Native Formation Sampling Letter Report
Dry Dock 5 Construction Dredging

Joint Base Pearl Harbor-Hickam, Oahu, Hawaii

JBPHH PEARL HARBOR HI SITE 19

Pearl Harbor Naval Complex National Priorities List Site

Naval Facilities Engineering Systems Command Pacific
April 2024

This letter report presents the data and results from a sampling and analysis program to evaluate native formation dredged material for the construction of Dry Dock (DD) Number 5 (DD5) at Joint Base Pearl Harbor-Hickam, Oahu, Hawaii (Figure 1). The objective of this sampling and analysis is to determine whether native formation material present above the -57 feet mean sea level (MSL) elevation within the dredge project area is subject to a response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or is eligible to be further evaluated for ocean disposal and/or beneficial reuse.

1. Overview

The DD5 dredging project area is located to the west-northwest of the existing DD Number 3 in Southeast Loch, Joint Base Pearl Harbor-Hickam, Oahu, Hawaii. The native formation portion of the DD5 dredging project area, designated as DD5B, encompasses approximately 96,000 square feet and is located within Decision Unit (DU) SE-1 (Southeast Loch) of the Pearl Harbor Sediment CERCLA site footprint. DU SE-1 is designated for the remediation of soft sediment impacted by chemicals of concern (COCs) that include copper, lead, mercury, and polychlorinated biphenyls (PCBs). The selected remedy for DU SE-1, as documented in the record of decision (DON 2018), includes a combination of focused dredging, enhanced natural recovery, monitored natural recovery, and in situ treatment with activated carbon. The DD5B footprint is located within the DU SE-1 areas that are designated for enhanced natural recovery or monitored natural recovery.

Dredging to support DD5 construction is expected to remove approximately 70,000 cubic yards of consolidated native formation material from the DD5B dredge area following the removal of the overlying soft harbor sediments. The native formation layer is defined as the material present beneath the soft, unconsolidated harbor sediments unit and consists of interbedded layers of coralline detritus, coral formation, volcanic tuff, and older alluvial deposits (DON 2023). Additional investigation of native formation material above -57 feet MSL is required to determine whether the material is subject to response action under CERCLA or is eligible to be evaluated for ocean disposal suitability under Marine Protection, Research, and Sanctuaries Act (MPRSA) or for beneficial reuse as on-site construction fill in waters of the United States (WOTUS) under Section 404 of the Clean Water Act.

In accordance with the agreement reached between the United States (U.S.) Department of the Navy, U.S. Environmental Protection Agency Region 9, and the State of Hawaii Department of Health during the April 11–13, 2023 meeting, dredged material in areas designated for remediation under CERCLA is not considered subject to any response action under CERCLA if the COC concentrations of the material are below the lowest and most conservative remedial action level (RAL_0) defined for each DU. Native formation material with COC concentrations below RAL_0 do not require remedial action under CERCLA. Therefore, the material is considered to be non-CERCLA material and will be eligible to be evaluated for suitability for ocean disposal or for on-site beneficial reuse in WOTUS, in accordance with MPRSA and Section 404 of the Clean Water Act regulations, respectively.

2. Methodology and Field Sampling Activities

Field sampling activities for the DD5 native formation investigation were conducted in accordance with the work plan (WP) (DON 2023). The objective of the sampling and analysis is to characterize native formation material above -57 feet MSL within the DD5B dredge area footprint. The data provided by this sampling and analysis will be used to determine whether the native material meets the RAL_0 criteria and therefore will not require remedial action under CERCLA. Native material that meets the RAL_0 criteria will be eligible to be evaluated for suitability for ocean disposal or for on-site beneficial reuse in WOTUS. The following principal study question was identified for the work, as documented in the WP (DON 2023):

- *Principal Study Question #1:* Do COC concentrations in native formation material above -57 feet MSL meet the RAL_0 criteria?
  - *Alternative Action 1:* The native formation material satisfies the RAL_0 criteria, is not subject to CERCLA response action, and therefore is eligible for further evaluation for ocean disposal suitability under MPRSA regulations.
  - *Alternative Action 2:* The native formation material does not satisfy the RAL_0 criteria, is subject to CERCLA response action, and therefore is not eligible for ocean disposal suitability evaluation or beneficial reuse consideration.

Field sampling activities were conducted from October 9 to 14, 2023, in accordance with the WP. Sampling to determine whether the native formation material is subject to CERCLA response action was also conducted concurrently with sampling activities to evaluate the native formation material for ocean disposal suitability. Native formation core samples were collected from five coring locations within the DD5B footprint using a solid-stem auger drill rig with a modified California sampler to collect representative native formation material above the -57 feet MSL elevation. In accordance with the WP, discrete samples collected from the upper 0–1, 1–2, and 2–3-foot depth intervals of the native material were submitted for laboratory analysis of the DU SE-1 COCs to evaluate whether the native formation material is subject to CERCLA response action. A summary of the native formation sampling program is presented in Table 1.

The project team, in coordination with the U.S. Department of the Navy, evaluated each proposed sampling station to determine whether it was clear of utilities (e.g., phone cables, electrical cables, and oil or gas pipelines) that could be damaged by the drill sampler or boat anchor. Access to the sediment sampling stations was arranged with Pearl Harbor Port Operations. All sampling stations were identified in the field at predetermined coordinates using the Hawaii State Plane Zone 3 coordinate system (North American 1983 datum) and a differential global positioning system receiver using U.S. Coast Guard differential correction data accurate to approximately ±3 feet. Once the sampling vessel arrived at the designated coordinates for an in-water sampling station, the vessel was anchored as necessary to support sampling operations and the actual location coordinates were recorded. Areas within a 10-foot radius of the designated coordinates were defined as the station locations. Vertical elevation control was determined for all sampling locations and was recorded in feet as the depth to sediment from the water surface to the nearest 0.1 foot. Water depth measurements were then converted to surface elevations (MSL datum) using tidal data from the National Oceanic and Atmospheric Administration (NOAA) Honolulu tide station (Station Identification 1612340).

Sampling was conducted in accordance with the explosives safety submission (ESS) determination request response letter approved by the Naval Ordnance Safety and Security Activity. The ESS determination request response letter confirmed that an ESS was not required for sediment

sampling because the likelihood of encountering underwater munitions and explosives of concern or material potentially presenting an explosive hazard is low. Surface and subsurface anomaly avoidance techniques were employed by a qualified unexploded ordnance technician for coring as required by the ESS determination request response. The collected cores were also visually inspected for munitions and explosives of concern by the unexploded ordnance technician.

All but one of the sampling stations were located within 10 feet of the target location identified in the WP. Sampling location DD5BS-03 was relocated westward from the target location due to insufficient water depth for the sampling vessel accessibility. Elevation of the harbor bottom range at the coring locations ranges from -28 to -43 feet MSL. Most of the cores are in areas that have been previously dredged to remove the overlying soft sediment; therefore, only a thin veneer of soft sediment (1 foot or less) was encountered at these locations. A thicker layer of soft sediment is present above the native formation layer at location DD5BS-02 of 3.4 feet, which is outside of the previous soft sediment dredge footprint. Detailed core logs are presented in Attachment 1 and summarized on Figure 2. Based on the core logs, the general stratigraphy at the site is characterized by a thin veneer of soft harbor sediment underlain by native formation material composed of coralline detritus of varying particle sizes (silt to gravel) and a layer of brown clay representing older alluvium, likely terrigenous in origin. A thin layer of volcanic tuff is present at location DD5BS-05 at -37 feet MSL elevation. This general stratigraphy is consistent with data from borings advanced during previous investigations within the area.

2.1 ANALYTICAL RESULTS

All samples were analyzed for copper, lead, mercury, and PCBs as congeners. the analytical results are compared to the RAL_0 criteria in accordance with the WP. The analytical results with comparisons to the RAL_0 criteria and the Pearl Harbor Sediment remediation goals, are presented in Table 2 and Figure 3.

Copper and lead are detected in all collected samples, but at concentrations well below the RAL_0 criterion and the Pearl Harbor Sediment remediation goal. Mercury is detected in most of the samples analyzed except for four samples from DD5B-S04 and DD5B-S05. All samples with reported mercury detections have concentrations that are below the RAL_0 criterion and the Pearl Harbor Sediment remediation goal. Most of the individual PCB congeners are non-detects. Total PCBs, calculated as twice the sum of the NOAA-18 congeners for consistency with the Pearl Harbor Sediment criterion, have detected concentrations below both the RAL_0 criterion and the Pearl Harbor Sediment remediation goal. The highest concentrations of PCBs are reported for location DD5B-S02 with 66 and 87 micrograms per kilogram at the 0–1 and 1–2 feet sampling depth intervals, respectively. As shown on Figure 2 and in Attachment 1, a relatively thicker layer of soft sediment is present at location DD5B-S02, with a thin layer of dark gray silty gravel at the transition between the soft sediment and the underlying silty sand native formation material. The levels of PCBs detected at location DD5B-S02 is likely attributed to comingling of the overlying soft sediment material within the upper 2 feet of the underlying native formation material. However, these PCBs concentrations are below the RAL_0 criterion, as well as the more conservative remediation goal threshold for the site; therefore, this material is concluded as not subject to CERCLA response action.

2.2 DATA QUALITY

Data validation is currently in progress; therefore, a preliminary summary on data quality parameters is presented and will be updated once the data validation process has been completed. All samples were extracted and analyzed within the recommended holding times. The laboratory blanks for chemical analyses contained low levels of copper and PCB-209. Detections of copper in the laboratory blank were below the limit of quantitation and were either not detected in the associated field samples

or were detected in the field samples at greater than five times the detected concentration in the laboratory blank. Therefore, detections of copper in the laboratory blank likely do not impact the results. Detections of PCB-209 were below the limit of quantitation and, therefore, likely do not impact the associated field sample results. Laboratory method blanks for all other analyses were not detected at the indicated detection limits, demonstrating no sample cross-contamination associated with analytical procedures.

Surrogate recoveries were below control limits for PCBs, potentially indicating low bias in the affected samples. All other analytes were within acceptance criteria. Laboratory control spike (LCS) and LCS duplicate (LCSD) recoveries were within acceptance criteria. Matrix spike (MS) and matrix spike duplicate (MSD) recoveries were outside of the acceptance criteria for PCBs. Recovery limits outside of the acceptance criteria are likely due to matrix interference and/or sample heterogeneity as LCS and LCSD recoveries were within acceptance criteria. All other analytes were within acceptance criteria.

LCS/LCSD and MS/MSD relative percent differences were within acceptance criteria for all analytes, indicating adequate precision.

3. Summary and Conclusion

The results from the sampling and analysis of the upper 3 feet of native formation material within the DD5B dredge footprint indicate some detected concentrations of COCs identified for DU SE-1 under CERCLA. However, the reported detected concentrations are below the RAL_0 criteria and are also below the more conservative Pearl Harbor Sediment remediation goals. Therefore, the native formation present within the DD5B dredge footprint is not subject to CERCLA response action and is eligible for further evaluation for suitability for ocean disposal or for beneficial reuse.

4. References

Department of the Navy (DON). 2018. *Final Record of Decision Pearl Harbor Sediment Joint Base Pearl Harbor-Hickam Oahu HI*. JBPHH HI: Naval Facilities Engineering Command, Pacific. September.

———. 2023. *Final Work Plan Native Formation Investigation Dry Dock 5 Construction Dredging Joint Base Pearl Harbor-Hickam Oahu HI*. Prepared by AECOM Technical Services, Inc. JBPHH HI: Naval Facilities Engineering Systems Command, Pacific. September.

Table 1: Native Formation Sampling Program Summary

Location ID	Coordinates (Hawaii State Plane Zone 3, NAD83 Datum)				Water Depth (ft)	Top of Native Formation Elevation (ft MSL)	Soft Sediment Thickness (ft)	Bottom Elevation of Sampled Interval (ft MSL)	Notes
	Target		Actual						
	Easting (ft)	Northing (ft)	Easting (ft)	Northing (ft)					
DD5BS-01	1653323	67194	1653321	67183	-37.1	-37.6	0.5	-40.6	—
DD5BS-02	1653321	67313	1653324	67318	-35.2	-38.6	3.4	-41.6	—
DD5BS-03	1653420	67396	1653406	67415	-43.4	-43.4	0	-46.4	Original location water depth below -57 ft MSL
DD5BS-04	1653454	67546	1653462	67544	-28.0	-29.0	1.0	-32.0	—
DD5BS-05	1653515	67651	1653513	67630	-30.6	-31.1	0.5	-34.1	Relocated due to water depth too shallow for sampling vessel

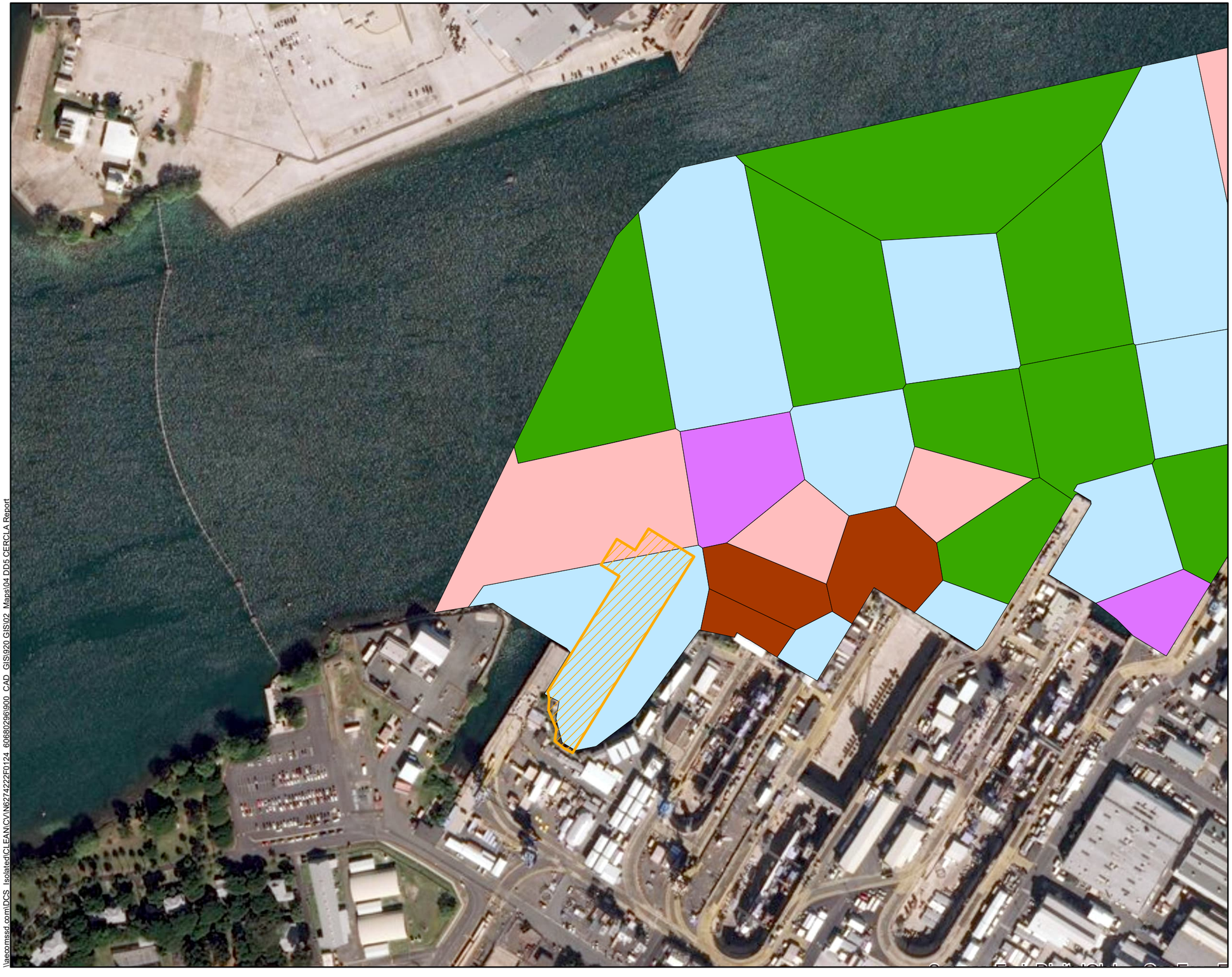
Note: Only successful sampling attempts are included in the table; unsuccessful sampling attempts where no sample recovery occurred are not included.
n/a not available
— not applicable/no data
ft foot
ID identification
NAD83 North American Datum 1983

Table 2: Analytical Chemistry Results Summary

			DD5BS-01			DD5B-S02					DD5B-S03			DD5B-S04			DD5B-S05		
			JT216	JT217	JT218	JT220	JT224	JT221	JT222	JT226	JT227	JT228	JT229	JT212	JT213	JT214	JT208	JT209	JT210
Parameter	RG [a]	RAL_0 [b]	0–1 ft	1–2 ft	2–3 ft	0–1 ft	0–1 ft [d]	1–2 ft	2–3 ft	2–3 ft [d]	0–1 ft	1–2 ft	2–3 ft	0–1 ft	1–2 ft	2–3 ft	0–1 ft	1–2 ft	2–3 ft
Metals (mg/kg)																			
Copper	214	1,900	21.8	25.8	16	18.6	46.2	17.6	16	15.6	38.4	18.9	13.8	18.9	11	21	97.4	31.1	30.9
Lead	119	1,000	4.07	3.36	1.07	20.5	7.8	0.89	0.45	0.44	19.7	0.94	0.25	1.13	0.24	0.18	4.12	0.32	0.32
Mercury	0.71	1.3	0.31	0.06	0.049	0.079	0.16	0.0089 J	0.0077 J	0.0072 J	0.051	0.016 J	0.02 U	0.016 U	0.018 U	0.017 U	0.123	0.016 U	0.016 U
PCBs (µg/kg)																			
PCB-008	—	—	0.57 U	0.56 U	0.53 U	2.8 U	3.2 U	0.57 U	0.53 U	0.55 U	0.55 U	0.55 U	0.14 J	0.56 U	0.56 U	0.5 U	0.55 U	0.51 U	0.52 U
PCB-018	—	—	2.3 U	2.3 U	2.1 U	11 U	13 U	2.3 U	2.1 U	2.2 U	2.2 U	2.2 U	0.55 U	2.2 U	2.2 U	2 U	2.2 U	2.0 U	2.1 U
PCB-028	—	—	0.57 U	0.56 U	0.53 U	2.8 U	3.2 U	0.57 U	0.53 U	0.55 U	0.55 U	0.55 U	0.55 U	0.56 U	0.56 U	0.5 U	0.55 U	0.51 U	0.52 U
PCB-052	—	—	0.57 U	0.56 U	0.53 U	2.8 U	3.2 U	0.57 U	0.53 U	0.55 U	0.55 U	0.55 U	0.55 U	0.56 U	0.56 U	0.5 U	0.55 U	0.51 U	0.52 U
PCB-044	—	—	0.57 U	0.56 U	0.53 U	2.8 U	3.2 U	0.57 U	0.53 U	0.55 U	0.55 U	0.55 U	0.55 U	0.56 U	0.56 U	0.5 U	0.55 U	0.51 U	0.52 U
PCB-066	—	—	0.57 U	0.56 U	0.53 U	2.8 U	3.2 U	0.57 U	0.53 U	0.55 U	0.55 U	0.55 U	0.55 U	0.56 U	0.56 U	0.5 U	0.55 U	0.51 U	0.52 U
PCB-101	—	—	0.57 U	0.56 U	0.53 U	2.7 J	3.6 J	0.53 J	0.53 U	0.55 U	0.55 U	0.55 U	0.55 U	0.56 U	0.56 U	0.5 U	0.55 U	0.51 U	0.52 U
PCB-118	—	—	0.57 U	0.56 U	0.53 U	0.89	1.1 J	0.23 J	0.53 U	0.55 U	0.55 U	0.55 U	0.55 U	0.56 U	0.56 U	0.5 U	0.55 U	0.51 U	0.52 U
PCB-153	—	—	0.23 J	0.56 U	0.26 J	9.3	12	2	0.47 J	0.72 J	1.2 J	0.44 J	1.1 J	0.56 U	0.56 U	0.5 U	0.62 J	0.51 U	0.52 U
PCB-105	—	—	1.1 U	1.1 U	1.1 U	5.6 U	6.4 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0.14 J	1.1 U	1.1 U	1 U	1.1 U	1 U	1 U
PCB-138	—	—	0.57 U	0.56 U	0.57 U	6.1	8.1	1.4 J	0.53 U	0.34 J	0.66 J	0.14 J	0.64 U	0.56 U	0.56 U	0.5 U	0.55 U	0.51 U	0.52 U
PCB-187	—	—	0.57 U	0.56 U	0.53 U	3.6	4.4 J	0.85 J	2.1 U	0.2 J	0.53 J	0.55 U	0.64 U	0.56 U	0.56 U	0.5 U	0.25 J	0.51 U	0.52 U
PCB-128	—	—	0.57 U	0.56 U	0.53 U	2.8 U	3.2 U	0.57	0.53 U	0.55 U	0.55 U	0.55 U	0.64 U	0.56 U	0.56 U	0.5 U	0.55 U	0.51 U	0.52 U
PCB-180	—	—	0.57 U	0.56 U	0.53 U	6.3	8.4	1.6	0.53 U	0.37 J	0.79 J	0.55 U	0.64 U	0.56 U	0.56 U	0.5 U	0.55 U	0.51 U	0.52 U
PCB-170	—	—	0.57 U	0.56 U	0.53 U	3.5	4.6 J	0.85 J	0.53 U	0.22 J	0.48 J	0.55 U	0.64 U	0.56 U	0.56 U	0.5 U	0.55 U	0.51 U	0.52 U
PCB-195	—	—	0.57 U	0.56 U	0.53 U	0.64	0.76 J	0.18 J	0.53 U	0.55 U	0.15 J	0.55 U	0.64 U	0.56 U	0.56 U	0.5 U	0.55 U	0.51 U	0.52 U
PCB-206	—	—	0.57 U	0.56 U	0.53 U	2.8 U	3.2 U	0.57 U	0.53 U	0.55 U	0.55 U	0.55 U	0.64 U	0.56 U	0.56 U	0.5 U	0.55 U	0.51 U	0.52 U
PCB-209	—	—	0.57 U	0.56 U	0.53 U	2.8 U	0.7 J	0.53 J	0.53 U	0.55 U	0.55 U	0.55 U	0.64 U	0.56 U	0.56 U	0.5 U	0.55 U	0.51 U	0.52 U
Total PCBs [c]	170	420	0.46 J	2.3 U	0.52 J	66 J	87 J	16 J	0.47 J	3.7 J	7.6 J	1.1 J	2.6 U	2.2 U	2.2 U	2 U	1.74 J	2.0 U	2.1 U

— not applicable/no data
µg/kg microgram per kilogram
ft foot
J estimated concentration
mg/kg milligram per kilogram
RG remediation goal
U non-detect concentration

[a] Pearl Harbor Sediment remediation goal (DON 2018).
[b] RAL_0 criterion to determine whether the native formation material is subject to CERCLA response action.
[c] Calculated as two times the sum of the NOAA-18 congeners.
[d] Duplicate sample.



LOCATION MAP

LEGEND

- DD5B Native Formation Dredge Footprint
- DU Sub-Area Designated for Dredging
- DU Sub-Area Designated for ENR
- DU Sub-Area Designated for ENR + AC
- DU Sub-Area Designated for MNR
- DU Sub-Area Designated for MNR + AC
- DU Sub-Area Designated for No Remedy

NOTES

1. Map Projection: UTM State Plane Zone 3 unit feet, NAD 83 Datum.
2. Basemap source: ESRI
3. Abbreviation:
   - AC activated carbon treatment
   - DU decision unit
   - ENR enhanced natural recovery
   - MNR monitored natural recovery

N

0 125 250 500 Feet

Figure 1
Project Location Map
Native Formation Sampling Letter Report
Dry Dock 5 Construction Dredging
PHNC National Priorities List Site
JBPHH, Oahu, Hawaii

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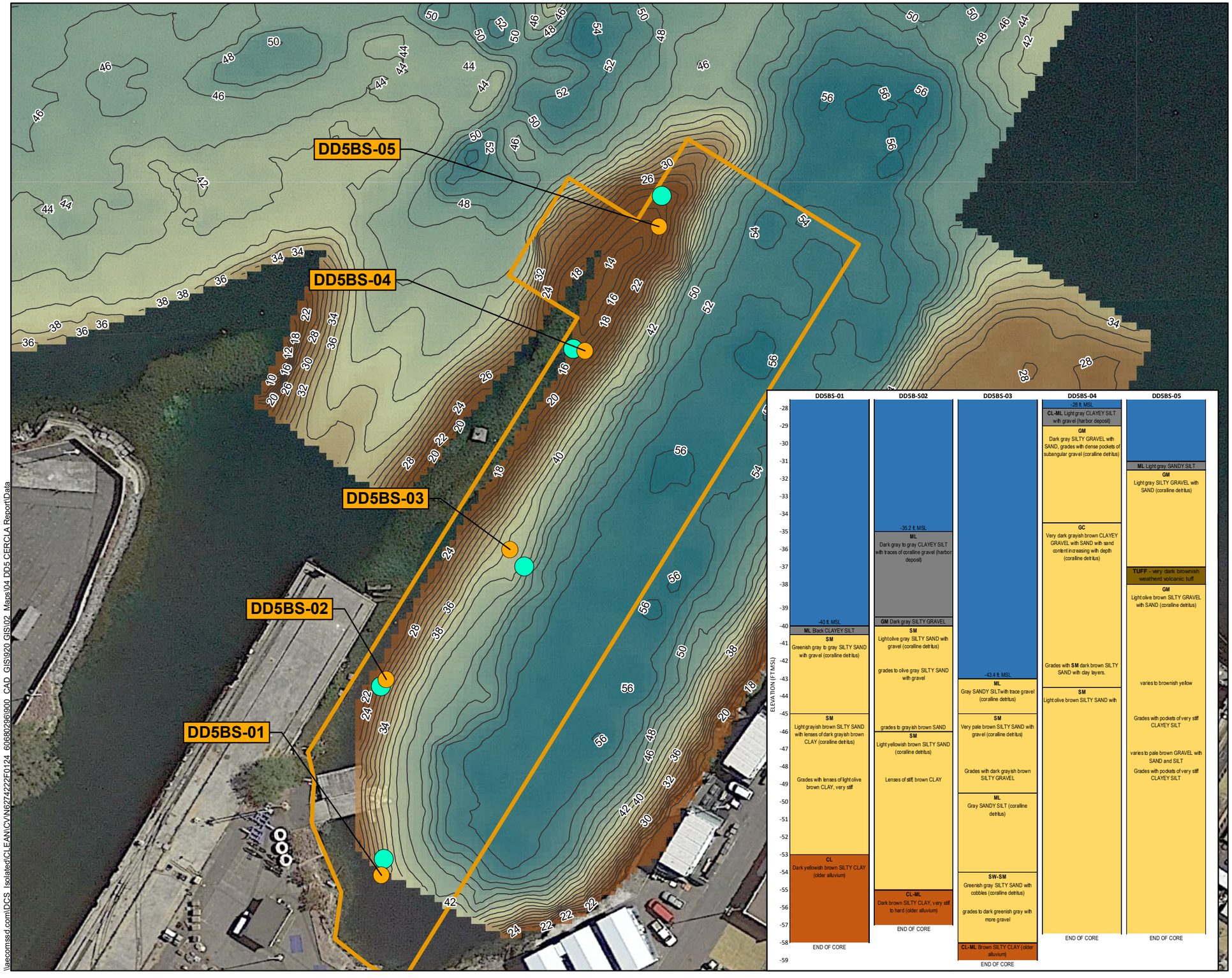

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LEGEND

- Actual Native Formation Sampling Location
- Proposed Native Formation Sampling Location
- DD5B Native Formation Dredge Footprint
- 2-ft Bathymetric Contour (ft MSL)

Bathymetry (ft MSL)

- High : -56
- Low : -9

NOTES

1. Map Projection: UTM State Plane Zone 3 unit feet, NAD 83 Datum.
2. Basemap source: ESRI
3. Non-detect values are reported to the limit of detection
4. Core log legend:

Harbor Water
Soft Harbor Sediment
Native Formation - Coralline Detritus
Native Formation - Volcanic Tuff
Native Formation - Older Alluvium

N

0 25 50 100 Feet

Figure 2
Sampling Locations and Stratigraphy
Native Formation Sampling Letter Report
Dry Dock 5 Construction Dredging
PHNC National Priorities List Site
JBPHH, Oahu, Hawaii

DD5BS-05						
Sample ID	Sample Depth (ft)	COC	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	PCBs (µg/kg)
		RAL_0	*1,900*	*1,000*	*1.3*	*420*
		RG	*214*	*119*	*0.71*	*170*
JT208	0 – 1		97.4	4.12	0.12	1.7 J
JT209	1 – 2		31.1	0.32	0.016 J	2.0 U
JT210	2 – 3		30.9	0.32	0.016 U	2.1 U

DD5BS-04						
Sample ID	Sample Depth (ft)	COC	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	PCBs (µg/kg)
		RAL_0	*1,900*	*1,000*	*1.3*	*420*
		RG	*214*	*119*	*0.71*	*170*
JT212	0 – 1		18.9	1.13	0.016 U	2.2 U
JT213	1 – 2		11	0.24	0.018 U	2.2 U
JT214	2 – 3		21	0.18	0.017 U	2.0 U

DD5BS-03						
Sample ID	Sample Depth (ft)	COC	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	PCBs (µg/kg)
		RAL_0	*1,900*	*1,000*	*1.3*	*420*
		RG	*214*	*119*	*0.71*	*170*
JT227	0 – 1		38.4	19.7	0.051	7.6 J
JT228	1 – 2		19.1	0.94	0.016 J	1.1 J
JT229	2 – 3		13.8	0.25	0.02 U	2.6 U

DD5BS-02						
Sample ID	Sample Depth (ft)	COC	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	PCBs (µg/kg)
		RAL_0	*1,900*	*1,000*	*1.3*	*420*
		RG	*214*	*119*	*0.71*	*170*
JT220	0 – 1		18.6	20.5	0.079	66 J
JT224	0 – 1 dup		46.2	7.8	0.16	87 J
JT221	1 – 2		17.6	0.89	0.0089 J	16 J
JT222	2 – 3		16	0.45	0.0077 J	1.4 J
JT226	2 – 3 dup		15.6	0.44	0.0072 J	3.7 J

DD5BS-01						
Sample ID	Sample Depth (ft)	COC	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	PCBs (µg/kg)
		RAL_0	*1,900*	*1,000*	*1.3*	*420*
		RG	*214*	*119*	*0.71*	*170*
JT216	0 – 1		21.8	4.07	0.31	0.46 J
JT217	1 – 2		25.8	3.36	0.06	2.3 U
JT218	2 – 3		16	1.07	0.049	0.52 J

LEGEND

- Actual Native Formation Sampling Location
- Proposed Native Formation Sampling Location
- DD5B Native Formation Dredge Footprint
- 2-ft Bathymetric Contour (ft MSL)

Bathymetry (ft MSL)

High : -56

Low : -9

NOTES

1. Map Projection: UTM State Plane Zone 3 unit feet, NAD 83 Datum.
2. Basemap source: ESRI
3. Non-detect values are reported to the limit of detection
4. µg/kg microgram per kilogram
   ft foot
   J estimated concentration
   mg/kg milligram per kilogram
   MSL mean sea level
   PCBs polychlorinated biphenyls
   U non-detect concentration

N

0 25 50 100 Feet

Figure 3
Analytical Chemistry Results
Native Formation Sampling Letter Report
Dry Dock 5 Construction Dredging
PHNC National Priorities List Site
JBPHH, Oahu, Hawaii

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Attachment 1:
Native Formation Coring Logs

AECOM

BORING LOG

BORING: DD5BS-01
PAGE 1 OF 5

CLIENT NAVFAC
PROJECT NAME Dry Dock EIS at JBPHH, Oahu, Hawaii
PROJECT NUMBER
GENERAL LOCATION Joint Base Pearl Harbor Hickam, Oahu, Hawaii
DATE/TIME STARTED 10/11/2023 09:25 AM
DRILLING METHOD PQ Core/ California Barrel
TOTAL DEPTH OF BORING (FT BGS) 59.5
DATE/TIME FINISHED 10/11/2023
DRILLING CONTRACTOR Geolabs
GROUND WATER LEVELS:
BORING NORTHING 67,183.000
DRILLER J. Loane
▽ **AT TIME OF DRILLING** ---
BORING EASTING 1,653,321.000
DRILLING EQUIPMENT PQ Core/ California Barrel
▼ **AFTER DRILLING** ---
DATUM NAD83 Hawaii State Plane Zone 3 (feet)
SIZE AND TYPE OF BIT 4.5" PQ Core
ANALYTICAL SAMPLE TYPE Composite
GROUND ELEVATION (FT MSL) 1.50
BOREHOLE DIAMETER (IN) 4.5
NUMBER OF ANALYTICAL SAMPLES
COMPLETION INFORMATION
LOGGED BY C. Smith
SURFACE DESCRIPTION Mud/water interface measured at 1.7' below sea deck and adjusted by a tide of -0.2'. Calculated elevation is 1.5' MSL.
CHECKED BY

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
	CORE					**DECKING**						0	
0						**AIR**							
						WATER						5	
-5													
												10	

(Continued Next Page)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-10												10	
-15												15	
-20												20	

(Continued Next Page)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-25												25	
-30												30	
												35	

(Continued Next Page)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-35												40	
-40	CAL	3			ML	**CLAYEY SILT**; black (2.5Y 2.5/1), wet, very soft, organic odor (harbor deposit)	5	10	85				
					SM	**SILTY SAND**; greenish gray (GLEY1 5/10GY) to gray (2.5Y 5/1), wet, loose, with various amounts of gravel, (coralline detritus)	15	60	25		JT216		
	CAL	8									JT217		
											JT218		
	CAL	15									JT219	45	
-45	CAL	19			SM	**SILTY SAND**; light grayish brown (2.5Y 6/3), wet, medium dense, with some gravel, lesser amounts of clay lenses, dark grayish brown (2.5Y 3/2) in color, (coralline detritus)	10	65	25				
	CAL	16											

(Continued Next Page)

BORING LOG

BORING: DD5BS-01
PAGE 5 OF 5

CLIENT NAVFAC
PROJECT NAME Dry Dock EIS at JBPHH, Oahu, Hawaii
PROJECT NUMBER
GENERAL LOCATION Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
	CORE												
	CAL	11				grades to with clay lenses, light olive brown (2.5Y 5/6), very stiff						50	
-50	CAL	17											
	CAL	22											
					CL	**SILTY CLAY**; dark yellowish brown (10YR 3/4), wet, very stiff to hard, (older alluvium)	0	0	100				
	CORE												
	CAL	28										55	
-55	CAL	60											
	CAL	92											

End of Boring (-58.00 ft msl)

BORING LOG

BORING: DD5BS-02

CLIENT NAVFAC
PROJECT NAME Dry Dock EIS at JBPHH, Oahu, Hawaii
PROJECT NUMBER
GENERAL LOCATION Joint Base Pearl Harbor Hickam, Oahu, Hawaii
DATE/TIME STARTED 10/13/2023 09:22 AM
DRILLING METHOD Manual
TOTAL DEPTH OF BORING (FT BGS) 59.5
DATE/TIME FINISHED 10/13/2023
DRILLING CONTRACTOR Geolabs
GROUND WATER LEVELS:
BORING NORTHING 69,317.000
DRILLER J. Loane
▽ **AT TIME OF DRILLING** ---
BORING EASTING 1,653,324.000
DRILLING EQUIPMENT PQ Core/ California Barrel
▼ **AFTER DRILLING** ---
DATUM NAD83 Hawaii State Plane Zone 3 (feet)
SIZE AND TYPE OF BIT 4.5" PQ Core
ANALYTICAL SAMPLE TYPE Composite
GROUND ELEVATION (FT MSL) 1.30
BOREHOLE DIAMETER (IN) 4.5
NUMBER OF ANALYTICAL SAMPLES
COMPLETION INFORMATION
LOGGED BY M. Zinn
SURFACE DESCRIPTION Mud/water interface measured at 1.7' below sea deck and adjusted by a tide of -0.9'. Calculated elevation is 1.3' MSL.
CHECKED BY

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
1.3	CORE					**DECKING**						0	
0						**AIR**							
						WATER						5	
-5													
												10	
-10													
												15	

(Continued Next Page)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-15												15	
-20												20	
-25												25	
-30												30	

(Continued Next Page)

BORING LOG

BORING: DD5BS-02

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-35												35	
					CL-ML	**CLAYEY SILT**; dark gray to gray, wet, very soft, with traces of coralline gravel, (harbor deposit)							
	CAL	13			GM	**SILTY GRAVEL with SAND**; dark gray (5Y 4/1), wet, medium dense, (coralline detritus)	40	25	35		JT220	40	
					SM		25	40	35				
-40						**SILTY SAND**; light olive gray (5Y 6/2), wet, medium dense, with various amounts of gravel (coralline detritus)	10	65	25		JT221 JT223		
	CAL	16									JT222		
	CAL	23				grades to olive gray (5Y 5/2), medium to coarse sand, with clayey silt locally	30	40	30				
	CORE												
	CAL	20					20	60	20			45	
-45	CAL	22				grades to grayish brown (2.5Y 5/2),	15	60	25				
					SM	**SILTY SAND**; light yellowish brown (2.5Y 6/4), wet, medium dense, (coralline detritus)							
	CAL	24											
	CORE												
	CAL	16				with stiff, brown clayey pockets locally, up to 1.5" thick	0	20	80			50	
-50	CAL	18											
	CAL	19											

(Continued Next Page)

AECOM

BORING LOG

BORING: DD5BS-02
PAGE 4 OF 4

CLIENT NAVFAC
PROJECT NAME Dry Dock EIS at JBPHH, Oahu, Hawaii
PROJECT NUMBER
GENERAL LOCATION Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
	CORE												
	CAL	21				medium to coarse sand, angular						55	
-55	CAL	58			CL-ML	**SILTY CLAY**; dark brown (10YR 3/3), moist, very stiff to hard, (older alluvium)	0	0	100				
						End of Boring (-57.00 ft msl)							

Project File: DD5.GPJ; Library: CTO-0049_GINT_LIBRARY.GLB; Report: BORING LOG DD5; Date: 11/2/23

BORING LOG

BORING: DD5BS-02A (run 2)

CLIENT NAVFAC
PROJECT NAME Dry Dock EIS at JBPHH, Oahu, Hawaii
PROJECT NUMBER
GENERAL LOCATION Joint Base Pearl Harbor Hickam, Oahu, Hawaii
DATE/TIME STARTED 10/13/2023 12:20 PM
DRILLING METHOD Manual
TOTAL DEPTH OF BORING (FT BGS) 59.5
DATE/TIME FINISHED 10/13/2023
DRILLING CONTRACTOR Geolabs
GROUND WATER LEVELS:
BORING NORTHING 69,317.000
DRILLER J. Loane
AT TIME OF DRILLING ---
BORING EASTING 1,653,324.000
DRILLING EQUIPMENT PQ Core/ California Barrel
AFTER DRILLING ---
DATUM NAD83 Hawaii State Plane Zone 3 (feet)
SIZE AND TYPE OF BIT 4.5" PQ Core
ANALYTICAL SAMPLE TYPE Composite
GROUND ELEVATION (FT MSL) 2.00
BOREHOLE DIAMETER (IN) 4.5
NUMBER OF ANALYTICAL SAMPLES
COMPLETION INFORMATION
LOGGED BY M. Zinn
SURFACE DESCRIPTION Mud/water interface measured at 1.7' below sea deck and adjusted by a tide of -0.9'. Calculated elevation is 1.3' MSL.
CHECKED BY

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
0	CORE					**DECKING**						0	
						AIR							
0						**WATER**							
-5												5	
-10												10	
												15	

(Continued Next Page)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-15												15	
-20												20	
-25												25	
-30												30	

(Continued Next Page)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	Estimated %: Gravel	Estimated %: Sand	Estimated %: Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
												35	
-35					CL-ML	**CLAYEY SILT**; dark gray to gray, wet, very soft, with traces of coralline gravel, (harbor deposit)	0	15	85				
	CAL											40	
	CAL				SM	**SILTY GRAVEL with SAND**; dark gray (5Y 4/1), wet, medium dense, (coralline detritus)	10	65	25				
-40													
	CAL				SM	**SILTY SAND**; light olive gray (5Y 6/2), wet, medium dense, with various amounts of gravel (coralline detritus)	20	60	20				
	CORE											45	
	CAL												
	CAL				SM	**SILTY SAND**; olive gray (5Y 5/2), wet, medium dense, with a little clay (coralline detritus)	15	60	25				
-45													
	CAL												
	CORE				SM	**SILTY SAND**; light yellowish brown (2.5Y 6/4), wet, medium dense, with a little clay (coralline detritus)	0	20	80			50	
	CAL												
-50													
	CAL												

(Continued Next Page)

AECOM

BORING LOG

BORING: DD5BS-02A (run 2)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
	CORE											55	
	CAL												
	CAL												
-55					CL-ML	**SILTY CLAY**; dark brown (10YR 3/3), moist, very stiff to hard, (older alluvium)	0	0	100				
						End of Boring (-56.5.00 ft msl)							

AECOM

BORING LOG

BORING: DD5BS-03
PAGE 1 OF 4

CLIENT NAVFAC
PROJECT NAME Dry Dock EIS at JBPHH, Oahu, Hawaii
PROJECT NUMBER
GENERAL LOCATION Joint Base Pearl Harbor Hickam, Oahu, Hawaii
DATE/TIME STARTED 10/14/2023 09:39 AM
DRILLING METHOD Manual
TOTAL DEPTH OF BORING (FT BGS) 60.0
DATE/TIME FINISHED 10/14/2023
DRILLING CONTRACTOR Geolabs
GROUND WATER LEVELS:
BORING NORTHING ---
DRILLER J. Loane
▽ **AT TIME OF DRILLING** ---
BORING EASTING ---
DRILLING EQUIPMENT PQ Core/ California Barrel
▼ **AFTER DRILLING** ---
DATUM NAD83 Hawaii State Plane Zone 3 (feet)
SIZE AND TYPE OF BIT 4.5" PQ Core
ANALYTICAL SAMPLE TYPE Composite
GROUND ELEVATION (FT MSL) 1.30
BOREHOLE DIAMETER (IN) 4.5
NUMBER OF ANALYTICAL SAMPLES
COMPLETION INFORMATION
LOGGED BY M. Zinn
SURFACE DESCRIPTION Mud/water interface measured at 1.7' below sea deck and adjusted by a tide of -0.4'. Calculated elevation is 1.3' MSL.
CHECKED BY

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
1	CORE					**DECKING**						0	
0						**AIR**							
						WATER						5	
-5												10	
-10												15	

Project File: DD5.GPJ; Library: CTO-0049_GINT_LIBRARY.GLB; Report: BORING LOG DD5; Date: 11/2/23

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AECOM

BORING LOG

BORING: DD5BS-03
PAGE 2 OF 4

CLIENT NAVFAC
PROJECT NAME Dry Dock EIS at JBPHH, Oahu, Hawaii
PROJECT NUMBER
GENERAL LOCATION Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-15												15	
-20												20	
-25												25	
-30												30	

(Continued Next Page)

BORING LOG

BORING: DD5BS-03

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-35												35	
-40												40	
					ML	**SANDY SILT**; gray, wet, very soft soft, with trace gravel, gravel coralline, (fill)						45	
-45	CAL	0									JT227		
	CAL	12			SM	**SILTY SAND**; very pale brown (10YR 8/2), wet, very loose to loose, with a some gravel, coralline, (fill)	25	60	15		JT228		
											JT229		
	CAL	5									JT230		
	CAL	0				varies to dark grayish brown (10YR 4/2), increased gravel content	50	35	15			50	Little to no recovery
-50					ML	**SANDY SILT**; gray, wet, very soft, (fill)	0	15	85				
	CAL	0											

(Continued Next Page)

AECOM

BORING LOG

BORING: DD5BS-03
PAGE 4 OF 4

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	Estimated %: Gravel	Estimated %: Sand	Estimated %: Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
	CAL	4											
	CAL	26										55	Little recovery
-55					SW-SM	**SILTY SAND**; greenish gray (GLEY1 6/10Y), wet, loose to medium dense, trace cobble, coralline, (fill)	3	67	30				
	CAL	13				varies to to dark greenish gray (GLEY1 4/10Y), becomes gravelly	35	25	40				
	CAL	8				varies to light brownish gray (2.5Y 6/2)	20	60	20				
					CL-ML	**SILTY CLAY**; brown, moist, stiff to very stiff, (older alluvium)			100			60	

End of Boring (-58.50 ft msl)

BORING LOG

BORING: DD5BS-03A (run 2)

CLIENT NAVFAC
PROJECT NAME Dry Dock EIS at JBPHH, Oahu, Hawaii
PROJECT NUMBER
GENERAL LOCATION Joint Base Pearl Harbor Hickam, Oahu, Hawaii
DATE/TIME STARTED 10/14/2023 11:20 AM
DRILLING METHOD Manual
TOTAL DEPTH OF BORING (FT BGS) 60.0
DATE/TIME FINISHED 10/14/2023
DRILLING CONTRACTOR Geolabs
GROUND WATER LEVELS:
BORING NORTHING ---
DRILLER J. Loane
AT TIME OF DRILLING ---
BORING EASTING ---
DRILLING EQUIPMENT PQ Core/ California Barrel
AFTER DRILLING ---
DATUM NAD83 Hawaii State Plane Zone 3 (feet)
SIZE AND TYPE OF BIT 4.5" PQ Core
ANALYTICAL SAMPLE TYPE Composite
GROUND ELEVATION (FT MSL) 1.30
BOREHOLE DIAMETER (IN) 4.5
NUMBER OF ANALYTICAL SAMPLES
COMPLETION INFORMATION
LOGGED BY M. Zinn
SURFACE DESCRIPTION Mud/water interface measured at 1.7' below sea deck and adjusted by a tide of -0.4'. Calculated elevation is 1.3' MSL.
CHECKED BY

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
0	CORE					**DECKING**						0	
						AIR							
						WATER							
-5												5	
-10												10	
												15	

(Continued Next Page)

AECOM

BORING LOG

BORING: DD5BS-03A (run 2)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-15												15	
-20												20	
-25												25	
-30												30	

(Continued Next Page)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-35												35	
-40												40	
	CAL	45			SM	**SILTY SAND with GRAVEL**; dark grayish brown (2.5YR 4/2), wet, medium dense, angular gravel, coralline, (fill)	30	50	20			45	
-45	CAL	22											
					ML	**SANDY SILT with GRAVEL**; pale brown (2.5Y7/3), wet, very soft, coralline, (fill)	15	25	60				45'-50': no recovery
	CAL	7											
	CAL	2										50	
-50	CAL	0											50'-55': 2' recovery

(Continued Next Page)

AECOM

BORING LOG

BORING: DD5BS-03A (run 2)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	Estimated % Gravel	Estimated % Sand	Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-55	CAL	2				grades to with gravel pockets locally, varies to black (5Y 2.5/2) and pale brown (2.5Y 7/3) varies to greenish gray (GLEY1 6/10Y) olive gray (5Y 4/2)	25	55	30			55	
	CAL	5											
	CAL	2				varies to gray (10YR 6/1)							55'-60': 2' recovery
	CAL	7											
					CL-ML	**SILTY CLAY**; dark brown (10YR 3/3), moist, stiff to very stiff, (older alluvium)			100			60	

End of Boring (-58.50 ft msl)

BORING LOG

BORING: DD5BS-03B (run 3)

CLIENT NAVFAC
PROJECT NAME Dry Dock EIS at JBPHH, Oahu, Hawaii
PROJECT NUMBER
GENERAL LOCATION Joint Base Pearl Harbor Hickam, Oahu, Hawaii
DATE/TIME STARTED 10/14/2023 01:10 PM
DRILLING METHOD Manual
TOTAL DEPTH OF BORING (FT BGS) 60.0
DATE/TIME FINISHED 10/14/2023
DRILLING CONTRACTOR Geolabs
GROUND WATER LEVELS:
BORING NORTHING ---
DRILLER J. Loane
AT TIME OF DRILLING ---
BORING EASTING ---
DRILLING EQUIPMENT PQ Core/ California Barrel
AFTER DRILLING ---
DATUM NAD83 Hawaii State Plane Zone 3 (feet)
SIZE AND TYPE OF BIT 4.5" PQ Core
ANALYTICAL SAMPLE TYPE Composite
GROUND ELEVATION (FT MSL) 1.80
BOREHOLE DIAMETER (IN) 4.5
NUMBER OF ANALYTICAL SAMPLES
COMPLETION INFORMATION
LOGGED BY M. Zinn
SURFACE DESCRIPTION Mud/water interface measured at 1.7' below sea deck and adjusted by a tide of -0.4'. Calculated elevation is 1.3' MSL.
CHECKED BY

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
	CORE					**DECKING**						0	
						AIR							
0						**WATER**							
-5												5	
-10												10	
												15	

(Continued Next Page)

AECOM

BORING LOG

BORING: DD5BS-03B (run 3)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-15												15	
-20												20	
-25												25	
-30												30	

(Continued Next Page)

BORING LOG

BORING: DD5BS-03B (run 3)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-35												35	
												40	
-40													
					ML	**SANDY SILT**; pale brown (2.5Y7/3), wet, very soft, with trace gravel, coralline, (fill)						45	
	CAL	0											
-45	CAL	0											45'-50': No recovery
	CAL	0											
	CAL	2										50	
-50	CAL	1											
					SM	**SILTY SAND**; dark grayish brown (10YR 4/2), wet, medium dense, with some	15	55	30				50'-55': 2.5' recovery

(Continued Next Page)

AECOM

BORING LOG

BORING: DD5BS-03B (run 3)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
	CAL	37				gravel and clay, (coralline detritus)							
	CAL	40										55	
-55	CAL	72			CL-ML	**SILTY CLAY**; yellowish brown (10YR 3/4), moist, very stiff to hard, (older alluvium)	0	0	100				
						End of Boring (-57.25 ft msl)						60	

BORING LOG

BORING: DD5BS-03B (run 4)

CLIENT NAVFAC
PROJECT NAME Dry Dock EIS at JBPHH, Oahu, Hawaii
PROJECT NUMBER
GENERAL LOCATION Joint Base Pearl Harbor Hickam, Oahu, Hawaii
DATE/TIME STARTED 10/14/2023 02:15 PM
DRILLING METHOD Manual
TOTAL DEPTH OF BORING (FT BGS) 60.0
DATE/TIME FINISHED 10/14/2023
DRILLING CONTRACTOR Geolabs
GROUND WATER LEVELS:
BORING NORTHING ---
DRILLER J. Loane
AT TIME OF DRILLING ---
BORING EASTING ---
DRILLING EQUIPMENT PQ Core/ California Barrel
AFTER DRILLING ---
DATUM NAD83 Hawaii State Plane Zone 3 (feet)
SIZE AND TYPE OF BIT 4.5" PQ Core
ANALYTICAL SAMPLE TYPE Composite
GROUND ELEVATION (FT MSL) 2.10
BOREHOLE DIAMETER (IN) 4.5
NUMBER OF ANALYTICAL SAMPLES
COMPLETION INFORMATION
LOGGED BY M. Zinn
SURFACE DESCRIPTION Mud/water interface measured at 1.7' below sea deck and adjusted by a tide of -0.4'. Calculated elevation is 1.3' MSL.
CHECKED BY

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
2	CORE					**DECKING**						0	
						AIR							
0						**WATER**							
-5												5	
-10												10	
												15	

(Continued Next Page)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-15												15	
-20												20	
-25												25	
-30												30	

(Continued Next Page)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-35												35	
-40												40	
					CL-ML	**CLAYEY SILT**; pale brown (2.5Y7/3), wet, very soft, with trace gravel, coralline, (harbor deposit)						45	
-45													
												50	
-50	CAL	6			SM	**SILTY SAND**; greensh gray (GLEY1 5/10Y), wet, very loose, with a little gravel, (coralline detritus)	10	50	40				

(Continued Next Page)

AECOM

BORING LOG

BORING: DD5BS-03B (run 4)
PAGE 4 OF 4

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
	CAL	20				varies to light olive brown (2.5Y 3/2), becomes clayey	20	50	30				
	CAL	35										55	
-55	CAL	67			CL-ML	**SILTY CLAY**; yellowish brown (10YR 3/3), moist, very stiff to hard, (older alluvium)			100				
						End of Boring (-57.80 ft msl)						60	

BORING LOG

BORING: DD5BS-04
PAGE 1 OF 4

CLIENT NAVFAC
PROJECT NAME Dry Dock EIS at JBPHH, Oahu, Hawaii
PROJECT NUMBER
GENERAL LOCATION Joint Base Pearl Harbor Hickam, Oahu, Hawaii
DATE/TIME STARTED 10/10/2023 01:15 PM
DRILLING METHOD Manual
TOTAL DEPTH OF BORING (FT BGS) 58.0
DATE/TIME FINISHED 10/10/2023
DRILLING CONTRACTOR Geolabs
GROUND WATER LEVELS:
BORING NORTHING 67,543.000
DRILLER J. Loane
AT TIME OF DRILLING ---
BORING EASTING 1,653,459.000
DRILLING EQUIPMENT PQ Core/ California Barrel
AFTER DRILLING ---
DATUM NAD83 Hawaii State Plane Zone 3 (feet)
SIZE AND TYPE OF BIT 4.5" PQ Core
ANALYTICAL SAMPLE TYPE Composite
GROUND ELEVATION (FT MSL) 1.60
BOREHOLE DIAMETER (IN) 4.5
NUMBER OF ANALYTICAL SAMPLES
COMPLETION INFORMATION
LOGGED BY M. Zinn
SURFACE DESCRIPTION Mud/water interface measured at 1.7' below sea deck and adjusted by a tide of -0.1'. Calculated elevation is 1.6' MSL.
CHECKED BY

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
1.6	CORE					**DECKING**						0	
0						**AIR**							
						WATER						5	
-5													
												10	
-10													
												15	

(Continued Next Page)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-15												15	
												20	
-20												25	
					CL-ML	**CLAYEY SILT**; light gray, wet, soft, with a little gravel (harbor deposit)	5	0	95			30	
	CAL	13			GM	**SILTY GRAVEL with SAND**; dark gray (5Y 4/1), wet, medium dense, grades with dense sandy gravel pockets locally, subangular gravel, (coralline detritus)	70	15	15		JT212		
-30	CAL	22									JT213		
						varies to gray (10YR 6/1)	50	35	15				
	CAL	55									JT214		

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BORING LOG

BORING: DD5BS-04
PAGE 3 OF 4

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	Estimated % Gravel	Estimated % Sand	Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
	CORE					varies to white (10YR 8/1), poorly graded, angular gravel up to 2" in diameter	80	15	5		JT215		
	CAL	13				varies to light brownish gray (10YR 6/2)						35	
-35	CAL	16			GC	**CLAYEY GRAVEL with SAND**; very dark grayish brown (10YR 3/2), wet, medium dense, sand increases with depth(coralline detritus)	60	10	30				
	CAL	20											
	CORE												
	CAL	28				varies to light olive brown (2.5Y 5/4), subangular gravel up to 5" in diameter	40	35	25			40	
-40	CAL	19											
	CAL	30				grades with dark brown clay layers (10YR 3/3) locally	5	75	20				
	CORE												
	CAL	17			SM	grades to **SILTY SAND with GRAVEL**; light olive brown (5Y 4/1), wet, medium dense, decreasing gravel content with depth (coralline detritus)	25	55	20			45	
-45	CAL	17											
	CAL	19											
	CORE												
	CAL	22										50	
-50	CAL	29											
	CAL	24											

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AECOM

BORING LOG

BORING: DD5BS-04
PAGE 4 OF 4

CLIENT NAVFAC
PROJECT NAME Dry Dock EIS at JBPHH, Oahu, Hawaii
PROJECT NUMBER
GENERAL LOCATION Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-55	CORE											55	
	CAL	29											
	CAL	29											
	CAL	37											

End of Boring (-57.50 ft msl)

BORING LOG

BORING: DD5BS-05

CLIENT NAVFAC
PROJECT NAME Dry Dock EIS at JBPHH, Oahu, Hawaii
PROJECT NUMBER
GENERAL LOCATION Joint Base Pearl Harbor Hickam, Oahu, Hawaii
DATE/TIME STARTED 10/9/2023 10:44 AM
DRILLING METHOD Manual
TOTAL DEPTH OF BORING (FT BGS) 58.0
DATE/TIME FINISHED 10/9/2023
DRILLING CONTRACTOR Geolabs
GROUND WATER LEVELS:
BORING NORTHING 67,629.000
DRILLER J. Loane
AT TIME OF DRILLING ---
BORING EASTING 1,653,512.000
DRILLING EQUIPMENT PQ Core/ California Barrel
AFTER DRILLING ---
DATUM NAD83 Hawaii State Plane Zone 3 (feet)
SIZE AND TYPE OF BIT 4.5" PQ Core
ANALYTICAL SAMPLE TYPE Composite
GROUND ELEVATION (FT MSL) 2.30
BOREHOLE DIAMETER (IN) 4.5
NUMBER OF ANALYTICAL SAMPLES
COMPLETION INFORMATION
LOGGED BY M. Zinn
SURFACE DESCRIPTION Mud/water interface measured at 1.7' below sea deck and adjusted by a tide of 0.6'. Calculated elevation is 2.3' MSL.
CHECKED BY

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
2.3	CORE					**DECKING**						0	
						AIR							
0						**WATER**							
-5												5	
-10												10	
												15	

(Continued Next Page)

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-15												15	
-20												20	
-25												25	
	CAL	12			ML	**SANDY SILT**; light gray, wet, soft, with a little gravel (coralline), (harbor deposit)						30	
					GM	grades to **SILTY GRAVEL with SAND**; light gray (10YR 7/2), fine to coarse, angular, wet, medium dense, decreasing gravel content with depth (coralline detritus)	60	15	25		JT208		
-30	CAL	19									JT209		
						varies to very pale brown (10YR 7/3), subangular to angular	40	35	25		JT210		
	CAL	32									JT211		

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AECOM

BORING LOG

BORING: DD5BS-05
PAGE 3 OF 4

CLIENT NAVFAC **PROJECT NAME** Dry Dock EIS at JBPHH, Oahu, Hawaii

PROJECT NUMBER **GENERAL LOCATION** Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
-35	CORE											35	
	CAL	30											
	CAL	38				varies to yellowish brown (10YR 5/4), silt increases, becomes slightly plastic	40	25	35				
	CAL	42											
	CORE												
	CAL	15			GM	**TUFF**; very dark brownish (10YR 3/2), wet, soft to medium hard, moderate to highly weathered, (volcanic tuff)	60	15	25			40	
-40	CAL	20			GM	grades to **SILTY GRAVEL with SAND**; light olive brown (10YR 3/3), fine to coarse, subangular, wet, medium dense, medium to coarse sand, slightly plastic (coralline detritus)	40	30	30				
	CAL	28											
	CORE												
	CAL	24				varies to brownish yellow (10YR 4/6), becomes sticky, medium plasticity	40	20	40			45	
	CAL	28											
-45	CAL	29				grades with very stiff clayey silt pockets locally	10	25	65				
	CORE					varies to pale brown (10YR 7/4)	65	25	10				
	CAL	12				grades with very stiff clayey silt pockets locally	10	65	25			50	
	CAL	26											
-50							40	35	30				
	CAL	38					10	65	25				

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AECOM

BORING LOG

BORING: DD5BS-05
PAGE 4 OF 4

CLIENT NAVFAC
PROJECT NAME Dry Dock EIS at JBPHH, Oahu, Hawaii
PROJECT NUMBER
GENERAL LOCATION Joint Base Pearl Harbor Hickam, Oahu, Hawaii

Elevation (ft msl)	COLLECT: Sample Type and Number	COLLECT: Blow Counts	COLLECT: Recovery (ft)	LOG: Graphic	LOG: USCS or Rock Type	LOG: Soil/Rock Visual Description	LOG: Estimated % Gravel	LOG: Estimated % Sand	LOG: Estimated % Fines	MEASURE: PID (ppm)	MEASURE: Analytical Sample and ID	Depth (ft)	REMARKS
						varies to light yellowish brown (10YR 3/2)	50	30	20				
	SS	16										55	
							40	25	35				
						End of Boring (-54.25 ft msl)							
-55													