DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND, HAWAII
400 MARSHALL ROAD
JBPHH, HAWAII 96860-3139

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FEB 15 2017

TO: Distribution

SUBJECT: NAVY ENVIRONMENTAL RESTORATION PROGRAM, FINAL WORK PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY, FACILITIES DEPARTMENT SALVAGE YARD MARINE CORPS BASE SITE 8, MARINE CORPS BASE HAWAII, KANEOHE, HAWAII

We are providing you with the final work plan (WP) for the Remedial Investigation/Feasibility Study (RI/FS) for the Salvage Yard at Marine Corps Base Hawaii for your information and retention. The investigation will be conducted in the Salvage Yard and Marina industrial areas, adjacent wetlands, and in the submerged lands in Kaneohe Bay where polychlorinated biphenyls (PCBs) may have migrated.

The submission of these reports is in accordance with the Superfund Amendments and Reauthorization Act of 1986, which requires federal agencies to coordinate closely with the regulatory agencies and Federal Natural Resource Trustees during Environmental Restoration investigations.

Should you have any questions, please contact (b) (6) [redacted] of our Environmental Restoration staff at (b) (6) [redacted].

Sincerely,

(b) (6) [redacted]

Environmental
Business Line Coordinator
By direction of the
Commanding Officer

2017 FEB 21 P 2:38
HEALTH OFFICE
DEPARTMENT OF HEALTH

Enclosure: Final Work Plan Remedial Investigation/Feasibility Study, Facilities Department Salvage Yard Marine Base Corps Site 8, Marine Corps Base Hawaii, Kaneohe, Hawaii of January 2017

Distribution:
(b) (6) [redacted], State of Hawaii Department of Health (CD)
U.S. Fish and Wildlife Service (CD)

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NAVFAC
Naval Facilities Engineering Command
NAVFAC HAWAII

Remedial Investigation / Feasibility Study
Kaneohe Bay Sediments – OU3
Facilities Department Salvage Yard Site 8
MCBH, Kaneohe, Hawaii

Project Status Meeting
October 13, 2017
Eric Shigaki, RPM, NAVFAC Hawaii

Presentation Outline

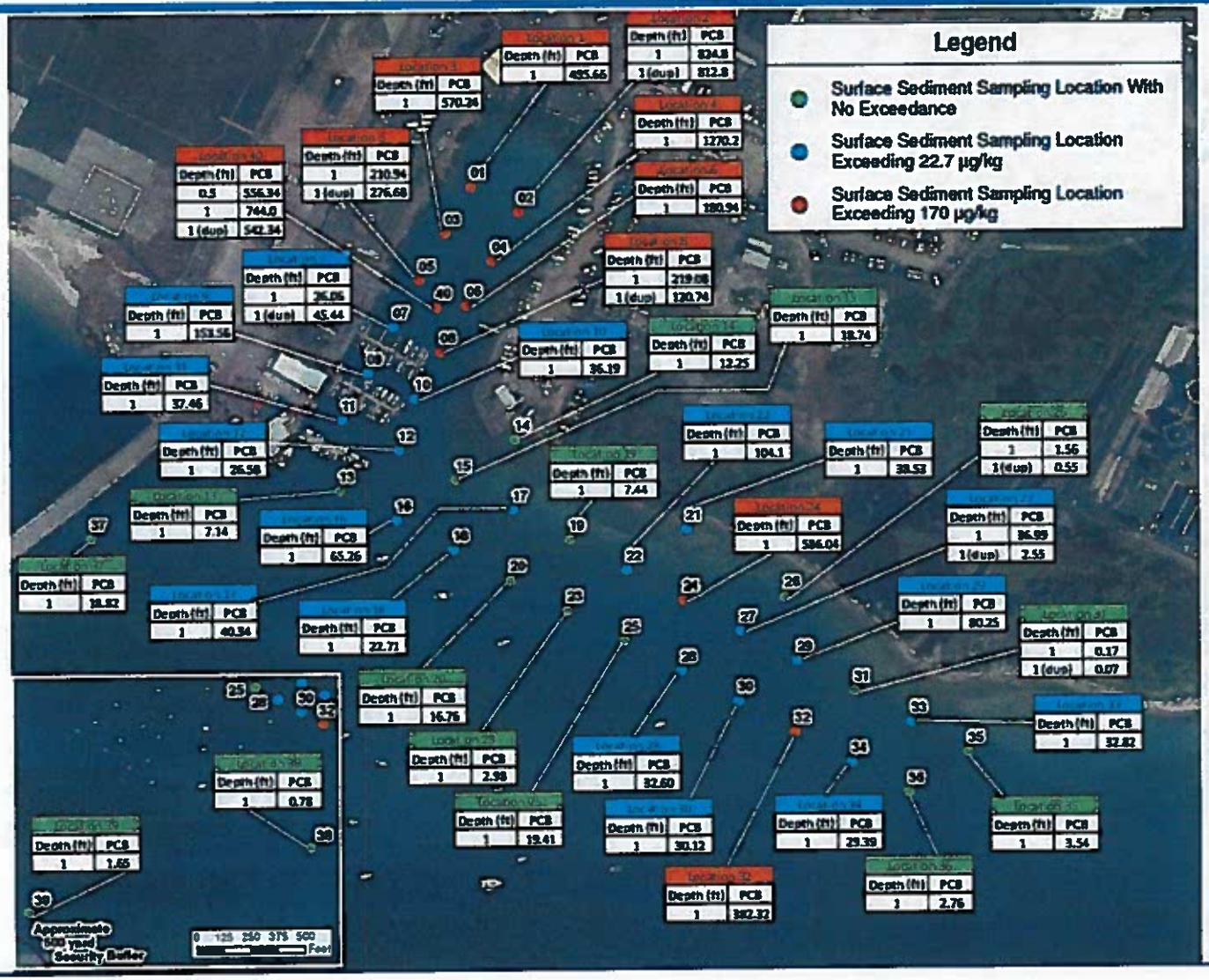
- Site Location and Use
- PCB Concentrations in Surface Sediment
- Sediment Concentration Interpolation Results
- Fish Tissue Samples and Results
- Data Gaps and Next steps
- Discussion and Questions

Site Layout and Operable Units (OUs)

Current Site Use

- Salvage Yard used to store and stage various equipment, materials and other items.
- Active marina, boating activities, and boat storage
- Boat launches on east and west side of marina inlet
- Fishing allowed from fuel pier and west side of marina inlet
- Defined "Recreational Program Area" surrounds marina inlet

PCB Concentrations in Surface Sediment



Surface Sediment PCBs – Interpolated Concentrations

Sediment PCB Results Discussion

- Total PCB concentrations in sediment reported within the marina inlet are elevated (maximum PCB concentration of 1,270 ppb)
- Total PCB concentrations in sediment reported near-shore south of Salvage Yard and wetland are elevated (maximum PCB concentration of 586 ppb)
- PCB concentrations decrease as you exit the marina inlet
- PCB concentrations decrease with depth based on limited number of sediment cores

Fish Tissue Sampling Discussion

- Fish tissue samples were collected from five (5) locations by gill net
- Targeted fish species was goatfish (Weke)
- Two species of Goatfish were sampled – Yellow Stripe and Bandtail
- Goatfish were chosen based on their feeding habits and relatively limited home range
- Fish were categorized by species, weight, and length
- Fish samples were composited by species and weight resulting in three or four samples from each location
- Yellow Stripe were only netted near shore and in the marina inlet and Bandtail were more prevalent offshore
- Whole fish were composited and analyzed for each sample
- Fish tissue PCB concentrations exceeded the Hawaii DOH Limited Fish Consumption screening number (190 ppb) at three locations

Fish Tissue Samples and Results

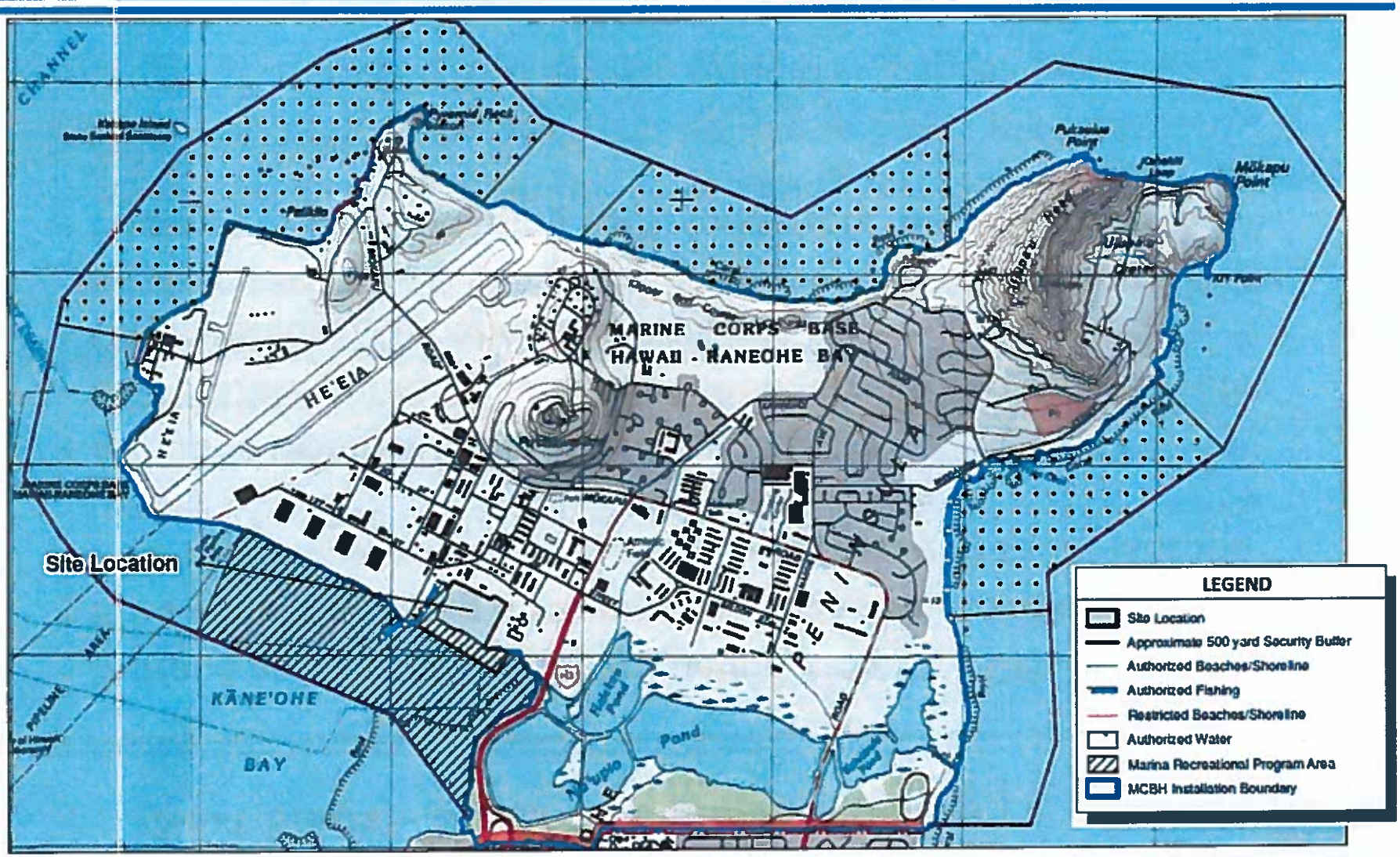
Identified Data Gaps

- Nature and Extent of Contamination
  - Lateral and vertical delineation of sediment
  - Porewater evaluation
- Sediment Stability and Sediment Transport
  - Construction and maintenance dredging plans
  - Current and wave parameters
  - Sediment shear stress and erosion rates
- Ongoing Sources and Natural Recovery
  - Fine resolution cores and sediment dating
- Sediment Characteristics for Remedial Alternatives Evaluation
  - Geotechnical and geochemical analysis

Next Steps – Site Use and Investigation

- Surface and vertical sediment delineation for PCBs
- Pore water sampling and analysis – passive samplers
- Fine resolution cores for vertical definition and radio-isotope dating
- Acoustic Doppler Current Profiler (ADCP)
- SEDFLUME cores for sediment shear stress and erosion rates
- Geotechnical / Geochemical analysis – particle size, total organic carbon, pH, wet bulk density, and black carbon
- Sediment Profile Imaging (SPI) to identify bio-active zone

Site Location and Use – MCB Hawaii



NAVFAC
Naval Facilities Engineering Command
NAVFAC HAWAII

Questions?

10/26/17

Sign-In Sheet
for Meeting
(Salvage Yard - McBH)

(b) (5)

[redacted]

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8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1] mg/kg	HDOH 2016 Tier 1 EAL[2] mg/kg	DU-K1 mg/kg	DU-K2 mg/kg	DU-KCA-1 mg/kg
4,4'-DDD	8.1	2.3	nd	nd	nd
4,4'-DDE	8.1	2	0.002	0.0006	0.0015
4,4'-DDT	5.7	1.9	0.0033	0.00069	0.0015
Aldrin	0.92	3.9	0.0043	nd	nd
Chlordane (technical)	16	17	0.25	0.012	0.012
Dieldrin	1.5	2.5	0.056	0.00042	0.00061
Endosulfan I	370	13	nd	nd	nd
Endrin	18	4	nd	nd	nd
gamma-BHC (Lindane)	1.5	0.08	nd	nd	nd
Heptachlor	0.36	0.14	0.0004	nd	nd
Heptachlor epoxide	0.18	0.07	0.0012	nd	nd
Methoxychlor	310	16	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd

nd - Not detected above laboratory minimum method detection limits

1 - Sampling and Analysis Plan (SAP) Environmental Action Level, based on combination between site-specific HDOH Tier 2 EALs and HDOH Tier 1 EALs (Fall, 2011), see Section 4.7 (Table 3) of SAP, dated March, 2017

2 - HDOH Tier 1 Environmental Action Level, updated December 2016. Site scenario parameters = unrestricted land use, non-potable groundwater, nearest surface water body is greater than 150 meters from project site

BELOW EALS - Value reported less than both the corresponding SAP and HDOH Tier I EALs

ABOVE SAP EAL - Value reported equal to or greater than the corresponding SAP EAL

ABOVE HDOH TIER 1 EAL - Value reported equal to or greater than the corresponding HDOH Tier 1 EAL

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8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1] mg/kg	HDOH 2016 Tier 1 EAL[2] mg/kg	DU-MC1 mg/kg	DU-MC1-T2 mg/kg	DU-MC1-T3 mg/kg	DU-MCCA-1 mg/kg
4,4'-DDD	8.1	2.3	nd	nd	nd	nd
4,4'-DDE	8.1	2	0.0052	0.0065	0.0057	0.0072
4,4'-DDT	5.7	1.9	0.0048	0.0097	0.0067	0.0045
Aldrin	0.92	3.9	0.0022	0.014	0.0015	nd
Chlordane (technical)	16	17	0.048	0.031	0.049	0.024
Dieldrin	1.5	2.5	0.0074	0.0093	0.0073	0.0017
Endosulfan I	370	13	nd	nd	nd	nd
Endrin	18	4	nd	nd	nd	nd
gamma-BHC (Lindane)	1.5	0.08	nd	nd	nd	nd
Heptachlor	0.36	0.14	nd	nd	nd	nd
Heptachlor epoxide	0.18	0.07	nd	nd	nd	nd
Methoxychlor	310	16	nd	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd	nd

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ABOVE HDOH TIER 1 EAL - Value reported equal to or greater than the corresponding HDOH Tier 1 EAL

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8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1]	HDOH 2016 Tier 1 EAL[2]	DU-M1	DU-M2	DU-M3	DU-M4 (resample)	DU-M5	DU-M6	DU-M6-T2
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
4,4'-DDD	8.1	2.3	nd	nd	nd	nd	nd	nd	nd
4,4'-DDE	8.1	2	0.0031	0.002	0.0018	0.0033	0.0012	0.0011	0.0019
4,4'-DDT	5.7	1.9	0.0035	0.0032	0.0035	0.0045	0.0013	0.0022	0.0021
Aldrin	0.92	3.9	0.0057	0.00084	0.001	0.0014	0.00072	0.002	0.0014
Chlordane (technical)	16	17	0.13	0.17	0.11	0.32	0.083	0.64	0.66
Dieldrin	1.5	2.5	0.036	0.02	0.016	0.019	0.0067	0.058	0.051
Endosulfan I	370	13	nd	nd	nd	nd	nd	nd	nd
Endrin	18	4	0.00044	nd	nd	nd	nd	nd	nd
gamma-BHC (Lindane)	1.5	0.08	nd	nd	nd	nd	0.00007	nd	nd
Heptachlor	0.36	0.14	0.0045	0.0021	0.0014	0.00061	0.0006	0.0014	0.0019
Heptachlor epoxide	0.18	0.07	0.0082	0.0026	0.0022	0.002	0.00046	0.0019	0.0016
Methoxychlor	310	16	nd	nd	nd	nd	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd	nd	nd	nd	nd

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ABOVE HDOH TIER 1 EAL - Value reported equal to or greater than the corresponding HDOH Tier 1 EAL

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8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1]	HDOH 2016 Tier 1 EAL[2]	DU-M6-T3	DU-M7	DU-M8	DU-M9	DU-M10	DU-M10-T2	DU-M10-T3
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
4,4'-DDD	8.1	2.3	nd	nd	nd	nd	nd	nd	nd
4,4'-DDE	8.1	2	0.00097	0.0029	0.0011	0.0022	nd	nd	nd
4,4'-DDT	5.7	1.9	0.0018	0.0022	0.002	0.0013	nd	nd	nd
Aldrin	0.92	3.9	0.0015	0.0012	nd	nd	nd	nd	nd
Chlordane (technical)	16	17	0.58	0.22	0.025	0.082	0.31	0.43	0.13
Dieldrin	1.5	2.5	0.055	0.015	0.0016	0.0077	nd	0.022	nd
Endosulfan I	370	13	nd	nd	nd	nd	nd	nd	nd
Endrin	18	4	nd	nd	nd	nd	nd	nd	nd
gamma-BHC (Lindane)	1.5	0.08	nd	nd	nd	nd	nd	nd	nd
Heptachlor	0.36	0.14	0.0011	0.00092	nd	0.0017	0.0027	0.013	0.002
Heptachlor epoxide	0.18	0.07	0.0014	0.00084	nd	0.0012	nd	nd	nd
Methoxychlor	310	16	nd	nd	nd	nd	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd	nd	nd	nd	nd

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1 - Sampling and Analysis Plan (SAP) Environmental Action Level, based on combination between site-specific HDOH Tier 2 EALs and HDOH Tier 1 EALs (Fall, 2011), see Section 4.7 (Table 3) of SAP, dated March, 2017

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MOLOLANI (3 of 7)

8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1]	HDOH 2016 Tier 1 EAL[2]	DU-M11	DU-M12	DU-M13	DU-M13-T2	DU-M13-T3	DU-M14	DU-M15
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
4,4'-DDD	8.1	2.3	nd	nd	nd	nd	nd	0.00046	0.00045
4,4'-DDE	8.1	2	0.00045	0.00049	0.00088	0.0024	0.0016	0.00069	0.00095
4,4'-DDT	5.7	1.9	0.00064	0.00055	nd	0.0015	nd	0.00054	0.00072
Aldrin	0.92	3.9	nd	0.00023	0.00056	nd	nd	0.00014	0.00075
Chlordane (technical)	16	17	0.026	0.035	0.197	0.1	0.181	0.038	0.038
Dieldrin	1.5	2.5	0.0021	0.0022	0.0024	0.003	0.0028	0.0018	0.0055
Endosulfan I	370	13	nd	nd	nd	nd	nd	nd	nd
Endrin	18	4	nd	0.000093	nd	nd	nd	nd	nd
gamma-BHC (Lindane)	1.5	0.08	nd	nd	nd	nd	nd	0.00011	nd
Heptachlor	0.36	0.14	0.00057	0.0099	0.0018	0.00051	0.00038	0.00028	nd
Heptachlor epoxide	0.18	0.07	0.00066	0.0063	0.00082	0.00089	0.00086	0.00031	0.00088
Methoxychlor	310	16	nd	nd	nd	nd	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd	nd	nd	nd	nd

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MOLOLANI (4 of 7)

8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1]	HDOH 2016 Tier 1 EAL[2]	DU-M16	DU-M16-T2	DU-M16-T3	DU-M17	DU-M18	DU-M19	DU-M20
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
4,4'-DDD	8.1	2.3	0.00077	0.00071	0.00051	nd	nd	nd	nd
4,4'-DDE	8.1	2	0.0019	0.0017	0.0012	0.00068	nd	0.002	0.0011
4,4'-DDT	5.7	1.9	0.00081	0.00078	0.00067	0.00097	nd	0.0028	0.0023
Aldrin	0.92	3.9	0.0024	0.0016	0.0017	0.00082	nd	0.0041	0.00042
Chlordane (technical)	16	17	0.072	0.079	0.066	0.091	0.55	0.15	0.054
Dieldrin	1.5	2.5	0.015	0.017	0.014	0.0061	0.058	0.043	0.0056
Endosulfan I	370	13	nd	nd	nd	nd	nd	nd	nd
Endrin	18	4	0.00016	0.00015	0.00018	nd	nd	nd	nd
gamma-BHC (Lindane)	1.5	0.08	0.00018	0.00008	0.000076	nd	nd	nd	nd
Heptachlor	0.36	0.14	0.0012	0.0011	0.00099	0.0044	nd	0.0031	0.00067
Heptachlor epoxide	0.18	0.07	0.0023	0.0027	0.0022	0.00031	nd	0.0057	0.0013
Methoxychlor	310	16	nd	nd	nd	nd	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd	nd	nd	nd	nd

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MOLOLANI (5 of 7)

8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1]	HDOH 2016 Tier 1 EAL[2]	DU-M21	DU-M22	DU-M23	DU-M24	DU-M24-T2	DU-M24-T3	DU-M25
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
4,4'-DDD	8.1	2.3	0.0005	nd	nd	nd	nd	nd	nd
4,4'-DDE	8.1	2	0.0011	0.0011	0.00036	nd	nd	0.017	nd
4,4'-DDT	5.7	1.9	0.00051	0.0011	0.00075	nd	nd	nd	nd
Aldrin	0.92	3.9	nd	0.0007	nd	nd	nd	0.035	nd
Chlordane (technical)	16	17	0.065	0.034	0.012	0.57	0.63	0.53	0.12
Dieldrin	1.5	2.5	0.0037	0.0049	0.0019	0.05	0.037	0.226	0.006
Endosulfan I	370	13	nd	nd	nd	nd	nd	nd	nd
Endrin	18	4	nd	0.0001	nd	nd	nd	nd	nd
gamma-BHC (Lindane)	1.5	0.08	nd	nd	nd	nd	nd	nd	nd
Heptachlor	0.36	0.14	0.00072	nd	nd	nd	nd	0.013	nd
Heptachlor epoxide	0.18	0.07	0.0013	0.00016	nd	nd	nd	0.032	nd
Methoxychlor	310	16	nd	nd	nd	nd	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd	nd	nd	nd	nd

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MOLOLANI (6 of 7)

8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1]	HDOH 2016 Tier 1 EAL[2]	DU-M26	DU-M27	DU-M28	DU-MCA-1	DU-MCA-2	DU-MCA-3	DU-MCA-4
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
4,4'-DDD	8.1	2.3	nd	nd	nd	0.0011	0.0007	nd	nd
4,4'-DDE	8.1	2	0.00072	0.00053	0.00068	0.0016	0.0022	nd	0.027
4,4'-DDT	5.7	1.9	0.0006	0.00089	0.00079	0.0011	0.0033	nd	0.022
Aldrin	0.92	3.9	nd	nd	0.00087	0.00067	0.00093	nd	0.035
Chlordane (technical)	16	17	0.067	0.036	0.084	0.16	0.054	1.01	0.66
Dieldrin	1.5	2.5	0.017	0.00068	0.0077	0.013	0.0097	0.064	0.286
Endosulfan I	370	13	nd	nd	nd	nd	nd	nd	nd
Endrin	18	4	0.00079	nd	nd	0.00082	0.00038	nd	nd
gamma-BHC (Lindane)	1.5	0.08	nd	nd	nd	0.000095	nd	nd	nd
Heptachlor	0.36	0.14	0.00055	0.00042	0.00082	0.00029	nd	nd	0.013
Heptachlor epoxide	0.18	0.07	0.00096	0.0006	0.0019	0.00058	0.0005	nd	0.046
Methoxychlor	310	16	nd	nd	nd	nd	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd	nd	nd	nd	nd

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ABOVE SAP EAL - Value reported equal to or greater than the corresponding SAP EAL

ABOVE HDOH TIER 1 EAL - Value reported equal to or greater than the corresponding HDOH Tier 1 EAL

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MOLOLANI (7 of 7)

8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1]	HDOH 2016 Tier 1 EAL[2]	DU-MCA-5	DU-MCA-6	DU-MCA-7	DU-MCA-8	DU-MCA-9	DU-MCA-10	DU-MCA-11 (DU-MCA-17 on COC)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
4,4'-DDD	8.1	2.3	nd	nd	nd	nd	nd	0.00048	nd
4,4'-DDE	8.1	2	0.00097	0.0019	nd	0.0002	0.0011	0.0019	0.00087
4,4'-DDT	5.7	1.9	0.0019	0.0013	nd	0.00031	0.0011	0.0042	0.002
Aldrin	0.92	3.9	nd	nd	nd	nd	0.0019	0.00057	0.0012
Chlordane (technical)	16	17	0.058	0.164	0.061	0.02	0.11	0.039	0.061
Dieldrin	1.5	2.5	0.0032	0.005	nd	0.00074	0.024	0.0061	0.0069
Endosulfan I	370	13	nd	nd	nd	nd	nd	nd	nd
Endrin	18	4	nd	nd	nd	nd	0.00073	nd	nd
gamma-BHC (Lindane)	1.5	0.08	nd	nd	nd	nd	nd	nd	nd
Heptachlor	0.36	0.14	nd	nd	0.00037	0.00047	0.00027	nd	nd
Heptachlor epoxide	0.18	0.07	0.00048	0.00053	nd	0.00026	0.00059	0.001	0.0009
Methoxychlor	310	16	nd	nd	nd	nd	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd	nd	nd	nd	nd

nd - Not detected above laboratory minimum method detection limits

1 - Sampling and Analysis Plan (SAP) Environmental Action Level, based on combination between site-specific HDOH Tier 2 EALs and HDOH Tier 1 EALs (Fall, 2011), see Section 4.7 (Table 3) of SAP, dated March, 2017

2 - HDOH Tier 1 Environmental Action Level, updated December 2016. Site scenario parameters = unrestricted land use, non-potable groundwater, nearest surface water body is greater than 150 meters from project site

BELOW EALS - Value reported less than both the corresponding SAP and HDOH Tier I EALs

ABOVE SAP EAL - Value reported equal to or greater than the corresponding SAP EAL

ABOVE HDOH TIER 1 EAL - Value reported equal to or greater than the corresponding HDOH Tier 1 EAL

PA HONUA

PA HONUA (1 of 2)

8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1] mg/kg	HDOH 2016 Tier 1 EAL[2] mg/kg	DU-P1 mg/kg	DU-P2 mg/kg	DU-P3 mg/kg	DU-P4-T1 mg/kg	DU-P4-T2 mg/kg	DU-P4-T3 mg/kg	DU-P5 mg/kg
4,4'-DDD	8.1	2.3	nd	nd	nd	nd	nd	nd	nd
4,4'-DDE	8.1	2	0.0004	nd	nd	0.0029	0.001	0.00067	nd
4,4'-DDT	5.7	1.9	0.00083	0.0018	nd	0.0016	0.0012	nd	0.0016
Aldrin	0.92	3.9	nd	nd	nd	0.00079	nd	0.0003	nd
Chlordane (technical)	16	17	0.39	0.62	1.06	0.31	0.24	0.36	0.14
Dieldrin	1.5	2.5	0.0039	0.0027	nd	0.0021	0.0019	0.0031	0.0006
Endosulfan I	370	13	nd	nd	nd	nd	nd	nd	nd
Endrin	18	4	nd	nd	nd	nd	nd	nd	nd
gamma-BHC (Lindane)	1.5	0.08	nd	nd	nd	nd	nd	nd	nd
Heptachlor	0.36	0.14	nd	0.0038	nd	0.00028	0.00015	0.00018	0.00038
Heptachlor epoxide	0.18	0.07	0.0018	0.00059	nd	0.017	0.0024	0.013	0.0053
Methoxychlor	310	16	nd	nd	nd	nd	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd	nd	nd	nd	nd

nd - Not detected above laboratory minimum method detection limits

1 - Sampling and Analysis Plan (SAP) Environmental Action Level, based on combination between site-specific HDOH Tier 2 EALs and HDOH Tier 1 EALs (Fall, 2011), see Section 4.7 (Table 3) of SAP, dated March, 2017

2 - HDOH Tier 1 Environmental Action Level, updated December 2016. Site scenario parameters = unrestricted land use, non-potable groundwater, nearest surface water body is greater than 150 meters from project site

BELOW EALS - Value reported less than both the corresponding SAP and HDOH Tier I EALs

ABOVE SAP EAL - Value reported equal to or greater than the corresponding SAP EAL

ABOVE HDOH TIER 1 EAL - Value reported equal to or greater than the corresponding HDOH Tier 1 EAL

PA HONUA

PA HONUA (2 of 2)

8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1] mg/kg	HDOH 2016 Tier 1 EAL[2] mg/kg	DU-P6 mg/kg	DU-P7 (resample) mg/kg	DU-PCA-1 mg/kg	DU-PCA-2 mg/kg
4,4'-DDD	8.1	2.3	nd	nd	nd	nd
4,4'-DDE	8.1	2	0.00045	0.00034	0.0096	0.00066
4,4'-DDT	5.7	1.9	nd	0.00072	0.0091	0.0013
Aldrin	0.92	3.9	nd	nd	0.00033	0.00014
Chlordane (technical)	16	17	0.18	0.25	1.8	0.9
Dieldrin	1.5	2.5	0.0014	0.00094	0.023	0.0066
Endosulfan I	370	13	nd	nd	nd	nd
Endrin	18	4	nd	nd	nd	nd
gamma-BHC (Lindane)	1.5	0.08	nd	nd	nd	nd
Heptachlor	0.36	0.14	nd	0.00018	0.00056	0.0011
Heptachlor epoxide	0.18	0.07	0.00073	0.0011	0.0078	0.0028
Methoxychlor	310	16	nd	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd	nd

nd - Not detected above laboratory minimum method detection limits

1 - Sampling and Analysis Plan (SAP) Environmental Action Level, based on combination between site-specific HDOH Tier 2 EALs and HDOH Tier 1 EALs (Fall, 2011), see Section 4.7 (Table 3) of SAP, dated March, 2017

2 - HDOH Tier 1 Environmental Action Level, updated December 2016. Site scenario parameters = unrestricted land use, non-potable groundwater, nearest surface water body is greater than 150 meters from project site

BELOW EALS - Value reported less than both the corresponding SAP and HDOH Tier I EALs

ABOVE SAP EAL - Value reported equal to or greater than the corresponding SAP EAL

ABOVE HDOH TIER 1 EAL - Value reported equal to or greater than the corresponding HDOH Tier 1 EAL

ULUPAU

ULUPAU (1 of 2)

8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1] mg/kg	HDOH 2016 Tier 1 EAL[2] mg/kg	DU-U1 mg/kg	DU-U2 mg/kg	DU-U3 mg/kg	DU-U3-T2 mg/kg	DU-U3-T3 mg/kg	DU-U4 mg/kg	DU-U5 mg/kg
4,4'-DDD	8.1	2.3	0.0034	nd	nd	nd	nd	nd	nd
4,4'-DDE	8.1	2	0.0015	0.0011	0.0023	0.0021	0.0012	0.0018	0.001
4,4'-DDT	5.7	1.9	0.017	0.0024	0.0025	0.0031	0.0015	0.0031	0.0011
Aldrin	0.92	3.9	0.0024	0.00052	0.0011	0.0011	0.00032	0.00072	0.00057
Chlordane (technical)	16	17	0.12	0.08	0.28	0.27	0.18	0.21	0.18
Dieldrin	1.5	2.5	0.046	0.15	0.04	0.044	0.018	0.02	0.038
Endosulfan I	370	13	nd	nd	nd	nd	nd	nd	nd
Endrin	18	4	0.00069	0.0024	nd	nd	nd	nd	0.00064
gamma-BHC (Lindane)	1.5	0.08	nd	nd	nd	nd	nd	nd	nd
Heptachlor	0.36	0.14	0.00023	0.00016	0.00067	0.0034	0.00045	nd	0.00022
Heptachlor epoxide	0.18	0.07	0.014	0.0029	0.0013	0.0018	0.0009	0.00087	0.0002
Methoxychlor	310	16	nd	nd	nd	nd	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd	nd	nd	nd	nd

nd - Not detected above laboratory minimum method detection limits

1 - Sampling and Analysis Plan (SAP) Environmental Action Level, based on combination between site-specific HDOH Tier 2 EALs and HDOH Tier 1 EALs (Fall, 2011), see Section 4.7 (Table 3) of SAP, dated March, 2017

2 - HDOH Tier 1 Environmental Action Level, updated December 2016. Site scenario parameters = unrestricted land use, non-potable groundwater, nearest surface water body is greater than 150 meters from project site

BELOW EALS - Value reported less than both the corresponding SAP and HDOH Tier I EALs

ABOVE SAP EAL - Value reported equal to or greater than the corresponding SAP EAL

ABOVE HDOH TIER 1 EAL - Value reported equal to or greater than the corresponding HDOH Tier 1 EAL

ULUPAU

ULUPAU (2 of 2)

8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1] mg/kg	HDOH 2016 Tier 1 EAL[2] mg/kg	DU-U6 mg/kg	DU-U7 mg/kg	DU-UCA-1 mg/kg	DU-UCA-2 mg/kg	DU-UCA-3 mg/kg	DU-UCA-4 mg/kg	DU-UCA-5 mg/kg
4,4'-DDD	8.1	2.3	nd	nd	nd	nd	nd	0.0075	nd
4,4'-DDE	8.1	2	0.0007	0.00086	0.00073	0.00015	0.0009	0.0016	0.00086
4,4'-DDT	5.7	1.9	0.0093	0.0016	0.0013	0.00069	0.0023	0.004	0.0014
Aldrin	0.92	3.9	0.0016	0.00049	0.00076	0.00017	0.00087	0.0013	0.00043
Chlordane (technical)	16	17	0.23	0.1	0.09	0.024	0.11	0.22	0.072
Dieldrin	1.5	2.5	0.039	0.032	0.02	0.017	0.011	0.032	0.02
Endosulfan I	370	13	nd	nd	nd	nd	nd	nd	nd
Endrin	18	4	0.00081	0.00062	0.00052	0.00023	nd	0.00049	0.00037
gamma-BHC (Lindane)	1.5	0.08	nd	nd	nd	nd	nd	nd	nd
Heptachlor	0.36	0.14	0.00027	0.00083	nd	nd	nd	0.00065	nd
Heptachlor epoxide	0.18	0.07	0.00056	0.0013	0.003	0.00058	0.00044	0.0012	0.00023
Methoxychlor	310	16	nd	nd	nd	nd	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd	nd	nd	nd	nd

nd - Not detected above laboratory minimum method detection limits

1 - Sampling and Analysis Plan (SAP) Environmental Action Level, based on combination between site-specific HDOH Tier 2 EALs and HDOH Tier 1 EALs (Fall, 2011), see Section 4.7 (Table 3) of SAP, dated March, 2017

2 - HDOH Tier 1 Environmental Action Level, updated December 2016. Site scenario parameters = unrestricted land use, non-potable groundwater, nearest surface water body is greater than 150 meters from project site

BELOW EALS - Value reported less than both the corresponding SAP and HDOH Tier I EALs

ABOVE SAP EAL - Value reported equal to or greater than the corresponding SAP EAL

ABOVE HDOH TIER 1 EAL - Value reported equal to or greater than the corresponding HDOH Tier 1 EAL

WAIKULU

WAIKULU (1 of 2)

8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1] mg/kg	HDOH 2016 Tier 1 EAL[2] mg/kg	DU-W2 mg/kg	DU-W3 mg/kg	DU-W4 mg/kg	DU-W5 mg/kg	DU-W6 mg/kg	DU-W7 mg/kg	DU-W9 mg/kg	DU-W10 mg/kg
4,4'-DDD	8.1	2.3	nd	nd	nd	nd	nd	nd	0.00037	nd
4,4'-DDE	8.1	2	nd	nd	nd	nd	0.0024	nd	0.0017	nd
4,4'-DDT	5.7	1.9	nd	nd	nd	nd	0.0031	nd	0.0011	nd
Aldrin	0.92	3.9	nd	nd	nd	nd	0.0023	0.0057	nd	0.0073
Chlordane (technical)	16	17	2.6	0.55	3.8	1.8	0.13	0.3	0.018	0.75
Dieldrin	1.5	2.5	0.098	0.019	0.038	0.03	0.015	0.056	0.0016	0.062
Endosulfan I	370	13	nd	nd	nd	nd	nd	nd	nd	nd
Endrin	18	4	nd	nd	nd	nd	nd	nd	0.0001	nd
gamma-BHC (Lindane)	1.5	0.08	nd	nd	nd	nd	nd	nd	nd	nd
Heptachlor	0.36	0.14	0.019	nd	nd	nd	nd	nd	nd	nd
Heptachlor epoxide	0.18	0.07	0.026	0.0066	0.045	0.019	nd	nd	0.00017	0.0055
Methoxychlor	310	16	nd	nd	nd	nd	nd	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd	nd	nd	nd	nd	nd

nd - Not detected above laboratory minimum method detection limits

1 - Sampling and Analysis Plan (SAP) Environmental Action Level, based on combination between site-specific HDOH Tier 2 EALs and HDOH Tier 1 EALs (Fall, 2011), see Section 4.7 (Table 3) of SAP, dated March, 2017

2 - HDOH Tier 1 Environmental Action Level, updated December 2016. Site scenario parameters = unrestricted land use, non-potable groundwater, nearest surface water body is greater than 150 meters from project site

Note: Waikulu Decision Units (DUs) 1 and 8 were field verified as part of Hawaii Loa Neighborhood. As such, DU-W1 and DU-W8 were not sampled.

BELOW EALS - Value reported less than both the corresponding SAP and HDOH Tier I EALs

ABOVE SAP EAL - Value reported equal to or greater than the corresponding SAP EAL

ABOVE HDOH TIER 1 EAL - Value reported equal to or greater than the corresponding HDOH Tier 1 EAL

WAIKULU

WAIKULU (2 of 2)

8081A Organochlorine Pesticides (GC)

ANALYTE	Sampling & Analysis EAL[1] mg/kg	HDOH 2016 Tier 1 EAL[2] mg/kg	DU-WCA-1 mg/kg	DU-WCA-2 mg/kg	DU-WCA-3 mg/kg	DU-WCA-3-T2 mg/kg	DU-WCA-3-T3 mg/kg	DU-WCA-4 mg/kg	DU-WCA-5 mg/kg	DU-WCA-6 mg/kg	DU-WCA-7 mg/kg	DU-WCA-8 mg/kg
4,4'-DDD	8.1	2.3	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4,4'-DDE	8.1	2	nd	nd	nd	nd	nd	nd	0.0019	0.0038	0.0014	0.0027
4,4'-DDT	5.7	1.9	nd	nd	nd	nd	nd	nd	0.0026	0.005	0.0027	nd
Aldrin	0.92	3.9	nd	nd	0.023	nd	nd	0.017	nd	0.006	0.0048	0.0061
Chlordane (technical)	16	17	0.26	0.51	2.8	1.3	1.6	0.98	0.078	0.29	0.2	0.28
Dieldrin	1.5	2.5	0.073	0.011	0.1	0.044	nd	0.05	0.0065	0.058	0.03	0.037
Endosulfan I	370	13	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Endrin	18	4	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
gamma-BHC (Lindane)	1.5	0.08	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Heptachlor	0.36	0.14	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Heptachlor epoxide	0.18	0.07	nd	0.0057	nd	nd	nd	nd	nd	nd	nd	nd
Methoxychlor	310	16	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Toxaphene	1.3	0.05	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

nd - Not detected above laboratory minimum method detection limits

1 - Sampling and Analysis Plan (SAP) Environmental Action Level, based on combination between site-specific HDOH Tier 2 EALs and HDOH Tier 1 EALs (Fall, 2011), see Section 4.7 (Table 3) of SAP, dated March, 2017

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