APPENDIX A

DATA QUALITY OBJECTIVES

DATA QUALITY OBJECTIVES PRE-REMEDIAL ACTION SAMPLING

COASTAL SALT MARSH

HAMILTON ARMY AIRFIELD

NOVATO, CALIFORNIA

Revised Submittal

Prepared by:

US Army Corps of Engineers ®

Sacramento District
Environmental Design Section

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The data quality objectives (DQOs) process identifies the overall objective of data needs and follows a documented process through to the sampling strategy. The purpose of using the data quality objectives process is to ensure that any sampling meets the needs of the project and the usability of the data is directly linked to the objective. Section 3.2 of the Quality Assurance Project Plan lists the seven steps of the DQO process as related to this project.

As a result of discussions between the Army and the Regional Water Quality Control Board (RWQCB) representatives, the original focus of the data quality objectives expanded from their definition of excavation limits, and verifying previous exceedences of action goals. The action goals were defined and presented in the *Main Airfield Parcel Record of Decision/ Remedial Action Plan,(ROD/RAP) Hamilton Army Airfield*, Final, August 2003. Additional concerns and numerical values regarding contaminant concentrations protective of ecological receptors were expressed in the US Fish & Wildlife Service (USFWS) Biological Opinion and amending letter, August 2003 and September 2003. Excavation areas and depths have been proposed based upon historical data. This sampling effort is designed not only to verify proposed excavation boundaries identified previously, but additionally, to further characterize chemical concentrations, metals and organics, across broader areas of the marsh plain and areas where characterization had been limited to one or two samples. The data will be used to confirm, enlarge, or decrease the proposed excavation areas. Additional samples used to characterize broader areas of the marsh plain will confirm whether or not excavation areas need to be expanded or additional sites need to be included for remediation. The data resulting from this sampling effort may also indicate the need for stepout sampling.

The following table summarizes the sampling strategy for each of the sites to be remediated. The attached figures illustrate the proposed excavation areas and the pre-remedial action sampling design. Historical sample identification numbers are presented for most sites with the contaminants of concern to identify which data were used to determine the sampling strategy; however, the outboard drainage ditch, antenna debris disposal area, and the high marsh site strategies were based upon data from samples that were too numerous to list. All historical data are presented in the *Coastal Salt Marsh Focused Feasibility Study Report, Hamilton Army Airfield*, Final, June 2003. The data obtained during this effort will be included with the historical data to form a more comprehensive marsh characterization dataset.

Hamilton Army Airfield Coastal Salt Marsh Data Quality Objectives Summary Table

Figure/ Section Number	Site	Objective	Contaminants of Concern (COCs)	Proposed Depth of Excavation	Sampling Design (see associated figure)
2.1	Boat Dock – Under the Dock	Verify lateral and vertical extent of contamination for proposed excavation	Lead, zinc, total chlordanes, total DDTs, heptachlor Epoxide (Samples 32, 34 through 39 at 0 feet depth	1 foot below the dock	9 sidewall and 2 floor samples. Sidewall samples collected midway between surface and proposed excavation depth (6 inches). Analyze for COCs.
	Boat Dock – In the Channel	Verify lateral extent of surface contamination to determine if excavation is needed	Barium, copper, lead, and zinc (HB-99-SD-33 at 0 feet depth and HB-99-BD-33A at 1 foot)	None proposed at this time.	5 surface samples. Analyze for COCs.
2.2	Area 14 – Motor Oil	Verify lateral and vertical extent of contamination for proposed excavation	Motor Oil (CSM-A14-SD-370 at 2 and 4 feet bgs)	6 feet below ground surface (bgs)	1 sample at 6 feet bgs near former exceedence and four surrounding samples at 2 feet bgs. Analyze for TPH-motor oil.
	Area 14 - Cobalt	Confirm cobalt exceedence at that location. Lateral extent of cobalt contamination.	Cobalt (CSM-A14-SD-371 at 2 feet bgs)	None proposed at this time.	1 sample at surface near former exceedence and three surrounding samples at 2 feet bgs. Analyze for cobalt.

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Figure/ Section Number	Site	Objective	Contaminants of Concern (COCs)	Proposed Depth of Excavation	Sampling Design (see associated figure)
2.3	Historic ODD – northern half of excavation	Verify lateral and vertical extent of contamination in proposed excavation	Cadmium, cobalt, lead, manganese, nickel, zinc, dichlorprop (TWA-SD7 and CSM-HDD-SD-341 down to 3 feet bgs)	3 feet bgs	1 sample collected at 3 feet bgs at each end of proposed excavation. Analyze for COCs.
	Historic ODD – southern half of excavation	Lateral and vertical extent of contamination in proposed excavation	Total DDTs (CSM-HDD-SD-342 at surface)	1 foot bgs	1 sample collected at 1 foot bgs at each end of proposed excavation. Analyze for Total DDTs.
2.4	East Levee Construction Debris Disposal Area (ELCDDA) – PCBs	Confirm PCB contamination	Total PCBs (CSM CDA-SD-363 at 2 feet bgs)	None proposed at this time	1 sample collected at surface and 1 collected at 2 feet bgs near previous PCB exceedence. Analyze for PCB homologues.
	ELCDDA – lead and zinc	Verify lateral and vertical extent of contamination for proposed excavation	Lead and zinc (HT-10 and HT-15 down to 4 feet bgs)	1 foot below the fill	10 sidewall samples and 4 floor samples of proposed excavation area. Sidewall samples will be collected from the cap material (0.5 – 1.5 feet bgs) and floor samples will be 1 foot into the landfill material or groundwater level, whichever is most shallow. Analyze for lead and zinc. Archive 4 samples from bay mud below landfill material for possible analysis for lead and zinc, depending upon the results of the more shallow floor samples.
2.5	ELCDDA	Verify lateral	Total PCBs,	3 feet bgs	8 sidewall samples and 4 floor samples of proposed

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Figure/ Section Number	Site	Objective	Contaminants of Concern (COCs)	Proposed Depth of Excavation	Sampling Design (see associated figure)
	Burn Pit	and vertical extent of contamination in proposed excavation	Dioxins (SB-ELBP-01, -04, –04a, and –08 down to 3 feet bgs); TPH-E (EL-SB-01, -03, and –04 down to 11.5 feet); Metals (HAAF-BP-1018-0, -1019-0 at surface)		excavation area. Sidewall samples collected midway between surface and excavation depth (1.5 feet bgs). Analyze for PCB homologues and dioxin congeners. In addition, 4 samples collected beneath floor of excavation 1 foot below bay mud interface. Analyze for TPH-E. 2 surface samples to east and south of Burn Pit. Analyze for metals.
2.6	Outfall Drainage Ditch (ODD)	Verify vertical and lateral extent of contamination in proposed excavation	Beryllium, cadmium, cobalt, copper, lead, manganese, nickel, silver, zinc, TPH-E, PCBs, PCP, phenol, total DDTs, total chlordanes, endrin aldehyde	2 feet below the bottom of the ditch (approximately 5 feet below marsh plain surface)	14 locations at ditch throughout the length of the north/south leg of the ODD, at the southern 5 locations collect 3 samples per location - 1 bottom and 2 sidewalls. Floor samples collected 2’ to 2.5’ below the center of the bottom of the ditch. Sidewall samples collected at half the distance between the marsh surface and the bottom of the proposed excavation (approx 2.5 to 3 feet below the marsh surface), 1.5 feet laterally beyond the current edge of the ditch. At the 9 northern sample locations collect bottom samples only, at depth indicated above. 3 samples (surface, 1.5’, 3’) at 1 location near mouth of ODD. (HAAF-BP-1014-3). Analyze for COCs.

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Figure/ Section Number	Site	Objective	Contaminants of Concern (COCs)	Proposed Depth of Excavation	Sampling Design (see associated figure)
	ODD-Building 39 outfall	Verify vertical and lateral extent of contamination in proposed excavation	Beryllium, cadmium, cobalt, copper, lead, manganese, nickel, silver, zinc, TPH-E, PCBs, PCP, phenol, total DDTs, total chlordanes, endrin aldehyde	2 feet below the bottom of the outfall (approximately 5 feet below marsh plain surface)	3 sidewall and 2 floor samples of outfall basin. Floor samples collected 2' to 2.5' below sediment depth. Sidewall samples half the distance between the marsh surface and the bottom of the proposed excavation (approx 2.5 to 3 feet below the marsh surface), 1.5' outside of basin. Analyze for COCs.
2.7	Former Sewage Treatment Plant (FSTP) Outfall Area	Lateral extent of contamination to possibly expand the proposed excavation	Copper, lead, mercury, silver, zinc, total chlordanes, total DDTs (CSM-HM-SD-396 and –397, and TP-SD-03 and –03A down to 1.5 feet bgs)	1.5 feet bgs	Six locations, 3 north and 3 south of the proposed excavation in stepouts of previous sample locations. All north samples collected from the surface and 1 sample at 1' bgs and 2 samples at 2' bgs; 3 south samples, 2 collected at 1.5' bgs and 1 collected at surface. Analyze for COCs.
	FSTP Channel	Lateral and vertical extent of contamination to determine length (and depth) of excavation	Copper, lead, mercury, silver, zinc, total chlordanes, total DDTs (TP-SD03 down to 1.5 feet bgs)	1.5 feet bgs	One location in channel downstream of previous sample locations. Samples collected on the surface of the marsh plain and 1.5 feet bgs. Analyze for COCs.

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Figure/ Section Number	Site	Objective	Contaminants of Concern (COCs)	Proposed Depth of Excavation	Sampling Design (see associated figure)
2.8 – Figure 2-6 for sample locations, Figure 2-8 for excavation depths	High Marsh Plain – Eastern extension of proposed excavation	Lateral extent of contamination in proposed excavation	Beryllium, cobalt, copper, lead, manganese, nickel, silver, zinc, PCBs	Varies; see Figure 2-8	8 surface locations along eastern boundary of proposed excavation in the high marsh from just north of the channel cut area to just south of the FSTP outfall pipeline. Analyze for COCs.
	High Marsh Plain – Western extension of proposed excavation	Determine lateral extent of ODD contamination towards the levee nearest the pump station outfalls, where contaminated effluent may have exceeded the banks of the ODD, to possibly expand the proposed excavation	Beryllium, cadmium, cobalt, copper, lead, manganese, nickel, silver, zinc, TPH-E, PCBs, PCP, phenol, total DDTs, total chlordanes, endrin aldehyde	None	6 locations west of the ODD throughout and starting just downstream of the pump station area. Collect 1 surface sample at each location. Analyze for COCs.
	High Marsh Plain – vertical extension of proposed excavation	Define vertical extent of contamination of proposed excavation	Beryllium, cobalt, copper, lead, manganese, nickel, silver, zinc, PCBs	Varies, see Figure 2-8	6 locations inside eastern boundary of proposed excavation at floor depth of proposed excavation. For floor depths, see Figure 2-8. 2 locations near and in channel cut at 3 to 3.5 feet bgs and 4 locations south of channel cut at 2’ bgs. Analyze for COCs.

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Figure/ Section Number	Site	Objective	Contaminants of Concern (COCs)	Proposed Depth of Excavation	Sampling Design (see associated figure)
	High Marsh Plain – Characterization near previous sample.	Characterize whether release of metals occurred near TWA-SD02	Copper, zinc	None proposed at this time	2 stepout locations southeast and southwest of TWA-SD02 collected at surface. Analyze for COCs.
	High Marsh Plain – Surface characterization– mid to south marsh - pesticide	Characterize DDTs across inner marsh plain in a series of five linear surveys of immuno-assay samples	DDTs semi-quantitative	None	20 surface sample locations - 5 rows, spaced approximately 600 to 900 feet apart, of samples; 4 samples in each row. Samples spaced approximately 75 to 100 feet apart. Rows extend west to east. First row starting at middle of the marsh north of ELCDDA. Four additional rows lined out along and perpendicular to the southern end of the levee. The last row of samples located in the marsh between the runway approach and the north side of Boat Dock area. Analyze for DDTs.

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Figure/ Section Number	Site	Objective	Contaminants of Concern (COCs)	Proposed Depth of Excavation	Sampling Design (see associated figure)
2.9	High Marsh Plain – Surface and depth characterization– north marsh plain	Define lateral or vertical extent of contamination across north marsh plain in 46 grid samples	Diesel Range Organics, motor oil, total chlordanes, total DDTs, endrin aldehyde, heptachlor, heptachlor epoxide, PCBs by homologue	2 to 5 feet bgs for inner excavations at ADA. 3 feet bgs for outer ADA excavation. None proposed at this time for outer marsh plain. See Figure 2-9a	5 columns and 9 rows of samples forming 45 sample locations at grid intersection "nodes"– samples collected at 3 feet or at surface. Locations A, B, C 1-9 , 11 surface samples and 17 samples & 3' bgs [Location C-3, 1 surface and 1 3'bgs]. Locations D, E 1-9, 18 surface samples. Analyze for COCs.