Temporary Debris Storage (TDS) Site Monitoring
U.S. Army Corps of Engineers and County of Maui Department of Environmental Management
December 29, 2025

The Temporary Debris Storage (TDS) site located in Olowalu received an estimated 380,493 tons of ash and debris, reaching just over half of its original design capacity. The TDS site was designed to protect the soil, groundwater, and the ocean. It was closely monitored by USACE, County of Maui, and Hawai'i Department of Health (DOH) to ensure no impacts to the surrounding area or the marine environment from the ash and debris, along with any leachate or stormwater run-off generated.

A Stormwater Pollution Prevention Plan (SWPPP) was developed outlining activities to prevent contamination of the surrounding area from site operations in compliance with applicable state and federal requirements.

On January 21, 2024, the County of Maui approved Ordinance #5596, also known as "Bill 120." Among other recordkeeping, operational and planning requirements, the ordinance required the following specific monitoring at the TDS site:

1) Leachate quantity, quality, and treatment processes, if required
2) Run-off, including nearby waterways
3) Air quality for toxins and contaminants

The data from this monitoring must be made publicly available, which is the purpose of this section. Quarterly reports have been developed and submitted to the Maui County Council as follows:

Report	Dates
1	1/21/2024 – 4/21/2024
2	4/21/2024 – 7/20/2024
3	7/19/2024 – 10/17/2024
4	10/18/2024 – 1/15/2025
5	1/16/2025 – 4/16/2025
6	4/17/2025 – 7/15/2025
7	7/16/2025 – 10/14/2025
8*	10/15/2025 - 1/13/2026

** report to be submitted on 1/13/2026*

The quarterly reports are posted here.

1) Leachate

Due to the dry conditions in West Maui, baseline sampling of run-off water was collected directly from a leachate basin two days after a significant storm event on January 9, 2024. Approximately 3" of rain fell over 24 hours during this storm event, generating approximately 500,000 gallons of run-off, which was collected in the leachate basin. At the time of the storm, no ash or debris had been placed at the TDS site, so the run-off represented normal stormwater run-off un-impacted by waste, therefore considered typical of what normally runs off the natural soils present in the area.

Since the preliminary, baseline sampling event, USACE sampled the leachate basin only if there was a 1" or greater storm event. Results of leachate sampling can be found in the quarterly reports posted here.

2) Nearby Waterways

Because there were no observable releases of leachate from the TDS site, there was no need to sample surface water in creeks or drainage ditches adjacent to the TDS site.

DOH continues nearshore water quality monitoring, with data available on the DOH website. DOH continues to affirm that these data show that there are no ash/debris or fire-related chemicals present in the surface water at concentrations of human health concern and are consistent with background levels.

3) Air Quality

There are several air monitoring stations (a.k.a. 'PurpleAir Sensors' and 'DustTrak' monitors) in the vicinity of the TDS site, which are operated, maintained, and monitored by either DOH or a contractor to USACE. The air monitoring equipment provides data for both Particulate Matter (PM) 2.5 and 10, which correspond to the size of the particulate matter in micrometers (or microns), which represent one millionth of a meter. The measurement units for PM are expressed in micrograms/cubic meter, or $\mu g/m^3$, which is basically the weight of the total dust particles (in micrograms) in a defined area of space (one cubic meter). The smaller the particles (i.e., 2.5 microns), the deeper into the respiratory tract and lungs the particles can penetrate and either cause or exacerbate existing respiratory health problems. More information on the health effects of particulate matter pollution can be found here.

The locations of the PurpleAir monitors operated by DOH are found in Figure 1. Monitoring data can be viewed at DOH's Maui Data Portal.

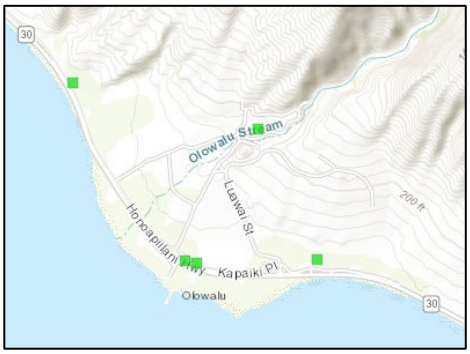


Figure 1. Locations of air monitors near Olowalu.

In addition, a contractor to USACE collected air monitoring samples following a DOH-approved plan at the TDS site. A summary of data collected at various locations around the TDS site (monitors were not always placed in the same location depending on wind conditions) is found in Table 1. Dust monitoring was paused at the end of April, as the TDS site was temporarily capped and ceased operations. Monitoring resumed in mid-June 2025 when excavation and hauling of ash/debris from the TDS site to the Permanent Disposal Site (PDS) at the Central Maui Landfill started. Air monitoring operations were paused again from November 21 – 30, 2025, for the Thanksgiving holiday break.

DATE	Average PM10 (ug/m^3)	Average PM2.5 (ug/m^3)	Monitor #s
23-Jan to 13-Nov	see previous reports		
Site Action Level	150	35	NA
14-Nov	9	5	1,2
15-Nov	8.5	5.5	1,2
16-Nov	6	4	1,2
17-Nov	7	4.5	1,2
18-Nov	8.5	5	1,2
19-Nov	30	10	1,2
20-Nov	11	6	1,2
21-Nov to 30-Nov	-	-	-
1-Dec	13	9	1,2
2-Dec	9.5	7	1,2
3-Dec	8.5	6	1,2
4-Dec	9	6.5	1,2
5-Dec	14.5	9	1,2
6-Dec	12	8.5	1,2
7-Dec	9	7.5	1,2
8-Dec	9	7	1,2
9-Dec	9	6.5	1,2
10-Dec	12.5	10	1,2
11-Dec	6.5	4.5	1,2
12-Dec	7.5	5.5	1,2
13-Dec	14	11.5	1,2
14-Dec	11	9	1,2
15-Dec	12	8.5	1,2
16-Dec	11	7	1,2
17-Dec	12	7	1,2
18-Dec	4.5	3.5	1,2
19-Dec	8	5.5	1,2

Table 1. Air monitoring data collected at the TDS site.

USACE established an 'Action Limit' of 35 for Particulate Matter (PM 2.5) and 150 for Particulate Matter (PM 10). Engineering and/or operating controls such as water sprays and limiting truck speed were implemented in the event of any exceedance of an Action Limit.

Finally, USACE conducted personnel air monitoring according to an Air Monitoring and Sampling Plan (AMSP) using personal air cartridges directly on workers. The results were evaluated against criteria based on the Occupational Safety and Health Administration (OSHA) Permissible Exposure Levels (PELs) and/or the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs). All sampling results collected from excavator operators and laborers did not show any exceedances of these health-based criteria, so this activity was discontinued in late June 2024.

4) Groundwater

To comply with Bill 120, USACE installed temporary groundwater monitoring wells (MW) adjacent to the TDS site. An upgradient (uphill) MW and downgradient (downhill) MW were installed at the TDS site in June – July 2024 as shown in Figures 2 & 3. A well completion report was submitted to the County by USACE in August 2024 with specific construction details.

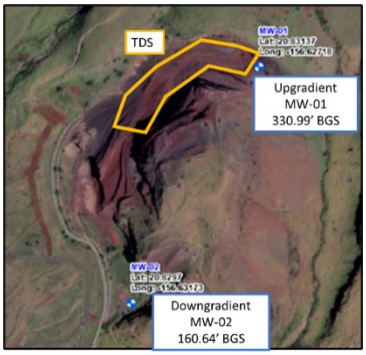


Figure 2. Locations of groundwater monitoring wells.

Figure 3. Groundwater monitoring well MW-02.

Groundwater samples were collected and analyzed quarterly (every 3 months, see table below), which was recommended by DOH at the time of the TDS site plan development. This approach was conservative given that the typical groundwater monitoring frequency for a lined solid waste landfill is semi-annual.

Sampling Event	Date
1 (initial)	7/7/2024
2	10/8/2024*
3	2/8/2025
4	5/5/2025
5	8/5/2025
6 (final)	11/18/2025

*A re-sampling for this event was held in 12/2024.

Results from the last quarterly groundwater sampling event on November 18, 2025, are found in Table 2.

The first samples taken on July 7, 2024, were considered 'baseline' samples, since MW-01 and MW-02 were newly installed, and there were no previous sampling data from them to compare. The analysis includes the analytes and parameters found in Table 2, which includes contaminants or indicators of contaminants present in the TDS site leachate in 2025.

Table 2. Analytes and parameters for groundwater samples (2025).

Major cations & anions	7/7/2024 MW-01 Q3 2024 (Baseline)	2/8/2025 MW-01 Q1 2025	5/5/2025 MW-01 Q2 2025	8/5/2025 MW-01 Q3 2025	11/18/2025 MW-01 Q4 2025	7/7/2024 MW-02 Q3 2024 (Baseline)	2/8/2025 MW-02 Q1 2025	5/5/2025 MW-02 Q2 2025	8/5/2025 MW-02 Q3 2025	11/18/2025 MW-02 Q4 2025	Units
Magnesium	12000	12000	11000	11000	12000	17000	16000	15000	15000	16000	ug/L
Sodium	78000	71000	64000	67000	70000	130000	120000	110000	120000	130000	ug/L
Calcium	15000	14000	13000	13000	14000	21000	21000	21000	21000	23000	ug/L
Potassium	5400	5100	4600	4700	5000	7600	7400	7100	7100	7800	ug/L
Chloride	100	110	110	110	110	190	200	170	210	160	mg/L
Carbonate	ND	ND	6.0	6.0	6.0	ND	6.0	6.0	6.0	6.0	mg/L
Sulfate	19	16	16	17	16	25	26	27	29	27	mg/L
Major Indicators											
TDS	210	280	290	300	310	350	480	450	460	460	mg/L
TOC	4.6	1.9	1.5	0.90	0.97	0.58	1.4	1.1	0.97	1.0	mg/L
Total Alkalinity	69	60	60	56	56	67	61	63	61	61	mg/L
Ammonia (as Nitrogen)	0.09	0.090	0.09	0.086	0.09	0.05	0.090	0.09	0.076	0.09	mg/L
Iron	140	65	170	190	410	380	660	2700	1100	490	ug/L
Field Parameters											
pH	7.2	7.3	7.4	7.6	7.3	7.5	7.6	7.5	7.7	7.4	S.U.
Turbidity	2.5	2.3	12	7.2	2.0	18	16	60	95	14	NTU
Metals											
Arsenic	ND	1.7	0.74	1.7	1.7	ND	1.7	1.7	1.7	1.7	ug/L
Lead	ND	0.17	0.5	0.24	0.24	ND	3.2	0.5	0.25	0.22	ug/L
Antimony	ND	0.5	0.5	0.5	0.5	ND	0.5	0.5	0.5	0.5	ug/L
Cobalt	0.84	0.54	0.69	0.23	0.28	0.19	0.4	0.17	0.4	0.4	ug/L
Copper	2.5	0.67	0.93	0.86	0.87	0.72	1.2	1.1	0.9	0.9	ug/L

Abbreviations & Symbols:

mg/L: milligrams per liter
MW: monitoring well
ND: non-detect or below detection limit
NTU: nephelometric turbidity unit
TDS: total dissolved solids
TOC: total organic carbon
µg/L: micrograms per liter

The baseline (pre-use) sampling data, from MW-01 and MW-02 were used to monitor any changes or impacts to groundwater from the TDS site in subsequent quarterly sampling events or should the post-use soil sampling data show any impacts.

Post-use contamination levels measured in all soil samples were below DOH Tier 1 Environmental Action Levels (Tier 1 EALs) established by the State of Hawaii (see Section 5). Note that for some parameters, other criteria were used for comparison other than Tier 1 EALs (see footnotes following Table 3), which were less stringent.

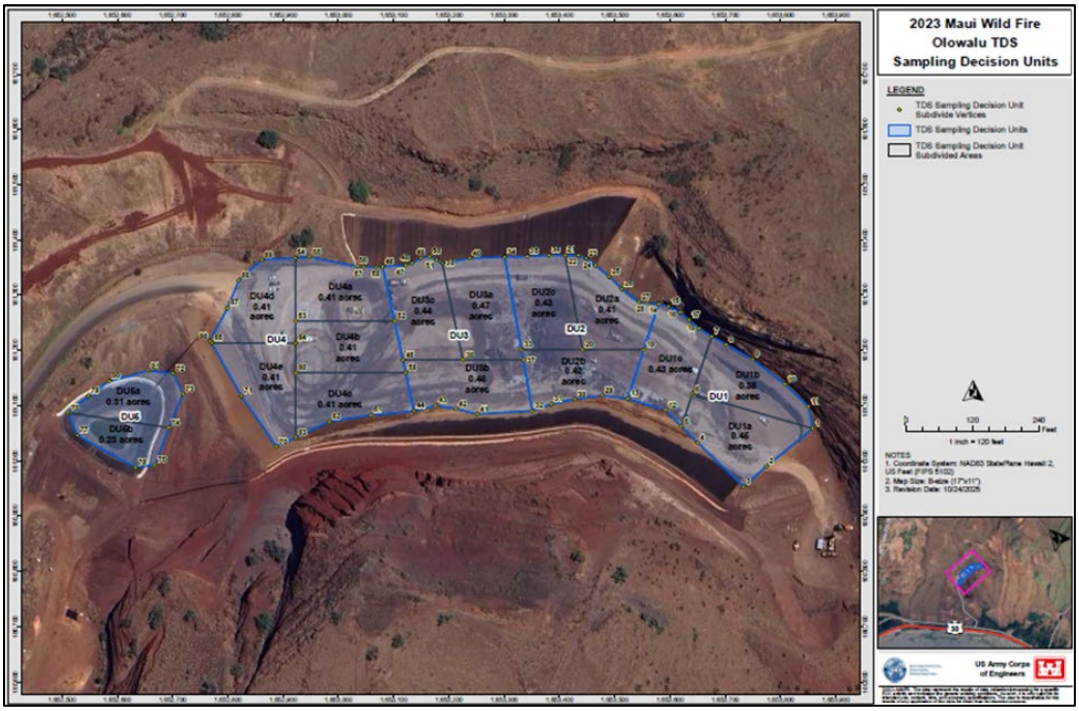
Given that post-use contaminant levels were below Action Levels, both MW-01 and MW-02 were decommissioned (removed) on December 18-19, 2025. A groundwater well de-commissioning report was submitted to the County of Maui by USACE with specific removal and abandonment details.

5) Soils

The TDS site was originally divided into five decision units (DUs)—or set areas—from which pre-use soil samples were collected and analyzed for target contaminants to define soil conditions prior to installation of the protective liner. Analytical results from this assessment, conducted on November 28, 2023, are found in Table 3.

Once all the ash and debris were removed and transferred to the Central Maui Landfill, the protective liner was removed, and post-use samples were taken in similar locations to determine if TDS site operations had any impact on the underlying soils. The number of samples taken in each DU was increased in the post-use sampling effort, with sub-areas added in each DU (see Figure 4), at the recommendation of DOH (see Figure 4).

Figure 4. TDS Site sampling Decision Units (DUs).



Analytical results from this post-use assessment, conducted on November 16-17, 2025, are found in Table 3.

The pre-use and post-use data was compared to Tier 1 EALs to determine whether any action (i.e., further excavation, cleanup) was necessary prior to final grading of the TDS site. For some parameters, other criteria were used for comparison, other than Hawaii's Tier 1 EALs, which were less stringent (see footnotes following Table 3). Post-use data were well below Action Levels (shown in last column of Table 3), therefore no action was necessary to remove any of the underlying soil and final grading could be carried out.

Table 3. Analytical results from pre-construction and post-construction soil sampling at TDS site.

Constituent (mg/kg)	DU-1 (mg/kg)		DU-2 (mg/kg)		DU-3 (mg/kg)		DU-4 (mg/kg)		DU-5 (mg/kg)		Action Level*
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Antimony	0.18	0.06	0.19	0.08	0.19	0.06	0.19	0.08	0.19	0.1	6.3
Arsenic	1.4	0.96	1.5	1.04	0.73	0.91	0.58	0.74	0.94	0.71	41
Barium	15	49	15	56	32	51	40	50	39	72	1000
Beryllium	0.56	1.1	0.66	1.02	0.6	1.07	0.75	0.87	0.66	1.45	31
Cadmium	0.09	0.08	0.13	0.08	0.09	0.08	0.09	0.07	0.1	0.09	17
Chromium	0.81	14.7	1	20	0.84	18.7	0.53	13	7	1.3	1100
Cobalt	1.1	7.1	1.4	9.9	1.2	8.6	1.2	6.2	3	1.8	156
Copper	1.6	10.0	4.9	14.7	1.6	17.8	0.86	8.4	4.9	1.8	3100
Lead	2.1	1.57	1	2.1	1.1	1.73	0.97	1.51	2.2	1.55	200
Molybdenum	0.51	0.6	0.54	0.73	0.5	0.68	0.67	0.66	0.69	0.76	78
Nickel	0.79	14.7	1	19	0.92	15.7	0.53	11.6	9	1.75	767
Selenium	4.9	0.13	5.4	0.05	3.6	0.11	3.2	0.09	3.7	0.11	78
Silver	0.05	0.04	0.02	0.05	U	U	0.05	0.06	0.047	0.075	78
Thallium	U	U	U	U	U	U	U	U	U	U	0.78
Vanadium	1.2	30.7	1.4	43.3	1.2	38.3	1.0	26.4	8.5	3.25	770
Zinc	48	58.7	51	63.7	44	55	49	50.2	52	61	4700
Mercury	U	U	U	U	U	U	U	U	U	U	4.7
Diesel Range Organics	U	U	U	U	U	U	30	7.74	16	8.9	180
Gasoline Range Organics	U	U	U	U	U	U	U	U	U	U	100
Oil Range Organics	18	14.7	26	27.7	30	60.3	29	22.9	30	22.5	500

Abbreviations: DU: decision unit U: Undetected
mg/kg: milligrams per kilogram

** Action levels are based on Hawaii Environmental Action Levels (EAL), Table A-2, Final EAL, with the following exceptions, as modified by DOH:*

- The level for arsenic of 41 mg/kg incorporates the bioavailability of arsenic for human receptors.

- The level for cobalt of 156 mg/ kg is based on concentrations presented in 'Cobalt Content of Typical Soils and Plants of the Hawaiian Islands,' Fujimoto and Sherman, 1950.

- The level for copper of 3100 mg/kg is based on the residential direct- exposure EAL presented in Table I-1, Final EAL, with Hazard Quotient = 1.

- The level for nickel of 767 mg/ kg is based on the upper background threshold value for nickel presented in Table 6, 'Hawaiian Islands Soil Metal Background Evaluation Report,' May 2012.

- The level for zinc of 4700 mg/kg is based on the residential direct- exposure EAL presented in Table I-1, Final EAL, for non-carcinogens.

6) Conclusion

The final grading and restoration of the TDS site were finished on December 19, 2025. There will be no more environmental data collected at the TDS site. This is the final TDS Site Monitoring report for the project. A final quarterly report on environmental monitoring at the TDS site will be submitted to the Maui County Council on January 13, 2026. All quarterly reports are posted here.