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2019

St. Thomas Secondary System

License Number: 190-101

Permit Number: 190-201

Provincial Regulation 170/03
Summary Report

For the Period
January 1, 2022 – December 31, 2022



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1 Summary Report Requirements

1.1 Introduction

The 2022 Summary Report for the St. Thomas Area Secondary Water Supply System (STASWSS) is being submitted to satisfy Schedule 22 of Ontario Regulation 170/03, the requirement to prepare and distribute a summary report of water system operations, outlining regulatory non-compliance with respect to water quality and water system management and administration and evaluating the water system infrastructure adequacy (with respect to its ability to continuing meeting the water demands of the serviced community).

As per Ontario Regulation 170/03, the summary report must:

- a. List the requirements of the Act, the regulations, the system's approval, drinking water works permit, municipal drinking water licence, and any orders applicable to the system that were not met at any time during the period covered by the report; and
- b. For each requirement referred to in clause (a) that was not met, specify the duration of the failure and the measures that were taken to correct the failure.

The report must also include the following information for the purpose of enabling the owner of the system to assess the capability of the system to meet existing and planned uses of the system:

- A summary of the quantities and flow rates of the water supplied during the period covered by the report, including monthly average and maximum daily flows.
- A comparison of the summary to the rated capacity and flow rates approved in the system's approval, drinking water works permit or municipal drinking water licence, or if the system is receiving all of its water from another system under an agreement, to the flow rates specified in the written agreement.

The information provided is for the purpose of enabling the owner of the system to assess the capacity of the system. This report covers the reporting period from January 1, 2022 to December 31, 2022.

1.2 System Description

The STASWSS is supplied water from the Elgin Middlesex Pumping Station (EMPS) and Reservoir. The EMPS reservoir is filled by the Elgin Area Primary Water Supply System (EAPWSS) which obtains its water from Lake Erie and provides water treatment at the Elgin Area Primary Water Treatment Plant, located on Dexter Line, East of Port Stanley Ontario.

Operation and Maintenance of the EMPS- St. Thomas section is currently under contract with the Ontario Clean Water Agency (OCWA). The operation and maintenance of the associated transmission main and distribution system of the STASWSS is currently conducted by the City of St. Thomas – Environmental Services Dept.

The STASWSS is considered a distribution-only system, providing water directly to the City of St. Thomas and sections of the Southwold and Central Elgin Water Distribution Systems.

1.3 System Approvals and Regulatory Requirements

Operation and Maintenance of the STASWSS is governed by the Safe Drinking Water Act, 2002, and the regulations established under this Act. In accordance with the Safe Drinking Water Act, The Joint Board of Management of the St. Thomas Area Secondary Water Supply System holds a Municipal Drinking Water Licence and Drinking Water Works Permit, which provide approval for the establishment of drinking water infrastructure and provide the authority to operate and maintain said water system.

During the reporting period, The St. Thomas Area Secondary Water Supply System was operated pursuant to the approvals, licences and permits listed below:

- MDWL No. 190-101, issue 3 to April 23, 2021, issue 4 to Sept 30, 2021, issue 5 to end of year
- DWWP No. 190-201, issue 2 to Sept 30, issue 3 to end of year

Ontario Regulation 170/03 – Drinking Water Systems, governs the operation, maintenance and water quality monitoring requirements for municipal drinking water systems in Ontario. Ontario Regulation 128/04 – Certification of Drinking Water System Operations and Water Quality Analysts sets out the requirements for persons performing operational or maintenance activities on the water system. The Safe Drinking Water Act, 2002 and the associated regulations are enforced by the Ministry of Environment, Conservation and Parks (MECP) and monitored through annual inspections by Ministry personnel. Any non-compliant conditions identified during the course of the annual inspection are listed in the Inspection Report issued at the conclusion of the inspection period and are summarized in section 4.1 of this report.

Ontario Regulation 169/03 – Ontario Drinking Water Quality Standards sets the limits for parameters of concern in drinking water. Drinking water quality is monitored by the Operating Authority and any exceedance of the Drinking Water Quality Standards must be reported to the MECP and Public Health Unit, verbally and in written form through the use of a Notice of Adverse Test Results and Issue Resolution Form. Any non-compliant conditions identified through water quality monitoring exercises over the reporting period have been documented on a Notice of Adverse Test Results and Issue Resolution Form and are summarized in section 4.2 of this report.

2 Evaluation of Water Quantities and Flow Rates

The EMPS is situated on a site owned by the Elgin Area Primary Water Supply System and includes the original St. Thomas pump station, constructed in 1966 that services St. Thomas, and sections of the Municipalities of Central Elgin and Southwold. Two additional pump stations were completed in 1994 and service the City of London, as well as the Municipality of Malahide, Town of Aylmer, and the Municipality of Central Elgin.

The St. Thomas pump station is comprised of three high-lift pumps that deliver water through a transmission main that services the St. Thomas Area Secondary Water Supply System. A gas re-chlorination system provides re-chlorination for water being directed to the St. Thomas Area Secondary Water Supply System.

The Ontario Clean Water Agency (OCWA) is currently the Operating Authority for all 3 pump stations located within the EMPS, and ultimately control the pumps directing water into the STASWSS.

OCWA has prepared a Summary Report for their operations at the EMPS for the reporting period, which evaluates the volumes of water delivered to the STASWSS. The report is attached as Appendix A.

3 Water Quality Summary

A summary of water quality testing completed by the City of St. Thomas – Environmental Services Dept. over the course of the reporting period is available in the Annual Report, attached as Appendix B.

A summary of water quality testing completed by OCWA over the course of the reporting period is available in the Annual Report included as an appendix to the Summary Report (Appendix A to this report).

4 Summary of Non-Compliant Conditions

4.1 Ministry of the Environment, Conservation and Parks Inspection

The Ontario Ministry of the Environment, Conservation and Parks (MECP) conducts an inspection of the St. Thomas portion of the Elgin-Middlesex Pumping Station, operated by OCWA, annually along with the St. Thomas Area Secondary Water System, operated by the City of St. Thomas.

An MECP inspection has been scheduled but not completed by the time the report was authored.

| MECP Inspection Finding | O.A. Responsible | Action Taken |
|-------------------------|------------------|--------------|
| N/A | N/A | N/A |

4.2 Adverse Test Results and Issue Resolution

Any non-compliant conditions identified through water quality monitoring exercises undertaken by St. Thomas Environmental Services over the reporting period, and actions taken are summarized in the table below.

| Adverse Test Result (Date / Location) | O.A. Responsible | Action Taken |
|---------------------------------------|------------------|--------------|
| N/A | N/A | N/A |

5 List of Appendices

Appendix A – OCWA EMPS – St. Thomas Secondary Water Supply System – 2022 Annual Report

Appendix B - St. Thomas Secondary Water Supply System – 2022 Annual Report

APPENDIX A

ELGIN-MIDDLESEX PUMPING STATION
ST. THOMAS AREA SECONDARY WATER SUPPLY
SYSTEM
2022 COMPLIANCE REPORT
(Schedule 22 Summary Report)

Facility Name: Elgin-Middlesex Pumping Station -
St. Thomas Area Secondary Water Supply System

Mailing Address: Elgin Area Primary Water Supply System
P.O. Box 220
Port Stanley, ON N5L 1J4



Average Daily Flow 7,744m³/day
Max. Daily Flow 15,062m³/day
Source Water Elgin Area Primary Water Supply System

CONTACT INFO:

Contract Administration:
City of St. Thomas, City Hall
Environmental Services
545 Talbot Street, St. Thomas, ON N5P3V7
Contact: Mr. Justin Lawrence
Director of Environmental
Services and City Engineer

Operator:
Ontario Clean Water Agency.
P.O. Box 220, Port Stanley, Ontario N5L 1J4
Contact: Mr. Greg Henderson - Senior Operations Manager
(226) 378-5154

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System Approvals:

The St. Thomas Area Secondary Water Supply System is supplied water through the Elgin-Middlesex Pump Station, which receives water from the Elgin Area Primary Water Supply System on Dexter Line, east of Port Stanley, Ontario. During the reporting period, The St. Thomas Area Secondary Water Supply System was operated pursuant to the approvals, licenses and permits listed below.

The supply and distribution of water to the system is governed by the following Municipal Drinking Water Licenses (MDWL) and Drinking Water Works Permits (DWWP):

- MDWL No. 190-101, issued on September 30, 2021
- DWWP No. 190-201, issued on September 30, 2021

The DWWP and MDWL were issued in accordance with the Safe Drinking Water Act (SDWA), 2002.

Treated Water Requirements:

The requirements fall under the Drinking Water Systems Regulation (O.Reg.170/03) and the Ontario Drinking Water Quality Standards (O.Reg.169/03) under the Safe Drinking Water Act, 2002.

Staff Complement and Training:

In 2022, the St. Thomas facility at the Elgin-Middlesex Pump Station (EMPS) was operated and maintained under the operating authority, Ontario Clean Water Agency. The operational and maintenance staff are based at the Elgin Area Primary Water Supply System (EAPWSS) located east of Port Stanley, Ontario, and share their time between the two facilities. Employees responsible for the operations and maintenance of the facility included one (1) Senior Operations Manager, two (2) Team Leads, eight (8) full time equivalent operations staff, four (4) full time equivalent maintenance staff and one (1) administrative assistant.

Regional staff shares their work hours between the EMPS Systems, Lake Huron Primary Water Supply System (LHPWSS) and the Elgin Area Primary Water Supply System (EAPWSS). They provides administrative support services to the EMPS, which includes the Regional Hub Manager, Regional Business Manager, Safety, Process and Compliance Manager, Technical Projects Coordinator and Asset Maintenance Specialist.

In 2022, all employees received Director Approved and practical on-the-job training, which contributed to annual MECF training requirements.

History of Facility:

The EMPS is an integrated booster station occupied by three secondary systems which are fed from two in-ground storage reservoirs, each having a capacity of 27.3 million liters. The two storage reservoirs and the site upon which the three booster stations are situated are owned by the Elgin Area Primary Water Supply System (EAPWSS). This includes the original St. Thomas pump station, constructed in 1966 that services St. Thomas, and sections of the Municipalities of Central Elgin and Southwold. Two additional pump stations were completed in 1994 and service the City of London, as well as the Municipality of Malahide, Town of Aylmer, and the Municipality of Central Elgin.

The St. Thomas pump station is comprised of three high-lift pumps that deliver water through a transmission main that services the St. Thomas Area Secondary Water Supply System. A gas re-chlorination system provides re-chlorination for water being directed to the St. Thomas Area Secondary Water Supply System.

In the event of a power failure, an on-site generator can provide sufficient standby power to operate the facility and the St. Thomas pumps.

Remote monitoring and control of all three pump stations is performed by staff at the Elgin Area Primary Water Supply System (EAPWSS) near Port Stanley, Ontario. Remote monitoring and control capabilities are made possible via the EAPWSS and the Elgin-Middlesex Pumping Station (EMPS) SCADA systems

Process Description:



The Elgin-Middlesex Pump Station (EMPS) receives treated water from the Elgin Area Primary Water Supply System, which treats water at the water treatment plant located on the shores of Lake Erie to the east of Port Stanley. Water from the plant is pumped into the EAPWSS reservoirs located at the EMPS where it is subsequently fed via a series of headers to each of the pumping stations serving the Aylmer Area Secondary Water Supply System, the City of London Distribution System, and the St. Thomas Area Secondary Water Supply System.



The St. Thomas pump station has two duty pumps and one standby pump. All three pumps are equipped with Variable Frequency Drives (VFD). However, the VFD's are presently configured to act as soft starts. Each pump has a rated capacity of 263 L/s.

Post-Treatment:

The St. Thomas Area and Aylmer Area Secondary Water Supply System pump stations both utilize a gas re-chlorination system. The system consists of two scaled 68kg gas chlorine cylinders and three chlorinators equipped with booster pumps.

The three chlorinators redundantly serve the Aylmer Area Secondary Water Supply System (AASWSS) and St. Thomas Area Secondary Water Supply System (STASWSS) and have a dosage capacity range of 1-60kg/h of chlorine gas.

High Lift Pump Station:

The three high lift pumps provide redundant pumping capacity into the St. Thomas Area Secondary Water Supply System. See Appendix B for 2022 Total Daily Flows and Appendix C for 2022 Daily Instantaneous Peak Flows.

Maintenance:

Site maintenance was carried out by Ontario Clean Water Agency field services staff based at the Elgin Area Primary Water Supply System. Specialty maintenance services are provided, on an as needed basis by external service providers. All maintenance scheduling is monitored through a computerized maintenance management system (Maximo).

In addition to the routine preventative maintenance program, a number of maintenance projects were completed at the EMPS in 2022. A summary of non-routine maintenance is available in Appendix D, the 2022 Annual Report.

Sampling Procedures:

All samples collected by licensed OCWA personnel are submitted to CALA (Canadian Association for Laboratory Accreditation) accredited laboratories for bacteriological and chemical analysis.

Distribution water samples are taken twice per week at the inlet to the reservoir and submitted for bacteriological analysis. The distribution water entering the St. Thomas Area Secondary Water Supply System is sampled weekly and submitted to an external laboratory for bacteriological analysis. Chlorine residual, for the water entering the St. Thomas Area Secondary Water Supply System, is monitored continuously from the Elgin Area Primary Water Supply System by means of the SCADA system.

On a quarterly basis the distribution water entering the reservoir, as well as the water entering the St. Thomas Area Secondary Water Supply System is sampled and submitted to an accredited laboratory for testing of Total Trihalomethanes (THMs) and Haloacetic Acids (HAA's), disinfection by-products. Twice annually, the distribution water entering the reservoir is sampled and submitted to an accredited laboratory for testing of lead concentrations.

All water quality sampling at the Elgin- Middlesex Pump Station is performed in accordance with Ontario Regulation 170/03.

Flow Measurement and Water Quality Monitoring:

Flow leaving the EMPS directed to St. Thomas Secondary System is measured utilizing a magnetic flow measuring device. See Appendix A for a summary of 2022 water quality data.

Statement of Comparison:

The previous Certificate of Approval and new Municipal Drinking Water License for the St. Thomas Area Secondary Water Supply System does not identify a rated capacity for the system. The pumping station has an available capacity of 68,169m³/day, whereby instantaneous peak flow is 789 L/s.

The maximum total daily flow witnessed by the system in 2022 was 15,062m³/day, approximately 22% of the capacity. The average total daily flow witnessed by the system in 2022 was 7,744m³/day, approximately 11% of the capacity.

The maximum instantaneous peak flow witnessed by the system in 2022 was 477 L/s, approximately 60% of the capacity. See Appendix B for 2022 total daily flow values and Appendix C for 2022 daily instantaneous peak flow rates.

Ministry of the Environment Conservation and Parks Inspections:

The Ontario Ministry of the Environment Conservation and Parks (MECP) conducts an inspection of the St. Thomas portion of the Elgin-Middlesex Pumping Station annually along with the St Thomas Area Secondary Water System operated by the City of St Thomas. A MECP inspection took place in February 16 2023. The final inspection report and inspection rating is still in review.

Benefiting Municipalities:

Following the adoption of the Municipal Water and Sewer Transfer Act in 1997, the Ontario Ministry of the Environment Conservation and Parks transferred the ownership of the three booster stations from the Province of Ontario to the water systems' benefiting municipalities. As a result, the Aylmer Area Secondary Water Supply System portion of the EMPS and associated equipment is owned by the Aylmer Area Secondary Water Supply System Joint Board of Management, the London portion of the EMPS is owned by the Corporation of the City of London, and the St. Thomas Area Secondary Water System portion of the EMPS and associated appurtenances are owned by the St. Thomas Area Secondary Water System Joint Board of Management. Jointly these water systems benefit, and are managed on behalf of, the communities of Aylmer, Central Elgin, London, Malahide, Southwold and St. Thomas. A list of municipalities that receive water directly and indirectly from the St. Thomas Area Secondary Water Supply System at the EMPS is provided in Appendix D. The Ontario Clean Water Agency operates and maintains the Elgin- Middlesex Pump Station, under contracts to the Aylmer Area Secondary Water Supply System, The Corporation of the City of London and the St. Thomas Area Secondary Water Supply System.

This report was prepared by Ontario Clean Water Agency, the Operating Authority for the St. Thomas portion of the EMPS, on behalf of the St. Thomas Area Secondary Water Supply System Joint Board of Management.

**APPENDIX A – EMPS ST. THOMAS
WATER QUALITY SUMMARY 2022**

| MONTH | POST TREATMENT | |
|------------------|------------------------------|--|
| | Free Cl ₂ mg/L | |
| January | | |
| Minimum | 0.88 | |
| Maximum | 1.65 | |
| Average | 1.46 | |
| February | | |
| Minimum | 0.85 | |
| Maximum | 1.61 | |
| Average | 1.40 | |
| March | | |
| Minimum | 0.81 | |
| Maximum | 1.63 | |
| Average | 1.43 | |
| April | | |
| Minimum | 0.69 | |
| Maximum | 1.58 | |
| Average | 1.40 | |
| May | | |
| Minimum | 0.75 | |
| Maximum | 1.65 | |
| Average | 1.40 | |
| June | | |
| Minimum | 0.84 | |
| Maximum | 1.59 | |
| Average | 1.40 | |
| July | | |
| Minimum | 0.79 | |
| Maximum | 1.55 | |
| Average | 1.37 | |
| August | | |
| Minimum | 0.83 | |
| Maximum | 1.42 | |
| Average | 1.32 | |
| September | | |
| Minimum | 0.93 | |
| Maximum | 2.53 | |
| Average | 1.57 | |
| October | | |
| Minimum | 0.81 | |
| Maximum | 2.24 | |
| Average | 1.44 | |
| November | | |
| Minimum | 0.92 | |
| Maximum | 2.32 | |
| Average | 1.51 | |
| December | | |
| Minimum | 0.96 | |
| Maximum | 2.47 | |
| Average | 1.63 | |
| Yearly Minimum | 0.69 | |
| Yearly Maximum | 2.53 | |
| Yearly Average | 1.44 | |

Note: Chlorine residuals obtained from SCADA.

**APPENDIX B
ST. THOMAS TOTAL DAILY FLOW - 2022**

| Date | January m³ | February m³ | March m³ | April m³ | May m³ | June m³ | July m³ | August m³ | September m³ | October m³ | November m³ | December m³ | |
|----------------|----------------------------------|-----------------------------------|--------------------------------|--------------------------------|------------------------------|-------------------------------|-------------------------------|---------------------------------|------------------------------------|----------------------------------|-----------------------------------|-----------------------------------|-----------|
| 1 | 9376 | 9596 | 8889 | 9338 | 7182 | 7572 | 8881 | 8084 | 8756 | 6987 | 3411 | 4989 | |
| 2 | 9684 | 12139 | 8979 | 9847 | 6670 | 5440 | 7718 | 6960 | 9504 | 7356 | 3112 | 4438 | |
| 3 | 9685 | 11166 | 9041 | 10465 | 6279 | 7112 | 7657 | 7694 | 8994 | 6444 | 3096 | 3396 | |
| 4 | 9068 | 10745 | 9154 | 9067 | 6833 | 6340 | 9378 | 6680 | 7739 | 6255 | 3110 | 3921 | |
| 5 | 8942 | 10053 | 9307 | 8802 | 7164 | 7134 | 6953 | 6368 | 8586 | 6353 | 3934 | 2942 | |
| 6 | 9199 | 10687 | 9944 | 8790 | 6723 | 4887 | 7719 | 7356 | 7651 | 6316 | 3711 | 4199 | |
| 7 | 9426 | 9849 | 8855 | 8823 | 7288 | 5075 | 8118 | 6544 | 8034 | 6046 | 5062 | 7214 | |
| 8 | 9865 | 10161 | 8890 | 8651 | 7829 | 6267 | 8062 | 6363 | 9017 | 6442 | 3424 | 8482 | |
| 9 | 10882 | 9824 | 8489 | 9156 | 7932 | 6374 | 7798 | 6706 | 6684 | 5907 | 3526 | 6305 | |
| 10 | 9262 | 10021 | 8790 | 9530 | 7768 | 6852 | 9927 | 7071 | 7616 | 6995 | 6397 | 6674 | |
| 11 | 9392 | 9781 | 8135 | 9052 | 7635 | 7901 | 15062 | 7895 | 7780 | 6447 | 9301 | 7072 | |
| 12 | 9458 | 10261 | 8311 | 9441 | 8412 | 7137 | 12213 | 7168 | 7219 | 5505 | 11133 | 6119 | |
| 13 | 9220 | 9783 | 8441 | 9227 | 8217 | 7688 | 8189 | 7743 | 7622 | 5564 | 9490 | 6436 | |
| 14 | 9242 | 9346 | 8343 | 8391 | 8560 | 8339 | 8419 | 7571 | 7127 | 5665 | 4977 | 6287 | |
| 15 | 9882 | 8961 | 8133 | 8795 | 8206 | 8645 | 9170 | 8492 | 7492 | 4577 | 3956 | 4830 | |
| 16 | 10564 | 8691 | 8545 | 8551 | 6117 | 8152 | 9099 | 6145 | 7170 | 4098 | 4299 | 6117 | |
| 17 | 8773 | 9036 | 8655 | 8645 | 6034 | 8133 | 6567 | 8311 | 7247 | 3300 | 4817 | 7114 | |
| 18 | 9562 | 8298 | 8226 | 9060 | 5527 | 8094 | 7790 | 12887 | 7680 | 4795 | 5332 | 7446 | |
| 19 | 9541 | 8796 | 8398 | 9756 | 6477 | 9373 | 6868 | 9066 | 7680 | 4540 | 6006 | 7415 | |
| 20 | 9571 | 8681 | 9542 | 9051 | 6911 | 7535 | 6875 | 9132 | 8127 | 5004 | 6490 | 6513 | |
| 21 | 9595 | 9583 | 9231 | 9080 | 6762 | 9229 | 6938 | 6686 | 7695 | 4716 | 5532 | 6193 | |
| 22 | 9804 | 8093 | 9139 | 9945 | 5981 | 9801 | 7507 | 7161 | 7796 | 5230 | 6163 | 6674 | |
| 23 | 10493 | 8401 | 9923 | 10052 | 7760 | 9944 | 12772 | 7782 | 9084 | 5608 | 5091 | 6474 | |
| 24 | 9149 | 8521 | 8975 | 9244 | 7596 | 9647 | 13998 | 8142 | 7694 | 4432 | 5560 | 7741 | |
| 25 | 9268 | 7924 | 8385 | 4465 | 6711 | 8375 | 10610 | 7828 | 8956 | 4381 | 4854 | 6732 | |
| 26 | 9720 | 9153 | 9611 | 5276 | 6595 | 9710 | 7827 | 7222 | 7750 | 4732 | 5248 | 6745 | |
| 27 | 9254 | 8990 | 10239 | 6041 | 6507 | 10232 | 7170 | 7382 | 7885 | 5007 | 6152 | 6402 | |
| 28 | 9403 | 8446 | 9300 | 6135 | 6279 | 10261 | 8490 | 8035 | 7832 | 4640 | 5165 | 6180 | |
| 29 | 9711 | | 9799 | 5543 | 7662 | 9555 | 8835 | 7562 | 7906 | 5634 | 4536 | 6539 | |
| 30 | 10208 | | 9316 | 6891 | 9076 | 10597 | 8303 | 6806 | 7311 | 5632 | 5519 | 6229 | |
| 31 | 9534 | | 9610 | | 7006 | | 7925 | 6990 | | 3113 | | 8029 | |
| Total | 296,733 | 264,986 | 278,595 | 255,110 | 221,699 | 241,401 | 272,838 | 235,832 | 237,634 | 167,721 | 158,404 | 191,847 | 2,822,800 |
| Minimum | 8,773 | 7,924 | 8,133 | 4,465 | 5,527 | 4,887 | 6,567 | 6,145 | 6,684 | 3,113 | 3,096 | 2,942 | 2,942 |
| Maximum | 10,882 | 12,139 | 10,239 | 10,465 | 9,076 | 10,597 | 15,062 | 12,887 | 9,504 | 7,356 | 11,133 | 8,482 | 15,062 |
| Average | 9,572 | 9,464 | 8,987 | 8,504 | 7,152 | 8,047 | 8,801 | 7,607 | 7,921 | 5,410 | 5,280 | 6,189 | 7,744 |

APPENDIX C
ST. THOMAS DAILY INSTANTANEOUS PEAK FLOW - 2022

| Date | January L/s | February L/s | March L/s | April L/s | May L/s | June L/s | July L/s | August L/s | September L/s | October L/s | November L/s | December L/s | |
|----------------|-------------|--------------|-----------|-----------|---------|----------|----------|------------|---------------|-------------|--------------|--------------|-----|
| 1 | 299 | 302 | 304 | 285 | 304 | 273 | 272 | 275 | 264 | 271 | 269 | 272 | |
| 2 | 298 | 304 | 286 | 286 | 296 | 278 | 269 | 274 | 266 | 271 | 278 | 271 | |
| 3 | 477 | 280 | 301 | 301 | 308 | 276 | 270 | 270 | 267 | 268 | 278 | 269 | |
| 4 | 347 | 297 | 308 | 300 | 316 | 276 | 268 | 293 | 268 | 273 | 275 | 270 | |
| 5 | 300 | 285 | 305 | 313 | 305 | 273 | 269 | 288 | 269 | 268 | 278 | 273 | |
| 6 | 398 | 307 | 290 | 306 | 308 | 273 | 266 | 268 | 266 | 267 | 277 | 274 | |
| 7 | 364 | 299 | 300 | 301 | 305 | 280 | 268 | 268 | 277 | 274 | 278 | 273 | |
| 8 | 298 | 286 | 282 | 311 | 302 | 281 | 291 | 268 | 275 | 278 | 278 | 284 | |
| 9 | 306 | 295 | 296 | 294 | 282 | 274 | 286 | 268 | 274 | 276 | 274 | 282 | |
| 10 | 302 | 297 | 300 | 309 | 280 | 275 | 287 | 278 | 277 | 281 | 267 | 284 | |
| 11 | 295 | 285 | 296 | 298 | 274 | 273 | 272 | 277 | 279 | 279 | 277 | 286 | |
| 12 | 316 | 292 | 272 | 291 | 277 | 275 | 274 | 278 | 279 | 277 | 280 | 282 | |
| 13 | 282 | 296 | 299 | 307 | 278 | 273 | 281 | 275 | 279 | 279 | 276 | 286 | |
| 14 | 292 | 307 | 300 | 303 | 275 | 271 | 276 | 279 | 277 | 278 | 275 | 282 | |
| 15 | 274 | 300 | 295 | 288 | 275 | 274 | 276 | 277 | 277 | 276 | 274 | 281 | |
| 16 | 292 | 289 | 287 | 300 | 272 | 276 | 277 | 278 | 276 | 278 | 272 | 278 | |
| 17 | 272 | 310 | 287 | 297 | 277 | 276 | 277 | 273 | 273 | 275 | 275 | 278 | |
| 18 | 291 | 300 | 301 | 293 | 290 | 280 | 277 | 275 | 275 | 281 | 279 | 279 | |
| 19 | 312 | 306 | 296 | 294 | 268 | 278 | 276 | 271 | 277 | 274 | 276 | 276 | |
| 20 | 303 | 303 | 300 | 350 | 270 | 278 | 281 | 273 | 273 | 276 | 277 | 279 | |
| 21 | 321 | 309 | 299 | 296 | 269 | 280 | 279 | 272 | 276 | 274 | 277 | 275 | |
| 22 | 326 | 296 | 287 | 289 | 271 | 281 | 279 | 274 | 279 | 276 | 279 | 270 | |
| 23 | 301 | 296 | 290 | 296 | 272 | 272 | 280 | 273 | 278 | 273 | 276 | 273 | |
| 24 | 319 | 299 | 283 | 290 | 268 | 276 | 280 | 272 | 277 | 275 | 272 | 269 | |
| 25 | 313 | 309 | 298 | 306 | 276 | 275 | 276 | 272 | 279 | 273 | 277 | 268 | |
| 26 | 303 | 283 | 315 | 290 | 276 | 276 | 281 | 275 | 277 | 271 | 273 | 270 | |
| 27 | 307 | 312 | 299 | 288 | 276 | 274 | 273 | 271 | 277 | 270 | 276 | 272 | |
| 28 | 289 | 289 | 299 | 311 | 273 | 275 | 277 | 271 | 271 | 270 | 277 | 272 | |
| 29 | 282 | | 287 | 298 | 280 | 272 | 274 | 274 | 270 | 270 | 277 | 274 | |
| 30 | 306 | | 307 | 292 | 273 | 271 | 276 | 271 | 270 | 268 | 272 | 270 | |
| 31 | 284 | | 302 | | 288 | | 275 | 274 | | 270 | | 270 | |
| Minimum | 272 | 280 | 272 | 285 | 268 | 271 | 266 | 268 | 264 | 267 | 267 | 268 | 264 |
| Maximum | 477 | 312 | 315 | 350 | 316 | 281 | 291 | 293 | 279 | 281 | 280 | 286 | 477 |
| Average | 312 | 298 | 296 | 299 | 283 | 276 | 276 | 274 | 274 | 274 | 276 | 276 | 284 |



| | |
|----------------------------------------|----------------------------------------------------------------------------------------|
| Drinking-Water System Number: | 260078897 |
| Drinking-Water System Name: | Elgin Middlesex Pumping Station - St. Thomas Area Secondary Water Supply System |
| Drinking-Water System Owner: | St. Thomas Area Secondary Water Supply System Joint Board of Management |
| Drinking-Water System Category: | Large Municipal Residential |
| Period being reported: | January 1, 2022 through December 31, 2022 |

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [X] No []</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [X] No []</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</p> <div style="border: 1px solid black; padding: 5px;"> <p>City of St. Thomas, City Hall Environmental Services 545 Talbot Street St Thomas, ON. N5P 3V7 www.city.st-thomas.on.ca</p> <p>Elgin Area Primary Water Supply System Treatment Plant 43665 Dexter Line, Union, ON N0L 2L0</p> </div> | <p><u>Complete for all other Categories.</u></p> <p>Number of Designated Facilities served:</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-left: 20px;">N/A</div> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [] No []</p> <p>Number of Interested Authorities you report to:</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-left: 20px;">N/A</div> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [] No []</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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

Systems that receive their drinking water directly from the St. Thomas EMPS:

| Drinking Water System Name | Drinking Water System Number |
|-----------------------------------------------|------------------------------|
| St. Thomas Area Secondary Water Supply System | 260078897 |
| St. Thomas Distribution System | 260002187 |



Systems that receive their drinking water indirectly from the St. Thomas EMPS:

| Drinking Water System Name | Drinking Water System Number |
|------------------------------------|------------------------------|
| Dutton/Dunwich Distribution System | 220002967 |
| Municipality of Central Elgin | 260004761 |
| Southwold Distribution Supply | 210001362 |

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

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

- Public access/notice via the web
- Public access/notice via Government Office
- Public access/notice via a newspaper
- Public access/notice via Public Request
- Public access/notice via a Public Library
- Public access/notice via other method

Describe your Drinking-Water System

The Elgin Middlesex Pumping Station (EMPS) receives water from the Elgin Area Primary Water Supply System (EAPWSS), which is located to the east of Port Stanley. Water from the EAPWSS is pumped into the EAPWSS site reservoirs located at the EMPS. The total capacity of the 2 reservoirs is 54,600m³. Through various secondary water supply systems, the EMPS serves the Cities of London, St. Thomas, Town of Aylmer, and Municipalities of Central Elgin, Malahide, Dutton-Dunwich and Southwold.

The EMPS is a shared facility. Booster pumps are dedicated to directing water to the City of London, St. Thomas Secondary and/or Aylmer Area Secondary Water Supply Systems. A gas chlorine system is utilized to provide re-chlorination for water being directed to the St. Thomas and Aylmer Area Secondary Water Supply Systems. The facility also houses a 600kW standby diesel generator that provides emergency power to support pumping of water into the St. Thomas and Aylmer systems during a power interruption.

Three pipelines exit the EMPS: one exits to the south of the EMPS property and extends west to service the St. Thomas Secondary Water Supply System; the second services the City of London distribution system; the third services the municipalities on the Aylmer Area Secondary Water Supply System.

List all water treatment chemicals used over this reporting period

Chlorine Gas

Were any significant expenses incurred to?

- Install required equipment
- Repair required equipment
- Replace required equipment

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

- Replacement of chlorine booster pump
- Replacement of EMPS backflow
- Rebuilt discharge control valves surge and relief
- Completed EMPS PFD Consolidation

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 |
|---------------|-----------|--------|-----------------|-------------------|------------------------|
| N/A | N/A | N/A | N/A | N/A | N/A |

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 (CFU/100 mL) (min #)-(max #) | Range of Total Coliform Results (CFU/100 mL) (min #)-(max #) | Number of Heterotrophic Plate Count (HPC) Samples | Range of HPC Results (CFU/1 mL) (min #)-(max #) |
|---------------------|-------------------|------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------|
| Distribution | 57 | (0) – (0) | (0) – (0) | 57 | (<10) - (10) |

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

| Parameter | Number of Grab Samples (Continuous Monitoring) | Min | Max | Avg |
|--------------------------------------|------------------------------------------------|------|------|------|
| Free Chlorine Residual (mg/L) | 8760 | 0.69 | 2.53 | 1.44 |

Note:



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: result value is based on one sample) | January 5, 2022 April 6, 2022 July 5, 2022 October 11, 2022 | 14 13 19 22 | µg/L µg/L µg/L µg/L | NO |
| THM Running Annual Average (RAA) | 2022 | 17.0 | µg/L | NO |
| HAA (NOTE: result value is based on one sample) | January 5, 2022 April 6, 2022 July 5, 2022 October 11, 2022 | 5.5 ND 7.5 13.9 | µg/L µg/L µg/L µg/L | NO |
| HAA Running Annual Average (RAA) | 2022 | 8.05 | µg/L | NO |

ND= Non-detect

| APPENDIX E | |
|-----------------------------------------|--------------------------------------|
| EMPS Chemical Consumption - 2022 | |
| Month | Total Chlorine Gas Usage - Kg |
| January | 219 |
| February | 164.6 |
| March | 168 |
| April | 149.2 |
| May | 138.2 |
| June | 156.6 |
| July | 203.6 |
| August | 211.5 |
| September | 201.4 |
| October | 178.6 |
| November | 158.9 |
| December | 172.6 |
| Yearly Total | 2122.2 |

Please note: Aylmer and St.Thomas combined cl2 usage

APPENDIX B



| | |
|----------------------------------------|--------------------------------------------------------------------------------|
| Drinking-Water System Number: | 260078897 |
| Drinking-Water System Name: | St. Thomas Area Secondary Water Supply System |
| Drinking-Water System Owner: | Joint Board of Management of the St. Thomas Area Secondary Water Supply System |
| Drinking-Water System Category: | Large Municipal Residential |
| Period being reported: | January 1, 2022 through December 31, 2022 |

| | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|
| <p><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [] No [X]</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [X] No []</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</p> <table border="1" style="width: 100%;"> <tr> <td>City of St. Thomas, City Hall Environmental Services 545 Talbot Street St Thomas, Ontario</td> </tr> </table> | City of St. Thomas, City Hall Environmental Services 545 Talbot Street St Thomas, Ontario | <p><u>Complete for all other Categories.</u></p> <p>Number of Designated Facilities served:</p> <table border="1" style="width: 100%;"> <tr> <td>NA</td> </tr> </table> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [] No []</p> <p>Number of Interested Authorities you report to:</p> <table border="1" style="width: 100%;"> <tr> <td>NA</td> </tr> </table> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [] No []</p> | NA | NA |
| City of St. Thomas, City Hall Environmental Services 545 Talbot Street St Thomas, Ontario | | | | |
| NA | | | | |
| NA | | | | |

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 |
|----------------------------------------------|-------------------------------------|
| City of St. Thomas Water Distribution System | 260002187 |
| Municipality of Central Elgin | 260004761 |
| Township of Southwold | 210001362 |
| Dutton/Dunwich Distribution System | 220002967 |

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 []



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 | NA | NA | NA | NA | NA |
| Treated | NA | NA | NA | NA | NA |
| Distribution | 161 | (0)-(0) | (0)-(0) | 161 | (<10)-(1170) |
| | | | | | |

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 #) |
|----------------------------------|------------------------|----------------------------------|
| Chlorine (Grab Samples) | 161 | (0.77)-(1.85) |
| Chlorine (Continuous Monitoring) | 8760 | (0.20)-(2.27) |

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

NOTE: The value of 0.00 mg/L was recorded on the continuous chlorine sampler as a result of equipment abnormality/SCADA issue/maintenance work or calibration.

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 |
|---------------------------------|-----------|--------------|--------|-----------------|
| NA | NA | NA | NA | NA |

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

| Parameter | Sample Date | Result Value | Unit of Measure | Exceedance |
|-----------|-------------|--------------|-----------------|------------|
| NA | NA | NA | NA | NA |

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 | NA | NA | NA |
| Distribution | NA | NA | NA |



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

| Parameter | Sample Date | Result Value | Unit of Measure | Exceedance |
|-------------------------------------------|--------------------------------------------------------------|--------------|-----------------|------------|
| HAA5 | Mar 10, 2022 Jun 17, 2022 Oct 17, 2022 Dec 19, 2022 | 6.1 | ug/L | no |
| THM (NOTE: show latest annual average) | Mar 10, 2022 Jun 17, 2022 Oct 17, 2022 Dec 19, 2022 | 28.5 | 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 |
|-----------|--------------|-----------------|----------------|
| NA | NA | NA | NA |
| NA | NA | NA | NA |