

**4. 2018 DRINKING WATER QUALITY MANAGEMENT SYSTEM ANNUAL
MANAGEMENT REVIEW REPORT AND OPERATIONAL PLAN**

**RAPPORT ANNUEL DE L'EXAMEN PAR LA DIRECTION ET PLAN
D'EXPLOITATION EN VERTU DE LA NORME DE GESTION DE LA
QUALITÉ DE L'EAU POTABLE DE 2018**

COMMITTEE RECOMMENDATIONS

That Council:

- 1. Receive the 2018 Drinking Water Quality Management System Annual Management Review Report;**
- 2. Endorse the Drinking Water Quality Management System Operational Plan.**

RECOMMANDATIONS DU COMITÉ

Que le Conseil :

- 1. prenne connaissance du Rapport annuel de l'examen par la direction et plan d'exploitation en vertu de la Norme de gestion de la qualité de l'eau potable de 2018;**
- 2. entérine le Plan d'exploitation en vertu de la Norme de gestion de la qualité de l'eau potable.**

DOCUMENTATION / DOCUMENTATION

1. Director's Report, Water Services, Public Works and Environmental Services Department dated 6 September 2019 (ACS2019-PWE-WTS-0018).

Rapport de la Directrice, Services d'eau, Direction générale des travaux publics et de l'environnement, daté le 6 septembre 2019 (ACS2019-PWE-WTS-0018).

2. Extract of Draft Minute, 17 September 2019 – *See previous item.*

Note: This item was considered in conjunction with EPWWM Council Report 5, Item No. 3, *Lead Pipe Replacement Program Update* (ACS2019-PWE-GEN-0013).

Étrait de l'ébauche du procès-verbal, le 17 septembre 2019 – *Veuillez voir le point précédent.*

Nota : Ce point est examiné parallèlement au point n° 3 du rapport au Conseil du PEEGD n° 5, « *Actualisation du programme de remplacement des conduites de branchement en plomb* » (ACS2019-PWE-GEN-0013).

**STANDING COMMITTEE ON
ENVIRONMENTAL PROTECTION,
WATER AND WASTE MANAGEMENT**

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**COMITÉ PERMANENT DE LA
PROTECTION DE
L'ENVIRONNEMENT, DE L'EAU ET
DE LA GESTION DES DÉCHETS
RAPPORT 5
LE 25 SEPTEMBRE 2019**

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**Report to
Rapport au:**

**Standing Committee on Environmental Protection, Water and Waste Management
Comité permanent de la protection de l'environnement, de l'eau et de la gestion
des déchets**

17 September 2019 / 17 septembre 2019

**and Council
et au Conseil**

25 September 2019 / 25 septembre 2019

**Submitted on September 6, 2019
Soumis le 6 septembre 2019**

**Submitted by
Soumis par:**

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Department / Directrice, Services d'eau, Direction générale des travaux publics et de
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Ward: CITY WIDE / À L'ÉCHELLE DE LA VILLE File Number: ACS2019-PWE-WTS-0018

**SUBJECT: 2018 Drinking Water Quality Management System Annual
Management Review Report and Operational Plan**

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**OBJET: Rapport annuel de l'examen par la direction et plan d'exploitation en
 vertu de la Norme de gestion de la qualité de l'eau potable de 2018**

REPORT RECOMMENDATIONS

That the Standing Committee on Environmental Protection, Water and Waste Management recommend that Council:

- 1. Receive the 2018 Drinking Water Quality Management System Annual Management Review Report;**
- 2. Endorse the Drinking Water Quality Management System Operational Plan.**

RECOMMANDATIONS DU RAPPORT

Que le Comité permanent de la protection de l'environnement, de l'eau et de la gestion des déchets recommande au Conseil :

- 1. de prendre connaissance du Rapport annuel de l'examen par la direction et plan d'exploitation en vertu de la Norme de gestion de la qualité de l'eau potable de 2018;**
- 2. d'entériner le Plan d'exploitation en vertu de la Norme de gestion de la qualité de l'eau potable.**

EXECUTIVE SUMMARY

The Drinking Water Quality Management System (DWQMS) was adopted provincially in 2002. A requirement of the DWQMS is to conduct an annual management review on the implementation and performance of the quality management system, to ensure that the result are communicated to the Owner (Council).

Overall, the City has successfully implemented its DWQMS Operational Plan. There are a total of 16 topics that must be considered in the annual management review. A full list of recommended action items can be found in Document 1 – 2018 Management Review Action Items.

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As previously reported in 2016 and 2017, the trend for nitrate levels has gradually increased by approximately 0.30 - 0.40 mg/L every year but levelled off in 2017 and 2018. The current concentration of 4.30 mg/L is within the safe drinking water standard for nitrate. A project is currently underway to drill two new deeper source wells for the Shadow Ridge system to resolve the nitrate issue.

Due to increasing concerns about health impacts from lead, on March 8, 2019, Health Canada published a more stringent guideline of 5 parts per billion (ppb) for lead in drinking water compared to the previous guideline of 10 ppb. The Province will likely be adopting the new 5 ppb guideline, although implementation timelines have not been announced. Although Ottawa's tap water is lead free, small amounts of lead can dissolve during transport through lead service pipes and/or household plumbing and tap fixtures.

Accordingly, the City conducted a 4-year pilot of research experiments to determine a new treatment strategy to meet the new standard. Based on the study, a low-dose phosphate strategy has been selected for both treatment plants. Phosphate has been widely used in North America for corrosion control and is considered a best practice for drinking water supplies in older cities with lead service pipes. Ottawa Public Health was engaged in the research pilot and has provided comment in this report speaking to the health impacts of phosphate in drinking water.

BACKGROUND

In 2002, Justice Dennis O'Connor published Part Two of the Report of the Walkerton Inquiry, which recommended the adoption of a quality management approach for municipal drinking water systems. The report also recommended that a quality management standard, specifically designed for drinking water systems, be developed and implemented in Ontario; thus, leading to the creation of the Drinking Water Quality Management Standard (DWQMS). The requirement to implement the DWQMS is now mandated through the [Safe Drinking Water Act, 2002](#).

As the Owner of the municipal drinking water systems, Council has a number of duties and responsibilities under the [Safe Drinking Water Act, 2002](#), described in sections 11, 13, 16 and 17 of the Act. The duties of the Owner related to the Standard of Care are

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described under Section 19 and came into force on December 31, 2012. In order to ensure that City Councillors were made aware of their duties and responsibilities under the Act, staff organized a Technical Briefing of newly elected City Councillors on November 15, 2018.

In his 2002 report, Justice O'Connor further commented that municipalities who had an accredited Operating Authority would be making a significant step in meeting the owner's due diligence and responsibilities under the Act. One of the primary tools that the Owner has in place to satisfy the Standard of Care under the Act is to have Municipal Drinking Water Licences for all its drinking water systems. The elements of each Licence include:

- A permit to take water;
- A drinking water works permit;
- An operational plan;
- A financial plan; and
- An accredited operating authority.

The City of Ottawa has valid licences for all seven of its drinking water systems:

- Central System (Britannia and Lemieux water purifications plants and water distribution system);
- Carp Communal Well System;
- Vars Communal Well System;
- Kings Park (Richmond) Communal Well System;
- Munster Hamlet Communal Well System;
- Richmond West Well System; and
- Shadow Ridge (Greely) Communal Well System (This well system is not owned by the City, but the City of Ottawa is the Operating Authority).

The Richmond West Well System is a newly constructed system that was commissioned on July 26, 2019. The City will assume ownership of the system in Fall 2019.

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The City of Ottawa received the first phase of DWQMS accreditation effective April 29, 2009 (Limited Scope – Entire DWQMS), with Full Scope accreditation on October 3, 2011, then re-accreditation on September 4, 2014 and again on October 2, 2017. Results of the 2017 external audit demonstrated zero findings of non-conformance. The third party accreditation body conducts their surveillance audits of the City's Quality Management System (QMS) annually between the years when re-accreditation is required. The Richmond West Well System underwent a Limited Scope Audit in 2018 and a Full Scope Audit was completed in early 2019 to fulfill the DWQMS accreditation requirements, both of which resulted in zero findings of non-conformance.

A requirement of the DWQMS is to conduct an annual management review of the QMS and to ensure that the results of this review are communicated to the Owner (Council) by Top Management. Top Management is a term defined in the DWQMS as,

“A person, persons or a group of people at the highest management level within an operating authority that makes decisions respecting the QMS and recommendations to the owner respecting the subject system or subject systems.”

Thus, Top Management at the City of Ottawa includes the General Manager of Public Works and Environmental Services (PWES) Department, the Director of Water Services and other select Managers within PWES and Water Services. Top Management is responsible to make recommendations to the Owner regarding the drinking water systems and the QMS.

The main purpose of this report is to provide Council, as the Owner of the municipal drinking water systems, with an update on the implementation and the performance of the QMS in 2018 and seek endorsement of the DWQMS Operational Plan.

DISCUSSION

The DWQMS is the key tool that supports and assures Council, as the Owner of the drinking water systems, that it is meeting its duties and responsibilities under the [Safe Drinking Water Act, 2002](#) and the Statutory Standard of Care (section 19).

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As a requirement of the Operational Plan, a comprehensive review of the QMS must be undertaken annually by Top Management. This requirement is completed as part of the Management Review, which entails a series of meetings attended by Top Management where specific items are reviewed for the past year. This review and any recommendations for improvement are included within the Management Review reports prepared each year.

Overall, the City of Ottawa has successfully implemented its Operational Plan. Some examples that demonstrate this achievement in 2018, as documented in the Management Review report, include:

- City's Water Services has successfully implemented a robust Drinking Water Quality Management System starting in 2008. The program is well established, well managed, with high staff engagement and commitment;
- Continued excellent external audit results have been received since its initial accreditation in 2009. In August 2017, the third-party accreditation body (NSF International Strategic Registrations) conducted their on-site re-accreditation audit of the City's DWQMS. Audit results demonstrated zero findings of non-conformance.
- Successful accreditation of the new system, Richmond West Well System, with the completion of a Limited Scope Transitional Audit in 2018 and a consequent Full Scope Audit completed in May 2019. The Richmond West Well System is now fully accredited, as required by the Ministry of the Environment, Conservation and Parks (MECP).
- Continued positive trend in the completion of preventive maintenance for the City's drinking water treatment facilities. The completion of the planned preventive maintenance program remains a key priority, for Water Production's maintenance teams, with a completion rate of 98% in 2018.
- The Large-Diameter Watermain Condition Assessment Program completed 8.2 km in 2018 exceeding the 5 km target that was established by the previous Term of Council.

All of these efforts reinforce the fact that the City of Ottawa produces and delivers some of the best quality and safest drinking water in the world.

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There are a total of 16 topics that must be considered in the annual management review (Table 1). This report provides an update to only those items that require attention. All other items not discussed in this report have either been reported to Council previously or the items have been reviewed and determined to be in compliance with all regulations or in conformance with the Operational Plan. A full list of recommended action items as a result of the 2018 Management Review can be found in Document 1 – 2018 Management Review Action Items.

Table 1 - List of Items for Annual Review that will be discussed in this report

Management Review Topic	Summary
Incidents of regulatory non-compliance	Not required this year (refer to ACS2019-PWE-GEN-0009)
Incidents of adverse drinking water tests	Not required this year (refer to ACS2019-PWE-GEN-0009)
Deviations from critical control point limits and response actions	Not required this year
Effectiveness of the risk assessment process	Not required this year
Results of audits (internal and external)	Not required this year
Results of relevant emergency response testing	Not required this year
Operational performance	Not required this year
Raw water supply and drinking water quality trends	Yes, see below
Follow-up action items from previous management reviews	Not required this year

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Status of management action items identified between reviews	Not required this year
Changes that could affect the QMS	Yes, see below
Summary of consumer feedback	Not required this year
Resources needed to maintain the QMS	Not required this year
Results of the infrastructure review	Yes, see below
Operational plan currency, content and updates	Not required this year
Summary of staff suggestions	Not required this year

Raw water supply and drinking water quality trends

As previously reported in the 2016 and 2017 DWQMS Annual Reports ([ACS2017-PWE-GEN-0029](#) and [ACS2018-PWE-GEN-0017](#), respectively), the trend for nitrate has gradually increased by approximately 0.30 – 0.40 mg/L every year but levelled off during 2017/2018. If the trend continues at the historical rate, the source wells will reach the drinking water MAC (maximum acceptable concentration) of 10 mg/L in 12 - 15 years. However, the current concentration of 4.30 mg/L is within the safe drinking water standard (MAC) for nitrate.

In order to provide a long-term solution for the nitrate issue, the City is working on a project to drill new well sources located deeper into the aquifer. The focus during 2019 is to review the quality of the water from the deeper aquifer to confirm the suitability as the source water to supply Shadow Ridge. Test wells are being drilled on the new property where we expect to construct the new production wells. A functional design and construction activities is expected to continue into 2020.

Revisions to the Drinking Water Quality Management Standard

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On April 6, 2017, the MECP released the final policy decision for revisions to the [Standard on the Environmental Bill of Rights](#) (EBR) website. The revisions were mostly administrative in nature and were incorporated into the City's DWQMS Operational Plan during 2018 and released in 2019.

Lead in drinking water

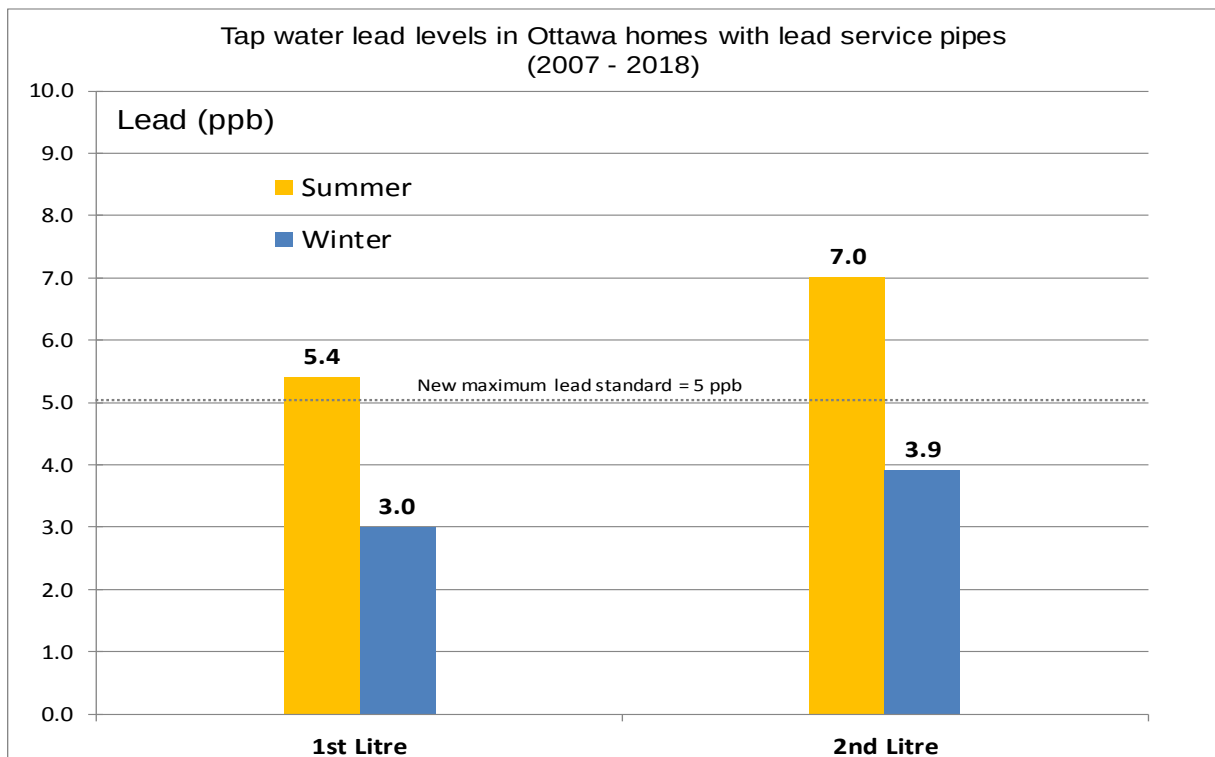
Due to increasing concerns about health impacts from lead, on March 8, 2019, Health Canada published a new more stringent guideline of 5 ppb for lead in drinking water, expressed as a Maximum Acceptable Concentration (MAC). The new guideline included the provision of ALARA (as low as reasonably achievable) to encourage water providers to make every effort to minimize lead exposure.

The Province will be adopting the new 5 ppb standard for lead, although an implementation timeline has not yet been announced. Since 2007, the City has conducted extensive monitoring of tap water lead concentrations as per [O.Reg.17003 Schedule 15.1](#).

Although Ottawa's water supply is lead-free, small amounts of lead can be dissolved during transport through lead service pipes and/or household plumbing and tap fixtures. Using the current corrosion control method (pH adjustment), the City has passed all 22 rounds of semi-annual testing complying with the previous 10 ppb standard. However, we will not meet the new 5 ppb guideline. The figure below shows tap water lead concentrations for a home supplied by a lead service pipe, based on Litre-1 and Litre-2 "standing" samples taken after a period of 30 minutes sitting stagnant in household plumbing. The values shown are 90th percentile lead concentrations which are the basis of regulatory compliance:

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Figure 1 - Average Lead Concentrations



Accordingly, the City has conducted 4-years of pilot research experiments to determine a new treatment strategy. Based on the study, a low-dose phosphate strategy has been selected for both treatment plants, with design scheduled to begin in 2019. Once completed, the City will be adding a trace amount of phosphate (0.3 mg/L as P) into the treated drinking water to form a protective scale that minimizes the occurrence of lead and other heavy metals in tap water. Phosphate has been widely used in North America for corrosion control and is considered a best practice for drinking water supplies in older cities with lead service pipes, including Toronto, Hamilton, and Halifax. This treatment strategy also provides enhanced protection of Ottawa's metallic watermain distribution system.

Design costs for the new water treatment process of adding phosphate are estimated to be \$1M. Construction costs, including chemical storage tanks, pumps, piping and related control equipment, are estimated to be \$5.5M. These costs are included in the approved 2019 Rate Supported Capital Budget, with \$500,000 identified for design

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during 2019. Annual operating costs for the new treatment process are estimated to be \$400,000 per year to cover chemicals and maintenance. These expenditures will be included in future Rate Supported Operating Budgets.

In addition, revisions to the Lead Pipe Replacement Program and outreach communications were reviewed by staff and will be brought forward to Committee and Council for approval concurrently with this report (ACS2019-PWE-GEN-0013). These measures will assist residents to replace lead service pipes and minimize their exposure to lead in tap water. It is estimated that the LPRP's current annual authority of \$1M will be sufficient to cover the cost of the updates and renewed interest in the program.

New Well System – Richmond West

A new well system was commissioned in Richmond West in 2019. As a result of this new drinking water system, efforts have been underway to update and/or obtain documents and records, including SOPs, Municipal Drinking Water Licenses and Permits, Source Protection approvals and third party accreditation. As a recommendation of this report, PWES recommends obtaining Council endorsement of the revised DWQMS Operational Plan, which will include the existing drinking water systems and the new Richmond West Well System.

Results of the infrastructure review

The [Office of the Auditor General Annual Report \(2012\)](#) recommended that a summary of inspections on critical water transmission mains, including an action plan for correction of pipes identified to be in very poor condition be provided as part of the Drinking Water Quality Management System annual report.

Beginning in the 2013 DWQMS annual report to Council, management has responded with a summary of inspections on critical water transmission mains and an action plan for the correction of pipes identified to be in poor condition.

In order to continue meeting the recommendation made by the Office of the Auditor General, a summary of the Large Diameter Watermain Condition Assessment results

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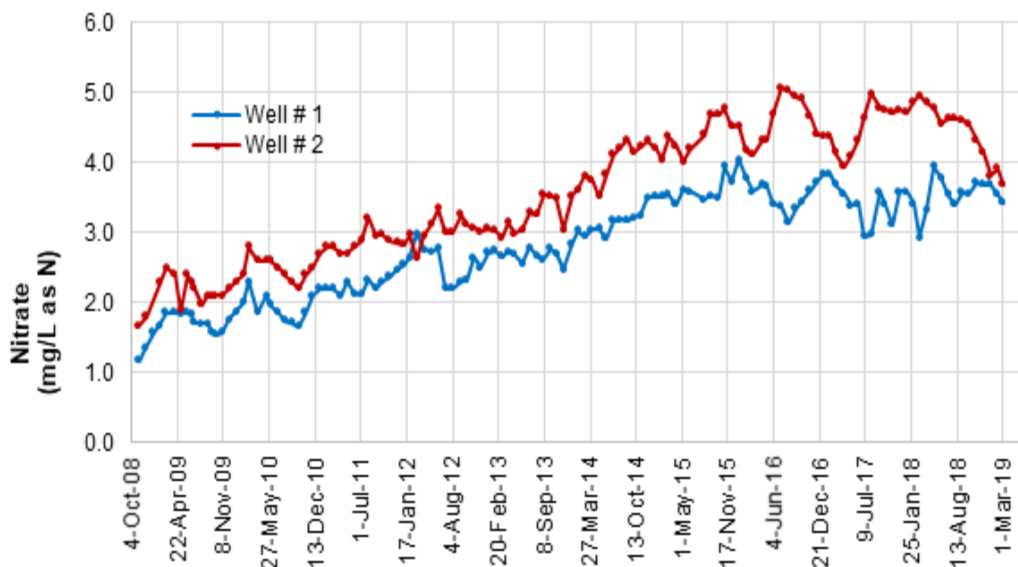
and follow-up activities is described in Document 2 - 2018 Large Diameter Watermains Inspection Results and Corrective Action Plans.

Next Steps

Staff will continue to provide safe drinking water and ensure all legislation is followed under the [Safe Drinking Water Act, 2002](#). Staff will also be implementing the action items identified as part of the 2018 Management Review.

RURAL IMPLICATIONS

As previously discussed, there is evidence of an increasing trend in nitrate concentration in the ground water wells in Shadow Ridge. The trend for nitrate has gradually increased by approximately 0.30 – 0.40 mg/L every year but has levelled off during 2017/2018. The trend graph below shows the nitrate concentration in each of the source wells for Shadow Ridge, 2008 - 2019:



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While nitrate levels are still well-below the 10 mg/L Maximum Acceptable Concentration (MAC) for Ontario Drinking Water, the City is working on a project to drill new well sources located deeper into the aquifer.

As this community is part of Ward 20, the Ward Councillor has been kept apprised of the City's on-going efforts to address the water quality of the well systems in Shadow Ridge. Staff have been actively engaging with residents through the Councillor, keeping them informed of the City's long-term plans to ensure a sustainable good quality source of water in the Shadow Ridge Community.

CONSULTATION

Ottawa Public Health (OPH) is supportive of improving Ottawa's corrosion control strategy through the addition of phosphate. It is understood that a low dose of phosphate in the treated water supply will further minimize exposure to lead in drinking water, particularly in older homes that are supplied by lead service pipes. It is also understood that this change will provide corrosion protection for the City's metallic watermain.

Health Canada sets out Recommended Dietary Intake (RDI) levels for phosphorus in the range of 460 to 1250 mg per day depending on age, sex, and pregnancy. The proposed amount of 0.3 mg/L phosphate (as phosphorus, P) to be added to drinking water would be considered a trace level by comparison. Because phosphates are considered nutrients and have a margin of safety far exceeding any conceivable concentrations in potable water, OPH supports the use of phosphate in Ottawa's water supply to minimize exposure to lead from tap water.

COMMENTS BY THE WARD COUNCILLOR(S)

This is a City-wide report.

ADVISORY COMMITTEE(S) COMMENTS

There was no advisory committee consultation as part of this report.

LEGAL IMPLICATIONS

There are no legal implications associated with receiving this report.

RISK MANAGEMENT IMPLICATIONS

All risks associated have been identified and explained in the report and are being mitigated by the appropriate staff.

ASSET MANAGEMENT IMPLICATIONS

The recommendations documented in this report are consistent with the City's Comprehensive Asset Management (CAM) Program objectives.

The Drinking Water Quality Management System considers asset management system elements that help inform decision making processes necessary to protect Ottawa's drinking water system and reduce public health risks.

FINANCIAL IMPLICATIONS

There are no financial implications associated with this report.

ACCESSIBILITY IMPACTS

There are no accessibility impacts associated with this report.

ENVIRONMENTAL IMPLICATIONS

The development of the QMS is provincially legislated under the [Safe Drinking Water Act, 2002](#). The QMS has been reviewed by a third-party accreditation body and the City of Ottawa has obtained its Operating Authority Accreditation. This report also fulfills the legislative requirement to report on the Annual Management Review of the QMS to the Owner.

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TECHNOLOGY IMPLICATIONS

There are no technology implications to this report.

TERM OF COUNCIL PRIORITIES

ES1 – Support an environmentally sustainable Ottawa.

GP2 – Advance management oversight through tools and processes that support accountability and transparency.

SUPPORTING DOCUMENTATION

Document 1 - 2018 Management Review Action Items

Document 2 - 2018 Large Diameter Watermains Inspection Results and Corrective Action Plans

Document 3 - DWQMS Operational Plan

DISPOSITION

Staff will continue to work to provide safe drinking water, following all legislation. Staff will implement any direction received as a result of this report. ^[OBJ]