Region of Waterloo

2018 Summary Report

Presented to Regional Council - March 2019

2710925 This document is available in alternate formats upon request

2018 Summary Report – Region of Waterloo Water Services

1. OVERVIEW & BACKGROUND 3

1.1 Safe Drinking Water Act 3

1.2 Drinking Water Quality Management System (QMS) Conformance and Municipal Drinking Water Licensing Program 3

Management Review 4

Infrastructure Review 4

2. HEALTH RELATED NOTIFICATIONS – BOIL WATER ADVISORIES (BWA)/DRINKING WATER ADVISORIES (DWA) 4

3. REGULATORY COMPLIANCE 4

Chart 1 – MECP Average Inspections Ratings 5

Table 1 – Summary of Non-Compliance Issues under the Safe Drinking Water Act (SDWA), Municipal Drinking Water Licenses (MDWL), Drinking Water Works Permits (DWWPs), Permits to Take Water (PTTW) and the Ontario Water Resources Act (OWRA) 5

4. HYDRAULIC PERFORMANCE 7

5. PREVENTATIVE MAINTENANCE PROGRAMS 7

6. WELL MAINTENANCE 8

7. ASSET MANAGEMENT AND CAPITAL INFRASTRUCTURE REPLACEMENT PROGRAM 9

APPENDIX B – QMS MANAGEMENT REVIEW 13

APPENDIX C – TREATED WATER FLOW DATA 17

APPENDIX D – SYSTEM INFORMATION 46

APPENDIX E – MECP INSPECTION COMPLIANCE RATINGS 50

2018 Summary Report – Region of Waterloo Water Services

1. Overview & Background

This report addresses the requirements as defined under the Safe Drinking Water Act and the Drinking Water Quality Management System.

1.1 Safe Drinking Water Act

Schedule 22-2 of Ontario Regulation 170/03 states that owners of municipal drinking water systems shall ensure that, no later than March 31 of each year, a summary report is prepared for the preceding calendar year and presented to the members of municipal council. This report includes:

(1) A list of the requirements in the Act, the regulations, the system's approval, drinking water works permit, municipal drinking water license, and any order applicable to the system that was not met at any time during the period covered by the report;
(2) for each requirement in (1) specify the duration of the failure and the measures that were taken to correct the failure;
(3) a summary of the quantities of flow rates of water supplied during the period covered by the report, including monthly average and maximum flows;
(4) a comparison of the summary referred in (3) to the rated capacity flow rates in the system's approval, drinking water works permit or municipal drinking water license.

This summary report represents all the drinking water supply systems in the Region and the distribution systems in North Dumfries and Wellesley. The water supply for the Region is from two sources: approximately 75 percent is from ground water wells and 25 percent is from the Grand River (Mannheim Water Treatment Plant).

This report captures non-compliance issues and corresponding corrective action(s) or mitigating measure(s). Any Adverse Water Quality Incidents (AWQIs) not captured in the 2018 Annual Water Quality Report (issued February 28th) are identified in Appendix A.

1.2 Drinking Water Quality Management System (QMS) Conformance and Municipal Drinking Water Licensing Program

To obtain and maintain a Municipal Drinking Water License (MDWL) the Region must hold: a valid Drinking Water Works Permits (DWWP), a valid Permit To Take Water (PTTW) for each water source, operational plans as approved by the Ministry of the Environment, Conservation and Parks (MECP), third party accreditation (audit based on DWQMS 21 Elements), and financial plans approved by Regional Council. Each Municipal Drinking Water License (MDWL) and each Financial Plan must be renewed every 5 years. Reaccreditation was successfully obtained in 2016, and 14 new MDWLs were issued. The West Montrose DWWP and MDWL were end-dated in 2018.

Management Review

The management review must be conducted annually to evaluate the suitability, adequacy, and effectiveness of the Quality Management System (QMS) with the results being communicated to Regional Council as the system owner. The management review provides evidence of continued endorsement and commitment to the QMS from Top Management.

The QMS annual management review was conducted on November 26, 2018 and included discussion of non-compliance issues and corresponding corrective/preventative action(s). The 2018 management review minutes, identified deficiencies, decisions and action items, are included in Appendix B. There were no major non-conformances identified with the QMS.

Infrastructure Review

DWQMS (Element 14 and 15) requires that the operational plan document a summary and monitor the effectiveness of the Operating Authority's infrastructure maintenance, rehabilitation and renewal programs for the systems and to communicate these programs and any updates to the Owner. Asset management and maintenance programs are established and maintained to ensure repair and replacement of water system infrastructure. An overview of the infrastructure maintenance is found in section 5.

2. Health Related Notifications – Boil Water Advisories (BWA)/Drinking Water Advisories (DWA)

The Region of Waterloo Water Services Division, in collaboration with the Public Health Department, ensures a safe water supply. There were no BWA or DWA issued during 2018.

3. Regulatory Compliance

The MECP drinking water system inspections focus on compliance with the SDWA and related regulations. The following legislative requirements apply to municipally owned and operated drinking water systems:

- proper documentation;
- sampling and analytical testing;
- adverse water quality incident reporting (AWQI);
- proper treatment and maintenance;
- corrective actions;
- Municipal Drinking Water Licenses;
- Drinking Water Works Permits;
- accreditation
- continuous water quality monitoring;

- flow monitoring;
- calibration/verification of flow meters and instrumentation and
- certified operators.

The 2017-18 MECP Chief Drinking Water Inspector's report, released in November 2018, identifies 22 inspection reports with a 100% compliance rating for the Region of Waterloo.

During 2018, twenty-three (23) drinking water system inspections were completed. Five (5) inspections were completed as part of the 2017/2018 inspection period, and eighteen (18) inspections were completed as part of the 2018/2019 inspection period. The MECP inspections for the 2018/2019 period not included in this report will be captured in the 2019 Annual Summary Report. Chart 1 below compares the average MECP inspection compliance ratings over the past 5 years and Appendix E summarizes the ratings for this inspection year.

Chart 1 – MECP Average Inspections Ratings

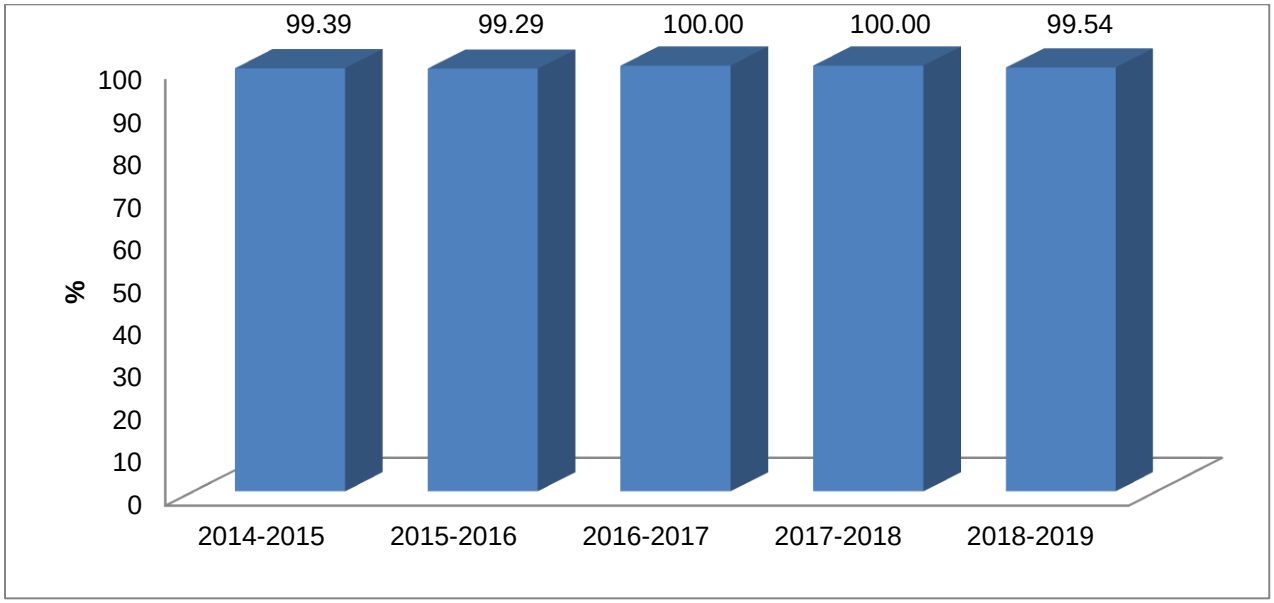

Table 1 – Summary of Non-Compliance Issues under the Safe Drinking Water Act (SDWA), Municipal Drinking Water Licenses (MDWL), Drinking Water Works Permits (DWWPs), Permits to Take Water (PTTW) and the Ontario Water Resources Act (OWRA)

Date	Description	Root Cause	Preventative/ Corrective Action
O.Reg. 170/03 – Schedule 6-5 - Continuous Monitoring			
April 30 08:17-08:33 (16 minutes)	K21 Primary disinfection data not captured following communication loss event.	Datalogging function not enabled following RPU change out.	Work order developed to routinely verify datalogging is operational.
April 30 08:17-08:33 (16 minutes) **May 3** 11:12-11:55 (33 minutes) 11:02-11:16 (14 minutes) 11:02-12:24 (82 minutes) **May 4** 15:45-17:22 (97 minutes)	K26, G6, H4, New Hamburg, P9, P15 Primary disinfection data not captured following communication loss event.	Inadequate notification process to ensure datalog downloaded.	Loss of Communication SOP revised to improve notification process.
O.Reg. 128/04 – Schedule 26 - Maintenance of Records (Logbooks)			
2018	Maryhill Well Supply Some logbook entries were difficult to read or vague about work completed.	n/a	Conducted logbook training session for all operators.
Permit to Take Water (PTTW)			
March 1 08:20-08:54 (32 minutes)	Wellesley WTP Following a communication loss event, two wells started exceeding the permitted instantaneous flow rate.	Server issue suspected.	Update server configuration.

September 5 10:42-10:59 (duration – 17 minutes)	Well H3A Permitted instantaneous flow rate exceeded during new well pump testing.	Well contractor not aware of instantaneous permitted flow rate.	Contractor staff directed to review the PTTW prior to any testing and not exceed flow limits in any circumstances.
MDWL – Schedule C, Calibration of Flow Measuring Devices			
2018	Wellesley WTP, Well K34, Well A3, Well K11A Flow meters not calibrated in required timeframe.	Scheduling error.	Flow meters were calibrated and schedule revised. Annual review of schedule will occur.

4. Hydraulic Performance

A summary of the monthly average and maximum flow rates of water supplied are identified in Appendix C.

The Region of Waterloo Drinking Water systems have 38 Permits to Take Water (PTTW), 13 Municipal Drinking Water Licenses (MDWL) and 13 Drinking Water Works Permits (DWWP). Refer to Appendix D for a full list of PTTW, MDWLs and DWWPs.

5. Preventative Maintenance Programs

Elements 14 and 15 of the DWQMS require that the operational plan documents a procedure for the annual review of infrastructure necessary to operate and maintain the system. Element 14 requires that the operating authority carry out the review and report to the owner. This ensures that the owner is regularly informed of infrastructure needs and can plan accordingly. Element 15 is about documenting a summary of the maintenance, rehabilitation and renewal programs for the infrastructure. These summaries must be updated as changes occur and must be communicated to the owner. Monitoring the effectiveness of the maintenance program is achieved by periodically reviewing the maintenance program and confirming the effectiveness of the program.

Avantis is a computerized maintenance management software (CMMS) system that manages the infrastructure, equipment and components at water facilities. The system is used to develop, monitor, and report on preventative maintenance plans for the equipment. Preventative maintenance is based on industry standards, regulatory requirements, past history, manufacturers' recommendations and risk analysis. As of 2018, the following preventative maintenance programs exist:

- As per the MDWL and/or Reg. 170/03, instrumentation is calibrated and/or verified in accordance with manufacturer's instructions with the exception of the billing meters; a third party calibrates and/or verifies the billing meters annually.
- Instrumentation such as ultraviolet sensors, ultraviolet transmittance, chlorine, and turbidity analyzers, ozone monitors, and other equipment are calibrated and/or verified in-house as per manufacturer's recommendations.
- A software program monitors the status of the SCADA RPU communication system.
- Process and Instrumentation Diagrams (P&IDs) are reviewed and maintained as needed.
- Electrically, the UV ballasts are run to failure and the UV lamps are replaced as per manufacturer's instructions.
- Canadian Standards Association (CSA) guidelines have specific requirements for diesel generators, such as an annual load bank test, run under load for rated power, oil changes, coolant, filters, electrical test of alternator, test oil for engine problems and efficiency. There is a contract with a third party to ensure CSA requirements are met.
- In house backup diesel generators are run monthly under load and preventative maintenance is conducted in accordance with CSA guidelines.
- Sub Station Maintenance, performed twice per year, involves a visual inspection, oil testing of transformers, check connections for tightness and electrical integrity of components by Megger testing.
- All other electrical components are replaced as required.
- Mechanically, chlorine injectors are rebuilt monthly at all sites except the Mannheim WTP, booster pumps are maintained as required, chemical pumps are checked monthly and rebuilt as required. Piping and valve work is done as required. Air chambers are checked yearly and pumped out as required and Process Flow Diagrams (PFDs) are updated as required.
- Distribution system maintenance for North Dumfries and Wellesley Townships includes annual water main flushing and hydrant maintenance. All valves are operated over a 5 year span. Water main repairs, service leaks, meter replacement, and locates occur as required.
- Distribution maintenance, including water main repairs on the trunk mains are performed by the cities, townships or a third party contractor. Programs exist and vary by city for leak detection analysis, locates, and flushing. A more enhanced program continues to be developed to ensure that valves are exercised and remain operational.

6. Well Maintenance

Wells are maintained in accordance with O. Reg. 903, (Ontario Water Resources Act) and O.Reg. 170/03 (Schedule1). Routine well inspections indicated production wells and monitoring wells were in compliance. In 2017, the MECP expressed concerns with the

methodology used to decommission production well FG2. A mitigation plan was submitted and accepted by the MECP and well FG2 was decommissioned in 2018 as outlined in the plan.

7. Asset Management and Capital Infrastructure Replacement Program

The Region's key asset management principle is to meet service levels and to manage risk, while minimizing life cycle costs. Risk events, such as an asset failure, are events which may compromise the delivery of the Region's strategic objectives. The Region's asset risk assessment takes into account potential losses to services, financial loss, and potential safety hazards. All assets are scored according to the impact of asset failure against these criteria and the likelihood of that failure occurring based on asset age, condition and performance.

Renewal work involves replacing assets or components of assets to avoid service failure or interruption. For those assets with a higher risk profile, renewal works are timed to minimize any risk of failure, while obtaining the longest economic and service life from the assets. The objective is to replace critical assets before condition deteriorates into a poor or very poor state (which would increase the risk of failure).

The predominant drivers of renewals investment are as follows:

- Current condition and performance: The Region regularly inspects its assets to monitor their condition and performance, according to Water Service's Inventory and Condition Assessment Protocol and supporting data template.
- Rate of deterioration: Examination of the rate of deterioration over time based on current condition, compared to expected service life.
- Renewals intervention point: Establishing a renewals intervention point based on the level of service required and its risk categorization.

The above summary has established the foundation upon which asset management and capital infrastructure replacement decisions are made. In addition, regular preventative maintenance is also performed to maintain the condition of assets and help ensure expected service lives are achieved.

In 2018, asset management activities included:

- Annual Elevated Tank Inspection Program. The Region undertakes an annual tank inspection program to examine ladders, landings, handrails, appurtenances, external and internal coatings, venting and overflow screens. These inspections meet or exceed the recommended requirements set out in the AWWA Standard M42-Steel Water Storage Tanks.

- Reservoir cleaning and re-coating: Based on the finding of the Annual Elevated Tank Inspection Program, elevated tanks undergo or are scheduled for major maintenance of cleaning or re-coating to help ensure sustainable operation and extend service life.
- Energy Assessments: When equipment replacement is being considered, and it is determined that more energy efficient alternatives are available, energy assessments are undertaken. These assessments confirm the cost benefits of replacing an asset with the potential energy savings, replacement incentives, and payback period, to find the most appropriate replacement alternative.
- Annual review, prioritization and coordination of watermain replacements: Watermain replacement requirements are reviewed based on the age, material, and condition (break history and leakage reports where available) and are coordinated with both Regional and Local transportation capital programs.
- Water Facility Inventory, Condition, and Risk Assessment Updates: Facility inventory and condition assessments are performed to recognize all major building, process, and site works assets and components, as well as to assess the current physical and performance (capacity, suitability, quality, quantity, and cost or energy efficiency). These assessments combined with criticality will provide the risk assessment for water facilities. Resulting information provides input into the annual and extended 25 year capital forecast of repair and replacements.
- Optimized Decision Making Process (ODMP): The process whereby an asset deficiency is observed in the field to the point where it is on a list of prioritized projects for implementation. The process is a four (step) processes that includes the following steps and documentation:
    - Identify the Asset Issue and the Root Cause analysis
    - Assess the impacts and measures to mitigate
    - Gather Information and Identify the best approach to address the asset issue
    - Review project delivery options
    - Develop project verification, prioritization, and implementation plan.
- Project Management Tool & Project Tracking: The Project Management (PM) Tool is a process in which all projects can be tracked and reviewed. The PM tool includes the scope, status, budget, invoices, documentation, risks and project priority.
- Asset Management Planning: The Ministry filed O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure on December 27, 2017 under the “Infrastructure for Jobs and Prosperity Act”. The regulation requires that every municipality prepare its first strategic asset management policy by July 1, 2019 and shall review and, if necessary, update it at least every five (5) years. The regulation also requires that every municipality prepare an asset management plan for its core municipal

infrastructure assets by July 1, 2021, and for all of its other municipal infrastructure assets by July 1, 2023.

In 2017 the Region outlined a proposed schedule to meeting the primary requirements of O. Reg. 588/17:

- Council approved the Region's Corporate Asset Management Policy in 2016. Region staff proposes to complete their second asset management policy during the first six months of 2019 to meet the July 1, deadline.
- The 2015 Region of Waterloo Corporate Asset Management Plan, completed in 2016, already includes all infrastructure assets and staff proposes that the second version of the Asset Management Plan be completed in 2020 using 2019 data inclusive of all municipal infrastructure as required of the province by July 1, 2023.
- The Asset Management Plan (AM Plan) is a long range planning document that is used to provide a rational framework for managing the Region's assets. The Region's AM Plan contains consolidated information that is currently available for the Region's assets to provide both a short term (10 years) and a long term (100 years) focus. The AM Plan is a written representation of proposed risk reduction programs and strategies for the Region's assets based on understanding of customer requirements, regulatory compliance, and the ability of the assets to meet required levels of service. This AM Plan identifies future costs and assists in predicting future problems that may hinder service delivery. This creates opportunities for the Region's asset managers and operators to remove physical, financial and political barriers before they negatively impact customer levels of service.

In addition to the above mentioned asset management activities within Water Services, the Region of Waterloo is in the midst of a multi-year Asset Management System Implementation Project (AMSIP). The project is comprised of two primary components:

1. Work Management System Implementation (Lucity) - an enterprise level software product to be used by all asset-owning Divisions at the Region of Waterloo to perform maintenance and all other work on assets.
2. Decision Support System acquisition and implementation (PowerPlan) - a set of correlated tools that work with the Work Management System in an integrated fashion to facilitate decision making for determining the appropriate rehabilitation, restoration, replacement, or maintenance strategies for optimal Asset performance.

Integrated with other key corporate systems, these systems will enable staff to make better decisions related to asset maintenance, help forecast capital works, improve efficiencies through enhanced work planning and scheduling, provide consistent metrics for comparing assets across Divisions and allow better reporting to help Council make more informed decisions.

Appendix A – Adverse Water Quality Incidents (AWQI) for Regional Distribution Facilities (IUS)

AWQI	Date	Location	Parameter	Result	Unit	Corrective Action
No IUS Distribution Facility AWQI in 2018						

Appendix B – QMS Management Review

DATE: November 26, 2018

TIME: 1:30pm – 4:00pm

PLACE: Mannheim Training Room

PRESENT:

Thomas Schmidt	Nancy Kodousek	Olga Vrentzos	Dale Wiens
Peter Clarke	Kathy Taylor	Frank Infante	Chris Komorowski (PH)

REGRETS:

Sandy Stevens

1) QMS MANAGEMENT REVIEW PROCESS

A summary was provided of the Management Review purpose and objectives - to evaluate the effectiveness and appropriateness of the QMS and to address any deficiencies.

2) QMS POLICY REVIEW AND APPROVAL

The QMS policy (DOCS#981236) was reviewed and continues to be appropriate.

3) DWQMS MANAGEMENT REVIEW REQUIREMENTS

Required Management Review agenda items were discussed in accordance with the procedure DOCS#500605.

4) ROUNDTABLE DISCUSSION

Management Review discussion conducted as per presentation (DOCS#2861561) and agenda (DOCS#2873880).

5) PREVIOUS ACTION ITEMS- FOLLOW-UP

Reviewed 2017 Management Review action status:

I. Consider arsenic removal efficiencies in 2018 Risk Assessment

MAC has changed from 25 µg/L to 10 µg/L. Study completed to determine arsenic removal efficiency from iron/manganese filtration at select sites. Removal efficiencies varied from 45-95% at different facilities. Risk Value was determined to be low (3) due to all raw water Arsenic levels being below 10 µg/L.

Action: QMS Team

Timeline: Complete

II. Revise Critical Control Limits

SCADA LOLO and HIHI alarm setpoints were previously used as both primary and secondary CCLs. Alarm setpoint revisions were completed and secondary disinfection CCLs changed to 0.30 mg/L and 3.0 mg/L Region-wide.

Action: QMS Team

Status: Complete

III. Mannheim Filters – Extended Terminal Subfluidization Wash (ETSW)

Consultant to review data before proceeding to Phase 2, which will require coordination with the Ministry.

Action: Supervisor, Process & Compliance

Timeline: Ongoing (Summer 2019)

IV. Protocol for Operating Hidden Valley and the K80s Wells During Grand River Watershed Upsets

A peer review of the current procedure is underway. Received a tech memo for operation with turbidity levels from 50-100 NTU.

Action: Manager, Operations and Maintenance

Timeline: Ongoing (Spring 2020)

6) INCIDENTS OF REGULATORY NON-COMPLIANCE REVIEW

Five (5) regulatory non-compliance issues occurred in 2018. For most non-compliance issues a corrective/preventative action was implemented (see Management Review Presentation Slides #15-18, DOCS#2861561 for details).

7) OPERATIONAL PLANS AND MUNICIPAL DRINKING WATER LICENSES

- 2 new MDWL and 2 new DWWPs were issued in 2018.
- West Montrose Waterworks and MDWL end dated.

8) General

- Discussed performing a cost/benefit analysis of the current algae monitoring program including sampling and monitoring frequency.
- Discussed history of regulatory relief granted for AWQI reporting.

- Required primary disinfection upgrades (chlorine contact chambers) on track for completion by Dec 31, 2018 at wells G4/G4A, K23 and W10.
- Health Canada Public Consultation document discussion with respect to 1,4 Dioxane, chloramine, barium, and Enterococci.
- Lead levels in plumbing regularly discussed at meetings with Public Health. Recent focus on lead results from schools and daycares.
- Discussed future plans to direct RMP discharge to City of Kitchener sanitary sewer. Will require an updated DWWP.
- Well P6 decommissioned, TCE not detected in any samples.
- Wells B1,B2 (not in use, elevated Nitrates) planned for decommissioning.
- Real time H_2O_2 dosage at Greenbrook established.
- PACL storage and transfer system operational at Mannheim.
- Discussed potential for participation in the Strategic Fuel Reserve Program which would provide diesel fuel for generators during widespread power outages.

9) NEW ACTION ITEMS

I. PROVIDE STANDARD OF CARE TRAINING TO NEW COUNCIL (IF REQUESTED)

- Investigate bringing course in-house for new Regional Council and open up training for lower tier Councillors as well.

Action: Director, Water Services & Supervisor, Process and Compliance

Timeline: Winter 2019

II. IMPLEMENT EXTENDED TERMINAL SUBFLUIDIZATION WASH (ETSW) FOR MANNHEIM FILTERS

- Consultant report and MECP notification required before implementation.

Action: Supervisor, Process and Compliance

Timeline: Summer 2019

III. REVIEW/IMPLEMENT INTERNAL AUDIT FINDINGS

- Zero (0) non-conformance issues were identified.
- Fifteen (15) opportunities for improvement were identified, implementation to be assessed and decided by management staff.

Action: Supervisor, Process and Compliance

Timeline: Spring 2019

IV. DEVELOP STANDARD OPERATING PROCEDURE FOR GREENBROOK WTP

- Health Canada's proposed MAC of 50 µg/L for 1,4-Dioxane may impact the Region's current target level of 10 µg/L. Online continuous peroxide dosage monitoring now in place.

Action: Supervisor, Process and Compliance

Timeline: Summer 2019

V. Revise Protocol for Operating Hidden Valley and the K80s Wells During Grand River Watershed Upsets

- A peer review of the current procedure is underway.

Action: Manager, O&M

Timeline: Spring 2020

10) Next Steps

- Continue Opportunity for Improvement (OFI) review and implementation as applicable.
- QMS Re-Accreditation Audit scheduled for week of January 21st, 2019.
- Develop Non Conformance corrective action plans as applicable.
- Amend DWQMS procedures, as applicable.
- Ensure work orders are generated as required once the transition to Lucity is implemented.

Appendix C – Treated Water Flow Data

The following tables summarize the flow rates for 2018, including MDWL Schedule C-Table 1 flow limits and treated water monthly average daily volumes. There were no MDWL flow limit exceedances in 2018. See Table 1 for PTTW flow exceedances.

Cambridge Drinking Water System – Wells G4/G4A			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1900 m^3/day)	**Monthly Average** (m^3/d)
January	19.41	1651	1493
February	20.47	1652	1636
March	21.72	1649	1449
April	20.80	1650	1594
May	20.39	1652	1600
June	20.61	1648	1471
July	20.24	1650	1634
August	19.69	1648	1615
September	20.57	1649	1114
October	0	0	0
November	20.64	1734	868
December	20.41	1730	1634
Average			**1342**
Maximum	**21.72**	**1734**	

Cambridge Drinking Water System – Wells G5/G5A			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 4320 m^3/day)	**Monthly Average** (m^3/d)
January	25.79	2195	2125
February	25.76	2200	2186
March	25.74	2199	2085
April	0	0	0
May	0	0	0
June	0	0	0
July	30.42	2585	1402
August	33.69	2590	2093
September	23.31	1744	919
October	30.49	2585	1462
November	32.66	2686	2120
December	30.42	2591	1704
Average			**1253**
Maximum	**33.69**	**2686**	

Cambridge Drinking Water System – Well G6			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1,900 m^3/day)	**Monthly Average** (m^3/d)
January	16.37	1357	1320
February	16.21	1359	1346
March	16.19	1358	1338
April	16.20	1353	1301
May	16.10	1354	1303
June	16.24	1346	1326
July	15.96	1351	1326
August	16.12	1349	1332
September	16.09	1353	1336
October	16.12	1350	1333
November	16.10	1386	1297
December	16.23	1349	1317
Average			**1323**
Maximum	**16.37**	**1386**	

Cambridge Drinking Water System – Well G9			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 3,280 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	0	0	0
March	0	0	0
April	21.82*	0	0
May	12.36*	0	0
June	10.03*	0	0
July	21.34	1644	181
August	21.18	1801	831
September	21.40	1792	1732
October	21.08	1747	1693
November	20.89	1741	1637
December	21.00	1749	1666
Average			**646**
Maximum	**21.82**	**1801**	

*Running to waste.

Cambridge Drinking Water System – Well H3/H3A			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1642 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	17.54	1125	380
September	20.00*	1295	541
October	15.52	1295	1293
November	15.66	1295	361
December	16.68	1296	1192
Average			**339**
Maximum	**20.00**	**1296**	

*See Table 1. Running to waste.

Cambridge Drinking Water System – Wells H4/H4A			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 2074 m^3/day)	**Monthly Average** (m^3/d)
January	16.36	1336	1276
February	16.30	1329	1317
March	16.23	1326	1316
April	16.28	1328	1315
May	18.14	1334	1276
June	16.56	1332	1315
July	16.13	1321	1206
August	0	0	0
September	0	0	0
October	20.00*	1480	1063
November	20.00*	1476	1333
December	20.00*	1474	958
Average			**983**
Maximum	**20.00**	**1480**	

*Less than 10 minute flow spike on startup.

Cambridge Drinking Water System – Well H5			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1987 m^3/day)	**Monthly Average** (m^3/d)
January	11.79	849	827
February	11.20	853	800
March	10.20	805	757
April	13.80	832	721
May	19.33	1496	903
June	19.87	1522	1472
July	18.74	1498	1282
August	15.50	1136	1076
September	15.44	1115	1077
October	15.09	1127	1072
November	15.11	1140	1088
December	16.06	1119	974
Average			**1004**
Maximum	**19.87**	**1522**	

Cambridge Drinking Water System – Middleton Wells (G1, G1A, G2, G3, G14, G15)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 40349 m^3/day)	**Monthly Average** (m^3/d)
January	422.07	17556	15938
February	455.32	18838	15989
March	447.53	17799	16235
April	438.53	17462	16153
May	438.98	17876	16241
June	484.33*	18343	16883
July	453.80	19135	17305
August	457.72*	19184	18344
September	442.96	19054	16918
October	441.67	19493	16765
November	434.55	17753	15116
December	406.71	16980	14194
Average			**16340**
Maximum	**484.33**	**19493**	

* Less than 10 minute flow spike.

Cambridge Drinking Water System – Pinebush Wells (P10, P11, P17)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 10368 m^3/day)	**Monthly Average** (m^3/d)
January	58.10	3403	2920
February	57.60	3415	3098
March	55.73	3388	3003
April	62.54	3375	897
May	55.58	3331	2963
June	58.71	3253	2831
July	48.36	3416	2965
August	47.43	3097	2830
September	48.63	3014	2696
October	62.84	2972	390
November	64.94	3062	1938
December	65.32	3070	2670
Average			**2433**
Maximum	**65.32**	**3416**	

Cambridge Drinking Water System – Well P16			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1961 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
Average			0
Maximum	0	0	

Cambridge Drinking Water System – Well P9			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 2592 m^3/day)	**Monthly Average** (m^3/d)
January	16.24	1396	1348
February	15.93	1369	1320
March	15.84	1357	1262
April	16.23	1388	1296
May	16.01	1359	1313
June	15.13	1270	1230
July	14.44	1237	1170
August	14.31	1191	1082
September	12.62	1077	1036
October	12.27	1052	1014
November	11.34	1002	959
December	11.15	953	934
Average			**1164**
Maximum	**16.24**	**1396**	

Cambridge Drinking Water System – Well P15			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1642 m^3/day)	**Monthly Average** (m^3/d)
January	8.58	696	686
February	8.22	693	684
March	8.68	732	684
April	8.62	733	723
May	8.35	705	699
June	7.86	666	645
July	12.14	761	687
August	11.69	710	656
September	8.03	676	645
October	7.93	667	648
November	7.66	672	639
December	7.01	596	586
Average			**665**
Maximum	**12.14**	**761**	

Cambridge Drinking Water System – Shades Mill Wells (G7, G8, G38, G39)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 12960 m^3/day)	**Monthly Average** (m^3/d)
January	105.11	6592	5076
February	99.84	6642	4963
March	99.93	7283	5194
April	100.39	6647	5986
May	102.47	8200	6611
June	101.74	8058	6235
July	103.55	7849	5545
August	55.79	3871	147
September	64.85	5280	3294
October	110.35	7992	5981
November	110.12	7093	5386
December	108.62	7026	4647
Average			**4922**
Maximum	**110.35**	**8200**	

Cambridge Drinking Water System – Turnbull Wells (G16, G17, G18)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 10368 m^3/day)	**Monthly Average** (m^3/d)
January	84.41	5966	4369
February	83.14	5122	3608
March	89.02	5786	4229
April	90.47	6093	4943
May	85.49	6109	3269
June	93.92	6180	4893
July	90.95	6489	5720
August	87.86	5231	4316
September	129.40*	6531	4419
October	94.04	4732	2625
November	93.78	4546	2248
December	94.39	4224	1795
Average			**3870**
Maximum	**129.40**	**6531**	

*Flow spikes, analyser issue.

Kitchener Drinking Water System – Greenbrook Wells (K1A, K2A, K4B, K5A, K8)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 12269 m^3/day)	**Monthly Average** (m^3/d)
January	118.76	6483	5316
February	119.06	6327	5809
March	156.68	6401	4641
April	165.05	6413	5776
May	146.50	6423	5827
June	128.99	6262	5792
July	136.39	6375	5878
August	137.95	6299	5521
September	154.17	6293	5068
October	125.54	6148	3664
November	142.37	8413	1747
December	138.39	8909	5228
Average			**5022**
Maximum	**165.05**	**8909**	

Kitchener Drinking Water System – Wells K34/K36			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 6868 m^3/day)	**Monthly Average** (m^3/d)
January	44.16	3503	3410
February	43.18	3465	3357
March	43.84	3495	3409
April	43.48	3471	3384
May	42.67	3450	3391
June	43.42	3275	3056
July	62.13	4793	3882
August	66.46	5189	4142
September	71.34	5282	1318
October	59.14	416	49
November	59.97	4554	3058
December	63.39	4448	3056
Average			**2959**
Maximum	**71.34**	**5282**	

Kitchener Drinking Water System – Well K21			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 4925 m^3/day)	**Monthly Average** (m^3/d)
January	32.69	2671	2628
February	33.02	2706	2660
March	32.88	2725	2707
April	32.95	2814	2709
May	35.45	2843	2724
June	35.07	2946	2808
July	34.80	2871	2694
August	34.82	2846	2803
September	43.49	2824	2806
October	37.90	2810	2742
November	34.59	2890	2756
December	33.38	2781	2771
Average			**2734**
Maximum	**43.49**	**2946**	

Kitchener Drinking Water System – Well K25			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 6826 m^3/day)	**Monthly Average** (m^3/d)
January	57.88	4636	4560
February	59.29	4654	4555
March	60.48	4812	4735
April	60.84	4761	4707
May	62.20	4555	4359
June	62.99	4556	4444
July	88.31	4591	4332
August	60.28	4589	4540
September	60.95	4653	4567
October	62.20	4612	4519
November	66.44	4776	4567
December	60.35	4607	4586
Average			**4539**
Maximum	**88.31**	**4812**	

Kitchener Drinking Water System – Well K29			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 5270 m^3/day)	**Monthly Average** (m^3/d)
January	44.34	3105	3004
February	48.61	3111	3022
March	46.26	3273	3227
April	50.43	4285	3433
May	62.98	4324	4132
June	58.21	4447	4035
July	66.50	4320	3879
August	55.49	4033	3948
September	55.75	4131	3980
October	55.98	4080	3952
November	56.03	4182	3968
December	51.20	4056	4004
Average			**3715**
Maximum	**66.50**	**4447**	

Kitchener Drinking Water System – Well K22A			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 6566 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
Average			**0**
Maximum	**0**	**0**	

Kitchener Drinking Water System – Well K23			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 6566 m^3/day)	**Monthly Average** (m^3/d)
January	26.82	2184	2048
February	26.36	2189	2124
March	27.47	2279	1927
April	29.48	2167	1943
May	30.81	2449	2153
June	30.94	2552	2308
July	29.69	2506	2254
August	30.52	2510	2408
September	31.85	2570	1949
October	0.00	0	0
November	17.33*	0	0
December	40.32	2468	701
Average			**1651**
Maximum	**40.32**	**2570**	

*Running to waste.

Kitchener Drinking Water System – Well K24			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 6566 m^3/day)	**Monthly Average** (m^3/d)
January	39.38	2976	2808
February	35.77	2996	2955
March	45.81	3784	3364
April	46.18	3886	2348
May	46.48*	0	0
June	50.59	2607	1312
July	47.83	2562	2469
August	37.40	2573	2362
September	47.11	2562	2471
October	32.59	2529	1870
November	37.21	2235	1956
December	50.87	2168	1979
Average			**1988**
Maximum	**50.87**	**3886**	

*Running to waste.

Kitchener Drinking Water System – Well K26			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 9158 m^3/day)	**Monthly Average** (m^3/d)
January	92.13	7521	7480
February	91.50	7565	7469
March	91.02	7550	7489
April	101.54	8458	6724
May	95.60	7761	7541
June	95.28	7936	7500
July	99.09	8033	7852
August	96.17	7943	7877
September	115.49	8043	7040
October	83.91	6644	6251
November	86.20	6789	6560
December	83.79	6764	6313
Average			**7175**
Maximum	**115.49**	**8458**	

Kitchener Drinking Water System – ASR1			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 6566 m^3/day)	**Monthly Average** (m^3/d)
January	32.81	1661	217
February	25.80	1679	296
March	23.68	1693	255
April	45.73	1676	342
May	60.70	719	57
June	31.84	70	9
July	41.97	796	40
August	43.34	996	55
September	60.30	1697	176
October	37.86	1563	119
November	0	0	0
December	37.42*	0	0
Average			**131**
Maximum	**60.70**	**1697**	

*Running to waste.

Kitchener Drinking Water System – ASR2			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 3283 m^3/day)	**Monthly Average** (m^3/d)
January	31.23	1844	235
February	30.71	2570	271
March	30.40	2548	328
April	33.58	2651	516
May	34.50	2285	190
June	30.16*	0	0
July	30.62	2229	191
August	30.65	1870	65
September	34.11	1971	226
October	33.90	1928	190
November	30.15	590	20
December	30.05	1164	195
Average			**202**
Maximum	**34.50**	**2651**	

*Running to waste.

Kitchener Drinking Water System – ASR3			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 3974 m^3/day)	**Monthly Average** (m^3/d)
January	21.74	76	2
February	22.32	1275	162
March	21.90	1315	151
April	43.06	1630	105
May	28.86	855	51
June	0	0	0
July	0	0	0
August	30.01	796	26
September	29.00	1662	157
October	28.18	641	59
November	27.23	390	13
December	26.79	650	119
Average			**70**
Maximum	**43.06**	**1662**	

Kitchener Drinking Water System – ASR4			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 5443 m^3/day)	**Monthly Average** (m^3/d)
January	41.44	2185	303
February	43.06	3455	562
March	0	0	0
April	55.47	4090	497
May	60.61	2268	173
June	52.73*	0	0
July	55.10	1374	146
August	56.63	1402	48
September	46.00	3250	298
October	42.92	2704	263
November	47.35	603	43
December	43.70	1093	203
Average			**211**
Maximum	**60.61**	**4090**	

*Running to waste.

Kitchener Drinking Water System – RCW1			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 5961 m^3/day)	**Monthly Average** (m^3/d)
January	60.77	5031	663
February	60.30	4727	731
March	53.33	4505	599
April	61.90	5163	919
May	63.53	3812	299
June	62.96*	0	0
July	63.17	3643	338
August	55.05	2630	91
September	62.52	4736	430
October	55.89	4365	419
November	65.49	1018	111
December	62.04	2608	392
Average			**416**
Maximum	**65.49**	**5163**	

* Running to waste.

Kitchener Drinking Water System – RCW2			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 5443 m^3/day)	**Monthly Average** (m^3/d)
January	58.21	4757	647
February	55.06	4711	720
March	55.24	4706	646
April	65.20	5104	918
May	53.64	3814	306
June	56.18*	0	0
July	54.96	3566	138
August	58.22	3072	107
September	56.75	4721	347
October	59.04	4315	360
November	58.47	1019	106
December	56.60	1034	157
Average			**371**
Maximum	**65.20**	**5104**	

*Running to waste.

Kitchener Drinking Water System – K91			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 4492 m^3/day)	**Monthly Average** (m^3/d)
January	35.32	2819	1629
February	35.08	2769	736
March	35.70	2886	638
April	36.19	2949	1188
May	36.95	2867	826
June	35.87	2788	683
July	36.25	2932	1097
August	35.75	2936	423
September	36.14	2832	1179
October	36.35	2965	941
November	35.76	2951	1056
December	35.00	2918	943
Average			**945**
Maximum	**36.95**	**2965**	

Kitchener Drinking Water System – Well K92			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 4492 m^3/day)	**Monthly Average** (m^3/d)
January	47.26	3875	2228
February	47.26	3946	1033
March	48.40	4023	886
April	49.04	3945	1441
May	56.67	3941	954
June	48.67	1709	199
July	50.62	3895	1483
August	47.79	3883	558
September	50.21	3892	1610
October	60.75	3893	1207
November	48.36	3904	1425
December	50.22	3909	1232
Average			**1188**
Maximum	**60.75**	**4023**	

Kitchener Drinking Water System – Well K93			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 4492 m^3/day)	**Monthly Average** (m^3/d)
January	41.33	3133	1814
February	44.23	3147	756
March	65.40	3343	694
April	42.92	3272	1302
May	42.30	3339	870
June	41.92	3341	775
July	39.08	3077	1094
August	35.31	2541	371
September	35.85	2790	1119
October	36.53	2790	932
November	41.69	3003	1049
December	42.19	3260	1052
Average			**986**
Maximum	**65.40**	**3343**	

Kitchener Drinking Water System – Well K94			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 4492 m^3/day)	**Monthly Average** (m^3/d)
January	44.17	3429	1968
February	44.51	3435	852
March	44.46	3611	743
April	45.79	3682	1366
May	43.56	3648	920
June	44.83	3662	876
July	46.38	3546	1317
August	43.67	3222	473
September	45.20	3541	1461
October	44.72	3560	1133
November	45.09	3573	1247
December	44.91	3573	1128
Average			**1124**
Maximum	**46.38**	**3682**	

Kitchener Drinking Water System – Grand River Intake (Mannheim WTP)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 72576 m^3/day)	**Monthly Average** (m^3/d)
January	621.83	43711	33948
February	637.15	44352	36795
March	602.30	43257	36287
April	601.81	46696	34921
May	818.36	57282	47102
June	827.17	56875	50718
July	771.61	64749	46289
August	722.03	48460	42093
September	711.41	60635	47152
October	724.39	59055	46450
November	713.22	49557	42283
December	715.61	47482	38468
Average			**41875**
Maximum	**827.17**	**64749**	

Kitchener Drinking Water System – Parkway Wells (K31, K32, K33)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 13737 m^3/day)	**Monthly Average** (m^3/d)
January	95.62	5505	4559
February	99.05	7933	2999
March	97.91	7826	4320
April	96.76	7809	5206
May	94.48	7680	5395
June	93.86	7670	5596
July	94.60	7633	5421
August	95.91	7747	3964
September	94.79	7700	4117
October	96.89	5162	5055
November	92.66	5663	5100
December	91.84	5367	5093
Average			**4735**
Maximum	**99.05**	**7933**	

Kitchener Drinking Water System Strange St. Wells (K10A, K11A, K13, K13A, K18, K19)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 15854 m^3/day)	**Monthly Average** (m^3/d)
January	34.77	2875	2781
February	33.58	2730	2614
March	31.46	2605	2487
April	32.33	2636	2487
May	42.27	2589	2268
June	51.52	2577	2523
July	52.54	2902	2521
August	32.27	2673	2536
September	30.26	2500	2455
October	35.94	2498	2426
November	29.10	2449	2320
December	28.25	2324	2241
Average			**2472**
Maximum	**52.54**	**2902**	

Shingletown Drinking Water System – Wells K50/51			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 13651 m^3/day)	**Monthly Average** (m^3/d)
January	114.04	9194	8840
February	110.42	8797	8598
March	109.34	8555	8375
April	128.03	10325	8765
May	133.78	10105	8840
June	144.92	11490	10229
July	149.64	12058	11546
August	157.60*	12832	12434
September	130.09	8465	8413
October	134.01	8478	8204
November	131.59	8801	8460
December	130.39	8491	8438
Average			**9262**
Maximum	**157.60**	**12832**	

* Less than 10 minute flow spike.

Kitchener Drinking Water System – Woolners Wells (K80, K81, K82)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 11146 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
Average			0
Maximum	0	0	

Waterloo Drinking Water System – Erb Street Wells (W6B, W6C, W7, W8)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 24139 m^3/day)	**Monthly Average** (m^3/d)
January	132.21	12927	11122
February	135.32	12838	11068
March	134.96	12161	10735
April	140.20	13018	10595
May	132.52	11185	8698
June	120.32	11009	9510
July	203.35	11179	9363
August	146.83	11286	9321
September	126.15	11281	9259
October	115.10	11364	9141
November	113.65	10770	9222
December	113.19	10817	9116
Average			**9763**
Maximum	**203.35**	**13018**	

Waterloo Drinking Water System – William Street Wells (W1B, W1C, W2, W3)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 16753 m^3/day)	**Monthly Average** (m^3/d)
January	63.56	5015	4752
February	64.32	5033	4688
March	63.37	4984	4851
April	63.54	4978	4541
May	62.31	4854	3522
June	61.59	4949	4704
July	61.95	4918	4451
August	62.12	4880	4183
September	61.49	5118	4303
October	61.79	4789	4336
November	62.29	4867	4530
December	60.19	4772	697
Average			**4130**
Maximum	**64.32**	**5118**	

Waterloo Drinking Water System – Well W10			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 2160 m^3/day)	**Monthly Average** (m^3/d)
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	40.00*	308	19
Average			**3**
Maximum	**40.00**	**308**	

*Less than 10 minute flow spike.

New Hamburg/Baden Drinking Water System – Well (NH3)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 3542 m^3/day)	**Monthly Average** (m^3/d)
January	35.93	1770	1043
February	38.29	1889	1202
March	37.01	2386	1498
April	39.84	2663	1463
May	39.79	2136	1534
June	39.62	1587	729
July	39.98	2680	1906
August	40.01	2056	1740
September	47.22*	2477	1864
October	45.15*	1856	1373
November	44.34*	1809	1543
December	48.17*	1801	1395
Average			**1441**
Maximum	**48.17**	**2680**	

*Less than 10 minute flow spike on startup.

Ayr Drinking Water System – Wells (A1, A2, A3)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 5478 m^3/day)	**Monthly Average** (m^3/d)
January	60.58	2416	1783
February	54.27	2368	1848
March	54.00	2228	1830
April	53.77	2116	1846
May	58.38	2804	2127
June	57.97	3182	2251
July	58.86	3013	2333
August	51.37	2322	2081
September	54.84	2244	1937
October	55.32	2100	1703
November	55.06	2177	1722
December	51.31	2137	1710
Average			**1931**
Maximum	**60.58**	**3182**	

Branchton Drinking Water System – Wells (BM1, BM2)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 130 m^3/day)	**Monthly Average** (m^3/d)
January	1.25	30	22
February	1.27	36	22
March	1.31	25	20
April	1.23	50	23
May	1.26	45	27
June	1.22	35	23
July	2.00*	68	38
August	1.45	44	25
September	2.00*	31	22
October	1.34	28	23
November	1.73*	33	25
December	2.00*	37	27
Average			**25**
Maximum	**2.00**	**68**	

*Less than 10 minute flow spike, typically on startup.

Roseville Drinking Water System – Wells (R5, R6)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 357.7 m^3/day)	**Monthly Average** (m^3/d)
January	4.43*	76	62
February	4.47*	74	62
March	4.48*	73	62
April	7.68*	71	62
May	4.48*	108	78
June	4.47*	136	95
July	4.46*	168	113
August	4.45*	124	92
September	5.24*	109	81
October	4.50*	74	63
November	4.43*	73	61
December	4.46*	80	65
Average			**75**
Maximum	**7.68**	**168**	

*Less than 10 minute flow spike, typically on startup.

Heidelberg Drinking Water System – Wells (HD1, HD2)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1373.8 m^3/day)	**Monthly Average** (m^3/d)
January	7.70	190	160
February	8.62	185	156
March	7.80	182	152
April	7.80	200	160
May	7.81	277	197
June	7.73	404	219
July	7.71	372	252
August	7.68	218	181
September	7.77	238	181
October	7.71	402	172
November	7.76	189	161
December	7.75	207	179
Average			**181**
Maximum	**8.62**	**404**	

Conestogo Golf Drinking Water System – Wells (C5, C6)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 601.3 m^3/day)	**Monthly Average** (m^3/d)
January	4.97	115	90
February	4.60	105	86
March	5.15	106	81
April	7.06	109	86
May	4.99	287	153
June	6.07	431	250
July	10.14	486	325
August	8.82	370	238
September	4.72	282	189
October	5.46	140	103
November	4.96	109	84
December	4.71	122	88
Average			**148**
Maximum	**10.14**	**486**	

Conestogo Plains/West Montrose Drinking Water System – Wells (C3, C4)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 786.2 m^3/day)	**Monthly Average** (m^3/d)
January	4.12	166	122
February	5.35	173	125
March	5.28	153	118
April	5.37	140	117
May	5.30	257	186
June	4.36	358	209
July	5.62	361	238
August	4.62	298	189
September	4.67	218	168
October	4.76	182	143
November	4.47	169	121
December	4.64	167	126
Average			**155**
Maximum	**5.62**	**361**	

West Montrose Drinking Water System – Wells (WM1, WM2, WM3, WM4)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 238 m^3/day)	**Monthly Average** (m^3/d)
January	The West Montrose Well Supply system was end dated in 2018. The West Montrose distribution system was supplied from Conestoga Plains in 2018. West Montrose wells will be decommissioned in 2019.		
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			
Average			
Maximum			

Maryhill Drinking Water System – Maryhill WTP- Wells (MH1, MH2)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 157 m^3/day)	**Monthly Average** (m3/d)
January	2.00*	64	60
February	2.00*	64	59
March	2.00*	63	52
April	2.00*	58	51
May	2.00*	91	59
June	2.00*	74	60
July	2.71*	71	57
August	1.90*	66	49
September	1.84*	62	52
October	1.83*	64	51
November	2.00*	71	52
December	3.09*	70	56
Average			**55**
Maximum	**3.09**	**91**	

*Less than 10 minute flow spike, typically on startup.

Maryhill Drinking Water System – Maryhill Heights- Wells (MH3, MH4A)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 812 m^3/day)	**Monthly Average** (m^3/d)
January	5.47	34	26
February	5.46	43	26
March	5.62	67	25
April	5.50	42	26
May	5.23	54	28
June	5.26	122	38
July	5.17	130	63
August	5.05	69	40
September	5.63	55	36
October	5.23	50	31
November	4.87	60	29
December	5.21	43	28
Average			**33**
Maximum	**5.63**	**130**	

Linwood Drinking Water System – Wells (L1A, L2)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 604.8 m^3/day)	**Monthly Average** (m^3/d)
January	6.29	270	244
February	6.30	255	239
March	6.30	263	245
April	6.35	265	244
May	6.33	261	205
June	6.62	213	167
July	6.64	236	178
August	6.54	195	157
September	10.26	174	149
October	6.60	165	142
November	6.69	158	134
December	6.42	181	142
Average			**187**
Maximum	**10.26**	**270**	

St. Clements Drinking Water System – Wells (SC2, SC3, SC4)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 1771.2 m^3/day)	**Monthly Average** (m^3/d)
January	16.15	733	213
February	16.11	217	189
March	16.16	217	186
April	19.57	218	191
May	19.49	342	241
June	25.73*	396	266
July	16.95	415	289
August	16.98	289	220
September	17.63	349	223
October	20.53*	224	193
November	29.41*	226	186
December	17.59	235	200
Average			**217**
Maximum	**29.41**	**733**	

*Less than 10 minute flow spike.

Wellesley Drinking Water System – Wells (WY1, WY5, WY6)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 3006 m^3/day)	**Monthly Average** (m^3/d)
January	30.16*	659	570
February	16.05	643	558
March	27.85**	665	571
April	15.43	670	571
May	16.06	1104	634
June	16.30	916	679
July	31.06*	861	671
August	16.33	756	586
September	27.73*	712	591
October	22.11*	890	601
November	16.25	660	547
December	29.27*	681	578
Average			**596**
Maximum	**31.06**	**1104**	

*Less than 10 minute flow spike. **See Table 1.

Foxboro Drinking Water System – Wells (FG1, FG2A, FG4)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 288 m^3/day)	**Monthly Average** (m^3/d)
January	3.89	110	94
February	3.84	101	89
March	3.80	103	86
April	3.80	120	98
May	3.72	129	102
June	3.66	148	103
July	3.63	121	100
August	3.49	111	95
September	3.91	114	97
October	2.50	108	93
November	4.20	164	92
December	3.47	132	110
Average			**97**
Maximum	**4.20**	**164**	

New Dundee Drinking Water System – Wells (ND4, ND5)			
Month	**Raw Peak Flow Rate** (L/s)	**Treated – Max Day** (MDWL Limit= 982.2 m^3/day)	**Monthly Average** (m^3/d)
January	16.60*	212	175
February	16.64*	202	161
March	16.83*	202	163
April	16.48*	200	166
May	16.53*	248	201
June	16.39*	377	253
July	16.73*	341	237
August	16.81*	264	185
September	16.58*	204	179
October	5.70	189	164
November	16.51*	195	163
December	16.50*	216	173
Average			**185**
Maximum	**16.83**	**377**	

*Less than 10 minute flow spike, typically on startup

Appendix D – System Information

Municipality	Location	Water Source	MDWL# / DWWP#	PTTW #	Sub-System Class /Number	Type
Cambridge Drinking Water Supply System (IUS)	Galt Wells	G4/G4A	012-102 / 012-202	1224-88MK7Q	WT Class III #8125	LARGE
		G5/G5A		4220-8HZHZQ		
		G6		8842-9FDJUC		
		G9		Grandfathered		
	Hespeler Wells	H3/H3A		1438-97BM7N		
		H4/H4A		8456-85DJHL		
		H5/5A		7145-8Z8QUN		
	Middleton WTP	G1, G1A, G2, G3, G14		7214-AMGR5G		
		G15		6132-AKURBN		
	Pinebush WTP	P10		Grandfathered		
		P11 P17		7343-9FFJBX		
	Preston Wells	P16		2004-AKXNEB		
	Rahmans Wells	P9 P15/P15A		7600-A27NB5		
	Shades Mill WTP	G7, G8, G38, G39, G40		3004-A9GHYU		
	Turnbull WTP	G16, G17, G18		8842-9FDJUC		
Kitchener Drinking Water Supply System (IUS)	Greenbrook WTP	K1A, K2A, K4B, K5A, K8	012-102 / 012-202	7562-AUWPKG	WT Class III #8126	LARGE
	Kitchener WTP	K34, K36		6732-A3FJYA		
	Parkway WTP	K31, K32		Grandfathered		
		K33		3115-AMHHXH		
	Strange Street WTP	K10A, K11A, K13, K13A, K18, K19		7163-A27HM3		
	Woolners Wells	K80, K81,K82		3281-8VPQYV		
Mannheim	Mannheim WTP	HVLL	012-102 / 012-202	Hidden Valley 0366-AYCP5A	WT Class IV #1843	LARGE

2018 Summary Report – Region of Waterloo Water Services

Municipality	Location	Water Source	MDWL# / DWWP#	PTTW #	Sub-System Class /Number	Type
Drinking Water Supply System (IUS)	ASR Wells	ASR1, ASR2, ASR3, ASR4, RCW1, RCW2		(Mannheim WTP supply only) Mannheim Consolidated 2671-AC9PFQ (Mannheim Wells, Peaking Wells and ASRs)		
	K90 Peaking Wells	K91 K92 K93 K94				
	Mannheim Wells	K21 K25 K29				
Waterloo Drinking Water Supply System (IUS)	Erb Wells	W6B, W6C, W7, W8	012-102 / 012-202	1541-AWGPZR	WT Class II #8127	LARGE
	Waterloo Wells	W10		3436-9SGLDK		
	William St. Wells	W1B/W1C W2/W2A & W3		6370-83MMJN		
IUS Distribution System	Cambridge, Kitchener and Waterloo	IUS Sources	012-102 / 012-202	N/A	WD Class IV #8128	LARGE
North Dumfries Township Drinking Water Supply Systems	Ayr WTP	A1 A2 A3	012-113 / 012-213	6350-8VPSBP	WT Class II #2591 & WD Class II #362	LARGE
	Branchton WTP	BM1 BM2 BM3	012-111 / 012-211	2577-9TPMWL	Limited Groundwater	SMALL
	Lloyd Brown Distribution		012-102 / 012-202	N/A	Limited Groundwater	SMALL
	Roseville WTP	R5 R6	012-101 / 012-201	6063-8M6M8M	Limited Groundwater	SMALL

Municipality	Location	Water Source	MDWL# / DWWP#	PTTW #	Sub-System Class /Number	Type
Wellesley Township Drinking Water Supply Systems	Heidelberg WTP	HD1 HD2	012-104 / 012-204	8624-824PKF	WT Class II #3101 Class II WD 3610	LARGE
	Linwood WTP	L1A L2	012-108 / 012-208	2287-8VQGV4	WT Class II #3594 WD Class II #1951	LARGE
	St. Clements WTP	SC2 SC3 SC4	012-110 / 012-210	0152-998JPE	WT Class II #2598 WD Class II 1952	LARGE
	Wellesley WTP	WY1 WY5 WY6	012-115 / 012-215	0345-94UQ6A	WT Class II #2601 WD Class II 1953	LARGE
Wilmot Township Drinking Water Supply Systems	Foxboro	FG01 FG02A FG04	012-105 / 012-205	2055-9C5PEU	WT Class I #2599	LARGE
	Mannheim Village Wells	K22A K23 K24 K26	012-102 / 012-202	2671-AC9PFQ	WT Class I #3603	LARGE
	New Dundee Wells	ND4 ND5	012-107 / 012-207	6562-837S4S	WDS Class I #3595	LARGE
	New Hamburg WTP	NH3 NH4	012-102 / 012-202	7021-AQRK39	WT Class II #2930	LARGE
	Shingletown Wells	K50 K51	012-102 / 012-202	4874-9SGL5L	WDS Class I #3593	LARGE
Woolwich Township Drinking Water Supply Systems	Conestogo Golf Wells	C5 C6	012-103 / 012-203	2006-8VQQ4Z	WDS Class I #8129	LARGE
	Conestogo Plains Wells	C3 C4	012-112 / 012-212	2407-837SX8	WDS Class I #3609	LARGE
	Maryhill Village Hts. Wells	MH3 MH4A	012-106 / 012-206	7733-8ADP56	WT Class I #8867 *The 2 Maryhill Limited Groundwater systems were	LARGE

Municipality	Location	Water Source	MDWL# / DWWP#	PTTW #	Sub-System Class /Number	Type
					combined into a Large system in 2018	
	Maryhill WTP	MH1 MH2		2876-837JDT	WT Class I #8867 *The 2 Maryhill Limited Groundwater systems were combined into a Large system in 2018	LARGE
	West Montrose WTP	WM1, WM2, WM3, WM4	012-109 / 012-209 *End-dated in 2018	6432-88UHLX	WT Class II #3104 *End-dated in 2018	SMALL

Appendix E – MECP Inspection Compliance Ratings

Drinking Water System	Type	Water Works #	Inspection #	Inspection Period	Inspection Date	Compliance Rating %
New Hamburg Baden	Large	220000111	1-I6CKX	Dec 1, 2017 to Sep 30, 2018	Oct 10, 2018	96.4
Waterloo	Large	220000157	1-F6PTE	April 1, 2017 to Mar 31, 2018	April 11, 2018	100
Cambridge	Large	220000166	1-I6C26	May 17, 2017 to May 31, 2018	May 22, 2018	100
Foxboro	Large	220009210	1-I6CRB	June 1, 2017 to Nov 30, 2018	Dec 17, 2018	100
Maryhill	Small	220004171	1-I73HT	June 1, 2017 to May 31, 2018	June 18, 2018	100
Maryhill Village Heights	Small	260007413	1-I73P6	June 1, 2017 to May 31, 2018	June 18, 2018	100
Conestogo Plains/West Montrose	Large	26002772	1-I745W	Jan 1, 2018 to Oct 31, 2018	Nov 6, 2018	100
Conestogo Golf	Large	260001994	1-I745W	Jan 1, 2018 to Nov 30, 2018	Dec 4, 2018	100
St. Clements	Large	220005811	1-I73RP	April 1, 2017 to Aug 31, 2018	Sept 18, 2018	100
Mannheim Village	Large	260002668	1-I6CPS	April 1, 2017 to June 30, 2018	July 11, 2018	95.2
New Dundee	Large	220004180	1-I6DL6	Oct 1, 2017 to Aug 31, 2018	Aug 30, 2018	100
Branchton	Small	260002538	1-I6C0O	Sep 15, 2017 to Sep 15, 2018	Aug 15, 2018	100
Kitchener	Large	220003092	1-I6IJG	Nov 1, 2017 to Oct 31, 2018	Nov 20, 2018	100
Mannheim	Large	220006981	1-I6IL9	Oct 1, 2017 to	Oct 16, 2018	100

2018 Summary Report – Region of Waterloo Water Services

Drinking Water System	Type	Water Works #	Inspection #	Inspection Period	Inspection Date	Compliance Rating %
				Oct 1, 2018		
Wellesley	Large	220004215	1-I73XO	May 1, 2017 to Nov 30, 2018	Dec 7, 2018	100
Shingletown	Large	260002707	1-I6DS4	Nov 1, 2017 to Sep 30, 2018	Oct 15, 2018	100
Heidelberg	Large	20007310	1-I747X	Feb 1, 2018 to Sep 30, 2018	Oct 15, 2018	100
Linwood	Large	220000102	1-I736Y	Feb 1, 2018 to Aug 31, 2018	Sep 14, 2018	100
Linwood	Large	220000102	1-F6PVG	Dec 1, 2016 to Jan 31, 2018	Feb 5, 2018	100
Lloyd Brown	Small	260002759	1-F6K12	Aug 1, 2016 to Dec 31, 2017	Feb 14, 2018	100
Heidelberg	Large	20007310	1-F6MK5	Jan 11, 2017 to Feb, 2018	Feb 27, 2018	100
West Montrose	Small	220007007	1-F6NCG	Nov 17, 2016 to Feb 2018	Feb 27, 2018	100