OPTIONAL ANNUAL REPORT TEMPLATE

Drinking-Water System Number:	**220001272**
Drinking-Water System Name:	Perth Drinking Water System
Drinking-Water System Owner:	The Corporation of the Town of Perth
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 1 2016 to Dec 31 2016

Complete if your Category is Large Municipal Residential or Small Municipal Residential

Does your Drinking-Water System serve more than 10,000 people? Yes [ ] No [x]

Is your annual report available to the public at no charge on a web site on the Internet? Yes [x] No [ ]

Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.

The 2016 Summary Report will be prepared and forwarded to the Town of Perth Municipal Council by March 2017. Paper copies will be available at the Water Treatment Plant and electronic copies available on the municipal website.

Complete for all other Categories.

Number of Designated Facilities served:

20-25

Did you provide a copy of your annual report to all Designated Facilities you serve?
Yes [x] No [ ] Available on Website

Number of Interested Authorities you report to: n/a

Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility?
Yes [ ] No [ ] n/a

Note: For the following tables below, additional rows or columns may be added or an appendix may be attached to the report

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number
Tay Valley Township	n/a

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?
Yes [x] No [ ]

Indicate how you notified system users that your annual report is available, and is free of charge.

- **[x] Public access/notice via the web**
- **[ ] Public access/notice via Government Office**
- **[ ] Public access/notice via a newspaper**
- **[x] Public access/notice via Public Request**
- **[ ] Public access/notice via a Public Library**
- **[ ] Public access/notice via other method _____**

Describe your Drinking-Water System

Water Treatment Subsystem

The Water Treatment Plant is a Class III facility and was constructed in 1964 replacing the old Plant on Leslie Street, which was built in 1897. The town of Perth's water source is the Tay River, with our intake located at the Links O' Tay Golf Course. At the plant, conventional filtration practices are followed using a multiple barrier approach, including disinfection at various points in the process. The surface water, or raw water, flows by gravity from the intake area to the plant's intake wells, pretreated, and then onward to the raw water wells in the pump room. The raw water's quantity and quality is monitored in order for proper chemical dosages to occur. Raw water pretreatment consists of double screening for solids, and disinfection when needed with chlorine dioxide. If the plant is experiencing high colour, taste and odour problems, or high organics, the ability exists to add powdered activated carbon as part of the pretreatment stage.

The water is pumped to a mixing chamber where a coagulant is added to start the suspended solids removal process. During the next process step, in large flocculation tanks, the coagulant is allowed to form and develop into a gelatinous sticky "floc", also entrapping suspended solids and colour. The water then passes into settling chambers where the "floc" eventually sinks to the chambers' bottom, carrying the solids with it. After remaining in these settling chambers for a few hours (depending on demand), water is then decanted from the settling tanks and directed to two gravity filter beds.

The filter beds consist of layers of granular activated carbon and sand, with an additional gravel layer found in the older of the two filters. The filtered water's turbidity is continuously monitored and the filters are regenerated (backwashed), when predetermined process parameters have been reached. After filtering, the water proceeds to the clearwell where disinfection again occurs. Before leaving the clearwell, calcium hydroxide (lime) is added for pH adjustment (a target pH of 7.1 to 7.5 is desired). Fluoride (as recommended by the Ministry of Health and the Canadian Dental Association), is also added at this point. Reports of the level of fluoride present in the water are sent to the Health Unit on a monthly basis.

The water then flows into an underground reservoir at the plant with a storage capacity of approximately 750,000 gallons (3,000,000 liters). It remains there until demand requires it in the distribution system. Before pumping the water directly into the distribution system, post chlorination takes place to bring the free chlorine residual up to a level required to maintain a residual throughout the distribution system.

Water Distribution Subsystem

The distribution subsystem is comprised of approximately 40 km of water mains constructed primarily of cast, PVC and ductile iron pipe ranging in diameter from 100 mm to 400mm. The system serves a population of approximately 6000, supplies approximately 2300 service connections, and has approximately 245 hydrant installations.

An elevated tank, with storage capacity of 945 m^3, provides system pressure and storage. In the fall of 2007 upgrades to the tank included installation of a water mixing system to ensure adequate disinfection is maintained while water is stored in the tank. In 2008 the tank interior was re-lined and the exterior was rust-proofed and re-painted. In 2014 the overflow pipe was equipped with a 4 mesh non-corrodible screen and the elevated tank had its annual inspection at the same time.

The system is checked on a weekly basis to ensure that drinking water remains safe, free of bacteria and disinfected.

List all water treatment chemicals used over this reporting period

Sodium Hypochlorite
Chlorine Dioxide (made by mixing HCL, Sodium Chlorite and Sodium Hypochlorite
Calcium Hydroxide
Sodium Silicoflouride (Flouride)
Activated Carbon (GAC)
Poly-Aluminum Chloride (PAX XL-6)
Polymer

Were any significant expenses incurred to?

[x] Install required equipment
[x] Repair required equipment
[x] Replace required equipment

Please provide a brief description and a breakdown of monetary expenses incurred

1. Replacement of Service Water Discharge Valve
2. Replacement of 2 Overhead Chain Hoists
3. Filter Media Replaced in both Filters
4. Filter 2 – Underdrain Replacement
5. Positive Displacement Blower installed to allow for Filter Air Scour
6. Filter 2 Drain Valve Replaced
7. New Coagulant Pump and Tank Level Monitor
8. Replace Chlorine Gas Detector
9. Replacement of River Level Monitor
10. Replacement of Settling Tank Scraper Drive Motors
11. Rebuild of Filter Backwash Console and Controls
12. Continued electrical and SCADA upgrades
13. Replacement UPS for PLC Tower

Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
Apr 29 2016	Exceedance – Dichlorobenzene 1,4	6.1	ug/L	Resample	May 5 2016
Oct 3 2016	Contamination of Treated Water Supply Reservoir	Various measures of hydro-carbon	ug/L	Isolation of area, Clean up, Resample	Oct 5 2016

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.Coli Or Fecal Results (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	52	0-320	16-2100	n/a	n/a
Treated	52	Absent in all Samples	Absent in all Samples	52	10-200
Distribution	208	Absent in all Samples	Absent in all Samples	208	<10-80

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

	Number of Grab Samples	Range of Results (min #)-(max #)	Unit of Measure
Turbidity	**8760**	**.02-.74**	**NTU**
Chlorine	**8760**	**.74-1.99**	**mg/L free**
Fluoride (If the DWS provides fluoridation)	**365**	**.23-.87**	**mg/L**

***NOTE**: For continuous monitors use 8760 as the number of samples.*

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
MDWL 160-101 **Oct 31 2014**	**Sched C Residue Mgmt TSS**	**Monthly**	**Ann. Avg.** **7.31**	mg/L
MDWL 160-101 **Oct 31 2014**	**Sched C Residue Mgmt T Cl Residual**	**Monthly**	**Range** **0.01 to 0.03**	mg/L

Summary of Inorganic parameters tested during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	25 July 2016	<0.0001	mg/L	
Arsenic	25 July 2016	0.0003	mg/L	
Barium	25 July 2016	0.028	mg/L	

Boron	25 July 2016	0.012	mg/L	
Cadmium	25 July 2016	<0.00002	mg/L	
Chromium	25 July 2016	<0.002	mg/L	
***Lead**	25 July 2016	0.00021	mg/L	
Mercury	25 July 2016	<0.00002	mg/L	
Selenium	25 July 2016	<0.001	mg/L	
Sodium	25 July 2016	0.00021	mg/L	
Uranium	25 July 2016	<0.00005	mg/L	
Fluoride	18 Apr 2016	0.5	mg/L	
Nitrite	11 Jan 2016 18 Apr 2016 25 July 2016 17 Oct 2016	<0.1 <0.1 <0.1 <0.1	mg/L mg/L mg/L mg/L	
Nitrate	11 Jan 2016 18 Apr 2016 25 July 2016 17 Oct 2016	0.1 0.1 <0.1 <0.1	mg/L mg/L mg/L mg/L	

*only for drinking water systems testing under Schedule 15.2; this includes large municipal non-residential systems, small municipal non-residential systems, non-municipal seasonal residential systems, large non-municipal non-residential systems, and small non-municipal non-residential systems

Summary of lead testing under Schedule 15.1 during this reporting period
(applicable to the following drinking water systems; large municipal residential systems**,** small municipal residential systems, and non-municipal year-round residential systems)

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Unit of Measure	Number of Exceedances
Plumbing	**n/a**			
Distribution	**3**	**0.00011 to 0.00062**	**mg/L**	

The Municipality was required to conduct lead sampling in the 2016 calendar year. As well, Distribution staff did record pH and Alkalinity of two separate samples (winter and summer).

Period	Number of Distribution Samples	Range of pH results (min#) – (max #)	Range of Alkalinity Results (min#) – (max #)	Temperature Range (min#) – (max #)
Dec 15, 2015-Apr 15, 2016	**3**	**7.40 – 7.98**	**57-78**	**5.4-9.1**
June 15, 2016-Oct 15, 2016	**3**	**7.71 – 8.10**	**64-66**	**19.9-22.4**

Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	**25 July 2016**	**<0.3**	**ug/L**	
Aldicarb		**n/a**	ug/L	
Aldrin + Dieldrin		**n/a**	ug/L	
Atrazine + N-dealkylated metobolites	**25 July 2016**	**<0.5**	ug/L	
Azinphos-methyl	**25 July 2016**	**<1**	ug/L	
Bendiocarb		**n/a**	ug/L	
Benzene	**25 July 2016**	**<0.5**	ug/L	
Benzo(a)pyrene	**25 July 2016**	**<0.005**	ug/L	
Bromoxynil	**25 July 2016**	**<0.3**	ug/L	
Carbaryl	**25 July 2016**	**<3**	ug/L	
Carbofuran	**25 July 2016**	**<1**	ug/L	
Carbon Tetrachloride	**25 July 2016**	**<0.2**	ug/L	
Chlordane (Total)		**n/a**	ug/L	
Chlorpyrifos	**25 July 2016**	**<0.5**	ug/L	
Cyanazine		**n/a**	ug/L	
Diazinon	**25 July 2016**	**<1**	ug/L	
Dicamba	**25 July 2016**	**<5**	ug/L	
1,2-Dichlorobenzene	**25 July 2016**	**<0.1**	ug/L	
1,4-Dichlorobenzene	**25 July 2016**	**<0.2**	ug/L	
Dichlorodiphenyltrichloroethane (DDT) + metabolites		**n/a**	ug/L	
1,2-Dichloroethane	**25 July 2016**	**<0.1**	ug/L	
1,1-Dichloroethylene (vinylidene chloride)			ug/L	
Dichloromethane	**25 July 2016**	**<0.3**	ug/L	
2-4 Dichlorophenol	**25 July 2016**	**<0.1**	ug/L	
2,4-Dichlorophenoxy acetic acid (2,4-D)	**25 July 2016**	**<5**	ug/L	
Diclofop-methyl	**25 July 2016**	**<0.5**	ug/L	
Dimethoate	**25 July 2016**	**<1**	ug/L	
Dinoseb		**n/a**	ug/L	
Diquat	**25 July 2016**	**<5**	ug/L	
Diuron	**25 July 2016**	**<5**	ug/L	
Glyphosate	**25 July 2016**	**<25**	ug/L	
Heptachlor + Heptachlor Epoxide		**n/a**	ug/L	

Lindane (Total)		**n/a**	ug/L	
Malathion	**25 July 2016**	**<5**	ug/L	
Methoxychlor		**n/a**	ug/L	
Metolachlor	**25 July 2016**	**<3**	ug/L	
Metribuzin	**25 July 2016**	**<3**	ug/L	
Monochlorobenzene	**25 July 2016**	**<0.2**	ug/L	
Paraquat	**25 July 2016**	**<1**	ug/L	
Parathion		**n/a**	ug/L	
Pentachlorophenol	**25 July 2016**	**<0.1**	ug/L	
Phorate	**25 July 2016**	**<0.3**	ug/L	
Picloram	**25 July 2016**	**<5**	ug/L	
Polychlorinated Biphenyls(PCB)	**25 July 2016**	**<0.5**	ug/L	
Prometryne	**25 July 2016**	**<0.1**	ug/L	
Simazine	**25 July 2016**	**<0.5**	ug/L	
THM (NOTE**:** show latest annual average**)**	17 Oct 2016	**34.875**	ug/L	
Temephos		**n/a**	ug/L	
Terbufos	**25 July 2016**	**<0.3**	ug/L	
Tetrachloroethylene	**25 July 2016**	**<0.2**	ug/L	
2,3,4,6-Tetrachlorophenol	**25 July 2016**	**<0.1**	ug/L	
Triallate	**25 July 2016**	**<10**	ug/L	
Trichloroethylene	**25 July 2016**	**<0.1**	ug/L	
2,4,6-Trichlorophenol	**25 July 2016**	**<0.1**	ug/L	
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)		**n/a**	ug/L	
Trifluralin	**25 July 2016**	**<0.5**	ug/L	
Vinyl Chloride	**25 July 2016**	**<0.2**	ug/L	

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample
1,4 Dichlorobenzene	**6.1**	**ug/L**	**April 25 2016**