CERTIFICATE OF ANALYSIS

REPORTED TO	Mid Shuswap Lumby Water Stewards 1631 Mable Lake Rd Lumby, BC V0E 2G6		
ATTENTION	Russ Collins	**WORK ORDER**	22H2100
PO NUMBER	Mid Shuswap Lumby Water Stewards	**RECEIVED / TEMP**	2022-08-15 09:06 / 11.5°C
PROJECT	Analytical Testing	**REPORTED**	2022-08-22 12:40
PROJECT INFO		**COC NUMBER**	40837.5581

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here: https://www.caro.ca/terms-conditions

If you have any questions or concerns, please contact me at TeamCaro@caro.ca

Authorized By:

Team CARO
Client Service Representative

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TEST RESULTS

REPORTED TO	Mid Shuswap Lumby Water Stewards	**WORK ORDER**	22H2100
PROJECT	Analytical Testing	**REPORTED**	2022-08-22 12:40

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Harris Creek (Hwy 6) (22H2100-01) | Matrix: Water | Sampled: 2022-08-14 11:25						FILT, PRESa
Anions						
Chloride	**1.37**	AO ≤ 250	0.10	mg/L	2022-08-15	
Nitrate (as N)	**0.013**	MAC = 10	0.010	mg/L	2022-08-15	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2022-08-15	
Sulfate	**18.4**	AO ≤ 500	1.0	mg/L	2022-08-15	
Calculated Parameters						
Nitrate+Nitrite (as N)	**0.0134**	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	**0.141**	N/A	0.0500	mg/L	N/A	
General Parameters						
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2022-08-16	
Conductivity (EC)	**223**	N/A	2.0	µS/cm	2022-08-16	
Nitrogen, Total Kjeldahl	**0.128**	N/A	0.050	mg/L	2022-08-19	
pH	**7.62**	7.0-10.5	0.10	pH units	2022-08-16	HT2
Phosphorus, Total (as P)	**0.0295**	N/A	0.0050	mg/L	2022-08-18	
Phosphorus, Total Dissolved	**0.0271**	N/A	0.0050	mg/L	2022-08-18	
Turbidity	**1.12**	OG < 1	0.10	NTU	2022-08-15	
Microbiological Parameters						
Coliforms, Total (Q-Tray)	**5480**	MAC = 0	1	MPN/100 mL	2022-08-15	
Coliforms, Fecal (Q-Tray)	**345**	N/A	1	MPN/100 mL	2022-08-15	
E. coli (Q-Tray)	**271**	MAC = 0	1	MPN/100 mL	2022-08-15	
Duteau Creek (Hwy 6) (22H2100-02) | Matrix: Water | Sampled: 2022-08-14 11:15						FILT, PRESa
Anions						
Chloride	**2.96**	AO ≤ 250	0.10	mg/L	2022-08-15	
Nitrate (as N)	**0.245**	MAC = 10	0.010	mg/L	2022-08-15	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2022-08-15	
Sulfate	**10.1**	AO ≤ 500	1.0	mg/L	2022-08-15	
Calculated Parameters						
Nitrate+Nitrite (as N)	**0.245**	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	**0.471**	N/A	0.0500	mg/L	N/A	
General Parameters						
Conductivity (EC)	**131**	N/A	2.0	µS/cm	2022-08-16	
Nitrogen, Total Kjeldahl	**0.226**	N/A	0.050	mg/L	2022-08-19	
pH	**7.60**	7.0-10.5	0.10	pH units	2022-08-16	HT2
Phosphorus, Total (as P)	**0.0248**	N/A	0.0050	mg/L	2022-08-18	
Phosphorus, Total Dissolved	**0.0202**	N/A	0.0050	mg/L	2022-08-18	
Turbidity	**2.27**	OG < 1	0.10	NTU	2022-08-15	
Microbiological Parameters						

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TEST RESULTS

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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Duteau Creek (Hwy 6) (22H2100-02) | Matrix: Water | Sampled: 2022-08-14 11:15, Continued						FILT, PRESa
Microbiological Parameters, Continued						
Coliforms, Total (Q-Tray)	4350	MAC = 0	1	MPN/100 mL	2022-08-15	
Coliforms, Fecal (Q-Tray)	345	N/A	1	MPN/100 mL	2022-08-15	
E. coli (Q-Tray)	305	MAC = 0	1	MPN/100 mL	2022-08-15	
Mid Bessette Creek (22H2100-03) | Matrix: Water | Sampled: 2022-08-14 10:25						FILT, PRES
Anions						
Chloride	**4.28**	AO ≤ 250	0.10	mg/L	2022-08-15	
Nitrate (as N)	**0.091**	MAC = 10	0.010	mg/L	2022-08-15	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2022-08-15	
Sulfate	**22.1**	AO ≤ 500	1.0	mg/L	2022-08-15	
Calculated Parameters						
Nitrate+Nitrite (as N)	**0.0910**	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	**0.269**	N/A	0.0500	mg/L	N/A	
General Parameters						
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2022-08-16	
Conductivity (EC)	**245**	N/A	2.0	µS/cm	2022-08-16	
Nitrogen, Total Kjeldahl	**0.178**	N/A	0.050	mg/L	2022-08-19	
pH	**7.92**	7.0-10.5	0.10	pH units	2022-08-16	HT2
Phosphorus, Total (as P)	**0.0203**	N/A	0.0050	mg/L	2022-08-18	
Phosphorus, Total Dissolved	**0.0124**	N/A	0.0050	mg/L	2022-08-18	
Turbidity	**2.98**	OG < 1	0.10	NTU	2022-08-15	
Microbiological Parameters						
Coliforms, Total (Q-Tray)	2500	MAC = 0	1	MPN/100 mL	2022-08-15	
Coliforms, Fecal (Q-Tray)	548	N/A	1	MPN/100 mL	2022-08-15	
E. coli (Q-Tray)	511	MAC = 0	1	MPN/100 mL	2022-08-15	
Lower Bessette Creek (22H2100-04) | Matrix: Water | Sampled: 2022-08-14 10:15						FILT, PRES
Anions						
Chloride	**4.60**	AO ≤ 250	0.10	mg/L	2022-08-15	
Nitrate (as N)	**0.039**	MAC = 10	0.010	mg/L	2022-08-15	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2022-08-15	
Sulfate	**25.5**	AO ≤ 500	1.0	mg/L	2022-08-15	
Calculated Parameters						
Nitrate+Nitrite (as N)	**0.0390**	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	**0.441**	N/A	0.0500	mg/L	N/A	
General Parameters						

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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Lower Bessette Creek (22H2100-04) | Matrix: Water | Sampled: 2022-08-14 10:15, Continued						FILT, PRES
General Parameters, Continued						
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2022-08-16	
Conductivity (EC)	**262**	N/A	2.0	µS/cm	2022-08-16	
Nitrogen, Total Kjeldahl	**0.402**	N/A	0.050	mg/L	2022-08-19	
pH	**8.05**	7.0-10.5	0.10	pH units	2022-08-16	HT2
Phosphorus, Total (as P)	**0.0146**	N/A	0.0050	mg/L	2022-08-18	
Phosphorus, Total Dissolved	**0.0085**	N/A	0.0050	mg/L	2022-08-18	
Turbidity	**3.86**	OG < 1	0.10	NTU	2022-08-15	
Microbiological Parameters						
Coliforms, Total (Q-Tray)	**2530**	MAC = 0	1	MPN/100 mL	2022-08-15	
Coliforms, Fecal (Q-Tray)	**307**	N/A	1	MPN/100 mL	2022-08-15	
E. coli (Q-Tray)	**307**	MAC = 0	1	MPN/100 mL	2022-08-15	
Shuswap River (Wilsey Dam) (22H2100-05) | Matrix: Water | Sampled: 2022-08-14 09:50						FILT, PRES
Anions						
Chloride	**0.39**	AO ≤ 250	0.10	mg/L	2022-08-15	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2022-08-15	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2022-08-15	
Sulfate	**6.1**	AO ≤ 500	1.0	mg/L	2022-08-15	
Calculated Parameters						
Nitrate+Nitrite (as N)	< 0.0100	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	**0.0540**	N/A	0.0500	mg/L	N/A	
General Parameters						
Conductivity (EC)	**104**	N/A	2.0	µS/cm	2022-08-16	
Nitrogen, Total Kjeldahl	**0.054**	N/A	0.050	mg/L	2022-08-19	
pH	**7.81**	7.0-10.5	0.10	pH units	2022-08-16	HT2
Phosphorus, Total (as P)	**0.0054**	N/A	0.0050	mg/L	2022-08-18	
Phosphorus, Total Dissolved	< 0.0050	N/A	0.0050	mg/L	2022-08-18	
Turbidity	**1.01**	OG < 1	0.10	NTU	2022-08-15	
Microbiological Parameters						
Coliforms, Total (Q-Tray)	**1300**	MAC = 0	1	MPN/100 mL	2022-08-15	HT1
Coliforms, Fecal (Q-Tray)	**23**	N/A	1	MPN/100 mL	2022-08-15	HT1
E. coli (Q-Tray)	**21**	MAC = 0	1	MPN/100 mL	2022-08-15	HT1
Shuswap River (Odd Fellows) (22H2100-06) | Matrix: Water | Sampled: 2022-08-14 09:20						FILT, PRES
Anions						
Chloride	**0.64**	AO ≤ 250	0.10	mg/L	2022-08-15	

TEST RESULTS

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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Shuswap River (Odd Fellows) (22H2100-06) | Matrix: Water | Sampled: 2022-08-14 09:20, Continued						FILT, PRES
Anions, Continued						
Nitrate (as N)	**0.013**	MAC = 10	0.010	mg/L	2022-08-15	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2022-08-15	
Sulfate	**7.5**	AO ≤ 500	1.0	mg/L	2022-08-15	
Calculated Parameters						
Nitrate+Nitrite (as N)	**0.0133**	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	< 0.0500	N/A	0.0500	mg/L	N/A	
General Parameters						
Conductivity (EC)	**119**	N/A	2.0	µS/cm	2022-08-16	
Nitrogen, Total Kjeldahl	< 0.050	N/A	0.050	mg/L	2022-08-19	
pH	**7.72**	7.0-10.5	0.10	pH units	2022-08-16	HT2
Phosphorus, Total (as P)	**0.0064**	N/A	0.0050	mg/L	2022-08-18	
Phosphorus, Total Dissolved	< 0.0050	N/A	0.0050	mg/L	2022-08-18	
Turbidity	**1.53**	OG < 1	0.10	NTU	2022-08-15	
Microbiological Parameters						
Coliforms, Total (Q-Tray)	**1990**	MAC = 0	1	MPN/100 mL	2022-08-15	HT1
Coliforms, Fecal (Q-Tray)	**52**	N/A	1	MPN/100 mL	2022-08-15	HT1
E. coli (Q-Tray)	**30**	MAC = 0	1	MPN/100 mL	2022-08-15	HT1
Vance Creek (Mabel Lake Rd) (22H2100-07) | Matrix: Water | Sampled: 2022-08-14 10:40						FILT, PRESb
Anions						
Chloride	**3.16**	AO ≤ 250	0.10	mg/L	2022-08-15	
Nitrate (as N)	**0.034**	MAC = 10	0.010	mg/L	2022-08-15	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2022-08-15	
Sulfate	**36.8**	AO ≤ 500	1.0	mg/L	2022-08-15	
Calculated Parameters						
Nitrate+Nitrite (as N)	**0.0343**	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	< 0.0500	N/A	0.0500	mg/L	N/A	
General Parameters						
Conductivity (EC)	**403**	N/A	2.0	µS/cm	2022-08-16	
Nitrogen, Total Kjeldahl	< 0.050	N/A	0.050	mg/L	2022-08-19	
pH	**8.24**	7.0-10.5	0.10	pH units	2022-08-16	HT2
Phosphorus, Total (as P)	< 0.0050	N/A	0.0050	mg/L	2022-08-18	
Phosphorus, Total Dissolved	< 0.0050	N/A	0.0050	mg/L	2022-08-18	
Turbidity	**0.73**	OG < 1	0.10	NTU	2022-08-15	
Microbiological Parameters						
Coliforms, Total (Q-Tray)	**613**	MAC = 0	1	MPN/100 mL	2022-08-15	
Coliforms, Fecal (Q-Tray)	**58**	N/A	1	MPN/100 mL	2022-08-15	

TEST RESULTS

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PROJECT	Analytical Testing	**REPORTED**	2022-08-22 12:40

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Vance Creek (Mabel Lake Rd) (22H2100-07) | Matrix: Water | Sampled: 2022-08-14 10:40, Continued						FILT, PRESb
Microbiological Parameters, Continued						
E. coli (Q-Tray)	**54**	MAC = 0	1	MPN/100 mL	2022-08-15	

Sample Qualifiers:

FILT	The sample has been filtered for TDP in the laboratory. Results may not reflect conditions at the time of sampling.
HT1	The sample was prepared and/or analyzed past the recommended holding time.
HT2	The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.
PRES	Sample has been preserved for TKN,TDP,TN in the laboratory and the holding time has been extended.
PRESa	Sample has been preserved for TKN,TDP,TP in the laboratory and the holding time has been extended.
PRESb	Sample has been preserved for TKN,TN,TDP in the laboratory and the holding time has been extended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Mid Shuswap Lumby Water Stewards	**WORK ORDER**	22H2100
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Analysis Description	Method Ref.	Technique	Accredited	Location
Ammonia, Total in Water	SM 4500-NH3 G* (2017)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2017)	Ion Chromatography	✓	Kelowna
Coliforms, Fecal in Water	NA / SM 9223 (2017)	Quanti-Tray / Enzyme Substrate Endo Agar	✓	Kelowna
Coliforms, Total in Water	NA / SM 9223 (2017)	Quanti-Tray / Enzyme Substrate Endo Agar	✓	Kelowna
Conductivity in Water	SM 2510 B (2017)	Conductivity Meter	✓	Kelowna
E. coli in Water	NA / SM 9223 (2017)	Quanti-Tray / Enzyme Substrate Endo Agar	✓	Kelowna
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2017)	Block Digestion and Flow Injection Analysis	✓	Kelowna
pH in Water	SM 4500-H+ B (2017)	Electrometry	✓	Kelowna
Phosphorus, Total Dissolved in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2017)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Phosphorus, Total in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2017)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Turbidity in Water	SM 2130 B (2017)	Nephelometry	✓	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration (health based)
mg/L	Milligrams per litre
MPN/100 mL	Most Probable Number per 100 millilitres
NTU	Nephelometric Turbidity Units
OG	Operational Guideline (treated water)
pH units	pH < 7 = acidic, ph > 7 = basic
µS/cm	Microsiemens per centimetre
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

Guidelines Referenced in this Report:

Guidelines for Canadian Drinking Water Quality (Health Canada, June 2019)

Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Mid Shuswap Lumby Water Stewards	**WORK ORDER**	22H2100
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General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued or once samples expire, whichever comes first. Longer hold is possible if agreed to in writing. The quality control (QC) data is available upon request

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:TeamCaro@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline (s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.