Temporary Debris Storage (TDS) Site Monitoring

U.S. Army Corps of Engineers and County of Maui Department of Environmental Management

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The Temporary Debris Storage (TDS) area located in West Maui was designed and is underlain by a thick (80 mil or 0.08 inches) plastic impermeable liner to be protect the soil, groundwater, and ocean. The entire TDS site is being monitored closely 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 rainwater run-off generated.

Leachate is a liquid, usually rainwater, which percolates through the ash and debris within the lined area of the TDS working boundaries. As it passes through the ash and debris, it may pick up contaminants present within the ash, such as heavy metals (i.e., arsenic, lead and cobalt) as detected by Hawai'i DOH in samples of the ash taken in Lahaina. Leachate is different than rainwater or surface water run-off which is diverted around the TDS working area from the surrounding hills. Stormwater is intentionally diverted around the TDS to minimize the generation of leachate. All leachate collected within the TDS area is drained by gravity to a low spot in the TDS working area called a sump, where it is drained via a drainpipe to a leachate basin. This leachate basin is located directly below the TDS working area, and was constructed with the same thick, impermeable liner underneath it to prevent any infiltration into the underlying soils. A second leachate basin is being constructed below the primary leachate basin as a precaution in the unlikely event the primary leachate basin fills due a very large rain event.

The leachate basin has a design capacity of 1.375 million gallons, which is much more than is ever expected to be collected, even in the most significant rain event in West Maui. For example, during a rainstorm in January during which over 3" of rain fell in less than 24 hours, the leachate basin successfully collected all rainwater which fell directly into the TDS working area as well as its surroundings, as construction had yet to be completed on the stormwater diversion canals around the TDS working area. It filled with approximately 500,000 gallons of rainwater, which only caused it to reach just over 1/3 of its capacity.

The leachate generated in the TDS is being utilized within the limits of the lined TDS working area where the storage of ash and debris is taking place. It is being applied via wet spray atop the debris as a means to control dust generation. During this process, most of the liquid evaporates. The water spray is applied several times throughout the workday, especially on drier days. All the leachate which accumulated during the January rain event has since been utilized for dust control. The leachate basin has been for the most part empty for the past several weeks.

A percolation basin is located below the TDS site, which was designed to receive rainwater run-off which is diverted around the TDS working area, which does not come into contact with any ash or debris. The purpose of the percolation basin is to allow rainwater run-off to percolate into the natural soils and not run down the roadway or drainage channels into the ocean. A Stormwater Pollution Prevention Plan (SWPPP) was developed to prevent contamination of the surrounding area from site operations which complies 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:

1) Leachate quantity, quality and treatment processes
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.

1) <u>Leachate</u>

Due to the dry conditions in West Maui, 'baseline' sampling of run-off water was collected directly from the leachate basin two days after a significant storm event on January 9, 2024. Approximately 3 inches 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 in the TDS working area, so the run-off represented typical precipitation 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 has sampled the leachate basin periodically, and plans to continue sampling leachate monthly directly from the leachate basin if a 1" or greater storm event occurs within that month.

The following table shows the parameters analyzed by FQ Labs in Oahu along with the results from samplings conducted by USACE to date. Not all parameters shown below were analyzed for by the laboratory during each event, as additional parameters were added at the request of Hawai'i DOH and the Maui County subsequent to the baseline sampling event on January 11, 2024.

Parameter	Method*	Result (Baseline) 1/11/2024	1/30/2024	2/8/2024	2/13/2024	2/20/2024	Units
TSS	SM 2450D	316	46	32	8	-	mg/L
TDS	EPA 160.1	NS	NS	289	315	-	mg/l
TOC	EPA 415.3	NS	NS	7.96	9.16	-	mg/l
COD	EPA 410.4	NS	NS	15.5	12		mg/l
Turbidity	EPA 180.1	650	103	NS	NS	-	NTU
Total Alkalinity	EPA 310.2	NS	NS	69.9	74.1	-	
Nitrogen-Total	EPA 351.2	NS	NS	15.9	16.5	-	mg/l
Nitrates	EPA 353.2	NS	10.1	14.4	15		mg/l
Nitrites	EPA 353.2	NS	0.369	0.74	0.59	-	mg/l
Oil & Grease	EPA 1664A	< 5.0	3.9	< 5.0	9	-	mg/L
TPH	EPA 1664A	< 5.0	NS	NS	NS	-	mg/L
Chlorine	EPA 9250	NS	< 0.01	0.317	0.283	-	mg/l
Hex Chromium	EPA 218.6	NS	0.185	NS	NS	-	mg/l
Carbonate		NS	NS	1.2	5	-	mg/l
Sulfide	EPA 9034	NS	NS	0.057	0.058	-	mg/l
Sulfate	EPA 9038	NS	NS	107	121	-	mg/l
Dioxin (2378-TCDD)	EPA 1613B	NS	-	-	< 1.9	< 2.0	
PCBs (total)	EPA 8082A	NS	NS	ND	ND	ND	mg/l
Herbicides	EPA 615	NS	NS	NS	ND	ND	

Parameter	Method	Result (Baseline) 1/11/2024	1/30/2024	2/8/2024	2/13/2024	2/20/2024	Units
Pesticides	EPA 608.3	NS	-	-	NS	ND	ug/l
VOCs	EPA 8260D	NS	ND	-	ND	ND	ug/l
SVOCs	EPA 8270E	NS	-	-	NS	ND	ug/l
Tributyltin		NS	2.9	NS	NS	NS	ng/l
Dissolved Oxygen		NS	NS	9.53	9.91		mg/l
pH		NS	NS	8.21	8.88	-	
Total Metals	3015/200.8						
Beryllium		< 0.010	0.00048	-	< 0.0015	0.030	mg/L
Boron		0.107	-	-	-	-	mg/L
Sodium		70.3	-	-	-	-	mg/L
Magnesium		13.1	-	-	-	-	mg/L
Aluminum		61.4	-	-	-	-	mg/L
Potassium		< 5.00	-	-	-	-	mg/L
Calcium		13.7	-	-	-	-	mg/L
Vanadium		0.13	0.019	-	0.013	0.92	mg/L
Chromium		0.136	0.013	-	0.0075	0.56	mg/L
Manganese		0.991	-	-	-	-	mg/L
Iron		63.9	-	-	-	-	mg/L
Cobalt		0.026	0.0033	-	0.0019	0.4	mg/L
Nickel		0.078	0.011	-	0.0063	0.38	mg/L
Copper		0.042	0.007	-	0.0047	0.23	mg/L
Zinc		< 0.100	0.017	-	0.0052	0.49	mg/L
Arsenic		< 0.010	0.0027	-	0.0027	<0.16	mg/L
Selenium		< 0.010	< 0.005	-	< 0.025	<0.16	mg/L
Strontium		0.226	-	--	-	-	mg/L
Molybdenum		< 0.010	0.0021	-	0.0024	<0.02	mg/L
Silver		< 0.010	NS	-	< 0.008	<0.04	mg/L
Cadmium		< 0.010	NS	-	< 0.0035	<0.01	mg/L
Antimony		< 0.010		-	< 0.0011	<0.16	mg/L
Barium		0.251	0.04	-	0.025	2.6	mg/L
Mercury		< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.085	mg/L
Thallium		< 0.010	NS	-	NS	<0.12	mg/L
Lead		< 0.010	0.00096	-	0.0042	<0.071	mg/L

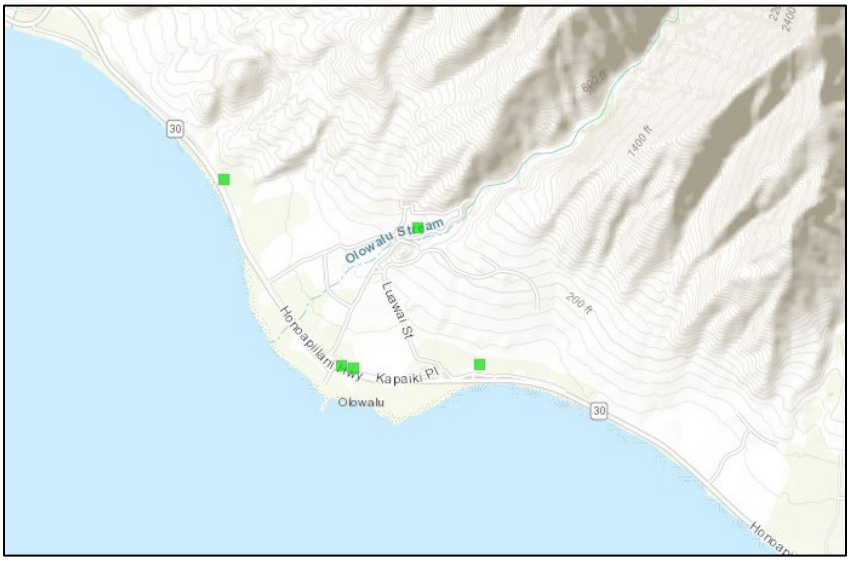
TSS = Total Suspended Solids
NTU = Nephelometric Turbidity Unit
TPH = Total Petroleum Hydrocarbons – Oil
COD = Chemical Oxygen Demand
TOC = Total Organic Carbon
ND = Non-Detect
NS = Not Sampled
Note* = laboratory methods may vary

2) Nearby Waterways

The nearest water body is the Pacific Ocean. There are currently plans being developed and/or carried out by other agencies (i.e., Hawai'i DOH, USGS) to sample nearshore water. Those data will also be reported on mauirecovers.org.

3) Air Quality

There are several air monitoring stations (a.k.a. 'Purple Air Sensors') around the TDS, which are operated, maintained, and monitored by Hawai'i DOH. The locations are found in the figure below.



Locations of air monitors located around the TDS site in Olowalu.

Monitoring data can be viewed at https://fire.airnow.gov. In addition, USACE is collecting air monitoring samples following a DOH-approved plan that includes all debris removal work zones as well as the TDS.

4) Groundwater

USACE is planning to go beyond the requirements in Bill 120 to monitor the environment and will be installing groundwater monitoring wells around the TDS site, one upgradient (uphill) and two downgradient (downhill) from the TDS site. When these wells are installed, and data is being generated, it will be shared in this section.

It is expected that once the monitoring wells are installed, which is expected in April, that samples will be collected quarterly (i.e., every 3 months) for laboratory analysis, which is a typical frequency around waste storage and disposal facilities.