

DRINKING WATER ANNUAL REPORT 2014



February 23, 2015

Contents

Introduction	3
Water System Overview	4
Annual Consumption Data	4
Drinking Water Cost Breakdown.....	5
Water System Assessment and Infrastructure Deficit.....	6
Completed Major Projects	6
Forthcoming Major Projects	7
Water Quality Monitoring.....	7
Environmental Operators Certification.....	9
Major Events	9
Water Conservation Plan	10
Cross Connection Control Program	10
Emergency Response Plan	11

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 2014.

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.

Under current operating parameters, the combined source capacity of the Shuswap River and the Shuswap Well is 4,753 m³ per day. The ultimate source capacity, with infrastructure changes and assuming the capability to operate the Shuswap Well for twenty-four hours per day, is 6,135 m³.

Annual Consumption Data

In 2014, the total water distributed through the City of Enderby water system was 624,476 m³. The maximum one-day demand was on July 15 at 4,445 m³.

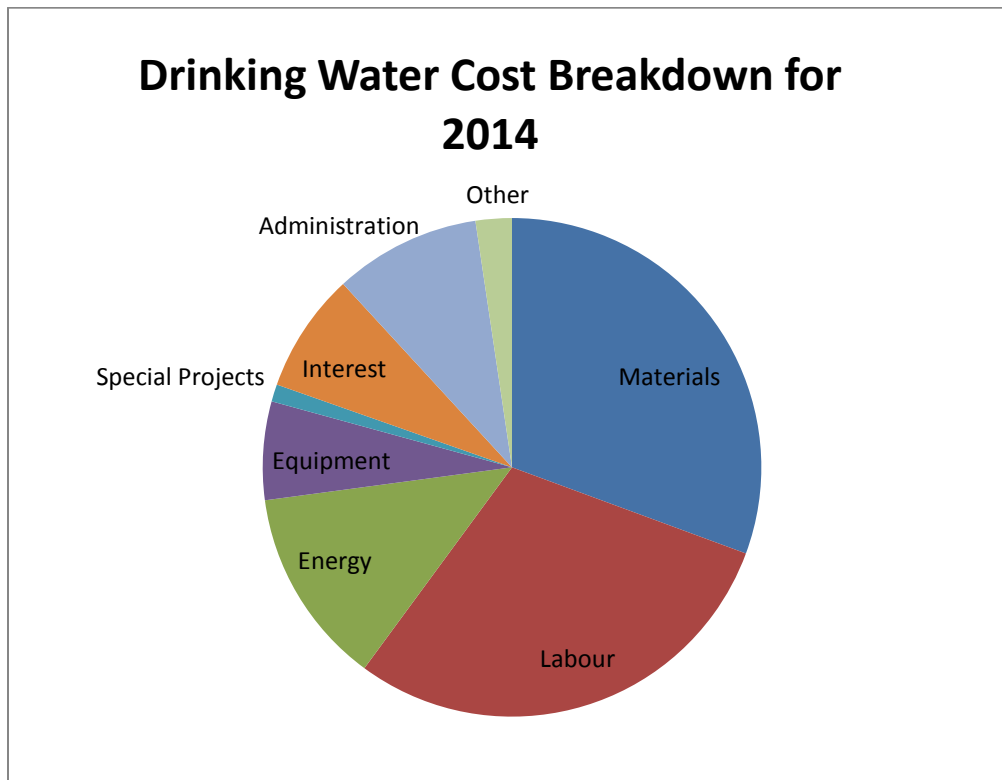
By contrast, in 2013, the total water distributed was 631,787 m³ and the maximum one-day demand was on August 21 at 4,429 m³.

The following chart shows minimum, maximum, and average daily demands by month for 2014.

Month	Max. Daily Demand (m ³)	Avg. Daily Demand (m ³)
January	3131	1599
February	2314	1539
March	1889	1530
April	2362	1769
May	3500	2122
June	3579	2538
July	4445	2999
August	3197	2106
September	2058	1429
October	1811	1028
November	1336	1052
December	1430	1079

Drinking Water Cost Breakdown

In 2014, the City of Enderby spent \$461,364 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	141,256
Labour	135,958
Energy	59,055
Equipment	29,433
Special Projects	5,163
Interest	35,840
Administration	43,824
Capital	-
Other	10,835
Total	461,364

Water System Assessment and Infrastructure Deficit

The total replacement value for the City of Enderby water distribution system (such as pipes and pumps) is \$18,348,214. As of December 31, 2014, the total depreciation is \$7,909,211. The remaining value is \$10,439,003.

The total replacement value for the City of Enderby water treatment system (such as buildings, clarifier, chlorinators, and ultraviolet) is \$3,579,153. As of December 31, 2014, the total depreciation is \$1,166,529. The remaining value is \$2,412,624.

In 2014, \$152,192 was contributed to the City of Enderby water reserve fund. No funds were withdrawn from the water reserve fund during the year. The interest earned on the reserve fund was \$9,681. The balance of the City of Enderby's water reserve fund as of December 31, 2014 is \$660,441.

There were no capitalized assets for 2014.

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.

Note that there were some changes made to the overall valuation of the water system as a result of the completion of the City's asset management inventory in early 2014, which resulted in a reduction of the replacement and depreciation values.

Completed Major Projects

There were several major water infrastructure projects in 2014:

1. Turbidity monitoring at the Shuswap Well was integrated into the SCADA system;
2. Meter rate structure and billing process was tested and a rate established by bylaw, further to 2015 implementation of metered billing for all water customers;

3. Long-term planning analysis for water infrastructure was nearly completed;
4. Gunter-Ellison booster station was re-plumbed.

One project planned for 2014, cleaning of Reservoir 2, was deferred in favour of other projects.

Forthcoming Major Projects

In 2015, the following projects are scheduled:

1. Obtain jar testing equipment and train staff on using it to select appropriate coagulant application rate for given raw water conditions.
2. Clean and perform interior inspection of Reservoir 2.
3. Complete long-term infrastructure plan for water system.
4. Re-start cross connection program.
5. Commence source protection planning process.

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.

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 following exceptions:

- 1) The Shuswap River raw water sample location, which had Coliform counts ranging from 23 to 400 per 100 mL and E. Coli levels ranging from undetectable to 26 per 100 mL. As Coliforms and E. Coli occur naturally in the environment, these levels are expected and help explain why the City of Enderby needs to treat its drinking water.
- 2) The Shuswap Well sample location, which had a Coliform count of 1 on December 16, 2014.
- 3) The Brash PRV sample location, which had a Coliform count of 1 on March 5, 2014.

No E. Coli was detected at any point in the distribution system.

The BCA filter backwash is sampled on a bi-monthly schedule for pH, conductivity, turbidity, total suspended solids, aluminum, 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 0.004 to 0.034 mg/L.

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. Comprehensive tests were performed on both sources in 2014 and are as follows:

Test	Unit	River	Well
Alkalinity, Total as CaCO ₃	mg/L	43	54
Chloride	mg/L	0.39	1.66
Fluoride	mg/L	<0.10	<0.10
Nitrogen, Nitrate as N	mg/L	<0.010	0.252
Nitrogen, Nitrite as N	mg/L	<0.010	<0.010
Sulfate	mg/L	5.6	5.6
UV Transmittance @ 254nm	% T	90.4	96.2
Colour, True	CU	6	<5
Cyanide, total	mg/L	<0.010	<0.010
Turbidity	NTU	1.1	0.1
pH	pH units	7.58	7.23
Conductivity (EC)	uS/cm	96	124
Hardness, Total (Total as CaCO ₃)	mg/L	43.4	51
Solids, Total Dissolved	mg/L	50.5	64.3
Aluminum, total	mg/L	0.07	<0.05
Antimony, total	mg/L	<0.001	<0.001
Arsenic, total	mg/L	<0.005	<0.005
Barium, total	mg/L	<0.05	<0.05
Beryllium, total	mg/L	<0.001	<0.001
Boron, total	mg/L	<0.04	<0.04
Cadmium, total	mg/L	<0.0001	<0.0001
Calcium, total	mg/L	14.1	15.4
Chromium, total	mg/L	<0.005	<0.005
Cobalt, total	mg/L	<0.0005	<0.0005
Copper, total	mg/L	<0.002	0.004
Iron, total	mg/L	0.13	<0.10
Lead, total	mg/L	<0.001	<0.001
Magnesium, total	mg/L	2	3
Manganese, total	mg/L	0.009	<0.002
Mercury, total	mg/L	<0.0002	<0.0002
Molybdenum, total	mg/L	<0.001	0.001
Nickel, total	mg/L	<0.002	<0.002
Phosphorus, total	mg/L	<0.2	<0.2
Potassium, total	mg/L	0.5	1.1
Selenium, total	mg/L	<0.005	<0.005
Silicon, total	mg/L	<5	6
Silver, total	mg/L	<0.0005	<0.0005
Sodium, total	mg/L	1.3	3.7
Uranium, total	mg/L	0.0003	<0.0002

Vanadium, total	mg/L	<0.01	<0.01
Zinc, total	mg/L	<0.04	<0.04
Coliforms, Total (MPN)	MPN/100mL	> 23	<1.1
Coliforms, Fecal (MPN)	MPN/100mL	23	<1.1
E. coli (MPN)	MPN/100mL	4.4	<1.1

Environmental Operators Certification

City of Enderby operators are progressing towards required EOCP 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, 2014, City of Enderby operators are certified as follows:

Name	Title	Water Treatment	Water Distribution
Kevin Walters	Systems Operator I	Level II	Level I
Clayton Castle	Lead Hand	Level I	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
Ray Brown	Utility Worker III/Facility Maintenance Worker	Operator-in-Training	Operator-in-Training

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.

In 2015, the City anticipates that internal staff will have the necessary certifications to serve as Chief Operator.

Major Events

The City had to contend with multiple water breaks in 2014, including ones on Granville Avenue, Enderby-Mabel Lake Road, Maud Avenue, and Stanley Avenue.

During the Cook Creek washout in early May, 2014, the City of Enderby relied upon the Shuswap Well due to elevated turbidity levels in the raw water. Other events included a power outage to the Shuswap Well caused by a major electrical storm on July 24, 2014, and a flange gasket failure that led to water flowing back into the clearwell on October 12, 2014.

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, 2014, 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 2014 with a staff-guided public tour of the Water Treatment Facility.
 - c. Continuing compliance patrols and enforcement by a City of Enderby Bylaw Enforcement Officer with respect to sprinkling regulations.
2. Metering and Rates
 - a. Council adopted by bylaw a rate structure to balance conservation and equity.
 - b. Amended the Building Bylaw to include requirements for water meters.
 - c. Amended Municipal Type Service Agreement with the Splatsin Band to require water meters on reserve connections serviced by the City, which were installed by Splatsin 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 penultimate draft of the 2015 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. 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 February 15, 2015.