

2018 ANNUAL REPORT FOR MITCHELL DRINKING WATER SYSTEM

Part 1 – ANNUAL REPORT (as required by O. Reg. 170/03, Section 11)

Drinking-Water System Number:	210000577
Drinking-Water System Name:	Mitchell Drinking Water System
Drinking-Water System Owner:	Municipality of West Perth
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	Operating year 2018

Complete if your Category is Large Municipal Residential or Small Municipal Residential	Complete for all other Categories
Does your Drinking-Water System serve more than 10,000 people? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Number of Designated Facilities served: 11
Is your annual report available to the public at no charge on a web site on the Internet? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Did you provide a copy of your annual report to all Designated Facilities you serve? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection. Municipal Office, Mitchell Public Library and Municipality of West Perth Website	Number of Designated Facilities served: 11
	Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

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
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?
N/A

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

<input checked="" type="checkbox"/> Public access/notice via the web	<input type="checkbox"/> Public access/notice via Government Office	<input type="checkbox"/> Public access/notice via a newspaper
<input checked="" type="checkbox"/> Public access/notice via Public Request	<input type="checkbox"/> Public access/notice via a Public Library	<input type="checkbox"/> Public access/notice via Other Method

Describe your Drinking Water System

The Mitchell Drinking Water System is a Class II Distribution and Supply sub-system owned and operated by the Municipality of West Perth. The system consists of four drilled groundwater wells.

Production Well #1, contained within Well-house #1, is 23.2m deep and has a 200mm steel liner inserted into the original 305mm well casing. Raw water from this well is pumped through piping past Well-house #2 where, when required, it is combined with raw water from Well #2 and directed to Treatment Plant #123. Production Well #2 is 30.2m deep and has a 200mm steel liner inserted into the original 305mm well casing. Raw water is combined with raw water from Well #1 when required and directed to Treatment Plant #123. Production Well #3 is the main well for Treatment Plant #123 which is located within Well-house #3. The well is 54.7m deep with a 200mm steel liner inserted into the original 305mm well casing. Water from this well is conveyed through piping to Treatment Plant #123. Production Well #4, located within Treatment Plant #4, was drilled to a final depth of 71.6m with a 300mm steel casing. Raw water from this well is treated within Treatment Plant #4.

Raw water from all four wells is typically free from any bacteriological activity. The water is hard and naturally has elevated levels of fluoride. The turbidity of the raw water ranges from 0.1-0.5 NTU. Other than the normal increase in usage during the summer months, there are no major operational challenges due to event-driven fluctuations.

Treatment Plant #123 is located on the west side of St. George St. The storage reservoir is located adjacent to the eastern limit of the plant. It has a baffled section with a capacity of 155m³ and an unbaffled section with a capacity of 243m³. Raw water from the wells 1, 2 and 3 is conveyed into the plant, after which treatment chemicals are injected; sodium silicate for iron sequestering, and sodium hypochlorite for disinfection. The treated water is directed into the reservoir for contact time and then through the high lift pumps into the distribution system. Treatment Plant #123 also has a backup chlorination system.

Treatment Plant #4 is located near the NW corner of Arthur and Herbert streets. The plant includes a disinfection system and a 250m³ baffled, below grade reservoir. Primary

disinfection is achieved using liquid sodium hypochlorite. Sodium silicate is injected for iron sequestering. As in Treatment #123, the treated water is directed into the reservoir for contact time and then through the high lift pumps into the distribution system. The disinfection system has been designed with backup pumps.

The Mitchell standpipe is located at 87 Arthur Street. It is approximately 46m high and approximately 11m wide. The standpipe control building houses a series of water pipes and valves used to regulate the level of the standpipe. A diesel-powered fire pump is also connected to the piping system.

The Mitchell water tower is located at 125 Clarke Street. It is approximately 41m high and has a capacity of 1,000 m³. The control room has pipes and valves, level and flow monitoring equipment, and re-chlorination equipment.

The works currently services a population of approximately 4,000. There is approximately 42 km of distribution piping of various diameters and materials contained within the Mitchell Drinking Water System. There are approximately 1950 service connections and 212 fire hydrants. Flow varies across the grid, with lower flow volumes in the most remote and dead-end parts of the grid. Pressure within the distribution system is maintained by the level of the standpipe and water tower. If required, the distribution system pressure can be controlled by the high lift pump at Treatment #4.

List all water treatment chemicals used over this reporting period

Liquid Chlorine 12% - NSF
Liquid Chlorine 6% - NSF
Sodium Silicate - NSF

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

Nelson St. underground infrastructure replaced between Huron Rd. and Blenheim St.
Frank St. underground infrastructure installed between Arthur St. and Road 160.
New VFD and motor for Well 3.
New well pump for Well 2.
New VFD, high lift pump and motor at T#123.

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	Corrective Action	Corrective Action Date
11-05-18	Sodium (T123)	35mg/L	Resample	11-13-18
11-05-18	Sodium (T4)	47mg/L	Resample	11-13-18

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 Results (min #) - (max#)	Range of Total Coliform Results (min #) - (max#)	Number of HPC Samples	Range of HPC Results (min #) - (max#)
Raw Well #1	52	0	0	N/A	N/A
Raw Well #2	48	0	0	N/A	N/A
Raw Well #3	45	0	0	N/A	N/A
Raw Well #4	52	0	0	N/A	N/A
POE #123	52	0	0	52	0-3
POE #4	52	0	0	52	0-2
Distribution	208	0	0	52	0-76

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 #)	Units
Turbidity Raw Well #1	26	0.11-0.39	NTU
Turbidity Raw Well #2	20	0.10-0.61	NTU
Turbidity Raw Well #3	20	0.12-0.46	NTU
Turbidity Raw Well #4	26	0.10-0.39	NTU
Chlorine - POE 123 Continuous Monitoring	8760	0.00 – 5.00	mg/L
Chlorine-POE 4 Continuous Monitoring	8760	0.00 – 4.85	mg/L

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
N/A				

Treatment 123 (Reservoir and Distribution Center)

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	Apr 04, 2018	ND	µg/L	No
Arsenic	Apr 04, 2018	3.0	µg/L	No
Barium	Apr 04, 2018	57	µg/L	No
Boron	Apr 04, 2018	110	µg/L	No
Cadmium	Apr 04, 2018	ND	µg/L	No
Chromium	Apr 04, 2018	ND	µg/L	No
Lead-see results below				
Mercury	Apr 04, 2018	ND	µg/L	No
Selenium	Apr 04, 2018	ND	µg/L	No
Sodium	Nov 05, 2018	35	mg/L	Yes
Uranium	Apr 04, 2018	ND	µg/L	No
Fluoride	Dec 18, 2017	1.9	mg/L	Yes
Nitrite	Jan 02, 2018	ND	µg/L	No
Nitrate	Jan 02, 2018	ND	µg/L	No
Nitrite	Apr 03, 2018	ND	µg/L	No
Nitrate	Apr 03, 2018	ND	µg/L	No
Nitrite	Jul 09, 2018	ND	µg/L	No
Nitrate	Jul 09, 2018	ND	µg/L	No
Nitrite	Oct 01, 2018	ND	µg/L	No
Nitrate	Oct 01, 2018	ND	µg/L	No

ND = Not detected

Treatment 4 (Reservoir and Distribution Center)

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	Dec. 12 2016	ND	µg/L	No
Arsenic	Dec. 12 2016	1.5	µg/L	No
Barium	Dec. 12 2016	59	µg/L	No
Boron	Dec. 12 2016	110	µg/L	No
Cadmium	Dec. 12 2016	ND	µg/L	No
Chromium	Dec. 12 2016	ND	µg/L	No
Lead-see results below				
Mercury	Dec 12, 2016	ND	µg/L	No
Selenium	Dec 12, 2016	ND	µg/L	No
Sodium	Nov 05, 2018	47	mg/L	Yes
Uranium	Dec 12, 2016	0.22	µg/L	No
Fluoride	Dec 18, 2017	1.8	mg/L	Yes
Nitrite	Jan 02, 2018	ND	µg/L	No
Nitrate	Jan 02, 2018	ND	µg/L	No
Nitrite	Apr 03, 2018	ND	µg/L	No
Nitrate	Apr 03, 2018	ND	µg/L	No
Nitrite	Jul 09, 2018	ND	µg/L	No
Nitrate	Jul 09, 2018	ND	µg/L	No
Nitrite	Oct 01, 2018	ND	µg/L	No
Nitrate	Oct 01, 2018	ND	µg/L	No

N/D = Not detected

Lead Testing Results

Summary of Lead Results during this reporting period (Winter: Dec. 15/13-April 15/14; Summer: June 15-Oct. 15/14)				
Sampling Period	Location	Distribution System mg/L Lead	Distribution System mg/L Alkalinity	Any Adverse Water Quality Incidents?
Jan 16, 2018	Well #3 SS	ND	210	N
Jan 16, 2018	Hydrant #64	ND	210	N
Jan 16, 2018	Hydrant #136	ND	220	N
Jun 25, 2018	Well #3 SS	0.00055	210	N
Jun 25, 2018	Hydrant #135	ND	210	N
Jun 25, 2018	Hydrant #61	ND	210	N

ND: Non-detect

Point of Entry 123

Summary of Organic parameters tested during this reporting period or the most recent sample results				
Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Semivolatile Organics				
2,3,4,6- Tetrachlorophenol	Apr. 9 2018	ND	µg/L	No
2,4,6-Trichlorophenol	Apr. 9 2018	ND	µg/L	No
2,4-D	Apr. 9 2018	ND	µg/L	No
2,4-Dichlorophenol	Apr. 9 2018	ND	µg/L	No
Alachlor	Apr. 9 2018	ND	µg/L	No
Atrazine	Apr. 9 2018	ND	µg/L	No
Des-ethyl atrazine	Apr. 9 2018	ND	µg/L	No
Atrazine+Desethyl-atrazine	Apr. 9 2018	ND	µg/L	No
Bromoxynil	Apr. 9 2018	ND	µg/L	No
Carbaryl	Apr. 9 2018	ND	µg/L	No
Carbofuran	Apr. 9 2018	ND	µg/L	No
Chlorpyrifos(Dursban)	Apr. 9 2018	ND	µg/L	No
Diazinon	Apr. 9 2018	ND	µg/L	No
Dicamba	Apr. 9 2018	ND	µg/L	No
Diclofop-methyl	Apr. 9 2018	ND	µg/L	No
Dimethoate	Apr. 9 2018	ND	µg/L	No
Malathion	Apr. 9 2018	ND	µg/L	No

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

MCPA	Apr. 9 2018	ND	µg/L	No
Metolachlor	Apr. 9 2018	ND	µg/L	No
Metribuzin(Sencor)	Apr. 9 2018	ND	µg/L	No
Pentachlorophenol	Apr. 9 2018	ND	µg/L	No
Phorate	Apr. 9 2018	ND	µg/L	No
Picloram	Apr. 9 2018	ND	µg/L	No
Prometryne	Apr. 9 2018	ND	µg/L	No
Simazine	Apr. 9 2018	ND	µg/L	No
Terbufos	Apr. 9 2018	ND	µg/L	No
Triallate	Apr. 9 2018	ND	µg/L	No
Trifluralin	Apr. 9 2018	ND	µg/L	No
Benzo(a)pyrene	Apr. 9 2018	ND	µg/L	No
Volatile Organics				
1,1-Dichloroethylene	Apr. 9 2018	ND	µg/L	No
1,2-Dichlorobenzene	Apr. 9 2018	ND	µg/L	No
1,2-Dichloroethane	Apr. 9 2018	ND	µg/L	No
1,4-Dichlorobenzene	Apr. 9 2018	ND	µg/L	No
Benzene	Apr. 9 2018	ND	µg/L	No
Carbon Tetrachloride	Apr. 9 2018	ND	µg/L	No
Chlorobenzene	Apr. 9 2018	ND	µg/L	No
Methylene Chloride (Dichloromethane)	Apr. 9 2018	ND	µg/L	No
Ethylbenzene	Apr. 9 2018	ND	µg/L	No
Tetrachloroethylene	Apr. 9 2018	ND	µg/L	No
Toluene	Apr. 9 2018	ND	µg/L	No
Trichloroethylene	Apr. 9 2018	ND	µg/L	No
Vinyl Chloride	Apr. 9 2018	ND	µg/L	No
o-Xylene	Apr. 9 2018	ND	µg/L	No
p+m-Xylene	Apr. 9 2018	ND	µg/L	No
Total Xylenes	Apr. 9 2018	ND	µg/L	No
PCBs				
Total PCB	Apr. 9 2018	ND	µg/L	No
THM (NOTE: show latest annual average)	Q1-Q4 2018	29.05	µg/L	No
HAA (NOTE: show latest annual average)	Q1-Q4 2018	8.63	µg/L	No

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

Pesticides & Herbicides				
Glyphosate	Apr. 9 2018	ND	µg/L	No
Diquat	Apr. 9 2018	ND	µg/L	No
Diuron	Apr. 9 2018	ND	µg/L	No
Guthion (Azinphos-methly)	Apr. 9 2018	ND	µg/L	No
Paraquat	Apr. 9 2018	ND	µg/L	No
Temephos	Apr. 9 2018	ND	µg/L	No

ND= non-detect

Point of Entry 4

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

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
2,3,4,6-Tetrachlorophenol	Dec. 12 2016	ND	µg/L	No
2,4,6-Trichlorophenol	Dec. 12 2016	ND	µg/L	No
2,4-D	Dec. 12 2016	ND	µg/L	No
2,4-Dichlorophenol	Dec. 12 2016	ND	µg/L	No
Alachlor	Dec. 12 2016	ND	µg/L	No
Atrazine	Dec. 12 2016	ND	µg/L	No
Des-ethyl atrazine	Dec. 12 2016	ND	µg/L	No
Atrazine+Desethyl-atrazine	Dec. 12 2016	ND	µg/L	No
Bromoxynil	Dec. 12 2016	ND	µg/L	No
Carbaryl	Dec. 12 2016	ND	µg/L	No
Carbofuran	Dec. 12 2016	ND	µg/L	No
Chlorpyrifos (Dursban)	Dec. 12 2016	ND	µg/L	No
Diazinon	Dec. 12 2016	ND	µg/L	No
Dicamba	Dec. 12 2016	ND	µg/L	No
Diclofop-methyl	Dec. 12 2016	ND	µg/L	No
Dimethoate	Dec. 12 2016	ND	µg/L	No
Malathion	Dec. 12 2016	ND	µg/L	No
MCPA	Dec. 12 2016	ND	µg/L	No
Metolachlor	Dec. 12 2016	ND	µg/L	No
Metribuzin (Sencor)	Dec. 12 2016	ND	µg/L	No

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

Pentachlorophenol	Dec. 12 2016	ND	µg/L	No
Phorate	Dec. 12 2016	ND	µg/L	No
Picloram	Dec. 12 2016	ND	µg/L	No
Prometryne	Dec. 12 2016	ND	µg/L	No
Simazine	Dec. 12 2016	ND	µg/L	No
Terbufos	Dec. 12 2016	ND	µg/L	No
Triallate	Dec. 12 2016	ND	µg/L	No
Trifluralin	Dec. 12 2016	ND	µg/L	No
Benzo(a)pyrene	Dec. 12 2016	ND	µg/L	No
1,1-Dichloroethylene	Dec. 12 2016	ND	µg/L	No
1,2-Dichlorobenzene	Dec. 12 2016	ND	µg/L	No
1,2-Dichloroethane	Dec. 12 2016	ND	µg/L	No
1,4-Dichlorobenzene	Dec. 12 2016	ND	µg/L	No
Benzene	Dec. 12 2016	ND	µg/L	No
Carbon Tetrachloride	Dec. 12 2016	ND	µg/L	No
Chlorobenzene	Dec. 12 2016	ND	µg/L	No
Methylene Chloride (Dichloromethane)	Dec. 12 2016	ND	µg/L	No
Tetrachloroethylene	Dec. 12 2016	ND	µg/L	No
Toluene	Dec. 12 2016	ND	µg/L	No
Trichloroethylene	Dec. 12 2016	ND	µg/L	No
Vinyl Chloride	Dec. 12 2016	ND	µg/L	No
Total PCB	Dec. 12 2016	ND	µg/L	No
Glyphosate	Dec. 12 2016	ND	µg/L	No
Diquat	Dec. 12 2016	ND	µg/L	No
Diuron	Dec. 12 2016	ND	µg/L	No
THM (NOTE: show latest annual average)	Q1-Q4 2018	29.05	µg/L	No
HAA (NOTE: show latest annual average)	Q1-Q4 2018	8.63	µg/L	No
Guthion (Azinphos-methly)	Dec. 12 2016	ND	µg/L	No
Paraquat	Dec. 12 2016	ND	µg/L	No
Temephos	Dec. 12 2016	ND	µg/L	No

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

Parameter	Sample Date	Result Value	Unit of Measure	ODWS Criteria
Fluoride (T123)	Dec 18, 2017	1.9	mg/L	1.5
Fluoride (T4)	Dec 18, 2017	1.8	mg/L	1.5

Part 2 – SUMMARY REPORT (as required by O. Reg. 170/03, Schedule 22)

Non-Compliance with Legislations, Regulations, Approvals & Orders

During this period, the Facility was operated in full compliance with the Act, the regulations and the Facility's approval, save and except for the following:

- Sodium exceedance at Treatment 123 and Treatment 4.
- Failed to comply with O-Reg 170/03, Schedule 16-3.

Well #1

System Capability Assessment			
Comparison of Flow Rates (raw flow; m ³):			
Month	Average Daily Flow	Maximum Daily Flow	*Max flow (L/min)
January	2.32	43.99	1587.6
February	0.57	4	1597.2
March	8.42	101.02	1581.6
April	33.07	188.98	1602
May	24.23	185.02	1590.6
June	3.73	66	1599
July	60.58	632.98	1832.4**
August	183.48	946	1427.4
September	6.47	32.99	1406.4
October	108.13	883	1414.8
November	159.63	889.99	1503
December	80.29	595	1506.6
*MAXIMUM	N/A	946	1832.4
AVERAGE	55.91	380.75	1554.05
PTTW	N/A	2617.92	1818
% of PTTW MAX	-	36.14%	100.79%
% of PTTW AVG	-	14.54%	85.48%

Well #2

System Capability Assessment			
Comparison of Flow Rates (raw flow; m ³):			
Month	Average Daily Flow	Maximum Daily Flow	*Max flow (L/min)
January	51.1	236.99	1946.4
February	46.79	234	1909.2
March	43.03	224	1868.4
April	10.13	111.99	1991.4
May	14.74	188.99	1877.4
June	9.30	150.02	1890.6
July	148.65	1566.99	1991.4
August	476.9	2352.01	1813.2
September	2.6	25	1792.8
October	193.61	2377.02	1831.2
November	219.23	2389.02	2889.6**
December	7.81	170	4545**
*MAXIMUM	N/A	2389.02	4545
AVERAGE	101.99	835.50	2195.55
PTTW	N/A	3024	2100
% of PTTW MAX	-	79%	216.43%
% of PTTW AVG	-	27.63%	104.55%

Well #3

System Capability Assessment			
Comparison of Flow Rates (raw flow; m ³):			
Month	Average Daily Flow	Maximum Daily Flow	*Max flow (L/min)
January	1251.19	3171.02	2823
February	1179.82	3062.98	2859.6
March	1104.32	3145.96	2821.2
April	1210.13	3200.01	2821.8
May	1143.26	3151.99	2818.2
June	1297.07	3195.00	2800.2
July	1231.94	3238.98	2813.4
August	539.94	3212.98	2805.6
September	1240.07	3182.01	2817.6
October	1105.77	3179.99	2826.6
November	0	0	73.8
December	683.81	3192.99	2882.4**
*MAXIMUM	N/A	3238.98	2882.4
AVERAGE	998.94	2911.16	2596.95
PTTW	N/A	3900.0	2880.0
% of PTTW MAX	-	83.05%	100.08%
% of PTTW AVG	-	74.65%	90.17%

Well #4

System Capability Assessment			
Comparison of Flow Rates (raw flow; m ³):			
Month	Average Daily Flow	Maximum Daily Flow	*Max flow (L/min)
January	1661.55	4115	4330.4
February	1489.25	3826	5264.25
March	1715.16	4113	4310.48
April	1602.87	3640	5428.704
May	2037.81	4301	4323.87
June	1719.93	4148	4296.75
July	1701.97	4108	4305.336
August	1672.68	3983	5412.912
September	1609.50	3684	4300.524
October	1726.87	4150	8736.66**
November	2538.20	3779	4304.646
December	1750.94	3608	4274.778
*MAXIMUM	N/A	4301	8736.66
AVERAGE	1768.89	3955	4940.78
PTTW	N/A	8640	6000
% of PTTW MAX	-	49.78%	145.611%
% of PTTW AVG	-	45.78%	82.35%

* All max flow data is taken from L/s data from the SCADA system and converted to L/min to coincide with the PTTW.

** Permit exceedances due to routine maintenance and repair operations.

Treatment 123

System Capability Assessment		
Comparison of Flow Rates (total treated flow; m ³ /d):		
Month	Average Flow	Maximum Daily Flow
January	1261.98	3145.59
February	1190.30	3024.29
March	1118.98	3079.43
April	1219.43	3129.15
May	1121.90	3120.01
June	1269.24	3146.12
July	1392.50	3156.57
August	1133.28	3147.42
September	1211.37	3122.67
October	1365.50	3123.79
November	359.69	3095.17
December	743.53	3102.52
* AVERAGE	1115.64	N/A
MAXIMUM	N/A	3156.57
SYSTEM CAPACITY	8640	8640
% CAPACITY	12.91%	36.53%

Treatment 4

System Capability Assessment		
Comparison of Flow Rates (total treated flow; m ³ /d):		
Month	Average Flow	Maximum Flow
January	1637.10	4031
February	1467.61	3740
March	1689.94	4028
April	1580.07	3616
May	2006.58	4234
June	1695.60	4081
July	1676.42	4046
August	1648.97	3923
September	1585.43	3661
October	1701.45	4110
November	2500.87	3701
December	1750.94	3553
*AVERAGE	1745.08	N/A
MAXIMUM	N/A	4234
SYSTEM CAPACITY	8640	8640
% CAPACITY	20.20%	49.00%