1. Incidents of Regulatory Non-Compliance: Drinking Water Systems

The following Incidents of Regulatory Non-Compliance with the terms and conditions of the Drinking Water Works Permit or the Municipal Drinking Water License, O.Reg 170/03 – Drinking Water Systems and O.Reg 169/03 – Ontario Drinking Water Quality Standards are noted:

There were no incidents of Regulatory Non-Compliance with the terms and conditions of the Drinking Water Works Permit or the Municipal Drinking Water License for the 2023 reporting year.

Adverse Water Quality Incidents:

Bothwell Drinking Water System

Bacteriological Sample Results
- 1 instance of no data due to overgrown with organisms in a distribution sample

Chatham Drinking Water System (including Dover, North Kent & Thamesville)

Bacteriological Sample Results
- 2 instances of no data due to overgrown with organisms in a distribution sample
- 2 instances of Total Coliforms in a distribution sample

South Chatham-Kent Drinking Water System

Bacteriological Sample Results
- 1 instance of Total Coliforms in a distribution sample

Wheatley Drinking Water System

Pressure Loss in the Distribution System
- Boil Water Advisory issued

Low Distribution Chlorine Residual

2. Incidents of Regulatory Non-Compliance: Wastewater Systems

The following incidents of Regulatory Non-Compliance with the terms and conditions of the Environmental Certificates of Approval (ECA - Provincial), and the Wastewater Systems Effluent Regulation (WSER - Federal) are noted:

Blenheim & Charing Cross Wastewater System

Spill
- Valve failure on raw sewage forcemain

Effluent Limit Exceedances
- 2 incidents of e.Coli geomean count in the final effluent
- 2 incidents of pH results in the final effluent

Bypass Event
- 1 planned bypass of the sand filtration process

Chatham Wastewater System

Effluent Limit Exceedances
- 1 instance of Total Residual Chlorine in the final effluent

Bypass Events
- 3 emergency bypasses of the disinfection process

Overflow Events
- 28 emergency overflow events at pump stations in the collection system

Tilbury Wastewater System

Peak Flow Rate Exceedance
- 3 instances of influent raw sewage flow rate

Effluent Limit Exceedances
- 2 incidents of e.Coli geomean count in the final effluent

Wallaceburg Wastewater System

Effluent Limit Exceedance
- Total Ammonia Nitrogen concentration in the final effluent

Bypass Events
- 3 emergency bypasses of the preliminary and primary processes

Wheatley Wastewater System

Effluent Limit Exceedances
- 16 instances of Total Residual Chlorine in the final effluent

3. Deviations for Critical Control Points – Drinking Water Systems

A Critical Control Point is an essential step or point in the system where controls are applied to prevent or eliminate a hazard or to reduce it to an acceptable level. The following incidents of Deviation from Critical Control Points occurred:

Chatham Drinking Water System

Secondary Disinfection Deterioration of Chlorine Residual
- 3 instances from distribution chlorine residual monitoring

Wheatley Drinking Water System

Distribution System Pressure Loss
- 1 instance due to a fire at the Wheatley Water Treatment Plant

4. Deviations for Critical Control Points – Wastewater Systems

A Critical Control Point is an essential step or point in the system where controls are applied to prevent or eliminate a hazard or to reduce it to an acceptable level. The following incidents of Deviation from Critical Control Points occurred:

Chatham Wastewater System

Failure of Equipment or Process Associated with Disinfection
- 3 instances of chlorination dosing disruption

Failure of Equipment or Process Associated with Dechlorination
- 2 instances of dechlorination dosing disruption

Tilbury Wastewater System

Failure of Equipment or Process Associated with Aeration
- 3 instances of inadequate dissolved oxygen concentrations

5. Effectiveness of the Risk Assessment Process

During the Risk Assessment process, hazardous events to the drinking water systems and wastewater systems are identified. Available Controls to address the Hazardous Events are determined. Based on the Available Controls, rankings for Consequence, Likelihood and detectability are established.

Based on the above rankings Critical Control Points are determined and Critical Control Limits are implemented.

Infrastructure Review / Infrastructure Maintenance, Rehabilitation and Renewal activities are also reviewed and updated for any relevant infrastructure and associated equipment with regards to Hazardous Events and Available Controls.

Risk Assessments are completed as a cycle. After creation and implementation, reviews are completed each year for 2 years, the 3rd year being a renewal of the risk assessments.

During 2023, renewals of the risk assessments were conducted. There were no significant changes to the risk assessments, Critical Control Points and Critical Control Limits remained the same.

6. Internal and External Audit Results

Internal Auditing

Internal Auditing is the Check process of the Drinking Water Quality Management System (DWQMS) cycle. Internal audits are a self-evaluation of the Quality Management System (QMS), to determine if the Chatham-Kent Public Utilities Commission (CK PUC) is conforming to the requirements of the standard.

Internal Audits are conducted on an on-going basis scheduled throughout the year. Internal auditing is conducted by trained representatives of the PUC's Compliance & Quality Standards department.

Audits are conducted with co-operation from PUC Operations, Engineering, Compliance and Management staff. Audits are also conducted with co-operation from PW staff.

Internal Auditing findings from 2023 demonstrated that our QMS's were meeting the requirements of the standard. The majority of Corrective Action Requests (CARs) were issued as a non-conformity to a procedure or requirement and/or documentation/record keeping. Corrective Action was undertaken, in an attempt to rectify the issues.

Opportunities for Improvement (OFIs) were recognized where conformance to the requirement is determined, but there is an opportunity for improvement.

Preventative Action Requests (PARs) were identified to prevent the occurrence of non-conformances.

External Audits

Systems Audit

A desktop audit of the operational plans for the subject system to assess whether the documented QMS meets the PLAN requirements of the DWQMS V2.

- Conformance: The management system is effectively implemented and maintained and meets the requirements of the standard relative to the scope of the audit.
- Opportunities for Improvement: None identified.

Reaccreditation Audit

Not completed until 2024 due to scheduling issues with the accreditation authority. Results of this audit will be provided in the 2024 Annual Information Report.

7. Results of Emergency Response Testing

The annual CK PUC Mock Emergency was conducted in the form of response to an actual emergency occurrence in 2023, the fire inside the Wheatley Water Treatment Plant.

The Mock Emergency captured the actions taken for immediate response and recovery of the Wheatley Drinking Water System in the initial week and a half following the fire at the Wheatley Water Treatment Plant on September 13, 2023.

8. Operational Performance: Drinking Water Systems

Rated Capacity Data

DRINKING WATER SYSTEM	RATED CAPACITY m^3	AVERAGE DAILY FLOW m^3	% of RATED CAPACITY	MAXIMUM DAILY FLOW m^3	% of RATED CAPACITY
Bothwell	--	250	--	563	--
Chatham	67,999	28,845	42	45,302	67
Ridgetown (Erie)	2,780	1,211	44	1,865	67
Ridgetown (Scane)	1,310	543	41	1,251	95
South CK	22,809	8,651	38	13,151	58
Wallaceburg	13,600	4,517	33	6,496	48
Wheatley	23,846	8,053	34	12,976	54

There were no significant operational issues encountered, as a result of, system deficiencies during this reporting period.

After the September 13 fire at the Wheatley Water Treatment Plant, the Distribution System received treated water through multiple interconnects from the South Chatham-Kent Drinking Water System and from the Leamington Distribution System. The Leamington Distribution System is fed from the Union Water Supply System (UWSS) a system which receives water from the Ruthven Water Treatment Plant (RWTP) located in the hamlet of Ruthven in the Town of Kingsville, Ontario and draws water from Lake Erie.

Water was hauled by bulk water truck to the Tilbury Reservoir, as required, to maintain supply in the Tilbury area of the distribution system. Consumers and water users and residents have been asked to conserve water.

Watermain Breaks

DRINKING WATER SYSTEM	# of WATERMAIN BREAKS
Bothwell	0
Chatham	
Chatham	24
Dresden	11
Mitchell's Bay	0
Pain Court	0
Thamesville	0
Ridgetown	
Ridgetown	13
Highgate	0
South CK	
Blenheim	6
Charing Cross	1
Dealtown	0
Erieau	0
Merlin	1
Shrewsbury	3
Wallaceburg	21
Wheatley	
Wheatley	0
Tilbury	4
TOTAL	84

9. Operational Performance: Wastewater Systems

Rated Capacity Data

WASTEWATER SYSTEM	RATED CAPACITY m^3	AVERAGE DAILY FLOW m^3	% of RATED CAPACITY	MAXIMUM DAILY FLOW m^3
Blenheim	4,045	2,076	51	5,049
Chatham	36,000	22,839	63	64,440
Dresden	4,546	1,706	38	5,843
Merlin	464	262	56	2,453
Mitchell's Bay	509	138	27	849
Ridgetown	2,347	1,900	81	4,305
Tilbury	5,434	2,689	49	27,918
Wallaceburg	10,800	6,131	57	31,520
Wheatley	2,752	1,831	67	7,713

There were no significant operational issues encountered, as a result of system deficiencies during this reporting period, with the following exceptions:

Blenheim Wastewater System

Algae growth in lagoon cells during the summer months eventually ends up being pumped on the sand filters resulting in sand filter media plugging, restricting the filtration flow and potential removal of nutrients and bacteria.

Chatham Wastewater System

Algae growth in the lagoons during the summer months resulted in the increased total suspended solids concentrations in the effluent when the lagoon contents were introduced into the plant for treatment.

23 Combined Sewer Overflow Events occurred in 2023. All of these overflow events were attributed to wet weather events.

Dresden Wastewater System

During a seasonal produce production run, the treatment plant experiences high concentrations and loadings of organic parameters, which can provide challenges for removal and elevated concentrations of organic parameters and nutrients in the effluent.

Ridgetown Wastewater System

The Chatham-Kent PUC is undertaking a review of the design and rated capacity of the treatment system components. Should the review findings support that treatment system components rated capacity is higher than the existing C of A capacities, an amendment application for re-rating will be submitted to the Ministry.

Tilbury Wastewater System

Re-introduction of the wetlands contents into the treatment plan resulted in increased concentrations of Total Phosphorus in the effluent.

10. Raw Water Supply & Drinking Water Quality Trends

Raw Water Supply

Ground Water (Ridgetown Drinking Water System)

Well # 2 (Hitch) continues to exhibit a steady increasing trend in raw water turbidity.

Lake Erie (Chatham, South Chatham-Kent & Wheatley Drinking Water Systems)

The monthly average temperature of the incoming lake water at the South CK and Wheatley Water Treatment plant intakes has risen approximately 1.5 ^{o}C from 2008 to 2023.

Chenal Ecarte (Wallaceburg Drinking Water System)

The monthly average turbidity of the incoming river water at the Wallaceburg Water Treatment Plant intake has continued to decrease from 2008 to 2023.

Treated Drinking Water

With respect to treated drinking water trends, production decreased slightly in 2023, comparable to flows in 2020 and 2021. In 2023, total production totalled 18,128,010 m^3, an decrease of approximately 7% from 19,502,590 m^3 in 2022.

The Chatham Water Treatment Plant and South Chatham-Kent Water Treatment Plant flows have illustrated an increase in treated water flows over the past few years. The Ridgetown Water Treatment Plant, Wallaceburg Water Treatment Plant and Wheatley Water Treatment Plant flows have illustrated consistent treated water flows over the past few years.

Wallaceburg Drinking Water System

The treated water continues to exhibit decreasing concentrations of Nitrates.

Distribution Water

Bothwell Drinking Water System (DWS), Chatham DWS, South CK DWS, Wallaceburg DWS and Wheatley DWS continue to exhibit sustained or reduced concentrations of disinfection by-products, THM's (Trihalomethanes) and HAA's (Haloacetic Acids).

Distribution water continues to see decreased concentrations of THM's in the drinking water due to the installation of hydrodynamic mixing systems in elevated tanks, when rehabilitation/improvements are completed.

Ridgetown DWS has exhibited increased THM's since expansion of the distribution system to Highgate, however decreases in concentration have been observed during 2022 to present.

11. Raw Wastewater Influent & Effluent Quality Trends

Raw Wastewater Influent

With respect to raw wastewater influent trends, collection was consistent in 2023 with previous years. Total collection totalled 14,476,430 m^3, an increase of approximately 17% from, 12,346,970 m^3 in 2022, but typical of 2019 - 2021. Precipitation received in Chatham-Kent in 2023 increased from 2022 but was still lower than many years since 2008.

All of the wastewater treatment plants illustrated an increase in total raw wastewater flows in 2023.

Dresden Wastewater System

Trending of increased concentrations of Total Suspended Solids, Total Phosphorus and Biochemical Oxygen Demand (BOD) observed since 2021, potential due to a seasonal produce production run at a local industry.

Wastewater Effluent

Effluent quality discharged from the wastewater systems was typical of previous years with no significant elevations in parameter concentrations. Effluent quality complied with the Environmental Compliance Approval limits the majority of the reporting year, with some exceptions due to events.

12. Changes that could affect the Quality Management Systems

Wastewater Collection Consolidated Linear Infrastructure (CLI) ECA

Requirements implemented / to be implemented:

- Operations & Maintenance Manuals
- Pumping Station Inspection & Maintenance Schedules
- Collection System (Linear) Inspection & Maintenance Schedules
- Erosion & Sediment Control Plans (Alterations)
- Source Water Protection for Alterations
- Source Water Protection for Operation & Maintenance
- Wet Weather Flows Compared to Dry Weather Flows Study
- Assessment of Conformance to Procedures F-5-1 & F-5-5
- Pollution Prevention Control Plan
- Pollution Prevention Control Plan
- Signage at Combined Sewer & Sanitary Sewer Overflow Locations
- Sewer Model

Environmental Compliance Approval (ECA) Amendments

Wheatley Wastewater System

The amended ECA included the following new requirements, monitoring, reporting, etc.:

- Monthly Average Limits for concentrations & loadings, no longer 12-month consecutive averaging
- Additional sampling parameters added, no effect as the CK PUC is currently exceeding the required sampling parameters
- Total Residual Chlorine monitoring of the effluent

13. Consumer Feedback

2023 Drinking Water System feedback received as complaints or inquiries.

DRINKING WATER SYSTEM	TASTE & ODOUR	COLOUR	LOW PRESSURE	OTHER
Bothwell			1	
Chatham				
Chatham	6	25	5	5
Dresden	1		1	
Mitchell's Bay				
Pain Court				
Thamesville				
Ridgetown				
Ridgetown		1		
Highgate				
South CK				
Blenheim	1	2	1	1
Charing Cross				
Dealtown				1
Erieau				
Merlin				
Shrewsbury				
Wallaceburg	2	12	5	2
Wheatley				
Wheatley		4	5	1
Tilbury		6		
TOTALS	10	50	18	10

2023 Wastewater System feedback received as complaints or inquiries.

WASTEWATER SYSTEM	ODOUR	OTHER
Blenheim & Charing Cross		
Chatham		
Dresden		
Merlin		
Mitchell's Bay		
Ridgetown & Thamesville		
Tilbury	1	
Wallaceburg		
Wheatley	1	
TOTALS	2	

14. Resources Needed to Maintain the Quality Management Systems

1. Electronic Document Management System
    a. Software
    b. Annual Maintenance
    c. On site backup of every document
2. Quality Management System Representative
    a. Wages
    b. Workstation
3. Administrative Costs
    a. Travel for Conferences, Meetings
    b. Stationery, photocopies
4. Internal Auditing Staff
    a. Captured through Compliance Staff
5. External Audit Fee
    a. Budgeted annually
6. Permit To Take Water Renewals
7. Municipal Drinking Water Renewals / Applications
8. Drinking Water Works Permit Amendments
9. Environmental Compliance Approval Applications / Amendments

15. Results of the Infrastructure Review

Infrastructure Renewal, Rehabilitation and Replacement projects and activities underway or completed in 2023:

Chatham Drinking Water System (including Dover, North Kent & Thamesville)

Replacement

- Wrights's Lane, Dresden Watermain Replacement
- William St North, Stanley Avenue, Colborne St, Chatham Watermain Replacements

Ridgetown Drinking Water System

Replacement

- Albert Ave, Ridgetown Watermain Replacement

South Chatham-Kent Drinking Water System

Rehabilitation

- Low Lift Pumping: Motor & Pump rebuild for spare
- High Lift Pumping: Motor & Pump rebuild for Pump # 1
- Blenheim Reservoir: Concrete & structural repairs

Replacement

- Filtration: Membrane modules in Microfiltration Unit 102

Renewal

- Disinfection: New chlorinators and associated equipment for raw water chlorination and treated water disinfection

Wallaceburg Drinking Water System

Replacement

- Dufferin Ave, Wallaceburg Watermain Replacement (Lisgar St. to edge of town)

Blenheim & Charing Cross Wastewater System

Replacement

- Charing Cross Pump Station: Pump replacement

Rehabilitation

- Aeration: Rehabilitation of the aeration components in Cell 1A

Chatham Wastewater System

Replacement

- William St North, Stanley Avenue, Colborne St, Chatham Sewer Separation
- Selkirk St, Wallaceburg Sewer Separation

Dresden Wastewater System

Replacement

- Raw Sewage Pumping: Main Lift Pump # 3 replacement

Ridgetown & Thamesville Wastewater System

Replacement

- Wildwood Pump Station: Pump replacement
- Albert Ave, Ridgetown Sanitary Sewer Replacement

Rehabilitation

- Lamila Pump Station, Thamesville: Pump rebuilt

16. Operational Plan Currency, Content and Updates

Annual review of all 21 Water & Wastewater Operational Plan Elements were reviewed by the Management Team. Revisions were completed as necessary.

Numerous System Level Procedures, Standard Operating Procedures and associated documents were reviewed by the applicable staff. Revisions were completed as necessary.

New System Level Procedures and site-specific Procedures and documents were created and implemented.

Document and procedure revisions or creations required by the new Wastewater Collection Consolidated Linear Infrastructure (CLI) ECA's have been completed and continue to be undertaken.

The 2019 regulated Water and Wastewater Records were archived at the McGeorge warehouse after remaining on site at the facilities for 3 years. After a period of 12 additional years these records will be released for retrieval or destruction.

The 2007 regulated Water Records were released for destruction, following a retrieval period issued.

17. Staff Suggestions

Email Submission Selection on Fillable PDF Forms

Suggestion by staff member to include email selection field to automatically generate an email on fillable pdf's, Ex. Overflow Logsheet – Wastewater Collection.

18. Continual Improvement

Best Management Practices published by the Ministry:

None currently published by the MECP.

Best Management Practices from Ministry Inspection Reports:

None issued by the MECP in 2023.

Procedure Revisions & Development:

Numerous procedure revisions and developments were completed in 2023 to include new, update/revise or to obsolete content and information, as well as, inclusion of any Quality Management Standard requirements or regulatory requirements from the Municipal Drinking Water Licence, Drinking Water Works Permit, Environment Compliance Approvals, or regulations, bulletins, etc.

Examples:

- Monitoring Programs implemented for the Wastewater Systems
- Wastewater Sampling Programs inclusion of Sanitary Sewer and Combined Sewer Overflow sampling requirements
- Wastewater Pump Station Inspection & Maintenance Schedules implemented
- Wastewater Overflow Procedures revised & Logsheets implemented
- Wastewater Bypass Procedures revised & Logsheets implemented

Trending Review Logbook:

Developed and implemented for review and documentation of continuous monitoring at a remote system/facility.

Wastewater Collection System Operations & Maintenance Manual:

Developed and implemented an Operations & Maintenance Manual for the linear works and pump stations.

Virtual Staff Training Sessions:

Reduces the requirement to schedule multiple training sessions to ensure applicable staff receive the required training.