

TECHNICAL MEMORANDUM

IRAM Import Materials Testing Plan

To: Sarah Greenfield, Oregon Department of Environmental Quality
Katie Daugherty, Oregon Department of Environmental Quality

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Attachments: Table 1. Vendors of Fine-Grained Import Materials
Table 2. Analytical Schedule and Screening Levels

Date: January 12, 2026

Overview

The Oregon Department of Environmental Quality (DEQ) is planning an Interim Removal Action Measure (IRAM) in the Lowland/In-Water Operable Unit (the “ Site”) at a former fiberboard facility in St. Helens, Oregon. The IRAM design requires a variety of import materials to support the development of haul roads, backfill excavation areas, and restore the Site. This Import Materials Testing Plan outlines the types of import materials required by the design and the approach for initially characterizing them for use in the IRAM. The results of this work will support the development of criteria for the IRAM construction contractor (Contractor) to demonstrate chemical suitability of IRAM import materials. These criteria, samples per unit volume of import materials, and other considerations will be provided in a summary memorandum upon completion of the testing.

Import Material Types

Import materials indicated in the IRAM’s design have been broken into three different classes based on their characteristics: coarse materials for stabilization and embankments, fine-grained materials for backfilling and the residual management layer, and other construction or biostabilization materials. The different import materials that are part of the IRAM design will be evaluated as follows:

- **Haul Rock and Embankment Materials.** No chemical testing is planned for coarse rock (e.g., quarry spall, angular rock) used for stabilization and embankments. These materials include various sizes of angular aggregate and rounded drain rock. Efforts will be made to ensure that rock is not sourced from confirmed or suspected contaminated sites or contains significant fines that could sorb contaminants. The Engineer will review certificates purporting material quality and geotechnical specifications per the Final Design Specifications (GSI Water Solutions [GSI] and Dalton, Olmsted & Fuglevand, Inc. [DOF], 2025) before these materials are brought to the Site.
- **Fine-Grained Backfill Materials.** Topsoil, compost, residual management layer sand, and granular activated carbon (GAC) are fine-grained import materials used primarily for backfilling. Local sources of each of these four materials, except for GAC, were identified and their stockpiles will be tested to

determine their chemical characteristics. Results from this work will support development of a set of criteria the Contractor will use to evaluate their own sources. The specifications for these materials is enumerated in the Final Design Report (GSI and DOF, 2025) and will be confirmed with each vendor. Specifications include but are not limited to the following:

- Topsoil shall consist of a sandy-loam, generally free from particles greater than 1-inch and admixtures of clay, weeds, grasses, and other materials detrimental to plant growth; topsoil shall be dry with an organic content between 2 to 10 percent.
- Compost shall be thermophilic processed, originating from a DEQ-permitted composting facility that meets requirements from the U.S. Composting Council and its Seal of Testing Assurance program. Compost shall contain a minimum of 65 percent by volume recycled plant waste and comply with particle size/media parameters as identified in the Final Design Specifications (GSI and DOF, 2025).
- Sand shall be commercially well-graded, friable, subangular to subrounded, river or bank aggregate material. It shall be free of loam and organic matter and possess grain size criteria that complies with the Final Design Specifications (GSI and DOF, 2025).
- GAC shall be virgin activated carbon from coconut fiber and relatively well-graded between 200 to 1,000 microns; 20 x 50-mesh mixes or other standard alternatives may be approved by the Engineer.
- **Biostabilization and Other Construction Materials.** No chemical testing is planned for biostabilization materials such as coir mat, geotextiles, and jute. No chemical testing is required for asphalt products, pipes, and other miscellaneous hardware. During construction, the Contractor will identify their preferred materials and sources for Engineer approval.

Import Material Characterization

Three vendors have been identified for each fine-grained backfill import material (Table 1). These vendors' stockpiles will be chemically tested consistent with the analyses of Area G during the Data Gaps Investigation (GSI and Haley & Aldrich, 2023) and results will be initially screened against DEQ clean fill criteria (DEQ, 2019). Samples will be analyzed by Pace Analytical National of Mount Juliet, Tennessee under State Price Agreement #8903 and Cape Fear Analytical, LLC, of Wilmington, North Carolina, and Apex Laboratories, LLC, of Tigard, Oregon, under subcontract to GSI. The analytical suite is provided in Table 2 and summarized below:

- Total metals, including arsenic, antimony, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, selenium, silver, thallium, vanadium, and zinc (U.S. Environmental Protection Agency [EPA] Method 6020B)
- Mercury (EPA Method 7471A)
- Polycyclic aromatic hydrocarbons (EPA Method 8270E-SIM)
- Semivolatile organic compounds (EPA Method 8270E)
- Polychlorinated dibenzo-p-dioxins and dibenzofurans (EPA Method 1613B)
- Polychlorinated biphenyls (EPA Method 8082A)
- Organochlorine pesticides (EPA Method 8081B)
- Total solids (Standard Method 2540G)
- Grain size (ASTM D442 MOD)
- Total organic carbon (EPA Method 9060A)
- Percent moisture

If possible, a single sample of each material will be collected from the area of the pit where the vendor anticipates to be working during the 2026 and 2027 construction seasons. When possible, these samples will

be composited from at least five distributed subsample locations. If the pit is not accessible, samples will be collected along the circumference of a single existing stockpile. GAC samples will be obtained directly from the manufacturer and submitted for analysis. If a vendor listed in Table 1 is not amenable to this sampling effort or currently lacks the correct import material, an alternative source will be identified.

This work will result in a total of 12 samples (e.g., one sample per vendor and material type). Field blanks, duplicates, or other quality assurance or quality control samples will not be collected in the field, and results will not undergo validation; this approach is likely to be consistent with the Contractor's during the IRAM and will ensure timely decision making.

Samples will be collected following standard collection and decontamination procedures per the IRAM Investigation Work Plan (GSI and DOF, 2024), including use of stainless-steel equipment decontaminated with a detergent solution (Liquinox®), tap water, and de-ionized water rinses.

Deliverable

Results of this work will be tabulated, screened against DEQ clean fill criteria (DEQ, 2019), and summarized in a short memorandum. It is anticipated that the organic content of topsoil and compost materials may result in higher concentrations of certain analytes; therefore, reasonably achievable chemical concentrations (criteria) of each fine-grained import material will be established in the memorandum. The memorandum will also define the number of samples the Contractor will be required to submit per unit volume of each fine-grained import material. This will support the Contractor in the identification of vendors and the evaluation of import materials for chemical suitability during the IRAM implementation.

References

- DEQ. 2019. Clean Fill Determinations. Oregon Department of Environmental Quality, Materials Management. February 21, 2019.
- GSI and Haley & Aldrich. 2023. *Data Gaps Investigation Evaluation Report, Former St. Helens Fiberboard Facility, Lowland/In-Water Operable Unit Data Gaps Investigation*. ECSI Site No. 91. Prepared for Oregon Department of Environmental Quality. Prepared by GSI Water Solutions, Inc. (GSI) and Haley & Aldrich, Inc. June 29, 2023.
- GSI and DOF. 2024. *Lowland/In-Water Operable Unit Interim Removal Action Measure Investigation Work Plan*. ECSI Site No. 91. Prepared for the Oregon Department of Environmental Quality. Prepared by GSI Water Solutions, Inc. (GSI) and Dalton, Olmsted & Fuglevand, Inc. (DOF). April 15, 2024.
- GSI and DOF. 2025. *Lowland/In-Water Operable Unit Interim Removal Action Measure Final Design Report*. ECSI Site No. 91. Prepared for the Oregon Department of Environmental Quality. Prepared by GSI Water Solutions, Inc. (GSI) and Dalton, Olmsted & Fuglevand, Inc. (DOF). August 6, 2025.

Table 1. Vendors of Fine-Grained Backfill Materials

Material	Vendor	Address	Contact
Residual Management Layer Sand	CalPortland - Santosh	3485 N. Honeyman Rd., Scappoose OR 97056	503.342.0879
	Knife River - Watters Quarry	60371 N Columbia River Hwy, St. Helens, OR 97051	503.944.3570
	Scappoose Sand and Gravel	33485 Crown Zellerbach Rd, Scappoose OR, 97056	503.543.8821
Granular Activated Carbon	Karbonous, Inc.	13095 E. Temple Avenue, City of Industry, CA 91746	626.858.1888
	Pacific Coast Carbon	14006 NW 3rd Ct Ste. 104, Vancouver, WA, 98642	360.727.3775
	General Carbon Corporation	33 Paterson St, Paterson, NJ, 07501	973.991.9103
Compost	CedarMill Landscape Supply	12700 NW Barnes Road, Portland, OR 97229	503.644.9101
	American Landscape Supply	6460 NW Cornelius Pass Rd, Hillsboro, OR 97124	503.645.6906
	Cascadian All in One	21500 NW Farm Park Dr., Ste. D., Hillsboro, OR 97124	503.647.7787
Topsoil	CedarMill Landscape Supply	12700 NW Barnes Road, Portland, OR 97229	503-644-9101
	American Landscape Supply	6460 NW Cornelius Pass Rd, Hillsboro, OR 97124	503.645.6906
	Cascadian All in One	21500 NW Farm Park Dr., Ste. D., Hillsboro, OR 97124	503.647.7787

Table 2. Analytical Schedule and Screening Levels

Chemical Class	Laboratory Method	Laboratory	Chemical Compound	RTV	ASR	Clean Fill Screening Level	Portland Basin Soil Background	Coast Range Soil Background	Laboratory Detection Limit	Unit	
Metals	EPA 6020B	Pace	Antimony	—	—	—	0.56	0.55	0.166	mg/kg	
			Arsenic	33	330	—	8.8	12	0.1	mg/kg	
			Barium	—	—	—	790	840	0.152	mg/kg	
			Beryllium	—	—	—	2	2.8	0.138	mg/kg	
			Cadmium	—	—	—	0.63	0.54	0.0855	mg/kg	
			Chromium	—	—	—	76	240	0.2965	mg/kg	
			Cobalt	—	—	43	—	—	0.04625	mg/kg	
			Copper	—	—	—	34	100	0.1325	mg/kg	
			Lead	—	—	—	28	34	0.099	mg/kg	
			Manganese	—	—	—	1,800	2,100	0.2685	mg/kg	
			Nickel	—	—	—	47	160	0.197	mg/kg	
			Selenium	—	—	—	0.71	1.5	0.1795	mg/kg	
			Silver	—	—	—	0.82	0.41	0.0865	mg/kg	
			Thallium	—	—	—	5.2	5.4	0.065	mg/kg	
Vanadium	—	—	—	180	260	0.187	mg/kg				
Zinc	—	—	—	180	140	0.74	mg/kg				
	EPA 7471B		Mercury	0.2	—	—	0.23	0.11	0.018	mg/kg	
Polychlorinated dibenzo-p-dioxin and -furans	EPA 1613B	Cape Fear	TCDD TEQ	50	500	—	—	—	—	ng/kg	
			2,3,7,8-TCDD	—	—	0.29	—	—	0.121	ng/kg	
			1,2,3,7,8-PeCDD	—	—	—	—	—	0.0708	ng/kg	
			1,2,3,4,7,8-HxCDD	—	—	—	—	—	0.107	ng/kg	
			1,2,3,6,7,8-HxCDD	—	—	—	—	—	0.108	ng/kg	
			1,2,3,7,8,9-HxCDD	—	—	—	—	—	0.119	ng/kg	
			1,2,3,4,6,7,8-HpCDD	—	—	—	—	—	0.144	ng/kg	
			OCDD	—	—	—	—	—	0.253	ng/kg	
			2,3,7,8-TCDF	—	—	—	—	—	0.112	ng/kg	
			1,2,3,7,8-PeCDF	—	—	—	—	—	0.0636	ng/kg	
			2,3,4,7,8-PeCDF	—	—	—	—	—	0.0607	ng/kg	
			1,2,3,4,7,8-HxCDF	—	—	—	—	—	0.0673	ng/kg	
			1,2,3,6,7,8-HxCDF	—	—	—	—	—	0.0657	ng/kg	
			1,2,3,7,8,9-HxCDF	—	—	—	—	—	0.0977	ng/kg	
			2,3,4,6,7,8-HxCDF	—	—	—	—	—	0.0692	ng/kg	
			1,2,3,4,6,7,8-HpCDF	—	—	—	—	—	0.079	ng/kg	
1,2,3,4,7,8,9-HpCDF	—	—	—	—	—	0.133	ng/kg				
OCDF	—	—	—	—	—	0.251	ng/kg				
Polycyclic Aromatic Hydrocarbons	EPA 8270E-SIM	Pace	Total cPAH	—	—	0.11	—	—	—	mg/kg	
			Total PAH	12.205	—	—	—	—	—	—	mg/kg
			1-Methylnaphthalene	—	—	0.36	—	—	0.00449	mg/kg	
			2-Chloronaphthalene	—	—	230	—	—	0.00466	mg/kg	
			2-Methylnaphthalene	—	—	11	—	—	0.00427	mg/kg	
			Acenaphthene	—	—	0.25	—	—	0.00209	mg/kg	
			Acenaphthylene	—	—	120	—	—	0.00216	mg/kg	
			Anthracene	—	—	6.8	—	—	0.0023	mg/kg	
			Benz(a)anthracene	—	—	0.73	—	—	0.00173	mg/kg	
			Benzo(a)pyrene	—	—	0.11	—	—	0.00179	mg/kg	
			Benzo(b)fluoranthene	—	—	1.1	—	—	0.00153	mg/kg	
			Benzo(g,h,i)perylene	—	—	25	—	—	0.00177	mg/kg	
			Benzo(k)fluoranthene	—	—	11	—	—	0.00215	mg/kg	
			Chrysene	—	—	3.1	—	—	0.00232	mg/kg	
			Dibenz(a,h)anthracene	—	—	0.11	—	—	0.00172	mg/kg	
			Fluoranthene	—	—	10	—	—	0.00227	mg/kg	
			Fluorene	—	—	3.7	—	—	0.00205	mg/kg	
			Indeno(1,2,3-cd)pyrene	—	—	1.1	—	—	0.00181	mg/kg	
Naphthalene	—	—	0.077	—	—	0.00408	mg/kg				
Phenanthrene	—	—	5.5	—	—	0.00231	mg/kg				
Pyrene	—	—	10	—	—	0.002	mg/kg				
Semivolatile Organic Compounds	EPA 8270E	Pace	Total cPAH	—	—	0.11	—	—	—	mg/kg	
			Total PAH	12.205	—	—	—	—	—	—	mg/kg
			2-Chloronaphthalene	—	—	230	—	—	0.00585	mg/kg	
			Acenaphthene	—	—	0.25	—	—	0.00539	mg/kg	
			Acenaphthylene	—	—	120	—	—	0.00469	mg/kg	
			Anthracene	—	—	6.8	—	—	0.00593	mg/kg	
			Benz(a)anthracene	—	—	0.73	—	—	0.00587	mg/kg	
			Benzo(a)pyrene	—	—	0.11	—	—	0.00619	mg/kg	
			Benzo(b)fluoranthene	—	—	1.1	—	—	0.00621	mg/kg	
			Benzo(g,h,i)perylene	—	—	25	—	—	0.00609	mg/kg	
			Benzo(k)fluoranthene	—	—	11	—	—	0.00592	mg/kg	
			Chrysene	—	—	3.1	—	—	0.00662	mg/kg	
			Dibenz(a,h)anthracene	—	—	0.11	—	—	0.00923	mg/kg	
			Fluoranthene	—	—	10	—	—	0.00601	mg/kg	
			Fluorene	—	—	3.7	—	—	0.00542	mg/kg	
			Indeno(1,2,3-cd)pyrene	—	—	1.1	—	—	0.00941	mg/kg	
			Naphthalene	—	—	0.077	—	—	0.00836	mg/kg	
			Phenanthrene	—	—	5.5	—	—	0.00661	mg/kg	
			Pyrene	—	—	10	—	—	0.00648	mg/kg	
			1,2,4-Trichlorobenzene	—	—	0.2	—	—	0.0104	mg/kg	
			2,4,5-Trichlorophenol	—	—	4	—	—	0.0113	mg/kg	
			2,4,6-Trichlorophenol	—	—	2.4	—	—	0.0107	mg/kg	
			2,4-Dichlorophenol	—	—	1.4	—	—	0.0097	mg/kg	
			2,4-Dimethylphenol	—	—	20	—	—	0.0087	mg/kg	
			2,4-Dinitrophenol	—	—	2.6	—	—	0.0779	mg/kg	
			2,4-Dinitrotoluene	—	—	0.019	—	—	0.00955	mg/kg	
			2,6-Dinitrotoluene	—	—	0.0089	—	—	0.0109	mg/kg	
			2-Chlorophenol	—	—	0.39	—	—	0.011	mg/kg	
			2-Methylphenol	—	—	0.67	—	—	0.01	mg/kg	
			2-Nitrophenol	—	—	—	—	—	0.0119	mg/kg	
			3&4-Methylphenol Coelution	—	—	—	—	—	0.0104	mg/kg	
			3,3'-Dichlorobenzidine	—	—	0.17	—	—	0.0123	mg/kg	
4,6-Dinitro-O-Cresol	—	—	0.16	—	—	0.0755	mg/kg				
4-Bromophenyl phenyl ether	—	—	—	—	—	0.0117	mg/kg				
4-Chloro-3-methylphenol	—	—	—	—	—	0.0108	mg/kg				
4-Chlorophenyl phenyl ether	—	—	—	—	—	0.0116	mg/kg				
4-Nitrophenol	—	—	7	—	—	0.0104	mg/kg				

Table 2. Analytical Schedule and Screening Levels

Chemical Class	Laboratory Method	Laboratory	Chemical Compound	RTV	ASR	Clean Fill Screening Level	Portland Basin Soil Background	Coast Range Soil Background	Laboratory Detection Limit	Unit
Semivolatile Organic Compounds (continued)	EPA 8270E	Pace	Bis(2-chloro-1-methylethyl) ether	—	—	16	—	—	0.0144	mg/kg
			bis(2-Chloroethoxy)methane	—	—	0.78	—	—	0.01	mg/kg
			bis(2-Chloroethyl) ether	—	—	0.00019	—	—	0.011	mg/kg
			bis(2-Ethylhexyl) phthalate	—	—	0.02	—	—	0.0422	mg/kg
			Butyl benzyl phthalate	—	—	14	—	—	0.0104	mg/kg
			Dibutyl phthalate	—	—	0.011	—	—	0.0114	mg/kg
			Diethyl phthalate	—	—	100	—	—	0.011	mg/kg
			Dimethyl phthalate	—	—	10	—	—	0.0706	mg/kg
			Di-N-Octyl phthalate	—	—	0.91	—	—	0.0225	mg/kg
			Hexachlorobenzene	—	—	0.018	—	—	0.0118	mg/kg
			Hexachlorobutadiene	—	—	0.016	—	—	0.0112	mg/kg
			Hexachloroethane	—	—	0.022	—	—	0.0131	mg/kg
			Hexachlorocyclopentadiene	—	—	0.078	—	—	0.0175	mg/kg
			Isophorone	—	—	1.6	—	—	0.0102	mg/kg
			Nitrobenzene	—	—	0.0055	—	—	0.0116	mg/kg
			N-Nitrosodimethylamine	—	—	0.0000016	—	—	0.0494	mg/kg
			N-Nitrosodi-n-propylamine	—	—	0.00094	—	—	0.0111	mg/kg
			N-Nitrosodiphenylamine	—	—	10	—	—	0.0252	mg/kg
			Pentachlorophenol	—	—	0.066	—	—	0.00896	mg/kg
			Phenol	—	—	0.79	—	—	0.0134	mg/kg
Pyridine	—	—	0.41	—	—	0.022	mg/kg			
Polychlorinated Biphenyl Aroclors	EPA 8082A	Pace	Total PCBs	—	—	0.23	—	—	—	mg/kg
			Aroclor 1016	—	—	1.1	—	—	0.0118	mg/kg
			Aroclor 1221	—	—	0.0048	—	—	0.0118	mg/kg
			Aroclor 1232	—	—	0.0048	—	—	0.0118	mg/kg
			Aroclor 1242	—	—	0.041	—	—	0.0118	mg/kg
			Aroclor 1248	—	—	0.0073	—	—	0.0074	mg/kg
			Aroclor 1254	—	—	0.041	—	—	0.0074	mg/kg
			Aroclor 1260	—	—	0.24	—	—	0.0074	mg/kg
			Aroclor 1262	—	—	—	—	—	0.0074	mg/kg
Aroclor 1268	—	—	—	—	—	0.0074	mg/kg			
Organochlorine Pesticides	EPA 8081B	Pace	4,4-DDD	—	—	0.0063	—	—	0.0069	mg/kg
			4,4-DDE	—	—	0.01	—	—	0.00673	mg/kg
			4,4-DDT	—	—	0.01	—	—	0.00766	mg/kg
			Aldrin	—	—	0.023	—	—	0.00645	mg/kg
			Alpha-BHC	—	—	0.0063	—	—	0.00637	mg/kg
			Beta-BHC	—	—	0.009	—	—	0.0063	mg/kg
			Chlordane	—	—	0.27 ¹	—	—	0.099	mg/kg
			Delta-BHC	—	—	0.0063 ²	—	—	0.00635	mg/kg
			Dieldrin	—	—	0.0045	—	—	0.00697	mg/kg
			Endosulfan I	—	—	0.64 ³	—	—	0.00604	mg/kg
			Endosulfan II	—	—	0.64 ³	—	—	0.00661	mg/kg
			Endosulfan sulfate	—	—	0.64 ³	—	—	0.00642	mg/kg
			Endrin	—	—	0.0014	—	—	0.00746	mg/kg
			Endrin aldehyde	—	—	0.0014 ⁴	—	—	0.0059	mg/kg
			Endrin ketone	—	—	0.0014 ⁴	—	—	0.00695	mg/kg
			Gamma BHC / Lindane	—	—	0.0095	—	—	0.00676	mg/kg
			Heptachlor	—	—	0.017	—	—	0.00693	mg/kg
			Heptachlor epoxide	—	—	0.0042	—	—	0.0065	mg/kg
Hexachlorobenzene	—	—	0.018	—	—	0.00608	mg/kg			
Methoxychlor	—	—	5.1	—	—	0.00806	mg/kg			
Toxaphene	—	—	0.36	—	—	0.214	mg/kg			
Conventional Parameters	SM 2540G	Pace	Total Solids	—	—	—	—	—	0.1	%
	ASTM D422 mod	Apex	Grain size	—	—	—	—	—	—	—
	EPA 9060A	Apex	Total Organic Carbon	—	—	—	—	—	200	mg/kg
	% MOIST	Pace	Percent moisture	—	—	—	—	—	—	%

Notes

Clean fill and background values from DEQ (2019).

¹ Value shown is for alpha-chlordane.

² Value shown is for alpha-BHC.

³ Value shown is for Endosulfan, alpha-beta.

⁴ Value shown is for Endrin.

— = not applicable

Apex = Apex Laboratories, LLC

ASR = Area of Significant Risk

ASTM = American Standardized Testing Method

BHC = benzene hexachloride

Cape Fear = Cape Fear Analytical, LLC

cPAH = carcinogenic polycyclic aromatic hydrocarbons

EPA = U.S. Environmental Protection Agency

HpCDD = heptachlorodibenzo-p-dioxin

HpCDF = heptachlorodibenzofuran

HxCDD = hexachlorodibenzo-p-dioxin

HxCDF = hexachlorodibenzofuran

mg/kg = milligrams per kilogram

ng/kg = nanograms per kilogram

OCDD = octachlorodibenzo-p-dioxin

OCDF = octachlorodibenzofuran

Pace = Pace Analytical National Center for Testing & Innovation

PAH = polycyclic aromatic hydrocarbon

PCB = polychlorinated biphenyl

PeCDD = pentachlorodibenzo-p-dioxin

PeCDF = pentachlorodibenzofuran

RTV = remediation threshold value

SM = Standard Method

TCDD = tetrachlorodibenzo-p-dioxin

TCDF = tetrachlorodibenzofuran

TEF = toxic equivalency factor

TEQ = toxic equivalents