

TECHNICAL MEMORANDUM

Supplemental Pre-Design Investigation for the Interim Removal Action Measure

St. Helens Lowland/In-Water Operable Unit

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

From: Connor Lamb, PE; Dalton, Olmsted & Fuglevand
Rob Webb, PE; Dalton, Olmsted & Fuglevand
Benjamin Johnson, RG; GSI Water Solutions, Inc.
Braedon Warner, RG; GSI Water Solutions, Inc.

Attachments: Table 1. Supplemental Pre-Design Investigation Survey Location Coordinates
Figure 1. SPDI Sampling Locations
Figure 2. SPDI Survey Points

Date: March 31, 2025

Introduction

This memorandum details the scope of a Supplemental Pre-Design Investigation (SPDI) that is intended to resolve uncertainties driving design considerations for the St. Helens Lowland/In-Water Operable Unit Interim Removal Action Measure (IRAM). The goals of the SPDI are to:

- Collect additional data about subsurface soil contamination to 3 feet (ft) below ground surface (bgs) in Subarea 2 along the upland slope leading to the main IRAM Area, Subarea 1 (Figure 1).
- Collect topographic survey data to verify existing surface elevations at previous sampling locations, to verify gaps between previous sampling locations, and to establish survey control points in the uplands near the IRAM Area. In addition, the staff gauge and casing at stilling well SW-07 will be resurveyed.

The following sections outline the approach for soil sampling in Subarea 2 and topographic surveying. GSI Water Solutions, Inc. (GSI), is preparing a Budget and Assumptions Proposal (BAP), which will detail the budget for planning, implementation, and reporting of the SPDI activities. The BAP will be submitted to the Oregon Department of Environmental Quality (DEQ) in April 2025. This memorandum details the work associated with the SPDI as it aligns with current project tasks.

Task 1 - Project Administration

Task 1 will include the development of estimated costs for the 2025 SPDI, as part of preparation of the BAP in April 2025.

Task 8 – IRAM Investigation Work Plan Preparation and Subcontractor Procurement

Task 8 activities include the preparation of this memorandum and time for associated communications and facilitation with subcontractors. Subcontractors for the SPDI will include a cultural resource monitor, an analytical laboratory for dioxin/furan analysis, an investigation-derived waste disposal firm, and a professional land surveyor. GSI will subcontract with previously used, competitively solicited firms, provided they honor existing rates (or their rates are within any allowed escalation per contract) and previously provided lump sum or unit rates are applicable to the SPDI needs. Otherwise, GSI will evaluate whether a direct award to a firm for a given service is in the best interests of the project (e.g., low cost) or if a competitive solicitation for a given service is needed. Any direct awards will be subject to the \$25,000 limit for a rolling 5-year period across all of GSI's DEQ projects.

Task 10 – IRAM Investigation Work Plan Implementation

Task 10 SPDI activities include preparation for and completion of field work (i.e., soil sampling and surveying), data validation, and sample management. SPDI activities are described below.

Subarea 2 Soil Sampling. Recent sampling in Subarea 2 as part of the IRAM investigation confirmed surface impacts were present along the entire length of the slope. The top 1 foot of soil is planned for removal in select areas of Subarea 2 as part of the IRAM. To better understand the nature of the proposed leave surface and explore the potential for subsurface chemical bounding, additional subsurface sampling is being pursued. This work will inform the potential use of backfill amendments depending on conditions at the leave surface.

Twenty-eight borings will be completed along 10 transects in Subarea 2 (Figure 1). Except for transects 2 and 4, each transect will include top, middle, and bottom slope borings. The bottom of transects 2 and 4 are coincident with previous core locations from the Data Gaps Investigation (IU1-T05-01 and IU1-T04-01, respectively) (GSI and Haley & Aldrich, 2023). Therefore, a bottom location at transects 2 and 4 will not be sampled. While each transect is aligned with previous brush-clearing paths, sample locations will be adjusted as necessary to avoid:

- Obstructions such as surface rock, trees, and building debris
- The upland cap, based on visual indicators
- Areas that are not safely accessible

If one of these conditions exists at a given location, it will be dropped from the SPDI. A cultural resource monitor will be present for all ground-breaking activities.

Each boring will be advanced to a target depth of 3 ft bgs using a hand auger, push corer, or equivalent method; if advancing borings is difficult or slow, the use of powered sampling equipment may be employed. Samples will be assigned a depth interval based on corrections for compaction, expansion, or loss depending on the sampling method used. If a penetration depth of 3 ft bgs cannot be achieved, a new sample location offset 10 ft or less from the target will be attempted. If nearby boring locations cannot be penetrated to 3 ft bgs or greater, a lesser depth may be accepted after consultation with the GSI's Field Director and DEQ. Equipment will be decontaminated between samples and borings; final sample locations will be recorded with a global positioning system (GPS) unit; and soil will be logged, photographed, and processed consistent with the IRAM Investigation Work Plan (GSI and DOF, 2024).

The 0 to 1 ft bgs surface interval of each boring will be archived as previous sampling has already identified surface impacts along the entire length of the slope. The 1 to 2 ft bgs and 2 to 3 ft bgs intervals will be submitted for immediate chemical analysis. Samples will be analyzed consistent with the contaminants of

concern and methods detailed in the IRAM Investigation Work Plan, Table 8-1, and validated using the same procedures (GSI and DOF, 2024).

Topographic Survey. Recent analyses of the digital terrain model covering the IRAM Area and location-specific survey elevations has identified discrepancies between datasets, which include drone-captured LIDAR, single beam bathymetric data, and multiple manual surveys. As the elevation of the depth of contamination and resulting volume estimates are based upon the surface elevation of borings in the lowlands, additional manual surveying in Subareas 1 and 2 are needed to refine the digital terrain model. Specifically, manual surveying will eliminate the impacts of near-surface vegetation on the interpreted elevation and provide a comprehensive dataset that spans both the IRAM Area and the immediately adjacent lowlands, where greater confidence in the topography is needed to support design.

The topographic survey will be performed by an Oregon-licensed Professional Land Surveyor at the 90 locations detailed in Figure 2 and Table 1. These locations will include:

- The completed SPDI Subarea 2 sample locations (SPDI Sample Locations). Survey work will commence after the sampling has been completed, and the final sample locations will be reoccupied.
- Previous sample locations from the IRAM investigation and PDI, selected for spatial coverage across the lowlands (Previous Sample Locations).
- New locations to improve spatial coverage between previously sampled locations (SPDI Survey Locations).
- The staff gauge and casing at stilling well SW-07, which was installed as part of the PDI program (Stilling Well). This feature will be re-surveyed as discrepancies have been noted in the initial evaluation of transducer data at this location using the most recent survey values.
- Two upland control points (Control Points). One upland control point is in the vicinity of Outfall 005 and may require the installation of a recoverable monument. The other will be in an undetermined location on top of the historical pier structure at the discretion of the field team and surveyor. These control points will remain in place for use during the IRAM and future remedy.

The horizontal datum will be North American Datum of 1983 (NAD 83) (international feet) and the vertical datum will be North American Vertical Datum of 1988 (NAVD 88). Vertical elevations will record the depth to a competent ground surface, rather than loose surface vegetation, with an accuracy goal of 0.1 ft. This survey work will help resolve elevation uncertainty in the current site Digital Terrain Model.

Task 11 – Preparation of IRAM Report

Task 11 will include a summary of the SPDI field work completed; a discussion of the results; tables of sample locations and analytical/screening results; maps and figures; and appendices, including field forms, photographs, and data validation reports. A draft SPDI Report will be submitted to DEQ for comment, and it will be revised. The revised report will be submitted to DEQ as the final. The results of the survey work will be compiled into a series of tables, figures, and a brief narrative memorandum for DEQ.

Schedule

To support the design schedule, the above field activities will be completed in spring/summer 2025. Subarea 2 sampling is unlikely to be dependent on water levels and could occur in April 2025 upon issuance of a Task Order Amendment after acceptance of the April 2025 BAP. Survey work is likely tide and water level-dependent and will need to occur when water levels are lower, anticipated to be mid spring or summer. It is anticipated that the slope sampling field effort will require up to 10 days to complete, while the survey work will require up to 5 days. Findings and analytical results from the Subarea 2 sampling effort will be

summarized for DEQ a month after validation of data. The results of the survey work will be conveyed to DEQ within a month of completion.

Costs

Estimated costs for SPDI work will be included in the April 2025 BAP and will be based on the finalized scope of work presented in this memorandum.

References

GSI and DOF. 2024. Lowland/In-Water Operable Unit Interim Removal Action Measure Investigation Work Plan. Former St. Helens Fiberboard Facility, ECSI Site No. 91. April 15, 2024.

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. June 29, 2023.

Table

Table 1
Supplemental Pre-Design Investigation Survey Location Coordinates

Location Type	Location Name	Easting ¹	Northing ¹	Latitude	Longitude
Previous Sampling Locations	BS-4C	7611966.83	800041.60	45.8379	-122.8157
	CBC-02	7611837.50	799952.85	45.8376	-122.8162
	CBC-04	7611647.08	799965.70	45.8376	-122.8169
	CBC-05	7611711.44	799867.28	45.8374	-122.8167
	CBC-06	7611307.86	800108.58	45.8380	-122.8183
	CBC-07	7611429.41	800015.29	45.8378	-122.8178
	CBC-10	7611211.49	800002.12	45.8377	-122.8187
	CBC-13	7611459.23	799679.32	45.8368	-122.8177
	CD-02	7611116.34	800024.44	45.8378	-122.8190
	CD-04	7611195.30	800089.58	45.8379	-122.8187
	CD-11	7611392.84	800194.29	45.8383	-122.8180
	IU1-T01-01	7611701.70	800320.51	45.8386	-122.8168
	IU1-T01-02	7611816.57	800206.56	45.8383	-122.8163
	IU1-T01-03	7611912.97	800100.43	45.8380	-122.8159
	IU1-T01-04	7612017.88	799994.67	45.8378	-122.8155
	IU1-T02-01	7611595.85	800230.52	45.8384	-122.8172
	IU1-T02-02	7611702.75	800105.25	45.8380	-122.8167
	IU1-T02-03	7611801.97	799993.57	45.8377	-122.8163
	IU1-T02-04	7611884.54	799894.53	45.8375	-122.8160
	IU1-T03-02	7611490.52	800128.97	45.8381	-122.8176
	IU1-T03-03	7611583.75	800001.04	45.8377	-122.8172
	IU1-T03-04	7611675.57	799913.29	45.8375	-122.8168
	IU1-T03-05	7611774.08	799791.91	45.8372	-122.8164
	IU1-T04-01	7611292.99	800161.39	45.8382	-122.8184
	IU1-T04-02	7611364.31	800025.58	45.8378	-122.8181
	IU1-T04-03	7611471.06	799924.63	45.8375	-122.8176
	IU1-T04-04	7611581.87	799802.28	45.8372	-122.8172
	IU1-T04-05	7611662.31	799702.70	45.8369	-122.8169
	IU1-T05-02	7611258.76	799945.92	45.8376	-122.8185
	IU1-T05-03	7611347.72	799817.52	45.8372	-122.8181
	IU1-T05-04	7611441.81	799719.97	45.8370	-122.8177
	IU1-T05-05	7611545.83	799597.82	45.8366	-122.8173
	IU1-T06-01	7611049.20	799944.04	45.8375	-122.8193
	IU1-T06-02	7611147.21	799850.02	45.8373	-122.8189
	IU1-T06-03	7611224.23	799720.13	45.8369	-122.8186
	IU1-T06-04	7611332.61	799616.70	45.8367	-122.8181
	IU1-T06-05	7611433.04	799503.17	45.8364	-122.8177
	IU1-WW-C-B	7611713.27	800249.65	45.8384	-122.8167
	IU1-WW-C-C	7611769.04	800268.11	45.8385	-122.8165
	RC-01B	7612091.49	800047.11	45.8379	-122.8152
	TRB-01	7612060.91	799977.91	45.8377	-122.8153
	TRB-02	7611930.04	799854.85	45.8374	-122.8158
TRB-03	7611835.18	799769.96	45.8371	-122.8162	
TRB-04	7611698.99	799655.11	45.8368	-122.8167	
TRB-05	7611604.85	799510.12	45.8364	-122.8171	
TRB-06	7611503.86	799400.21	45.8361	-122.8174	

Table 1
Supplemental Pre-Design Investigation Survey Location Coordinates

Location Type	Location Name	Easting ¹	Northing ¹	Latitude	Longitude
Proposed SPDI Sampling Locations ²	SPDI-T01-01	7611068.22	800023.33	45.8378	-122.8192
	SPDI-T01-02	7611076.60	800008.03	45.8377	-122.8192
	SPDI-T01-03	7611087.39	799988.33	45.8377	-122.8191
	SPDI-T02-01	7611133.29	800099.18	45.8380	-122.8190
	SPDI-T02-02	7611144.25	800079.17	45.8379	-122.8189
	SPDI-T03-01	7611187.38	800183.08	45.8382	-122.8188
	SPDI-T03-02	7611206.65	800147.90	45.8381	-122.8187
	SPDI-T03-03	7611228.31	800108.34	45.8380	-122.8186
	SPDI-T04-01	7611257.36	800244.26	45.8384	-122.8185
	SPDI-T04-02	7611281.11	800200.91	45.8383	-122.8184
	SPDI-T05-01	7611327.35	800307.93	45.8386	-122.8182
	SPDI-T05-02	7611365.87	800237.60	45.8384	-122.8181
	SPDI-T05-03	7611406.79	800162.88	45.8382	-122.8179
	SPDI-T06-01	7611421.96	800295.27	45.8385	-122.8179
	SPDI-T06-02	7611450.40	800243.33	45.8384	-122.8177
	SPDI-T06-03	7611481.26	800187.00	45.8382	-122.8176
	SPDI-T07-01	7611520.00	800305.85	45.8386	-122.8175
	SPDI-T07-02	7611526.08	800294.74	45.8385	-122.8175
	SPDI-T07-03	7611534.57	800279.24	45.8385	-122.8174
	SPDI-T08-01	7611587.35	800378.14	45.8388	-122.8172
	SPDI-T08-02	7611601.71	800351.93	45.8387	-122.8172
	SPDI-T08-03	7611618.46	800321.33	45.8386	-122.8171
	SPDI-T09-01	7611718.42	800437.18	45.8389	-122.8167
	SPDI-T09-02	7611715.73	800407.96	45.8389	-122.8167
	SPDI-T09-03	7611712.58	800373.77	45.8388	-122.8167
	SPDI-T10-01	7611767.83	800429.46	45.8389	-122.8165
	SPDI-T10-02	7611764.84	800397.07	45.8388	-122.8165
	SPDI-T10-03	7611761.40	800359.70	45.8387	-122.8165
SPDI Survey Locations	SP-01	7611796.07	800321.51	45.8386	-122.8164
	SP-02	7611844.72	800279.43	45.8385	-122.8162
	SP-03	7611893.38	800234.72	45.8384	-122.8160
	SP-04	7611934.14	800183.44	45.8383	-122.8158
	SP-05	7611990.68	800129.53	45.8381	-122.8156
	SP-06	7611661.95	800162.40	45.8382	-122.8169
	SP-07	7611590.94	800113.75	45.8380	-122.8172
	SP-08	7611510.73	800055.89	45.8379	-122.8175
	SP-09	7611187.25	799967.79	45.8376	-122.8187
	SP-10	7611143.86	799928.34	45.8375	-122.8189
	SP-11	7611096.52	799888.89	45.8374	-122.8191
	SP-12	7611043.92	799883.63	45.8374	-122.8193
	SP-13	7610991.33	799907.30	45.8374	-122.8195
Stilling Well	SW-07	7611450.24	799610.56	45.8367	-122.8177
Upland Control Points	Upland Control Point 1	TBD	TBD	TBD	TBD
	Upland Control Point 2	TBD	TBD	TBD	TBD

Notes

¹ Datum is North American Datum of 1983 (NAD 83), Oregon State Plane North, International Feet.

² Actual survey location will reflect the final sample point rather than the target location.

SPDI = Supplemental Pre-Design Investigation

TBD = To Be Determined - the locations of the upland control points will be finalized in the field.

FIGURE 1
SPDI Sampling Locations
 Supplemental Pre-Design
 Investigation for the
 Interim Removal Action Measure



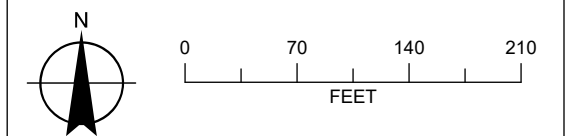
LEGEND

- Proposed SPDI Sample Location
- SPDI Transect Line
- Previous Sample Locations**
- Contaminant Delineation (CD) Sample Location (Composite)
- Subsurface Sample (Core)
- Riverbank Sample
- All Other Features**
- Interim Removal Action Measure (IRAM) Subarea
- Lowland/In-Water Operable Unit (OU2/Project Area)¹
- Upland Operable Unit (OU1)¹
- Ordinary High Water (OHW) Elevation, 17.5 ft NAVD 88
- Watercourse

NOTES

1. Combined, the Upland Operable Unit (OU1) and the Lowland/In-Water Operable Unit (OU2/Project Area) are known as the Site.
2. Combined, the extents of the IRAM subareas make up the IRAM area.
3. The IRAM subarea boundaries are subject to change.

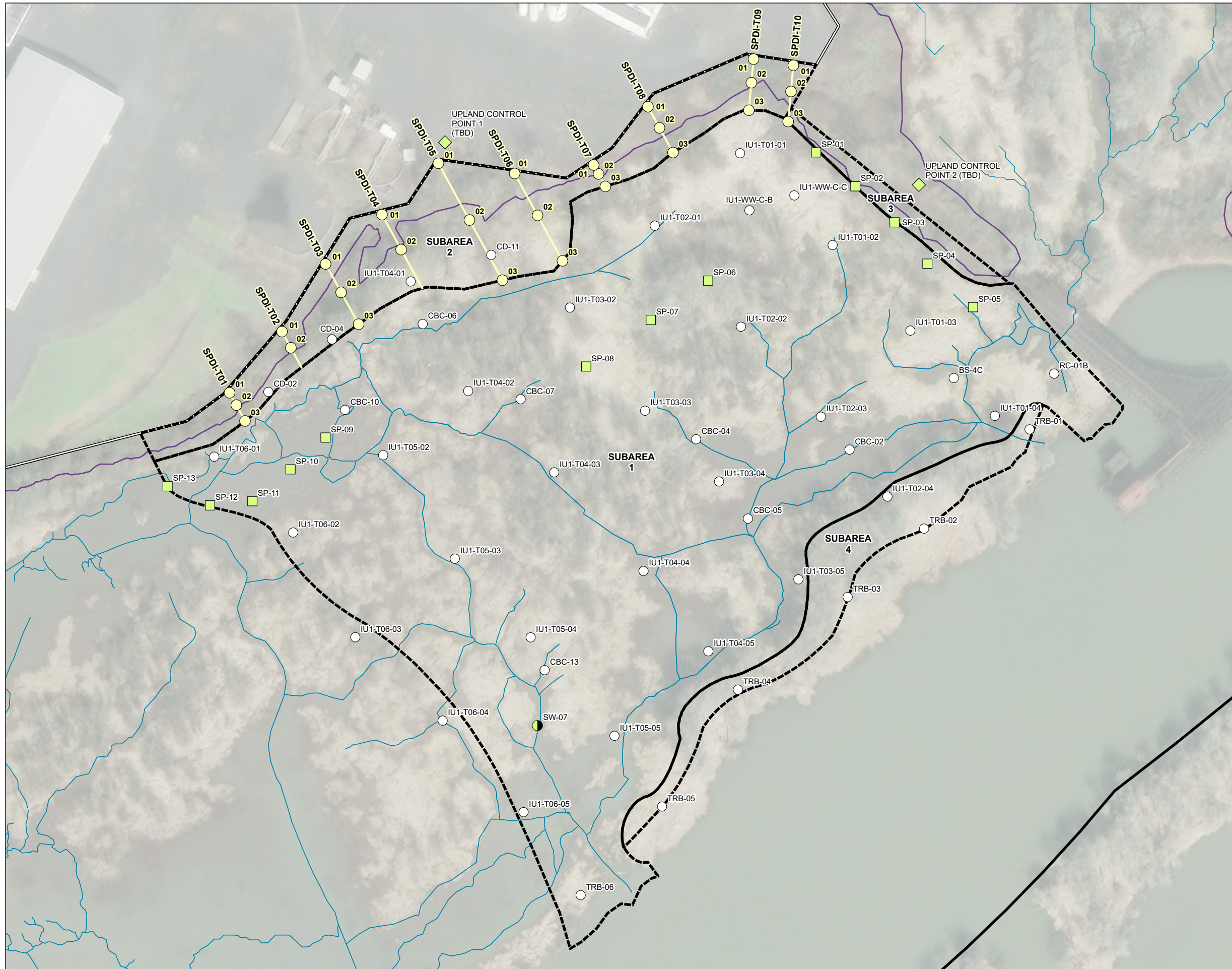
ft: feet or foot
 NAVD 88: North American Vertical Datum of 1988
 SPDI: Supplemental Pre-Design Investigation



Date: March 11, 2025
 Data Sources: BLM, ESRI, ODOT, USGS, Imagery (2022)



FIGURE 2
SPDI Survey Points
 Supplemental Pre-Design
 Investigation for the
 Interim Removal Action Measure



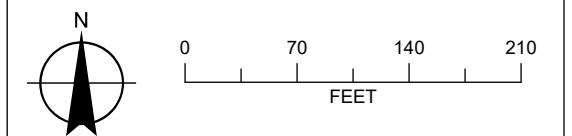
LEGEND

- SPDI Transect Line
- SPDI Survey Locations**
- Proposed SPDI Sample Location
- New Survey Point
- ◆ Control Point
- Stilling Well
- Previous Sample Location
- All Other Features**
- Interim Removal Action Measure (IRAM) Subarea
- Lowland/In-Water Operable Unit (OU2/Project Area)¹
- Upland Operable Unit (OU1)¹
- ~ Ordinary High Water (OHW) Elevation, 17.5 ft NAVD 88
- ~ Watercourse

NOTES

1. Combined, the Upland Operable Unit (OU1) and the Lowland/In-Water Operable Unit (OU2/Project Area) are known as the Site.
2. Combined, the extents of the IRAM subareas make up the IRAM area.
3. The IRAM subarea boundaries are subject to change.

ft: feet or foot
 NAVD 88: North American Vertical Datum of 1988
 SPDI: Supplemental Pre-Design Investigation



Date: March 11, 2025
 Data Sources: BLM, ESRI, ODOT, USGS, Imagery (2022)

