
**Peterborough
Utilities
Commission**



Annual Drinking Water Report

2018





2018 Annual Drinking Water Report

2018 COMMISSION

Mayor Daryl Bennett..... Chair
Councillor Lesley Parnell..... Vice-Chair
Councillor Gary Baldwin Commissioner
Councillor Dave Haacke..... Commissioner
Councillor Don Vassiliadis..... Commissioner

2018 RIVERVIEW PARK & ZOO ADVISORY COMMITTEE

Name of Volunteer	Date Appointed
Wally Davidson	Lifetime Member
Mike Kirkpatrick	January 2016
Janet Lafortune	January 2018
Dennis Carter-Edwards	January 2018
Paul Hartung	January 2018

On the Cover

The newly designed and built Greencrest Booster Pumping Station, which is located at 1227 Sherbooke Street West, was commissioned in 2018

Questions or comments

Please contact us either by mail, phone or email.

PUG Services Corp.
1867 Ashburnham Drive, Peterborough, ON K9L 1P8
705-748-9300, ext. 1258
Patricia Skopelianos, Water Quality Assurance Manager
pskopelianos@peterboroughutilities.ca

Inside this Report

INTRODUCTION.....	1
DRINKING WATER PROCESS DESCRIPTION.....	1
Source Water	1
Treatment Plant Operations	1
Reservoirs, Elevated Tanks, Water Booster Pumping Stations	2
Water Distribution.....	2
Water Main Replacement.....	2
New Water Main Installation	3
Water Service Replacement	3
Water Main Rehabilitation	3
SUMMARY OF INSPECTION & COMPLIANCE	3
Ministry of Environment Conservation & Parks Inspection	3
Adverse Water Quality Incidents	3
WATER FLOWS	4
Permit to Take Water	4
Treated Water Production	4
WATER QUALITY RESULTS	5
Chlorine Residual.....	5
Turbidity	5
E coli	6
Total Coliform.....	6
Inorganic Parameters	7
Organic Parameters	7
Trihalomethanes -THM	8
Haloacetic Acid	9
Sodium.....	9
Lead	9
Summary Report.....	9
Taste and Odour	10
CHEMICAL CONSUMPTION.....	11
Chlorine.....	12
Hydrofluorosilicic Acid (Fluoride).....	12
Sodium Silicate	12
Aluminium Sulphate (Alum).....	12
DRINKING WATER QUALITY MANAGEMENT SYSTEM.....	13
Water Treatment Plant.....	13
Water Distribution.....	13



2018 Annual Drinking Water Report

CAPITAL WORKS SUMMARY	13
Water Treatment Plant Capital Upgrades	13
IMPACT OF CLIMATE EVENT	13
PILOT PLANT	14
Ozone and Advanced Oxidation.....	14
Chloramination	14
Corrosion Control	15
CUSTOMER SERVICE	15
Customer Calls.....	15
Tours	15
Water Rates	16
RIVERVIEW PARK & ZOO	18
Park Operation & Facilities.....	18
Zoo Operations & Facilities	18
Capital Program	19
Revenue Contributions.....	19
Zoo Animal Collection	20
Conservation & Education.....	20
Research.....	21
Special Events	21
Staff & Volunteers	21
APPENDIX A – FINANCIAL STATEMENT	22
APPENDIX B – ABBREVIATIONS.....	37

Introduction

All Peterborough Utilities Commission facilities are managed and operated under contract by PUG Services Corp. (PUG). The Water Utility section of PUG includes the following operating departments:

- Water Treatment Plant
- Water Distribution
- Riverview Park and Zoo

Drinking Water Process Description

Source Water

The source of raw (untreated) water for Peterborough's drinking water is the Otonabee River. The Otonabee River water is of good quality and can be described as a moderately coloured water of low turbidity. The river water temperature ranges from 0°C (winter) to approximately 26°C (summer). The raw river water is what we call a surface water supply, which means that it is considered to be an unprotected source.

Accordingly, we assume that raw water always requires full treatment at the Peterborough Water Treatment Plant to make it drinkable or potable.

The river water quality is monitored by staff at the plant as well as the Otonabee Region Conservation Authority (ORCA) and the Peterborough Health Unit (beaches only).

The watershed is protected by planning and approvals processes through the City of Peterborough and ORCA. Since 1998, ORCA has monitored water quality in the Otonabee watershed under the Watershed 2000 Program and the Provincial Water Quality Monitoring Network.

Peterborough Utilities continued its participation in the Source Water Protection Committee in 2018.

Treatment Plant Operations

The plant is located at 1230 Water Street North, Peterborough, adjacent to the Riverview Park & Zoo. The plant was initially built in 1922 and expanded in 1952, 1965, 1995 and 2016. The conventional treatment process includes coagulation, flocculation, sedimentation, filtration and chlorine disinfection and a process waste treatment facility to dewater the backwash sludge.

Total raw water processed in 2018 was 11,455.40 megalitres (ML), this is an average of 31.38 ML daily (Table 1). The maximum daily pumpage of 41.84 ML, occurred on June 29th, was a 2.5% increase from the maximum daily value (40.80 ML) recorded on August 3rd, 2017.

Table 1

Water Treatment Plant Operations	2017	2018
Total Annual Raw Water	11,104.80	11,455.40
Average Day ML	30.42	31.38
Total Annual Plant Effluent	9,969.46	10,252.18
Average Day ML	27.30	28.07
Max. Daily Pumpage	40.80 – Aug 3	41.84 – June 29
Max. Daily City Consumption	44.56 – Aug 3	40.40 – July 9
Peak Hourly Consumption Rate	67.70 – Aug 29 @ 11:30h	73.25 – Sept 15 @ 11:30h
Total Wash Water	192.85	197.74
Average of Plant Effluent	1.9 %	2.0 %
Total Zone #1 Pumpage	5,723.15	5,925.93
Average Day	15.68	16.23
Total Zone #2 Pumpage	4,246.31	4,326.26
Average Day	11.63	11.84

Reservoirs, Elevated Tanks, Water Booster Pumping Stations

Treated water is stored at various locations throughout the City in underground reservoirs and elevated storage tanks. Storage is used to supplement supply during times of high water demand and in emergency situations such as firefighting. The water storage capacity in the system is 55.36 ML, including the Water Treatment Plant. Water storage around the city is as follows:

Water Treatment Plant	7.1 ML
High Street Elevated Tank	4.55 ML
Clonsilla Avenue Reservoir	18.18 ML
Towerhill Reservoir	22.73 ML
Sherbrooke Elevated Tank	2.3 ML
Milroy Elevated Tank	0.5 ML

Water Distribution

The water distribution system consists of approximately 461 kilometres of pipe (water mains), 2,292 hydrants and 27,229 individual water services. Hydrants are colour-coded according to the Ontario Fire Code requirements to indicate the available flow rate at a 20 psi residual pressure.

Water Main Replacement

Approximately 0.5 km of distribution water mains were replaced on:

- ◆ Caddy Street
- ◆ Donegal Street
- ◆ Hilliard Street
- ◆ McDonnel Street

New Water Main Installation

Approximately 2.4 km of water main was installed on:

- ◆ Lily Lake Road
- ◆ Nassau Mills Road
- ◆ Pioneer Road
- ◆ Tower Hill Road

Water Service Replacement

A total of 63 water services were repaired and 3 water services were replaced in 2018.

Water Main Rehabilitation

Cleaning and lining of approximately 4.7 km of existing distribution water mains took place on:

- ◆ Antrim Street
- ◆ Argyle Street
- ◆ Aylmer Street North
- ◆ Bolivar Street
- ◆ Bonaccord Street
- ◆ Cordache Crescent
- ◆ Crown Drive
- ◆ Dennistoun Avenue
- ◆ Edinburgh Street
- ◆ Elcombe Crescent
- ◆ Grandview Avenue
- ◆ Inverlea Street
- ◆ Rubidge Street
- ◆ The Kingsway
- ◆ Victoria Avenue

Structural lining of approximately 1.3 km of existing distribution water mains took place on:

- ◆ Clonsilla Avenue
- ◆ Oriole Crescent
- ◆ Oriole Drive

Summary of Inspection & Compliance

Ministry of Environment Conservation & Parks Inspection

During 2018, there was a Ministry of the Environment, Conservation & Parks (MECP) Inspection on February 9, 2018, report #1-FCYHV. The Peterborough Drinking Water System received a 100% compliance rating. There were no recommended best practices noted in the report.

Adverse Water Quality Incidents

There were two incidents of adverse drinking water quality in 2018. All incidents were reported to the MECP and appropriate corrective action was taken. Details and corrective action are described below.

An adverse water quality sample was reported at the Southpark Sampling Station for 3 total coliforms. Additional samples were re-submitted for the same location as well as additional samples above and below the original location. All follow-up samples reported zero total coliforms.

An adverse water quality sample was reported for a low chlorine residual in the distribution system on Technology Drive. The distribution system was flushed to restore chlorine residual levels.

Water Flows

Permit to Take Water

The *Ontario Water Resources Act, Regulation 387/05* authorized Peterborough Utilities Commission in accordance with Permit to Take Water, 5167-9BVR6A the withdrawal of 190.68 ML per day. Under this Regulation we are required to report the daily water taking annually by March 31 each year.

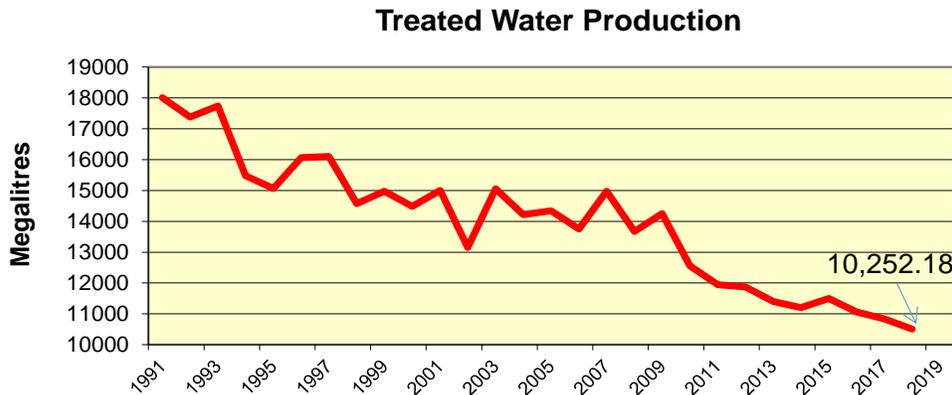
In 2018, there were no instances of water taking in excess of this daily limit. The total volume of water pumped into the Water Treatment Plant was 11,455.40 megalitres (ML), this is an average of 31.38 ML daily.

Treated Water Production

The Water Treatment Plant produced 10,252.18 megalitres (ML) in 2018, this is an average of 28.07 ML daily (Table 1). Historically the highest water consumption recorded was in 1980 (18,621.20 ML).

Peterborough Utilities meters water usage and the majority of water usage in 2018 was by industrial, institutional and large commercial users. There was a certain amount of water used for distribution system maintenance in order to maintain the water quality in the distribution system.

Figure 1



Water Quality Results

No known health-related water quality guidelines for inorganic (Table 2) and organic (Table 3) parameters were exceeded in 2018 in Peterborough's drinking water. In order to ensure that Peterborough's water is safe to drink; water quality is carefully monitored and subject to constant surveillance.

In addition to continuous monitoring of turbidity, chlorine, fluoride and pH levels at the Water Treatment Plant, thousands of water samples are taken each year for chemical, physical and microbiological tests. These tests are carried out on water samples before and after treatment as well as on samples collected from different points in the water distribution system.

A total of approximately 20,000 individual tests were performed on Water Treatment Plant and water distribution samples in 2018. Approximately 13,000 individual tests were performed in the Water Treatment Plant Laboratory and approximately 6,000 microbiological and chemical tests were performed by Peterborough Environmental Protection Laboratory and SGS Lakefield Research Limited.

Results of the laboratory testing continue to confirm that the Peterborough Water Treatment Plant produces good quality water and this quality is maintained throughout the water distribution system to the customer's tap.

O. Reg. 169/03 contains the *Ontario Drinking Water Quality Standards* (ODWQS). The purpose of the Province's ODWQS is to establish parameter limits to protect public health.

An exceedance of any parameter would result in an adverse water quality event with notification to the Medical Officer of Health and the MECP. Appropriate corrective action would have to be initiated to address the adverse incident.

Chlorine Residual

The Peterborough Water Treatment Plant uses chlorine for disinfection against viruses and bacteria in accordance with O. Reg. 170/03. Sample results reported under Schedule 7 for plant effluent were 0.63 -2.66 mg/L.

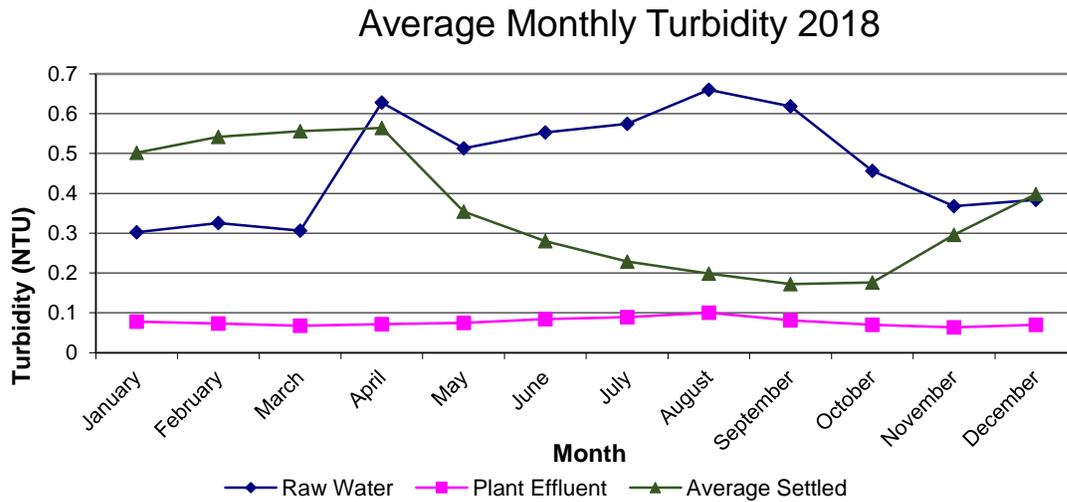
Turbidity

The average raw water turbidity in 2018 was 0.48 NTU; average during 2017 was 0.44 NTU. The monthly raw water turbidity peak occurred in August at 0.66 NTU as shown in Figure 2. The past 20-year average raw water turbidity was 0.57 NTU and treated water turbidity was 0.09 NTU.

The zebra mussel population in the river could also be a contributing factor for the cyclical increase and decreases in raw water turbidity. Raw water turbidity has slowly dropped since 2008.

The performance criteria for filtered water is 0.30 NTU for 95% of the time, without exceeding 1.0 NTU. The average filtered water turbidity was 0.04 NTU for 2018 and in 2017 was 0.05 NTU. Filters are taken off-line when the turbidity reaches 0.15 NTU. The 2018 average treated water turbidity was measured at 0.08 NTU.

Figure 2



Microbiological Standards Testing

E. coli

During 2018, a total of 233 E. coli samples were analyzed from the Otonabee River (at the WTP intake) to assist in determining the source of fecal contamination within our source water. Monthly values ranged from 0 to 120 Colony Forming Units (CFU) per litre. A total of 1478 E. coli samples were analyzed from the plant effluent and distribution system. In 2018, there were no instances where E. coli was detected in the potable drinking water.

Total Coliform

The MECP guidelines for clostridium perfringens is to have all samples collected from the plant effluent to be zero CFU per litre of water sampled. While the MECP does not require this parameter to be tested, the bacteria is analyzed as an indicator of treatment efficiency for protection from parasitic protozoan giardia and cryptosporidium.

Inorganic Parameters

Table 2

Schedule 23		2018 Results	MAC
Antimony	mg/L	<0.00002	0.006
Arsenic	mg/L	<0.00002	0.025
Barium	mg/L	0.0237	1.0
Boron	mg/L	0.017	5.0
Cadmium	mg/L	0.000004	0.005
Chromium	mg/L	0.00008	0.05
Mercury	mg/L	<0.00001	0.001
Selenium	mg/L	0.00004	0.01
Uranium	mg/L	0.00003	0.02

Organic Parameters

Table 3

Schedule 24		2018 Results	MAC
Alachlor	mg/L	<0.00002	0.005
Atrazine + N-dealkylated metabolites	mg/L	<0.00001	0.005
Azinphos-methyl	mg/L	<0.00005	0.02
Benzene	mg/L	<0.00032	0.005
Benzo(a)pyrene	mg/L	<0.000004	0.00001
Bromoxynil	mg/L	<0.00033	0.005
Carbaryl	mg/L	<0.00005	0.09
Carbofuran	mg/L	<0.00001	0.09
Carbon Tetrachloride	mg/L	<0.00016	0.005
Chlorpyrifos	mg/L	<0.00002	0.09
Diazinon	mg/L	<0.00002	0.02
Dicamba	mg/L	<0.0002	0.12
1,2-Dichlorobenzene	mg/L	<0.00041	0.2
1,4-Dichlorobenzene	mg/L	<0.00036	0.005
1,2-Dichloroethane	mg/L	<0.00035	0.005
1,1-Dichloroethylene (vinylidene chloride)	mg/L	<0.00033	0.014
Dichloromethane	mg/L	<0.00035	0.05
2,4-Dichlorophenol	mg/L	<0.00015	0.9
2,4-Dichlorophenoxy acetic acid (2,4-D)	mg/L	<0.00019	0.1
Diclofop-methyl	mg/L	<0.0004	0.009
Dimethoate	mg/L	<0.00003	0.02
Diquat	mg/L	<0.001	0.07
Diuron	mg/L	<0.00003	0.15
Glyphosate	mg/L	<0.001	1

Schedule 24		2018 Results	MAC
Malathion	mg/L	<0.00002	0.19
2-Methyl-4-chlorophenoxyacetic acid	mg/L	<0.00012	0.00012
Metolachlor	mg/L	<0.00001	0.05
Metribuzin	mg/L	<0.00002	0.08
Monochlorobenzene	mg/L	<0.0003	0.08
Paraquat	mg/L	<0.001	0.01
Pentachlorophenol	mg/L	<0.00015	0.06
Phorate	mg/L	<0.00001	0.002
Picloram	mg/L	<0.001	0.19
Polychlorinated Biphenyls (PCB)	mg/L	<0.00004	0.003
Prometryne	mg/L	<0.00003	0.001
Simazine	mg/L	<0.00001	0.01
Terbufos	mg/L	<0.00001	0.001
Tetrachloroethylene (perchloroethylene)	mg/L	<0.00035	0.03
2,3,4,6-Tetrachlorophenol	mg/L	<0.0002	0.1
Triallate	mg/L	<0.0001	0.23
Trichloroethylene	mg/L	<0.00044	0.005
2,4,6-Trichlorophenol	mg/L	<0.00025	0.005
Trifluralin	mg/L	<0.00002	0.045
Vinyl Chloride	mg/L	<0.00017	0.002

Trihalomethanes -THM

In Ontario, the Ministry of the Environment Conservation & Parks MAC for total THM's (total concentration of chloroform, bromoform, bromodichloromethane and dibromochloromethane) are set to 100 µg/L (annual average) for the distribution system. According to O. Reg. 170/03, distribution THM samples must be collected and analyzed quarterly.

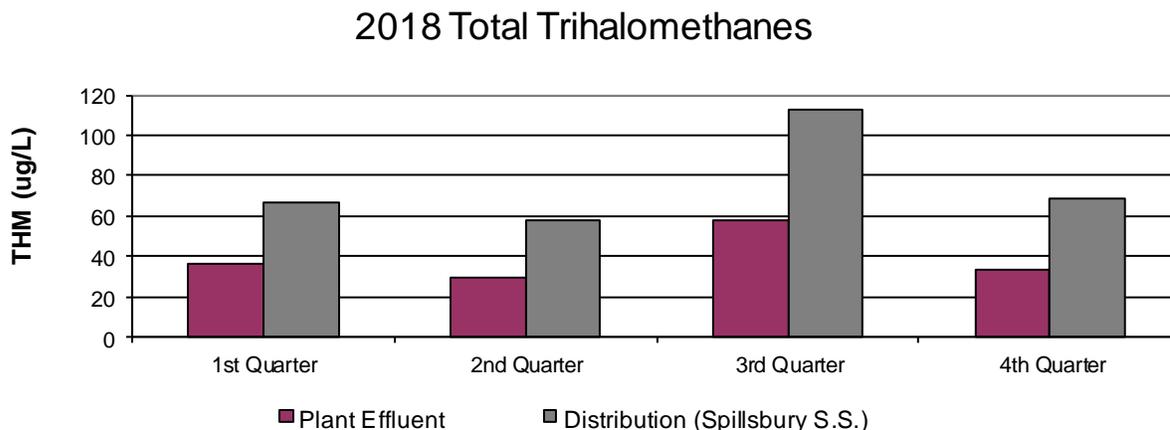
Trihalomethanes (THM's) are formed as a by-product when chlorine is used to disinfect water for drinking. The presence of organic materials along with the use of chlorine in the water treatment process can contribute to the formation of disinfection by-products. The THM's may have adverse health effects at high concentrations and many governments

set limits on the amount permissible in drinking water.

The THM average values found leaving the Water Treatment Plant during 2018 was 39 µg/L. The past 10-year average plant effluent has been 43 µg/L.

Distribution levels are always found to be higher than those leaving the Water Treatment Plant since THM's continue to form as the water travels through the distribution piping system. During 2018, one distribution location was selected to assist in determining areas of the city where THM's may be highest. The annual average 2018 THM value in the distribution system was 77 µg/L (Figure 3). The average THM value during 2017 was 78 µg/L. The 10-year average of distribution THM concentration was found to be 76 µg/L.

Figure 3



Haloacetic Acid

HAA's are another group of chemicals that are formed as disinfection by-products similar to trihalomethanes (THM).

The 2018 average treated water HAA was 36.6 µg/L and the average distribution sample was found to be 69.6 µg/L. O Reg. 170/03 was amended to include HAAs in 2020. The regulatory limit for distribution samples will be 80 µg/L; therefore, the Peterborough Drinking Water would maintain compliance to this upcoming legislative change.

Sodium

Sodium is not part of Schedule 23 or 24 but is required to be tested at least once every five (5) years. It has been sampled every year and was found to be below the ODWS aesthetic objective of 200 mg/L. In 2018, the sodium result was found to be 10.6 mg/L (was 8.68 mg/L in 2017). The local MOH must be notified when the sodium concentration exceeds 20 mg/L so that this information may be passed on to local physicians.

Lead

Lead sampling is required under O. Reg. 170/03, schedule 15.1. Peterborough requires 8 distribution samples to be collected and analyzed for lead, pH and alkalinity plus two non-residential samples every sampling period. Peterborough is required to sample any residential house in the city that requests sampling for the same parameters mentioned above.

Summary Report

The summary of water delivered as per O. Reg. 170/03 Schedule 22 in 2018 is in Table 4.

Table 4

Month	Average Day (M ³ /d)	Maximum Day (M ³ /d)	Peak Flows (L/m)
January	26,260	27,714	19,246
February	25,588	30,050	20,868
March	25,031	27,082	18,807
April	25,303	27,603	19,169
May	28,792	33,755	23,441
June	32,855	41,838	29,054
July	34,099	39,597	27,498
August	32,665	38,131	26,480
September	30,121	33,743	23,433
October	26,350	28,831	20,022
November	25,288	28,337	19,678
December	24,503	30,490	21,174
Rated Capacity	----	104.00	----
Approved Flowrate	----	190.68	132,743 L/m

Taste and Odour

During 2018, the primary source of taste and odour in our raw water was from the naturally occurring compounds geosmin (name derived from the Greek ‘earth’ and ‘smell’) and 2-MIB (2-methylisoborneol). These compounds are monitored as a precursor to taste and odour complaints (earthy/musty) of the water and are not a health concern. They can be detected by humans at very low levels (less than 10ng/L). The bacteria actinomycetes, zebra mussels and some species of algae can produce geosmin and 2-MIB, though all of the contributing organisms are not known. Observations have shown that when we have greater zebra mussel and/or algae populations we experience higher amounts of geosmin and 2-MIB.

Previous annual data indicates that geosmin and 2-MIB would hit peaks at the same time during the summer months. There is usually a large peak near the end of the summer when the water temperature is highest and sunlight hours are high. The concentration peaks for

both taste and odour causing compounds occurred approximately August to November.

Geosmin is thought to originate higher in the water column and produce an earthy odour. The average raw water value during 2018 was 5.8 ng/L and the average plant treated water was 6.8 ng/L (Figure 4).

The 2-MIB is produced in the sediment or benthic layer and gives off a musty odour. 2-MIB can reproduce well when sunlight can penetrate down to the bottom of lakes and streams. The average raw water value during 2018 was 2.1 ng/L and the average plant effluent was 2.4 ng/L (Figure 5).

The reduction of geosmin and 2-MIB due to water treatment processes (coagulation, sedimentation, filtration and chlorination) was negligible. Both geosmin and 2-MIB compounds resist oxidation (disinfection) and are difficult to remove by conventional water treatment processes.

Figure 4

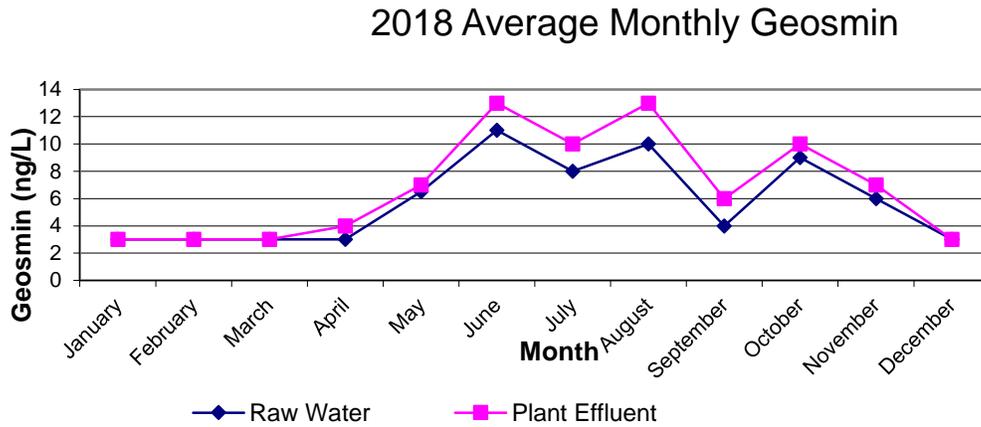
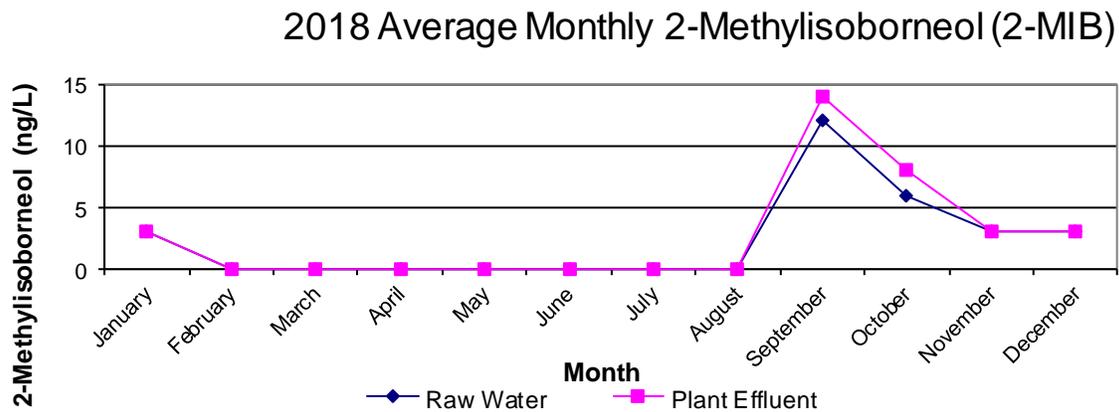


Figure 5



Chemical Consumption

Table 5

Chemical Use	2017	2018
Total Chlorine	36,337 kg	40,422 kg
Average Dosage	1.27 mg/L	1.23 mg/L
Total Aluminum Sulphate	802,010 L	807,321 L
Average Dosage	47.3 mg/L	46.1 mg/L
Total Hydrofluosilicic Acid	11,827 L	24,298 L
Average Dosage	0.62 mg/L	0.67 mg/L
Total BW46M Sodium Silicate	124,451L	21,071
Average Dosage	6.7 mg/L	7.4 mg/L

Chlorine

The average dose of chlorine for 2018 was 1.23 mg/L (Table 5). This value fluctuates throughout the year as higher doses of primary chlorine are required during the summer months because it takes more chlorine to disinfect the water when the water is warmer.

Chlorine is also added into the treated water before it leaves the WTP. This secondary chlorine is added to help maintain the chlorine residual throughout the distribution system to comply with the Ontario Drinking Water Standards (ODWS).

Zebra mussel control for the Water Treatment Plant included adding approximately 0.5 mg/L of chlorine into the Water Treatment Plant intakes from May to October. The addition of zebra mussel chlorine is dosed only during the months when there are warmer water temperatures (usually when water temperature is above 12°C). This is when the zebra mussels will colonize on surfaces such as the intake pipe walls.

Hydrofluorosilicic Acid (Fluoride)

Hydrofluorosilicic acid (fluoride) was added to the treated water to attain a combined concentration (target value) of 0.70 mg/L. Fluoride is added to the water depending on the total concentration required in the treated water and also the concentration of the raw water. The average dosage of fluoride added to the water in 2018 was approximately 0.62 mg/L (Table 5). The average treated water fluoride residual was 0.65 mg/L. The average fluoride concentration found in the raw water (natural fluoride) during 2018 was 0.12 mg/L.

Sodium Silicate

Sodium silicate (BW46) is normally added to the plant effluent for corrosion control within the distribution system as well as plant effluent pH adjustment. The use of chlorine and aluminium sulphate (alum) during the water treatment process lowers the pH level causing the water to be slightly acidic (corrosive). The addition of BW46 increases the pH to a more acceptable value of 7.1. The addition of BW46 contributes to the total silica level found in the water. The level of silica in the distribution system is monitored monthly. Silica levels throughout the distribution system generally ranged between 2.0 mg/L and 14.0 mg/L with an annual average of 5.1 mg/L.

Aluminium Sulphate (Alum)

Aluminium Sulphate (Alum) is used as our primary coagulant causing particles (silt, sand, algae, and bacteria) to coagulate or 'clump' to form a floc, which can settle in the sedimentation basins. The water is further treated by filtration. Alum was added to the water during 2018 at an average rate of 46.1 mg/L (Table 5). The average alum dosage during 2017 was 47.3 mg/L. Aluminium residual found in the WTP treated water can be a by-product of the addition of alum. The average treated water Aluminium residual for 2017 was 0.026 mg/L the Operational Guideline for Aluminium is 0.1 mg/L.

Drinking Water Quality Management System

On October 30, 2006, the finalized standard was issued on the Environmental Bill of Rights Registry. The purpose of this Standard is to assist owners and operating authorities in the effective management and operation of their municipal residential drinking water systems. This Standard outlines requirements for a Quality Management System (QMS) to ensure high quality drinking water. In the development of a QMS, the Operating Authority must create an Operational Plan; this document will define the QMS and will be subject to external audits for accreditation. Staff developed and implemented a QMS specific to the Peterborough municipal water system, which received full scope accreditation in June 2011.

The Peterborough Drinking Water System maintained accreditation to the Drinking Water Quality Management Standard (DWQMS). In advance of the on-site verification audit an internal audit was conducted in September 2018. The internal audit found four opportunities for improvement and no corrective action that all were corrected before the external audit. The external audit, conducted in October 2018 described that the management system was well documented and continues to be effective.

Water Treatment Plant

Annual maintenance was conducted at the Water Treatment Plant, Water Street Pumphouse, reservoirs, elevated tanks and booster pumping stations. Two of the pad mount transformers that feed primary

power to the Water Treatment Plant via Utility #1 and Utility #2 failed and required replacing.

Water Distribution

Annual water distribution review and maintenance programs are necessary to ensure the safe delivery of drinking water in Peterborough. These programs include:

- ◆ Valve maintenance
- ◆ Hydrant maintenance
- ◆ Dead end flushing
- ◆ Service post repair

Capital Works Summary

Water Treatment Plant Capital Upgrades

The major capital project of replacing Greenhill underground Pumping Station with Greencrest above ground Pumping Station was completed and the station was fully commissioned by the end of October.

Impact of Climate Event

The temperature during June, July and August averaged approximately 17.5°C. 21.8°C and is considered to be slightly above normal summertime temperature according to published values from Environment Canada (normal data 1981 – 2010). The summer months in 2018 were hotter than normal with 24 days where temperatures were higher than 30°C. Rainfall totals for the three summer months of June, July and August was 234.7 mm, this is considered to be normal rainfall values for the three summer months.

Pilot Plant

The Peterborough Water Treatment Plant has conducted pilot-scale studies in an effort to optimize production, improve water quality, and investigate next-generation treatment technologies.

A 5000:1 scale-model version of the main treatment facility, the pilot plant includes processes such as coagulation, tapered mixing, flocculation, settling and filtration. In addition to conventional water treatment studies, ozone and advanced oxidation applications have been investigated. The primary objectives using the ozone pilot were to determine if ozone, advanced oxidation, and biofiltration will enhance our water quality and provide operational flexibility as an integral component of our multi-barrier approach to water treatment.

In 2018, chloramination studies were initiated to evaluate the formation of monochloramines as a secondary disinfectant. Chloramination studies were conducted to investigate water treatment techniques that will improve water quality, mitigate taste and odour compounds, while still using our existing infrastructure. Our primary objectives were to focus on the reduction of disinfection by-product (DBP) formation and increased stability of secondary disinfectant in our distribution.

In order to evaluate our current corrosion control program, distribution pipe-loop systems were designed and installed in order to simulate worst-case premise plumbing conditions (Figure 7). The pipe-loop systems were installed to evaluate treatment technologies on distribution corrosion and assess alternative corrosion inhibitors.

Ozone and Advanced Oxidation

Our current studies focused on optimizing ozone dose and integration into full-scale applications as a next generation technology. Previous research at our facility has shown the effectiveness of ozone, advanced oxidation, and biofiltration in the removal of DBP precursors and taste and odour compounds, geosmin and 2-methylisoborneol. In 2018, the ozone residual was reduced from 0.5 mg/L to 0.1 mg/L prior to filtration in an effort to reduce operational costs and streamline integration with our water treatment facility. The reduced ozone dose was shown to be effective in the amelioration of trihalomethanes (THMs) and haloacetic acids (HAAs) by 30% and 40%, respectively. Ozone applied pre-filtration was also shown to improve filter performance, reduce natural organic matter, and decrease our chlorine demand.

Chloramination

The application of chloramination as a secondary disinfectant was investigated in an effort to improve water quality through the mitigation of DBP formation. Simulated distribution studies were performed to replicate residence time in our distribution system. Water quality analysis was completed for DBP formation, monochloramine stability, and the formation of nitrates and nitrites. The primary uncertainties were if chloramination would reduce DBP formation of THMs and HAAs, or subsequently cause an increase in nitrogen-based DBP formation, including nitrosodimethylamine (NDMA).

Our simulated distribution studies showed that monochloramine formation provided increased stability as a secondary disinfectant in our distribution system. Increased stability of a secondary disinfectant has the potential to improve water quality aesthetics, mitigate taste and odour complaints, and reduce operational costs.

Chloramination resulted in a 30% reduction in THMs and a 42% reduction in HAA formation. The formation of NDMA, nitrites, and nitrates remained well below regulatory guidelines.

Corrosion Control

Pipe-loop systems were monitored in the distribution in order to simulate worst-case premise plumbing conditions. Our current corrosion inhibitor, sodium silicate, was shown to be effective in mitigating lead release through increased pH and not through silicate lining of pipes. Current studies are examining alternative chemicals to increase pH and alkalinity to mitigate potential lead release in premise plumbing in an effort to reduce corrosion and enhance public health.

Customer Service

Customer Calls

Customer concerns relating to water are tracked by WTP staff and logged using computer software. Some questions and concerns that were asked from our WTP staff were related to taste and odour, colour, hardness, general water quality, information on water treatment, sampling, operations, and questions to assist with school projects on water treatment.

In 2018, staff responded to a total of 26 inquiries, this was an increase of 8% from 2017. The 26 inquiries were related to the following concerns; 38% of customer concern calls were relating to colour (usually rusty coloured water), 4% were relating to particulate matter, a total of 50% relating to taste & odour, and 8% relating to bacteriological concerns (Figure 5).

In every inquiry regarding bacteriological issues, the water was tested for bacteria and none was found.

A further breakdown of the 13 taste and odour complaints revealed the following: 7 concerns were for an earthy musty odour, 2 concerns were for a chlorine taste and odour, and 4 concerns were for various other taste and odours, from metallic to medicinal.

Tours

Tours have been an important part of public education at the Peterborough Water Treatment Plant. Over 273 people had a tour of the Water Treatment Plant process during 2018 (over 2,611 people in the last 10 years).

Water Rates

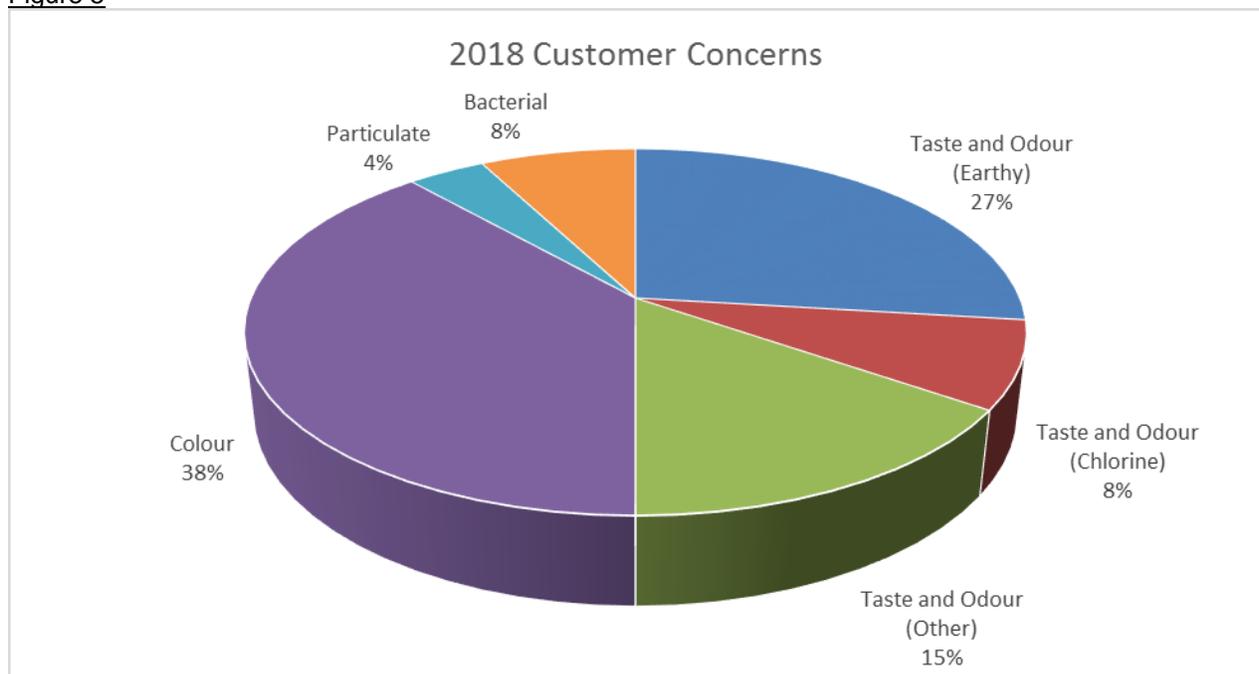
Table 6

Meter Basic Charge		2017	2018
15mm (5/8") Meter		\$20.25	\$20.76
20mm (1/2") Meter		\$20.25	\$20.76
25mm (1") Meter		\$37.31	\$38.24
40mm (1 1/2") Meter		\$63.96	\$65.56
50mm (2") Meter		\$90.61	\$92.88
75mm (3") Meter		\$162.04	\$166.09
100mm (4") Meter		\$327.64	\$335.83
150mm (6") Meter		\$568.57	\$582.78
200mm (8") Meter		\$809.47	\$829.71
250mm (10") Meter		\$1,130.58	\$1,158.84
300 mm (12") Meter		\$1,605.40	\$1,645.54
Consumption Charge			
0-20 cubic metres		\$1.3217	\$1.3549
21-100 cubic metres		\$1.3858	\$1.4204
101-4,999 cubic metres		\$0.7230	\$0.7411
5,000+ cubic metres		\$0.4985	\$0.5110
Flat Rate Service			
Basic Charge		\$12.13	\$12.43
Rooms		\$2.61	\$2.68
Lot Area (charge subject to 1500 m ² maximum)		\$2.41/100 m ²	\$2.47/100 m ²
Swimming Pool		\$0.24/ m ³	\$0.25/ m ³
<p>Seasonal Shut off Requests A \$62 fee will apply for customers who request to have their service disconnected during the winter months; a \$62 fee will also apply for reconnection of the service. The applicable Basic Charges still apply during the months when the service is off.</p>			
<p>Seasonal Water Meters Services that are removed for the winter and re-installed in the spring will incur a \$151 fee for both the installation and removal of the meter.</p>			
<p>Flat Rate Surcharge Customers who have not allowed the installation of a water meter are subject to a 65% surcharge on each billed component.</p>			
<p>Turn-on/Turn-off Service There is no charge for this service during normal business hours unless it is on a repeat basis. Repeat requests during normal working hours are subject to a \$62 fee and a \$151 minimum fee plus actual costs for after hour requests.</p>			

Table 7

Number of Customer Accounts	2018	
	Metered	Flat Rate
Residential	25,964	122
Industrial, Institutional, Commercial & Multi- Residential	2,134	140
Woodland Acres	1	0
	<u>28,099</u>	<u>262</u>
Total	<u>28,361</u>	

Figure 5



Riverview Park & Zoo

In 2018 Riverview Park and Zoo was open and operating during regular hours (8:30 AM – dusk) from January 1st to December 31st. Attendance was somewhat hit and miss and thought to be lower than normal due to the rainy start to the summer with total annual attendance estimated at more than 333,000 visitors.

Ongoing improvements to the facilities and equipment continued in 2018 and included upgrades to several animal exhibits, accessibility upgrades, a new dental unit for the Animal Health Centre and continuation of the rehabilitation of the miniature train rail bed.

The zoo's animal collection saw many changes in 2018 with the deaths of some of our older animals as well as new acquisitions. Deaths included a red-rumped agouti, our oldest reindeer, a Gouldi's monkey, a serval, and our older Sichuan takin, "Quentin". New animals included two domestic yaks, a new young male Sichuan Takin, two woodland caribou, and the hatching of a red-billed hornbill chick.



Park Operation & Facilities

The miniature train ride opened for Victoria Day weekend. The ride ran daily (weather permitting) from May 18th until September 22nd. Ridership was good with an estimated 67,000 train riders in 2018.



The Kiwanis Club of Peterborough operated the Snack bar again in 2018 daily from May through September 4th and on weekends in the fall until Thanksgiving Day. Snack bar profits remained high for the third year in a row. Proceeds from the snack bar were shared between the Park and Zoo and the Kiwanis Club of Peterborough.

Zoo Operations & Facilities

Regular and emergency veterinary care was provided by consulting veterinarian Dr. John Sallaway throughout 2018. Park and Zoo animal care staff worked with Dr. Sallaway throughout the year to provide planned animal health care to the animals in our collection. Animals were examined and/or treated as part of their health care program. This included physical exams, surgery, numerous vaccinations/treatments, blood samples, the trimming of many hooves/claws/beaks/tusks, dentistry and dental cleaning.

In 2018, there were 5 births and 14 deaths of animals during the year. Post mortems were performed on those animals that had died in an attempt to determine cause of

2018 Annual Drinking Water Report

death. 12 new animals were acquired during the year.

As of December 31, 2018, the animal collection on site consisted of 131 animals, representing 61 species (including fish and invertebrates). The collection had 29 animals in on loan and 12 animals out on loan (Table 9).

Capital Program

The 2018 capital program included the third phase of a three-year rehabilitation of the miniature train rail bed, new playground equipment, paving of various pathways and roads, and the renovation and expansion of the cat exhibit.



Other capital items included new rubberized ground cover for the wheelchair swing, a new pool for the capybara exhibit and a new dental unit for the Animal Health Centre.

There were also numerous upgrades made to various animal exhibits.



Revenue Contributions

A total of \$268,157 revenue was provided to the Park and Zoo through operational sources and fundraising in 2018 (Table 8).

Table 8

	2017	2018
Train Ticket Sales	\$131,999	\$133,573
Donation Boxes/ Fountain	\$7,422	\$8,340
Snack Bar Revenue	\$21,000	\$7,000
Other Donations<\$25,000	\$15,485	\$27,220
Animal Adoption Program	\$9,098	\$13,450
RPZ 5 km Fun Run	\$12,465	\$12,080
Education Programs	\$7,654	\$10,561
Facility Rentals	\$2,843	\$2,532
Guest Services Kiosk	\$59,128	\$53,401
TOTAL DONATIONS & REVENUE	\$267,594	\$268,157

Zoo Animal Collection

Table 9

	January 1, 2018	Birth/ Hatching	Deaths	Acquisitions	Disposition	December 31, 2018
# ANIMALS OWNED ON SITE	106	6	18	131	123	102
# ANIMALS IN ON LOAN	31	0	1	3	0	29
# ANIMALS OUT ON LOAN	8	0	2	0	0	12

Conservation & Education

The 2018 education program continued to grow and benefited from strong support from our volunteers and our partnership with the School of Education at Trent University. Last year’s program included Educators with roving “touch-tables”, public speaking engagements, “behind-the-scenes” tours, the parent & tot “Zoo Crew” program, formal guided tours, our “Zoo Academy” and “Zoo Trek” half-day curriculum-based day sessions as well as the new Turtle Trek joint-facility program developed in partnership with the Ontario Turtle Conservation Centre.

The Park and Zoo also collaborated with Otonabee Conservation to deliver the renowned Bondar Challenge education program at Riverview and the Warsaw Caves Conservation Area. Developed by The Roberta Bondar Foundation, the Bondar Challenge is a unique experiential program that helps children make a connection to nature through the art of photography.

Other programming included the “Meet the Keeper” sessions, custom sessions for visiting groups, sleepover programs for Brownies/Scouts, the Homeschool Spelling Bee, and our seasonal conservation exhibit. In 2018, the “Community of Conservation” exhibit featured contributions from several local

conservation organizations including Camp Kawartha, Peterborough Green Up, Otonabee Conservation, the Ontario Turtle Conservation Centre, Peterborough Distribution Inc., etc. and included a series of conservation events/activities.

In 2018, the Park and Zoo’s conservation program included cooperative projects with the Otonabee Region Conservation authority as well as supporting the Ontario Turtle Conservation Centre’s conservation work by donating heat lamp bulbs, turtle feed (smelt) and equipment. The Park and Zoo also participated in the Association of Zoos and Aquariums (AZA) Stud Book for red-necked wallaby, Sichuan takin and bobcat. We also participated in the African red-billed hornbill, Goeldi’s monkey, meerkat and squirrel monkey AZA Species Survival Plans, the Emu and Brazilian agouti Population Management Plans.

We were also instrumental in the “rescue” of 133 tropical fish that required care and rehoming following the death of a local private collector. Park and Zoo staff worked closely with staff from Kawartha Aquariums, the OSPCA, and Peterborough Humane Society to move the fish, ten aquariums and all of the associated equipment, etc. to the Park and Zoo. We then provided care for the fish until we arranged placement for them at CAZA-Accredited facilities.

Research

In 2018 the Park and Zoo participated in the Ontario Turtle Conservation Centre's Blanding's Turtle research project as well as hosting research projects by university biology and conservation biology students.

Special Events

The following events were hosted at the Riverview Park & Zoo:

- 17th Annual Peterborough Children's Water Festival,
- Eight musical groups performed in the 2018 summer season at the Gazebo,
- The 9th annual 5 km Fun Run with the Animals, raising \$10,000 for the Zoo.
- Hosting the Rotary Spelling Bee



Staff & Volunteers

As of December 2018, permanent staff included 1 Manager and Curator, 1 Supervisor, 1 Groundskeeper, 1 Animal Care Tech., 3 Zookeepers and 1 Park & Zoo Maintenance.

From May to August a total of 18 seasonal student employees assisted with Park and Zoo operations. Student employee positions included 3 zookeepers, 1 zoo maintenance worker, 2 public educators, 2 Guest Services representatives, 2 park maintenance workers, 4 horticulture/groundskeeping workers and 4 train operators.

A total of 5 student employees worked part-time hours starting in September. The students operated Guest Services on weekends until Thanksgiving, assisted with workload in the park until the end of October, and assisted zoo staff on weekends for the remainder of the calendar year.

The Park and Zoo hosted five college/university student placements over the year as well as two high school co-op placement students.

In 2018 the Volunteer Program continued to have strong support with a total of 28 volunteers assisting with our education program, and the operation of our seasonal conservation exhibit.

Appendix A – Financial Statement



**PETERBOROUGH UTILITIES COMMISSION
FINANCIAL STATEMENTS
AT DECEMBER 31, 2018**

TABLE OF CONTENTS

	<u>Page Number</u>
INDEPENDENT AUDITOR'S REPORT	
FINANCIAL STATEMENTS	
Statement of Financial Position	1
Statement of Operations and Accumulated Surplus	2
Statement of Cash Flows	3
Statement of Changes in Net Financial Assets	4
Notes to Financial Statements	5 to 12



Baker Tilly KDN LLP
272 Charlotte Street
Peterborough, ON
Canada K9J 2V4

D: 705.742.3418
F: 705.742.9775

www.bakertilly.ca

INDEPENDENT AUDITOR'S REPORT

To the Chair and Members of the Peterborough Utilities Commission

Opinion

We have audited the financial statements of Peterborough Utilities Commission (the Commission), which comprise the statement of financial position as at December 31, 2018 and the statements of operations and accumulated surplus, changes in net assets and cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the Commission as at December 31, 2018, and its financial performance and its cash flows for the year then ended in accordance with Canadian Public Sector Accounting Standards.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are independent of the Commission in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Other Matter

The financial statements of the Commission as at and for the year ended December 31, 2017 were audited by Collins Barrow Kawarthas LLP, which became Baker Tilly KDN LLP effective January 10, 2019.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with Canadian Public Sector Accounting, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Commission's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Commission or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Commission's financial reporting process.

ASSURANCE • TAX • ADVISORY

Baker Tilly KDN LLP is a member of Baker Tilly Canada Cooperative, which is a member of the global network of Baker Tilly International Limited. All members of Baker Tilly Canada Cooperative and Baker Tilly International Limited are separate and independent legal entities.

Peterborough

Courtice

Lindsay

Cobourg



Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Commission's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Commission's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Commission to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Baker Tilly KDN LLP

Chartered Professional Accountants
Licensed Public Accountants

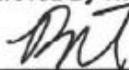
Peterborough, Ontario
April 25, 2019

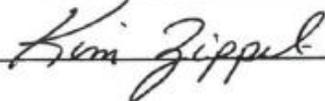
PETERBOROUGH UTILITIES COMMISSION
STATEMENT OF FINANCIAL POSITION
At December 31, 2018



	2018 \$	2017 \$
FINANCIAL ASSETS		
Cash (Note 3)	15,682,690	14,320,856
Accounts receivable		
Customer accounts	886,668	887,151
Sewer surcharge	876,985	831,962
Sundry	434,896	337,743
Unbilled water revenue on customer accounts	1,316,000	1,397,000
Unbilled sewer surcharge	1,251,000	1,306,000
	20,448,239	19,080,712
LIABILITIES		
Accounts payable and accrued charges	2,705,865	2,064,784
Sewer surcharge payable	2,914,539	2,726,964
Long term debt (Note 4)	10,981,703	12,344,783
Customer deposits	616,421	607,610
	17,218,528	17,744,141
NET FINANCIAL ASSETS	3,229,711	1,336,571
NON-FINANCIAL ASSETS		
Inventories	363,471	223,257
Tangible capital assets (Note 5)	121,580,113	119,624,934
Prepaid expenses	6,587	89,859
	121,950,171	119,938,050
ACCUMULATED SURPLUS (Note 6)	125,179,882	121,274,621

Approved By The Commission


_____, Chair


_____, Member

The accompanying notes are an integral part of this financial statement.

PETERBOROUGH UTILITIES COMMISSION
STATEMENT OF OPERATIONS AND ACCUMULATED SURPLUS
For The Year Ended December 31, 2018



	Budget 2018 \$ (Unaudited)	Actual 2018 \$	Actual 2017 \$
REVENUES			
Sale of water	17,100,000	17,394,669	16,718,003
Contributed capital installation charges	518,000	107,905	146,608
Development charges earned	2,608,000	2,119,948	91,449
Fire protection	650,000	650,000	650,000
Sewer surcharge billings	406,000	406,000	398,000
Riverview Park and Zoo (Note 12)	208,000	232,597	244,687
Interest	163,000	301,136	164,482
Other	210,000	200,934	286,488
Electricity	425,000	467,134	439,931
Donations	25,000	16,908	22,907
	22,313,000	21,897,231	19,162,555
EXPENSES			
Water treatment and storage	4,402,000	3,985,702	3,773,936
Water distribution	2,212,000	2,478,251	2,408,678
Riverview Park and Zoo (Note 12)	1,517,000	1,682,650	1,683,503
Administration	3,634,000	3,421,714	3,480,365
Amortization	6,300,000	6,043,949	6,047,497
Interest	380,000	379,704	415,113
	18,445,000	17,991,970	17,809,092
ANNUAL SURPLUS	3,868,000	3,905,261	1,353,463
OPENING ACCUMULATED SURPLUS	120,997,000	121,274,621	119,921,158
CLOSING ACCUMULATED SURPLUS	124,865,000	125,179,882	121,274,621

The accompanying notes are an integral part of this financial statement.

PETERBOROUGH UTILITIES COMMISSION
STATEMENT OF CASH FLOWS
For The Year Ended December 31, 2018



	2018 \$	2017 \$
CASH PROVIDED BY (USED IN):		
OPERATIONS		
Annual surplus	3,905,261	1,353,463
Add: Non-cash charges to operations		
Amortization	6,043,949	6,047,497
Contributed capital installation charges	(107,905)	(146,608)
	9,841,305	7,254,352
Change in non-cash working capital items (Note 8)	774,832	(474,535)
	10,616,137	6,779,817
INVESTING ACTIVITY		
Purchase of tangible capital assets	(7,891,223)	(6,040,763)
FINANCING ACTIVITIES		
Repayment of long term debt	(1,363,080)	(1,350,561)
NET CHANGE IN CASH DURING THE YEAR	1,361,834	(611,507)
CASH POSITION - BEGINNING OF YEAR	14,320,856	14,932,363
CASH POSITION - END OF YEAR	15,682,690	14,320,856

The accompanying notes are an integral part of this financial statement.

PETERBOROUGH UTILITIES COMMISSION
STATEMENT OF CHANGES IN NET FINANCIAL ASSETS
For The Year Ended December 31, 2018



	Budget 2018 \$ (Unaudited)	Actual 2018 \$	Actual 2017 \$
Annual Surplus	3,868,000	3,905,261	1,353,463
Acquisition Of Tangible Capital Assets	(8,915,000)	(7,999,128)	(6,187,371)
Amortization Of Tangible Capital Assets	6,300,000	6,043,949	6,047,497
Decrease (Increase) in Inventories	-	(140,214)	(42,009)
Decrease (Increase) in Prepaid Expenses	10,000	83,272	(89,859)
Change In Net Financial Assets	1,263,000	1,893,140	1,081,721
Net Financial Assets, beginning of year	742,000	1,336,571	254,850
Net Financial Assets, end of year	2,005,000	3,229,711	1,336,571

The accompanying notes are an integral part of this financial statement.

PETERBOROUGH UTILITIES COMMISSION
NOTES TO THE FINANCIAL STATEMENTS
For The Year Ended December 31, 2018



1. NATURE OF ORGANIZATION

Operating under the authority of the Municipal Act, the Peterborough Utilities Commission (the "Commission") provides water services to the residents of the City of Peterborough along with operational governance and funding for the Riverview Park and Zoo.

2. SIGNIFICANT ACCOUNTING POLICIES

The financial statements of the Peterborough Utilities Commission have been prepared in accordance with Canadian generally accepted accounting principles for local governments and their local boards as recommended by the Public Sector Accounting Board of the Chartered Professional Accountants Canada.

Significant aspects of the accounting policies adopted by the Commission are as follows:

(a) Recognition of Revenue and Expenses

Revenue is recorded using the accrual basis of accounting, as water is used by customers. Unbilled revenue is calculated as the estimated consumption between the last meter reading date and the year end date.

The value of distribution systems installed by developers is recorded in revenue as capital installation charges in the year in which the Commission assumes ownership at the fair market value.

Development charges are recognized as revenue when they are transferred out of the reserve fund and spent on growth related projects.

Revenue from fire protection, sewer charges and electricity is recognized when the service is provided.

Expenses are recognized in the period the goods or services are acquired and a legal liability is incurred by transfers are due.

(b) Use of Estimates

The preparation of financial statements in conformity with Canadian generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities as well as the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenditures during the year. Significant estimates and assumptions used in the preparation of financial statements include, but are not limited to: estimates of revenue, allowance for doubtful accounts, and amortization rates and carrying values of property, plant and equipment. Actual results could differ from these estimates.

(c) Inventories

Inventories consist of maintenance supplies and construction materials and are valued at the lower of moving average cost and replacement cost.

(d) Tangible Capital Assets

Tangible capital assets are stated at cost or deemed cost. Amortization on the water treatment plant and reservoirs, distribution system and Riverview Park and Zoo (purchased from operating and donated funds) is recorded on a declining balance basis at a rate of 5% per annum. Water meters are amortized on a straight line basis over 20 years. The Commission capitalizes assets with a value of \$5,000 or greater.

Tangible capital assets categorized as construction-in-progress are not amortized until they are put into service.

PETERBOROUGH UTILITIES COMMISSION
NOTES TO THE FINANCIAL STATEMENTS
For The Year Ended December 31, 2018



2. SIGNIFICANT ACCOUNTING POLICIES - (Continued)

(e) Reserve Funds

Certain amounts as approved by the Commission and those required under legislative or other authority are set aside in reserve funds for future operating or capital purposes. Transfers to and/or from reserve funds are an adjustment to the respective fund when approved or required by agreement.

The following reserve funds are included in the accumulated surplus:

(i) Water Treatment Plant Reserve Fund

In December 1990, the City of Peterborough passed a by-law authorizing the Peterborough Utilities Commission to establish a reserve fund for the purpose of upgrading the water treatment plant. The established practice is to appropriate 4.2% of the water revenues to this fund each year. Utilization of these funds is authorized by the Commission.

(ii) Development Charges Act Reserve Fund

The Peterborough Utilities Commission is authorized under the City of Peterborough by-law to establish a reserve fund for development charges. The purpose of the fund is to cover growth related net capital costs incurred by the Water Utility for water treatment, storage and distribution systems.

(iii) Park And Zoo Major Projects Reserve Fund

In September 1993, the City of Peterborough passed a by-law authorizing the Peterborough Utilities Commission to establish a reserve fund for major projects at the Riverview Park and Zoo. The revenues received for this fund include donations from estates and the general public, the utility's share of profits from the refreshment booth operations and profits from the sale of birds and animals. Utilization of these funds is authorized by the Commission on a project by project basis based upon the recommendation of the Riverview Park and Zoo Advisory Committee.

(iv) Park and Zoo Animal Care Reserve Fund

In July 1999, the City of Peterborough passed a by-law authorizing the Peterborough Utilities Commission to establish a reserve fund for animal care at the Riverview Park and Zoo. The fund was established through a capital donation from a Peterborough resident. The income generated annually will be used for the care, treatment, habitat or display of the animals at the Riverview Park and Zoo for special or exceptional purposes beyond standard care.

(v) Park and Zoo State of Good Repair Reserve Fund

In November 2016, the Commission authorized the establishment of an internally restricted Riverview Park and Zoo state of good repair reserve fund. The purpose of the fund is to cover major repair and maintenance costs incurred by the Riverview Park and Zoo that would be required to maintain the quality of its tangible capital assets.

(f) Non-Financial Assets

Tangible capital and other non-financial assets are accounted for as assets by the Commission because they can be used to provide services in future periods. These assets do not normally provide resources to discharge the liabilities of the Commission unless they are sold.

PETERBOROUGH UTILITIES COMMISSION
NOTES TO THE FINANCIAL STATEMENTS
For The Year Ended December 31, 2018



3. CASH

	2018 \$	2017 \$
Unrestricted cash	7,169,688	6,747,776
Restricted cash	8,513,002	7,573,080
	15,682,690	14,320,856

4. LONG TERM DEBT

Long term debt is issued on behalf of the Commission by The Corporation of the City of Peterborough and consists of the following:

Date of Maturity/Payment Terms	Interest Rate %	2018 \$	2017 \$
March 5, 2020, annual principal payments of \$660,000, interest paid semi-annually	3.893	1,320,000	1,980,000
July 5, 2027, semi-annual blended payments of \$274,120	3.180	4,261,703	4,664,783
November 6, 2036, semi-annual principal payments of \$150,000 plus interest	2.790	5,400,000	5,700,000
		10,981,703	12,344,783

Future repayments for the long term debt are as follows:

	Principal \$	Interest \$	Total \$
2019	1,376,000	326,001	1,702,001
2020	1,389,334	274,740	1,664,074
2021	743,095	236,956	980,051
2022	757,297	214,384	971,681
2023	771,955	191,356	963,311
Thereafter	5,944,022	883,827	6,827,849
	10,981,703	2,127,264	13,108,967

PETERBOROUGH UTILITIES COMMISSION
NOTES TO THE FINANCIAL STATEMENTS
For The Year Ended December 31, 2018



5. **TANGIBLE CAPITAL ASSETS**

	Water Treatment Plant and Reservoirs \$	Water Distribution System \$	Riverview Park and Zoo \$	Other \$	Construction In Progress \$	Total \$
Cost Or Deemed Cost						
Balance at January 1, 2017	50,146,683	163,767,792	9,489,444	17,403	955,525	224,376,847
Additions	449,590	3,910,142	448,833	-	1,378,806	6,187,371
Balance At December 31, 2017	50,596,273	167,677,934	9,938,277	17,403	2,334,331	230,564,218
Additions	114,745	5,298,214	615,331	-	1,970,838	7,999,128
Balance At December 31, 2018	50,711,018	172,976,148	10,553,608	17,403	4,305,169	238,563,346
Accumulated Amortization						
Balance at January 1, 2017	22,279,879	78,445,536	4,149,146	17,226	-	104,891,787
Amortization for the year	1,292,095	4,477,157	278,236	9	-	6,047,497
Balance At December 31, 2017	23,571,974	82,922,693	4,427,382	17,235	-	110,939,284
Amortization for the year	1,241,599	4,511,414	290,928	8	-	6,043,949
Balance At December 31, 2018	24,813,573	87,434,107	4,718,310	17,243	-	116,983,233
Net Book Value						
At December 31, 2017	27,024,299	84,755,241	5,510,895	168	2,334,331	119,624,934
At December 31, 2018	25,897,445	85,542,041	5,835,298	160	4,305,169	121,580,113

PETERBOROUGH UTILITIES COMMISSION
NOTES TO THE FINANCIAL STATEMENTS
For The Year Ended December 31, 2018



6. ACCUMULATED SURPLUS

Accumulated surplus consists of the following:

	2018 \$	2017 \$
Operating surplus	6,068,470	6,406,994
Investment in tangible capital assets		
Tangible capital assets - net book value	121,580,113	119,624,934
Long term debt	(10,981,703)	(12,344,783)
Reserve funds (Note 11)	8,513,002	7,587,476
	125,179,882	121,274,621

7. RELATED PARTY AND INTER-ENTITY TRANSACTIONS

The Commission is a board of the City of Peterborough and is consolidated with the City's financial statements. In the ordinary course of business, the Commission enters into transactions with the Corporation of the City of Peterborough and other related corporations. These transactions, which include the sale of water and the purchase and sale of other goods and services, are exchanged at the same prices and terms as arm's length customers. The affiliated corporations of the Commission are:

The City of Peterborough Holdings Inc.,
Peterborough Utilities Services Inc.,
Peterborough Distribution Inc.,
Peterborough Utilities Inc., and
PUG Services Corp.

Details of services provided to Peterborough Utilities Commission during the year by Peterborough Utilities Services Inc. are as follows:

	2018 \$	2017 \$
Expenditures		
Professional services	8,628,889	8,525,051
Building rent	384,729	385,971
Software and equipment rent	114,000	114,541
	9,127,618	9,025,563

Billing and collecting for the sewer surcharge is done by the Commission for the City of Peterborough. During the year \$406,000 (2017 - \$398,000) was recognized as revenue for providing this service. At December 31, the sewer surcharge payable of \$2,914,539 (2017 - \$2,726,964) recognized on the statement for financial position is payable to the City of Peterborough. All amounts owing to the City are unsecured, without interest and no specific terms of repayment.

PETERBOROUGH UTILITIES COMMISSION
NOTES TO THE FINANCIAL STATEMENTS
For The Year Ended December 31, 2018



8. CHANGE IN NON-CASH WORKING CAPITAL ITEMS

	2018 \$	2017 \$
Accounts receivable	(141,693)	(1,710)
Unbilled revenue and sewer surcharge	136,000	(136,000)
Inventories	(140,214)	(42,009)
Prepaid expenses	83,272	(89,859)
Accounts payable and sewer surcharge payable	828,656	(205,174)
Customer deposits	8,811	217
	774,832	(474,535)
Other information:		
Interest paid	375,836	423,620

9. BUDGET FIGURES

The budget, approved by the Commission, for 2018 is reflected on the Statement of Operations and Accumulated Surplus and the Statement of Changes in Net Financial Assets. The budgets established for capital investment in tangible capital assets are on a project-oriented basis, the costs of which may be carried out over one or more years and, therefore may not be comparable with current year's actual amounts. Budget figures have been reclassified for the purposes of these financial statements to comply with Public Sector Accounting Board reporting requirements. Budget figures are not subject to audit.

10. CHANGES IN ACCOUNTING POLICIES

The organization has implemented the following PSA sections which are now effective under the PSA Handbook: 3320 Contingent Assets, 3380 Contractual Rights, 2200 Related Party Transactions and 3420 Inter-Entity Transactions.

Under Section 3320, a contingent asset is a potential asset that exists at the financial statement date but requires confirmation or disproof at a future date that is not in the control of the public-sector entity. If the contingent asset is deemed to be likely to exist, then this should be disclosed in the notes to the financial statements. Disclosure should include the nature, extent (except in those cases where extent cannot be measured or disclosure would have an adverse effect on the outcome), the reason for any non-disclosure of extent, and when an estimate of the amount has been made, the basis for that estimate. This section has been applied prospectively. The adoption of this standard did not have an impact on the organization's financial statements.

Under Section 3380, a contractual right arises out of a contract or agreement where it will result in the public sector entity having both an asset and future revenue. The contract or agreement must be between two or more parties and be enforceable under contract law. Contractual rights are assets and revenues that will occur in the future due to an enforceable agreement in effect at the financial statement date. If a contractual right exists, it should be disclosed in the notes or schedules to the statements and include descriptions about nature, extent and timing. This section has been applied prospectively. The adoption of this standard did not have an impact on the organization's financial statements.

Sections 2200 and 3240 establishes the standards and requirements on how to account for and report transactions between public sector entities that comprise the government's reporting entity. This section has been applied retroactively with restatement of prior periods. The adoption of this standard did not have an impact on the organization's financial statements as the organization was already disclosing this information.

PETERBOROUGH UTILITIES COMMISSION
NOTES TO THE FINANCIAL STATEMENTS
For The Year Ended December 31, 2018



11. RESERVE FUNDS

	Budget 2018 \$ (Unaudited)	Actual 2018 \$	Actual 2017 \$
TRANSFERS FROM OPERATIONS:			
Sale of water	713,000	728,152	693,583
Development charges	2,608,000	2,119,948	91,449
Interest	95,000	147,394	83,445
Donations	25,000	16,860	22,907
Riverview park and zoo	50,000	50,000	50,000
	3,491,000	3,062,354	941,384
TRANSFERS			
For tangible capital assets	(2,805,000)	(2,136,828)	(91,816)
	686,000	925,526	849,568
CHANGE IN RESERVE FUNDS			
OPENING RESERVE FUNDS	7,578,000	7,587,476	6,737,908
CLOSING RESERVE FUNDS	8,264,000	8,513,002	7,587,476
ANALYZED AS FOLLOWS:			
INTERNALLY RESTRICTED			
Water treatment plant reserve fund	7,320,000	7,374,136	6,532,375
Park and zoo state of good repair reserve fund	100,000	100,633	50,000
	7,420,000	7,474,769	6,582,375
EXTERNALLY RESTRICTED			
Park and Zoo major projects reserve fund	574,000	562,551	536,833
Park and Zoo major animal care reserve fund	270,000	475,682	468,268
	844,000	1,038,233	1,005,101
	8,264,000	8,513,002	7,587,476

PETERBOROUGH UTILITIES COMMISSION
NOTES TO THE FINANCIAL STATEMENTS
For The Year Ended December 31, 2018



12. **OPERATIONS FOR RIVERVIEW PARK AND ZOO**

	Budget 2018 \$ (Unaudited)	Actual 2018 \$	Actual 2017 \$
EXPENSES			
Maintenance park	613,000	606,668	595,620
Maintenance train	86,000	70,834	79,252
Animal care and zoo maintenance	818,000	1,005,148	1,008,631
	1,517,000	1,682,650	1,683,503
REVENUES			
Train	120,000	133,573	131,999
Miscellaneous	88,000	99,024	112,688
	208,000	232,597	244,687
NET EXPENSES FOR THE YEAR	1,309,000	1,450,053	1,438,816

Appendix B – Abbreviations

2-MIB	2-methlisoborneol
CFU	Colony Forming Unit
COD	Chemical Oxidization Demand
CTS	Calcium Thiosulphate
DBP	Disinfection by-product
DWQMS	Drinking Water Quality Standard
DWRG	Drinking Water Research Group
EDC	Endocrine disrupting compounds
HAA	Haloacetic Acid
KM	Kilometers
L/m	Litres per Minute
m ²	Square Meters
m ³	Cubic Meters
MAC	Maximum Acceptable Concentration
mg/L	Milligram per Litre
ML	Megalitres
MECP	Ministry of Environment & Climate Change
MOH	Medical Officer of Health
ng/L	Nanogram per Litre
NTU	Nephelometric Turbidity Unit
ODWQS	Ontario Drinking Water Quality Standards
ORCA	Otonabee Region Conservation Authority
ORP	Oxidative Reduction Potential
PACL	Polyaluminum Hydroxychloride
PUC	Peterborough Utilities Commission
PUG	Peterborough Utilities Services Inc.
RP& Z	Riverview Park & Zoo
STS	Sodium thiosulphate
THM	Trihalomethane
TOC	Total Organic Carbon
µg/L	Microgram per Litre
UVA	Ultra Violet Absorbance
WTP	Water Treatment Plant

