

REPORTED TO Keremeos Irrigation District
Box 220
Keremeos, BC V0X 1N0

TEL (250) 499-5651
FAX (250) 499-5696

ATTENTION Joel Cottrill

WORK ORDER 6051366

PO NUMBER

RECEIVED / TEMP 2016-05-18 08:30 / 13°C

PROJECT Comprehensive

REPORTED 2016-05-26

PROJECT INFO

COC NUMBER no#

General Comments:

CARO Analytical Services employs methods which are conducted according to procedures accepted by appropriate regulatory agencies, and/or are conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts, except where otherwise agreed to by the client.

The results in this report apply to the samples analyzed in accordance with the Chain of Custody or Sample Requisition 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 unless otherwise agreed to in writing.



Authorized By:

Ed Hoppe, B.Sc., P.Chem.
Division Manager, Kelowna

***If you have any questions or concerns, please contact your Account Manager:
Jennifer Shanko, ASCT (jshanko@caro.ca)***

Locations:

#110 4011 Viking Way
Richmond, BC V6V 2K9
Tel: 604-279-1499 Fax: 604-279-1599

#102 3677 Highway 97N
Kelowna, BC V1X 5C3
Tel: 250-765-9646 Fax: 250-765-3893

17225 109 Avenue
Edmonton, AB T5S 1H7
Tel: 780-489-9100 Fax: 780-489-9700

www.caro.ca

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Analysis Description	Method Reference	Technique	Location
Alkalinity, Total in Water	APHA 2320 B*	Titration with H2SO4	Kelowna
Anions by IC in Water	APHA 4110 B	Ion Chromatography with Chemical Suppression of Eluent Conductivity	Kelowna
Coliforms, Total (MF-CCA) in Water	APHA 9222*	Membrane Filtration / Incubation on Chromocult Agar	Kelowna
Colour, True in Water	APHA 2120 C	Spectrophotometry (456 nm)	Kelowna
Conductivity in Water	APHA 2510 B	Conductivity Meter	Kelowna
Cyanide, SAD in Water	APHA 4500-CN- C / APHA 4500-CN- E	Distillation / Colorimetry	Kelowna
E. coli (MF-CCA) in Water	APHA 9222*	Membrane Filtration / Incubation on Chromocult Agar	Kelowna
Hardness (as CaCO3) in Water	APHA 2340 B*	Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Estimated)	N/A
Mercury, total by CVAFS in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
pH in Water	APHA 4500-H+ B	Electrometry	Kelowna
Solids, Total Dissolved in Water	APHA 1030 E	Calculation: 100 x (([Cations]-[Anions])/([Cations]+[Anions]))	N/A
Total Metals by ICPMS in Water	APHA 3030E* / APHA 3125 B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma Mass Spectrometry (ICP-MS)	Richmond
Transmissivity at 254 nm in Water	APHA 5910 B	Ultraviolet Absorption	Kelowna
Turbidity in Water	APHA 2130 B	Nephelometry	Kelowna

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

Method Reference Descriptions:

APHA Standard Methods for the Examination of Water and Wastewater, 22nd Edition, American Public Health Association/American Water Works Association/Water Environment Federation
EPA United States Environmental Protection Agency Test Methods

Glossary of Terms:

MRL Method Reporting Limit
< Less than the Reported Detection Limit (RDL) - the RDL may be higher than the MRL due to various factors such as dilutions, limited sample volume, high moisture, or interferences
AO Aesthetic objective
MAC Maximum acceptable concentration (health based)
OG Operational guideline (treated water)
% T Percent Transmittance
CFU/100 mL Colony Forming Units per 100 millilitres
CU Colour Units (referenced against a platinum cobalt standard)
mg/L Milligrams per litre
NTU Nephelometric Turbidity Units
pH units pH < 7 = acidic, pH > 7 = basic
µS/cm Microsiemens per centimetre

Standards / Guidelines Referenced in this Report:

Guidelines for Canadian Drinking Water Quality (Oct 2014)

Website: http://www.hc-sc.gc.ca/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/sum_guide-res_recom-eng.pdf

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

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Analyte	Result / Recovery	Standard / Guideline	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: West #2 Well (6051366-01) [Water] Sampled: 2016-05-17 10:30

Anions

Chloride	3.69	AO ≤ 250	0.10	mg/L	N/A	2016-05-18	
Fluoride	< 0.10	MAC = 1.5	0.10	mg/L	N/A	2016-05-18	
Nitrate (as N)	0.882	MAC = 10	0.010	mg/L	N/A	2016-05-18	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	N/A	2016-05-18	
Sulfate	21.4	AO ≤ 500	1.0	mg/L	N/A	2016-05-18	

General Parameters

Alkalinity, Total (as CaCO3)	97	N/A	1	mg/L	N/A	2016-05-25	
Colour, True	< 5	AO ≤ 15	5	CU	N/A	2016-05-20	
Conductivity (EC)	235	N/A	2	µS/cm	N/A	2016-05-25	
Cyanide, Total	< 0.010	MAC = 0.2	0.010	mg/L	2016-05-25	2016-05-26	
pH	7.75	6.5-8.5	0.01	pH units	N/A	2016-05-19	HT2
Turbidity	< 0.10	OG < 0.1	0.10	NTU	N/A	2016-05-18	
UV Transmittance @ 254nm	97.0	N/A	0.1	% T	N/A	2016-05-19	

Calculated Parameters

Hardness, Total (as CaCO3)	119	N/A	5.0	mg/L	N/A	N/A	
Solids, Total Dissolved	140	AO ≤ 500	2.0	mg/L	N/A	N/A	

Total Recoverable Metals

Aluminum, total	< 0.05	OG < 0.1	0.05	mg/L	2016-05-24	2016-05-25	
Antimony, total	< 0.001	MAC = 0.006	0.001	mg/L	2016-05-24	2016-05-25	
Arsenic, total	< 0.005	MAC = 0.01	0.005	mg/L	2016-05-24	2016-05-25	
Barium, total	< 0.05	MAC = 1	0.05	mg/L	2016-05-24	2016-05-25	
Beryllium, total	< 0.001	N/A	0.001	mg/L	2016-05-24	2016-05-25	
Boron, total	0.04	MAC = 5	0.04	mg/L	2016-05-24	2016-05-25	
Cadmium, total	< 0.0001	MAC = 0.005	0.0001	mg/L	2016-05-24	2016-05-25	
Calcium, total	37.9	N/A	2.0	mg/L	2016-05-24	2016-05-25	
Chromium, total	< 0.005	MAC = 0.05	0.005	mg/L	2016-05-24	2016-05-25	
Cobalt, total	< 0.0005	N/A	0.0005	mg/L	2016-05-24	2016-05-25	
Copper, total	< 0.002	AO ≤ 1	0.002	mg/L	2016-05-24	2016-05-25	
Iron, total	< 0.10	AO ≤ 0.3	0.10	mg/L	2016-05-24	2016-05-25	
Lead, total	< 0.001	MAC = 0.01	0.001	mg/L	2016-05-24	2016-05-25	
Magnesium, total	5.9	N/A	0.1	mg/L	2016-05-24	2016-05-25	
Manganese, total	< 0.002	AO ≤ 0.05	0.002	mg/L	2016-05-24	2016-05-25	
Mercury, total	< 0.00002	MAC = 0.001	0.00002	mg/L	2016-05-19	2016-05-24	
Molybdenum, total	0.002	N/A	0.001	mg/L	2016-05-24	2016-05-25	
Nickel, total	0.004	N/A	0.002	mg/L	2016-05-24	2016-05-25	
Phosphorus, total	< 0.2	N/A	0.2	mg/L	2016-05-24	2016-05-25	
Potassium, total	1.5	N/A	0.2	mg/L	2016-05-24	2016-05-25	
Selenium, total	< 0.005	MAC = 0.05	0.005	mg/L	2016-05-24	2016-05-25	
Silicon, total	7	N/A	5	mg/L	2016-05-24	2016-05-25	
Silver, total	< 0.0005	N/A	0.0005	mg/L	2016-05-24	2016-05-25	
Sodium, total	5.9	AO ≤ 200	0.2	mg/L	2016-05-24	2016-05-25	
Uranium, total	0.0005	MAC = 0.02	0.0002	mg/L	2016-05-24	2016-05-25	
Vanadium, total	< 0.01	N/A	0.01	mg/L	2016-05-24	2016-05-25	
Zinc, total	< 0.04	AO ≤ 5	0.04	mg/L	2016-05-24	2016-05-25	

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Analyte	Result / Recovery	Standard / Guideline	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: West #2 Well (6051366-01) [Water] Sampled: 2016-05-17 10:30, Continued

Microbiological Parameters

Coliforms, Total	< 1	MAC = None Detected	1	CFU/100 mL	N/A	2016-05-18	
E. coli	< 1	MAC = None Detected	1	CFU/100 mL	N/A	2016-05-18	

Sample ID: Red Bridge 10hp Well (6051366-02) [Water] Sampled: 2016-05-17 10:50

Anions

Chloride	3.70	AO ≤ 250	0.10	mg/L	N/A	2016-05-19	
Fluoride	< 0.10	MAC = 1.5	0.10	mg/L	N/A	2016-05-19	
Nitrate (as N)	0.221	MAC = 10	0.010	mg/L	N/A	2016-05-19	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	N/A	2016-05-19	
Sulfate	15.5	AO ≤ 500	1.0	mg/L	N/A	2016-05-19	

General Parameters

Alkalinity, Total (as CaCO ₃)	84	N/A	1	mg/L	N/A	2016-05-25	
Colour, True	< 5	AO ≤ 15	5	CU	N/A	2016-05-20	
Conductivity (EC)	197	N/A	2	µS/cm	N/A	2016-05-25	
Cyanide, Total	< 0.010	MAC = 0.2	0.010	mg/L	2016-05-25	2016-05-26	
pH	7.72	6.5-8.5	0.01	pH units	N/A	2016-05-25	HT2
Turbidity	0.14	OG < 0.1	0.10	NTU	N/A	2016-05-18	
UV Transmittance @ 254nm	98.2	N/A	0.1	% T	N/A	2016-05-19	

Calculated Parameters

Hardness, Total (as CaCO ₃)	97.9	N/A	5.0	mg/L	N/A	N/A	
Solids, Total Dissolved	114	AO ≤ 500	2.0	mg/L	N/A	N/A	

Total Recoverable Metals

Aluminum, total	< 0.05	OG < 0.1	0.05	mg/L	2016-05-24	2016-05-25	
Antimony, total	< 0.001	MAC = 0.006	0.001	mg/L	2016-05-24	2016-05-25	
Arsenic, total	< 0.005	MAC = 0.01	0.005	mg/L	2016-05-24	2016-05-25	
Barium, total	< 0.05	MAC = 1	0.05	mg/L	2016-05-24	2016-05-25	
Beryllium, total	< 0.001	N/A	0.001	mg/L	2016-05-24	2016-05-25	
Boron, total	< 0.04	MAC = 5	0.04	mg/L	2016-05-24	2016-05-25	
Cadmium, total	< 0.0001	MAC = 0.005	0.0001	mg/L	2016-05-24	2016-05-25	
Calcium, total	31.2	N/A	2.0	mg/L	2016-05-24	2016-05-25	
Chromium, total	< 0.005	MAC = 0.05	0.005	mg/L	2016-05-24	2016-05-25	
Cobalt, total	< 0.0005	N/A	0.0005	mg/L	2016-05-24	2016-05-25	
Copper, total	< 0.002	AO ≤ 1	0.002	mg/L	2016-05-24	2016-05-25	
Iron, total	< 0.10	AO ≤ 0.3	0.10	mg/L	2016-05-24	2016-05-25	
Lead, total	< 0.001	MAC = 0.01	0.001	mg/L	2016-05-24	2016-05-25	
Magnesium, total	4.9	N/A	0.1	mg/L	2016-05-24	2016-05-25	
Manganese, total	< 0.002	AO ≤ 0.05	0.002	mg/L	2016-05-24	2016-05-25	
Mercury, total	< 0.00002	MAC = 0.001	0.00002	mg/L	2016-05-19	2016-05-24	
Molybdenum, total	0.002	N/A	0.001	mg/L	2016-05-24	2016-05-25	
Nickel, total	< 0.002	N/A	0.002	mg/L	2016-05-24	2016-05-25	
Phosphorus, total	< 0.2	N/A	0.2	mg/L	2016-05-24	2016-05-25	

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Sample ID: Red Bridge 10hp Well (6051366-02) [Water] Sampled: 2016-05-17 10:50, Continued

Total Recoverable Metals, Continued

Potassium, total	1.2	N/A	0.2	mg/L	2016-05-24	2016-05-25	
Selenium, total	< 0.005	MAC = 0.05	0.005	mg/L	2016-05-24	2016-05-25	
Silicon, total	7	N/A	5	mg/L	2016-05-24	2016-05-25	
Silver, total	< 0.0005	N/A	0.0005	mg/L	2016-05-24	2016-05-25	
Sodium, total	5.4	AO ≤ 200	0.2	mg/L	2016-05-24	2016-05-25	
Uranium, total	0.0005	MAC = 0.02	0.0002	mg/L	2016-05-24	2016-05-25	
Vanadium, total	< 0.01	N/A	0.01	mg/L	2016-05-24	2016-05-25	
Zinc, total	< 0.04	AO ≤ 5	0.04	mg/L	2016-05-24	2016-05-25	

Microbiological Parameters

Coliforms, Total	< 1	MAC = None Detected	1	CFU/100 mL	N/A	2016-05-18	
E. coli	< 1	MAC = None Detected	1	CFU/100 mL	N/A	2016-05-18	

Sample ID: East #1 Well (6051366-03) [Water] Sampled: 2016-05-17 11:20

Anions

Chloride	10.5	AO ≤ 250	0.10	mg/L	N/A	2016-05-19	
Fluoride	0.12	MAC = 1.5	0.10	mg/L	N/A	2016-05-19	
Nitrate (as N)	2.77	MAC = 10	0.010	mg/L	N/A	2016-05-19	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	N/A	2016-05-19	
Sulfate	118	AO ≤ 500	1.0	mg/L	N/A	2016-05-19	

General Parameters

Alkalinity, Total (as CaCO ₃)	238	N/A	1	mg/L	N/A	2016-05-25	
Colour, True	< 5	AO ≤ 15	5	CU	N/A	2016-05-20	
Conductivity (EC)	657	N/A	2	µS/cm	N/A	2016-05-25	
Cyanide, Total	< 0.010	MAC = 0.2	0.010	mg/L	2016-05-25	2016-05-26	
pH	8.16	6.5-8.5	0.01	pH units	N/A	2016-05-25	HT2
Turbidity	< 0.10	OG < 0.1	0.10	NTU	N/A	2016-05-18	
UV Transmittance @ 254nm	97.7	N/A	0.1	% T	N/A	2016-05-19	

Calculated Parameters

Hardness, Total (as CaCO ₃)	357	N/A	5.0	mg/L	N/A	N/A	
Solids, Total Dissolved	438	AO ≤ 500	10.0	mg/L	N/A	N/A	

Total Recoverable Metals

Aluminum, total	< 0.05	OG < 0.1	0.05	mg/L	2016-05-24	2016-05-25	
Antimony, total	< 0.001	MAC = 0.006	0.001	mg/L	2016-05-24	2016-05-25	
Arsenic, total	< 0.005	MAC = 0.01	0.005	mg/L	2016-05-24	2016-05-25	
Barium, total	< 0.05	MAC = 1	0.05	mg/L	2016-05-24	2016-05-25	
Beryllium, total	< 0.001	N/A	0.001	mg/L	2016-05-24	2016-05-25	
Boron, total	0.05	MAC = 5	0.04	mg/L	2016-05-24	2016-05-25	
Cadmium, total	< 0.0001	MAC = 0.005	0.0001	mg/L	2016-05-24	2016-05-25	
Calcium, total	109	N/A	2.0	mg/L	2016-05-24	2016-05-25	
Chromium, total	< 0.005	MAC = 0.05	0.005	mg/L	2016-05-24	2016-05-25	
Cobalt, total	< 0.0005	N/A	0.0005	mg/L	2016-05-24	2016-05-25	

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Sample ID: East #1 Well (6051366-03) [Water] Sampled: 2016-05-17 11:20, Continued

Total Recoverable Metals, Continued

Copper, total	< 0.002	AO ≤ 1	0.002	mg/L	2016-05-24	2016-05-25	
Iron, total	< 0.10	AO ≤ 0.3	0.10	mg/L	2016-05-24	2016-05-25	
Lead, total	< 0.001	MAC = 0.01	0.001	mg/L	2016-05-24	2016-05-25	
Magnesium, total	20.6	N/A	0.1	mg/L	2016-05-24	2016-05-25	
Manganese, total	< 0.002	AO ≤ 0.05	0.002	mg/L	2016-05-24	2016-05-25	
Mercury, total	< 0.00002	MAC = 0.001	0.00002	mg/L	2016-05-19	2016-05-24	
Molybdenum, total	0.004	N/A	0.001	mg/L	2016-05-24	2016-05-25	
Nickel, total	< 0.002	N/A	0.002	mg/L	2016-05-24	2016-05-25	
Phosphorus, total	< 0.2	N/A	0.2	mg/L	2016-05-24	2016-05-25	
Potassium, total	3.7	N/A	0.2	mg/L	2016-05-24	2016-05-25	
Selenium, total	< 0.005	MAC = 0.05	0.005	mg/L	2016-05-24	2016-05-25	
Silicon, total	11	N/A	5	mg/L	2016-05-24	2016-05-25	
Silver, total	< 0.0005	N/A	0.0005	mg/L	2016-05-24	2016-05-25	
Sodium, total	18.4	AO ≤ 200	0.2	mg/L	2016-05-24	2016-05-25	
Uranium, total	0.0033	MAC = 0.02	0.0002	mg/L	2016-05-24	2016-05-25	
Vanadium, total	< 0.01	N/A	0.01	mg/L	2016-05-24	2016-05-25	
Zinc, total	< 0.04	AO ≤ 5	0.04	mg/L	2016-05-24	2016-05-25	

Microbiological Parameters

Coliforms, Total	< 1	MAC = None Detected	1	CFU/100 mL	N/A	2016-05-18	
E. coli	< 1	MAC = None Detected	1	CFU/100 mL	N/A	2016-05-18	

Sample / Analysis Qualifiers:

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