

To: Rex Vaughn, Chair
Cedar Lake Improvement Board

Date: June 15, 2026
July 7, 2026 UPDATE

From: Mark S. Kieser
Senior Scientist, K&A

cc: Natalie Crum, K&A

RE: **UPDATED Summary of June 3, 2026 Water Quality Sampling of Shallow Groundwater at the CLIB Property and Surface Water in Jones Ditch for *E. coli*, Total Coliform Bacteria and Soluble Reactive Phosphorus**

Overview

A June 3, 2026 water quality survey was conducted by Kieser & Associates, Inc. (K&A) of shallow groundwater at the CLIB property north of Jones Ditch, as well as surface water in Jones Ditch. These efforts were conducted at the behest of the CLIB as a follow-up to 2025 monitoring that identified possible local sources of elevated phosphorus and bacteria in Jones Ditch, as well as shoreline areas adjacent to the confluence of the ditch and lake. A June 15, 2026 K&A Technical Memorandum presented background information and bacterial sampling results; this UPDATE includes laboratory data for soluble reactive phosphorus (SRP) samples not otherwise available at the time of the June 15th reporting.

Sampling Conditions on June 3, 2026

A previous November 24, 2025 attempt by K&A to retrieve a shallow groundwater sample at the CLIB property directly adjacent to, and north of Jones Ditch was unsuccessful due to non-water bearing lithology encountered in the wetland immediately downgradient of the historic septic system drain field. The June 3, 2026 sampling was conducted further to the west of the 2025 attempted groundwater sampling location in the former yard area of the original cabin on the CLIB property. Two manually installed, shallow groundwater monitoring wells encountered groundwater approximately 6 feet below ground surface at locations approximating downgradient conditions of the former drain field. One-inch diameter, stainless steel groundwater monitoring well materials were used to retrieve groundwater samples via low-flow pumping. Each well was purged for approximately 20 minutes before sampling, recovering between 1.5-3.0 gallons of groundwater before samples were retained for bacterial and soluble reactive phosphorus (SRP) samples. This methodology is consistent with groundwater monitoring at the Cedar Lake shoreline conducted by K&A in November 2025 (as reported on November 18, 2025).

Figure 1 identifies the two locations on the CLIB property where groundwater sampling was completed. In addition to groundwater sampling, three surface water samples were taken from Jones Ditch; one just to the west of the West Cedar Lake Road culvert crossing, a second at the private walking bridge moving east from the roadway between the CLIB property and the property to the south of Jones Ditch, and a third at a location further down Jones Ditch to the east, upstream of the confluence with Cedar Lake. Bacterial analyses were conducted by the local Enviro Lab Services in Oscoda, MI for *E. coli* and Total Coliform bacteria. Samples were delivered for processing at the lab within six hours of collection. Samples for SRP analysis were delivered frozen to the Great Lakes Environmental Center (GLEC) in Traverse City, MI following field filtering of raw water samples using 0.45µ Millepore filters within six hours of collection.

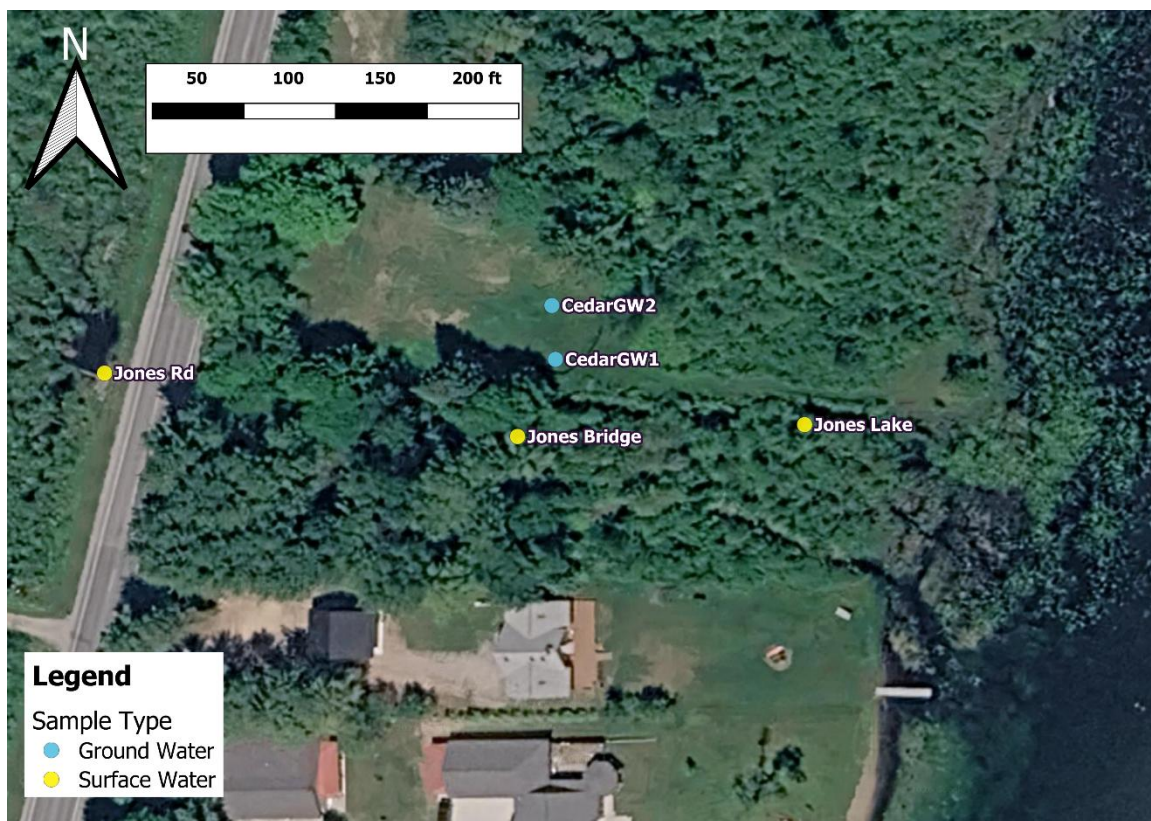


Figure 1. Groundwater and Water Quality Sampling Locations on June 3, 2026.

Findings

Results of groundwater sampling at the Jones Ditch CLIB property and Jones Ditch surface water samples are shown in Table 1. Attachment A includes a copy of lab results for bacterial analyses; Attachment B includes GLEC SRP lab reports.

CLIB property groundwater sampling results were non-detect for both *E. coli* and Total Coliform bacteria suggesting that there are no indications of residual bacterial discharge impacts from the former septic system. SRP levels suggest residual phosphorus in the

groundwater at both groundwater sampling locations. These SRP levels were similar to groundwater concentrations noted downgradient of an abandoned drain field at one of the properties sampled at the shoreline by K&A in November 2025 (i.e., Temporary GW-5 at 30.4 µg/L). That shoreline system was abandoned approximately three years ago with new home construction and a modern septic system replacement installed between West Cedar Lake Road and the new residence (whereas the old system was adjacent to the shoreline).

For Jones Ditch, both *E. coli* and Total Coliform results showed elevated levels of bacteria. The lowest concentrations were seen at West Cedar Lake Road (“Jones Rd”), the highest concentrations were observed at the pedestrian bridge (“Jones Bridge”), while intermediate levels were noted above the confluence with Cedar Lake (“Jones Lake”) (refer to Figure 1). These are substantially elevated over Jones Ditch bacterial levels measured in August of 2025.

Corresponding SRP levels in Table 1 for these Jones Ditch locations were 3.9, 1.9, and 5.1 µg/L, respectively. These SRP concentrations are very similar to or less than previously observed concentrations from the 2025 surface water sampling. Neither the August 2025 or June 2026 sampling of Jones Ditch shows readily discernable impacts of septic system drain field SRP contributions.

Table 1. Groundwater and Water Quality Sampling Bacterial Results from June 3, 2026.

Sample Description	Type	Sampling Date	Time	Conductivity (µs/cm)	<i>E. coli</i> (CFU/100mL)	Total Coliforms (CFU/100mL)	SRP (µg/L)
CedarGW1	GW	6/3/2026	9:40	424.6	ND	ND	30.0
CedarGW2	GW	6/3/2026	10:15	433.6	ND	ND	33.0
Jones Lake	SW	6/3/2026	10:45	234.3	330	1,280	5.1
Jones Bridge	SW	6/3/2026	11:00	376.1	1,112	3,620	1.9
Jones Rd	SW	6/3/2026	11:20	434.4	120	1,190	3.9

It is preliminarily suspected that a possible source for the higher bacteria concentrations noted halfway down the ditch may be related to two active septic systems to the immediate south of the ditch. Two tile drain fields on the property to the south are located closer to West Cedar Lake Road and within approximately 100 feet from Jones Ditch as indicated by county health department installation permit records. November 2025 sampling along the Cedar Lake shoreline at this residence revealed no substantial indications of a drain field discharge towards the lakeshore.

A preliminary K&A “flow net” analysis of groundwater suggests groundwater flows towards the deeply incised Jones Ditch channel in the proximity of local drain fields. This condition could account for bacteria levels in the mid to lower Jones Ditch sections. Elevated bacterial levels at West Cedar Lake Road suggest that there is also an upstream source of *E. coli* and Total Coliform bacteria at this location.

Recommendations

A second round of surface water monitoring along the Jones Ditch water course should be conducted in the summer of 2026 with the collection of additional water quality samples for DNA analysis by GLEC. These DNA samples could help identify if these are human and/or animal sources of observed bacterial levels in the Ditch.¹ Additional Ditch samples for *E. coli* and Total Coliform Bacteria could be sampled in triplicate at each to the three June 2026 locations in accordance with EGLE suggestions to discern geometric means at each station. Such means for *E. coli* are used by the Agency to determine potential surface water quality criteria violations. How EGLE will interpret third-party collected data in these regards is uncertain at this time, though clarification of such has been requested. There was no response from EGLE in these regards by the time of this reporting.

An expanded flow net analysis of groundwater towards Jones Ditch will further reveal the potential for contributions from adjacent properties. Additional sampling of groundwater might be warranted in this area on both south and north sides of Jones Ditch (but on CLIB property) to discern possible active or old septic system discharges into the ditch for bacteria and SRP. Bacterial DNA sourcing will be important given high bacterial levels in the ditch along with background water quality considerations for the forthcoming ditch restoration through a Midwest Glacial Lakes Partnership grant to the CLIB.

¹ Previous shoreline groundwater samples collected by K&A in November of 2025 had insufficient *E. coli* levels to produce DNA levels necessary for source analysis. Jones Ditch levels from June 2026 would otherwise likely have been sufficient. Such testing requires immediate and time-sensitive sample processing that could not be accommodated in the June 2026 sampling timeframe.

ATTACHMENT A

Surface and Groundwater Monitoring Results for June 3, 2026 Samples of *E. coli* and Total Coliform Bacteria as Analyzed by Enviro Lab Services of Oscoda, MI



USEPA Lab ID: M19885

Michigan EGLE Lab ID: 9115

Order ID: 26060301 **Client:** Kieser & Associates, LLC
Sample ID: 26060301-1 **Project Name:** E. coli/ Total Coliform Enumeration
Client Sample ID: Jones Lake **Address:** Jones Ditch, Cedar Lake
Oscoda, MI
Sample Matrix: Surface Water **Contact:** Mark Kieser
Sample Date/Time: 6/3/2026 10:45 **Reporting To:** data@kieser-associates.com
Received Date/Time: 6/3/2026 12:18 **Phone #:** (269) 344-7117
Sample Collected By: Natalie Crum **Report Date:** 6/5/2026
Analyst: Jonas Berenkowski

TEST: E. coli / Total Coliforms Ennumeration Analysis Date/Time: 6/3/2026 4:35:00 PM Read Date: 6/4/2026 4:41:00 PM

Analyte	CAS #	Method	Result	Units	Reporting Limit	MCL ^A	MCLG ^A
Total Coliforms	N/A	mColiBlue-24	1280	CFU/100mL	1	0	0
E. coli	N/A	mColiBlue-24	330	CFU/100mL	1	0	0

Definitions:

ND = Not detected

POS = Analyte detected in sample above reporting limit

MCL = Maximum contaminant level

MCLG = Maximum contaminant level goal

Comments:**FINAL APPROVAL**

APPROVED BY:

Lab Director

Date:

6/5/2026

The results herein relate only to the items/batch tested, calibrated, or sampled in this report. "ND" indicates that the analyte was not detected nor present in the sample tested at levels at or above the limit of quantitation. Results only pertain to sample as recived or sampled by Enviro Lab Services Inc.

This document is intended only for the use of the party to whom it is addressed and may contain information that is privileged, confidential or protected from disclosure. Under applicable law. If you have received this document in error, please immediately notify us and return it to the address listed above.

This report may not be reproduced except in full without approval from Enviro Lab Seviles Inc.



Enviro Lab Services, Inc.
4150 Arrow Street, Oscoda, MI 48750
Phone: (620) 417-3608
www.envirolabservice.com



USEPA Lab ID: MI9885

Michigan EGLE Lab ID: 9115

Order ID: 26060301 **Client:** Kieser & Associates, LLC
Sample ID: 26060301-2 **Project Name:** E. coli/ Total Coliform Enumeration
Client Sample ID: Jones Bridge **Address:** Jones Ditch, Cedar Lake
Oscoda, MI
Sample Matrix: Surface Water **Contact:** Mark Kieser
Sample Date/Time: 6/3/2026 11:08 **Reporting To:** data@kieser-associates.com
Received Date/Time: 6/3/2026 12:18 rvaughn@tir.com
Sample Collected By: Natalie Crum **Phone #:** (269) 344-7117
Analyst: Jonas Berenkowski **Report Date:** 6/5/2026

TEST: E. coli / Total Coliforms Ennumeration		Analysis Date/Time:	6/3/2026 4:35:00 PM	Read Date:	6/4/2026 4:41:00 PM		
Analyte	CAS #	Method	Result	Units	Reporting Limit	MCL ^A	MCLG ^A
Total Coliforms	N/A	mColiBlue-24	3620	CFU/100mL	1	0	0
E. coli	N/A	mColiBlue-24	1112	CFU/100mL	1	0	0

Definitions:

ND = Not detected

POS = Analyte detected in sample above reporting limit

MCL = Maximum contaminant level

MCLG = Maximum contaminant level goal

Comments:**FINAL APPROVAL**

APPROVED BY:		Lab Director	Date:	6/5/2026
--------------	---	--------------	-------	----------

The results herein relate only to the items/batch tested, calibrated, or sampled in this report. "ND" indicates that the analyte was not detected nor present in the sample tested at levels at or above the limit of quantitation. Results only pertain to sample as recived or sampled by Enviro Lab Services Inc.

This document is intended only for the use of the party to whom it is addressed and may contain information that is privileged, confidential or protected from disclosure. Under applicable law. If you have received this document in error, please immediately notify us and return it to the address listed above.

This report may not be reproduced except in full without approval from Enviro Lab Seviles Inc.



Enviro Lab Services, Inc.
4150 Arrow Street, Oscoda, MI 48750
Phone: (620) 417-3608
www.envirolabservice.com



USEPA Lab ID: M19885

Michigan EGLE Lab ID: 9115

Order ID:	26060301	Client:	Kieser & Associates, LLC
Sample ID:	26060301-3	Project Name:	E. coli/ Total Coliform Enumeration
Client Sample ID:	Jones Rd	Address:	Jones Ditch, Cedar Lake Oscoda, MI
Sample Matrix:	Surface Water	Contact:	Mark Kieser
Sample Date/Time:	6/3/2026 11:20	Reporting To:	data@kieser-associates.com
Received Date/Time:	6/3/2026 12:18		rvaughn@tir.com
Sample Collected By:	Natalie Crum	Phone #:	(269) 344-7117
Analyst:	Jonas Berenkowski	Report Date:	6/5/2026

TEST: E. coli / Total Coliforms Ennumeration	Analysis Date/Time:	6/3/2026 4:35:00 PM	Read Date:	6/4/2026 4:41:00 PM
--	---------------------	---------------------	------------	---------------------

Analyte	CAS #	Method	Result	Units	Reporting Limit	MCL ^A	MCLG ^A
Total Coliforms	N/A	mColiBlue-24	1190	CFU/100mL	1	0	0
E. coli	N/A	mColiBlue-24	120	CFU/100mL	1	0	0

Definitions:

ND = Not detected

POS = Analyte detected in sample above reporting limit

MCL = Maximum contaminant level

MCLG = Maximum contaminant level goal

Comments:**FINAL APPROVAL**

APPROVED BY:

Lab Director

Date:

6/5/2026

The results herein relate only to the items/batch tested, calibrated, or sampled in this report. "ND" indicates that the analyte was not detected nor present in the sample tested at levels at or above the limit of quantitation. Results only pertain to sample as recived or sampled by Enviro Lab Services Inc.

This document is intended only for the use of the party to whom it is addressed and may contain information that is privileged, confidential or protected from disclosure. Under applicable law. If you have received this document in error, please immediately notify us and return it to the address listed above.

This report may not be reproduced except in full without approval from Enviro Lab Seviceis Inc.



Enviro Lab Services, Inc.
4150 Arrow Street, Oscoda, MI 48750
Phone: (620) 417-3608
www.envirolabservice.com



USEPA Lab ID: MI9885

Michigan EGLE Lab ID: 9115

Order ID:	26060301	Client:	Kieser & Associates, LLC
Sample ID:	26060301-4	Project Name:	E. coli/ Total Coliform Enumeration
Client Sample ID:	Cedar GW1	Address:	Jones Ditch, Cedar Lake Oscoda, MI
Sample Matrix:	Ground Water	Contact:	Mark Kieser
Sample Date/Time:	6/3/2026 9:40	Reporting To:	data@kieser-associates.com
Received Date/Time:	6/3/2026 12:18		rvaughn@tir.com
Sample Collected By:	Natalie Crum	Phone #:	(269) 344-7117
Analyst:	Jonas Berenkowski	Report Date:	6/5/2026

TEST: E. coli / Total Coliforms Ennumeration	Analysis Date/Time:	6/3/2026 4:35:00 PM	Read Date:	6/4/2026 4:41:00 PM
--	---------------------	---------------------	------------	---------------------

Analyte	CAS #	Method	Result	Units	Reporting Limit	MCL ^A	MCLG ^A
Total Coliforms	N/A	mColiBlue-24	ND	CFU/100mL	1	0	0
E. coli	N/A	mColiBlue-24	ND	CFU/100mL	1	0	0

Definitions:

ND = Not detected

POS = Analyte detected in sample above reporting limit

MCL = Maximum contaminant level

MCLG = Maximum contaminant level goal

Comments:**FINAL APPROVAL**

APPROVED BY:

Lab Director

Date:

6/5/2026

The results herein relate only to the items/batch tested, calibrated, or sampled in this report. "ND" indicates that the analyte was not detected nor present in the sample tested at levels at or above the limit of quantitation. Results only pertain to sample as recived or sampled by Enviro Lab Services Inc.

This document is intended only for the use of the party to whom it is addressed and may contain information that is privileged, confidential or protected from disclosure. Under applicable law. If you have received this document in error, please immediately notify us and return it to the address listed above.

This report may not be reproduced except in full without approval from Enviro Lab Seviles Inc.



Enviro Lab Services, Inc.
4150 Arrow Street, Oscoda, MI 48750
Phone: (620) 417-3608
www.envirolabservice.com



USEPA Lab ID: MI9885

Michigan EGLE Lab ID: 9115

Order ID:	26060301	Client:	Kieser & Associates, LLC
Sample ID:	26060301-5	Project Name:	E. coli/ Total Coliform Enumeration
Client Sample ID:	Cedar GW2	Address:	Jones Ditch, Cedar Lake Oscoda, MI
Sample Matrix:	Ground Water	Contact:	Mark Kieser
Sample Date/Time:	6/3/2026 10:15	Reporting To:	data@kieser-associates.com
Received Date/Time:	6/3/2026 12:18		rvaughn@tir.com
Sample Collected By:	Natalie Crum	Phone #:	(269) 344-7117
Analyst:	Jonas Berenkowski	Report Date:	6/5/2026

TEST: E. coli / Total Coliforms Ennumeration	Analysis Date/Time:	6/3/2026 4:35:00 PM	Read Date:	6/4/2026 4:41:00 PM
--	---------------------	---------------------	------------	---------------------

Analyte	CAS #	Method	Result	Units	Reporting Limit	MCL ^A	MCLG ^A
Total Coliforms	N/A	mColiBlue-24	ND	CFU/100mL	1	0	0
E. coli	N/A	mColiBlue-24	ND	CFU/100mL	1	0	0

Definitions:

ND = Not detected

POS = Analyte detected in sample above reporting limit

MCL = Maximum contaminant level

MCLG = Maximum contaminant level goal

Comments:**FINAL APPROVAL**

APPROVED BY:

Lab Director

Date:

6/5/2026

The results herein relate only to the items/batch tested, calibrated, or sampled in this report. "ND" indicates that the analyte was not detected nor present in the sample tested at levels at or above the limit of quantitation. Results only pertain to sample as recived or sampled by Enviro Lab Services Inc.

This document is intended only for the use of the party to whom it is addressed and may contain information that is privileged, confidential or protected from disclosure. Under applicable law. If you have received this document in error, please immediately notify us and return it to the address listed above.

This report may not be reproduced except in full without approval from Enviro Lab Seviceis Inc.



Enviro Lab Services, Inc.
4150 Arrow Street, Oscoda, MI 48750
Phone: (620) 417-3608
www.envirolabservice.com

ATTACHMENT B

Surface and Groundwater Monitoring Results for June 3, 2026 Samples of
Soluble Reactive Phosphorus as Analyzed by the Great Lakes
Environmental Center of Traverse City, MI



Project Number: 2592-B10

June 25, 2026

**Kieser & Associates-Cedar Lake
536 E. Michigan Ave., Suite 300
Kalamazoo, MI 49007**

Attention: Natalie Crum

Project Description: Water Quality Sampling

Dear Client,

Enclosed is a copy of your laboratory report relating to samples, as they were received. All tests were performed within the maximum holding times and have met or exceeded QC criteria. Test results are in compliance with The NELAC Institute Standards. Visit our web site for a full list of tests for which GLEC (Lab 2059) is accredited through the New Hampshire Environmental Laboratory Accreditation Program (NH ELAP).

Please don't hesitate to call if you have questions or require further information.

Sincerely,

**Michelle A. Moore
Laboratory Coordinator and Research Scientist/Nutrient Chemistry**



Great Lakes Environmental Center

739 Hastings St., Traverse City MI 49686 - (231) 941-2230 - FAX: (231) 941-2240

Client ID: 2592-B10

Kieser-Cedar Lake

REPORT OF ANALYSIS

Soluble Reactive Phosphorus

<u>Lab ID</u>	<u>Sample Description</u>	<u>Sample Date</u>	<u>Result</u>	<u>Units</u>	<u>Rep Limit</u>	<u>MDL</u>	<u>Qualifier</u>	<u>Analysis Date</u>	<u>Comments</u>	<u>Initials</u>
3K060300062	Jones Lake	6/3/2026	0.0051	mg/L	0.001	0.00042		6/24/2026		BSC
3K060300063	Jones Bridge	6/3/2026	0.0019	mg/L	0.001	0.00042		6/24/2026		BSC
3K060300064	Jones Road	6/3/2026	0.0039	mg/L	0.001	0.00042		6/24/2026		BSC
3K060300065	Cedar GW1	6/3/2026	0.030	mg/L	0.004	0.00168		6/25/2026		BSC
3K060300066	Cedar GW2	6/3/2026	0.033	mg/L	0.004	0.00168		6/25/2026		BSC

LabQualifiers:

U - Analyte not detected.

J - Result between MDL and RL should be considered estimated.

Page 1 of 1

Thursday, June 25, 2026

Method:

SM 4500-P F

CHAIN OF CUSTODY RECORD

Section I. Submitting Company: <u>Kieser & Associates, LLC</u> Report Results To: <u>Natalie Crum</u> Address: <u>536 E. Michigan Ave, Kalamazoo, MI 49007</u> Phone: <u>(269)-344-7117</u> E-mail: <u>data@Kieser-associates.com</u>						Section II. Project Name: <u>Cedar Lake</u> Project Number: _____ P.O.#: _____ Sampled by: (initials) _____ ☐ GLEC ☒ Client <u>ALC + HD</u>						Section IV. Requested Analysis <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25px; height: 100px; text-align: center; vertical-align: middle;">pH</td> <td style="width:25px; height: 100px; text-align: center; vertical-align: middle;">Sample Upon Receipt</td> <td style="width:25px; height: 100px;"></td> <td style="width:25px; height: 100px;"></td> <td style="width:25px; height: 100px;"></td> <td style="width:25px; height: 100px;"></td> <td style="width:25px; height: 100px;"></td> <td style="width:25px; height: 100px;"></td> <td style="width:25px; height: 100px;"></td> <td style="width:25px; height: 100px;"></td> <td style="width:25px; height: 100px;"></td> <td style="width:25px; height: 100px;"></td> </tr> </table>										pH	Sample Upon Receipt										
pH	Sample Upon Receipt																																
Section III. Sample Information at Collection																																	
#	GLEC No.	Sample Identification	Sample Information			Grab or Composite	Preservative	Filtered Y or N	Sample Containers			SRP																					
			Date	Time	Matrix				Type	Size	No.																						
1		Jones Lake	6/3/26	10:45am	SW	grab	None	Y (SRP)	Plastic	125mL	1	X																					
2		Jones Bridge	6/3/26	11:00am	SW	grab		Y (SRP)	Plastic	125mL	1	X																					
3		Jones Rd	6/3/26	11:20am	SW	grab		Y (SRP)	Plastic	125mL	1	X																					
4		Cedar GW1	6/3/26	9:40am	GW	grab		Y (SRP)	Plastic	125mL	1	X																					
5		Cedar GW2	6/3/26	10:15am	GW	grab		Y (SRP)	Plastic	125mL	1	X																					
6																																	
7																																	
8																																	

Client Notes:

RELEASED BY / ORGANIZATION			DATE	TIME	RECEIVED BY / ORGANIZATION			DATE	TIME
Print Name & Organization: <u>Hope Dzik Kieser & Associates, LLC</u>			<u>6-22-26</u>	<u>9:00</u>	Print Name & Organization: _____				
Signature: <u>Hope Dzik</u>			<u>6/22/26</u>	<u>11:00am</u>	Signature: <u>[Signature]</u>			<u>6/22/26</u>	<u>9:00</u>
Print Name & Organization: _____					Print Name & Organization: _____				
Signature: _____					Signature: _____				

FOR LAB USE ONLY
 Temperature of Samples: 5.8 °C Initials: CTG Bottle ID #, if applicable 37646 ☒ Received on Wet Ice
 Notes/Anomalies/Discrepancies: _____
 GLEC may subcontract out analyses that we do not perform.

MATRIX CODES: S = SEDIMENT SW = SURFACE WATER	E = EFFLUENT GW = GROUNDWATER	SL = SLUDGE AO = AQUATIC ORGANISM
--	----------------------------------	--------------------------------------