



CERTIFICATE OF ANALYSIS

REPORTED TO Glenmore Ellison Improvement District
445 Glenmore Road
KELOWNA, BC V1V 1Z6

ATTENTION Chris Mackay

PO NUMBER

PROJECT Drinking Water

PROJECT INFO

WORK ORDER 22K2086

RECEIVED / TEMP 2022-11-16 11:35 / 9.9°C

REPORTED 2022-11-23 15:09

COC NUMBER No Number

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.

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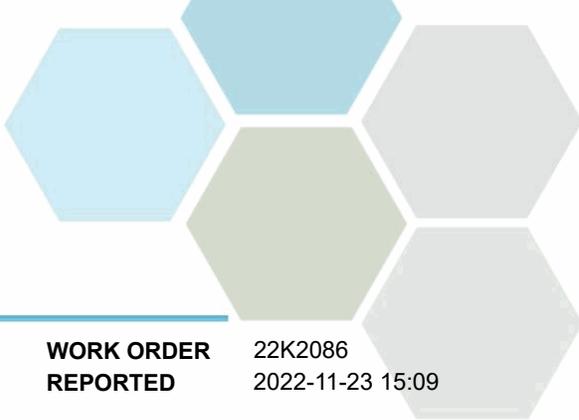
If you have any questions or concerns, please contact me at bwhitehead@caro.ca

Authorized By:

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TEST RESULTS

REPORTED TO PROJECT Glenmore Ellison Improvement District
Drinking Water

WORK ORDER REPORTED 22K2086
2022-11-23 15:09

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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OK LK Pump STN - RAW T/S (22K2086-01) | Matrix: Water | Sampled: 2022-11-16 10:20

Anions

Chloride	5.93	AO ≤ 250	0.10	mg/L	2022-11-18	
Fluoride	0.17	MAC = 1.5	0.10	mg/L	2022-11-18	
Nitrate (as N)	0.074	MAC = 10	0.010	mg/L	2022-11-18	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2022-11-18	
Sulfate	31.3	AO ≤ 500	1.0	mg/L	2022-11-18	

Calculated Parameters

Hardness, Total (as CaCO3)	124	None Required	0.500	mg/L	N/A	
Langelier Index	-0.3	N/A	-5.0		2022-11-23	CT6
Solids, Total Dissolved	169	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

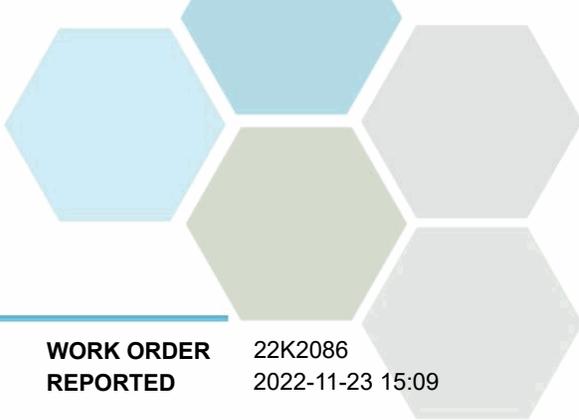
Alkalinity, Total (as CaCO3)	121	N/A	1.0	mg/L	2022-11-20	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-11-20	
Alkalinity, Bicarbonate (as CaCO3)	121	N/A	1.0	mg/L	2022-11-20	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-11-20	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-11-20	
Carbon, Total Organic	3.85	N/A	0.50	mg/L	2022-11-18	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2022-11-19	
Conductivity (EC)	283	N/A	2.0	µS/cm	2022-11-20	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2022-11-21	
pH	7.69	7.0-10.5	0.10	pH units	2022-11-20	HT2
Temperature, at pH	20.4	N/A		°C	2022-11-20	HT2
Turbidity	0.38	OG < 1	0.10	NTU	2022-11-18	

Microbiological Parameters

Coliforms, Total (Q-Tray)	2	MAC = 0	1	MPN/100 mL	2022-11-17	
E. coli (Q-Tray)	1	MAC = 0	1	MPN/100 mL	2022-11-17	

Total Metals

Aluminum, total	< 0.0050	OG < 0.1	0.0050	mg/L	2022-11-19	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2022-11-19	
Arsenic, total	0.00050	MAC = 0.01	0.00050	mg/L	2022-11-19	
Barium, total	0.0217	MAC = 2	0.0050	mg/L	2022-11-19	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2022-11-19	
Cadmium, total	< 0.000010	MAC = 0.005	0.000010	mg/L	2022-11-19	
Calcium, total	34.3	None Required	0.20	mg/L	2022-11-19	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2022-11-19	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2022-11-19	
Copper, total	0.00221	MAC = 2	0.00040	mg/L	2022-11-19	
Iron, total	< 0.010	AO ≤ 0.3	0.010	mg/L	2022-11-19	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2022-11-19	
Magnesium, total	9.26	None Required	0.010	mg/L	2022-11-19	
Manganese, total	0.00085	MAC = 0.12	0.00020	mg/L	2022-11-19	



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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
OK LK Pump STN - RAW T/S (22K2086-01) Matrix: Water Sampled: 2022-11-16 10:20, Continued						
<i>Total Metals, Continued</i>						
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2022-11-21	
Molybdenum, total	0.00339	N/A	0.00010	mg/L	2022-11-19	
Nickel, total	< 0.00040	N/A	0.00040	mg/L	2022-11-19	
Potassium, total	2.47	N/A	0.10	mg/L	2022-11-19	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2022-11-19	
Sodium, total	12.0	AO ≤ 200	0.10	mg/L	2022-11-19	
Strontium, total	0.306	MAC = 7	0.0010	mg/L	2022-11-19	
Uranium, total	0.00239	MAC = 0.02	0.000020	mg/L	2022-11-19	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2022-11-19	

Pre-UV (RAW) (22K2086-02) | Matrix: Water | Sampled: 2022-11-16 10:40

Anions

Chloride	5.79	AO ≤ 250	0.10	mg/L	2022-11-18	
Fluoride	0.19	MAC = 1.5	0.10	mg/L	2022-11-18	
Nitrate (as N)	0.067	MAC = 10	0.010	mg/L	2022-11-18	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2022-11-18	
Sulfate	30.9	AO ≤ 500	1.0	mg/L	2022-11-18	

Calculated Parameters

Hardness, Total (as CaCO3)	124	None Required	0.500	mg/L	N/A	
Langelier Index	-0.2	N/A	-5.0		2022-11-23	CT6
Solids, Total Dissolved	172	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

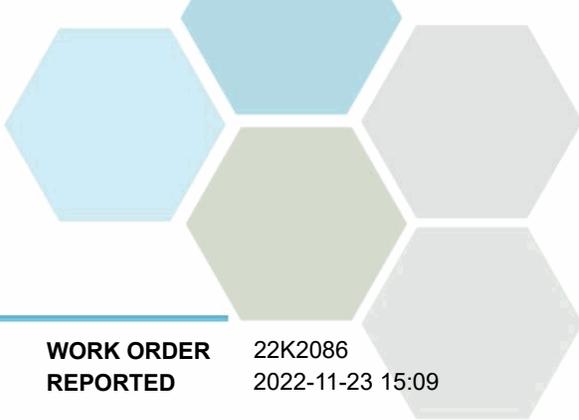
Alkalinity, Total (as CaCO3)	126	N/A	1.0	mg/L	2022-11-20	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-11-20	
Alkalinity, Bicarbonate (as CaCO3)	126	N/A	1.0	mg/L	2022-11-20	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-11-20	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-11-20	
Carbon, Total Organic	4.00	N/A	0.50	mg/L	2022-11-18	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2022-11-19	
Conductivity (EC)	283	N/A	2.0	µS/cm	2022-11-20	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2022-11-21	
pH	7.72	7.0-10.5	0.10	pH units	2022-11-20	HT2
Temperature, at pH	20.5	N/A		°C	2022-11-20	HT2
Turbidity	0.17	OG < 1	0.10	NTU	2022-11-18	

Microbiological Parameters

Coliforms, Total (Q-Tray)	1	MAC = 0	1	MPN/100 mL	2022-11-17	
E. coli (Q-Tray)	< 1	MAC = 0	1	MPN/100 mL	2022-11-17	

Total Metals

Aluminum, total	< 0.0050	OG < 0.1	0.0050	mg/L	2022-11-19	
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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Pre-UV (RAW) (22K2086-02) Matrix: Water Sampled: 2022-11-16 10:40, Continued						
Total Metals, Continued						
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2022-11-19	
Arsenic, total	0.00052	MAC = 0.01	0.00050	mg/L	2022-11-19	
Barium, total	0.0212	MAC = 2	0.0050	mg/L	2022-11-19	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2022-11-19	
Cadmium, total	< 0.000010	MAC = 0.005	0.000010	mg/L	2022-11-19	
Calcium, total	34.5	None Required	0.20	mg/L	2022-11-19	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2022-11-19	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2022-11-19	
Copper, total	0.00112	MAC = 2	0.00040	mg/L	2022-11-19	
Iron, total	< 0.010	AO ≤ 0.3	0.010	mg/L	2022-11-19	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2022-11-19	
Magnesium, total	9.22	None Required	0.010	mg/L	2022-11-19	
Manganese, total	0.00079	MAC = 0.12	0.00020	mg/L	2022-11-19	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2022-11-21	
Molybdenum, total	0.00342	N/A	0.00010	mg/L	2022-11-19	
Nickel, total	< 0.00040	N/A	0.00040	mg/L	2022-11-19	
Potassium, total	2.52	N/A	0.10	mg/L	2022-11-19	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2022-11-19	
Sodium, total	12.2	AO ≤ 200	0.10	mg/L	2022-11-19	
Strontium, total	0.299	MAC = 7	0.0010	mg/L	2022-11-19	
Uranium, total	0.00239	MAC = 0.02	0.000020	mg/L	2022-11-19	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2022-11-19	

Clearwell Outflow (22K2086-03) | Matrix: Water | Sampled: 2022-11-16 10:50

Anions

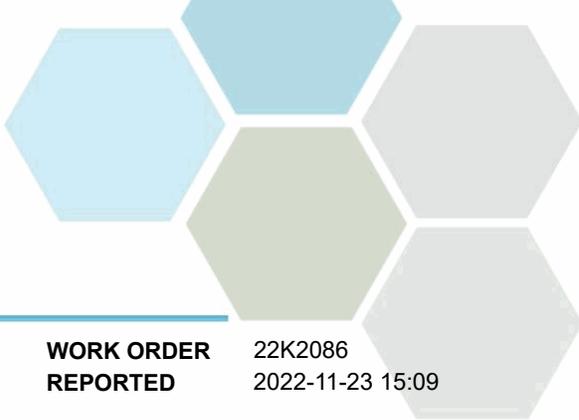
Chloride	8.79	AO ≤ 250	0.10	mg/L	2022-11-18	
Fluoride	0.14	MAC = 1.5	0.10	mg/L	2022-11-18	
Nitrate (as N)	0.068	MAC = 10	0.010	mg/L	2022-11-18	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2022-11-18	
Sulfate	31.3	AO ≤ 500	1.0	mg/L	2022-11-18	

Calculated Parameters

Hardness, Total (as CaCO3)	124	None Required	0.500	mg/L	N/A	
Langelier Index	-0.3	N/A	-5.0		2022-11-23	CT6
Solids, Total Dissolved	171	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

Alkalinity, Total (as CaCO3)	118	N/A	1.0	mg/L	2022-11-20	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-11-20	
Alkalinity, Bicarbonate (as CaCO3)	118	N/A	1.0	mg/L	2022-11-20	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-11-20	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-11-20	



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Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
Clearwell Outflow (22K2086-03) Matrix: Water Sampled: 2022-11-16 10:50, Continued					
<i>General Parameters, Continued</i>					
Carbon, Total Organic	4.32	N/A	0.50 mg/L	2022-11-18	
Colour, True	< 5.0	AO ≤ 15	5.0 CU	2022-11-19	
Conductivity (EC)	285	N/A	2.0 µS/cm	2022-11-20	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020 mg/L	2022-11-21	
pH	7.70	7.0-10.5	0.10 pH units	2022-11-20	HT2
Temperature, at pH	20.6	N/A	°C	2022-11-20	HT2
Turbidity	0.20	OG < 1	0.10 NTU	2022-11-18	

Microbiological Parameters

Coliforms, Total	< 1	MAC = 0	1 CFU/100 mL	2022-11-17	
E. coli	< 1	MAC = 0	1 CFU/100 mL	2022-11-17	

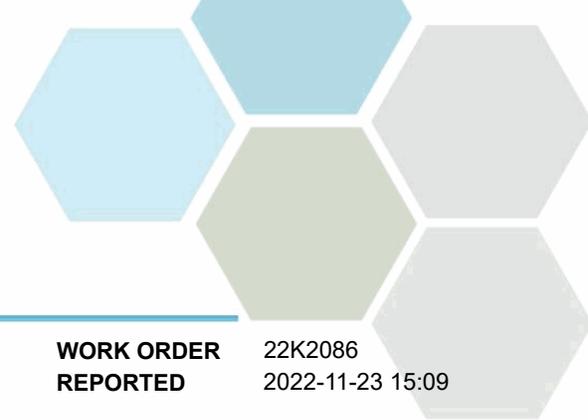
Total Metals

Aluminum, total	< 0.0050	OG < 0.1	0.0050 mg/L	2022-11-19	
Antimony, total	< 0.00020	MAC = 0.006	0.00020 mg/L	2022-11-19	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050 mg/L	2022-11-19	
Barium, total	0.0214	MAC = 2	0.0050 mg/L	2022-11-19	
Boron, total	< 0.0500	MAC = 5	0.0500 mg/L	2022-11-19	
Cadmium, total	< 0.000010	MAC = 0.005	0.000010 mg/L	2022-11-19	
Calcium, total	34.4	None Required	0.20 mg/L	2022-11-19	
Chromium, total	< 0.00050	MAC = 0.05	0.00050 mg/L	2022-11-19	
Cobalt, total	< 0.00010	N/A	0.00010 mg/L	2022-11-19	
Copper, total	0.00167	MAC = 2	0.00040 mg/L	2022-11-19	
Iron, total	< 0.010	AO ≤ 0.3	0.010 mg/L	2022-11-19	
Lead, total	< 0.00020	MAC = 0.005	0.00020 mg/L	2022-11-19	
Magnesium, total	9.34	None Required	0.010 mg/L	2022-11-19	
Manganese, total	0.00076	MAC = 0.12	0.00020 mg/L	2022-11-19	
Mercury, total	< 0.000010	MAC = 0.001	0.000010 mg/L	2022-11-21	
Molybdenum, total	0.00341	N/A	0.00010 mg/L	2022-11-19	
Nickel, total	0.00045	N/A	0.00040 mg/L	2022-11-19	
Potassium, total	2.55	N/A	0.10 mg/L	2022-11-19	
Selenium, total	< 0.00050	MAC = 0.05	0.00050 mg/L	2022-11-19	
Sodium, total	12.3	AO ≤ 200	0.10 mg/L	2022-11-19	
Strontium, total	0.305	MAC = 7	0.0010 mg/L	2022-11-19	
Uranium, total	0.00242	MAC = 0.02	0.000020 mg/L	2022-11-19	
Zinc, total	< 0.0040	AO ≤ 5	0.0040 mg/L	2022-11-19	

Sample Qualifiers:

CT6 Results were based on lab temperature & lab pH.

HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.



APPENDIX 1: SUPPORTING INFORMATION

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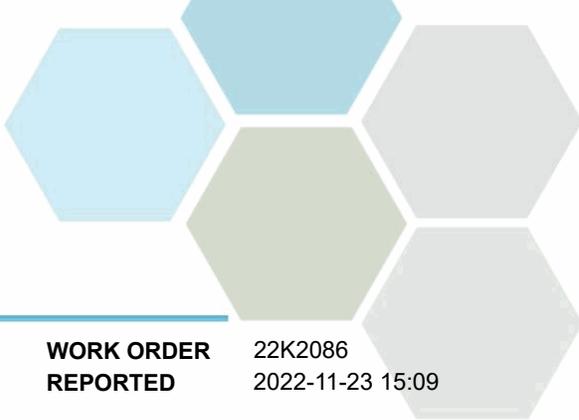
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Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2017)	Titration with H2SO4	✓	Kelowna
Anions in Water	SM 4110 B (2017)	Ion Chromatography	✓	Kelowna
Carbon, Total Organic in Water	SM 5310 B (2017)	Combustion, Infrared CO2 Detection	✓	Kelowna
Coliforms, Total in Water	SM 9222* (2017)	Membrane Filtration / Chromocult Agar	✓	Kelowna
Colour, True in Water	SM 2120 C (2017)	Spectrophotometry (456 nm)	✓	Kelowna
Conductivity in Water	SM 2510 B (2017)	Conductivity Meter	✓	Kelowna
Cyanide, SAD in Water	ASTM D7511-12	Flow Injection with In-Line UV Digestion and Amperometry	✓	Kelowna
E. coli in Water	SM 9222* (2017)	Membrane Filtration / Chromocult Agar	✓	Kelowna
Hardness in Water	SM 2340 B* (2017)	Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)	✓	N/A
Langelier Index in Water	SM 2330 B (2017)	Calculation		N/A
Mercury, total in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	✓	Richmond
pH in Water	SM 4500-H+ B (2017)	Electrometry	✓	Kelowna
Solids, Total Dissolved in Water	SM 1030 E (2017)	SM 1030 E (2011)		N/A
Total Metals in Water	EPA 200.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
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
°C	Degrees Celcius
AO	Aesthetic Objective
CFU/100 mL	Colony Forming Units per 100 millilitres
CU	Colour Units (referenced against a platinum cobalt standard)
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
ASTM	ASTM International Test Methods
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association



APPENDIX 1: SUPPORTING INFORMATION

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General Comments:

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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: bwhitehead@caro.ca

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