July 16, 2025
10157.004

Portland Golf Club
5900 Scholls Ferry Road
Portland, Oregon 97225

VIA Email/First Class

Attention: **Cory Isom, Director of Agronomy**

Subject: **Junor Lake Sediment MET Evaluation**

Dear Mr. Isom:

This document summarizes the results of Junor Lake sediment Modified Elutriate Testing (MET) sampling conducted at Portland Golf Club (PGC) on May 28-29, 2025. This investigation was conducted under a MET Evaluation Plan approved by Oregon Department of Environmental Quality (DEQ) via email on May 21, 2025. The freshwater aquatic life water quality criteria (WQC) for toxic pollutants set forth in Table 30 (DEQ, 2024) Oregon Administrative Rules (OAR) 340-041-8033 are applicable given the results for total copper, lead, and zinc previously detected in Junor Lake sediments (*EnviroLogic Resources*, 2023) were above background levels. The focus of the MET evaluation was to: a) simulate the dissolved concentrations of copper, lead, and zinc in the effluent/return water planned to be returned to the Fanno Creek watershed after draining from the removed dredge materials; and, b) establish the WQC applicable to the proposed Oregon DSL/DEQ joint permit. The MET sampling program was consistent with industry standard environmental sampling methods and procedures, and the approved Plan. Figure 1 and Figure 2 show the site location and surrounding vicinity.

Summary

Junor Lake bottom sediments planned for removal are comprised of silty clay-clayey silt. Four sediment cores and one set of water samples from near the lake bottom were obtained using a watercraft. The analytical testing laboratory composited the sediment cores into one representative sample for mixing with the lake bottom water to perform the MET analysis for total/dissolved copper, lead, and zinc. The mixed sediment/lake bottom water sample was then aerated for one hour and allowed to settle for 24 hours in the lab per the MET method. Lake water was measured for field geochemical parameters and also analyzed in the lab for relevant cations/anions and dissolved organic carbon (DOC) needed as input for the Biotic Ligand Model (BLM) to calculate WQC for dissolved copper. Dissolved lead and zinc WQC calculations rely on the lake water hardness per Table 30. The Junor Lake MET evaluation

sample locations are shown on Figure 3. Field sampling logs and photographs of this work are also attached.

An AMS^{TM}-type multi-stage sediment core sampler was used to advance and collect 3- to 4-ft cores from a small vessel, which were field screened along 1-ft intervals and placed into lab-provided jars for analysis. Recovered core lengths were shortened somewhat by compaction during sampling, however, sufficient sediment sample volumes were retrieved. Sediment core compositing, mixing, aeration, and settling, followed by MET analysis on the resulting supernatant were performed by APEX Laboratories, of Tigard, Oregon, while DOC testing of the lake water was performed by ALS, of Kelso, Washington. A&L Western Laboratories, of Sherwood, Oregon, performed cations/anions analysis on the lake water.

Sampling Results

While detectable concentrations of total copper, lead, and zinc were identified in the MET evaluation results for the sediment cores and lake bottom water, dissolved concentrations of copper, lead, and zinc were not detected within the laboratory method reporting limit (MRL). Analytical reports are attached to this report. Table 1 shows the sediment core composite sampling information. Table 2 attached present the MET evaluation results for copper, lead, and zinc.

Field measurements and results for major cations/anions in the Junor Lake water are summarized below.

Table 3 – Field Parameters & Water Sample Results for Major Cations/Anions

Locator	Date	pH	Specific Conductance µS/cm	Temperature °C	Dissolved Oxygen mg/L	ORP mV	Turbidity NTU	Dissolved Organic Carbon mg/L
Irrigation Pond Center *	5/28/25	7.7	191	18.7	6.2	126	15.5	5.10

Locator	Date	Na	Ca	Mg	Bicarbonate (HCO_3)	Cl	Electrical Conductivity (E.C.)	pH	Cu	Fe
		mg/L	mg/L	mg/L	mg/L	mg/L	dS/m		mg/L	mg/L
Irrigation Pond Center *	5/28/25	8.9	15.8	6.1	78.1	12.8	0.20	7.6	< 0.01	0.37

Locator	Date	Mn	K	Nitrate (NO_3)	Sulfate (SO_4)	B	Total Dissolved Solids (TDS)	Sodium Absorption Ratio (SAR)	SAR/ E.C. (SEC)	pHc
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L			
Irrigation Pond Center *	5/28/25	0.08	1.3	< 0.1	4.0	< 0.01	138	0.5	2.4	8.3

< = not detected at or above the laboratory analytical MRL
* = lakebed water column sample

A limited review of the associated laboratory analytical results and quality assurance/quality control (QA/QC) data indicate there were no detectable concentrations of the analytes submitted for testing within the method control blanks utilized for QA/QC purposes. The analytical data associated with the sediment MET evaluation and water sampling appears to be of acceptable quality for comparison with the relevant WQC.

Discussion

Freshwater aquatic life WQC are specified in OAR 340-140-8033, Table 30 (DEQ, 2024), including derivations for dissolved copper, lead, and zinc. WQC for dissolved copper is based on BLM input/output, while WQC for dissolved lead and zinc rely on Table 30 calculations using the lake water hardness per Table 30.

Water quality parameters temperature, pH, DOC, calcium, magnesium, sodium, potassium, sulfate, chloride, and alkalinity were input to the BLM Windows® Interface, Version 3.41.2.45 (Windward, 2019). The humic acid fraction of DOC default of 10-percent was used as the recommended value for natural waters. A non-zero default value of 0.001 mg/L (or 1 µg/L) for sulfide is shown as a reminder of the potential for metal-sulfide complexes and reactions, however, does not affect the outcome for the current iterations of the BLM simulation, per the software user manual. Alkalinity or dissolved inorganic carbon content was assumed to be comprised of the dominant species, or bicarbonate, concentrations in natural waters. Given the input field geochemical parameter measurements and the laboratory analytical results for DOC and cations/anions in the lake water, the acute to chronic WQC for copper were calculated to be in the range of 15-25 µg/L, as shown on the attached BLM output. The output WQC for copper does not change regardless if the MRL value or half the MRL is used for the simulated dissolved copper concentration.

Hardness is expressed as the sum of calcium and magnesium hardness as CaCO3, or around 65 mg/L for this MET sampling event (https://www.lenntech.com/ro/water-hardness.htm). The derived WQC based on hardness is in the range of 168-170 µg/L for lead and 34-35 µg/L for zinc. Table 4 presents the proposed WQC for the Junor Lake sediment removal project.

Table 4 – Proposed Project Water Quality Criteria for Dissolved Copper, Lead & Zinc

Dissolved Metal	This 2025 MET Evaluation	Fanno Creek at 56th Avenue USGS 14206950		Freshwater Water Quality Criteria (WQC)
	Result (µg/L)	Range (µg/L)	Average (µg/L)	DEQ Table 30 (µg/L)[1]
Copper	< 2.00	1.4 – 2.9	1.8	15-25
Lead	< 0.200	0.01 – 1.0	0.4	168-170
Zinc	< 4.00	3.5 - 42	17.2	34-35

[1] = DEQ Aquatic Life WQC (updated 2024), https://www.oregon.gov/deq/FilterRulemakingDocs/tables303140.pdf
< = not detected at or above the laboratory analytical MRL

Although we have derived WQC using the MET evaluation for permitting purposes, dissolved copper, lead, and zinc are not predicted to be measurable in the effluent/return water within current laboratory analytical method capabilities.

For additional perspective, a chart presenting Portland Basin background concentrations and 2023 Junor Lake sediment total copper, lead, and zinc versus total copper, lead, and zinc detected in the 2025 lakebed water samples is attached. The 2025 lakebed water sampling results for total copper, lead, and zinc are roughly two order-of-magnitudes lower than the Portland Basin background and 2023 sediment sampling results. This chart indicates that the 2023 sediment sampling results appear to trend within one standard deviation of background levels. It is likely that the 2023 sediment sampling results depict natural background concentrations variability in the Fanno Creek watershed.

Regarding the potential for temporary turbidity during project, reuse of the seepage/return water at Junor Lake is necessary to keep the dredge barge afloat, as well as maintain water capacity for golf course irrigation. Check dams will be used in a ditch downslope near the sediment bags to collect seepage/return water in a sump for pumping back to Junor Lake. Natural Woods Creek flow will be isolated from the pond by a temporary coffer dam and bypass pipe, and the Fanno Creek gate valve will remain closed to prevent flows to/from Junor Lake during the project, such that no excess turbid return water will discharge to the Fanno Creek watershed. If necessary, a temporary sprinkler system will be available to convey any turbid return water for infiltration within upland forest permeable soils nearby on-site to remove and sequester clay-size particles. After the project, turbidity will fluctuate within the historical seasonal background conditions range for the Fanno Creek watershed.

Junor Lake sediment removal will have a water quality benefit to Woods and Fanno Creeks, since deeper water in the pond (sans sediment) reduces water temperature prior to overflowing to the creek (PGC, 2024). Lower water temperatures provide better habitat for fish rearing and spawning. Such benefit is particularly pronounced in spring and autumn when Fanno Creek is sustained by rainfall and urban runoff (creek flow is minimal in summer due to naturally dry conditions in July, August and September). In contrast, an irrigation pond nearly full of accumulated sediment will eventually pass sediment through to increase turbidity and sedimentation downstream within Fanno Creek (PGC. 2024).

Background concentrations of total dissolved solids (TDS) at the PGC Fanno Creek and Woods Creek entry point sample locations in November 2023 ranged from 85 to 96 mg/L, while for Junor Lake was about 97 mg/L (*EnviroLogic Resources*, 2023). In April 2024 and May 2025, Junor Lake TDS levels ranged from 117 to 138 mg/L. For comparison with lab reported TDS levels of 138 mg/L for Junor Lake in May 2025, field measured TDS equated

to 124 mg/L - a roughly 10-percent difference. The potential for temporary incremental increases in TDS above background levels during the project, if any, will be mitigated by the same controls (e.g., Junor Lake isolation, reuse of return water, upland infiltration) described for turbidity. Once the project has been completed, TDS will fluctuate within the historical seasonal background conditions range for the Fanno Creek watershed. The DEQ water quality standard for TDS in the Willamette Basin is 100 mg/L, including tributaries. This portion of the Fanno Creek watershed has background TDS levels that periodically exceed 100 mg/L associated with land use by others or other conditions upstream.

Conclusions

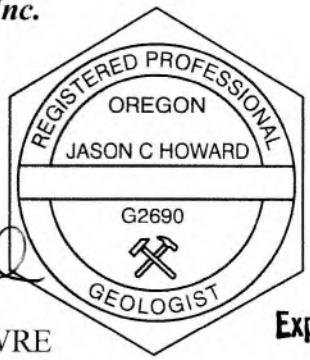
Based on this MET evaluation, dissolved concentrations of copper, lead, and zinc were not detected in the simulated effluent/return water that may drain from removed Junor Lake sediment, if any. MET evaluation is intended as a conservative means to account for geochemical changes occurring at the dredge spoils disposition site and to characterize effluent/return water quality under ambient conditions. Metals have a tendency to leave the dissolved phase and attach to suspended solids as an adsorbed form (EPA, 1996). The majority if not all copper, lead, and zinc in the simulated effluent/return water are likely to be present in the form of total metals, which are bound to suspended/particulate matter and expected to settle out and remain inert. While detectable concentrations of total copper, lead, and zinc in the sediments were identified by the laboratory, the derived WQC criteria are based on risks to aquatic life associated with dissolved metals concentrations. Dissolved metals approximate the bioavailable metal fraction in the water column toxicity given adsorption at the biotic ligand/fish gill surface. Although we have derived WQC using the MET evaluation for permitting purposes, dissolved copper, lead, and zinc are not predicted to be measurable in the effluent/return water. Therefore, proposed upland disposition should meet the relevant WQC established through this MET evaluation and does not appear to pose unacceptable risks to freshwater aquatic life in the Fanno Creek watershed.

Recommendations

A dredge sediment return water treatment feasibility study is not warranted given the levels of copper, lead, and zinc evaluated for this MET sampling event. However, the envisioned placement of the removed sediment bags on site uplands should be implemented using best management practices, including temporary erosion controls/sediment fencing and long-term vegetation planning (e.g., cover soil seeded with grass and other plantings).

We hope this letter adequately addresses your needs. If you have any questions or comment, please call *EnviroLogic Resources* at (503)768-5121.

Sincerely,
EnviroLogic Resources, Inc.



Expires: DEC 31 2025

Jason C. Howard, RG, CWRE
Senior Hydrogeologist

Jason C. Howard, for

Thomas J. Calabrese, RG, CWRE
Principal Hydrogeologist

Cc: Shelley Tattam, Oregon DEQ 401 Program

JCH/

Tables

Table 1 – Composite Samples Explanation
Table 2 – Sediment MET Sample Results for Total & Dissolved Copper, Lead & Zinc
Table 3 – Water Sample Results
Table 4 – Proposed Project Water Quality Criteria for Dissolved Copper, Lead & Zinc

Figures

Figure 1 – Site Location
Figure 2 – Site Vicinity
Figure 3 – Junor Lake Sampling Locations

Attachments

Photographs (May 28, 2025)
Sediment Sampling Field Data Sheets (*EnviroLogic Resources*, 2025)
Water Sampling Forms (*EnviroLogic Resources*, 2025)
Laboratory Analytical Results (Apex, ALS, and A&L Western Laboratories, 2025)
BLM Input & Water Quality Criteria for Copper
Background Soil & 2023 Sediment Total Metals vs 2025 Lakebed Water Total Metals

TABLES

TABLE 1
Portland Golf Club – Junor Lake, Portland, Oregon

Sediment MET Evaluation Samples Explanation

	Composite Sample ID	Discrete Sample ID *
Sediment	Composite FC-I/IP-C/WC-I/IP-O (1-3)	FC-I (1-3), IP-C (1-3), WC-I (1-3), and IP-O (1-3)
Water	Composite FC-I/IP-C/WC-I/IP-O (1-3)	FC-I (1-3), IP-C (1-3), WC-I (1-3), and IP-O (1-3)

***** = Discrete samples were submitted for laboratory compositing, preparation, and MET analyses for Cu, Pb and Zn

TABLE 3
MET COMPOSITE SAMPLE RESULTS
Copper, Lead & Zinc
Portland Golf Club-Junor Lake
Portland, Oregon

	Discrete Sample Locator ID	Lab Composite Sample ID	Date Analyzed in Lab	Sediment Sample Depth	Water Sample Depth	Solids (Dry Weight)	Total Metals *			Dissolved Metals *					
				feet	feet	%	µg/L (also µg/kg)			µg/L					
				below lakebed	above lakebed		Copper	Lead	Zinc	Copper		Lead		Zinc	
MET Evaluation	FC-I, IP-C, WC-I, and IP-O	FC-I/IP-C/WC-I/IP-O (1-3)	6/10/2025	0-3	2	47.3	546	339	2,540	2.00	U	0.200	U	4.00	U
		(lab duplicate – total Zinc only)	6/14/2025	0-3	2	–	–	–	2,490	–		–		–	
Calculated Water Quality Criteria (WQC) for Freshwater Aquatic Life						–	–	–	–	15-25/ 50 CCC-CMC/FAV		168-172		34-35	
Fanno Creek Background Water Quality						–	–	–	–	1.4-2.9 range 1.8 average		0.01-1.0 range 0.4 average		3.5-42 range 17.2 average	

Notes:

mg/kg = milligrams per kilogram, mg/L - milligrams per Liter, µg/kg = micrograms per kilogram, and µg/L - micrograms per Liter

* = See lab report for EPA Method 6020B method detection limits. All compounds tested are listed.

U = not detected within the laboratory method reporting limits

Conversions:

total metals as mg/L (also mg/kg)

0.546 0.339 2.54

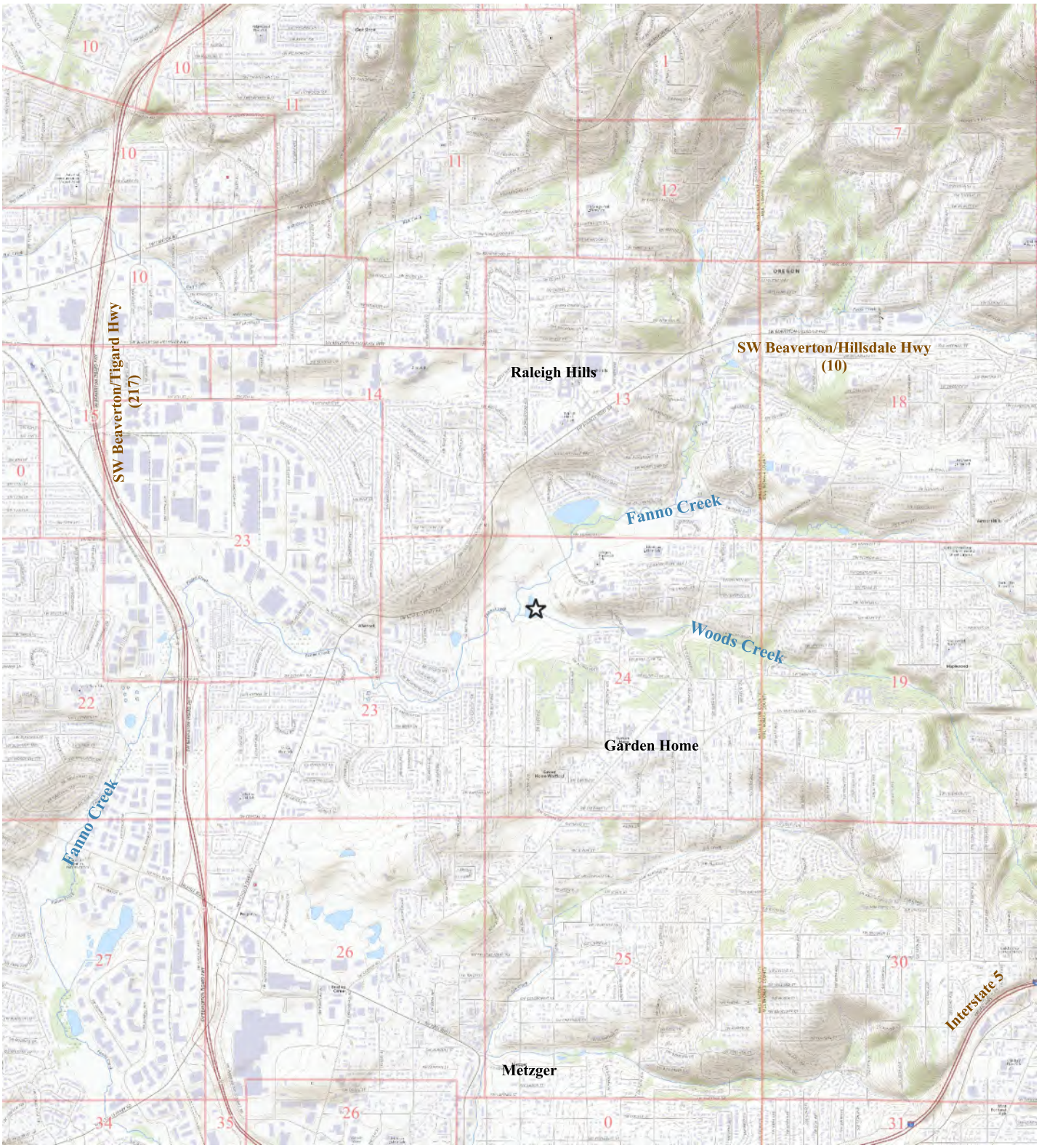
total metals as weight %

0.0000546 0.0000339 0.000254

Dissolved Metal Results vs WQC: Pass/Fail?

Copper	Lead	Zinc
Pass	Pass	Pass

FIGURES



Explanation

☆ Site Location

PLSS Lines

0 1/4 1/2 mi

N

WGS84/Psuedo-Mercator
Prepared September 11, 2023

Sources: PLSS county lines, Washington County tax lots, USGS TOPO (nationalmap.gov), ESRI Satellite, ormap.net.

EnviroLogic Resources, Inc.
ENVIRONMENTAL • WATER RESOURCES SCIENTISTS

FIGURE 1
SITE LOCATION

Junor Lake
Sediment Characterization
Portland Golf Club
Portland, Oregon

Explanation

Approximate Site Boundary

Streams

Lakes & Ponds

Golf Course Well Locations

0 250 500 ft

N

WGS84/Psuedo-Mercator
Prepared April 18, 2025

Sources: PLSS county lines, Washington County tax lots, USGS TOPO (nationalmap.gov), ESRI Satellite, ormap.net.

EnviroLogic Resources, Inc.
ENVIRONMENTAL • WATER RESOURCES SCIENTISTS

FIGURE 2
SITE VICINITY
Junor Lake
MET PLAN
Portland Golf Club
Portland, Oregon

Explanation

Approximate Site Boundary

Sediment Sample Locations (May 28-29, 2025)

0 100 200 ft

N

WGS84/Psuedo-Mercator
Prepared April 18, 2025

Sources: PLSS county lines, Washington County tax lots, USGS TOPO (nationalmap.gov), ESRI Satellite, ormap.net.

EnviroLogic Resources, Inc.
ENVIRONMENTAL • WATER RESOURCES SCIENTISTS

FIGURE 3
SAMPLE LOCATIONS
Junor Lake
Sediment Characterization
Portland Golf Club
Portland, Oregon

ATTACHMENTS

Portland Golf Club – Junor Lake Sediment MET Evaluation

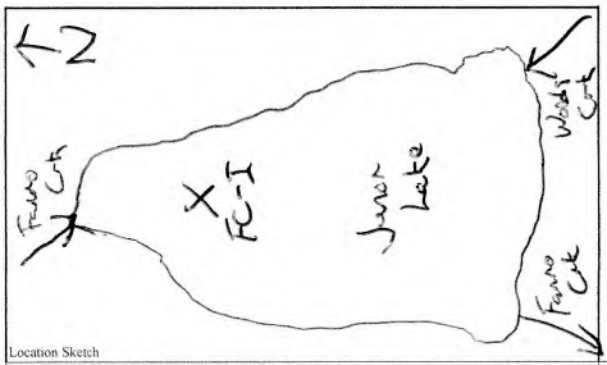
Portland, Oregon

Photo 1: view of IP-C lakebed water sampling with peristaltic pump

Photo 2: another view of IP-C lakebed water sampling with peristaltic pump.

Photo 3: view of multi-stage sediment core barrel sampler field kit

Photo 4: view of check-valve at top of sediment core sample barrel while cleaning



Location Sketch

LOG OF: FC-I

Project: PGC – Sediment Characterization – MET
Address:5900 SW Scholls Ferry Rd.
City, State: Portland, OR 97225

Project Number: 10157.004

DRILLING METHOD	AMS Multi-stage Sampler	DATE DRILLED	05/29/25
DRILLING CO	EnviroLogic Resources, Inc.	GROUND SURF ELEV	~207' lake edge
SAMPLING METHOD	AMS Multi-stage Sampler	REFERENCE PT ELEV	
DRILLER	B. Yeager & O. Daly	DATUM	Client Provided Map
LOGGED BY	OED	COMMENTS	

COMPLETION DETAILS | Depth | Blows | ppm | Samples | Graphic | **SOIL DESCRIPTION**

C/i = Composite

Lake Surface Water Level (ft) 0'

5'

(Water Column)

10'

Top of Sediment

Dark gray, wet, clayey silt, earthy odors, w/ organic debris

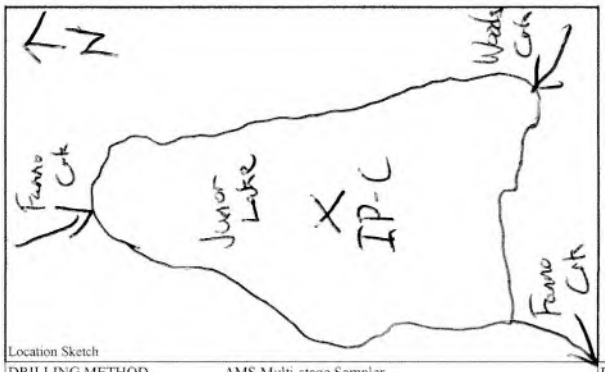
Bottom of Sediment

15'

20'

EnviroLogic Resources, Inc.
Consulting Environmental & Water Resources Scientists

Sheet __ of __



Location Sketch

LOG OF: IP-C

Project: PGC – Sediment Characterization – MET
Address:5900 SW Scholls Ferry Rd.
City, State: Portland, OR 97225

Project Number: 10157.004

DRILLING METHOD	AMS Multi-stage Sampler	DATE DRILLED	05/29/25
DRILLING CO	EnviroLogic Resources, Inc.	GROUND SURF ELEV	~207' lake edge
SAMPLING METHOD	AMS Multi-stage Sampler	REFERENCE PT ELEV	
DRILLER	B. Yeager & O. Daly	DATUM	Client Provided Map
LOGGED BY	OED	COMMENTS	

COMPLETION DETAILS | Depth | Blows | ppm | Samples | Graphic | **SOIL DESCRIPTION**

Lake Surface Water Level (ft)

0' C/I = Composite

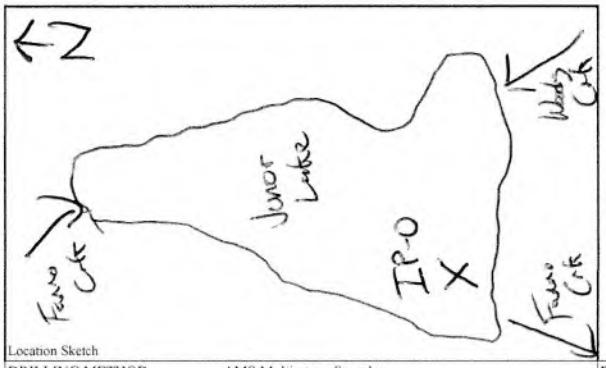
5' (Water Column)

10' Top of Sediment

Dark gray, wet, clayey silt, earthy odors, w/ organic debris

15' Bottom of Sediment

20'



Location Sketch

LOG OF: IP-0

Project: PGC – Sediment Characterization – MET
Address:5900 SW Scholls Ferry Rd.
City, State: Portland, OR 97225

Project Number: 10157.004

DRILLING METHOD	AMS Multi-stage Sampler	DATE DRILLED	05/29/25
DRILLING CO	EnviroLogic Resources, Inc.	GROUND SURF ELEV	~207' lake edge
SAMPLING METHOD	AMS Multi-stage Sampler	REFERENCE PT ELEV	
DRILLER	B. Yeager & O. Daly	DATUM	Client Provided Map
LOGGED BY	OED	COMMENTS	

COMPLETION DETAILS | Depth | Blows | ppm | Samples | Graphic | **SOIL DESCRIPTION**

Lake Surface Water Level (ft)

0' C/I = Composite

(Water Column)

5' Top of Sediment

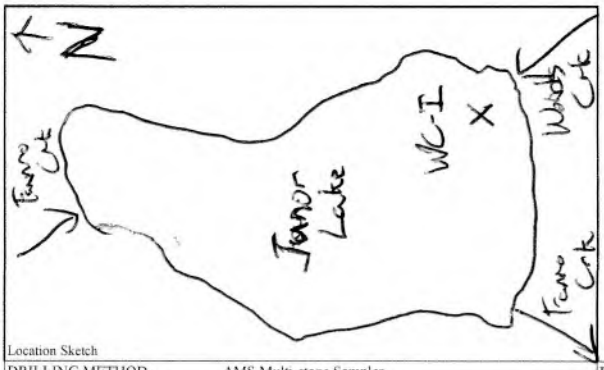
Dark gray, silty clay, wet, earthy odor, w/ organic debris

Bottom of Sediment

10'

15'

20'



Location Sketch

LOG OF: WC-I

Project: PGC – Sediment Characterization – MET
Address:5900 SW Scholls Ferry Rd.
City, State: Portland, OR 97225

Project Number: 10157.004

DRILLING METHOD	AMS Multi-stage Sampler	DATE DRILLED	05/29/25
DRILLING CO	EnviroLogic Resources, Inc.	GROUND SURF ELEV	~207' lake edge
SAMPLING METHOD	AMS Multi-stage Sampler	REFERENCE PT ELEV	
DRILLER	B. Yeager & O. Daly	DATUM	Client Provided Map
LOGGED BY	OED	COMMENTS	

COMPLETION DETAILS

Depth | Blows | ppm | Samples | Graphic

SOIL DESCRIPTION

Lake Surface Water Level (ft)

0'

C/i = Composite

(Water Column)

5'

Top of Sediment

Dark gray, silty clay, wet, earthy odor, w/ organic debris

10'

Inferred - Tualatin Valley Sediments

Bottom of Sediment

(Light Blue CLAY, earthy/mineral odor) (NOT INCLUDED IN SAMPLE)

15'

20'

WATER SAMPLE LOG

Project Number: 10157.004 Sampled by: BFY/OED

Project Name: Sediment Characterization - MET

Project Location: Portland, OR

Client: Portland Golf Club

Date: 05/28/2025	
Locator ID:	Sample ID: IP-C
Time Sample Collected: 12:05	Well or Boring No.:
Static Water Level:	Time:
Amount Purged:	
Sample Collection Method:	
Discharge rate during sampling: Well pump was not running during sampling event	
Color: light brown	Odor: organic/earthy
Temperature: 18.7 °C	Dissolved Oxygen: 69.8/6.23
pH: 7.69	ORP: 126
Specific Conductance: 191	Other: 15.5 NTUs
Analyses Requested:	
Comments:	

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Wednesday, June 25, 2025

Tom Calabrese
EnviroLogic Resources
2830 SW Plum Circle
Portland, OR 97219

RE: A5E1798 - Portland Golf Club - Junor Lake - 10157.004

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A5E1798, which was received by the laboratory on 5/28/2025 at 3:56:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: akepa@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information					
Acceptable Receipt Temperature is less than, or equal to, 6 degC (not frozen), or received on ice the same day as sampling.					
(See Cooler Receipt Form for details)					
Cooler #1	3.7	degC	Cooler #2	22.0	degC
Cooler #3	1.4	degC			

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Anissa Kepa, Project Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

EnviroLogic Resources	Project: **Portland Golf Club - Junor Lake**	
2830 SW Plum Circle	Project Number: **10157.004**	**Report ID:**
Portland, OR 97219	Project Manager: **Tom Calabrese**	**A5E1798 - 06 25 25 1154**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ID-C	A5E1798-01	Water	05/28/25 12:05	05/28/25 15:56
FC-I(1-3)	A5E1798-02	Sediment	05/29/25 11:40	05/28/25 15:56
IP-C(1-3)	A5E1798-03	Sediment	05/28/25 13:05	05/28/25 15:56
WC-I(1-3)	A5E1798-04	Sediment	05/29/25 10:50	05/28/25 15:56
IP-O(1-3)	A5E1798-05	Sediment	05/29/25 11:15	05/28/25 15:56
FC-I/IP-C/WC-I/IP-O (1-3) Composite	A5E1798-06	Sediment	05/28/25 13:05	05/28/25 15:56
FC-I/IP-C/WC-I/IP-O (1-3) Composite	A5E1798-07	Water	05/28/25 13:05	05/28/25 15:56

Apex Laboratories

Anissa Kepa, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

EnviroLogic Resources	Project: **Portland Golf Club - Junor Lake**	
2830 SW Plum Circle	Project Number: **10157.004**	**Report ID:**
Portland, OR 97219	Project Manager: **Tom Calabrese**	**A5E1798 - 06 25 25 1154**

ANALYTICAL CASE NARRATIVE

A5E1798 **Apex Laboratories**

Amended Report Revision 1:

Project Name Change-

This report supersedes all previous reports.

Per client request, the project name was changed from Portland Golf Club/ Junior Lake Sed. Char. to Portland Golf Club - Junor Lake.

Anissa Kepa
Project Manager
6/25/25

Apex Laboratories

Anissa Kepa, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

EnviroLogic Resources	Project: **Portland Golf Club - Junor Lake**	
2830 SW Plum Circle	Project Number: **10157.004**	**Report ID:**
Portland, OR 97219	Project Manager: **Tom Calabrese**	**A5E1798 - 06 25 25 1154**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
FC-I/IP-C/WC-I/IP-O (1-3) Composite (A5E1798-07)				**Matrix: Water**				
Batch: 25F0338								
Copper	**546**	---	2.00	ug/L	1	06/10/25 23:07	EPA 6020B	**COMP, PRO**
Lead	**339**	---	0.200	ug/L	1	06/10/25 23:07	EPA 6020B	**COMP, PRO**
FC-I/IP-C/WC-I/IP-O (1-3) Composite (A5E1798-07RE1)				**Matrix: Water**				
Batch: 25F0421								
Zinc	**2540**	---	20.0	ug/L	5	06/13/25 03:25	EPA 6020B	**COMP, PRO**
FC-I/IP-C/WC-I/IP-O (1-3) Composite (A5E1798-07RE2)				**Matrix: Water**				
Batch: 25F0421								
Zinc	**2490**	---	20.0	ug/L	5	06/14/25 16:06	EPA 6020B	**COMP, PRO,RR-8**

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Anissa Kepa, Project Manager

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ANALYTICAL REPORT

AMENDED REPORT

EnviroLogic Resources	Project: **Portland Golf Club - Junor Lake**	
2830 SW Plum Circle	Project Number: **10157.004**	**Report ID:**
Portland, OR 97219	Project Manager: **Tom Calabrese**	**A5E1798 - 06 25 25 1154**

ANALYTICAL SAMPLE RESULTS

Dissolved Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
FC-I/IP-C/WC-I/IP-O (1-3) Composite (A5E1798-07)				**Matrix: Water**				
Batch: 25F0308								
Copper	ND	---	2.00	ug/L	1	06/10/25 20:27	EPA 6020B (Diss)	COMP, PRO
Lead	ND	---	0.200	ug/L	1	06/10/25 20:27	EPA 6020B (Diss)	COMP, PRO
Zinc	ND	---	4.00	ug/L	1	06/10/25 20:27	EPA 6020B (Diss)	COMP, PRO

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ANALYTICAL REPORT

AMENDED REPORT

EnviroLogic Resources
2830 SW Plum Circle
Portland, OR 97219

Project: **Portland Golf Club - Junor Lake**
Project Number: **10157.004**
Project Manager: **Tom Calabrese**

Report ID:
A5E1798 - 06 25 25 1154

ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
FC-I/IP-C/WC-I/IP-O (1-3) Composite (A5E1798-06)				**Matrix: Sediment**		**Batch: 25E1037**		**COMP**
% Solids	**47.3**	---	1.00	%	1	06/02/25 05:12	EPA 8000D	

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2830 SW Plum Circle	Project Number: **10157.004**	**Report ID:**
Portland, OR 97219	Project Manager: **Tom Calabrese**	**A5E1798 - 06 25 25 1154**

ANALYTICAL SAMPLE RESULTS

Modified Dredging Elutriate Test (MDRET) Preparation

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
FC-I/IP-C/WC-I/IP-O (1-3) Composite (A5E1798-06)				**Matrix: Sediment**		**Batch: 25E1053**		**COMP**
DRET Preparation	0.00	---		N/A	1	06/06/25 17:28	DRET	

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Portland, OR 97219	Project Manager: **Tom Calabrese**	**A5E1798 - 06 25 25 1154**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 25F0338 - EPA 3015A												**Water**
Blank (25F0338-BLK1)			Prepared: 06/10/25 14:16		Analyzed: 06/10/25 22:51							
EPA 6020B												
Copper	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
Lead	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
LCS (25F0338-BS1)			Prepared: 06/10/25 14:16		Analyzed: 06/10/25 22:56							
EPA 6020B												
Copper	54.0	---	2.00	ug/L	1	55.6	---	97	80-120%	---	---	
Lead	57.4	---	0.200	ug/L	1	55.6	---	103	80-120%	---	---	
Duplicate (25F0338-DUP1)			Prepared: 06/10/25 14:16		Analyzed: 06/10/25 23:18							
QC Source Sample: Non-SDG (A5F1044-04)												
Copper	ND	---	2.00	ug/L	1	---	ND	---	---	---	20%	
Lead	ND	---	0.200	ug/L	1	---	0.244	---	---	***	**20%**	
Matrix Spike (25F0338-MS1)			Prepared: 06/10/25 14:16		Analyzed: 06/10/25 23:35							
QC Source Sample: Non-SDG (A5F1044-04)												
EPA 6020B												
Copper	53.9	---	2.00	ug/L	1	55.6	ND	97	75-125%	---	---	
Lead	57.9	---	0.200	ug/L	1	55.6	0.244	104	75-125%	---	---	
Batch 25F0421 - EPA 3015A												**Water**
Blank (25F0421-BLK1)			Prepared: 06/12/25 09:51		Analyzed: 06/13/25 03:14							
EPA 6020B												
Zinc	ND	---	4.00	ug/L	1	---	---	---	---	---	---	
LCS (25F0421-BS2)			Prepared: 06/12/25 09:51		Analyzed: 06/13/25 21:36							
EPA 6020B												
Zinc	59.0	---	4.00	ug/L	1	55.6	---	106	80-120%	---	---	Q-16
Duplicate (25F0421-DUP1)			Prepared: 06/12/25 09:51		Analyzed: 06/13/25 04:35							
QC Source Sample: Non-SDG (A5F1229-04)												
Zinc	**6.69**	---	4.00	ug/L	1	---	6.70	---	---	0.3	20%	

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ANALYTICAL REPORT

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EnviroLogic Resources	Project: **Portland Golf Club - Junor Lake**	
2830 SW Plum Circle	Project Number: **10157.004**	**Report ID:**
Portland, OR 97219	Project Manager: **Tom Calabrese**	**A5E1798 - 06 25 25 1154**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 25F0421 - EPA 3015A							**Water**					
Matrix Spike (25F0421-MS1)			Prepared: 06/12/25 09:51		Analyzed: 06/13/25 04:41							
QC Source Sample: Non-SDG (A5F1229-04)												
EPA 6020B												
Zinc	63.6	---	4.00	ug/L	1	55.6	6.70	102	75-125%	---	---	

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ANALYTICAL REPORT

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EnviroLogic Resources	Project: Portland Golf Club - Junor Lake	
2830 SW Plum Circle	Project Number: 10157.004	Report ID:
Portland, OR 97219	Project Manager: Tom Calabrese	A5E1798 - 06 25 25 1154

QUALITY CONTROL (QC) SAMPLE RESULTS

Dissolved Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 25F0308 - EPA 3015A - Dissolved								Water				
Blank (25F0308-BLK1)			Prepared: 06/10/25 10:26 Analyzed: 06/10/25 20:16									
EPA 6020B (Diss)												
Copper	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
Lead	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Zinc	ND	---	4.00	ug/L	1	---	---	---	---	---	---	
LCS (25F0308-BS1)			Prepared: 06/10/25 10:26 Analyzed: 06/10/25 20:22									
EPA 6020B (Diss)												
Copper	61.3	---	2.00	ug/L	1	55.6	---	110	80-120%	---	---	
Lead	55.8	---	0.200	ug/L	1	55.6	---	100	80-120%	---	---	
Zinc	64.2	---	4.00	ug/L	1	55.6	---	116	80-120%	---	---	
Duplicate (25F0308-DUP1)			Prepared: 06/10/25 10:26 Analyzed: 06/10/25 21:56									
QC Source Sample: Non-SDG (A5F1086-10)												
Copper	ND	---	2.00	ug/L	1	---	ND	---	---	---	20%	
Lead	ND	---	0.200	ug/L	1	---	ND	---	---	---	20%	
Zinc	ND	---	4.00	ug/L	1	---	ND	---	---	---	20%	
Matrix Spike (25F0308-MS1)			Prepared: 06/10/25 10:26 Analyzed: 06/10/25 22:07									
QC Source Sample: Non-SDG (A5F1086-11)												
EPA 6020B (Diss)												
Copper	71.6	---	2.00	ug/L	1	55.6	18.2	96	75-125%	---	---	
Lead	57.3	---	0.200	ug/L	1	55.6	0.496	102	75-125%	---	---	
Zinc	76.6	---	4.00	ug/L	1	55.6	19.9	102	75-125%	---	---	
Matrix Spike Dup (25F0308-MSD1)			Prepared: 06/10/25 10:26 Analyzed: 06/10/25 22:12									
QC Source Sample: Non-SDG (A5F1086-11)												
Copper	71.6	---	2.00	ug/L	1	55.6	18.2	96	75-125%	0.02	20%	
Lead	57.7	---	0.200	ug/L	1	55.6	0.496	103	75-125%	0.6	20%	
Zinc	77.2	---	4.00	ug/L	1	55.6	19.9	103	75-125%	0.7	20%	

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EnviroLogic Resources	Project: **Portland Golf Club - Junor Lake**	
2830 SW Plum Circle	Project Number: **10157.004**	**Report ID:**
Portland, OR 97219	Project Manager: **Tom Calabrese**	**A5E1798 - 06 25 25 1154**

QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 25E1037 - Dry Weight Prep (EPA 8000D)							**Soil**					
Duplicate (25E1037-DUP1)			Prepared: 05/30/25 10:43		Analyzed: 06/02/25 05:12							
QC Source Sample: Non-SDG (A5E1837-01)												
% Solids	**89.9**	---	1.00	%	1	---	90.3	---	---	0.4	10%	
Duplicate (25E1037-DUP2)			Prepared: 05/30/25 10:43		Analyzed: 06/02/25 05:12							
QC Source Sample: Non-SDG (A5E1842-01)												
% Solids	**90.5**	---	1.00	%	1	---	90.4	---	---	0.1	10%	
Duplicate (25E1037-DUP3)			Prepared: 05/30/25 10:43		Analyzed: 06/02/25 05:12							
QC Source Sample: Non-SDG (A5E1859-01)												
% Solids	**87.2**	---	1.00	%	1	---	83.3	---	---	5	10%	
Duplicate (25E1037-DUP4)			Prepared: 05/30/25 18:19		Analyzed: 06/02/25 05:12							
QC Source Sample: Non-SDG (A5E1902-01)												
% Solids	**78.0**	---	1.00	%	1	---	78.1	---	---	0.2	10%	
Duplicate (25E1037-DUP5)			Prepared: 05/30/25 18:19		Analyzed: 06/02/25 05:12							
QC Source Sample: Non-SDG (A5E1903-01)												
% Solids	**80.9**	---	1.00	%	1	---	80.8	---	---	0.1	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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SAMPLE PREPARATION INFORMATION

Total Metals by EPA 6020B (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 25F0338							
A5E1798-07	Water	EPA 6020B	05/28/25 13:05	06/10/25 14:16	45mL/50mL	45mL/50mL	1.00
Batch: 25F0421							
A5E1798-07RE1	Water	EPA 6020B	05/28/25 13:05	06/12/25 09:51	45mL/50mL	45mL/50mL	1.00
A5E1798-07RE2	Water	EPA 6020B	05/28/25 13:05	06/12/25 09:51	45mL/50mL	45mL/50mL	1.00

Dissolved Metals by EPA 6020B (ICPMS)

Prep: EPA 3015A - Dissolved

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 25F0308							
A5E1798-07	Water	EPA 6020B (Diss)	05/28/25 13:05	06/10/25 10:26	45mL/50mL	45mL/50mL	1.00

Percent Dry Weight

Prep: Dry Weight Prep (EPA 8000D)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 25E1037							
A5E1798-06	Sediment	EPA 8000D	05/28/25 13:05	05/30/25 18:19	1g	1g	1.00

Modified Dredging Elutriate Test (MDRET) Preparation

Prep: DRET Prep

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 25E1053							
A5E1798-06	Sediment	DRET	05/28/25 13:05	06/05/25 16:20	1189g/3750mL	1g/1mL	NA

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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

COMP	Analyzed sample is a composite of discrete samples that was performed in the laboratory.
PRO	Sample has undergone sample processing prior to extraction and analysis.
Q-16	Reanalysis of an original Batch QC sample.
RR-8	Not Reported. Sample was rerun to confirm original result. Original sample is reported.

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Validated Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting and Detection Limits: Default Limits

Default Reporting and Detection Limits are based on 100% dry weight with the minimum dilution for the analysis. Reporting and Detection Limits are raised due to moisture content, additional dilutions required for analysis, matrix interferences and in other cases, as necessary.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

Results for Volatiles analyses on soils and sediments that are reported on a “dry weight” basis include the water miscible solvent (WMS) correction referenced in the EPA 8000 Method guidance documents. Solid and Liquid samples reported on an “As Received” basis do not have the WMS correction applied, as dry weight was not performed.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.
Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

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REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to one half of the Reporting Limit (RL).
Blank results for gravimetric analyses are evaluated to the Reporting Level, not to half of the Reporting Level.
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.
-Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.
'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level, if results are not reported to the MDL.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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2830 SW Plum Circle	Project Number: **10157.004**	**Report ID:**
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Decanted Samples:

Soils/Sediments:
Unless TCLP analysis is required or there is notification otherwise for a specific project, all Soil and Sediments containing excess water are decanted prior to analysis in order to provide the most representative sample for analysis.

Water Samples:
Water samples containing solids and sediment may need to be decanted in order to eliminate these particulates from the water extractions. In the case of organics extractions, a solvent rinse of the container will not be performed.

Volatiles Soils (5035s)
Samples that are field preserved by 5035 for volatiles are dry weight corrected using the same dry weight corretion as for normal analyses. In the case of decanted samples, the dry weight may be performed on a decanted sample, while the aliquot for 5035 may not have been treated the same way. If this is a concern, please submit separate containers for dry weight analysis for volatiles can be provided.

All samples decanted in the laboratory are noted in this report with the DCNT qualifier indicating the sample was decanted.

Apex Laboratories

Anissa Kepa, Project Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

EnviroLogic Resources	Project: **Portland Golf Club - Junor Lake**	
2830 SW Plum Circle	Project Number: **10157.004**	**Report ID:**
Portland, OR 97219	Project Manager: **Tom Calabrese**	**A5E1798 - 06 25 25 1154**

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Anissa Kepa, Project Manager

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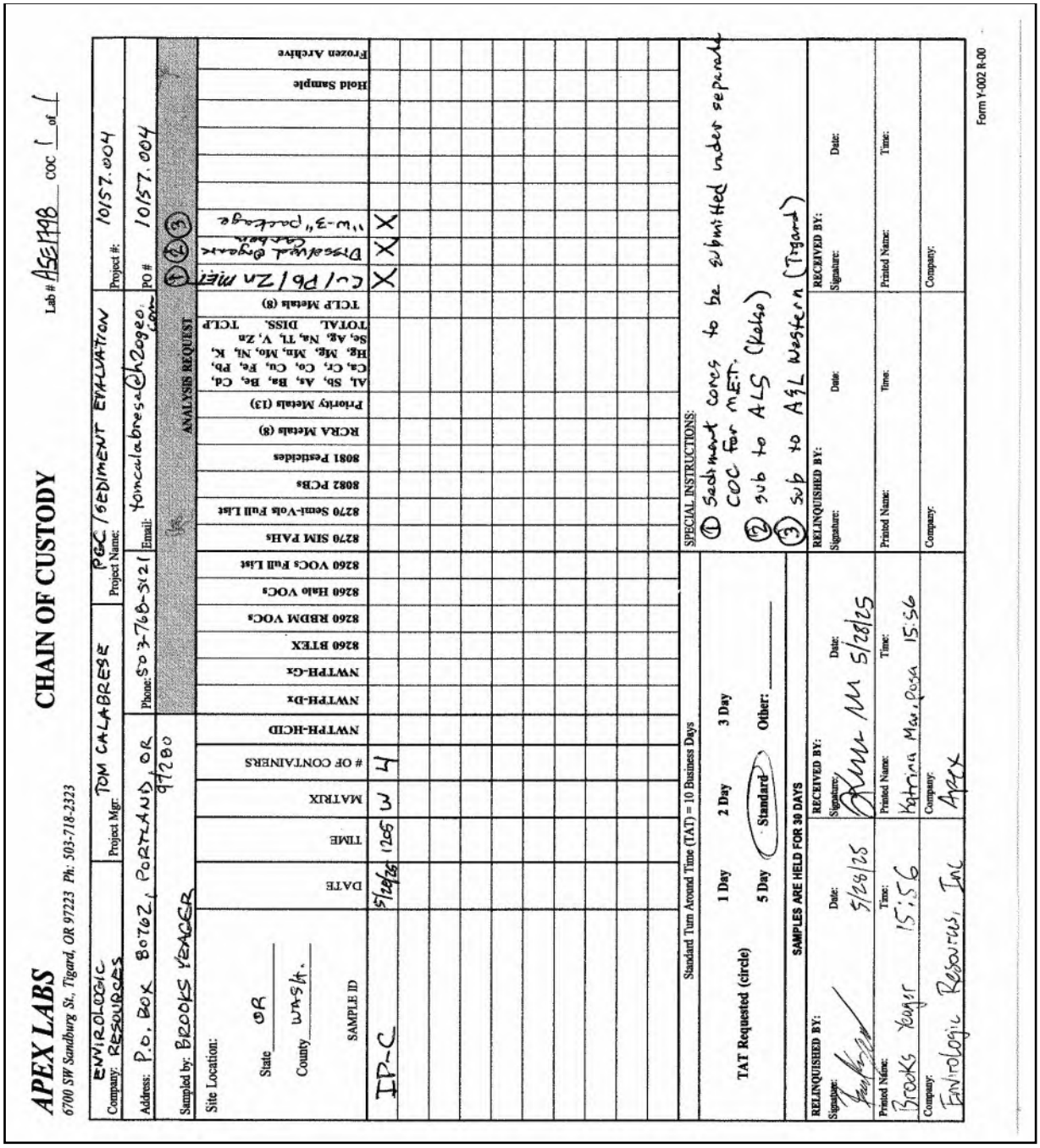
Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

EnviroLogic Resources	Project: **Portland Golf Club - Junor Lake**	
2830 SW Plum Circle	Project Number: **10157.004**	**Report ID:**
Portland, OR 97219	Project Manager: **Tom Calabrese**	**A5E1798 - 06 25 25 1154**



APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # A5E1798 COC 1 of 1

Company: Envirologic Resources | Project Mgr: Tom Calabrese | Project Name: PGC / Sediment Evaluation | Project #: 10157.004
Address: P.O. Box 80762, Portland, OR 97280 | Phone: 503-768-5121 | Email: tomcalabrese@h2ogeo.com | PO # 10157.004
Sampled by: Brooks Yeager

ANALYSIS REQUEST

Site Location: State OR County Wash.	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pesticides	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS. TCLP	TCLP Metals (8)	Cu / Pb / Zn metals ① ② ③	Dissolved Copper ① ② ③	11"w-3" package	Hold Sample	Frozen Archive
SAMPLE ID																								
IP-C	5/26/25	1205	W	4																X	X			

Standard Turn Around Time (TAT) = 10 Business Days
TAT Requested (circle): 1 Day 2 Day 3 Day 5 Day (Standard) Other: _____

SPECIAL INSTRUCTIONS:
① Sediment cores to be submitted under separate COC for MET.
② sub to ALS (Kelso)
③ sub to AGL Western (Tigard)

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature:	Signature:	Signature:
Printed Name:	Printed Name:	Printed Name:	Printed Name:
Date: 5/26/25	Date: 5/28/25	Date:	Date:
Time: 15:56	Time: 15:56	Time:	Time:
Company: Envirologic Resources, Inc	Company: Apex	Company:	Company:

Form Y-002 R-00

Apex Laboratories

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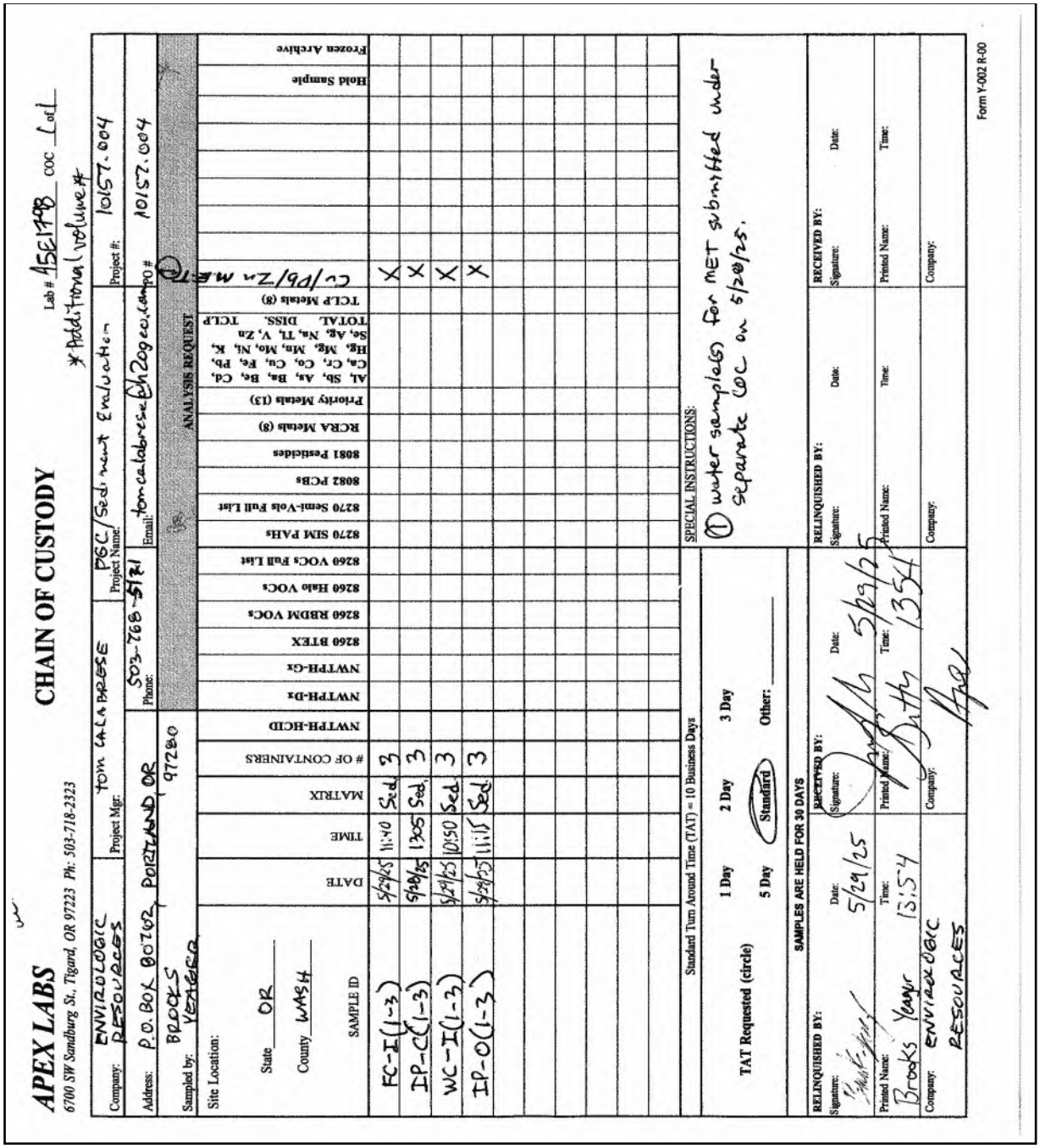
Anissa Kepa, Project Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

EnviroLogic Resources	Project: **Portland Golf Club - Junor Lake**	
2830 SW Plum Circle	Project Number: **10157.004**	**Report ID:**
Portland, OR 97219	Project Manager: **Tom Calabrese**	**A5E1798 - 06 25 25 1154**



APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # 45E1798 COC 1 of 1
*Additional volume #

Company: ENVIROLOGIC RESOURCES
Project Mgr: TOM CALABRESE
Phone: 503-768-5121
Project Name: PGC/Sednent Evaluation
Email: tomcalabrese@envirologeo.com
Project #: 10157.004
PO # 10157.004

Address: P.O. BOX 80702, PORTLAND OR 97280
Sampled by: BROOKS YEAGER

Site Location: State OR County WASH

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pesticides	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS. TCLP	TCLP Metals (8)	Cr/Pb/Zn metals	Hold Sample	Frozen Archive
FC-E(1-3)	5/24/25	11:40	Sed.	3																X		
IP-C(1-3)	5/24/25	1305	Sed.	3																X		
WC-I(1-3)	5/24/25	10:50	Sed.	3																X		
IP-O(1-3)	5/24/25	11:15	Sed.	3																X		

Standard Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 5 Day **Standard** Other: _____

SPECIAL INSTRUCTIONS:
(1) water samples for MET submitted under separate COC on 5/28/25.

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	Date:	RECEIVED BY:	Date:	RELINQUISHED BY:	Date:	RECEIVED BY:	Date:
Signature:	5/29/25	Signature:	5/29/25	Signature:		Signature:	
Printed Name:	Time: 13:54	Printed Name:	Time: 1354	Printed Name:	Time:	Printed Name:	Time:
Company: ENVIROLOGIC RESOURCES		Company: APEX		Company:		Company:	

Form Y-002 R-00

Apex Laboratories

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Anissa Kepa, Project Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

EnviroLogic Resources	Project: **Portland Golf Club - Junor Lake**	
2830 SW Plum Circle	Project Number: **10157.004**	**Report ID:**
Portland, OR 97219	Project Manager: **Tom Calabrese**	**A5E1798 - 06 25 25 1154**

APEX LABS COOLER RECEIPT FORM

1/2

Client: Enviro logic Resources Element WO#: A5E1798

Project/Project #: PGC / Sediment Evaluation / 10157.004

Delivery Info:

Date/time received: 5/28/25 @ 15 12:56 By: 2KM 5/28

Delivered by: Apex__Client X ESS__FedEx__UPS__Radio__Morgan__SDS__Evergreen__Other__

From USDA Regulated Origin? Yes ____ No X

Cooler Inspection Date/time inspected: 5/28/25 @ 15:56 By: 2KM

Chain of Custody included? Yes X No ____

Signed/dated by client? Yes X No ____

Contains USDA Reg. Soils? Yes ____ No X Unsure (email RegSoils) ____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	3.7	22.0					
Custody seals? (Y/N)	N						
Received on ice? (Y/N)	Y	N					
Temp. blanks? (Y/N)	Y	N					
Ice type: (Gel/Real/Other)	Real	None					
Condition (In/Out):	In	Out			AKG 5/30/25		

Cooler out of temp? (Y/N) Possible reason why: No cooler / ice, ~~Rino~~ water provided for sample prep.

Green dots applied to out of temperature samples? Yes No

Out of temperature samples form initiated? Yes/No AKG 5/30/25

Sample Inspection: Date/time inspected: 5/28/25 @ 5/28/25 By: 18:20

All samples intact? Yes X No ___ Comments: ____

Bottle labels/COCs agree? Yes X No ___ Comments: ____

COC/container discrepancies form initiated? Yes ___ No X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments: ____

Do VOA vials have visible headspace? Yes ___ No ___ NA X

Comments ____

Water samples: pH checked: Yes ___ No ___ NA X pH appropriate? Yes ___ No ___ NA X pH ID: ____

Comments: ____

Labeled by: 2KM Witness: KN Cooler Inspected by: 2KM

Form Y-003 R-02

Apex Laboratories

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Anissa Kepa, Project Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

EnviroLogic Resources	Project: **Portland Golf Club - Junor Lake**	
2830 SW Plum Circle	Project Number: **10157.004**	**Report ID:**
Portland, OR 97219	Project Manager: **Tom Calabrese**	**A5E1798 - 06 25 25 1154**

APEX LABS COOLER RECEIPT FORM

2 of 2

Client: Envirologic Resources Element WO#: A5 E1798

Project/Project #: PGC/Sediment Evaluation 10157.004

Delivery Info:

Date/time received: 5/29/25 @ 1354 By: JS *Additional volume *

Delivered by: Apex__Client X ESS__FedEx__UPS__Radio__Morgan__SDS__Evergreen__Other__

From USDA Regulated Origin? Yes ____ No X

Cooler Inspection Date/time inspected: 5/29/25 @ 1356 By: JS

Chain of Custody included? Yes ✓ No ____

Signed/dated by client? Yes ✓ No ____

Contains USDA Reg. Soils? Yes ____ No ✓ Unsure (email RegSoils) ____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	1.4						
Custody seals? (Y/N)	N						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	N						
Ice type: (Gel/Real/Other)	Gel Real						
Condition (In/Out):	In						

Cooler out of temp? (Y/N) Possible reason why: ____

Green dots applied to out of temperature samples? Yes (No)

Out of temperature samples form initiated? Yes (No)

Sample Inspection: Date/time inspected: 5/29/25 @ 16:55 By: RAM

All samples intact? Yes X No ___ Comments: ____

Bottle labels/COCs agree? Yes ___ No X Comments: Conts. Vay suffix ID.

COC/container discrepancies form initiated? Yes ___ No X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments: ____

Do VOA vials have visible headspace? Yes ___ No ___ NA X

Comments ____

Water samples: pH checked: Yes___No___NA X pH appropriate? Yes___No___NA X pH ID:____

Comments: ____

Labeled by: RAM Witness: JA Cooler Inspected by: RAM

Form Y-003 R-02

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.

Anissa Kepa, Project Manager

June 13, 2025 Service Request No:K2505786

Anissa Kepa
Apex Laboratories
6700 SW Sandburg St.
Tigard, OR 97223

Laboratory Results for: A5E1798

Dear Anissa,

Enclosed are the results of the sample(s) submitted to our laboratory June 06, 2025
For your reference, these analyses have been assigned our service request number **K2505786.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3260. You may also contact me via email at Luke.Rahn@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Luke Rahn
Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626
PHONE +1 360 577 7222 | FAX +1 360 636 1068
ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Apex Laboratories
Project: A5E1798
Sample Matrix: Water

Service Request: K2505786
Date Received: 06/06/2025

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

One water sample was received for analysis at ALS Environmental on 06/06/2025. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The sample was stored at minimum in accordance with the analytical method requirements.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by  Date 06/13/2025

SAMPLE DETECTION SUMMARY

This form includes only detections above the reporting levels. For a full listing of sample results, continue to the Sample Results section of this Report.

CLIENT ID: ID-C			Lab ID: K2505786-001			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Carbon, Dissolved Organic (DOC)	5.10		0.10	0.50	mg/L	SM 5310 B

Sample Receipt Information

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Apex Laboratories **Service Request:**K2505786
Project: A5E1798

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
K2505786-001	ID-C	5/28/2025	1205

SUBCONTRACT ORDER

Apex Laboratories

A5E1798

ALK 5/29/25

K2505786

SENDING LABORATORY:

Apex Laboratories
6700 S.W. Sandburg Street
Tigard, OR 97223
Phone: (503) 718-2323
Fax: (503) 336-0745
Project Manager: Anissa Kepa

RECEIVING LABORATORY:

ALS Group USA - Kelso
1317 S 13th Avenue
Kelso, WA 98626
Phone :(360) 577-7222
Fax: (360) 636-1068

Sample Name: ID-C **Sampled: 05/28/25 12:05** (A5E1798-01)

Analysis	Due	Expires	Comments
Dissolved Organic Carbon (5310B) (SUB)	06/10/25 17:00	06/25/25 12:05	
Lab Filtration - Wet Chem	06/10/25 17:00	05/28/25 12:19	
Containers Supplied:			
(A)250 mL Poly - Non Preserved			

Standard TAT

Released By 6/6/25 Date — Received By Diane Prine 6/6/25 1240 Date

Released By Diane Prine 6/6/25 1420 Date — Received By Diane Prine 6/6/25 1420 Date

Page 1 of 1

Cooler Receipt and Preservation Form

PM LR

Client Apex Service Request K25 05786

Received: 6/16/25 Opened: 6/16/25 By: pdp Unloaded: 6/16/25 By: pdp

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* (*Courier*) *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other*_____ *NA*
3. Were custody seals on coolers? NA Y (N) If yes, how many and where? _____
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp Indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
	3.1	IR02					

4. Was a Temperature Blank present in cooler? NA Y (N) If yes, notate the temperature in the appropriate column below:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA (Y) N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. (NA) Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

6. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* (*Wet Ice*) *Dry Ice* *Sleeves* _____
7. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
8. Were samples received in good condition (unbroken) NA (Y) N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA (Y) N
10. Did all sample labels and tags agree with custody papers? NA (Y) N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* (NA) Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
14. Was C12/Res negative? (NA) Y N
15. Were samples received within method specified time limit? If not, notate the error below and notify the PM. (NA) Y N
16. Were 100mL sterile microbiology bottles filled exactly to the 100mL mark? (NA) Y N Underfilled Overfilled

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

SHORT HOLD

Notes, Discrepancies, Resolutions: _____

Miscellaneous Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value over the calibration range.
J	The result is an estimated value between the MDL and the MRL.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Analyst Summary report

Client:	Apex Laboratories	**Service Request:**	K2505786
Project:	A5E1798/		

Sample Name:	ID-C	**Date Collected:**	05/28/25
Lab Code:	K2505786-001	**Date Received:**	06/6/25
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
SM 5310 B		MSPECHT

Sample Results

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Analytical Report

Client:	Apex Laboratories	**Service Request:**	K2505786
Project:	A5E1798	**Date Collected:**	05/28/25 12:05
Sample Matrix:	Water	**Date Received:**	06/06/25 14:20
Sample Name:	ID-C	**Basis:**	NA
Lab Code:	K2505786-001		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Carbon, Dissolved Organic (DOC)	SM 5310 B	**5.10**	mg/L	0.50	0.10	1	06/11/25 23:40	

QC Summary Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Analytical Report

Client:	Apex Laboratories	**Service Request:**	K2505786
Project:	A5E1798	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	K2505786-MB		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Carbon, Dissolved Organic (DOC)	SM 5310 B	**0.13 J**	mg/L	0.50	0.10	1	06/11/25 23:40	

QA/QC Report

Client:	Apex Laboratories	**Service Request:**	K2505786
Project:	A5E1798	**Date Analyzed:**	06/11/25
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
General Chemistry Parameters

Analysis Method:	SM 5310 B	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	882368

	Lab Control Sample K2505786-LCS			Duplicate Lab Control Sample K2505786-DLCS					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Carbon, Dissolved Organic (DOC)	23.5	25.0	94	23.1	25.0	92	85-115	2	10

A & L Western Laboratories, Inc.

1311 Woodland Avenue, Modesto CA 95351 209-529-4080
21830 SW Alexander Labne, Sherwood OR 97140 503-968-9225

Ag Suitability Water Analysis

APEX LABORATORIES
6700 SW SANDBURG ST
TIGARD, OR 97223

Order Number: 121441
Lab Number: W121441-01
Submitted Date: 6/3/2025
Report Date: 6/8/2025
Submitted By: ANISSA KEPA

P.O. #: A5E1798

Grower: A5E1798

Description: A5E1798-01 - Irrigation Water

mg/L = milligrams/liter = part per million = ppm
meq/L = milliequivalents/liter
dS/m = deciSiemen/meter = mmhos/cm
lbs/ac-ft = pounds/acre-foot

Analytes				Normal Values	Problem Values
pH (pH)		7.6	pH units	6.5 to 8.0	<6.5 or >8.0
Electrical Conductivity (EC)		0.20	dS/m	0.5 to 3.0	<0.5 or >3.0
Boron (B)		**<0.01**	mg/L	<0.5	>0.5
Iron (Fe)		0.37	mg/L		
Copper (Cu)		**<0.01**	mg/L		
Manganese (Mn)		0.08	mg/L		
Cations	**mg/L**	**meq/L**	**lbs/ac-ft**	**Normal Values mg/L**	**Problem Values mg/L**
Calcium (Ca)	15.8	0.79	42.7	30 to 400	<30
Magnesium (Mg)	6.1	0.51	16.5	1 to 60	[Mg]>[Ca]
Sodium (Na)	8.9	0.39	24.0	<70	>70
Potassium (K)	1.3	0.03	3.4		
Anions	**mg/L**	**meq/L**	**lbs/ac-ft**	**Normal Values mg/L**	**Problem Values mg/L**
Bicarbonate (HCO_3)	78.1	1.28	211	<150	>300
Chloride (Cl)	12.8	0.36	34.6	<150	>200
Nitrate - Nitrogen (NO_3-N)	**<0.1**	**<0.01**	**<0.3**	<10	>10
Sulfate - Sulfur (SO_4-S)	4.0	0.13	10.9		
Calculated Values				**Normal Values**	**Problem Values**
Total Dissolved Solids (TDS)		138	mg/L	1 to 1,500	>1,900
Sodium Absorption Ratio (SAR)		0.5		<6.0	>6.0
SAR/EC Ratio (SEC)		2.4		<5.0	>10.0
pHc (pHc)		8.3		<8.4 may add Ca	>8.4 may remove Ca

Gypsum Requirements	100% gypsum equivalent (lbs/ac-ft)
Eatons Gypsum Requirement (EGR)	14
Residual Sodium Carbonate (RSC)	0

RED = Value of Concern

contact@vtaglab.com

Water hardness calculator

Their are two types of water hardness. Temporary and permanent hardness. This calculator determines the permanent total hardness. For information about the temporary water hardness click here.

Total permanent water hardness is calculated with the following formula:

TOTAL PERMANENT HARDNESS = CALCIUM HARDNESS + MAGNESIUM HARDNESS

The calcium and magnesium hardness is the concentration of calcium and magnesium ions expressed as equivalent of calcium carbonate. The molar mass of $CaCO_3$, Ca^{2+} and Mg^{2+} are respectively 100,1 g/mol, 40,1 g/mol and 24,3 g/mol.
The ratio of the molar masses are:

$$\frac{M_{CaCO_3}}{M_{Ca}} = \frac{100{,}1}{40{,}1} = 2{,}5$$

$$\frac{M_{CaCO_3}}{M_{Mg}} = \frac{100{,}1}{24{,}3} = 4{,}1$$

So total permanent water hardness expressed as equivalent of $CaCO_3$ can be calculated with the following formula:

$$[CaCO_3] = 2{,}5 \cdot [Ca^{2+}] + 4{,}1 \cdot [Mg^{2+}]$$

The following calculator computes and gives an indication of the total water hardness. Fields with * are required.

$[Ca^{2+}]$	15.8 *	mg/L
$[Mg^{2+}]$	6.1 *	mg/L
Water Hardness	64.5	mg/L or ppm of $CaCO_3$
	6.45	French degree
	3.61	German degree
	4.52	English degree
	Moderately hard water	Indication

Calculate water hardness Erase values

The following values are used to give an indication about the water hardness:

Concentration as CaCO3	Indication
0 to 60 mg/L	Soft water
60 to 120 mg/L	Moderately hard water
120 to 180 mg/L	Hard water
>180 mg/L	Very hard water

Other calculators

Warning: Lenntech BV cannot be held responsible for errors in the calculation, the program itself or the explanation. For questions or remarks please contact us.

About Lenntech

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BLM Freshwater & Marine version 3.41.2.45 - Z:\EnviroLogic\Clients\PortlandGolfClub\10157_Portland Golf Club\004_Sediment Characterization\2025 Report\JunorLakeSedimentCharacterization.MET_Cu.blm

File Edit Options Inputs Help Language

Description:

Current Selections

Prediction Mode: Toxicity Metal: Cu Water Type: Freshwater

Organism/Test Info: US EPA WQC calculation

Site Chemistry | Simplified Site Chemistry

	Site Name	Sample Name	Temp.	pH	Cu	DOC	HA	Ca	Mg	Na	K	SO4	Cl	Alkalinity	S
			C		ug/L	mg C/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L CaCO3	mg/L
1	Junor Lake	Lakebed Water	18.7	7.69	1	5.1	10	15.8	6.1	8.9	1.3	4	12.8	78.1	0.001
2															
3															
4															
5															
6															
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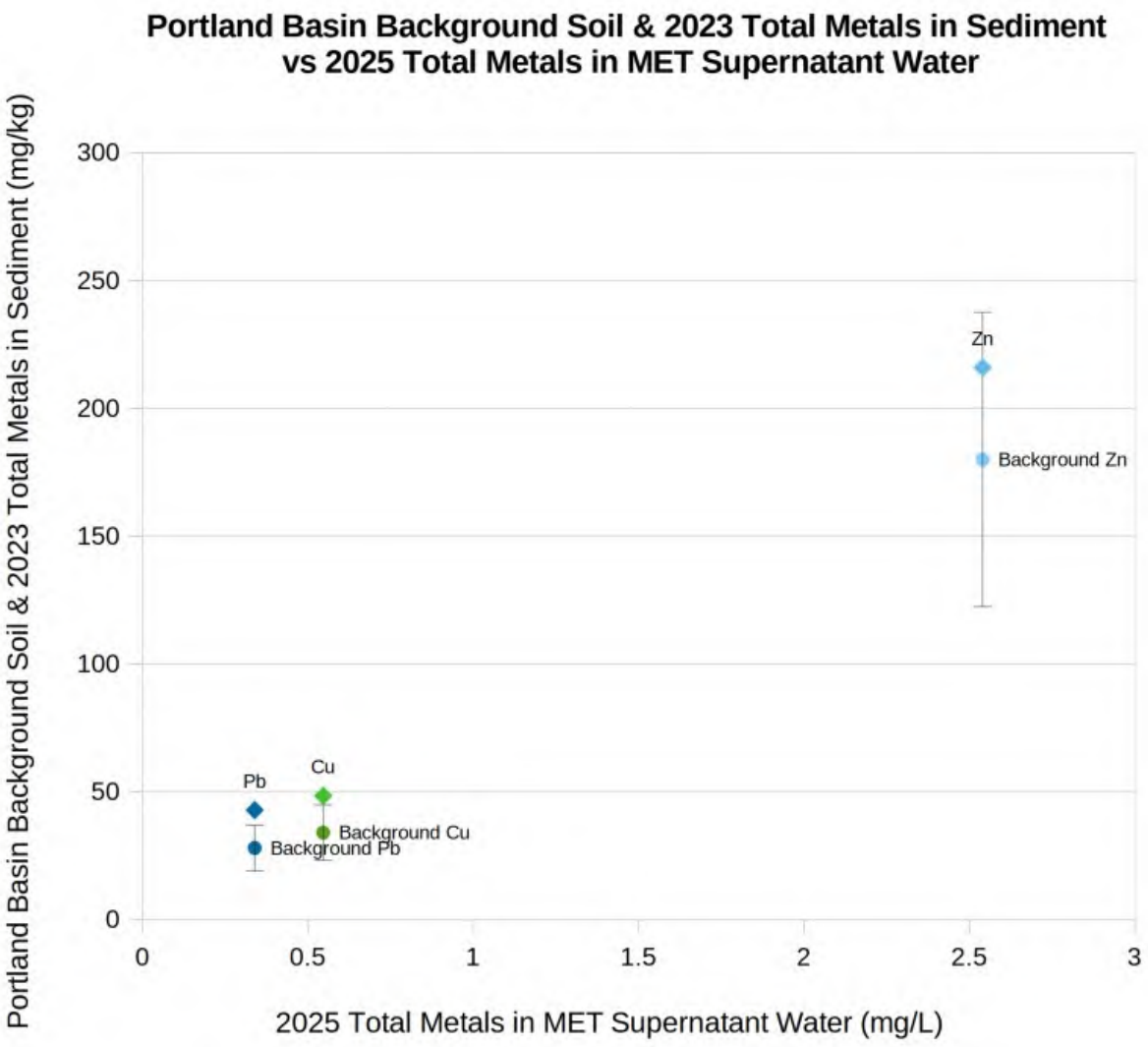
/S Z:\ENVIROLOGIC\CLIENTS\PORTLANDGOLFCLUB\10157_PORTLAND GOLF CLUB\004_SEDIMENT CHARACTERIZATION\2025 REPORT\JUNORLAKESEDIMENTCHARACTERIZATION.MET_CU.SCR, /W /QQ /VER3.41 /O3 /K1 /L											
Site Label	Sample Label	Final Acute Value	CMC	CCC	Cu	Acute Toxic Units	Chronic Toxic	Censored Flag			
		(FAV), ug/L	(CMC=FAV/2), ug/L	(CCC=FAV/ACR), ug/L	ug/L	(Acute TU=Cu/CMC)	(Chronic TU=C	(0 = quantified, 1 = BDL)			
"Junor Lake "	"Lakebed Water "	50.3983829040034	25.1991914520017	15.6516717093178	0.999998006171417	0.0396837338244034	0.0638908115	0			



Total Metals	2023 mg/kg	2025 mg/L	Background mg/kg
Cu	48.4	0.546	34
Pb	42.8	0.339	28
Zn	216	2.54	180