

CERTIFICATE OF ANALYSIS

REPORTED TO Prince George, City of - Pump Station
1100 Patricia Boulevard
Prince George, BC V2L 3v9

ATTENTION Cheyenne Magee

PO NUMBER

PROJECT Raw Water - PW 601

PROJECT INFO [info]

WORK ORDER 23D1917

RECEIVED / TEMP 2023-04-19 09:45 / 11.3°C

REPORTED 2023-05-08 13:04

COC NUMBER No Number

Introduction:

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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 pmand@caro.ca

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TEST RESULTS

REPORTED TO PROJECT Prince George, City of - Pump Station
Raw Water - PW 601

WORK ORDER REPORTED 23D1917
2023-05-08 13:04

Analyte	Result	RL	Units	Analyzed	Qualifier
PW 601 (23D1917-01) Matrix: Water Sampled: 2023-04-18 12:00					
Anions					
Bromide	< 0.10	0.10	mg/L	2023-04-20	
Chloride	9.93	0.10	mg/L	2023-04-20	
Fluoride	< 0.10	0.10	mg/L	2023-04-20	
Nitrate (as N)	0.150	0.010	mg/L	2023-04-20	
Nitrite (as N)	< 0.010	0.010	mg/L	2023-04-20	
Phosphate (as P)	< 0.0050	0.0050	mg/L	2023-04-20	
Sulfate	14.1	1.0	mg/L	2023-04-20	
Calculated Parameters					
Total Trihalomethanes	< 0.00400	0.00400	mg/L	N/A	
Hardness, Dissolved (as CaCO3)	177	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	0.150	0.0100	mg/L	N/A	
Nitrogen, Total	0.150	0.0500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2023-04-23	
Antimony, dissolved	0.00022	0.00020	mg/L	2023-04-23	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2023-04-23	
Barium, dissolved	0.0287	0.0050	mg/L	2023-04-23	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2023-04-23	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2023-04-23	
Boron, dissolved	< 0.0500	0.0500	mg/L	2023-04-23	
Cadmium, dissolved	0.000014	0.000010	mg/L	2023-04-23	
Calcium, dissolved	47.4	0.20	mg/L	2023-04-23	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2023-04-23	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2023-04-23	
Copper, dissolved	0.00098	0.00040	mg/L	2023-04-23	
Iron, dissolved	< 0.010	0.010	mg/L	2023-04-23	
Lead, dissolved	< 0.00020	0.00020	mg/L	2023-04-23	
Lithium, dissolved	0.00127	0.00010	mg/L	2023-04-23	
Magnesium, dissolved	14.1	0.010	mg/L	2023-04-23	
Manganese, dissolved	0.0119	0.00020	mg/L	2023-04-23	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2023-04-24	
Molybdenum, dissolved	0.00116	0.00010	mg/L	2023-04-23	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2023-04-23	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2023-04-23	
Potassium, dissolved	1.72	0.10	mg/L	2023-04-23	
Selenium, dissolved	0.00161	0.00050	mg/L	2023-04-23	
Silicon, dissolved	6.4	1.0	mg/L	2023-04-23	
Silver, dissolved	< 0.000050	0.000050	mg/L	2023-04-23	
Sodium, dissolved	4.77	0.10	mg/L	2023-04-23	
Strontium, dissolved	0.207	0.0010	mg/L	2023-04-23	
Sulfur, dissolved	4.8	3.0	mg/L	2023-04-23	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2023-04-23	



TEST RESULTS

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Analyte	Result	RL	Units	Analyzed	Qualifier
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PW 601 (23D1917-01) | Matrix: Water | Sampled: 2023-04-18 12:00, Continued

Dissolved Metals, Continued

Thallium, dissolved	< 0.000020	0.000020	mg/L	2023-04-23	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2023-04-23	
Tin, dissolved	< 0.00020	0.00020	mg/L	2023-04-23	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2023-04-23	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2023-04-23	
Uranium, dissolved	0.000476	0.000020	mg/L	2023-04-23	
Vanadium, dissolved	< 0.0050	0.0050	mg/L	2023-04-23	
Zinc, dissolved	0.0046	0.0040	mg/L	2023-04-23	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2023-04-23	

General Parameters

Adsorbable Organic Halides	< 50	50	µg/L	2023-05-05	
Alkalinity, Total (as CaCO3)	162	1.0	mg/L	2023-04-20	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2023-04-20	
Alkalinity, Bicarbonate (as CaCO3)	162	1.0	mg/L	2023-04-20	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2023-04-20	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2023-04-20	
Ammonia, Total (as N)	< 0.050	0.050	mg/L	2023-04-20	
Carbon, Total Organic	1.54	0.50	mg/L	2023-04-19	
Nitrogen, Total Kjeldahl	< 0.050	0.050	mg/L	2023-04-21	
Solids, Total Suspended	< 2.0	2.0	mg/L	2023-04-21	

Microbiological Parameters

Coliforms, Total	< 1	1	CFU/100 mL	2023-04-19	
Coliforms, Fecal	< 1	1	CFU/100 mL	2023-04-19	
E. coli	< 1	1	CFU/100 mL	2023-04-19	

Total Metals

Aluminum, total	< 0.0050	0.0050	mg/L	2023-04-24	
Antimony, total	0.00022	0.00020	mg/L	2023-04-24	
Arsenic, total	< 0.00050	0.00050	mg/L	2023-04-24	
Barium, total	0.0280	0.0050	mg/L	2023-04-24	
Beryllium, total	< 0.00010	0.00010	mg/L	2023-04-24	
Bismuth, total	< 0.00010	0.00010	mg/L	2023-04-24	
Boron, total	< 0.0500	0.0500	mg/L	2023-04-24	
Cadmium, total	0.000013	0.000010	mg/L	2023-04-24	
Calcium, total	47.1	0.20	mg/L	2023-04-24	
Chromium, total	< 0.00050	0.00050	mg/L	2023-04-24	
Cobalt, total	< 0.00010	0.00010	mg/L	2023-04-24	
Copper, total	0.00097	0.00040	mg/L	2023-04-24	
Iron, total	< 0.010	0.010	mg/L	2023-04-24	
Lead, total	< 0.00020	0.00020	mg/L	2023-04-24	
Lithium, total	0.00130	0.00010	mg/L	2023-04-24	
Magnesium, total	13.0	0.010	mg/L	2023-04-24	



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Analyte	Result	RL	Units	Analyzed	Qualifier
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PW 601 (23D1917-01) | Matrix: Water | Sampled: 2023-04-18 12:00, Continued

Total Metals, Continued

Manganese, total	0.0121	0.00020	mg/L	2023-04-24	
Mercury, total	< 0.000010	0.000010	mg/L	2023-04-24	
Molybdenum, total	0.00125	0.00010	mg/L	2023-04-24	
Nickel, total	0.00065	0.00040	mg/L	2023-04-24	
Phosphorus, total	< 0.050	0.050	mg/L	2023-04-24	
Potassium, total	1.59	0.10	mg/L	2023-04-24	
Selenium, total	0.00153	0.00050	mg/L	2023-04-24	
Silicon, total	6.2	1.0	mg/L	2023-04-24	
Silver, total	< 0.000050	0.000050	mg/L	2023-04-24	
Sodium, total	4.51	0.10	mg/L	2023-04-24	
Strontium, total	0.199	0.0010	mg/L	2023-04-24	
Sulfur, total	4.9	3.0	mg/L	2023-04-24	
Tellurium, total	< 0.00050	0.00050	mg/L	2023-04-24	
Thallium, total	< 0.000020	0.000020	mg/L	2023-04-24	
Thorium, total	< 0.00010	0.00010	mg/L	2023-04-24	
Tin, total	< 0.00020	0.00020	mg/L	2023-04-24	
Titanium, total	< 0.0050	0.0050	mg/L	2023-04-24	
Tungsten, total	< 0.0010	0.0010	mg/L	2023-04-24	
Uranium, total	0.000524	0.000020	mg/L	2023-04-24	
Vanadium, total	< 0.0050	0.0050	mg/L	2023-04-24	
Zinc, total	< 0.0040	0.0040	mg/L	2023-04-24	
Zirconium, total	< 0.00010	0.00010	mg/L	2023-04-24	

Volatile Organic Compounds (VOC)

Bromodichloromethane	< 0.0010	0.0010	mg/L	2023-04-24	
Bromoform	< 0.0010	0.0010	mg/L	2023-04-24	
Chloroform	< 0.0010	0.0010	mg/L	2023-04-24	
Dibromochloromethane	< 0.0010	0.0010	mg/L	2023-04-24	
Surrogate: Toluene-d8	115	70-130	%	2023-04-24	
Surrogate: 4-Bromofluorobenzene	100	70-130	%	2023-04-24	



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Prince George, City of - Pump Station
Raw Water - PW 601

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Analysis Description	Method Ref.	Technique	Accredited	Location
Adsorbable Organic Halogen in Water	PAPTAC/ISO - low level	Adsorption, Coulometric Titration		Sublet
Alkalinity in Water	SM 2320 B* (2021)	Titration with H2SO4	✓	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2021)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Carbon, Total Organic in Water	SM 5310 B (2022)	Combustion, Infrared CO2 Detection	✓	Kelowna
Coliforms, Fecal in Water	SM 9222 D (2015)	Membrane Filtration / m-FC Agar	✓	Kelowna
Coliforms, Total in Water	SM 9222* (2015)	Membrane Filtration / Chromocult Agar	✓	Kelowna
Dissolved Metals in Water	EPA 200.8 / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
E. coli in Water	SM 9222* (2015)	Membrane Filtration / Chromocult Agar	✓	Kelowna
Hardness in Water	SM 2340 B (2021)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	✓	N/A
Mercury, dissolved in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	✓	Richmond
Mercury, total in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	✓	Richmond
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2021)	Block Digestion and Flow Injection Analysis	✓	Kelowna
Solids, Total Suspended in Water	Solids in Water, Filtered / SM 2540 D* (2020)	Solids in Water, Filtered / Gravimetry (Dried at 103-105C)	✓	Kelowna
Total Metals in Water	EPA 200.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
Trihalomethanes in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	✓	Richmond

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
CFU/100 mL	Colony Forming Units per 100 millilitres
mg/L	Milligrams per litre
µg/L	Micrograms per litre
EPA	United States Environmental Protection Agency Test Methods
PAPTAC	Pulp and Paper Technical Association of Canada Standard Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO Prince George, City of - Pump Station
PROJECT Raw Water - PW 601

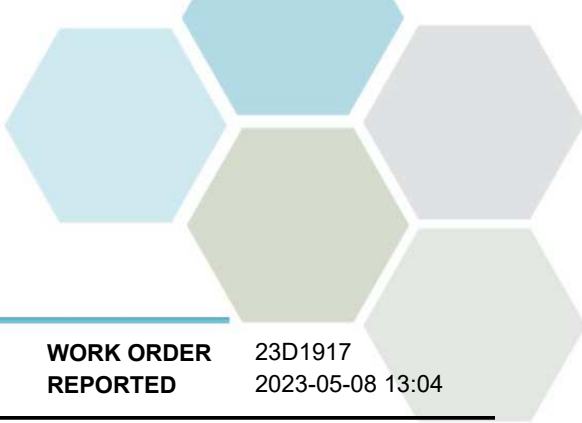
WORK ORDER 23D1917
REPORTED 2023-05-08 13:04

General Comments:

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APPENDIX 2: QUALITY CONTROL RESULTS

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The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk):** A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup):** An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS):** A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS):** A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM):** A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B3D1781									
Blank (B3D1781-BLK1)			Prepared: 2023-04-20, Analyzed: 2023-04-20						
Bromide	< 0.10	0.10 mg/L							
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 0.10	0.10 mg/L							
Nitrate (as N)	< 0.010	0.010 mg/L							
Nitrite (as N)	< 0.010	0.010 mg/L							
Phosphate (as P)	< 0.0050	0.0050 mg/L							
Sulfate	< 1.0	1.0 mg/L							
Blank (B3D1781-BLK2)			Prepared: 2023-04-20, Analyzed: 2023-04-20						
Bromide	< 0.10	0.10 mg/L							
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 0.10	0.10 mg/L							
Nitrate (as N)	< 0.010	0.010 mg/L							
Nitrite (as N)	< 0.010	0.010 mg/L							
Phosphate (as P)	< 0.0050	0.0050 mg/L							
Sulfate	< 1.0	1.0 mg/L							
LCS (B3D1781-BS1)			Prepared: 2023-04-20, Analyzed: 2023-04-20						
Bromide	4.04	0.10 mg/L	4.00		101	85-115			
Chloride	16.1	0.10 mg/L	16.0		101	90-110			
Fluoride	4.09	0.10 mg/L	4.00		102	88-108			
Nitrate (as N)	3.96	0.010 mg/L	4.00		99	90-110			
Nitrite (as N)	2.06	0.010 mg/L	2.00		103	85-115			
Phosphate (as P)	0.960	0.0050 mg/L	1.00		96	80-120			
Sulfate	16.1	1.0 mg/L	16.0		101	90-110			
LCS (B3D1781-BS2)			Prepared: 2023-04-20, Analyzed: 2023-04-20						
Bromide	4.09	0.10 mg/L	4.00		102	85-115			
Chloride	16.1	0.10 mg/L	16.0		101	90-110			
Fluoride	4.15	0.10 mg/L	4.00		104	88-108			
Nitrate (as N)	3.95	0.010 mg/L	4.00		99	90-110			
Nitrite (as N)	2.09	0.010 mg/L	2.00		104	85-115			
Phosphate (as P)	1.07	0.0050 mg/L	1.00		107	80-120			
Sulfate	16.2	1.0 mg/L	16.0		101	90-110			

Dissolved Metals, Batch B3D2049



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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Dissolved Metals, Batch B3D2049, Continued

Blank (B3D2049-BLK1)

Prepared: 2023-04-23, Analyzed: 2023-04-23

Aluminum, dissolved	< 0.0050	0.0050 mg/L							
Antimony, dissolved	< 0.00020	0.00020 mg/L							
Arsenic, dissolved	< 0.00050	0.00050 mg/L							
Barium, dissolved	< 0.0050	0.0050 mg/L							
Beryllium, dissolved	< 0.00010	0.00010 mg/L							
Bismuth, dissolved	< 0.00010	0.00010 mg/L							
Boron, dissolved	< 0.0500	0.0500 mg/L							
Cadmium, dissolved	< 0.000010	0.000010 mg/L							
Calcium, dissolved	< 0.20	0.20 mg/L							
Chromium, dissolved	< 0.00050	0.00050 mg/L							
Cobalt, dissolved	< 0.00010	0.00010 mg/L							
Copper, dissolved	< 0.00040	0.00040 mg/L							
Iron, dissolved	< 0.010	0.010 mg/L							
Lead, dissolved	< 0.00020	0.00020 mg/L							
Lithium, dissolved	< 0.00010	0.00010 mg/L							
Magnesium, dissolved	< 0.010	0.010 mg/L							
Manganese, dissolved	< 0.00020	0.00020 mg/L							
Molybdenum, dissolved	< 0.00010	0.00010 mg/L							
Nickel, dissolved	< 0.00040	0.00040 mg/L							
Phosphorus, dissolved	< 0.050	0.050 mg/L							
Potassium, dissolved	< 0.10	0.10 mg/L							
Selenium, dissolved	< 0.00050	0.00050 mg/L							
Silicon, dissolved	< 1.0	1.0 mg/L							
Silver, dissolved	< 0.000050	0.000050 mg/L							
Sodium, dissolved	< 0.10	0.10 mg/L							
Strontium, dissolved	< 0.0010	0.0010 mg/L							
Sulfur, dissolved	< 3.0	3.0 mg/L							
Tellurium, dissolved	< 0.00050	0.00050 mg/L							
Thallium, dissolved	< 0.000020	0.000020 mg/L							
Thorium, dissolved	< 0.00010	0.00010 mg/L							
Tin, dissolved	< 0.00020	0.00020 mg/L							
Titanium, dissolved	< 0.0050	0.0050 mg/L							
Tungsten, dissolved	< 0.0010	0.0010 mg/L							
Uranium, dissolved	< 0.000020	0.000020 mg/L							
Vanadium, dissolved	< 0.0050	0.0050 mg/L							
Zinc, dissolved	< 0.0040	0.0040 mg/L							
Zirconium, dissolved	< 0.00010	0.00010 mg/L							

LCS (B3D2049-BS1)

Prepared: 2023-04-23, Analyzed: 2023-04-23

Aluminum, dissolved	4.06	0.0050 mg/L	4.00	102	80-120
Antimony, dissolved	0.0411	0.00020 mg/L	0.0400	103	80-120
Arsenic, dissolved	0.415	0.00050 mg/L	0.400	104	80-120
Barium, dissolved	0.0393	0.0050 mg/L	0.0400	98	80-120
Beryllium, dissolved	0.0410	0.00010 mg/L	0.0400	103	80-120
Bismuth, dissolved	0.0406	0.00010 mg/L	0.0400	102	80-120
Boron, dissolved	0.413	0.0500 mg/L	0.400	103	80-120
Cadmium, dissolved	0.0395	0.000010 mg/L	0.0400	99	80-120
Calcium, dissolved	4.07	0.20 mg/L	4.00	102	80-120
Chromium, dissolved	0.0410	0.00050 mg/L	0.0400	103	80-120
Cobalt, dissolved	0.0411	0.00010 mg/L	0.0400	103	80-120
Copper, dissolved	0.0417	0.00040 mg/L	0.0400	104	80-120
Iron, dissolved	4.25	0.010 mg/L	4.00	106	80-120
Lead, dissolved	0.0401	0.00020 mg/L	0.0400	100	80-120
Lithium, dissolved	0.0408	0.00010 mg/L	0.0400	102	80-120
Magnesium, dissolved	4.21	0.010 mg/L	4.00	105	80-120
Manganese, dissolved	0.0407	0.00020 mg/L	0.0400	102	80-120



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Prince George, City of - Pump Station
Raw Water - PW 601

WORK ORDER REPORTED 23D1917
2023-05-08 13:04

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B3D2049, Continued									
LCS (B3D2049-BS1), Continued					Prepared: 2023-04-23, Analyzed: 2023-04-23				
Molybdenum, dissolved	0.0385	0.00010 mg/L	0.0400		96	80-120			
Nickel, dissolved	0.0404	0.00040 mg/L	0.0400		101	80-120			
Phosphorus, dissolved	4.16	0.050 mg/L	4.00		104	80-120			
Potassium, dissolved	4.14	0.10 mg/L	4.00		103	80-120			
Selenium, dissolved	0.407	0.00050 mg/L	0.400		102	80-120			
Silicon, dissolved	4.2	1.0 mg/L	4.00		106	80-120			
Silver, dissolved	0.0404	0.000050 mg/L	0.0400		101	80-120			
Sodium, dissolved	4.08	0.10 mg/L	4.00		102	80-120			
Strontium, dissolved	0.0408	0.0010 mg/L	0.0400		102	80-120			
Sulfur, dissolved	40.5	3.0 mg/L	40.0		101	80-120			
Tellurium, dissolved	0.0406	0.00050 mg/L	0.0400		102	80-120			
Thallium, dissolved	0.0405	0.000020 mg/L	0.0400		101	80-120			
Thorium, dissolved	0.0413	0.00010 mg/L	0.0400		103	80-120			
Tin, dissolved	0.0394	0.00020 mg/L	0.0400		99	80-120			
Titanium, dissolved	0.0408	0.0050 mg/L	0.0400		102	80-120			
Tungsten, dissolved	0.0405	0.0010 mg/L	0.0400		101	80-120			
Uranium, dissolved	0.0410	0.000020 mg/L	0.0400		102	80-120			
Vanadium, dissolved	0.0407	0.0050 mg/L	0.0400		102	80-120			
Zinc, dissolved	0.415	0.0040 mg/L	0.400		104	80-120			
Zirconium, dissolved	0.0401	0.00010 mg/L	0.0400		100	80-120			

Matrix Spike (B3D2049-MS1)		Source: 23D1917-01		Prepared: 2023-04-23, Analyzed: 2023-04-23					
Aluminum, dissolved	4.20	0.0050 mg/L	4.00	< 0.0050	105	70-130			
Antimony, dissolved	0.0410	0.00020 mg/L	0.0400	0.00022	102	70-130			
Arsenic, dissolved	0.432	0.00050 mg/L	0.400	0.00050	108	70-130			
Barium, dissolved	0.0704	0.0050 mg/L	0.0400	0.0287	104	70-130			
Beryllium, dissolved	0.0429	0.00010 mg/L	0.0400	< 0.00010	107	70-130			
Bismuth, dissolved	0.0316	0.00010 mg/L	0.0400	< 0.00010	79	70-130			
Boron, dissolved	0.397	0.0500 mg/L	0.400	< 0.0500	98	70-130			
Cadmium, dissolved	0.0418	0.000010 mg/L	0.0400	0.000014	105	70-130			
Calcium, dissolved	49.7	0.20 mg/L	4.00	47.4	58	70-130			MS2
Chromium, dissolved	0.0417	0.00050 mg/L	0.0400	< 0.00050	104	70-130			
Cobalt, dissolved	0.0406	0.00010 mg/L	0.0400	< 0.00010	101	70-130			
Copper, dissolved	0.0414	0.00040 mg/L	0.0400	0.00098	101	70-130			
Iron, dissolved	4.22	0.010 mg/L	4.00	< 0.010	105	70-130			
Lead, dissolved	0.0411	0.00020 mg/L	0.0400	< 0.00020	103	70-130			
Lithium, dissolved	0.0434	0.00010 mg/L	0.0400	0.00127	105	70-130			
Magnesium, dissolved	17.8	0.010 mg/L	4.00	14.1	91	70-130			
Manganese, dissolved	0.0527	0.00020 mg/L	0.0400	0.0119	102	70-130			
Molybdenum, dissolved	0.0423	0.00010 mg/L	0.0400	0.00116	103	70-130			
Nickel, dissolved	0.0402	0.00040 mg/L	0.0400	< 0.00040	100	70-130			
Phosphorus, dissolved	4.37	0.050 mg/L	4.00	< 0.050	109	70-130			
Potassium, dissolved	5.94	0.10 mg/L	4.00	1.72	105	70-130			
Selenium, dissolved	0.430	0.00050 mg/L	0.400	0.00161	107	70-130			
Silicon, dissolved	10.8	1.0 mg/L	4.00	6.4	109	70-130			
Silver, dissolved	0.0407	0.000050 mg/L	0.0400	< 0.000050	102	70-130			
Sodium, dissolved	8.75	0.10 mg/L	4.00	4.77	99	70-130			
Strontium, dissolved	0.241	0.0010 mg/L	0.0400	0.207	85	70-130			
Sulfur, dissolved	47.5	3.0 mg/L	40.0	4.8	107	70-130			
Tellurium, dissolved	0.0415	0.00050 mg/L	0.0400	< 0.00050	104	70-130			
Thallium, dissolved	0.0416	0.000020 mg/L	0.0400	< 0.000020	104	70-130			
Thorium, dissolved	0.0415	0.00010 mg/L	0.0400	< 0.00010	104	70-130			
Tin, dissolved	0.0440	0.00020 mg/L	0.0400	< 0.00020	110	70-130			
Titanium, dissolved	0.0431	0.0050 mg/L	0.0400	< 0.0050	108	70-130			
Tungsten, dissolved	0.0420	0.0010 mg/L	0.0400	< 0.0010	105	70-130			
Uranium, dissolved	0.0441	0.000020 mg/L	0.0400	0.000476	109	70-130			



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Prince George, City of - Pump Station
Raw Water - PW 601

WORK ORDER REPORTED 23D1917
2023-05-08 13:04

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Dissolved Metals, Batch B3D2049, Continued

Matrix Spike (B3D2049-MS1), Continued		Source: 23D1917-01		Prepared: 2023-04-23, Analyzed: 2023-04-23					
Vanadium, dissolved	0.0432	0.0050 mg/L	0.0400	< 0.0050	106	70-130			
Zinc, dissolved	0.421	0.0040 mg/L	0.400	0.0046	104	70-130			
Zirconium, dissolved	0.0449	0.00010 mg/L	0.0400	< 0.00010	112	70-130			

Dissolved Metals, Batch B3D2141

Blank (B3D2141-BLK1)		Prepared: 2023-04-24, Analyzed: 2023-04-24							
Mercury, dissolved	< 0.000010	0.000010 mg/L							
LCS (B3D2141-BS1)		Prepared: 2023-04-24, Analyzed: 2023-04-24							
Mercury, dissolved	0.000234	0.000010 mg/L	0.000250		94	80-120			
Matrix Spike (B3D2141-MS1)		Source: 23D1917-01		Prepared: 2023-04-24, Analyzed: 2023-04-24					
Mercury, dissolved	0.000233	0.000010 mg/L	0.000250	< 0.000010	93	70-130			

General Parameters, Batch B3D1469

Blank (B3D1469-BLK1)		Prepared: 2023-04-18, Analyzed: 2023-04-18							
Carbon, Total Organic	< 0.50	0.50 mg/L							
Blank (B3D1469-BLK2)		Prepared: 2023-04-18, Analyzed: 2023-04-18							
Carbon, Total Organic	< 0.50	0.50 mg/L							
Blank (B3D1469-BLK3)		Prepared: 2023-04-19, Analyzed: 2023-04-19							
Carbon, Total Organic	< 0.50	0.50 mg/L							
LCS (B3D1469-BS1)		Prepared: 2023-04-18, Analyzed: 2023-04-18							
Carbon, Total Organic	9.69	0.50 mg/L	10.0		97	78-116			
LCS (B3D1469-BS2)		Prepared: 2023-04-18, Analyzed: 2023-04-18							
Carbon, Total Organic	9.86	0.50 mg/L	10.0		99	78-116			
LCS (B3D1469-BS3)		Prepared: 2023-04-19, Analyzed: 2023-04-19							
Carbon, Total Organic	10.4	0.50 mg/L	10.0		104	78-116			

General Parameters, Batch B3D1766

Blank (B3D1766-BLK1)		Prepared: 2023-04-20, Analyzed: 2023-04-21							
Solids, Total Suspended	< 2.0	2.0 mg/L							
Blank (B3D1766-BLK2)		Prepared: 2023-04-20, Analyzed: 2023-04-21							
Solids, Total Suspended	< 2.0	2.0 mg/L							
LCS (B3D1766-BS1)		Prepared: 2023-04-20, Analyzed: 2023-04-21							
Solids, Total Suspended	98.0	10.0 mg/L	100		98	85-115			
LCS (B3D1766-BS2)		Prepared: 2023-04-20, Analyzed: 2023-04-21							
Solids, Total Suspended	104	10.1 mg/L	100		104	85-115			

General Parameters, Batch B3D1778

Blank (B3D1778-BLK1)		Prepared: 2023-04-20, Analyzed: 2023-04-20							
Ammonia, Total (as N)	< 0.050	0.050 mg/L							
Blank (B3D1778-BLK2)		Prepared: 2023-04-20, Analyzed: 2023-04-20							
Ammonia, Total (as N)	< 0.050	0.050 mg/L							



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REPORTED TO PROJECT Prince George, City of - Pump Station
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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B3D1778, Continued									
Blank (B3D1778-BLK3)			Prepared: 2023-04-20, Analyzed: 2023-04-20						
Ammonia, Total (as N)	< 0.050	0.050 mg/L							
LCS (B3D1778-BS1)			Prepared: 2023-04-20, Analyzed: 2023-04-20						
Ammonia, Total (as N)	0.994	0.050 mg/L	1.00		99	85-115			
LCS (B3D1778-BS2)			Prepared: 2023-04-20, Analyzed: 2023-04-20						
Ammonia, Total (as N)	0.988	0.050 mg/L	1.00		99	85-115			
LCS (B3D1778-BS3)			Prepared: 2023-04-20, Analyzed: 2023-04-20						
Ammonia, Total (as N)	0.995	0.050 mg/L	1.00		100	85-115			
General Parameters, Batch B3D1816									
Blank (B3D1816-BLK1)			Prepared: 2023-04-20, Analyzed: 2023-04-21						
Nitrogen, Total Kjeldahl	< 0.050	0.050 mg/L							
Blank (B3D1816-BLK2)			Prepared: 2023-04-20, Analyzed: 2023-04-21						
Nitrogen, Total Kjeldahl	< 0.050	0.050 mg/L							
LCS (B3D1816-BS1)			Prepared: 2023-04-20, Analyzed: 2023-04-21						
Nitrogen, Total Kjeldahl	1.08	0.050 mg/L	1.00		108	85-115			
LCS (B3D1816-BS2)			Prepared: 2023-04-20, Analyzed: 2023-04-21						
Nitrogen, Total Kjeldahl	1.07	0.050 mg/L	1.00		107	85-115			
General Parameters, Batch B3D1834									
Blank (B3D1834-BLK1)			Prepared: 2023-04-20, Analyzed: 2023-04-20						
Alkalinity, Total (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Bicarbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L							
LCS (B3D1834-BS1)			Prepared: 2023-04-20, Analyzed: 2023-04-20						
Alkalinity, Total (as CaCO ₃)	94.2	1.0 mg/L	100		94	80-120			
Microbiological Parameters, Batch B3D1600									
Blank (B3D1600-BLK1)			Prepared: 2023-04-19, Analyzed: 2023-04-19						
Coliforms, Total	< 1	1 CFU/100 mL							
E. coli	< 1	1 CFU/100 mL							
Blank (B3D1600-BLK2)			Prepared: 2023-04-19, Analyzed: 2023-04-19						
Coliforms, Total	< 1	1 CFU/100 mL							
E. coli	< 1	1 CFU/100 mL							
Blank (B3D1600-BLK3)			Prepared: 2023-04-19, Analyzed: 2023-04-19						
Coliforms, Total	< 1	1 CFU/100 mL							
E. coli	< 1	1 CFU/100 mL							
Blank (B3D1600-BLK4)			Prepared: 2023-04-19, Analyzed: 2023-04-19						
Coliforms, Total	< 1	1 CFU/100 mL							
E. coli	< 1	1 CFU/100 mL							



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REPORTED TO PROJECT Prince George, City of - Pump Station
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WORK ORDER REPORTED 23D1917
2023-05-08 13:04

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Microbiological Parameters, Batch B3D1600, Continued

Blank (B3D1600-BLK5)				Prepared: 2023-04-19, Analyzed: 2023-04-19					
Coliforms, Total	< 1	1 CFU/100 mL							
E. coli	< 1	1 CFU/100 mL							
Blank (B3D1600-BLK6)				Prepared: 2023-04-19, Analyzed: 2023-04-19					
Coliforms, Total	< 1	1 CFU/100 mL							
E. coli	< 1	1 CFU/100 mL							
Blank (B3D1600-BLK7)				Prepared: 2023-04-19, Analyzed: 2023-04-19					
Coliforms, Total	< 1	1 CFU/100 mL							
E. coli	< 1	1 CFU/100 mL							
Blank (B3D1600-BLK8)				Prepared: 2023-04-19, Analyzed: 2023-04-19					
Coliforms, Total	< 1	1 CFU/100 mL							
E. coli	< 1	1 CFU/100 mL							
Blank (B3D1600-BLK9)				Prepared: 2023-04-19, Analyzed: 2023-04-19					
Coliforms, Total	< 1	1 CFU/100 mL							
E. coli	< 1	1 CFU/100 mL							
Blank (B3D1600-BLKA)				Prepared: 2023-04-19, Analyzed: 2023-04-19					
Coliforms, Total	< 1	1 CFU/100 mL							
E. coli	< 1	1 CFU/100 mL							
Blank (B3D1600-BLKB)				Prepared: 2023-04-19, Analyzed: 2023-04-19					
Coliforms, Total	< 1	1 CFU/100 mL							
E. coli	< 1	1 CFU/100 mL							
Blank (B3D1600-BLKC)				Prepared: 2023-04-19, Analyzed: 2023-04-19					
Coliforms, Total	< 1	1 CFU/100 mL							
E. coli	< 1	1 CFU/100 mL							

Microbiological Parameters, Batch B3D1689

Blank (B3D1689-BLK1)				Prepared: 2023-04-19, Analyzed: 2023-04-19					
Coliforms, Fecal	< 1	1 CFU/100 mL							

Total Metals, Batch B3D2122

Blank (B3D2122-BLK1)				Prepared: 2023-04-24, Analyzed: 2023-04-24					
Aluminum, total	< 0.0050	0.0050 mg/L							
Antimony, total	< 0.00020	0.00020 mg/L							
Arsenic, total	< 0.00050	0.00050 mg/L							
Barium, total	< 0.0050	0.0050 mg/L							
Beryllium, total	< 0.00010	0.00010 mg/L							
Bismuth, total	< 0.00010	0.00010 mg/L							
Boron, total	< 0.0500	0.0500 mg/L							
Cadmium, total	< 0.000010	0.000010 mg/L							
Calcium, total	< 0.20	0.20 mg/L							
Chromium, total	< 0.00050	0.00050 mg/L							
Cobalt, total	< 0.00010	0.00010 mg/L							
Copper, total	< 0.00040	0.00040 mg/L							
Iron, total	< 0.010	0.010 mg/L							
Lead, total	< 0.00020	0.00020 mg/L							
Lithium, total	< 0.00010	0.00010 mg/L							
Magnesium, total	< 0.010	0.010 mg/L							
Manganese, total	< 0.00020	0.00020 mg/L							



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Prince George, City of - Pump Station
Raw Water - PW 601

WORK ORDER REPORTED 23D1917
2023-05-08 13:04

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B3D2122, Continued									
Blank (B3D2122-BLK1), Continued					Prepared: 2023-04-24, Analyzed: 2023-04-24				
Molybdenum, total	< 0.00010	0.00010 mg/L							
Nickel, total	< 0.00040	0.00040 mg/L							
Phosphorus, total	< 0.050	0.050 mg/L							
Potassium, total	< 0.10	0.10 mg/L							
Selenium, total	< 0.00050	0.00050 mg/L							
Silicon, total	< 1.0	1.0 mg/L							
Silver, total	< 0.000050	0.000050 mg/L							
Sodium, total	< 0.10	0.10 mg/L							
Strontium, total	< 0.0010	0.0010 mg/L							
Sulfur, total	< 3.0	3.0 mg/L							
Tellurium, total	< 0.00050	0.00050 mg/L							
Thallium, total	< 0.000020	0.000020 mg/L							
Thorium, total	< 0.00010	0.00010 mg/L							
Tin, total	< 0.00020	0.00020 mg/L							
Titanium, total	< 0.0050	0.0050 mg/L							
Tungsten, total	< 0.0010	0.0010 mg/L							
Uranium, total	< 0.000020	0.000020 mg/L							
Vanadium, total	< 0.0050	0.0050 mg/L							
Zinc, total	< 0.0040	0.0040 mg/L							
Zirconium, total	< 0.00010	0.00010 mg/L							

LCS (B3D2122-BS1)					Prepared: 2023-04-24, Analyzed: 2023-04-24				
Aluminum, total	4.09	0.0050 mg/L	4.00		102	80-120			
Antimony, total	0.0409	0.00020 mg/L	0.0400		102	80-120			
Arsenic, total	0.411	0.00050 mg/L	0.400		103	80-120			
Barium, total	0.0411	0.0050 mg/L	0.0400		103	80-120			
Beryllium, total	0.0412	0.00010 mg/L	0.0400		103	80-120			
Bismuth, total	0.0389	0.00010 mg/L	0.0400		97	80-120			
Boron, total	0.428	0.0500 mg/L	0.400		107	80-120			
Cadmium, total	0.0404	0.000010 mg/L	0.0400		101	80-120			
Calcium, total	4.15	0.20 mg/L	4.00		104	80-120			
Chromium, total	0.0413	0.00050 mg/L	0.0400		103	80-120			
Cobalt, total	0.0416	0.00010 mg/L	0.0400		104	80-120			
Copper, total	0.0416	0.00040 mg/L	0.0400		104	80-120			
Iron, total	4.18	0.010 mg/L	4.00		104	80-120			
Lead, total	0.0399	0.00020 mg/L	0.0400		100	80-120			
Lithium, total	0.0409	0.00010 mg/L	0.0400		102	80-120			
Magnesium, total	4.11	0.010 mg/L	4.00		103	80-120			
Manganese, total	0.0414	0.00020 mg/L	0.0400		103	80-120			
Molybdenum, total	0.0397	0.00010 mg/L	0.0400		99	80-120			
Nickel, total	0.0411	0.00040 mg/L	0.0400		103	80-120			
Phosphorus, total	4.10	0.050 mg/L	4.00		102	80-120			
Potassium, total	4.13	0.10 mg/L	4.00		103	80-120			
Selenium, total	0.419	0.00050 mg/L	0.400		105	80-120			
Silicon, total	4.4	1.0 mg/L	4.00		109	80-120			
Silver, total	0.0423	0.000050 mg/L	0.0400		106	80-120			
Sodium, total	4.06	0.10 mg/L	4.00		101	80-120			
Strontium, total	0.0413	0.0010 mg/L	0.0400		103	80-120			
Sulfur, total	41.9	3.0 mg/L	40.0		105	80-120			
Tellurium, total	0.0393	0.00050 mg/L	0.0400		98	80-120			
Thallium, total	0.0396	0.000020 mg/L	0.0400		99	80-120			
Thorium, total	0.0405	0.00010 mg/L	0.0400		101	80-120			
Tin, total	0.0422	0.00020 mg/L	0.0400		105	80-120			
Titanium, total	0.0419	0.0050 mg/L	0.0400		105	80-120			
Tungsten, total	0.0399	0.0010 mg/L	0.0400		100	80-120			
Uranium, total	0.0408	0.000020 mg/L	0.0400		102	80-120			



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Prince George, City of - Pump Station
Raw Water - PW 601

WORK ORDER REPORTED 23D1917
2023-05-08 13:04

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B3D2122, Continued									
LCS (B3D2122-BS1), Continued				Prepared: 2023-04-24, Analyzed: 2023-04-24					
Vanadium, total	0.0407	0.0050 mg/L	0.0400		102	80-120			
Zinc, total	0.411	0.0040 mg/L	0.400		103	80-120			
Zirconium, total	0.0418	0.00010 mg/L	0.0400		104	80-120			

Total Metals, Batch B3D2142

Blank (B3D2142-BLK1)				Prepared: 2023-04-24, Analyzed: 2023-04-24					
Mercury, total	< 0.000010	0.000010 mg/L							
Blank (B3D2142-BLK2)				Prepared: 2023-04-24, Analyzed: 2023-04-24					
Mercury, total	< 0.000010	0.000010 mg/L							
LCS (B3D2142-BS1)				Prepared: 2023-04-24, Analyzed: 2023-04-24					
Mercury, total	0.000229	0.000010 mg/L	0.000250		92	80-120			
LCS (B3D2142-BS2)				Prepared: 2023-04-24, Analyzed: 2023-04-24					
Mercury, total	0.000263	0.000010 mg/L	0.000250		105	80-120			
Matrix Spike (B3D2142-MS1)				Source: 23D1917-01		Prepared: 2023-04-24, Analyzed: 2023-04-24			
Mercury, total	0.000261	0.000010 mg/L	0.000250	< 0.000010	105	70-130			

Volatile Organic Compounds (VOC), Batch B3D2098

Blank (B3D2098-BLK1)				Prepared: 2023-04-23, Analyzed: 2023-04-23					
Bromodichloromethane	< 0.0010	0.0010 mg/L							
Bromoform	< 0.0010	0.0010 mg/L							
Chloroform	< 0.0010	0.0010 mg/L							
Dibromochloromethane	< 0.0010	0.0010 mg/L							
Surrogate: Toluene-d8	0.0259	mg/L	0.0250		104	70-130			
Surrogate: 4-Bromofluorobenzene	0.0241	mg/L	0.0249		97	70-130			

QC Qualifiers:

MS2 The native sample concentration is greater than the spike concentration hence the matrix spike limits do not apply.