

DRINKING WATER ANNUAL REPORT 2013



February 3, 2014

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Introduction

The City of Enderby operates and maintains a public water distribution system in accordance with the Drinking Water Protection Act and Regulations¹ and the Guidelines for Canadian Drinking Water Quality.²

Pursuant to Section 15 of the British Columbia Drinking Water Protection Act and Section 11 of the British Columbia Drinking Water Regulations, the City of Enderby provides the following Annual Drinking Water Report for 2013.

The goal of the City of Enderby is to provide clean, safe, and reliable drinking water. Our drinking water must meet or exceed criteria defining “high quality drinking water.” The Federal-Provincial-Territorial Committee on Drinking Water defines high quality drinking water as:

free of both disease-causing organisms and chemicals in concentrations that have been shown to cause health problems. Such drinking water has minimal taste and odour, making it aesthetically acceptable to the public for drinking.³

High quality drinking water must meet requirements with respect to the following:

- Maximum acceptable concentrations of microbiological organisms (such as enteric viruses and E. Coli);
- Maximum acceptable levels of turbidity;
- Maximum acceptable concentrations of chemical contaminants;
- Specific physical parameters; and
- Aesthetic objectives related to taste, colour, and odour.

The City accomplishes these requirements through a multi-barrier approach to treatment. A multi-barrier approach is required as “the limitations or failure of one or more barriers may be compensated for by the effective operation of the remaining barriers. This compensation minimizes the likelihood of contaminants passing through the entire system and being present in sufficient amounts to cause illness to consumers.”⁴

There are a variety of potential hazards to drinking water which must be controlled. These threats involve chemical and microbiological pathogens that may be introduced at the source or intake, during treatment, or during distribution. These hazards are an ever-present risk to our drinking water supply. The City uses a robust water quality monitoring regime and multi-barrier treatment to manage these risks and protect the public.

¹ Province of BC, “Drinking Water Protection Act” (Victoria, BC: 2001).

² Health Canada, “Guidelines for Canadian Drinking Water Quality” (Ottawa, Ontario: 2012).

³ Federal-Provincial-Territorial Committee on Drinking Water and the CCME Water Quality Task Group, “From Source to Tap: Guidance on the Multi-Barrier Approach to Safe Drinking Water” (Ottawa, Ontario: 2004), 14.

⁴ Ibid., 17.

Water System Overview

The Enderby water system consists of 3 main sources:

1. Brash Creek (surface water – decommissioned);
2. Shuswap Well (ground water; not determined if under the direct influence of surface water);
and
3. Shuswap River (surface water).

The total amount of pipe in the distribution system is 30,266 meters. This consists of 11,648 meters of PVC pipe and 18,618 meters of concrete pipe.

All water is chlorinated prior to distribution. The Shuswap River water is filtered through a two-stage rapid filtration system which reduces turbidity and minimizes the threat of giardia and cryptosporidium. The Shuswap Well and Brash Creek (prior to decommissioning) are piped into the Water Treatment Plant and the clearwell.

Under normal operation, water from the Shuswap River is filtered and chlorinated, then pumped from the clearwell through the UV disinfection system and into the distribution system to the two water reservoirs located on the Knoll. Water from the Shuswap Well is chlorinated on-site and pumped to the clearwell, then through the UV disinfection system to the reservoirs. There is a total of 2,400 m³ of reservoir capacity. Depending on demand, both systems can operate in conjunction. Each system can be isolated and run to the reservoirs alone. All water supplies can be operated with a portable generator.

It should be noted that, when water is drawn from the Shuswap Well supply, a number of customers east of the Enderby Bridge which are most proximate to the well source receive water that is not disinfected with UV light and has limited chlorine contact time. When all supply is from the Shuswap River source, all customers receive fully treated water.

The combined source capacity of the Shuswap River and the Shuswap Well is 6,245 m³ per day.

Annual Consumption Data

In 2013, the total water distributed through the City of Enderby water system was 631,787 m³. The maximum one-day demand was on August 12 at 4,479 m³. The minimum one-day demand was on March 21 at 603 m³.

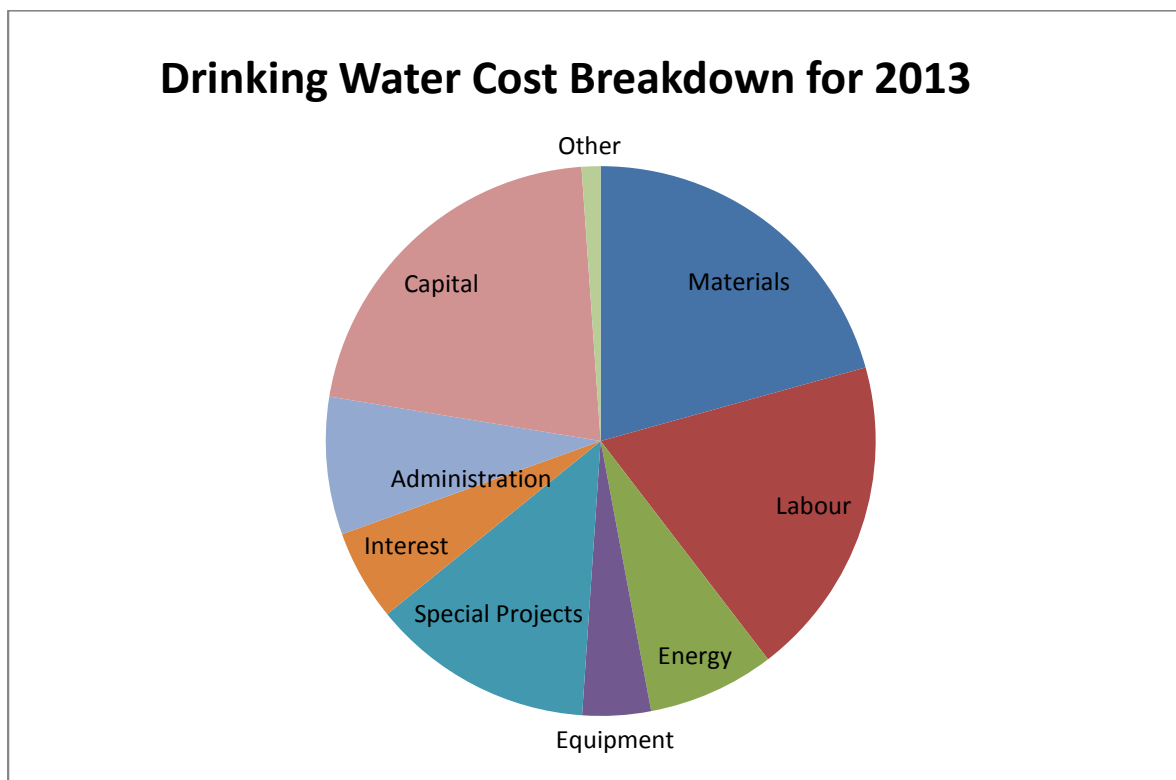
By contrast, in 2012, the total water distributed was 668,985 m³, the maximum one-day demand was on August 21 at 4,429 m³, and the minimum one-day demand was on March 17 at 755 m³.

The following chart shows minimum, maximum, and average daily demands by month for 2013.

Month	Min. Daily Demand (m ³)	Max. Daily Demand (m ³)	Avg. Daily Demand (m ³)
January	829	1705	1252
February	616	1983	1196
March	603	1590	1210
April	883	1916	1451
May	1156	3144	2115
June	1483	3171	2047
July	1526	4123	3016
August	1685	4479	2751
September	1190	2497	1687
October	1027	1706	1348
November	1030	1674	1336
December	1003	1623	1297

Drinking Water Cost Breakdown

In 2013, the City of Enderby spent \$741,191 to provide safe drinking water. This includes water treatment processes such as chlorination, ultraviolet, and filtration as well as improvement, repair, and maintenance of the distribution system. The costs by expense category are:



The following chart describes the dollar value associated with each expense category:

Category	Value
Materials	153,282
Labour	140,150
Energy	55,273
Equipment	29,842
Special Projects	96,978
Interest	39,559
Administration	60,001
Capital	157,908
Other	8,199
Total	741,191

Water System Assessment and Infrastructure Deficit

The total replacement value for the City of Enderby water distribution system (such as pipes and pumps) is \$24,372,451. As of December 31, 2013, the total depreciation is \$10,411,534. The remaining value is \$13,960,917.

The total replacement value for the City of Enderby water treatment system (such as buildings, clarifier, chlorinators, and ultraviolet) is \$8,672,889. As of December 31, 2013, the total depreciation is \$4,927,166. The remaining value is \$3,745,723.

In 2013, \$142,517 was contributed to the City of Enderby water reserve fund. No funds were withdrawn from the water reserve fund during the year. The balance of the City of Enderby's water reserve fund as of December 31, 2013 is \$498,568.

Capitalized assets include \$69,411 for water meters, \$71,058 for a mobile generator capable of providing back-up power to the water treatment plant during an outage, and \$17,439 for replacement of the Shuswap Well pump.

In order to address its infrastructure deficit, the City has committed to an incremental water utility tax increase of 1% per year. This amount will be dedicated to capital renewal.

Completed Major Projects

There were several major investments in water infrastructure in 2013:

1. Reservoir 1 was cleaned and the liner was checked for leaks;
2. Portable backup power capable of running all components of the water treatment plant was purchased;
3. Water meter installations were completed for all water system customers;

4. Clarifier nozzles and sand were replaced to improve filter performance at the Water Treatment Plant; and
5. Shuswap Well pump was replaced.

Forthcoming Major Projects

In 2014, the following projects are scheduled:

1. Turbidity monitoring at the Shuswap Well will be integrated into the SCADA system;
2. Reservoir 2 will be cleaned and the liner checked for leaks;
3. Meter rate structure and billing process will be tested, preparatory to 2015 implementation of metered billing for all water customers;
4. Long-term planning analysis for water infrastructure will be completed;
5. Infrastructure investment plan will be developed to address deficit; and
6. Gunter-Ellison booster station will be re-plumbed.

Water Quality Monitoring

Daily samples are collected at the Shuswap Well and Riverbank sites and tested for pH, temperature, and turbidity. Daily samples are also collected at the Water Treatment Plant and the BCA filter for testing pH, temperature, turbidity, and colour. The clearwell is also tested on a daily basis for pH, temperature, turbidity, colour, and free and total chlorine.

Weekly system checks and distribution samples are tested for free chlorine residuals to ensure a minimum residual of 0.20 mg/L is found at the furthest points in the distribution system. Residuals were above the minimum threshold for all sample locations and dates, with the exception of a 0.15 mg/L residual at the Valcairn sample station on September 11 and a 0.11 mg/L residual at the same station on October 8. In both cases, additional flushing was performed and the station was re-sampled on the same day to verify that the minimum residual had been obtained.

At least once per month, samples are collected at 13 monitoring stations for microbiological testing, including 3 sites in east Enderby, 4 sites in west Enderby, 3 sites in central Enderby, and 3 source water sites. Monthly samples are also collected at the Shuswap Well and the Water Treatment Plant effluent point. No Coliforms or E. Coli were detected at any of the sample points with the exception of the Shuswap River raw water sample location, which had Coliform counts ranging from 32 to 200 per 100 mL and E. Coli levels ranging from 1 to 77 per 100 mL. As Coliforms and E. Coli occur naturally, these levels are expected and help explain why the City of Enderby needs to treat its drinking water.

No E. Coli was detected at any point in the distribution system. No Coliforms were detected at any of the sample points within the distribution system except for a sample taken on November 13, 2013 at the Timberlane sample station, which detected 1 Coliform unit per 100 mL. This monitoring station was quickly resampled and returned a reading of 0 Coliform units per 100 mL. It was discovered that the end of the sample hose had been contaminated, and not the water in the distribution system; the sample hose was disinfected and storage procedures changed so that it would not come into contact with contaminants.

The BCA filter backwash is sampled on a bi-monthly schedule for pH, conductivity, turbidity, total suspended solids, aluminum, biochemical oxygen demand, and microbiology.

On a quarterly basis, trihalomethane (THM) samples are collected from the Brash PRV, Booster #1, and Valcain stations. THMs are by-products caused by the chemical reaction between chlorine and organic matter naturally present in water. High levels of THMs can have adverse health effects and, as a result, the *Guidelines for Canadian Drinking Water Quality* set a maximum acceptable concentration of 0.1 mg/L. All THM tests from the above sample stations reported a range well below the maximum acceptable concentration, with concentrations ranging from 0.009 to 0.039 milligrams per litre.

Also sampled on a quarterly basis are the Shuswap Well and Shuswap River sources for total organic carbon.

The Shuswap River is sampled annually for comprehensive testing. The Shuswap Well is sampled every three years for comprehensive testing. The next comprehensive tests for both sources will be in 2014.

Environmental Operators Certification

City of Enderby operators are progressing towards required EOCPC certifications. Interior Health requires that the City has a designated chief operator certified at Level III for Water Treatment and Level II for Water Distribution. As of December 31, 2013, City of Enderby operators are certified as follows:

Name	Title	Water Treatment	Water Distribution
Ida Arcand	Systems Operator II	Level II	Level I (coursework only)
Kevin Walters	Systems Operator I	Level I	Operator-in-Training*
Clayton Castle	Lead Hand	Operator-in-Training*	Operator-in-Training*
Jamie Prevost	Utility Worker III	Operator-in-Training	Operator-in-Training
Robert Hubley	Utility Worker III	Operator-in-Training	Operator-in-Training
Sheldon Tokairen	Utility Worker III/Facility Maintenance Worker	Operator-in-Training	Operator-in-Training
Ray Brown	Utility Worker II/Facility Maintenance Worker	Operator-in-Training	Operator-in-Training
*certified			

In 2013, the City commenced cooperation with Corix Utilities' Senior Water Specialists to meet Chief Operator certification requirements and gain expert consultation and relief/emergency support.

Major Events

The City had to contend with multiple water breaks in 2013, including two breaks on Northern Avenue, one break on Johnston Avenue, one break on Pete Street, and two breaks on Enderby-Mabel Lake Road.

The Shuswap Well was out of service from September 23 to October 4 due to pump failure requiring replacement of the motor and impellers.

Water Conservation Plan

The City of Enderby's Water Conservation Plan establishes strategies to reduce water demand throughout the community. Reducing water demand helps to protect our water resources, mitigate requirements for infrastructure expansion, and reduce operating and maintenance costs.

As of December 31, 2013, the City of Enderby has achieved a number of strategies within its Water Conservation Plan, including:

1. Education
 - a. Implementing a Water Conservation Education program which uses informational materials to raise awareness of our water resources.
 - b. Celebrating Drinking Water Week 2013 with a staff-guided public tour of the Water Treatment Facility.
 - c. Beginning compliance patrols and enforcement by a City of Enderby Bylaw Enforcement Officer with respect to sprinkling regulations. So far, no enforcement actions have been required; friendly reminders have been sufficient to bring property owners into compliance.
2. Metering and Rates
 - a. Developed rate structure promoting conservation.
 - b. Amended the Building Bylaw to include requirements for water meters.
 - c. Amended Municipal Type Service Agreement with the Splatkin Band to require water meters on reserve connections serviced by the City, which were installed by Splatkin in 2013.
 - d. Amended policy for out-of-town service connections (e.g. Area F customers) to require water meters on connections serviced by the City.
 - e. Completed water meter installations on all residential, commercial, industrial and civic properties within the City. Meter installations for all water customers outside of City limits have also been completed.
3. Loss Control
 - a. Completed a Loss Control Program in 2012, which estimated the total Unaccounted For Water at 6.5% or 12.05 m³ per hour.
 - b. Completed a Leak Detection Audit to identify and repair water leaks within municipal infrastructure.
4. Planning for the Future
 - a. Completed the first draft of the 2013 Water Study to update for 20-year growth projections and known infrastructure implications.

Cross Connection Control Program

In 2003, Interior Health required all large water purveyors (City of Enderby included) to develop and implement a cross connection control program as a condition of operating permit. The purpose of the program is to protect public health by ensuring that the drinking water provided by the City of Enderby is not contaminated due to a backflow incident.

The City adopted a Cross Connection Control Program in 2004 and began the program implementation with assessments of a number of commercial, industrial, institutional and agricultural customers in June, 2004. The emphasis was on sites identified as high risk. Under Enderby's program, owners were expected to implement the recommendations in a timely manner and were responsible for all costs associated with their backflow prevention systems.

For a number of reasons, including cost and internal capacity limitations, the Cross Connection Control Program has not been fully implemented. It is worth noting that, based on anecdotal information, the City of Enderby's progress compares favorably with other communities. Below is a synopsis of the categories and status as of December 31, 2013:

Hazard	Quantity	Surveyed	Not Surveyed	Vacant	Compliant*
High	54	51	0	3	36 (71%)
Medium	44	24	18	2	12 (29%)
Low	90	32	55	2	18 (21%)
TOTAL:	188	107	73	7	66 (37%)

*Compliance percentages are based only on occupied sites which have been assessed/surveyed.

There are a number of outstanding high, medium and low risk sites which are not in compliance. A number of attempts have been made to inform owners of their respective responsibilities and seek their compliance. The City is exploring alternate measures to ensure compliance. City of Enderby staff will be meeting with Interior Health on an ongoing basis to identify a suitable model for completing the City's cross connection control obligations.

Emergency Response Plan

The City of Enderby Drinking Water Emergency Response Plan was completed in early 2013 and distributed beginning January 16, 2013. The Emergency Response Plan includes provisions for public notification and response procedures for emergency situations, such as backflow incidents, broken water mains, chlorinator failure, source and/or reservoir contamination, and spills or vehicle accidents affecting the distribution system. It also provides an emergency contact directory.

The Emergency Response Plan was most recently reviewed on January 28, 2014. In addition to updating the contact directory, the Emergency Response Plan added a response procedure for prolonged ultraviolet outage at the Water Treatment Plant. Copies of the affected pages were sent to the distribution list on January 29, 2014.