



DEPARTMENT OF THE ARMY  
BASE REALIGNMENT AND CLOSURE  
ATLANTA FIELD OFFICE  
BRAC ENVIRONMENTAL COORDINATOR  
HAMILTON ARMY AIRFIELD  
1 BURMA ROAD  
NOVATO, CALIFORNIA 94949



June 1, 2004

**DAIM-BO-A-HA**

Subject: Forwarding the *Work Plan Coastal Salt Marsh Pre-Remedial Action Sampling*, Hamilton Army Airfield, Novato, CA.

Ms. Naomi Feger  
Regional Water Quality Control Board  
1515 Clay Street, Suite 1400  
Oakland, CA 94612

Dear Ms. Feger,

The Army is pleased to provide the *Work Plan Coastal Salt Marsh Pre-Remedial Action Sampling*, Hamilton Army Airfield, Novato, CA for your files.

The draft final of this document was distributed on November 25, 2003. The field work was accomplished in accordance with the draft final work plan as well as comments and concerns expressed by the US Fish and Wildlife Service and the Regional Water Quality Control Board. The enclosed Narrative of Changes was developed to document the modifications from the draft final work plan that were implemented in the field.

As discussed in our May 7, 2004 meeting, additional sampling will be conducted as pre-excavation confirmation sampling. This will be done as a part of the Remedial Action design phase. This submittal satisfies Task 11 of Board Order No. R2-2003-0076 Site Cleanup Requirements – Hamilton Army Airfield.

If you have any questions, please contact me at (415) 883-6386.

Sincerely,

Edward Keller, P.E.  
BRAC Environmental Coordinator  
Hamilton Army Airfield

Enclosure

Copies Furnished:

J. Chesnutt (USEPA)  
L. McMahan (DTSC)  
D. Diebert (DTSC)  
J. Browning (USFWS)  
B. Stanton (USFWS)  
L. Sullivan (NOAA)  
J. Yamamoto (CDFG)

J. Hardwick (CDFG)  
T. Gandesbery (CSCC)  
S. Goldbeck (BCDC)  
D. Plummer (SLC)  
R. Zimny (USACE - SPK)  
D. Doak (USACE – SPN)  
BRAC office files

**Distribution List**  
**Work Plan Coastal Salt Marsh Pre-Remedial Action Sampling**  
**Hamilton Army Airfield, Novato, CA 94949**  
**June 2004**

# COPIES	NAME	COMPANY	ADDRESS	CITY AND STATE	ZIP	PHONE AND FAX NUMBER
1	Ed Keller, PE Edward.Keller@usace.army.mil	Department of the Army BRAC Environmental Coordinator	Hamilton Army Airfield 1 Burma Road Novato, CA 94949	Novato, CA	94949	Ph: (415) 883-6386 FAX: (415) 883-1033 Cell: (415) 250-8472
3 hc (+1 cd)	Joy Lanzaro Joy.L.Lanzaro@usace.army.mil	BRAC Environmental Office - HAAF	Hamilton Army Airfield 1 Burma Road Novato, CA 94949	Novato, CA	94949	Ph: (415) 883-6386 FAX: (415) 883-1033
1	Hugh Ashley Hugh.T.Ashley@usace.army.mil	BRAC Environmental Office - HAAF	Hamilton Army Airfield 1 Burma Road Novato, CA 94949	Novato, CA	94949	Ph: (415) 883-1016 FAX: (415) 883-1033
1 hc (+1 cd)	Naomi Feger Nlf@rb2.swrcb.ca.gov	San Francisco Bay Regional Water Quality Control Board	1515 Clay Street, Suite 1400	Oakland, CA	94612	Ph: (510) 622-2390 FAX: (510) 622-2460
1	Donn Diebert DDiebert@dtsc.ca.gov	California Environmental Protection Agency Department of Toxic Substances Control	Region 1-Site Mitigation Branch 8800 Cal Center Drive	Sacramento, CA	95827	Ph: (916) 255-3728
1	Lance McMahan LMcmaha1@dtsc.ca.gov	California Environmental Protection Agency Department of Toxic Substances Control	Region 1-Site Mitigation Branch 8800 Cal Center Drive	Sacramento, CA	95827	Ph: (916) 255-3674 FAX: (916) 255-3697
1	Jim Hardwick JHARDWIC@OSPR.DFG.CA.GOV	Department of Fish and Game	1700 K Street Ste. 250	Sacramento, CA	95814	Ph: (916) 327-0911
1	Julie Yamamoto jyamamoto@OSPR.DFG.CA.GOV	California Department of Fish and Game, OSPR	1700 K Street, Suite 250	Sacramento, CA	95814	Ph: (916) 323-4428 FAX: (916) 324-8829
1	Jim Browning James_A_Browning@fws.gov	US Fish and Wildlife Service	2800 Cottage Way, Suite W-2605	Sacramento, CA	95825 -1846	Ph: (916) 414-6649 FAX: (916) 414-6712
1	Laurie Sullivan laurie.sullivan@noaa.gov	NOAA CRC Program c/o USEPA, Region IX	Mail Code H-8-5 75 Hawthorne Street	San Francisco, CA	94105	Ph: (415) 972-3210 FAX: (415) 972-3211
1	Ray Zimny Raymond.E.Zimny@usace.army.mil	USACE Sacramento District Attention: CESPK-ED-E	1325 "J" Street 12 <sup>th</sup> Floor	Sacramento, CA	95814 -2922	Ph: (916) 557-6965 FAX: (916) 557-7865
1	John Chesnutt Chesnutt.John@epa.gov	Environmental Protection Agency Region 9 DoD and Pacific Islands Section	SFD-8-3 75 Hawthorne St	San Francisco, CA	94105	Ph: (415) 972-3031 FAX: (415) 947-3518
1	Tom Gandesbery tgandesbery@scc.ca.gov	California State Coastal Conservancy	1330 Broadway Street, Ste 1100	Oakland, CA	94612	Ph: (510) 286-7028 FAX: (510) 286-0470
1	Steve Goldbeck steveg@bcd.ca.gov	Bay Conservation and Development Commission	50 California Street 26 <sup>th</sup> floor	San Francisco, CA	94111	Ph: (415) 352-3611
1	Becky Stanton Becky_stanton@fws.gov	US Fish and Wildlife Service	2800 Cottage Way W 2650	Sacramento, CA	95825	Ph: (916) 414-6602 FAX: (916) 414-6713
1	Dave Plummer plummed@slc.ca.gov	California State Lands Commission	100 Howe Ave, Suite 100- South	Sacramento, CA	95825 -8202	Ph: (916) 574-1858 FAX: (916) 574-1925

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# COPIES	NAME	COMPANY	ADDRESS	CITY AND STATE	ZIP	PHONE AND FAX NUMBER
1	David Doak david.v.doak@spd02.usace.army.mil	USACE - S.F. (SPN) CE-SPN-PPMD	333 Market Street, 8 <sup>th</sup> Floor	San Francisco, CA	94105	Ph: (415) 977-8562 FAX: (415) 977-8431
2	Victor Bonilla bonillav@forscom.army.mil	US Army BRAC Atlanta Field Office	ATTN: AFPI-BC 1777 Hardee Avenue SW, Bldg 200	Fort McPherson, GA	30330 -1062	Ph: (404) 464-6346 FAX: (404) 464-7040
1	Mike Kelly	Army Environmental Center	SFIM-AEC-ERA Building E4480	Aberdeen Proving Ground Edgewood Area, MD	21010 -5401	Ph: (410) 436-1508
2	Commander, USAEC	US Army Environmental Center Technical Information Center	SFIM-AEC-IE-TIC Bldg. E4464-2T (Julia Tracy) 5179 Hoadley Road [Beal Road]	Aberdeen Proving Ground, MD	21010	Ph: (410) 679-7878

After evaluations of analytical concentrations and discussions between the Army and Regional Water Quality Control Board representative with input from the US Fish and Wildlife Service, the following changes were made to the sampling plan in the Coastal Salt Marsh, Pre-Remedial Action Sampling Work Plan.

#### Boat Dock

One sample “under the Boat Dock” was added when the proposed area of excavation was increased to include the area around the Foster Wheeler sample number 37, which had levels of barium, lead, and zinc above the action goals.

Samples in the channel at the Boat Dock will be changed from depth to surface as the results of previous sampling indicated metals concentrations in the surface sediments with concentrations dropping off at depth. Results will be evaluated to determine if excavation in these sediments is warranted.

#### Area 14

There are no changes to the plan at Area 14.

#### Historic Outfall Drainage Ditch (HODD)

At the Historic Outfall Drainage Ditch (HODD) the sample in the ditch at location TWA-SD07–30 (3-foot depth) had elevated metals, particularly manganese and nickel. The proposed excavation depth is increased from 2 to 3 feet and the samples at this north excavation of the ditch will be collected from 3 to 3.5 feet. Another, previous sample location, TWA-SD25, is west of the HODD towards the levee road. The surface sample at this location had elevated lead. Three step-out samples were collected to evaluate if lead is an area concern or if the previous result was an anomaly.

#### East Levee Construction Debris Disposal Area (ELCDDA)

At the East Levee Construction Debris Disposal Area (ELCDDA) the PCB analysis for the surface sample to be collected at location CSM-CDA-SD-363, will be changed from arochlors to the homologue method 1668A. This method provides lower detection limits and therefore is a better indicator of total PCBs at lower concentrations.

Three sample locations have been added in the vicinity of the ELCDDA - Burn Pit. Two of the sample locations were analyzed for metals. These locations are to the east and south of the burn area. The third sample location was in the mouth of the Outfall Drainage Ditch and had samples collected at three depths. Each of these samples was analyzed for pentachlorophenol and phenol. These compounds had been identified in drainage ditch sediment samples.

#### Outfall Drainage Ditch (ODD)

The 14 ODD sample locations proposed in the work plan remained the same. The downstream five locations had a bottom sample and two sidewall samples as proposed in the draft work plan. Sidewall samples in the upstream nine locations were deleted with the anticipation that sidewalls will not exist when the marsh plain excavations in the

vicinity of the ODD are completed. The nine bottom samples were collected. The analytical method for homologues, 1668A, was used instead of the Arochlor method.

For the five samples collected from the walls and floor of the proposed excavation at the Building 39 outfall basin, PCBs were evaluated using the homologue method.

#### Former Sewage Treatment Plant (FSTP) Outfall

At the adjacent marsh plain from the Former Sewage Treatment Plant (FSTP) outfall, depth and surface samples were added to the proposed locations to better characterize metals and PCBs. Within the FSTP outfall channel a sample location was added to help characterize the extent (depth) of the anticipated excavation.

#### High Marsh Plain

For sampling in the high marsh plain, the Army completed an evaluation to define the probable lateral extent and depth of chemicals of concern (COCs). The sampling regimen changed at these locations in part to obtain a broader representation of the entire marsh plain surface. COCs have been identified predominantly in surface sediments with levels of most constituents dropping off at depth. A few anomalous results exist at depth. Eight samples in the southern part of the marsh plain that had been proposed for defining the eastern edge of the excavation had only surface samples collected at the originally proposed locations. The homologue method was substituted for the Arochlor analyses where PCBs were analyzed. Three originally proposed samples, associated with the eastern extent of the ODD excavation and the depth of the anticipated marsh plain excavation, were deleted. Six samples originally proposed to define the depth of the excavation on the west side of the ODD were collected at the surface to better define the extent of COCs in surface sediments between the ODD and the levee. Six samples originally proposed to define the surface and depth concentrations of inorganics and organics were collected only at depth to define the excavation bottom.

The balance of samples associated with the west and east Antenna Debris Areas and the marsh plain excavation delineation samples were replaced by samples arranged across the northern part of the marsh in a grid with 5 columns and 9 rows spaced approximately 75 feet apart. Samples were collected from each grid intersection or node for a total of 45 sample locations. Nodes geo-referenced on the plan were identified in the field using a global positioning system apparatus. A depth as well as a surface sample was collected at one of the sample locations. Depth and surface sample locations are based on evaluation of the existing data and on anticipated impacts from COCs near the storm water outfalls. Samples will be evaluated for metals, PCBs (homologues), and pesticides.

#### South Marsh Plain

Samples were collected in the south marsh plain at two additional locations associated with the previous sample location TWA-SD02. This sample had elevated copper and zinc as well as other metals concentrations slightly above their respective action goals.

### Mid and South Marsh Plain DDT Surface Sediment Survey

The Army collected surface sediment samples at 20 additional locations in the middle and southern area of the marsh. Five groups of four samples per group were collected in linear paths, which extended from a starting location approximately 100 feet east of the perimeter levee, perpendicular to the levee. Each sample was spaced approximately 75 to 100 feet apart extending eastward in the marsh from the initial sample location in the row. The five rows of samples were spaced between 600 and 900 feet along the levee starting in the area north of the ELCDDA to just north of the Boat Dock. The samples were collected to characterize concentrations of DDTs across the marsh plain where relatively few pesticide samples had been obtained previously. The surface sediment samples were analyzed for relative/qualitative concentrations of DDTs using Immuno-assay field test kits.

These changes to the Field Sampling Plan of the CSM Pre-Remedial Action Work Plan are updated in the Table 3-1 of the final plan. Due to the time constraints in completing the required sampling before the start of the California clapper rail nesting season, the Army was unable to complete the final revision of the plan before moving into the field. The field sampling occurred immediately after agreement on the changes was obtained between the Army and the lead agency, the Regional Water Quality Control Board.

Summary Table of Sample Changes to the  
Final Field Sampling Plan, Pre-Remedial Action Sampling, CSM, Hamilton AAF

Site	Changes or No. Of Samples Added / Removed	Proposed Depth	Sample Type	Analyses	Notes
Boat Dock UTD	1 sample added	0.5 foot	Confirmation in lieu of additional proposed excavation to the north to include the former sample HB-99-SD-37	Under the Dock analyte list. See attached Table 3-1. SW6010B, SW8081A	Sample added near F-W Sample No.37. Northeast side of proposed excavation extended outward ~10 feet. Two sidewall samples moved to this new excavation line.
Boat Dock Channel	3 samples removed, 5 surface samples remain	All samples will be collected at surface only.	Characterization of surface sediments in channel as step-ins from previous 2000-2001 samples	“In the BD Channel” analyte list. SW6010B	Metals only appeared to be elevated in previous surface samples. Surface sampling will confirm.
Area-14 - Motor Oil	No changes to plan	See Table 3-1	Delineation and Confirmation for proposed excavation laterally at depth of highest concentration and deeper to confirm extent	SW8015B	Defining excavation limits.
Area-14 Cobalt	No changes to plan	See Table 3-1	Characterization of cobalt as a release. Step-outs from CSM-A14-SD-375	SW6010B	Previous cobalt result had exceeded the 95th UCL
Historic ODD – Northern half of excavation	2 sample depths changed. 3 surface samples added around sample TWA-SD25.	2 at 3 feet 3 at surface	Confirmation of excavation depth for metals, dichlorprop.  Characterization around sample TWA-SD25 at surface.	SW6010B SW8151A	Sample TWA-SD7 in channel had metal detections at 2 to 2.5 feet. TWA-SD25 had elevated lead at surface.
Historic ODD – Southern half of excavation	No changes	2 samples at 1 foot	Confirmation for excavation of total DDTs	SW8081A	Defining excavation limits.
East Levee Construction Debris Disposal Area (ELCDDA) - PCBs	PCB Analytical method changed	1 sample at surface	Confirmation at surface of previous detection of PCBs at 2 feet, using homologue method.	1668A	Previous sample had been collected at 2 feet. Confirmation for surface.

Summary Table of Sample Changes to the  
Final Field Sampling Plan, Pre-Remedial Action Sampling, CSM, Hamilton AAF

Site	Changes or No. Of Samples Added / Removed	Proposed Depth	Sample Type	Analyses	Notes
ELCDDA – lead and zinc	No changes to plan	10 sidewall 4 floor and 4 archived samples from bay mud.	Confirmation of excavation limits.	SW6010B	Archived samples held for analysis pending results of 4 floor samples.
ELCDDA-Burn Pit	1 sample location added to mouth of the ODD adjacent to the burn pit – analyzed for PCP & Phenol at 3 depths. 2 samples added as step-outs from east and south excavation edges	3 PCP samples, one at surface, 1.5 feet and 3 feet collected from mouth of ODD. 2 metals samples at additional step-out locations	Verification and Characterization of PCP and phenol at mouth of ODD. Characterization of surface metals at step-outs from burn pit area	Add SW8270C – SIM at 3 added samples for PCP & phenols at ODD near north burn pit samples. Excavation sidewall and bottom samples get 1668A and SW8290. 4 bay mud samples get SW8015B	Pentachlorophenol had been detected in ditch sample at mouth of ODD. Sampling should confirm if PCP is still present. Metals detected above AGs in previous sampling, characterization of release.
Outfall Drainage Ditch (ODD)	All 14 Sample locations remain the same. Numbers of samples change.	5 Lower channel sample locations remain at 3 samples each - 1 at bottom and two sidewalls. Upper 9 locations sampled from excavation bottom only.	Confirmation of COC removal from excavated channel 1.5 feet out from channel wall and two feet below current channel bottom.	SW6010B, SW8015B, SW8270C, SW8081A at all locations and SW8151A at 3 upper most samples in vicinity of the ADA. Also 1668A for alternating samples as specified in Table 3-1	The upper nine sample locations will be removed presumably as part of the anticipated ADA and High Marsh excavations. No sidewalls would exist where the ADA and marsh excavations are below 2.5 feet. Upper 3 samples in ditch will be analyzed for MCPA and MCPP. PCB homologue method will be used instead of total arochlors.
ODD – Building 39 Outfall	Method change for PCBs only	3 sidewall at 2.5 feet and 2 floor samples at 2 to 2.5 feet below current bottom of outfall.	Confirmation of COC removal from excavated channel 1.5 feet out from channel wall and two feet below current channel bottom.	SW6010B, SW8015B, SW8270C, SW8081A, 1668A	See Work Plan Table 3-1.

Summary Table of Sample Changes to the  
Final Field Sampling Plan, Pre-Remedial Action Sampling, CSM, Hamilton AAF

Site	Changes or No. Of Samples Added / Removed	Proposed Depth	Sample Type	Analyses	Notes
Former Sewage Treatment Plant – Outfall Area	Sample locations remain, depths added	4 samples at surface, 3 samples at 1.5 feet, 2 samples at 2 feet.	Characterization of extent of metals and specific pesticides	SW6010B, SW8081A	Initially samples were proposed to characterize area. Samples from surface and depth will allow determination of excavation
Former Sewage Treatment Plant – Channel	1 sample location added at TP-SD3	Added sample at 1.5 foot depth, other location remains sampled from surface and 1.5 foot depth.	Delineation, characterization and confirmation of COC removal from channel for proposed excavation.	SW6010B, SW8081A, 1668A at channel samples at depth only	See Work Plan Table 3-1
High Marsh Plain South Area (eastern extension of proposed excavation)	Depth samples removed. PCB method changed to homologues. South 8 of 18 samples remain. Balance of samples (10) replaced, see “Grid” below.	All 8 at surface only	Characterization of marsh plain extent of COCs at surface.	SW6010B, 1668A at five of the 8 locations	Homologue method instead of Arochlors
High Marsh Plain South Area (eastern extension on ODD)	3 samples deleted	NA	Confirmation of excavation associated with ODD in marsh plain at 3.5 foot depth.	NA	See High Marsh Plain South Area (vertical extension of proposed excavation) below.
High Marsh Plain South Area (western extension of proposed excavation)	Sidewall samples moved to surface. PCB method changed. Northern most sample (7 <sup>th</sup> ) supplanted by “Grid”. See Grid below.	6 surface samples	Characterization of marsh plain extent of COCs at surface along western edge defined by levee.	SW6010B, Sw8015B, SW8270C, 1668A at 3 of the 6 locations, alternating along the levee	Homologue method changed from Arochlors. Surface will indicate areas where COCs affect marsh plain west boundary.

Summary Table of Sample Changes to the  
Final Field Sampling Plan, Pre-Remedial Action Sampling, CSM, Hamilton AAF

Site	Changes or No. Of Samples Added / Removed	Proposed Depth	Sample Type	Analyses	Notes
High Marsh Plain South Area (vertical extension of proposed excavation)	6 depth samples only. Surface samples removed. Northern most samples (10) supplanted by "Grid". See Grid below.	4 at 2 feet and 2 at 3 feet	Characterization /definition at depth and confirmation for proposed excavation (as defined by results).	SW6010B, 1668A at 3 of the 6 sample locations alternating down marsh	PCB homologue method replaces arochlor method.
Marsh Plain DDT Assay (survey of surface DDT)	20 surface samples added, to survey DDT concentrations using DDT Immuno-assay kits.	Marsh plain surface	Characterization in 5 strings of 4 samples each.	SW4042	Sample strings spaced 600 to 900 feet apart in undisturbed pickleweed stands across marsh. Samples in each string starting ~100 feet from levee and spaced ~ 100 feet apart.
Antenna Debris Disposal Area – East	All 15 samples supplanted by "Grid" samples. See Grid below.	Replacement Grid has varying depths. See below.	Characterization of entire area by samples from grid nodes.	See Grid below.	Results from sampling according to a grid appear to be more useful for evaluation of extent of COCs across marsh, including ADA.
Antenna Debris Disposal Area – West	All 14 samples supplanted by "Grid" samples. See Grid below.	Replacement Grid has varying depths. See below.	Characterization of entire area by samples from grid nodes.	See Grid below.	Results from sampling according to a grid appear to be more useful for evaluation of extent of COCs across marsh, including ADA.

Summary Table of Sample Changes to the  
Final Field Sampling Plan, Pre-Remedial Action Sampling, CSM, Hamilton AAF

Site	Changes or No. Of Samples Added / Removed	Proposed Depth	Sample Type	Analyses	Notes
<p>A Grid of sampling locations was applied to the entire northern area of the High Marsh Plain including the Antenna Debris Disposal Area. The Grid extends from an extension of the north property line down to the area of the marsh mid way between the Building 39 outfall and the Former Building 41 Outfall. The grid also extends from the levee (the western marsh boundary) to the east approaching the shoreline of San Pablo Bay. Grid spacing for sample location nodes is 75 feet in the north / south and east / west directions. See revised Figure 2-9. Five vertical lines with 75 foot spacing were labeled A, B, C, D, &amp; E defining the west to east direction across the marsh plain. Nine horizontal lines with 75 foot spacing were labeled 1 through 9 defining the north to south direction down the marsh plain. The intersections of the lines provide an evenly spaced sampling grid across and down the marsh plain with alpha and numeric designations defining the 45 resultant intersection nodes. The nodes were assigned sample numbers. Sample depths were assigned at the nodes according to the relative depths and COC concentrations of all previously obtained sample results within the High Marsh Plain, ADDA and ODD.</p>					
High Marsh Grid (A,B,C 1-9)	The 29 floor and sidewall samples of the ADA and the 24 High Marsh Plain sample locations with surface and depth samples are replaced by the 27 sample nodes of the Grid. Homologue analyses for PCBs as well as metals and pesticide analyses are applied to all 27 sample locations.	Samples will be collected from 27 locations from either surface (0 feet) or at 3 feet. Of these, 12 are surface samples and 18 are depth samples. Location node C-3 will have a sample collected from surface and depth. See Work Plan Table 3-1	Characterization at surface or depth across the marsh plain for COCs.	SW6010B, SW8081A, and 1668A	The 27 sample nodes defined by the intersections of lines A, B, & C and the numbered lines 1 through 9 cover the western area on the marsh plain within 225 feet of the levee and include the area where effects from DOD activities at the Antenna Debris Disposal Area and the pump station outfalls (Buildings 35 and 39) are relatively apparent. Contributing effects from other sources (San Pablo Bay) are not yet apparent.
High Marsh Grid (D, E 1-9)	The 29 floor and sidewall samples of the ADA and the 24 High Marsh Plain sample locations with surface and depth samples are replaced by the 18 sample nodes of the Grid. Homologue analyses for PCBs as well as metals and pesticide analyses are applied to all 18 sample locations.	All 18 samples to be collected at surface	Characterization at surface across the eastern side of the marsh plain for COCs.	SW6010B, SW8081A, and 1668A	The 18 sample nodes defined by the intersections of lines D & E and the numbered lines 1 through 9 cover the eastern area on the marsh plain within 200 feet of the San Pablo Bay shore line and encompass the area where effects from DOD activities and other sources are less certain.

Summary Table of Sample Changes to the  
 Final Field Sampling Plan, Pre-Remedial Action Sampling, CSM, Hamilton AAF

Site	Changes or No. Of Samples Added / Removed	Proposed Depth	Sample Type	Analyses	Notes
High Marsh near historical sewage pipeline	2 new, additional surface samples as stepouts to confirm metals detected in surface sample at TWA-SD02	Surface	Characterization at surface of the marsh plain for metals in the vicinity of the historical sewage pipeline.	SW6010B, SW8015B, SW8081A, 1668A	Primarily copper and zinc elevated above action goals. Other metals slightly over action goals.

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**WORK PLAN**  
**PRE-REMEDIAL ACTION SAMPLING**  
**COASTAL SALT MARSH**  
**HAMILTON ARMY AIRFIELD**  
**NOVATO, CALIFORNIA**

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Final

Prepared by:



**US Army Corps  
of Engineers ®**

Sacramento District  
Environmental Design Section

**June 2004**

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**ACRONYMS**

CSMPAS	Coastal Salt Marsh Pre-remedial Action Sampling
DQO	Data Quality Objectives
DTSC	Department Of Toxic Substances Control
EDS	Environmental Design Section
FSP	Field Sampling Plan
HAAF	Hamilton Army Airfield
mg/kg	milligram/kilogram
OC	Organochlorine
PCBs	Polychlorinated Biphenyls
QAPP	Quality Assurance Project Plan
SFBRWQCB	San Francisco Bay Area Regional Water Quality Control Board
SSHP	Site Safety and Health Plan
TPH	Total Petroleum Hydrocarbons
USACE	U.S. Army Corps of Engineers
WP	Work Plan

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# WORK PLAN

## PRE-REMEDIAL ACTION SAMPLING

### COASTAL SALT MARSH

### HAMILTON ARMY AIRFIELD

## 1.0 INTRODUCTION

### 1.1 SCOPE OF WORK

This Work Plan (WP) presents the project scope, regulatory authorities, site background, and project objectives for the Coastal Salt Marsh Pre-remedial Action Sampling (CSMPAS) at the Hamilton Army Airfield (HAAF) in Novato, California. The CSMPAS is designed to collect the data necessary to verify vertical and lateral extent of contamination in proposed excavation sites.

The US Army Corps of Engineers (USACE), Sacramento District will perform the work. This WP includes a Field Sampling Plan (FSP), a Quality Assurance Project Plan (QAPP), and a Site Specific Health and Safety Plan (SSHP). The FSP presents detailed field procedures to be followed in performance of CSMPAS, sampling strategy and rationale, sampling locations, sample collection methods, and sample handling procedures. The QAPP presents procedures to ensure data quality objectives are met, including field and laboratory procedures and details of the analytical protocols. The SSHP presents measures to ensure the safety of all field personnel.

### 1.2 REGULATORY AUTHORITIES

The San Francisco Bay Area Regional Water Quality Control Board is the lead regulatory agency providing oversight.

### 1.3 SITE BACKGROUND

HAAF is located in Novato, CA. HAAF is a former Air Force Base and Army Airfield. The location of HAAF is shown in Figure 1-1. The Coastal Salt Marsh consists of the following sites to be remediated. Boat Dock, Area 14, Historic Outboard Drainage Ditch (ODD), East Levee Construction Debris Disposal Area including the Burn Pit, ODD, High

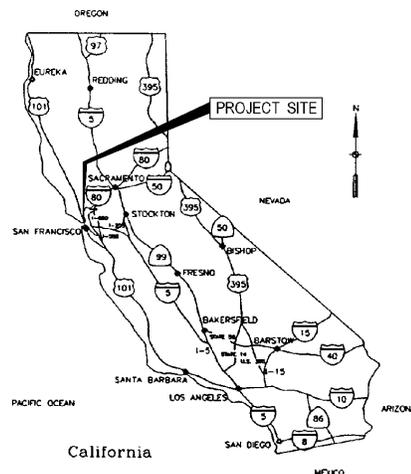


Figure 1-1: Project Location Map

Marsh, Former Sewage Treatment Plant Outfall, and the Antenna Debris Disposal Area. These locations of these sites within the Coastal Salt Marsh are illustrated in Figure 1-2.

#### 1.4 CHEMICALS OF CONCERN

The chemicals of concern are metals, organochlorine (OC) pesticides, three chlorinated herbicides (dichlorprop, MCPA and MCPP), extractable total petroleum hydrocarbons (TPH), two phenols, polychlorinated biphenyls (PCBs), and dioxin/furans. Action goals for these constituents originate from the *Main Airfield Parcel Record of Decision/Remedial Action Plan, Hamilton Army Airfield*, Final, August 2003. The action goals are listed below.

#### Action Goals for Pre-Remedial Action Sampling Coastal Salt Marsh, Hamilton Army Airfield

Contaminant	Action Goal (mg/kg)
<b>Metals</b>	
Barium	188
Beryllium	1.68
Cadmium	1.8
Cobalt	26.7
Copper	88.7
Lead	46.7
Manganese	1260
Mercury	0.58
Nickel	132
Silver	1
Zinc	169
<b>Semivolatile Organic Compounds</b>	
Pentachlorophenol	0.017
Phenol	0.13
<b>Total Petroleum Hydrocarbons (TPH)</b>	
TPH-Diesel/TPH-motor oil	144
<b>Pesticides/Herbicides/PCBs/Dioxins</b>	
Chlordanes, total	0.00479
DDTs, total	0.03

<b>Contaminant</b>	<b>Action Goal (mg/kg)</b>
Dichlorprop	0.14
MCPA	7.9
MCPP	3.0
Endrin Aldehyde	0.0064
Heptachlor	0.0088
Heptachlor Epoxide	0.0088
Polychlorinated Biphenyls (PCBs), Total	0.09
Dioxins (Total 2,3,7,8-tetrachlorodibenzo-p-dioxin Toxic Equivalencies)	0.000021

## **2.0 PROJECT STAFFING AND SCHEDULE**

### **2.1 PROJECT STAFFING**

The Environmental Design Section (EDS), Sacramento District, USACE will perform this work, under the supervision of Rick Meagher, Section Chief. Key project contacts are:

<u>Person</u>	<u>Responsibility</u>
Kathy Siebenmann	Technical Lead
Pamela Amie	Chemist
Tim Crummett	Field Lead, Geologist
Donna Maxey	Industrial Hygienist

### **2.2 PROPOSED PROJECT SCHEDULE**

The fieldwork for the CSM Pre-Remedial Action Sampling is scheduled for January 2003. The Data Report will be submitted within 30-days following the receipt of validated data.