Ontario Clean Water Agency
Agence Ontarienne Des Eaux

UNION WATER SUPPLY SYSTEM

Annual Performance Report

Union Area Water Supply System

Drinking Water System # 210000853

2016

Prepared for the Corporation of the Town of Kingsville, the Corporation of the Town of Essex, the Town of Lakeshore & the Municipality of Leamington

By the Ontario Clean Water Agency
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ANNUAL REPORT

Drinking-Water System Number:	**210000853**
Drinking-Water System Name:	Union Area Water Supply System
Drinking-Water System Owner:	Union Area Water Supply System Joint Board of Management (Municipality of Leamington, Town of Kingsville, Town of Essex, Town of Lakeshore)
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	01-January-2016 to 31-December-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 [X] No [ ]

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.

Union Water Treatment Plant
P.O. Box 340,
1615 Union Ave.,
Ruthven, Ont.
N0P 2G0

Complete for all other Categories.

Number of Designated Facilities served: N/A

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

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 [ ]

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
Municipality of Leamington	220004992
Town of Kingsville	220003403
Town of Essex	220003680
Town of Lakeshore	260004995

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
[X] Public access/notice via other method: Municipal Offices

Describe your Drinking-Water System

The Union Water Treatment Plant (UWTP) is a chemically assisted conventional filtration plant, which draws water from Lake Erie.

The UWTP supplies potable water to the Town of Kingsville, Municipality of Leamington, a portion of the Town of Essex and a portion of the Town of Lakeshore with an estimated service population of 60,000.

The treatment process includes chemically assisted up-flow clarification, filtration with dual media filters, primary disinfection using chlorine gas and secondary disinfection using chloramination.

Seasonally, the UWTP uses sodium hypochlorite at its intakes to control Zebra Mussel formation.

There are also four water towers and a booster/storage station located on the Union Water Supply System.

List all water treatment chemicals used over this reporting period

Zebra Mussel Control:

- Sodium Hypochlorite – (Seasonal)

Clarification Chemicals:

- Aluminum Sulfate – Coagulant (used for building a blanket during clarifier start up)
- DelPAC – Coagulant
- Hyper+Ion 1090 – Coagulant
- Magnafloc LT22 (polymer)-Coagulant Aid
- Magnafloc LT22S (polymer)-Coagulant Aid
- Powdered Activated Carbon – Taste and Odor Control

Filtration:

- Cat-Floc 8103 Plus (polymer) – Filter Aid (Seasonal)

Disinfection:

- Primary: Chlorine Gas
- Secondary: Aqua Ammonia & Chlorine (to form chloramines)

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

Item	Cost
Low Lift Pump #3 Major Maintenance	$19,640
New Zebra Mussel Control System – Intake #1	$100,218
Carbon Feed Pump Replacements (2)	$17,354
Clarifier #2 Inlet Valve Replacement	$8,833
Filter Meter Replacements – Filters #2, 3 and 4	$19,347
Filter Inlet/Outlet Valve Replacements – Filters #2 and 4	$27,914
Filter Inlet Valve Cylinders Rehab – Filters #5-8	$5,237
Coagulant Feed System Monitoring Equipment	$2,558
Boiler System Upgrades	$9,650
Turbidity Meter Replacements	$18,477
Chlorine Analyzer Replacements	$17,397
Main Wash #1 Pump VFD	$6,993
High Lift #1 Diesel Pump – Vent System Upgrades/Clutch Drive Upgrades	$5,910
High Lift Pump #3 Rehabilitation	$28,174
High Lift Reservoir #2 Repairs	$50,955
Treatment Pond Residuals Materials Management	$103,341
LED Lighting Upgrades – Treatment Plant	$5,193
Window Replacements	$27,395
Maintenance Shop – New cement pad staging area	$22,084
Pole Barn Roof Replacement	$15,800
Cottam Booster Pump #3 - Rehabilitation	$5,609
SCADA System – New Server and PLC upgrades	$21,491
Security System Upgrades	$727
Communication System Improvements	$10,451
Transmission System Valves and Components	$40,646
Albuna Water Tower – Electric Heater Replacements	$1,686
High Lift Transfer Switch Spare Breaker Reconditioning	$6,869
Ammonia System – Water Softener Rehabilitation	$5,626
Master Water Meter Replacements/Upgrades	$55,478
Portable 250hp Backup Generator for High Lift, Low Lift, Towers, etc	$132,161
Treatment Plant Roof Repairs	$1,221
Cottam Booster Roof Repairs	$1,883
Chlorine Building Roof Liner Replacement	$12,181
Treatment Plant – Operator's Area Ceiling Tile Replacement	$3,100

Expenses incurred continued

Laboratory Equipment	$5,250
New Above Ground Waste Oil Tank	$2,009
Essex Water Tower Ladder Safety Upgrade	$3,688
Total Capital Works/Major Maintenance	**$822,545**

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	Incident description	Corrective Action	AWQI #	Corrective Action Date
April 15, 2016	Loss of coagulant	Re-initialized coagulant	129180	April 15,2016

Note: Corrective action Date is Date of resolution.

Microbiological testing is done under Schedule 10 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of Ecoli Or Fecal Results (min #)-(max #) (ct/100 mL)	Range of Total Coliform Results (min #)-(max #) (ct/100 mL)	Number of HPC Samples	Range of HPC Results (min #)-(max #) (ct/mL)
Raw	52	<2 - 86	2 - 400	0	N/A
Treated	52	0 – 0	0 – 0	52	<10 - 10
Distribution	**Please See Individual Annual Reports for Distribution System Information:** Leamington (220004992), Kingsville (220003403), Essex (220003680), and Lakeshore (260004995).				

Operational testing is done under Schedule 7 of Regulation 170/03 during the period Covered by this annual report.

	Number of Grab Samples	Range of Results (min #)-(max #)
Turbidity	**8760**	**0.02 – 0.72 NTU**
Chlorine - Free	**8760**	**1.43 – 2.58 mg/L**
Fluoride (If the DWS provides fluoridation)	**N/A**	**N/A**

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

***NOTE**: Record the unit of measure if it is **not** milligrams per litre.*

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: (Suspended Solids)	Date Sampled	Result	Unit of Measure
21- July- 2014 Municipal Drinking Water Licence Number: 041-101	South Settling Pond	Jan 18/16	<3.0	mg/L
	South Settling Pond	Feb 09/16	4.0	mg/L
	South Settling Pond	Mar 07/16	4.0	mg/L
	South Settling Pond	Apr 04/16	14.0	mg/L
	South Settling Pond	May 09/16	3.0	mg/L
	North Settling Pond	June 14/16	<3.0	mg/L
	South Settling Pond	June 14/16	<3.0	mg/L
	North Settling Pond	July 04/16	<3.0	mg/L
	South Settling Pond	July 04/16	<3.0	mg/L
	North Settling Pond	Aug 09/16	<3.0	mg/L
	South Settling Pond	Aug 09/16	3.0	mg/L
	North Settling Pond	Sept 12/16	<3.0	mg/L
	South Settling Pond	Sept 12/16	<3.0	mg/L
	North Settling Pond	Oct 03/16	<3.0	mg/L
	South Settling Pond	Oct 03/16	6.0	mg/L
	North Settling Pond	Nov 07/16	3.0	mg/L
	South Settling Pond	Nov 07/16	5.0	mg/L
	North Settling Pond	Dec 02/16	3.0	mg/L
	South Settling Pond	Dec 02/16	4.0	mg/L
Limit 25.0 mg/L		Annual Average:	4.0	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	January 12, 2016	0.02	ug/L	No
Arsenic	January 12, 2016	0.2	ug/L	No
Barium	January 12, 2016	12.3	ug/L	No
Boron	January 12, 2016	17.9	ug/L	No
Cadmium	January 12, 2016	0.005	ug/L	No

Chromium	January 12, 2016	0.28	ug/L	No
***Lead**	n/a			
Mercury	January 12, 2016	0.01	ug/L	No
Sodium	January 12, 2016	6.38	mg/L	No
Selenium	January 12, 2016	0.13	ug/L	No
Uranium	January 12, 2016	0.055	ug/L	No
Fluoride	January 12, 2016	0.09	mg/L	No
Nitrite (N)	December 28, 2016	< 0.1	mg/L	No
Nitrate (N)	December 28, 2016	0.4	mg/L	No
Nitrite + Nitrate (N)	December 28, 2016	0.4	mg/L	No
Ammonia +Ammonium (N)	December 28, 2016	0.33	mg/L	No

*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 #)	Number of Exceedances
Plumbing	**Please See Individual Annual Reports for Distribution System Information:** Leamington (220004992), Kingsville (220003403), Essex (220003680), and Lakeshore (260004995).		
Distribution	**Please See Individual Annual Reports for Distribution System Information:** Leamington (220004992), Kingsville (220003403), Essex (220003680), and Lakeshore (260004995).		

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	January 12, 2016	0.02	ug/L	No
Atrazine + N-dealkylated metobolites	January 12, 2016	0.01	ug/L	No
Atrazine	January 12, 2016	0.01	ug/L	No
Azinphos-methyl	January 12, 2016	0.05	ug/L	No
Benzene	January 12, 2016	0.32	ug/L	No
Benzo(a)pyrene	January 12, 2016	0.004	ug/L	No
Bromoxynil	January 12, 2016	0.33	ug/L	No
Carbaryl	January 12, 2016	0.05	ug/L	No
Carbofuran	January 12, 2016	0.01	ug/L	No
Carbon Tetrachloride	January 12, 2016	0.16	ug/L	No
Chlorpyrifos	January 12, 2016	0.02	ug/L	No
Desethyl atrazine	January 12, 2016	0.01	ug/L	No
Diazinon	January 12, 2016	0.02	ug/L	No
Dicamba	January 12, 2016	0.20	ug/L	No
1,2-Dichlorobenzene	January 12, 2016	0.41	ug/L	No

1,4-Dichlorobenzene	January 12, 2016	0.36	ug/L	No
1,2-Dichloroethane	January 12, 2016	0.35	ug/L	No
1,1-Dichloroethene (vinylidene chloride)	January 12, 2016	0.33	ug/L	No
Dichloromethane	January 12, 2016	0.35	ug/L	No
2-4 Dichlorophenol	January 12, 2016	0.15	ug/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	January 12, 2016	0.19	ug/L	No
Diclofop-methyl	January 12, 2016	0.40	ug/L	No
Dimethoate	January 12, 2016	0.03	ug/L	No
Diquat	January 12, 2016	1.0	ug/L	No
Diuron	January 12, 2016	0.03	ug/L	No
Glyphosate	January 12, 2016	1.0	ug/L	No
Malathion	January 12, 2016	0.02	ug/L	No
MCPA	January 12, 2016	0.12	ug/L	No
Metolachlor	January 12, 2016	0.01	ug/L	No
Metribuzin	January 12, 2016	0.02	ug/L	No
Monochlorobenzene	January 12, 2016	0.3	ug/L	No
Paraquat	January 12, 2016	1.0	ug/L	No
Pentachlorophenol	January 12, 2016	0.15	ug/L	No
Phorate	January 12, 2016	0.01	ug/L	No
Picloram	January 12, 2016	1.0	ug/L	No
Polychlorinated Biphenyls(PCB)	January 12, 2016	0.04	ug/L	No
Prometryne	January 12, 2016	0.03	ug/L	No
Simazine	January 12, 2016	0.01	ug/L	No
THM (NOTE: show latest annual average)	Please See Individual Annual Reports for Distribution System Information: **Leamington (220004992), Kingsville (220003403), Essex (220003680), and Lakeshore (260004995).**			
Terbufos	January 12, 2016	0.01	ug/L	No
Tetrachloroethylene	January 12, 2016	0.35	ug/L	No
2,3,4,6-Tetrachlorophenol	January 12, 2016	0.20	ug/L	No
Triallate	January 12, 2016	0.01	ug/L	No
Trichloroethylene	January 12, 2016	0.44	ug/L	No
2,4,6-Trichlorophenol	January 12, 2016	0.25	ug/L	No
Trifluralin	January 12, 2016	0.02	ug/L	No
Vinyl Chloride	January 12, 2016	0.17	ug/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	Result Value	Unit of Measure	Date of Sample
None			

UNION WATER SUPPLY SYSTEM
SUMMARY REPORT 2016

For the Union Water Supply System
(Made under Schedule 22 of Ontario Regulation 170/03, a regulation made under the Safe Drinking Water Act, 2002)

EXPLANATION

Schedule 22 of Ontario Regulation 170/03, a regulation made under the Safe Drinking Water Act, 2002 requires that a large municipal residential drinking-water system must provide to its board members a Summary Report on various aspects of the system before March 31 of the following year. The Union Water Supply System is classed as a large municipal residential drinking-water system and all of the municipal water systems that obtain water from it are classified as large municipal residential drinking-water systems and are therefore subject to Schedule 22.

The Summary Report must list the following:

- The requirements of the Safe Drinking Water Act, 2002 that the system failed to meet during the period covered by the Summary Report
- The requirements of the regulations made under the Safe Drinking Water Act, 2002 that the system failed to meet during the period covered by the Summary Report
- Any condition of the drinking-water system's drinking water works permit or municipal drinking water license that the system failed to meet during the period covered by the Summary Report
- Any order that the system failed to meet during the period covered by the Summary Report, the duration of any such failure and any measures that were taken to correct such failure
- A summary of the quantities and flow rates of water supplied by the drinking-water system by monthly average and maximum daily flow rates and instantaneous peak flow rates
- A comparison of actual flow rates with rated capacity and flow rates in the systems approval

A drinking-water system that supplies water to another drinking water system must provide a copy of the Summary Report to that system's owner by March 31 of the year following the year covered in the Summary Report.

The sections below details the occasions on which the Union Water Supply System (UWSS) and the connected municipal water systems failed to meet the requirements of the Safe Drinking Water Act 2002, associated regulations, system approvals and provincial officer orders in 2016.

Union Water Supply System (UWSS)

The following provides details of occurrences where the Union Water Supply System was not in compliance with the requirements of the Safe Drinking Water Act 2002, associated regulations, system approvals and provincial officer orders.

Non-Compliance Item:

The following Adverse Water Quality Incident (AWQI) identified for the Union Water Supply System.

- AWQI #129180 – April 15, 2016 failure to maintain coagulant continuously. It was discovered that coagulant was not flowing continuously to Clarifier #1 for approximately twelve (12) hours. The Clarifier was taken out of service and will not return to service until flow monitoring devices are in place.

Leamington Water Distribution System

Non-Compliance Item:

The following Adverse Water Quality Incident (AWQI) identified for the Leamington Distribution System that is supplied by the Union Water Supply System.

- AWQI #129976 – June 28, 2016 – Bacti adverse at sample station SS-L-9 with 1 Total Coliform. Town of Leamington staff flushed affected area, then samples were taken upstream and downstream. A second set of samples were taken 24 hours later upstream and downstream. All results returned were within normal parameters.

- AWQI#130589 – August 3, 2016 – Bacti adverse at sample station SS-L-15 with 8 Total Coliform. Town of Leamington staff flushed affected area, then samples were taken upstream and downstream. A second set of samples were taken 24 hours later upstream and downstream. All results returned were within normal parameters.

Kingsville Water Distribution System

Non-Compliance Item:

The following Adverse Water Quality Incident (AWQI) identified for the Kingsville Distribution System that is supplied by the Union Water Supply System.

- AWQI #129835 – June 20, 2016, Chlorine residual reading at CRA01 and Cottam Booster Station displayed less than 0.25ppm for 20-25 minutes. Initial cause was a piece of debris caught in the check valve of the ammonia pump restricting flow. The debris was removed and normal flow returned. Weekly bacti samples were taken and all CL2 residuals were normal.

- AWQI #130343 – July 19, 2016, Bacti adverse at sample station SS-K-14 with 2 Total Coliform. Town of Kingsville staff flushed affected area, then samples were taken upstream and downstream. A second set of samples were taken 24 hours later upstream and downstream. All results were within normal parameters.

- AWQI #130987 – August 30, 2016, Watermain break on County Road 34. Pressure was below 20 psi from 10 pm to 12 am (2 hrs). Main break was isolated and fed from another source eliminating the low pressure. Bacti samples and chlorine residuals were taken the next morning.

Essex Water Distribution System

Non-Compliance Item:

The following Adverse Water Quality Incident (AWQI) identified for the Essex Distribution System that is supplied by the Union Water Supply System

- AWQI #129303 – April 27, 2016, Watermain break at 341 Talbot Street Road West, with possible cross contamination with sanitary line. Watermain break was repaired and isolated section of

watermain was flushed. Bacti samples were taken at the main break site, as well as upstream and downstream from the break site.

Lakeshore Water Distribution System

There were no non-compliances or AWQIs identified for the portion of the Town of Lakeshore Water Distribution System that is supplied by Union Water Supply System:

SUMMARY OF THE QUANTITIES AND FLOW RATES OF WATER SUPPLIED DURING THE PERIOD COVERED BY THE REPORT, INCLUDING MONTHLY AVERAGE AND MAXIMUM DAILY FLOWS, AND DAILY INSTANTANEOUS PEAK FLOW RATES

The following sections provide information in regards to the Union Water Supply System's Permit to Take Water, issued under Ontario Regulation 387/04 and Drinking Water License issued under the Safe Drinking Water Act, 2002.

Permit to Take Water

The Union Water Supply System operated under Permit to Take Water (PTTW) Number 0685-6AKRP3 for January to March 2016 and 0816-9T9SVT for April to December 2016. The PTTW has the following flow conditions:

- Maximum Allowable Amount Taken per Minute (Litres/Min) 113,650
- Maximum Allowable Amount Taken Per Day (Litres/Day) 163,656,000

The maximum amounts of raw water taken during 2016 (see Table 1 below) are as follows:

- Maximum Amount Taken per Minute in 2016 (Litres/Min) 68,945
- Maximum Amount Taken Per Day in 2016 (Litres/Day) 83,507,000

The system did not exceed the PTTW limits in 2016.

Drinking Water License

The UWSS operates under Municipal Drinking Water Licence 041-01; issue Number 4 which has been issued for the period July 21, 2014 to July 20, 2019. The Certificate of Approval and licence had the following condition:

- The drinking water system shall not be operated to exceed 124,588 m^3/d (27.4 MIGD) on any calendar day, conveyed from the treatment system to the distribution system.
- The maximum daily volume of water pumped into the distribution system was 71,369 m^3 (15.699 MIGD).

Tables 1A through 3B below provide the monthly average, maximum and peak flows for raw and treated water for the Union Water Supply System.

Table 1A
2016 Raw Water Taking from Lake Erie in Metric Units

	Maximum Allowed Flow Rate (m3/Day)	Average Flow (m3/Day)	Maximum Flow (m3/Day)	Maximum Flow (Litres/Day)	Maximum Allowed Flow Rate (Litres/ Minute)	Peak Flow (Litres/ Minute)
January	163,656	26,039	30,846	30,846,000	113,650	24,359
February	163,656	30,228	35,697	35,697,000	113,650	33,301
March	163,656	34,383	49,266	49,266,310	113,650	41,161
April	163,656	45,572	61,913	61,912,850	113,650	45,419
May	163,656	49,694	67,874	67,874,050	113,650	55,194
June	163,656	67,120	79,104	79,104,000	113,650	65,841
July	163,656	62,802	74,428	74,427,990	113,650	63,690
August	163,656	67,514	83,507	83,507,000	113,650	68,945
September	163,656	56,139	66,132	66,132,000	113,650	60,648
October	163,656	40,785	54,705	54,704,560	113,650	47,146
November	163,656	37,712	44,381	44,381,490	113,650	33,310
December	163,656	28,939	38,327	38,327,000	113,650	31,940

Table 1B
2016 Raw Water Taking from Lake Erie in Imperial Units

	Maximum Allowed Flow Rate (MGD)	Average Flow (MGD)	Maximum Flow (MGD)	Maximum Allowed Flow Rate (Gallons/ Minute)	Peak Flow (Gallons/ Minute)
January	36.00	5.73	6.79	25,000	5,358
February	36.00	6.66	7.85	25,000	7,325
March	36.00	7.56	10.84	25,000	9,054
April	36.00	10.02	13.62	25,000	9,991
May	36.00	10.93	14.93	25,000	12,141
June	36.00	14.76	17.40	25,000	14,483
July	36.00	13.81	16.37	25,000	14,010
August	36.00	14.85	18.37	25,000	15,166
September	36.00	12.35	14.55	25,000	13,341
October	36.00	8.97	12.03	25,000	10,371
November	36.00	8.30	9.76	25,000	7,327
December	36.00	6.37	8.43	25,000	7,026

Table 2A
2016 Treated Water Flow Into Distribution System in Metric Units

	Maximum Allowed Flow Rate (m3/Day)	Average Daily Flow (m3/Day)	Maximum Daily Flow (m3/Day)	Peak Instantaneous Flow (Litres/ Second)
January	124,588	24,671	28,085	581
February	124,588	27,607	33,326	813
March	124,588	32,711	40,818	1,066
April	124,588	39,028	49,586	989
May	124,588	48,240	65,768	1,255
June	124,588	64,732	76,159	1,385
July	124,588	60,836	72,435	1,358
August	124,588	58,899	70,977	1,366
September	124,588	54,282	63,994	1,355
October	124,588	37,725	51,618	1,108
November	124,588	27,800	31,008	932
December	124,588	28,495	35,326	813

Table 2B
2016 Treated Water Flow Into Distribution System in Imperial Units

	Maximum Allowed Flow Rate (MGD)	Average Daily Flow (MGD)	Maximum Daily Flow (MGD)	Peak Instantaneous Flow (Gallons/ Second)
January	27.4	5.43	6.18	128
February	27.4	6.07	7.33	179
March	27.4	7.20	8.98	234
April	27.4	8.59	10.91	218
May	27.4	10.61	14.47	276
June	27.4	14.24	16.75	305
July	27.4	13.38	15.94	299
August	27.4	12.96	15.61	300
September	27.4	11.94	14.08	298
October	27.4	8.30	11.36	244
November	27.4	6.12	6.82	205
December	27.4	6.27	7.77	179

Table 3A
2016 Treated Flow to Local Municipalities in Metric Units

	Leamington		*Kingsville*		*Essex*		*Lakeshore*	
	Monthly Total (m3)	Average Day (m3/day)	Monthly Total (m3)	Average Day (m3/day)	Monthly Total (m3)	Average Day (m3/day)	Monthly Total (m3)	Average Day (m3/day)
January	340,479	10,983	292,724	9,443	63,333	2,043	36,288	1,171
February	373,157	12,867	318,973	10,999	60,020	2,070	30,055	1,036
March	548,460	17,692	464,104	14,971	66,339	2,140	35,893	1,158
April	552,349	18,412	482,629	16,088	68,726	2,291	33,042	1,101
May	606,887	19,577	559,571	18,051	63,197	2,039	36,029	1,162
June	1,191,509	39,717	1,046,212	34,874	111,384	3,713	70,597	2,353
July	785,668	25,344	630,300	20,332	67,571	2,180	44,177	1,425
August	951,438	30,692	784,928	25,320	82,875	2,673	61,845	1,995
September	811,273	27,042	728,370	24,279	68,836	2,295	35,840	1,195
October	549,397	17,722	433,194	13,974	65,733	2,120	43,626	1,407
November	445,948	14,865	351,615	11,721	66,928	2,231	35,218	1,174
December	361,670	11,667	377,407	12,174	66,134	2,133	36,288	1,171
Total	**7,518,235**	**20,548**	**6,470,027**	**17,685**	**851,076**	**2,327**	**498,898**	**1,362**

Table 3A
2016 Treated Flow to Local Municipalities in Imperial Units

	Leamington		*Kingsville*		*Essex*		*Lakeshore*	
	Monthly Total (Imperial Gallons)	Average Day (MGD)	Monthly Total (Imperial Gallons)	Average Day (MGD)	Monthly Total (Imperial Gallons)	Average Day (MGD)	Monthly Total (Imperial Gallons)	Average Day (MGD)
January	74,894,910	2.42	64,390,278	2.08	13,931,312	0.45	7,982,244	0.26
February	82,083,065	2.83	70,164,251	2.42	13,202,554	0.46	6,611,176	0.23
March	120,644,334	3.89	102,088,608	3.29	14,592,540	0.47	7,895,356	0.25
April	121,499,794	4.05	106,163,538	3.54	15,117,607	0.50	7,268,224	0.24
May	133,496,477	4.31	123,088,412	3.97	13,901,397	0.45	7,925,272	0.26
June	262,095,339	8.74	230,134,467	7.67	24,501,055	0.82	15,529,169	0.52
July	172,822,799	5.57	138,646,617	4.47	14,863,542	0.48	9,717,581	0.31
August	209,287,102	6.75	172,660,022	5.57	18,229,951	0.59	13,603,998	0.44
September	178,455,112	5.95	160,219,001	5.34	15,141,803	0.50	7,883,698	0.26
October	120,850,445	3.90	95,289,359	3.07	14,459,239	0.47	9,596,378	0.31
November	98,094,846	3.27	77,344,487	2.58	14,722,102	0.49	7,746,877	0.26
December	79,556,278	2.57	83,017,934	2.68	14,547,446	0.47	7,982,244	0.26
Total	**1,653,780,501**	**4.52**	**1,423,206,976**	**3.89**	**187,210,548**	**0.51**	**109,742,218**	**0.30**

Ontario Clean Water Agency
Agence Ontarienne Des Eaux

UNION WATER SUPPLY SYSTEM

Annual Performance Report

Leamington Distribution System

Drinking Water System # 220004992

2016

Prepared for the Municipality of Leamington

By the Ontario Clean Water Agency
Ken Penney
Process & Compliance Technician
kpenney@ocwa.com
519-326-4447

ANNUAL REPORT

Drinking-Water System Number:	220004992
Drinking-Water System Name:	Leamington Distribution System (Union WSS)
Drinking-Water System Owner:	The Municipality of Leamington
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	01-January-2016 to 31-December 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 [X] No [ ]

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.

Municipality of Leamington Office
111 Erie Street North,
Leamington, ON
N8H 2Z9

Complete for all other Categories.

Number of Designated Facilities served:

N/A

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

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 [ ]

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	**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 [ ] No [N/A]

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

A stand alone distribution system serving a population of approx 31,000 residents of the Municipality of Leamington.

List all water treatment chemicals used over this reporting period

N/A

Were any significant expenses incurred to?

[ ] Install required equipment
[ ] Repair required equipment
[X] Replace required equipment

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

Morgan/Georgia watermain replacement project $570,000
Point Pelee Dr/Bevel Line Phase II watermain replacement project $563,000

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
June 28, 2016	Total Coliform	1	cfu/100mL	Resample upstream and downstream, and again in 24hrs	June 29, 2016
Aug. 03, 2016	Total Coliform	8	cfu/100mL	Resample upstream and downstream, and again in 24hrs	Aug. 04, 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 #) Cfu/100ml	Range of Total Coliform Results (min #)-(max #) Cfu/100ml	Number of HPC Samples	Range of HPC Results (min #)-(max #) Cfu/100ml
Raw	Please see the Annual Report for the Union Water Supply System # 210000853				
Treated	Please see the Annual Report for the Union Water Supply System # 210000853				
Distribution	532	0-0	0-8	235	10-60

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 #)
Turbidity	Please see the Annual Report for the Union Water Supply System # 210000853	
Chlorine Combined	364	Max: 2.09 mg/l Min: 0.87 mg/l Avg: 1.54 mg/l Combined Residual (Chloramination)
Fluoride (If the DWS provides fluoridation)	**N/A**	

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

***NOTE**: Record the unit of measure if it is **not** milligrams per litre.*

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
None				

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

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Nitrite	December 28,2016	<0.1	mg/L	No
Nitrate	December 28,2016	0.4	mg/L	No
Nitrate + Nitrite (N)	December 28,2016	0.4	mg/L	No

*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 Results (min#) – (max #)		MAC (ug/L	Number of Exceedances
		Minimum	Maximum		
Distribution – Lead Results (ug/L)	1	0.48	0.48	10	0
Distribution – Alkalinity (mg/L)	9	78	91	n/a	n/a
Distribution – pH In-House	4	7.45	7.55	n/a	n/a
Distribution – pH Lab	1	8.03	8.03	n/a	n/a

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

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
THM (NOTE**:** show latest annual average**)**	Annual Average	22.775	ug/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	Result Value	Unit of Measure	Date of Sample
None			

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OPTIONAL ANNUAL REPORT TEMPLATE

Drinking-Water System Number:	**220003332**
Drinking-Water System Name:	Wheatley Drinking Water System
Drinking-Water System Owner:	Municipality of Chatham-Kent
Drinking-Water System Category:	Large Municipal
Period being reported:	January 1 – December 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 [X] No [ ]

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.

Chatham-Kent P.U.C.
325 Grand Ave. East
P.O. Box 1191
Chatham, ON
N7M 5L8

Complete for all other Categories.

Number of Designated Facilities served:

N/A

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

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 [ ]

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
3rd&4th Concession Waterline Association	260086203
Richardson Sideroad Waterline Association	260086190
Cedar Inn Waterline Association	260086177
Tecumseh Road Waterline Association	260086151
Tilbury Townline Waterline Association	260086164
3rd Concession Waterline Association	260086125
KOA Waterline Association	260086138
Leamington (Wheatley) Distribution System	260087048
D & O Waterline Association	260091793
Mint Waterline Distribution System	260091767

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

Describe your Drinking-Water System

The Wheatley Water Treatment Plant draws raw water from Lake Erie. Large debris is screened out of the raw water as it is drawn into the treatment plant. Chlorine is added at the raw intake to control the growth of zebra mussels within the intake pipe. The raw water then passes through a 35 micron microstrainer to remove algae and other fine particles. Aluminum Sulphate and Polymer are added to achieve more effective settling in the clarifier. Activated carbon is added in the clarifier and is primarily used to remove dissolved organic matter that causes taste, odor and color in drinking water. The water then passes through the gravity filters into the clearwell, where it is disinfected with chlorine before being pumped into the distribution system. The distribution system pressure is regulated by an elevated storage tower in Wheatley, with a capacity of 1454 m3. The elevated storage tower in the community of Tilbury has a capacity of 6181 m3.

List all water treatment chemicals used over this reporting period

1. Chlorine Gas
2. Sodium Hypochlorite
3. Aluminum Sulphate
4. Activated Carbon
5. Betz Dearborn Klar-Aid IC1179 (Polymer).

Were any significant expenses incurred to?

- **[ ]** Install required equipment
- **[X]** Repair required equipment
- **[X]** Replace required equipment

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

Chlorine analyzer maintenance	$1,031
Turbidity analyzer maintenance	$2,357
Elevated tank safety upgrades	$3,150
Chemical metering pump	$4,478
Filter maintenance	$7,450
On-line analyzers	$8,200
Low lift & high lift pump maintenance	$10,636
Clarifier maintenance	$10,825
Elevated tank inspections, repairs and safety system change out	$56,840
SCADA/PLC upgrade	$420,000

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
May 31	Total Coliform in a Point of Entry sample	1	cfu/100 mL	Resample/re-test	May 31 & June 1
Aug 16	Leamington (Wheatley) DS SS3 Milo Road Total coliform	6	cfu/100	Resample/re-test	Aug 15
Sept 13	Leamington (Wheatley) DS SS1 Mersea Rd 1 Total coliform	>150	cfu/100	Resample/re-test	Sept 12
October 25	Total Coliforms in a Distribution Sample	10	cfu/100 mL	Resample/re-test	October 25
October 26	Total Coliform in a Distribution Sample	1	cfu/100 mL	Resample/re-test	October 26

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 - NDOGN	0 - NDOGN	NA	
Treated	52	0 - 0	0 - 1	52	<10 - 10
Distribution	431	0 - 0	0 - 10	341	<10 - 150

*NDOGN – No Data Overgrown with Non Targeted Organisms

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 #)
Turbidity	8760	0.017 – 0.210
Chlorine	8760	1.22 – 2.23
Fluoride (If the DWS provides fluoridation)	N/A	N/A

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

***NOTE**: Record the unit of measure if it is **not** milligrams per litre.*

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 027-102: Pg. 12 Residue Management Table 3 Avg Annual Limit: 25 mg/L	Total Suspended Solids	Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec Annual Avg Concentration	10 2 5 18 6 2 9 10 5 2 10 3 7	

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

*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

	Sample Date Feb 16/16	Sample Date May 9/16	Sample Date Aug 22/16	Sample Date Nov 14/16	Exceedance
Antimony – ug/L			ND		No
Arsenic – ug/L			ND		No
Barium – ug/L			18		No
Boron – ug/L			18		No
Cadmium – ug/L			ND		No
Chromium – ug/L			ND		No
Lead – ug/L	See Schedule 15.1 Summary				
Mercury – mg/L			ND		No
Selenium- ug/L			ND		No
Sodium – mg/L	8.6	8.5	8.7	9.2	No
Uranium – ug/L			ND		No
Fluoride – mg/L	ND	ND	ND	ND	No
Nitrate – mg/L	0.18	0.12	0.14	ND	No
Nitrite – mg/L	ND	ND	ND	ND	No

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 #)	Number of Exceedances
Residential	NA		
Non Residential	NA		
Distribution	NA		

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

Parameter	Sample Date	Results Value	Units in ug/L	Exceedance
Alachlor	Aug 22/16	ND	YES	NO
Atrazine + N-dealkylated metabolites	Aug 22/16	ND	YES	NO
Azinphos - methyl	Aug 22/16	ND	YES	NO
Benzene	Aug 22/16	ND	YES	NO
Benzo(a)pyrene	Aug 22/16	ND	YES	NO
Bromoxynil	Aug 22/16	ND	YES	NO
Carbaryl	Aug 22/16	ND	YES	NO
Carbofuran	Aug 22/16	ND	YES	NO
Carbon Tetrachloride	Aug 22/16	ND	YES	NO
Chloropyrifos	Aug 22/16	ND	YES	NO
Diazinon	Aug 22/16	ND	YES	NO
Dicamba	Aug 22/16	ND	YES	NO
1,2 - Dichlorobenzene	Aug 22/16	ND	YES	NO
1,4 - Dichlorobenzene	Aug 22/16	ND	YES	NO
1,2 - Dichloroethane	Aug 22/16	ND	YES	NO
1,1- Dichloroethylene (vinylidenechloride)	Aug 22/16	ND	YES	NO
Dichloromethane	Aug 22/16	ND	YES	NO
2,4 - Dichlorophenol	Aug 22/16	ND	YES	NO
2,4 - Dichlorophenoxy acetic acid (2,4 - D)	Aug 22/16	ND	YES	NO
Diclofop - methyl	Aug 22/16	ND	YES	NO
Dimethoate	Aug 22/16	ND	YES	NO
Diquat	Aug 22/16	ND	YES	NO
Diuran	Aug 22/16	ND	YES	NO
Glyphosate	Aug 22/16	ND	YES	NO
Malathion	Aug 22/16	ND	YES	NO
Metolachlor	Aug 22/16	ND	YES	NO
Metribuzin	Aug 22/16	ND	YES	NO
Monochlorobenzene (chlorobenzene)	Aug 22/16	ND	YES	NO
Paraquat	Aug 22/16	ND	YES	NO
Pentachlorophenol	Aug 22/16	ND	YES	NO
Phorate	Aug 22/16	ND	YES	NO
Picloram	Aug 22/16	ND	YES	NO
Polychlorinated Byphenyls (PCB)	Aug 22/16	ND	YES	NO
Prometryne	Aug 22/16	ND	YES	NO
Simazine	Aug 22/16	ND	YES	NO
Trihalomethanes – sampled quarterly	Feb 16/16	21.8	YES	NO

Running Annual Average	May 9/16 Aug 22/16 Nov 14/16	32.8 52.9 43.9 37.9		
Terbufos	Aug 22/16	ND	YES	NO
Tetrachloroethylene (perchloroethylene)	Aug 22/16	ND	YES	NO
2,3,4,6 - Tetrachlorophenol	Aug 22/16	ND	YES	NO
Triallate	Aug 22/16	ND	YES	NO
Trichloroethylene	Aug 22/16	ND	YES	NO
2,4,6 - Trichlorophenol	Aug 22/16	ND	YES	NO
Trifluralin	Aug 22/16	ND	YES	NO
Vinyl Chloride	Aug 22/16	ND	YES	NO
MPCA	Aug 22/16	ND	YES	NO

ADDITIONAL

Parameter- POINT OF ENTRY	**Sample Date Feb 16/16**	**Sample Date May 9/16**	**Sample Date Aug 22/16**	**Sample Date Nov 14/16**
pH	7.42	7.59	7.35	7.60
HARDNESS – mg/L	110	110	110	110
ALKALINITY – mg/L	76	76	82	75
COLOUR - TCU	ND	ND	ND	ND
FLUORIDE – mg/L	ND	ND	ND	ND
ALUMINUM –mg/L	0.008	0.018	0.018	0.021

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**
None			

Summary of additional voluntary sampling and testing during this reporting period.

Parameter	Date Sampled	Results Value Raw	Results Value Point of Entry	Results Value Distribution	Units
Microcystin	June 6	<0.15	<0.15	<0.15	ug/L
Microcystin	June 13	0.30	0.22	<0.15	ug/L
Microcystin	June 20	<0.15	<0.15	<0.15	ug/L
Microcystin	June 27	<0.15	<0.15	<0.15	ug/L
Microcystin	July 4	<0.15	<0.15	<0.15	ug/L
Microcystin	July 11	<0.15	<0.15	<0.15	ug/L
Microcystin	July 18	<0.15	<0.15	<0.15	ug/L
Microcystin	July 25	<0.15	<0.15	<0.15	ug/L
Microcystin	Aug 2	<0.15	<0.15	<0.15	ug/L
Microcystin	Aug 8	<0.15	<0.15	<0.15	ug/L
Microcystin	Aug 15	<0.15	<0.15	<0.15	ug/L
Microcystin	Aug 22	<0.15	Broken Bottle	<0.15	ug/L
Microcystin	Aug 29	<0.15	<0.15	<0.15	ug/L
Microcystin	Sept 6	<0.15	<0.15	<0.15	ug/L
Microcystin	Sept 12	<0.15	<0.15	<0.15	ug/L
Microcystin	Sept 19	<0.15	<0.15	<0.15	ug/L
Microcystin	Sept 26	<0.15	<0.15	<0.15	ug/L
Microcystin	Oct 3	0.17	<0.15	0.16	ug/L
Microcystin	Oct 11	<0.15	<0.15	<0.15	ug/L
Microcystin	Oct 17	<0.15	<0.15	<0.15	ug/L
Microcystin	Oct 24	<0.15	<0.15	<0.15	ug/L
Microcystin	Oct 31	<0.15	<0.15	<0.15	ug/L
Microcystin	Nov 7	0.16	0.21	0.21	ug/L
Microcystin	Nov 14	<0.15	<0.15	<0.15	ug/L
Microcystin	Nov 21	<0.15	<0.15	<0.15	ug/L
Microcystin	Nov 28	<0.15	<0.15	<0.15	ug/L