



Staff Report

Report No.: PWE 06-2019
Meeting Date: February 20th, 2019
Submitted by: Eric Joudrey – Water / Wastewater Operations Manager
Subject: 2018 Annual Water Reports

Recommendation:

THAT, Report No. PWE 06-2019 titled “2018 Annual Drinking Water Systems Summary” reports BE RECEIVED.

Purpose:

To provide Council with the 2018 Annual Summary Reports for the Middlesex Centre’s Drinking Water Systems as required under the Safe Drinking Water Act.

Background:

The summary reports were prepared as per Schedule 22 of Ontario Regulation 170/03 under the Safe Drinking Water Act. The Regulation requires that a Drinking Water Annual Summary Report be prepared and submitted to Council by March 31st relating to the operation and performance for the preceding calendar year.

Analysis

Enclosed are the 2018 Annual Drinking Water Systems Summary for each of Middlesex Centre Drinking Water Systems: Birr, Melrose and Middlesex Centre Distribution System, which includes Arva, Ballymote, Delaware, Denfield, Ilderton and Komoka.

Financial Implications:

Not Applicable

Strategic Plans:

Not Applicable



2018 ANNUAL PERFORMANCE REPORT

BIRR WATER TREATMENT PLANT



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INTRODUCTION

The Municipality of Middlesex Centre is preparing a report summarizing system operation and water quality for every municipal drinking water system annually. The reports detail the latest water quality testing results, water quantity statistics and any adverse conditions that may have occurred for the previous year. They are available for review by the end of February on the Municipality of Middlesex Centre website at [www.middlesexcentre.on.ca/Public/drinking water](http://www.middlesexcentre.on.ca/Public/drinking_water) or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is accurate. If you have any questions or comments concerning the report please contact the Municipality of Middlesex Centre.

Table 1 – Plant Information

Drinking Water System	Birr Well Supply System
Drinking Water System Number	220005492
Drinking Water System Owner & Contact Information	Municipality of Middlesex Centre Small Municipal Residential System 10227 Ilderton Road, RR #2 Ilderton, Ontario N0M 2A0
Reporting Period	January 1, 2018 to December 31, 2018

SECTION A – SYSTEM DESCRIPTION

The Birr Drinking Water System is owned by the Municipality of Middlesex Centre and operated by the Municipality of Middlesex Centre. The Birr Drinking Water System is a ground water supply system serving the Village of Birr that presently services 18 lots on Gwendolyn St with an estimated population of 53 residents. This system consists of one (1) drilled well, rated at 88m³/day operating under the Permit to Take Water # 3415-A3JHTY. Raw well water is pumped from the well into a concrete reservoir. The water is disinfected using a sodium hypochlorite disinfection system, consisting of one storage tank and two chemical metering pumps (one duty and one standby) with a feed line discharging into the underground reservoir. Two submersible high lift pumps, then pump the water through a 150mm water main to the distribution system. The system operates under Municipal Drinking Water License Number 052-104 and Drinking Water Works Permit Number 052-204.

The system is maintained by licensed water system operators, who operate treatment and monitoring equipment and collect samples as specified by the Regulation. Alarms automatically notify operators in the event of failure of critical operational requirements.

SECTION B – MODIFICATIONS & REPLACEMENTS

Modifications & Replacements
No major upgraded or Form 2 Record of Minor Modifications or Replacements to the Drinking Water System

SECTION C – MICROBIOLOGICAL TESTING**(I) E. COLI & TOTAL COLIFORM**

Bacteriological tests for E. coli and total coliforms are collected from the raw water at the facility and treated water from the distribution system. Raw water is collected monthly and the distribution water is collected on a bi-weekly schedule. Extra samples are taken after major repairs or maintenance work. Any E. coli or total coliform results above 0 in the treated distribution water must be reported to the Ministry of the Environment, Conservation and Parks (MECP) and Medical Officer of Health (MOH). Resamples and any other required actions are taken as quickly as possible. The results from the 2018 sampling program are shown on the table below. There were no adverse test results from 26 distribution water samples in this reporting period.

TABLE 2 – E. COLI & TOTAL COLIFORM SAMPLES

	Number of Samples	Range of E. coli Results Min – Max	Range of Total Coliform Results Min – Max
Raw	13	0	0
Distribution	26	0	0

(II) HETEROTROPHIC PLATE COUNT (HPC)

HPC analyses are required from the distribution water on a bi-weekly basis. HPC should be less than 500 colonies per 1 mL. Results over 500 colonies per 1 mL may indicate a change in water quality but it is not considered an indicator of unsafe water. The 2018 results are shown in the table below.

TABLE 3 – HETEROTROPHIC PLATE COUNT (HPC) SAMPLES

Parameters	Number of Samples	Range of HPC Results Min-Max
Distribution	26	<10 – 10

SECTION D – CHEMICAL TESTING

The Safe Drinking Water Act requires periodic testing of the water for chemical parameters. The sampling frequency varies for different types and sizes of water systems. If the concentration of a parameter is above half of the Maximum Allowable Concentration (MAC) under the Ontario Drinking

Water Quality Standards, an increased testing frequency of once every three months is required by the Regulation. Where concerns regarding a parameter exist, the MECP can also require additional sampling be undertaken.

Nitrate and nitrite samples are required every 3 months in normal operation.

TABLE 4 – QUARTERLY NITRATE & NITRITE

Parameter & Sample Date	Result (mg/l)	MAC (mg/l)	Exceedance
Nitrate			
1st Quarter	0.014	10.0	No
2nd Quarter	0.014	10.0	No
3rd Quarter	0.006	10.0	No
4th Quarter	0.017	10.0	No
Nitrite			
1st Quarter	<0.003	1.0	No
2nd Quarter	<0.003	1.0	No
3rd Quarter	0.003	1.0	No
4th Quarter	0.003	1.0	No

Trihalomethane (THM) and total Haloacetic Acids (HAA) are by-products of the disinfection process. The samples are required every 3 months from the distribution system.

TABLE 5 – QUARTERLY TRIHALOMETHANE & HALOACETIC ACID

Parameter & Sample Date	Result (mg/l)	Annual Rolling Average (mg/l)	MAC (mg/l)	Exceedance
Trihalomethane				
1st Quarter	0.054	0.055	100	No
2nd Quarter	0.044	0.044	100	No
3rd Quarter	0.047	0.047	100	No
4th Quarter	0.053	0.053	100	No
Haloacetic Acid (HAA)				
1st Quarter	0.043	0.037	80	No
2nd Quarter	0.043	0.042	80	No
3rd Quarter	0.034	0.039	80	No
4th Quarter	0.031	0.039	80	No

The following Table summarizes the most recent test results for Sodium and Fluoride. Testing and reporting any adverse results is required every 5 years.

TABLE 6 – SODIUM & FLUORIDE

Parameter	Sample Date	Result Value (mg/L)	MAC (mg/L)
Sodium	January 2, 2017	39.2*	20
Sodium	January 9, 2017	43.1*	20
Fluoride	January 2, 2017	1.34*	1.5

*Sodium levels between 20 – 200 mg/L must be reported every 5 years.

**Natural levels of fluoride between 1.5 – 2.4 mg/L must be reported every 5 years.

The following Table summarizes the most recent results for the Lead Testing Program. Lead samples are taken twice per year, in the winter sample period and the summer sample period as outlined below. Alkalinity and pH are monitored twice per year in the distribution system to ensure water quality is consistent and does not facilitate leaching of lead into the water.

TABLE 7 – LEAD SAMPLING

Parameter	Result Value	MAC	Exceedance
Winter Sample (Dec. 15 – April 15)			
Lead (ug/l)	0.18	10	No
Distribution Alkalinity (mg/l)	202	*30 - 500	No
Distribution pH	8.13	-	No
Summer Sample (June 15 – Oct. 15)			
Lead (ug/l)	0.11	10	No
Distribution Alkalinity	205	*30 – 500	No
Distribution pH	7.30	-	No

*Distribution alkalinity is an aesthetic objective / Operational Guideline with a range between 30 mg/l to 500 mg/l

The following Table summarizes the most recent test results for Schedules 23 and 24. Testing is required every 5 years for secure groundwater wells.

TABLE 8 – SCHEDULE 23 & 24

Parameter	Sample Date	Treated Water Value (ug/l)	Exceedance
Antimony	01/02/2017	ND	No
Arsenic	01/02/2017	ND	No
Barium	01/02/2017	502	No
Barium	01/02/2017	489	No
Barium	01/02/2017	484	No
Boron	01/02/2017	201	No
Cadmium	01/02/2017	0.012	No
Chromium	01/02/2017	0.58	No
Mercury	01/02/2017	ND	No
Selenium	01/02/2017	ND	No
Uranium	01/02/2017	0.023	No
Alachlor	01/02/2017	ND	No
Atrazine + N-dealkylated metabolites	01/02/2017	ND	No
Atrazine	01/02/2017	ND	No
Densethyl atrazine	01/02/2017	ND	No
Azinphos-methyl	01/02/2017	ND	No
Benzene	01/02/2017	ND	No
Benzo(a)pyrene	01/02/2017	ND	No
Bromoxynil	01/02/2017	ND	No

Carbaryl	01/02/2017	ND	No
Carbofuran	01/02/2017	ND	No
Carbon Tetrachloride	01/02/2017	ND	No
Chlorpyrifos	01/02/2017	ND	No
Chlorpyrifos	01/02/2017	ND	No
Diazinon	01/02/2017	ND	No
Dicamba	01/02/2017	ND	No
1,2-Dichlorobenzene	01/02/2017	ND	No
1,4-Dichlorobenzene	01/02/2017	ND	No
1,2-Dichloroethane	01/02/2017	ND	No
1,1-Dichloroethylene (vinylidene chloride)	01/02/2017	ND	No
Dichloromethane	01/02/2017	ND	No
2,4 Dichlorophenol	01/02/2017	ND	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	01/02/2017	ND	No
Diclofop-methyl	01/02/2017	ND	No
Dimethoate	01/02/2017	ND	No
Diquat	01/02/2017	ND	No
Diuron	01/02/2017	ND	No
Glyphosate	01/02/2017	ND	No
Malathion	01/02/2017	ND	No
2-methyl- 4chlorophenoxyacetic acid (MCPA)	01/02/2017	ND	No
Metolachlor	01/02/2017	ND	No
Metribuzin	01/02/2017	ND	No
Monochlorobenzene	01/02/2017	ND	No
Paraquat	01/02/2017	ND	No
Pentachlorophenol	01/02/2017	ND	No
Phorate	01/02/2017	ND	No
Picloram	01/02/2017	ND	No
Polychlorinated Biphenyls(PCB)	01/02/2017	ND	No
Prometryne	01/02/2017	ND	No
Simazine	01/02/2017	ND	No
Terbufos	01/02/2017	ND	No
Tetrachloroethylene	01/02/2017	ND	No
2,3,4,6-Tetrachlorophenol	01/02/2017	ND	No
Triallate	01/02/2017	ND	No
Trichloroethylene	01/02/2017	ND	No
2,4,6-Trichlorophenol	01/02/2017	ND	No
Trifluralin	01/02/2017	ND	No
Vinyl Chloride	01/02/2017	ND	No

ND = Non-Detect

SECTION E - OPERATIONAL MONITORING

(I) CHLORINE RESIDUAL

Free chlorine levels of the treated water are monitored continuously at the discharge point of the Water Treatment Facility. In the distribution system, free chlorine is checked twice weekly at various locations throughout the distribution system. As a target, free chlorine residual within the distribution system should be above 0.20 mg/L. A free chlorine level lower than 0.05 mg/L must be reported and corrective action taken. There were no reportable incidents in 2018. A summary of the chlorine residual readings is provided in the table below.

TABLE 4 – CHLORINE RESIDUALS

Parameter	Number of Tests or Monitoring Frequency	Range of Results (Min – Max)
Chlorine residual in distribution (mg/l)	104	0.59 – 1.48
Chlorine residual after treatment (mg/L)	Continuous	0.25 – 3.55

(I) TURBIDITY

Turbidity of treated water is continuously monitored at the treatment facility, as a change in turbidity can indicate an operational problem. The turbidity of untreated water from the well is checked monthly. Turbidity is measured in nephelometric turbidity units (NTU). Under Regulation 170/03 turbidity in groundwater is not reportable, however turbidity should be < 1 NTU at the treatment plant and < 5 NTU in the distribution system. A summary of the monitoring results for 2018 is provided in the table below.

TABLE 5 – TURBIDITY

Parameter	Number of Tests or Monitoring Frequency	Range of Results (Min – Max)
Turbidity after treatment (NTU)	Continuous	0.08 – 1.25

SECTION F - WATER QUANTITY

Continuous monitoring of flowrates from supply wells into the treatment system and from the facility into the distribution system is required by Regulation 170/03. The Municipal Drinking Water License and Permit to Take Water issued by the MECPC regulate the amount of water that can be utilized over a given time period. A summary of the 2018 flows are provided below.

TABLE 9 – FLOW DATA

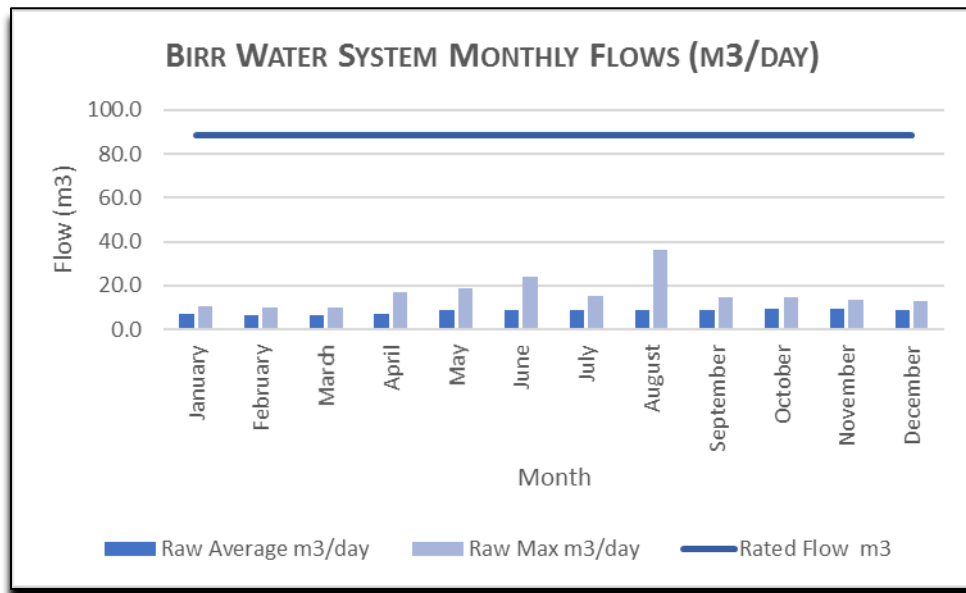
Flow Summary	Quantity
Permit to Take Water Limit	82 m ³ /d
Municipal Drinking Water License Limit	88.4 m ³ /d

2018 Average Daily Flow	8.2 m ³ /d
2018 Maximum Daily Flow	36.4 m ³ /d
2018 Average Monthly Flow	250.4 m ³
2018 Total Amount of Water Supplied	3,005 m ³

TABLE 10 – MONTHLY FLOWS

		Jan	Feb	March	April	May	June	July	August	September	October	November	December	Average
Rated Flow	m ³	88.4	88.4	88.4	88.4	88.4	88.4	88.4	88.4	88.4	88.4	88.4	88.4	
Raw Average	m ³ /d	7.2	6.8	6.2	7.2	9.0	8.8	8.6	9.0	8.7	9.1	9.2	8.9	8.2
Raw Max	m ³ /d	10.4	9.7	10.1	16.8	18.7	23.7	15.2	36.4	14.9	14.4	13.7	13.1	

GRAPH 1 – MONTHLY FLOWS (M³/DAY)



SECTION G - NON- COMPLIANCE FINDINGS & ADVERSE RESULTS

Non-compliance issues are typically identified by either the Operating Authority or the MECP Drinking Water Inspectors. All non-compliance issues are investigated, corrective actions taken and documented using the Municipalities Drinking Water Quality Management System (DWQMS) procedures.

(I) NON- COMPLIANCE FINDINGS

The MECP conducted an announced routine inspection of the Birr Drinking Water System on July 5, 2018. The MECP inspector identified two (2) non-compliances with the regulatory requirements.

1. The owner/operating authority was not in compliance with the requirement to prepare Form 2 documents as required by their Drinking Water Works Permit during the inspection period. At the time of the site inspection, a new online chlorine analyzer was observed that is understood to have been installed on August 10, 2017 in place of an older unit. It is further understood that the Owner / Operating Authority did not complete a Form 2 document related to this modification as required by Drinking Water Works Permit # 052204 – Issue #3, Section 4.0.

Action(s) Required: None. Since being notified of this issue as part of the inspection, the Owner / Operating Authority immediately completed the pertinent Form 2 and submitted it to the Ministry of the Environment, Conservation and Parks.

2. All nitrate/nitrite water quality monitoring requirements prescribed by legislation were not conducted within the required frequency for the DWS. Ontario Regulation 170/03 – Schedule 13-7 stipulates that nitrate and nitrite are required to be collected and tested every three months from the treated water within the required frequency as prescribed by Ontario Regulation 170/03 – Schedule 6-1.1(4).

According to documentation provided for review from the Owner / Operating Authority, samples were collected from the Treatment Plant on the following dates:

1. January 2, 2017
2. April 3, 2017
3. July 6, 2017
4. October 2, 2017
5. February 2, 2018
6. April 2, 2018

Based on the aforementioned tests, the Owner / Operating Authority did collect the appropriate number of nitrate and nitrite samples for testing, however, the appropriate time period between the samples collected on October 2, 2017, February 2, 2018, and April 2, 2018 did not meet the appropriate frequency of testing as prescribed by Ontario Regulation 170/03 – Schedule 6-1.1(4). Generally stated, a sample that is required to be collected every three months has an acceptable window for sample collection of between 60 to 120 days. As presented below, the aforementioned samples were not collected within this acceptable time period:

1. October 2, 2017 to February 2, 2018 --- 123 days
2. February 2, 2018 to April 2, 2018 --- 59 days

Action(s) Required: From herein, the Owner / Operating Authority shall ensure that all samples required to be collected every three months are done so as prescribed by the requirements of Ontario Regulation 170/03 – Schedule 6-1.1(4). Compliance with this requirement will be assessed during the next annual inspection of the water system.

(II) ADVERSE RESULTS

There were no adverse results in 2018.

2018 ANNUAL PERFORMANCE REPORT MELROSE WATER TREATMENT PLANT



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INTRODUCTION

The Municipality of Middlesex Centre has prepared a report summarizing system operation and water quality for every municipal drinking water system annually. The reports detail the latest water quality testing results, water quantity statistics and any adverse conditions that may have occurred for the previous year. They are available for review by the end of February on the Municipality of Middlesex Centre website at [www.middlesexcentre.on.ca/Public/drinking water](http://www.middlesexcentre.on.ca/Public/drinking_water) or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is accurate. If you have any questions or comments concerning the report please contact the Municipality of Middlesex Centre.

Table 1 – Plant Information

Drinking Water System	Melrose Well Supply System
Drinking Water System Number	260002915
Drinking Water System Owner & Contact Information	Municipality of Middlesex Centre Small Municipal Residential System 10227 Ilderton Road, RR #2 Ilderton, Ontario N0M 2A0
Reporting Period	January 1, 2018 to December 31, 2018

SECTION A – SYSTEM DESCRIPTION

The Melrose Drinking Water System is owned by the Municipality of Middlesex Centre and operated by the Municipality of Middlesex Centre. The Melrose Drinking Water System consists of two deep-drilled groundwater production wells operating under Permit to Take Water # 3078-8PYJEB that pump raw water through a sodium hypochlorite pre-disinfection system into an aerator for iron oxidization to a reservoir. From the reservoir the water is transferred to three multimedia pressure filters for iron removal. After the water is filtered it can be chlorinated a second time, analyzed for free chlorine residual and stored in a triple-chambered underground clear well. From the clear well the water is pumped into the distribution system and can be disinfected for a third time with sodium hypochlorite. The treated water is analyzed for both turbidity and free chlorine residual using online analyzers with the values being recorded SCADA. The system operates under Municipal Drinking Water License Number 052-103 and Drinking Water Works Permit Number 052-203. The system is maintained by licensed water system operators, who operate treatment and monitoring equipment and collect samples as specified by the Regulation. Alarms automatically notify operators in the event of failure of critical operational requirements.

SECTION B – MODIFICATIONS & REPLACEMENTS

Modifications & Replacements
Replacement of chlorine pumps #1 & #2, chemical lines with new chem flare lines and fittings.
Replacement of the chlorine analyzer with an updated version.

SECTION C – MICROBIOLOGICAL TESTING**(I) E. COLI & TOTAL COLIFORM**

Bacteriological tests for E. coli and total coliforms are collected from the raw water at the facility and treated water from the distribution system. Raw water is collected once per month on each well, and the distribution water is collected on a bi-weekly schedule. Extra samples are taken after major repairs or maintenance work. Any E. coli or total coliform results above 0 in the treated distribution water must be reported to the Ministry of the Environment, Conservation and Parks (MECP) and Medical Officer of Health (MOH). Resamples and any other required actions are taken as quickly as possible. The results from the 2018 sampling program are shown on the table below. There were no adverse test results from 27 distribution water samples in this reporting period.

TABLE 2 – E. COLI & TOTAL COLIFORM SAMPLES

	Number of Samples	Range of E. coli Results Min – Max	Range of Total Coliform Results Min – Max
Raw	26	0 – 0	0 – 3
Distribution	27	0 - 0	0 - 0

(II) HETEROTROPHIC PLATE COUNT (HPC)

HPC analyses are required from the distribution water on a bi-weekly basis. HPC should be less than 500 colonies per 1 mL. Results over 500 colonies per 1 mL may indicate a change in water quality but it is not considered an indicator of unsafe water. 2018 results are shown in the table below.

TABLE 3 – HETEROTROPHIC PLATE COUNT (HPC) SAMPLES

Parameters	Number of Samples	Range of HPC Results Min-Max
Distribution	27	<10 – 30

SECTION D – CHEMICAL TESTING

The Safe Drinking Water Act requires periodic testing of the water for chemical parameters. The sampling frequency varies for different types and sizes of water systems. If the concentration of a parameter is above half of the Maximum Allowable Concentration (MAC) under the Ontario Drinking Water Quality Standards, an increased testing frequency of once every three months is required by the

Regulation. Where concerns regarding a parameter exist, the MECP can also require additional sampling be undertaken.

Nitrate and nitrite samples are required every 3 months in normal operation.

TABLE 4 – QUARTERLY NITRATE & NITRITE

Parameter & Sample Date	Result (mg/l)	MAC (mg/l)	Exceedance
Nitrate			
1st Quarter	0.024	10.0	No
2nd Quarter	<0.006	10.0	No
3rd Quarter	0.008	10.0	No
4th Quarter	0.007	10.0	No
Nitrite			
1st Quarter	<0.003	1.0	No
2nd Quarter	<0.003	1.0	No
3rd Quarter	<0.003	1.0	No
4th Quarter	<0.003	1.0	No

Trihalomethane (THM) and total Haloacetic Acids (HAA) are by-products of the disinfection process. As described in Schedule 13.6 (4) a small municipal system which obtains test results from the previous 12 consecutive calendar quarters and no single test result is above 0.050 mg/l may cease sampling and testing for eight consecutive calendar quarters. There were no Trihalomethane samples collected in 2018. Samples for Haloacetic Acid (HAA) were collected every 3 months from the distribution system.

TABLE 5 – QUARTERLY TRIHALOMETHANE & HALOACETIC ACID

Parameter & Sample Date	Result (mg/l)	Annual Rolling Average (mg/l)	MAC (mg/l)	Exceedance
Trihalomethane				
1st Quarter	--	--	100	--
2nd Quarter	--	--	100	--
3rd Quarter	--	--	100	--
4th Quarter	--	--	100	--
Haloacetic Acid (HAA)				
1st Quarter	0.0053	0.0053	80	No
2nd Quarter	0.0053	0.0053	80	No
3rd Quarter	0.0053	0.0053	80	No
4th Quarter	0.0053	0.0053	80	No

The following Table summarizes the most recent test results for Sodium and Fluoride. Testing and reporting any adverse results is required every 5 years.

TABLE 6 – SODIUM & FLUORIDE

Parameter	Sample Date	Result Value (mg/L)	MAC (mg/L)
Sodium	January 2, 2017	24.4	20
Sodium	January 9, 2017	25.4	20
Fluoride	January 2, 2017	1.02	1.5

*Sodium levels between 20 – 200 mg/L must be reported every 5 years. Natural levels of fluoride between 1.5 – 2.4 mg/L must be reported every 5 years.

The following Table summarizes the most recent results for the Lead Testing Program. Lead samples are twice per year, in the winter sample period and the summer sample period as outlined below. Alkalinity and pH are monitored twice per year in the distribution system to ensure water quality is consistent and does not facilitate leaching of lead into the water.

TABLE 7 – LEAD SAMPLING

Parameter	Result Value	MAC	Exceedance
Winter Sample (Dec. 15 – April 15)			
Lead (ug/l)	0.30	10	No
Distribution Alkalinity (mg/l)	232	*30 - 500	No
Distribution pH	8.29	-	No
Summer Sample (June 15 – Oct. 15)			
Lead (ug/l)	0.31	10	No
Distribution Alkalinity	231	*30 – 500	No
Distribution pH	7.48	-	No

*Distribution alkalinity is an aesthetic objective / Operational Guideline with a range between 30 mg/l to 500 mg/l

The following Table summarizes the most recent test results for Schedules 23 and 24. Testing is required every 5 years for secure groundwater wells.

TABLE 8 – SCHEDULE 23 & 24

Parameter	Sample Date	Treated Water Value (ug/l)	Exceedance
Antimony	01/02/2017	0.02	No
Arsenic	01/02/2017	0.3	No
Barium	01/02/2017	148	No
Boron	01/02/2017	145	No
Cadmium	01/02/2017	0.006	No
Chromium	01/02/2017	0.57	No
Mercury	01/02/2017	ND	No
Selenium	01/02/2017	ND	No
Uranium	01/02/2017	0.087	No
Alachlor	01/02/2017	ND	No
Atrazine + N-dealkylated metabolites	01/02/2017	ND	No
Atrazine	01/02/2017	ND	No
Densethyl atrazine	01/02/2017	ND	No

Azinphos-methyl	01/02/2017	ND	No
Benzene	01/02/2017	ND	No
Benzo(a)pyrene	01/02/2017	ND	No
Bromoxynil	01/02/2017	ND	No
Carbaryl	01/02/2017	ND	No
Carbofuran	01/02/2017	ND	No
Carbon Tetrachloride	01/02/2017	ND	No
Chlorpyrifos	01/02/2017	ND	No
Diazinon	01/02/2017	ND	No
Dicamba	01/02/2017	ND	No
1,2-Dichlorobenzene	01/02/2017	ND	No
1,4-Dichlorobenzene	01/02/2017	ND	No
1,2-Dichloroethane	01/02/2017	ND	No
1,1-Dichloroethylene (vinylidene chloride)	01/02/2017	ND	No
Dichloromethane	01/02/2017	ND	No
2,4-Dichlorophenol	01/02/2017	ND	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	01/02/2017	ND	No
Diclofop-methyl	01/02/2017	ND	No
Dimethoate	01/02/2017	ND	No
Diquat	01/02/2017	ND	No
Diuron	01/02/2017	ND	No
Glyphosate	01/02/2017	ND	No
Malathion	01/02/2017	ND	No
2-methyl- 4chlorophenoxyacetic acid (MCPA)	01/02/2017	ND	No
Metolachlor	01/02/2017	ND	No
Metribuzin	01/02/2017	ND	No
Monochlorobenzene	01/02/2017	ND	No
Paraquat	01/02/2017	ND	No
Pentachlorophenol	01/02/2017	ND	No
Phorate	01/02/2017	ND	No
Picloram	01/02/2017	ND	No
Polychlorinated Biphenyls(PCB)	01/02/2017	ND	No
Prometryne	01/02/2017	ND	No
Simazine	01/02/2017	ND	No
Terbufos	01/02/2017	ND	No
Tetrachloroethylene	01/02/2017	ND	No
2,3,4,6-Tetrachlorophenol	01/02/2017	ND	No
Triallate	01/02/2017	ND	No
Trichloroethylene	01/02/2017	ND	No
2,4,6-Trichlorophenol	01/02/2017	ND	No
Trifluralin	01/02/2017	ND	No
Vinyl Chloride	01/02/2017	ND	No

ND = Non-Detect

SECTION E - OPERATIONAL MONITORING

(I) CHLORINE RESIDUAL

Free chlorine levels of the treated water are monitored continuously at the discharge point of the Water Treatment Facility. In the distribution system, free chlorine is checked twice weekly at various locations throughout the distribution system. As a target, free chlorine residual within the distribution system should be above 0.20 mg/L. A free chlorine level lower than 0.05 mg/L must be reported and corrective action taken. There were no reportable incidents in 2018. A summary of the chlorine residual readings is provided in the table below.

TABLE 9 – CHLORINE RESIDUALS

Parameter	Number of Tests or Monitoring Frequency	Range of Results (Min – Max)
Chlorine residual in distribution (mg/l)	104	0.50 – 1.24
Chlorine residual after treatment (mg/L)	Continuous	0.88 – 1.91

(I) TURBIDITY

Turbidity of treated water is continuously monitored at the treatment facility, as a change in turbidity can indicate an operational problem. The turbidity of untreated water from the wells is checked monthly. Turbidity is measured in nephelometric turbidity units (NTU). Under Regulation 170/03 turbidity in groundwater is not reportable however turbidity should be < 1 NTU at the treatment plant and < 5 NTU in the distribution system. A summary of the monitoring results for 2018 is provided in the table below.

TABLE 10 – TURBIDITY

Parameter	Number of Tests or Monitoring Frequency	Range of Results (Min – Max)
Turbidity after treatment (NTU)	Continuous	0.03 – 0.99

SECTION F - WATER QUANTITY

Continuous monitoring of flowrates from supply wells into the treatment system and from the facility into the distribution system is required by Regulation 170/03. The Municipal Drinking Water License and Permit to Take Water issued by the MECPC regulate the amount of water that can be utilized over a given time period. A summary of the 2018 flows are provided below.

TABLE 11 – RAW WATER FLOW DATA

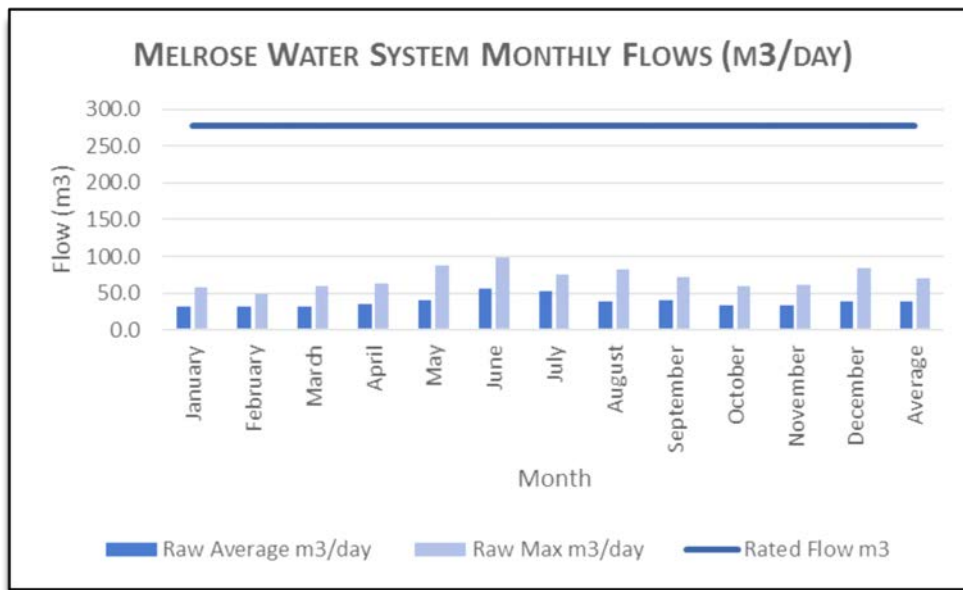
Flow Summary	Quantity
Permit to Take Water Limit	277 m ³ /d
Municipal Drinking Water License Limit	277 m ³ /d

2018 Average Daily Flow	39 m ³ /d
2018 Maximum Daily Flow	98.54 m ³ /d
2018 Average Monthly Flow	1,186 m ³
2018 Total Amount of Water Supplied	14,231 m ³

TABLE 12 – MONTHLY FLOWS

		Jan	Feb	March	April	May	June	July	August	September	October	November	December	Average
Rated Flow	m ³	277	277	277	277	277	277	277	277	277	277	277	277	
Raw Average	m ³ /d	32.4	31.5	32.4	35.2	41.0	56.6	52.2	38.3	41.0	34.3	33.5	39.0	39.0
Raw Max	m ³ /d	58.7	48.6	59.7	63.9	87.2	98.5	75.6	81.8	71.6	60.4	61.6	84.1	

GRAPH 1 – MONTHLY FLOWS (M³/DAY)



SECTION G - NON- COMPLIANCE FINDINGS & ADVERSE RESULTS

Non-compliance issues are typically identified by either the Operating Authority or the MECP Drinking Water Inspectors. All non-compliance issues are investigated, corrective actions taken and documented using the Municipalities Drinking Water Quality Management System (DWQMS) procedures.

(I) NON-COMPLIANCE FINDINGS

The MECP conducted an announced routine inspection of the Birr Drinking Water System on June 14, 2018. The MECP inspector identified one (1) non-compliance with the regulatory requirements.

1. All nitrate/nitrite water quality monitoring requirements prescribed by legislation were not conducted within the required frequency for the DWS. Ontario Regulation 170/03 – Schedule 13-7 stipulates that nitrate and nitrite are required to be collected and tested every three months from the treated water within the required frequency as prescribed by Ontario Regulation 170/03 – Schedule 6-1.1(4).

According to documentation provided for review from the Owner / Operating Authority, samples were collected from the Treatment Plant on the following dates:

1. April 3, 2017
2. July 6, 2017
3. October 2, 2017
4. February 2, 2018
5. April 2, 2018

Based on the aforementioned tests, the Owner / Operating Authority did collect the appropriate number of nitrate and nitrite samples for testing, however, the appropriate time period between the samples collected on October 2, 2017, February 2, 2018, and April 2, 2018 did not meet the appropriate frequency of testing as prescribed by Ontario Regulation 170/03 – Schedule 6-1.1(4). Generally stated, a sample that is required to be collected every three months has an acceptable window for sample collection of between 60 to 120 days. As presented below, the aforementioned samples were not collected within this acceptable time period:

1. October 2, 2017 to February 2, 2018 --- 123 days
2. February 2, 2018 to April 2, 2018 --- 59 days

Action(s) Required: From herein, the Owner / Operating Authority shall ensure that all samples required to be collected every three months are done so as prescribed by the requirements of Ontario Regulation 170/03 – Schedule 6-1.1(4). Compliance with this requirement will be assessed during the next annual inspection of the water system.

(II) ADVERSE RESULTS

There were no adverse results in 2018

2018 ANNUAL PERFORMANCE REPORT MIDDLESEX CENTRE DISTRIBUTION SYSTEM



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INTRODUCTION

The Municipality of Middlesex Centre prepares a report summarizing system operation and water quality for every municipal drinking water system annually. The reports detail the latest water quality testing results, water quantity statistics and any adverse conditions that may have occurred for the previous year. They are available for review by the end of February on the Municipality of Middlesex Centre website at [www.middlesexcentre.on.ca/Public/drinking water](http://www.middlesexcentre.on.ca/Public/drinking_water) or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is accurate. If you have any questions or comments concerning the report please contact the Municipality of Middlesex Centre.

Table 1 – Plant Information

Drinking Water System	Middlesex Centre Distribution System
Drinking Water System Number	260004202
Drinking Water System Owner & Contact Information	Municipality of Middlesex Centre Large Municipal Distribution System 10227 Ilderton Road, RR #2 Ilderton, Ontario N0M 2A0
Reporting Period	January 1, 2018 to December 31, 2018

SECTION A – SYSTEM DESCRIPTION

The Middlesex Centre Distribution System is owned and operated by the Municipality of Middlesex Centre. The system operates under Municipal Drinking Water License Number 052-101 and Drinking Water Works Permit Number 052-201. This system is made up of the following water systems:

- Arva Distribution System
- Ballymote Distribution System
- Delaware Distribution System
- Denfield Distribution System
- Ilderton Distribution System
- Komoka-Kilworth Distribution System

The water supply for the Arva Distribution System is obtained from a 1050 mm pipeline maintained by the City of London Water Supply System. A 200mm ductile-iron pipeline with flow meter and in-line vertical turbine fire pump distributes treated water. There is an on-line chlorine analyzer and paperless recorder. Two chemical metering pumps are available for secondary disinfection to boost sodium hypochlorite levels.

The Ballymote Distribution System is supplied by a 200mm water main from the City of London. A re-chlorination injection point exists with a portable chlorine feed system, a sampling tap immediately downstream from the injection point and a chlorine analyzer measure free chlorine residual in the water entering the distribution system.

The Delaware Drinking Water System receives water through a 150 mm water main from the City of London Distribution System connection at the Delaware Re-chlorination facility. The re-chlorination facility consists of two chemical metering pumps, a chemical storage tank, flow meter, piping, SCADA and a chlorine residual analyzer. The water is supplied to the distribution and elevated storage tank by an automatic valve and controls.

The water supply for the Denfield Distribution System is obtained from the 1200 mm pipeline of the LHPWSS. High lift pumps at the Denfield reservoir draw from the above ground storage tank and provide water to the distribution system. The Denfield system is equipped with two fixed speed pumps and one variable speed pump. Two sodium hypochlorite disinfection systems are used to boost chlorine entering and leaving the storage tank.

The water supply for the Ilderton distribution system is obtained from the LHPWSS. High lift pumps at the Ilderton reservoir provide water to the distribution system and the tower, which provides pressure for the distribution system. The reservoir is equipped with three high lift pumps. A sodium hypochlorite disinfection systems is used to boost chlorine entering the distribution system.

The water supply for the Komoka-Kilworth distribution system is obtained from the LHPWSS. High lift pumps at the Komoka reservoir draw from the above ground storage tank and provide water to the distribution system and the tower. The reservoir is equipped with two high lift pumps. Two sodium hypochlorite disinfection systems are used to boost chlorine entering and leaving the storage tank.

SECTION B – WATER TREATMENT CHEMICALS USED

- 12% sodium hypochlorite
- 6% sodium hypochlorite

SECTION C – MODIFICATIONS & REPLACEMENTS

Modifications & Replacements
No major upgraded or Form 2 Record of Minor Modifications or Replacements to the Drinking Water System

SECTION D – MICROBIOLOGICAL TESTING

(I) E. COLI & TOTAL COLIFORM

Bacteriological tests for E. coli and total coliforms in the distribution water are collected on a weekly schedule in various location throughout the distribution system. Extra samples are taken after major repairs or maintenance work. Any E. coli or total coliform results above 0 in treated distribution water must be reported to the Ministry of Environment, Conservation and Parks (MECP) and Medical Officer of Health (MOH). Resamples and any other required actions are taken as quickly as possible. The results from the 2018 sampling program are shown on the table below.

TABLE 2 – E. COLI & TOTAL COLIFORM SAMPLES

	Number of Samples	Range of E. coli Results Min – Max	Range of Total Coliform Results Min – Max
Distribution	251	0 - 0	0 - 12

(II) HETEROTROPHIC PLATE COUNT (HPC)

HPC analyses are required from the distribution water on a bi-weekly basis. HPC should be less than 500 colonies per 1 mL. Results over 500 colonies per 1 mL may indicate a change in water quality but it is not considered an indicator of unsafe water. 2018 results are shown in the table below.

TABLE 3 – HETEROTROPHIC PLATE COUNT (HPC) SAMPLES

Parameters	Number of Samples	Range of HPC Results Min-Max
Distribution	106	<10 – 580

SECTION E – CHEMICAL TESTING

The Safe Drinking Water Act requires periodic testing of the water for chemical parameters. The sampling frequency varies for different types and sizes of water systems. If the concentration of a parameter is above half of the Maximum Allowable Concentration (MAC) under the Ontario Drinking Water Quality Standards, an increased testing frequency of once every three months is required by the Regulation. Where concerns regarding a parameter exist, the MECP can also require additional sampling be undertaken.

Trihalomethane (THM) & Haloacetic Acids (HAA)

The Middlesex Distribution System collected samples for Trihalomethane (THM) and total Haloacetic Acids (HAA) which are by-products of the disinfection process. Samples were collected every 3 months from the distribution system.

TABLE 4 – QUARTERLY TRIHALOMETHANE & HALOACETIC ACID

Parameter & Sample Date	Result (mg/l)	Annual Rolling Average (mg/l)	MAC (mg/l)	Exceedance
Trihalomethane				
1st Quarter	0.033	0.041	100	No
2nd Quarter	0.032	0.037	100	No
3rd Quarter	0.048	0.039	100	No
4th Quarter	0.057	0.043	100	No
Haloacetic Acid (HAA)				
1st Quarter	0.0186	0.0203	80	No
2nd Quarter	0.0285	0.0219	80	No

3rd Quarter	0.0262	0.0228	80	No
4th Quarter	0.0148	0.0220	80	No

LEAD TESTING PROGRAM

The following Table summarizes the most recent results for the Lead Testing Program. Lead samples are twice per year in the winter sample period and the summer sample period as outlined below. Alkalinity and pH are monitored twice per year in the distribution system to ensure water quality is consistent and does not facilitate leaching of lead into the water.

As identified in Schedule D of the Municipal Drinking Water License #052-101, Middlesex Center was granted Regulatory Relief for Lead sampling. The number of sampling points has been reduced to the following:

TABLE 5 – REGULATORY RELIEF

Number of Sampling Points Required for Relief from Regulatory Requirements				
Column 1 Drinking Water System or Drinking Water Subsystem Name	Column 2 DWS Numbers	Column 3 Number of Sampling Points in Plumbing that Serves Private Residences	Column 4 Number of Sampling Points in Plumbing that Does Not Serve Private Residences	Column 5 Number of Sampling Points in Distribution System
Middlesex Centre Distribution System	260004202	20	2	4

TABLE 6 – LEAD SAMPLING

Parameter	Max Result Values	MAC	Exceedance
Winter Sample (Dec. 15 – April 15)			
Lead (ug/l)	4.47	10	No
Distribution Alkalinity (mg/l)	86	*30 - 500	No
Distribution pH	8.32	-	No
Summer Sample (June 15 – Oct. 15)			
Lead (ug/l)	2.00	10	No
Distribution Alkalinity	81	*30 - 500	No
Distribution pH	8.23	-	No

*Distribution alkalinity is an aesthetic objective / Operational Guideline with a range between 30 mg/l to 500 mg/l.

Middlesex Centre Distribution System has been granted Regulatory Relief for lead sampling as outlined in Table 2, Schedule D Conditions for Relief from Regulatory Requirements in the Regulatory Drinking Water Licence # 052-101, Issue #4 dated October 26, 2017. Middlesex Centre is required to take twenty (20) lead samples from plumbing that serve Private Residence, two (2) samples that do not serve private residents and four (4) samples from the distribution system. Samples results from the summer and winter lead sampling period are listed in Appendix A.

SECTION F - OPERATIONAL MONITORING

(I) CHLORINE RESIDUAL

Free chlorine levels of the treated water are monitored continuously at the discharge point of the Water Treatment Facility. In the distribution system, free chlorine is checked daily at various locations. As a target, free chlorine residual within the distribution system should be above 0.20 mg/L. A free chlorine level lower than 0.05 mg/L must be reported and corrective action taken. There were no reportable incidents in 2018. A summary of the chlorine residual readings is provided in the table below.

TABLE 7 – CHLORINE RESIDUALS

Parameter	Number of Tests or Monitoring Frequency	Range of Results (Min – Max)
Chlorine residual Point of Entry (POE) (mg/L)	Continuous	0.28 – 3.08

SECTION G - WATER QUANTITY

Continuous monitoring of flowrates from the supply systems to the Middlesex Distribution System is required by Regulation 170/03. The Municipal Drinking Water License and Permit to Take Water issued by the MECP regulate the amount of water that can be utilized over a given time period. A summary of the 2018 flows are provided below.

TABLE 8 – ARVA WATER 2018 FLOWS

		Jan	Feb	March	April	May	June	July	Aug	Sept	Oct.	Nov	Dec
Monthly Total	m ³	2,599	2,325	2,901	2,911	5,095	6,671	5,441	4,609	4,279	2635	2,570	2,619
Monthly Avg	m ³ /day	84	83	94	97	164	222	176	149	143	85	86	84
Monthly Max	m ³ /day	102	93	108	141	255	303	275	196	170	109	124	114

TABLE 9 – BALLYMOTE WATER 2018 FLOWS

		Jan	Feb	March	April	May	June	July	Aug	Sept	Oct.	Nov	Dec
Monthly Total	m ³	457	432	500	466	819	997	877	760	561	492	460	562
Monthly Avg	m ³ /day	15	15	16	15	26	33	28	27	19	16	15	18
Monthly Max	m ³ /day	20	21	19	32	48	56	41	61	32	26	19	24

TABLE 10 – DELAWARE WATER 2018 FLOWS

		Jan	Feb	March	April	May	June	July	Aug	Sept	Oct.	Nov	Dec
Monthly Total	m ³	9,800	8,195	9,137	9,572	12,860	15,569	16,503	11,581	11,933	9741	9,408	10,183
Monthly Avg	m ³ /day	316	293	295	319	415	519	532	374	398	314	314	328
Monthly Max	m ³ /day	443	425	474	476	754	802	832	508	546	441	419	416

TABLE 11 – DENFIELD WATER 2018 FLOWS

		Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Monthly Total	m ³	910	801	931	976	1,209	1,305	1,158	1,146	975	942	916	961
Monthly Avg	m ³ /day	29	29	30	33	39	44	37	37	32	30	31	31
Monthly Max	m ³ /day	35	37	37	56	72	70	61	72	46	45	56	37

TABLE 12 – ILBERTON WATER 2018 FLOWS

		Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Monthly Total	m ³	15,320	15,013	16,499	16,732	21,213	23,500	25,456	15,782	21,351	17,773	17,394	19,009
Monthly Avg	m ³ /day	494	536	532	558	684	783	821	509	712	573	580	613
Monthly Max	m ³ /day	955	863	918	979	1,128	1,397	1,112	1,059	956	838	986	948

TABLE 13 – KOMOKA WATER 2018 FLOWS

		Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Monthly Total	m ³	25,913	23,344	26,290	26,996	34,932	37,823	39,444	32,075	27,518	25,271	22,714	24554
Monthly Avg	m ³ /day	836	834	848	900	1,127	1,261	1,272	1035	917	815	757	792
Monthly Max	m ³ /day	980	982	974	1,086	1,775	1,984	1,827	1,937	1,175	1138	922	926

SECTION H - NON-COMPLIANCE FINDINGS & ADVERSE RESULTS

Section 6 documents any known incidents of non-compliance or adverse results and the associated correction actions taken to resolve the issue. Non-compliance issues are typically identified by either the Operating Authority or the MECP Drinking Water Inspectors. All non-compliance issues are investigated, corrective actions taken and documented using the Municipalities Drinking Water Quality Management System (DWQMS) procedures.

(I) SUMMARY OF REPORTING ADVERSE TEST RESULTS AND OTHER PROBLEMS (SCHEDULE 16)

There were 3 Adverse Water Quality Indicators (AWQI) during in 2018 reporting period.

Ballymote

There were two (2) adverse results during the year within the Ballymote Distribution System. The samples on May 30th, 2018 tested positive for three (3) total coliform and twelve (12) total coliforms on August 22nd, 2018. The Ballymote sample station, upstream fire hydrants and downstream fire hydrants were flushed on each occasion. Samples for total coliforms were collected at the sample stations and upstream and downstream fire hydrants, all resamples were negative for bacteria.

Komoka

There was one (1) low pressure during a service line repair, which lasted for less than 2 minutes on June 4th, 2018. The water main system was flushed for an hour and bacteriological samples were collected at the water service line, all samples were negative for bacteria.