact avoidance of new development in regards to endangered species protection. Manage United States Department of Agriculture (USDA) Wildlife Services contract to trap small mammalian predators in close proximity to endangered species habitat. This program includes a feral cat recovery program. Feral cats are spayed, neutered, and inoculated by veterinarian prior to being released to the Ames Cat Network. The Network adopts cats out to private citizens.

Baseline Wildlife Monitoring and Specialized Surveys

Baseline wildlife monitoring includes quarterly bird survey designed to build a species list and show habitat usage of different species. It is a population index not designed to give population estimates, but to show trends over time. Yearly turtle surveys have been conducted to gain information on habitat use for protection from activities that may affect them. The turtle population was discovered in 2002, where previously thought to be locally extant. Specialized surveys include burrowing owl surveys for specific projects, cliff swallow surveys for timing of nest removal and/or exclusion, rock dove surveys for exclusion and eradication, ground squirrel surveys, bat surveys, clapper rail surveys, and vegetation surveys.

Work History

Science Applications International Corporation, 1998-2000; 2005-Present

Integrated Science Solutions, Inc., 2010

PAI Corporation, 2000-2005

The Fisheries Foundation of California, 1999

Hanson Environmental, Inc. 1998-1999

Oregon Department of Fish and Wildlife, 1998

Beak Consultants, 1998

US Fish and Wildlife Service, 1997

The Institute for Bird Populations, 1996
G.K. Koi Fish Hatchery, 1992-1996

Specialized Training

American Red Cross CPR/AED Training
First Responder Operations (FRO) Training
Hazardous Waste Environmental Essentials and Spill Response
National Environmental Policy (NEPA) Overview
Hazardous Materials Industrial Technician
HAZWHOPPER
PCB Awareness