

City of Merritt Community Water System Annual Report

2012

Prepared by Kevin Vilac, Chief Operator



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Introduction

The City of Merritt is the purveyor of drinking water to users connected to the City of Merritt Community Water System. This report is provided to City Council and Interior Health for their information, and in fulfillment of the City's obligations under the Provincial Drinking Water Act and associated regulations, as well as the terms and conditions of the City's Water System Operating Permit. Enforcement of the regulations and issuance of water system permits is the responsibility of the Interior Health Authority's Drinking Water Officer.

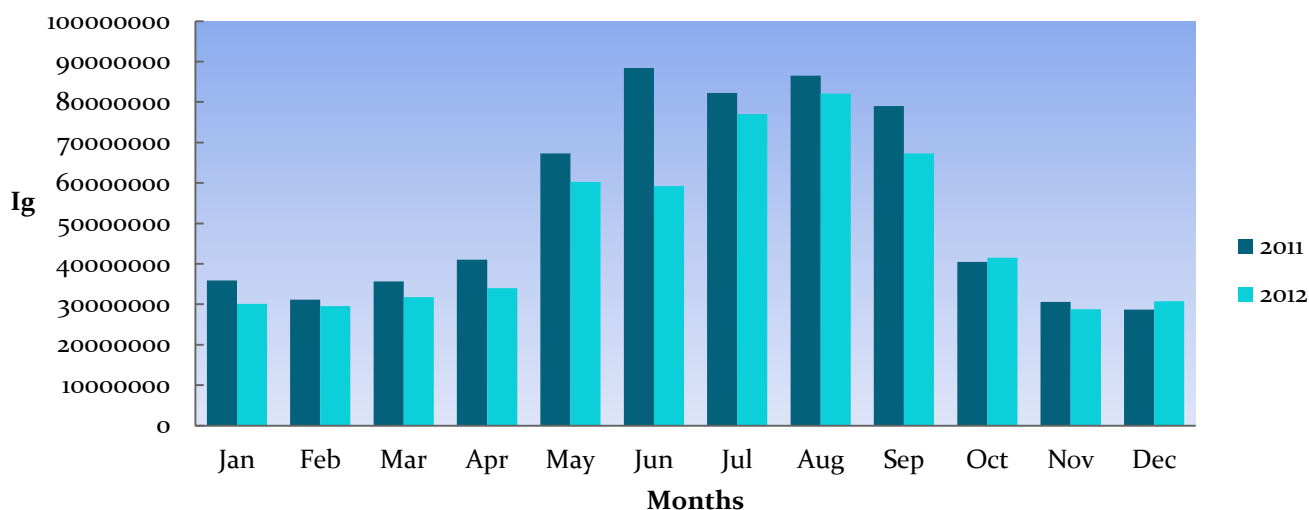
Water Consumption

Raw water for the City of Merritt water system is extracted from an aquifer through five pump stations. The aquifer provided the 582,806,000 Imperial Gallons (IG) (2,649,118,000 liters) of water consumed within the Merritt system in 2012. This represents a 9.9% decrease in overall water consumption from 2011. Maximum daily water demand peaked at 3,224,749 IG (14,660,000 liters) on Aug 16, 2012, while minimum daily demand occurred on Jan 8, 2012 at 781,550 IG (3,553,000 liters).

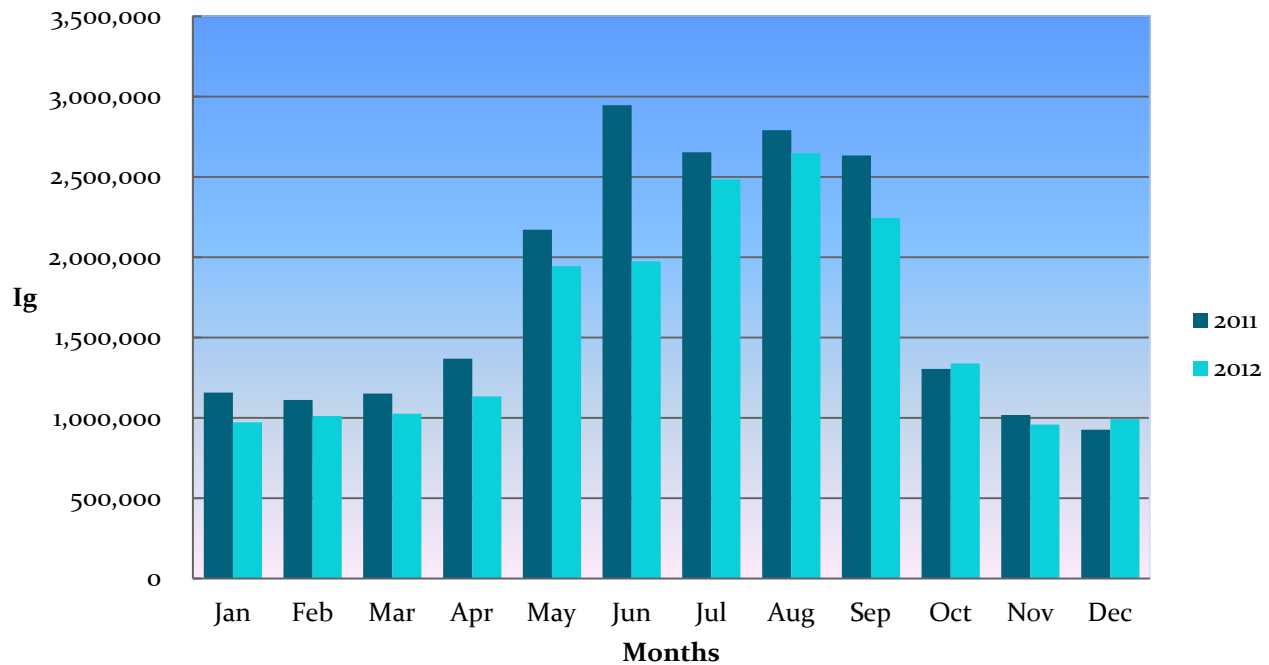
Water consumption in Merritt in 2012 averaged 1,592,366 IG (7,239,039 Liters) per day. The maximum day (Aug 16th) water consumption was 403 IG (1,832 liters) per person, while the minimum day (Jan 8th) consumption was 98 IG (444 liters) per person. The average was 199 IG (905 liters) per person in Merritt each and every day of the year (based a population of 8000); average daily consumption in Canada is only 72.4 IG (329 liters) per person.

To achieve future reduced water usage the enforcement of sprinkling and excess water usage will be a main priority. This will be increasingly important to enforce in 2013 as the city continues to grow.

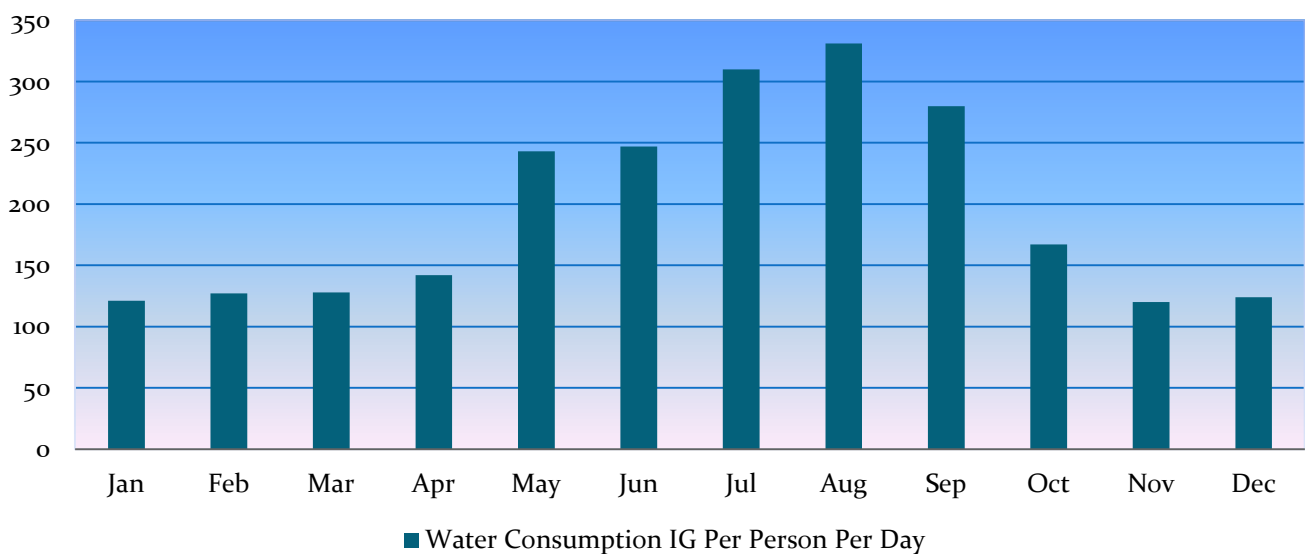
Total Water Use 2011-2012



Average Daily Water Use



Water Consumption Per Person Per Day





South East Balancing Reservoir

Water Storage

Water storage capacity is just over 7.7 million litres between four reservoirs named, Nicola, Grimmatt, Grandview and South East Balancing reservoir. In 2011 Grimmatt and Nicola reservoirs were cleaned and inspected. Considering it had been 9 years between cleanings they were both very clean. The only problem found was a deteriorated drain rod in Nicola reservoir which was replaced. On May 6 2011 the South East Balancing reservoir was put online. Merritt's distribution system accounts for another approximate 1.5 million litres. Distribution piping sizes range from 100mm to 350mm - approx. 69 kms in total length.

Water Production

All four production water wells are located within the deepest part of the aquifer. Kengard is drilled into a different aquifer.

Voght Park #1 - 250hp – rated at 125 L/sec.

Voght Park #2 Gas/Elec. – 200hp – rated 112 L/sec on electric power and 59 L/sec on gas power.

Fairley Park - 100hp – rated at 76 L/sec.

Collettville - 125hp – rated at 56 L/sec.

Kengard – 100hp – rated at 50 L/sec.

In the event of a power outage the Voght Park #2 Gas/Electric is the city's only pump that can be run under its own power.

Well depths range from 29.8m at Fairley Park to 135m below ground surface at Kengard.



Kengard Pump House

Source Water Quality

The coarse composition of the aquifer suggests the aquifer is unconfined - (the aquifer is not pressurized or capped), and therefore is very vulnerable to contamination. The City has enjoyed a high quality source of water for many years. However considering the vulnerability, distance from the Coldwater River, depths of the wells and an unconfined aquifer our water sources are rated as Ground Water Under Direct Influence from Surface Water (GUDI) therefore we have ongoing plans to protect the aquifer and the area around it. We have placed signage over the aquifer to let the public know where it is located in efforts to help protect the aquifer.

Source water is tested a number of times each year for a variety of characteristics from the presence of metals or chemicals to its clarity (turbidity), acidity, base (pH) and temperature. A complete list of the test elements is included as Appendix 'A' to this report and the 2012 Caro lab report is in Appendix "B". The quality of the City's raw water source is indicated by the fact that none of the tested parameters exceed the limits of regulated, or generally accepted, standards for raw water quality.

Source Water Disinfection

We are continuing our chlorination program with the City of Merritt's water system. Each pump house is outfitted with equipment to inject 12% sodium hypochlorite (bleach) in the raw water being drawn out of our aquifer. The raw water leaving each pump station has been tested and consumes approximately 0.4 mg/l of hypochlorite. With vigorous testing at many different points along our system and staying within the minimum requirements set out by Interior Health we are injecting approximately 0.9 mg/l to see approximately 0.5 mg/l free chlorine residual at the far ends of our system. This will vary due to the condition of piping and length of time before the water is used.



Kengard Disinfection

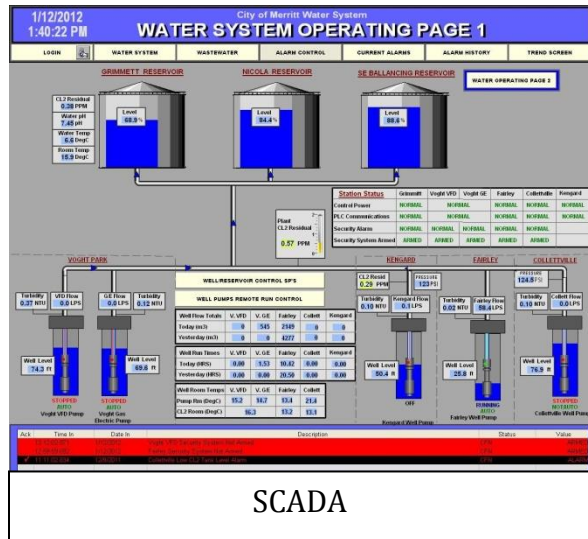
The addition of chlorine was used to satisfy a requirement of Interior Health in 2008 to help safeguard our drinking water supply. Interior Health requested we protect our water supply and distribution system because our GUDI rating of the shallow and unconfined (not pressurized or capped) aquifer the city uses. Chlorine injection was used to give the City of Merritt residents and all other users of our system the confidence of a clean safe drinking water.

Quality Monitoring

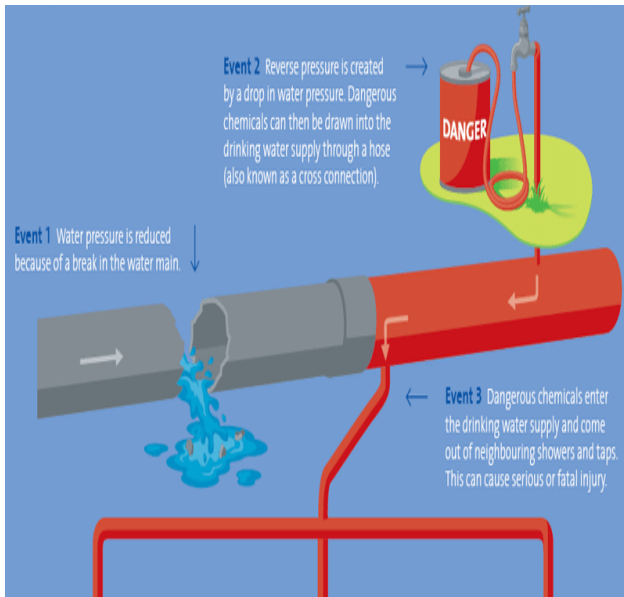
Drinking water delivered to users of the city system is subject to a comprehensive and rigorous testing program that ensures quality drinking water.

Water samples from five separate locations within the system were sent in 2011, on a weekly basis, to the *Caro Environmental Services* laboratories to be tested for the presence/absence of E.coli and total coliform bacteria. City staff draws these samples and sends them to Caro the Kelowna laboratory. City staff also when drawing these samples for the lab perform chlorine residual testing to ensure proper levels of chlorine are maintained throughout the city. Lab results are downloaded by Caro directly into the City's WaterTrax® system and emailed to the Chief Operator and Cross Connection Control Officer for review.

The standard protocol when a water sample is found to contain the presence of Coliform (an early indicator that we could have a problem arising), however minute, is to flush and resample the water immediately at the same location and resubmit for testing. The provincial Drinking Water Officer will determine if any action by the purveyor is necessary, if the sample shows the presence of Coliform or any other abnormality in the water.



All five wells, pumps and reservoirs are monitored 24/7 with our water quality monitoring devices. These devices will monitor in real time flow, temperature, turbidity, PH and chlorine residual. The quality control and accuracy of monitoring will greatly increase with these devices on line. All information from the different stations is sent back to the central computer system (SCADA) at the Wastewater Treatment Plant for monitoring and reviewing. With this real time monitoring devices the operators will be also able to instantly check for water quality and tell if a problem arises and in many cases before the lab results are finished each week. With the SCADA alarm system, operators will also be made aware of any problems 24/7 if any one system falls outside of the parameters.



Merritt has a Cross Connection Control Coordinator (CCCC) and he has developed a Cross-connection Control Program for the City of Merritt. This program is designed to inspect and eliminate any possible connections between our potable water system and any other connections that are not potable. For example; a connection to potable water and a sprinkler system that injects fertilizer could possibly contaminate the whole water system without the proper back flow device in place and maintained. Our Cross Connection Control Coordinator inspects all connections to our system and then identifying and making sure consumers regularly have their back flow assemblies inspected, tested and maintained. This is vitally important to ensure the end users of a safe clean drinking water supply for the City of Merritt.

Records

The City employs an automated and continuously operating system to monitor, flow, PH, turbidity, water temperature, well room temperature, chlorine residual, chlorine tank levels, and reservoir storage. This system is called SCADA, *Supervisory Control and Data Acquisition*, and it assists City staff to maintain a safe drinking water supply by advising of any monitored change within our water system. The SCADA system will alert staff by way of a portable 2-way radio and/or cell phone to ensure that corrections can be made before water levels or quality can be adversely affected.

Test records, as noted previously, are stored on the City's WaterTrax® database. Information from this database can be retrieved in many formats for presentation, analysis or public information. For example, the monthly water report posted on the City of Merritt website is prepared using WaterTrax®. This data is also used to provide information to the provincial Drinking Water Officer, including the completion of this annual report.

The public is able to log in and view information about our water system at:

<http://www.watertrax.com> using the name "Merritt Guest" and password of "MerrittGuest1".





Water main Leak

Staff

Trained certified City staff work to maintain and are on call 24 hours per day for the supply of safe drinking water that is available to users in Merritt. This is accomplished by ensuring that staff is on duty every day of the year and that the previously mentioned supervisory and control system (SCADA) is operating continuously. Water distribution work is also done by staff certified for their tasks: water main replacement, water service installation, fire hydrant and valve maintenance. Special tasks such as reservoir cleaning and leak detection are undertaken by qualified contractors with the proper equipment and experience to complete the work.

Emergency Callouts - 2012

There was a total of 18 emergency callouts in 2012. Loss of communications made up the majority of calls totaling 10. The other callouts were 4 Pump Fault alarms and 9 security alarms that were due to communication problems that alarmed operators as security.

Maintenance / Capital Projects – 2012

- Colletteville Motor and Pump was removed in April and the Motor and Pump were found to be in irreparable condition. Due to the cost of a new Motor and Pump as well as having to rehabilitate the Well this project was carried over to be completed in 2013.
- The Well was cleaned and rehabilitated using a Cable Tool Drill Rig.
- The Water Main was extended out to the Airport Terminal.
- The Airport Well was decommissioned permanently.
- Replaced 5 Fire Hydrants and installed new independent valves.
- Installed new Ultrasonic Level Transmitters in Nicola and Grimmer Reservoirs.
- 12 Water main breaks/leaks were located and repaired.
- 20 Water service leaks were located and repaired.
- Installed 6 new water services.
- Installed 6 new water meters and replaced 10.
- 260 Weekly water samples.

Initiatives – 2013

Complete the Collettville pump replacement project as well as finish installing the new Flow Meter, Level Transmitter, Check valve and a new Cl₂ injection pump. Install a new Online Chlorine Analyzer at the Grimmitt Reservoir. The Cross Connection Control Coordinator will continue to perform facility hazard assessments throughout the city to identify and work closely with owners to install the proper backflow assembly. With these devices in place it is a positive step forward in protecting the City's drinking water system.



Future Water Quality

Council has committed to an on-going program to improve quality and fire flow throughout the City through the reduction of dead end mains and installation of blow off assemblies where they presently do not exist. The City of Merritt has been advised by the Drinking Water Officer to include compliance with the new Drinking Water Regulation standards in any future capital works plans. Replacement or expansion of major parts of the City's water system will have to include provisions to ensure that standards of treatment required by current regulation are achieved.

Conclusion

The City of Merritt Employees work hard in the effort to maintain, ensure proper water usage, monitoring water quantity, monitoring water quality, and educating the public whenever possible. With these goals the City of Merritt should be able to maintain a quality water source and distribution system for many years to come.

This 2012 City of Merritt Water System Report is presented to the public, by way of posting on the City of Merritt website, as required by the British Columbia Drinking Water Protection Act and Regulations, as well as to meet the terms and conditions of the City's Water System Operating Permit (0210617) issued by the Interior Health Drinking Water Officer.

Appendix "A"

Weekly tests:

- Total Coliforms
- E. coli
- Turbidity
- PH
- Temperature

Annual Chemical Analyses Test Elements

of 3

Alkalinity	Total Lead
Ammonia	Total Lithium
Bromodichloromethane	Total Manganese
Bromoform	Total Magnesium
Chloroform	Total Mercury
Conductivity	Total Molybdenum
Dibromochloromethane	Total Nickel
Dissolved Chloride	Total Phosphorus
Dissolved Sulphate	Total Potassium
Fluoride	Total Selenium
Nitrate	Total Silicon
Nitrite	Total Silver
Total Aluminum	Total Sodium
Total Antimony	Total Strontium
Total Arsenic	Total Sulphur
Total Barium	Total Tellurium
Total Beryllium	Total Thallium
Total Bismuth	Total Thorium
Total Boron	Total Titanium
Total Cadmium	Total Tin
Total Calcium	Trihalomethanes
Total Chromium	Total Uranium
Total Cobalt	Total Vanadium
Total Copper	Total Zinc
Total Dissolved Solids	Total Zirconium
Total Iron	

Appendix "B"

SAMPLE DATA



CLIENT Merritt, City of
PROJECT Comprehensive Analysis

WORK ORDER # K200414
REPORTED Feb-29-12

Analyte	Result	Canadian DW Guideline (Dec 10)	RDL	Units	Prepared	Analyzed	Notes
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General Parameters

WT#1E18B - City Hall (K200414-01) Matrix: Water Sampled: Feb-13-12 09:50

Alkalinity, Total as CaCO ₃	131		1.0	mg/L	Feb-13-12	Feb-15-12	
Chloride	45.5	AO ≤ 250	0.10	mg/L	Feb-15-12	Feb-15-12	
Colour, True	< 5	AO ≤ 15	5	Coar. Unit	Feb-14-12	Feb-15-12	
Conductivity (EC)	469		2	µS/cm	Feb-13-12	Feb-15-12	
Cyanide (Total)	< 0.01	MAC = 0.2	0.01	mg/L	Feb-15-12	Feb-15-12	
Fluoride	< 0.10	MAC = 1.5	0.10	mg/L	Feb-15-12	Feb-15-12	
Hardness, Total (Total as CaCO ₃)	191		0.50	mg/L	N/A	N/A	
Nitrogen, Nitrate as N	1.50	MAC = 10	0.050	mg/L	Feb-15-12	Feb-15-12	
Nitrogen, Nitrite as N	< 0.01	MAC = 1	0.01	mg/L	Feb-15-12	Feb-15-12	
pH	7.51	AO = 6.5 - 8.5	0.01	pH Units	Feb-13-12	Feb-15-12	
Solids, Total Dissolved	244	AO ≤ 500	5	mg/L	Feb-20-12	Feb-20-12	
Surface	34.5	AO ≤ 500	1.0	mg/L	Feb-15-12	Feb-15-12	
Turbidity	< 0.1	Varies, See Guidelines	0.1	NTU	Feb-14-12	Feb-14-12	
UV Transmittance @ 254nm	97.9		0.1	%	Feb-14-12	Feb-14-12	

Total Recoverable Metals

WT#1E18B - City Hall (K200414-01) Matrix: Water Sampled: Feb-13-12 09:50

Aluminum	0.019	AO < 0.1	0.005	mg/L	Feb-16-12	Feb-17-12	
Antimony	< 0.0001	MAC = 0.006	0.0001	mg/L	Feb-15-12	Feb-17-12	
Arsenic	< 0.0005	MAC = 0.01	0.0005	mg/L	Feb-16-12	Feb-17-12	
Barium	0.100	MAC = 1	0.005	mg/L	Feb-16-12	Feb-17-12	
Beryllium	< 0.0001		0.0001	mg/L	Feb-16-12	Feb-17-12	
Bismuth	< 0.0001		0.0001	mg/L	Feb-16-12	Feb-17-12	
Boron	0.023	MAC = 5	0.005	mg/L	Feb-16-12	Feb-17-12	
Cadmium	0.00001	MAC = 0.005	0.00001	mg/L	Feb-16-12	Feb-17-12	
Calcium	51.4		0.2	mg/L	Feb-16-12	Feb-17-12	
Chromium	< 0.0005	MAC = 0.05	0.0005	mg/L	Feb-16-12	Feb-17-12	
Cobalt	< 0.00005		0.00005	mg/L	Feb-15-12	Feb-17-12	
Copper	0.0035	AO ≤ 1	0.0005	mg/L	Feb-16-12	Feb-17-12	
Iron	0.05	AO ≤ 0.3	0.01	mg/L	Feb-16-12	Feb-17-12	
Lead	0.0002	MAC = 0.01	0.0001	mg/L	Feb-16-12	Feb-17-12	
Lithium	0.0004		0.0001	mg/L	Feb-16-12	Feb-17-12	
Magnesium	15.3		0.01	mg/L	Feb-16-12	Feb-17-12	
Manganese	0.0008	AO ≤ 0.05	0.0002	mg/L	Feb-16-12	Feb-17-12	
Mercury	< 0.00002	MAC = 0.001	0.00002	mg/L	Feb-16-12	Feb-17-12	
Molybdenum	0.0004		0.0001	mg/L	Feb-16-12	Feb-17-12	
Nickel	0.0002		0.0002	mg/L	Feb-16-12	Feb-17-12	
Phosphorus	< 0.02		0.02	mg/L	Feb-16-12	Feb-17-12	
Potassium	1.55		0.02	mg/L	Feb-16-12	Feb-17-12	
Selenium	< 0.0005	MAC = 0.01	0.0005	mg/L	Feb-16-12	Feb-17-12	
Silicon	6.3		0.5	mg/L	Feb-16-12	Feb-17-12	
Silver	0.00007		0.00005	mg/L	Feb-16-12	Feb-17-12	
Sodium	16.8	AO < 200	0.02	mg/L	Feb-16-12	Feb-17-12	
Strontium	0.395		0.001	mg/L	Feb-16-12	Feb-17-12	
Tellurium	< 0.0002		0.0002	mg/L	Feb-16-12	Feb-17-12	

SAMPLE DATA



CLIENT
PROJECT

Merritt, City of
Comprehensive Analysis

WORK ORDER #
REPORTED

K2B0414
Feb 20 12

Analyte	Result	Canadian DW Guideline (Dec 10)	RDL	Units	Prepared	Analyzed	Notes
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Total Recoverable Metals, Continued

WT#1E188 - City Hall (K2B0414-01) Matrix: Water Sampled: Feb-13-12 09:50, Continued

Thallium	< 0.0002		0.0002	mg/L	Feb 16 12	Feb 17 12	
Thorium	< 0.0001		0.001	mg/L	Feb 16 12	Feb 17 12	
Tin	< 0.0002		0.002	mg/L	Feb 16 12	Feb 17 12	
Titanium	< 0.005		0.005	mg/L	Feb 16 12	Feb 17 12	
Uranium	0.0006	MAC = 0.02	0.0002	mg/L	Feb 16 12	Feb 17 12	
Vanadium	0.001		0.01	mg/L	Feb 16 12	Feb 17 12	
Zinc	< 0.004	AO ≤ 5	0.03	mg/L	Feb 16 12	Feb 17 12	
Zirconium	< 0.0001		0.001	mg/L	Feb 16 12	Feb 17 12	

Microbiological Parameters

WT#1E188 - City Hall (K2B0414-01) Matrix: Water Sampled: Feb-13-12 09:50

Coliforms, Total	< 1	MAC < 1	CFU/100mL	Feb 13 12	Feb 17 12	
E. coli	< 1	MAC < 1	CFU/100mL	Feb 13 12	Feb 14 12	

Volatile Organic Compounds

WT#1E188 - City Hall (K2B0414-01) Matrix: Water Sampled: Feb-13-12 09:50

Bromodichloromethane	< 0.001		0.03	mg/L	Feb 16 12	Feb 20 12	
Bromoform	< 0.001		0.03	mg/L	Feb 16 12	Feb 20 12	
Chloroform	< 0.001		0.03	mg/L	Feb 16 12	Feb 20 12	
Dibromodichloromethane	0.002		0.03	mg/L	Feb 16 12	Feb 20 12	
trichloroethenes (total)	< 0.004	MAC = 0.1	0.034	mg/L	Feb 16 12	Feb 20 12	
SUMMARY: C8H16Cl2O2	81.9		82.123		Feb 16 12	Feb 20 12	

