

Table of Contents

Section 1	Drinking Water System General Information	3
1.1	Drinking Water System Description	4
Section 2	Compliance Statements	5
Section 3	Results of External Performance Audits	6
3.1	Ministry of the Environment and Climate Change Inspection	6
3.2	Management System DWQMS	6
Section 4	Treatment Chemicals Used	7
Section 5	Required Reports to the Ministry of the Environment	8
Section 6	Summary of Results of the Required Tests	9
Section 7	Items of Significant Investment in the Water System in 2015	13
Section 8	Water Conservation	14
Section 9	Other Activities	15

Appendices

Appendix 1	Summary of Plant Flows	
------------	------------------------	--

Definitions/Acronyms

American Water Works Association.	AWWA
Bacteriological Sample	Sample count / Safe or adverse
Chlorine Dosages	(mg/l) milligrams/litre
Chlorine Residuals	(mg/l) milligrams/litre
Collingwood Drinking Water System	CDWS
Collingwood Environmental Services	CES
Conditions	Visual checks
Flow	(m ³ /d) cubic metres per day
Inorganic Sample	(mg/l) milligrams/litre (unless expressed otherwise)
Maximum Allowable Concentration	MAC
Ministry of the Environment & Climate Change	MOECC
Ontario Drinking Water Standards	ODWS
Organic Sample	(mg/l) milligrams/litre (unless expressed otherwise)
Pesticides & PCB	(mg/l) milligrams/litre (unless expressed otherwise)
Physical	(mg/l) milligrams/litre (unless expressed otherwise)
Temperature	(°C) degree Celsius
Turbidity	(NTU) nephelometric turbidity unit
Weight	(kg) kilograms

Section 1 Drinking Water System General Information

This report has been prepared in accordance with the reporting requirements of the Safe Drinking Water Act 2002 O. Reg. 170/03, s 11 (1), (3), (6), (7), (9.1) & (10) as well as schedule 22-1 and 22-2

This annual report has been presented to Council. A notice was placed in local newspapers notifying the public and any interested authority that the Collingwood Drinking Water System's 2016 Annual Compliance Report can be viewed on the website shown below, or viewed in the Public Information Books at the locations listed below or upon request a copy will be made available free of charge.

The following are the locations where hard copies can be viewed or a request placed for a hard copy free of charge:

Location	Address
Collingwood Public Library	55 St Marie Street, Collingwood

The Drinking Water System 2016 Annual Report can also be viewed and down loaded in PDF format from the following websites: <http://www.collingwood.ca/water/docs>

Permit to Take Water No. 91-P-3037 (New Permit 3451-8CZMJC issued Jan 28, 2011)
Maximum Rated Capacity 31,140 m³/d

Drinking Water System Number	220001165
Drinking Water System Permit Number	100-201 Issued May 13 th 2016
Drinking Water System License Number	100-101 Issued June 21 st 2016
Drinking Water System Name	Collingwood Drinking Water System
Drinking Water System Owner	Town of Collingwood
Drinking Water System Category	Large Municipal Residential
Water Treatment Subsystem Class	Class 2 Certificate No. 277 issued November 15, 2005
Water Distribution Subsystem Class	Class 2 Certificate No. 3009 issued November 15, 2005
Period being Reported	January 1, 2016 to December 31, 2016

Other Drinking Water Systems that receive drinking water from Raymond A. Barker Ultrafiltration Plant:

<u>Drinking Water System Owner</u>	<u>Drinking Water System Number</u>
Town of New Tecumseth	220001174
Town of The Blue Mountains	220001762
Baxter Distribution System (Township of Essa)	260086866
Angus Well Supply System (Township of Essa)	260001026
Clearview Township (Distribution and Supply Subsystem)	220003706

1.1 Description of the Drinking Water System

Collingwood Drinking Water System (CDWS) consists of the Raymond A Barker Ultrafiltration Plant (RAB) and the Collingwood Distribution System.

The Raymond A Barker Ultrafiltration Plant (RAB) is a direct filtration membrane surface water treatment plant. The RAB supplies safe drinking water to the Collingwood distribution system, which is comprised of approximately 160km of various diameter watermains, ranging from 100mm to 600mm diameter, 24.1km of private watermains, one (1) 2250m³ multi legged elevated storage tank, one (1) 6800m³ in-ground reservoir and booster pumping station (A.R. (Ted) Carmichael West End Reservoir), one (1) 2500m³ in-ground reservoir and booster station (R.A. (Bob) Davey South End Reservoir) and one (1) in line booster stations (Osler Bluff Road). Collingwood Environmental Services (CES) operates and maintains one (1) temporary in line booster station owned by the developer at Georgian Meadows. Currently RAB also supplies safe drinking water to four (4) other municipalities; the Town of Blue Mountain, through a connection to Collingwood's distribution system at the town boundary, and three (3) municipalities, through the 58km Regional Pipeline including Clearview Township (New Lowell), Essa Township (Village of Baxter and Town of Angus) and Town of New Tecumseth (Alliston).

Surface water is taken from Nottawasaga Bay through a submerged inlet structure, approximately 765m off shore in a depth of approximately 8m (26ft). Raw water flows by gravity through a 1067mm diameter intake pipe and surge chamber into the raw water well. Chlorine is applied to the raw water at the surge chamber, to assist in the disinfection process. Within the raw water well a submersible mixer is utilised to increase the hydraulic grade line of the raw water. Pre-chlorinated raw water then flows by gravity to the membrane distribution channel in the main building.

Pre-chlorinated raw water is then distributed to six (6) membrane tanks or treatment trains. Five (5) trains are fed by gravity. These house the 500 series ZeeWeed ultra-filtration membrane modules. One (1) train is fed with a low lift vertical turbine pump and a 5 micron strainer with automatic cleaner. This tank houses the 1000 series ZeeWeed ultra-filtration membrane (Mobile Package Plant).

Each treatment train of the Zenon membrane filtration system, both 500 and 1000 series, in general consists of membrane modules, one (1) permeate/backpulse pump, one (1) backpulse tank and one (1) air blower. The membranes have a pore size 0.035 micron and as such remove all particulate matter greater than this. The permeate pump creates a slight vacuum which sucks clean (permeate) water through the membrane leaving any particulate matter greater than 0.035 micron in the process tank.

The permeate water is then disinfected with the addition of chlorine. The chlorinated permeate water then flows into the two (2) 413 m³ chlorine contact chambers (total volume 826 m³) prior to flowing by gravity into the clearwell. The finished water is then pumped into two (2) separate systems, the Collingwood Distribution System and the Regional Pipeline, each with its own dedicated set of high lift pumps.

The fouling of the membranes is controlled by a regular cleaning cycle that consists of reversing the flow of clean water stored in the backpulse tank back through the membranes under positive pressure. This process concentrates the raw water which in turn is rejected to waste. It should be noted that this reject water can be discharged to the sewer or returned to the lake. Air is also used to prevent fouling of the membranes by injecting it at the bottom of the tank thus scouring the membranes with air bubbles as they rise to the surface. This air scouring process also assists in keeping the concentrated solids in suspension, prior to reject.

RAB is continually monitored 24 hours a day 365 days a year. The treated water parameters monitored are Turbidity, Flow, Pressure, Chlorine Residual, Temperature and pH. This is achieved through the SCADA (Supervisory Control And Data Acquisition) system.

Section 2 Compliance Statements

- Collingwood Environmental Services ensures compliance with the Ontario Drinking Water Standards (ODWS) by establishing a sampling schedule in accordance with O. Reg. 170/03. All sampling is performed in accordance with the Ministry of the Environment's "Guide to Collection and Submission of Samples for Laboratory Analysis". Compliance is also ensured by having all laboratory samples analyzed by a laboratory accredited by the Canadian Association for Environmental Analytical Laboratories (C.A.E.A.L.) of Canada.
- Collingwood Environmental Services ensures compliance is met with the requirements of the ODWS by operating the Collingwood Drinking Water System so that water intended for human consumption does not exceed the standards described in the ODWS. These standards are defined as Maximum Acceptable Concentration (MAC) standards, and Interim Maximum Acceptable Concentration (IMAC) standards. In the event that ODWS standards are exceeded, CES will follow the requirements of O. Reg. 170/03 – in notifying the Medical Officer of Health, the Ministry of the Environment and Climate Change (MOECC) and the Town, perform corrective actions as required, and if necessary, post a warning notice in a prominent location.
- Collingwood Environmental Services monitors the chemical parameters (non-health related) that may impair the taste, odour or colour of water or which may interfere with good water quality control practices which are reported as Aesthetic Objectives (AO).
- Collingwood Environmental Services ensures that the water leaving the treatment plant and entering the distribution system is disinfected to meet those requirements described in MOECC Procedure for Disinfecting Water in Ontario as amended from time to time.
- Collingwood Environmental Services ensures that all chemicals used in the treatment process and all materials contacting the water meet both the American Water Works Association (AWWA) quality criteria as set out in AWWA standards and the American National Standard Institute (ANSI) safety criteria as set out in ANSI standard NSF/60 or NSF/61
- Collingwood Environmental Services ensures that the Overall Responsible Operator is an operator who holds a valid license that is applicable to Collingwood Drinking Water System and that this is the same or higher class than the class determined for the water treatment plant and water distribution system in accordance with O Reg. 128/04 as amended from time to time.
- Collingwood Environmental Services exercises due diligence in ensuring that at all times, the works and related equipment and appurtenances used to achieve compliance are properly operated and maintained.

Section 3 Results of External Performance Audits

The following section discusses performance audits conducted by external agencies.

3.1 Ministry of the Environment and Climate Change Inspection

A Ministry of the Environment and Climate Change inspection was completed in November 2016. The primary focus of the inspection was to confirm compliance with the MOECC legislation and authorising documents as well as evaluating conformance with Ministry drinking water- related policies and guidelines.

Findings: One (1) non compliance with regulatory requirements

The documentation non-compliance has been addressed with corrective and preventative actions.

In order to measure individual drinking water systems inspection results, the MOECC has established an inspection compliance risk framework based on the principles of the inspection. The Inspection Report includes an Inspection Summary Rating Record which provides the MOECC, the system owner and the local Public Health Unit with a summarised quantitative measure of drinking water system inspection and regulated water quality testing performance.

Based on the MOECC established rating methodology the Collingwood Drinking Water System received a **100%** rating.

3.2 Management System

Collingwood Environmental Services Drinking Water Quality Management System (DWQMS) enshrines the DWQMS Standards. The Management System (MS) addresses the primary function of CES, which is to produce and distribute safe drinking water that meets applicable legislative and regulatory requirements, as well as provide for the continual improvement of the Management System. The Management System is also designed to include all reasonable precautions for safeguarding the health and safety of the Town's employees and to protect the environment within the concept of sustainable development.

DWQMS

Ontario Regulation 188/07 "Licensing of Municipal Drinking Water Systems" states that all municipal drinking water systems shall be operated by an accredited operating authority.

The external accreditation audit was conducted by NSF International Strategic Registrations, in October 2016. The primary purpose of the audit was to document CES's conformity to those element requirements addressed during the audit, and to verify that CES's DWQMS meets the standard. The overall objectives being to:

- Verify action taken on any non-conformances identified during the previous internal audit;
- Assess the DWQMS to selected requirements and elements of the Standard for continued conformance;
- Carefully follow the audit trail for procedures and processes related to the Standard elements schedule to be audited; and
- Document evidence of continual improvement of the DWQMS as well as positive practices.

In brief the external surveillance audit had zero (0) minor non-conformity and three (3) opportunities for improvements (OFI) which are in the process of being reviewed for revisions.

Section 4 Treatment Chemicals Used

The following section discusses the chemicals used in the treatment process.

The only chemical used for the treatment of water at R.A.B. is **Chlorine Gas** for primary disinfection.

The following table shows total chlorine used per month together with, average post filtration chlorine dosage and average free chlorine residual after contact time. In addition average raw water temperature, average raw water turbidity and average finished water turbidity are shown

Month	Total Chlorine Used (kg)	Ave. Post Chlorine Dose (mg/l)	Av. Free Chlorine Residual (mg/l)	Ave. Water Temp. °C	Ave. Raw Water Turbidity	Ave. Finished Water Turbidity
January	1043	2.10	1.63	2.9	1.8	0.04
February	949	1.95	1.59	2.3	1.1	0.04
March	940	1.88	1.56	3.3	0.9	0.04
April	1059	2.13	1.57	4.5	1.7	0.04
May	1211	2.09	1.62	8.1	0.7	0.04
June	1333	2.14	1.58	14.7	0.8	0.04
July	1373	1.99	1.56	20.6	0.9	0.04
August	1480	2.18	1.56	23.0	1.0	0.04
September	1212	2.13	1.59	20.4	0.7	0.04
October	1196	2.27	1.55	13.3	1.8	0.04
November	996	2.05	1.59	10.1	4.1	0.04
December	1050	2.07	1.55	4.5	2.6	0.04
Total/Ave.	13842	2.08	1.58	10.6	1.5	0.04
Max	1480	2.27	1.63	23.0	4.1	0.04
Min	940	1.88	1.55	2.30	0.7	0.04

The following table shows Chlorine residual testing conducted throughout the distribution system in 2016:

Month	No. of Samples	Ave Free Chlorine Residual mg/l	No. of Samples < 0.05 mg/l	No. of Samples > 0.05 mg/l	No. of Samples	Ave Total Chlorine Residual mg/l	No. of Samples < 0.05 mg/l	No. of Samples > 0.05 mg/l
January	36	0.92	0	36	36	1.00	0	36
February	37	0.98	0	37	37	1.06	0	37
March	44	1.01	0	44	44	1.10	0	44
April	36	0.96	0	36	36	1.05	0	36
May	36	0.92	0	36	36	1.03	0	36
June	45	0.94	0	45	45	1.05	0	45
July	36	0.78	0	36	36	0.90	0	36
August	45	0.65	0	45	45	0.73	0	45
September	36	0.67	0	36	36	0.75	0	36
October	36	0.73	0	36	36	0.82	0	36
November	36	0.82	0	36	36	0.92	0	36
December	37	0.84	0	37	37	1.01	0	37
Total	460		0	460	460		0	460
Average		0.85				0.94		

Section 5 Required Reports to the Ministry of the Environment

Summary of reports made to Ministry under subsection 18 (1) of the Act or 16-4 of Schedule 16 for the period covered by this report:

Incident Date	Parameter	Result	Unit of Measurement	Corrective action	Corrective action date
May 2 2016	High Chlorine Residual	4.90	mg/l	Flushed distribution system at the affected area,	May 2 2016

Note: Incident date is represented by the sample date
: Corrective action date is represented by the date the incident was resolved by confirmation of laboratory results

Section 6 Summary of Results of the Required Tests

Microbiological Testing done under Schedule 10, 11 or 12 of Regulation 170/03 during the period covered by this annual report for 2016:

	Number Of Samples	Range of E. Coli or Fecal Result (min #)-(max#)	Range of Total Coliform Results (min #)-(max#)	Number of HPC Samples	Range of HPC Results (min #)-(max#)
Raw	52	0 (min) – 8 (max)	0 (min) – 160(max)	0	
Treated	52	0 (max)	0 (max)	52	<10 (min) 110 (max)*
Distribution	460	0 (max)	0 (max)	460	<10 (min) 1580 (max)*

* This result is an anomaly as sample results taken before and after showed levels of <10. However, flushing was undertaken to ensure water quality.

As per the Regulations, Collingwood is required to test 396 samples per year (based on population).

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this annual report for 2016:

	Number of Samples	Range of Results
Turbidity (units NTU)	Continuous analyzers	0.040 min 0.095 max
Chlorine (units mg/l)	Continuous analyzers	0.65 min 4.90 max

Summary of inorganic parameters tested during the period covered by this annual report:

	Date of Samples				MAC
	Feb.	May	Aug.	Nov.	mg/l
Antimony	<0.001	<0.001	<0.001	<0.001	0.006
Arsenic	<0.006	<0.006	<0.006	<0.006	0.025
Barium	0.0147	0.0108	0.0123	0.0147	1.0
Boron	0.014	0.011	0.011	0.011	5.0
Cadmium	<0.0002	<0.0002	<0.0002	<0.0002	0.005
Chromium	0.0066	0.0012	0.0028	<0.0060	0.05
Fluoride	<0.05	<0.05	<0.05	<0.05	1.5
Mercury	<0.0001	<0.0001	<0.0001	<0.0001	0.001
Nitrate + Nitrite (as N)	0.29	0.25	0.21	0.22	10.0
Nitrite	<0.05	0.05	<0.05	<0.05	1.0
Nitrate	0.29	0.25	0.21	0.22	10.0
Selenium	<0.0008	<0.0008	<0.0008	<0.0008	0.01
Sodium	4.63	4.30	4.25	4.24	greater than 20 to be reported
Uranium	<0.0002	<0.0002	<0.0002	<0.0002	0.02

Summary of organic parameters tested during the period covered by this annual report:

	Date of Samples				MAC
	Feb	May	Aug	Nov	mg/l
Alachlor	<0.0005	<0.0005	<0.0005	<0.0005	0.005
Aldicarb	<0.002	<0.002	<0.002	<0.002	0.009
Aldrin +Dieldrin	<0.00007	<0.00007	<0.00007	<0.00007	0.0007
Atrazine	<0.001	<0.001	<0.001	<0.001	0.005
Azinphos-methyl	<0.002	<0.002	<0.002	<0.002	0.02
Bendiocarb	<0.002	<0.002	<0.002	<0.002	0.04
Bromoxynil	<0.005	<0.002	<0.002	<0.002	0.005
Carbaryl	<0.005	<0.005	<0.005	<0.005	0.09
Carbofuran	<0.005	<0.005	<0.005	<0.005	0.09
Chlordane(Total)	<0.0007	<0.0007	<0.0007	<0.0007	0.007
Chlorpyrifos	<0.001	<0.001	<0.001	<0.001	0.09
Cyanazine	<0.001	<0.001	<0.001	<0.001	0.01
Diazinon	<0.001	<0.001	<0.001	<0.001	0.02
Dicamba	<0.001	<0.001	<0.001	<0.001	0.12
2,4-Dichlorophenol	<0.0005	<0.0005	<0.0005	<0.0005	0.9
DDT	<0.003	<0.003	<0.003	<0.003	0.03
24-D	<0.001	<0.001	<0.001	<0.001	0.1
Dicoflp-methyl	<0.0009	<0.0009	<0.0009	<0.0009	0.009
Dimethoate	<0.0025	<0.0025	<0.0025	<0.0025	0.02
Dinoseb	<0.001	<0.001	<0.001	<0.001	0.01
Diquat	<0.005	<0.005	<0.005	<0.005	0.07
Diuron	<0.01	<0.01	<0.01	<0.01	0.15
Glyphosate	<0.02	<0.02	<<0.02	<0.02	0.28
Heptachlor + heptachlor epoxide	<0.0003	<0.0003	<0.0003	<0.0003	0.003
Lindane (Total)	<0.0004	<0.0004	<0.0004	<0.0004	0.004
Malathion	<0.005	<0.005	<0.005	<0.005	0.19
Methoxychlor	<0.09	<0.09	<0.09	<0.09	0.9
Metolachlor	<0.002	<0.002	<0.002	<0.002	0.05
Metribuzin	<0.002	<0.002	<0.002	<0.002	0.08
Paraquat	<0.001	<0.001	<0.001	<0.001	0.01
Parathion	<0.001	<0.001	<0.001	<0.001	0.05
Pentachlorophenol	<0.0005	<0.0005	<0.0005	<0.0005	0.06
Phorate	<0.0005	<0.0005	<0.0005	<0.0005	0.002
Picloram	<0.005	<0.005	<0.005	<0.005	0.19
PCB	<0.0002	<0.0002	<0.0002	<0.0002	0.003
Prometryne	<0.00025	<0.00025	<0.00025	<0.00025	0.001
Simazine	<0.001	<0.001	<0.001	<0.001	0.01
Temephos	<0.01	<0.01	<0.01	<0.01	0.28
Terbufos	<0.0005	<0.0007	<0.0007	<0.0007	0.001
2,3,4,6-Terachlorophenol	<0.0005	<0.0005	<0.0005	<0.0005	0.1
Triallate	<0.001	<0.001	<0.001	<0.001	0.23
2,4,6,-Trichlorphenol	<0.0005	<0.0005	<0.0005	<0.0005	0.005

Trifluralin	<0.002	<0.002	<0.002	<0.002	0.045
Trichlorophenoxyacetic Acid 2,4,5-T	<0.001	<0.001	<0.001	<0.001	0.28
Benzo(a)pyrene	<0.00001	<0.00001	<0.00001	<0.00001	0.00001
Bromoform	<0.0003	<0.0003	<0.0003	<0.0003	
Bromodichloromethane	0.0048	0.0087	0.0010	0.0077	
Chloroform	0.013	0.019	0.025	0.018	
Dibromochloromethane	0.019	0.026	0.024	0.0018	
Total Trihalomethanes	0.019	0.030	0.037	0.029	0.100 *
* Note:					

* Note: The MAC for Total Trihalomethanes is based on a four (4) quarter running average. The current running average for the Collingwood system is **0.029mg/l**

Summary of finished water aesthetic characteristics parameters covered by this annual report:

	Date of Samples		Aesthetic Objective	Operational Guidelines
	Feb	Aug	mg/l –(unless otherwise specified)	mg/l –(unless otherwise specified)
Alkalinity	74	72		30 - 500
Calcium	23.8	24.9	No objective	No guideline
Chloride	9.56	6.67	250	
Copper	0.033	0.002	1.0	
Dissolved Organic Carbon	1.5	1.9	5.0	
Electrical Conductivity	201 uS/cm	201 uS/cm	No objective	No guideline
Iron	<0.010	<0.010	0.3	
Magnesium	6.4	6.6	No objective	No guideline
Organic Nitrogen	0.10	0.24		0.15
Sulphate	15.7	13.7	500	
Sulphide	<0.05	<0.05	0.05	
Total Dissolved Solids	104	112	500	
Total Hardness (as CaCO ₃)	85	81		80 -100
Zinc	0.005	<0.005	5	

Summary of lead testing under Schedule 15.1 covered by this annual report:

CES submitted an application for a Certificate of Approval for relief from lead testing for plumbing for residential properties and commercial establishments. The Certificate of Approval was granted for the drinking water system based on the low lead sample results collected in 2009. However lead samples are collected within the distribution system to monitor the lead content.

Location Type	Number of Samples	Average of Lead Results	Range of Lead Results (min #)-(max#)		Number of Exceedances	MAC
Distribution	16	0.0005 mg/l	<0.0005 mg/l	0.0005 mg/l	0	0.010 mg/l

Section 7 Items of Significant Investment in the Water System in 2016

Description of items of significant system investment during the period covered by this annual report:

Water Treatment, Reservoirs, Booster Stations

Infrastructure Upgrades	Description	Investment
ZeeWeed Membrane Replacement	Issued a purchase order for the replacement of one full train of ZeeWeed 500B membranes with ZeeWeed 500D membranes. Membranes to be installed in 2017.	\$1,090,000
Chlorine Analyzer Replacement	Replacement of two chlorine analyzers.	\$16,000
Control System Upgrades	Upgrades to the communication systems at all stations.	\$10,000

Distribution System

Infrastructure Upgrades	Description	Investment
Watermains	Replacement of watermain, valves and services on Niagara Street, and services on East and West Streets, as part of the sanitary sewer renewal project.	\$200,000
Stewart Road Reservoir and Booster Station Engineering Design	Completed the engineering design of a new in ground 1,250m ³ reservoir and booster pumping station, required to service proposed development in Pressure Zone 2.	\$193,800
Georgian Meadows in line Booster Station	Purchased one spare booster pump.	\$8,000
Wireless Transmitters	Installation of wireless transmitters on residential properties to allow for remote meter reading.	\$44,000

In addition Collingwood Environmental Services Department ensures that drawings accurately showing the works constructed (record drawings) are kept up to date, including timely incorporation of all modifications made throughout the works. The complete CDWS pipe network is incorporated into CES's GIS and copies of the drawings are stored at the Raymond A Barker Ultrafiltration Plant or at the Collingwood Environmental Services Department offices, and are available for inspection by Ministry personnel upon request.

Section 8 Water Conservation

Water & Energy Conservation Strategy

The Collingwood Environmental Services Department has partnered with the Environment Network to launch a conservation strategy that focuses on the often overlooked intrinsic relationship between water and energy. Increasing conservation practices through a coordinated public awareness strategy offers a cost effective and immediate approach to closing the gap between supply and demand, ultimately serving to reduce further expansions in infrastructure. In addition, conservation efforts provide opportunities for introducing new products and services, supporting a green economy. The expected outcome of this strategy is to promote conservation and the wise use of water and electricity, to strengthen community relationships and support principles of environmental stewardship and sustainability.

Energy Conservation & Demand Management Plan

The Collingwood Environmental Services Department is committed to adhering to the requirements of Ontario Regulation 397/11 of the Green Energy Act. In addition, we hope to exceed the Ministry's expectations by successfully implementing energy saving initiatives and continuing to look for ways to reduce our greenhouse gas emissions. As a requirement of the Green Energy Act, in July 2016 we reported our 2014 energy consumption information in accordance with our Energy Conservation & Demand Management Plan 2014-2019. Our target reduction of energy consumption in all Collingwood Environmental Services Department facilities is 1% per year. Our goal is to show a total energy reduction by 5% of our 2012 totals by July 2019; we have met this goal.

Toilet Rebate Program

In 2016, The Collingwood Environmental Services Department continued with a water conservation program which enabled customers to apply for a \$50 rebate for the replacement of up to two (2) old 13L toilets with new high efficiency 6L low or dual flush toilets. Toilets are the single largest water user in most households accounting for up to 30% of water used. In 2016, 58 rebates were issued which on average saved each residence approximately 23 m³/ year. While the number of rebates issued has declined in recent years as more residents have already replaced their older model toilets, it is intended to continue this program in 2017. Since the program's inception in 2009, a total of 1316 toilet rebates have been issued.

National Benchmarking Project

In 2016, The Collingwood Environmental Services Department once again took part in Aecom's National Water and Wastewater Benchmarking Initiative (NWWBI). NWWBI helps to establish Key Performance Indicators for the CDWS and compares the Utility with systems throughout the province and country. Currently over 50 of Canada's most progressive municipalities take part in the project and Collingwood is among the smallest system represented. Results of 2015 data were presented to the Environmental Service Standing Committee on August 16th, 2016 and are available via the Town's website. In general, Collingwood often ranks around the median in all facets (treatment and distribution operations, cost of production, labour force etc). We are close to the minimum within water quality measures. There are no categories where Collingwood is a maximum.

AWWA Water Audit

As part of the NWWBI a water audit, in accordance with AWWA standards, was conducted based on 2015 data. The purpose of the water audit is to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. On completion of the audit an Infrastructure Leakage Index (ILI) is established. The Infrastructure Leakage Index (ILI) is the ratio of the Current Annual Real Losses to the Unavoidable Annual Real Losses. The ILI is a highly effective performance indicator for comparing (benchmarking) the performance of utilities in operational management of real losses.

Collingwood Drinking Water System ILI **3.18**

An Infrastructure Leakage Index close to 1.0 may demonstrate that all aspects of a successful leakage management policy are being implemented by a water utility or that the distribution system is in excellent condition with very little water loss.

- ILI 1 to 2; Excellent – Further loss reduction may be uneconomic unless there are shortages;
- ILI 2 to 4: Good – Potential for marked improvements;
- ILI 4 to 8: Poor – Poor leakage record; tolerable only if water is plentiful and cheap;
- ILI > 8: Very Bad – Very inefficient use of resources; leakage reduction programs imperative and high priority

The 2015 ILI is higher than recent years for two main reasons:

1. In 2015, the Town experienced a high amount of frozen services. In working to provide home and business owners with a continuous supply of water, properties had to be connected via high line services, allowing one property to supply water to a property with a frozen service. With this remedy, recipient properties were required to run a tap continuously to avoid freezing of the supply line. Other homes in susceptible areas were asked to run a tap as well to avoid freezing. This increased the total water losses in the system.
2. In 2015, the Town experienced a high amount of water main and water service breaks. Some of these have been attributed to the cold weather.

Section 9 Other Activities

Water Meters

The following is a summary of work undertaken with respect to metering in 2016:

- 116 new meters were installed
- 93 old meters were replaced
- 136 existing meters were serviced
- 288 wireless transmitters were installed

Utility Locates

2858 water locates were provided to other utilities and customers in 2016. Since CES became a members of ON1Call in 2013 locates have more than doubled.

2009	2010	2011	2012	2013	2014	2015	2016
870	910	861	1001	2207	2380	2615	2858

Watermain Breaks

In 2016 the Town experienced one (1) water main break, and nine (9) service leaks.

Frozen Water Services

There were no frozen water services reported in 2016 due to milder temperatures. The Town worked diligently on a Frozen Services Watch plan for 2016, with information communicated to residents via letter in December 2015. The letter included information on how to avoid frozen services and what actions to take should a Frozen Services Watch be declared.

We continue to monitor the frozen services specific email inbox frozen@collingwood.ca and continue to ask residents for as much contact information as possible should we need to contact them during a watch.

Watermain and Hydrant Maintenance

Collingwood Drinking Water System is comprised of the following watermain components:

- 160 km of watermain ranging in size from 100mm dia. to 600mm dia.

- We endeavour to flush all watermains annually and dead ends as required to ensure high water quality and adequate disinfection residuals are maintained
- Dead ends were flushed on 602 occasions in 2016.
- 1231 hydrants are maintained by CES
 - Maintenance includes; checking and lubricating the hydrant ports twice a year, painting, installing and removing hydrant markers, replacing or making repairs to hydrants, snow clearing and grass cutting around the hydrants as needed, and any other work related to keeping the hydrants operational all year long.
- Chlorine residuals and flowing pressure readings are taken at each hydrant
- 1693 water system valves

Treatment Plant and Reservoirs

Regular planned maintenance was undertaken on all equipment in the plant and reservoirs. Not including flow meters and pressure sensors, there are 19 on line instruments that continually monitor water quality. All instrumentation is calibrated annually by independent external contractors and checked and adjusted by our operators as follows:

- Seven (7) Chlorine analysers once per operating shift
- Ten Turbidimeters once a month
- Two (2) pH and temperature meters once a month

Appendix 1 Summary of Plant Flows

Month	Raw Water Taking				Total Plant Finished Water Supplied			
	Monthly	Daily Ave	Max Day	Min Day	Monthly	Daily Ave	Max Day	Min Day
	Total (m ³)	(m ³)	(m ³)	(m ³)	Total (m ³)	(m ³)	(m ³)	(m ³)
January	513,739	16,572	18,838	14,419	497,040	16,033	17,530	14,310
February	516,468	17,809	21,142	15,574	487,490	16,810	19,817	14,446
March	527,440	17,014	18,894	12,550	500,976	16,160	18,076	10,190
April	516,556	17,218	19,091	15,281	497,532	16,584	17,483	14,839
May	612,648	19,762	23,174	15,424	578,388	18,657	21,794	14,704
June	653,601	21,786	24,425	18,062	621,552	20,718	23,292	17,293
July	717,983	23,160	25,871	18,350	688,537	22,210	24,670	17,832
August	697,767	22,509	25,198	19,131	677,677	21,861	24,464	18,750
September	593,645	19,788	22,282	14,643	569,979	18,999	21,716	13,401
October	557,913	17,997	20,817	15,308	526,313	16,977	23,146	12,091
November	513,723	17,124	18,987	13,830	485,150	16,171	17,851	12,530
December	534,201	17,232	18,804	14,347	506,218	16,329	17,914	14,095
Total	6,955,684	18,998			6,636,852	18,126		
Max	717,983		25,871		688,537		24,670	
Min	513,723			12,550	485,150			10,190
Total Plant Production			6,636,852	m ³	Design Capacity	31,140	m ³ /d	
Maximum Production Day			24,670	m ³				
Yearly Daily Production Average			18,126	m ³				

The Collingwood Environmental Services Department operates the Raymond A Barker Ultra-Filtration Plant such that the maximum flow rate into the treatment system does not exceed 414.5L/s **except:**

- (a) where necessary to meet an unusual water demand for fighting a large fire, or
- (b) where necessary for the purpose of maintenance of the works and essential to its efficient operation and provide that the treatment water quality satisfies the requirements set out in the Ministry Procedure B13-13 entitled "Chlorination of Potable Water Supplies in Ontario", as amended from time to time.