## 8. Drinking Water Initiatives

### I. General Initiatives

**Water Quality Management Plan**

The Region of Peel (the Region) developed a Total Water Quality Management Plan in 2002 to guide decision-making with regards to best management practices of drinking water quality. The plan includes source water protection as well as decisions on how new and upgraded water treatment, transmission and distribution infrastructure will be planned, designed, constructed and commissioned over the next 20 years to support the development of a growing community.

**Source Water Protection**

In May 2000, the safety of Ontario's drinking water became the focus of concern when the municipal drinking water supply in Walkerton became contaminated with *E. coli* and *Campylobacter* bacteria. A public inquiry, led by Justice Dennis O'Connor, reviewed the events in Walkerton and made 121 recommendations to ensure clean and safe municipal drinking water, including robust legislation such as the *Safe Drinking Water Act, 2002* and the *Clean Water Act, 2006.*

*The Clean Water Act, 2006* and associated regulations aim to protect existing and future sources of drinking water from contamination and overuse. Source water protection is intended to be a shared responsibility of all stakeholders and is a key element of the multi-barrier approach from source to tap. The source protection process is driven by locally-based source protection committees comprised of municipal, industrial, commercial, agricultural and public representation. The Region is a stakeholder across three Source Protection Regions, including Halton-Hamilton (H-H), Credit Valley-Toronto and Region-Central Lake Ontario (CTC) and South Georgian Bay Lake Simcoe (SGBLS) and is responsible for implementing various policies in the approved source protection plans.

Technical studies on both groundwater and surface water (Lake Ontario) vulnerable areas and threats to municipal drinking water sources are summarized in science-based assessment reports which are used to support the development of local source protection plans and policies. The assessment reports and source protection plans are "living documents" expected to be amended as new information becomes available or as necessary to reflect changes to drinking water supply sources and legislation.

For more information on the Region's Source Protection Program, please visit www.peelregion.ca/sourcewater

## PRIVATE WELL ABANDONMENT PROGRAM

The Region implemented a Private Well Abandonment Program for decommissioning of old, unused private wells within the Region. This work is performed in accordance with the requirements of the Ontario Regulation 903 under the *Ontario Water Resources Act, 1990*. The program intends to gradually eliminate potential pathways of groundwater contamination in areas where groundwater is a source for drinking water. The program is carried out on a first come, first serve basis, with each well decommissioning request being evaluated for program eligibility prior to the commencement of any decommissioning work.

A total of 56 private wells throughout the Region were decommissioned under this program in 2018 (see Figure 1), with a number of wells waitlisted for completion in early 2019. Participation in this program is promoted through public awareness in the forms of events, newspaper ads, electronic newsletters, mobile road signs, as well as outreach to local community centers and local real estate firms to help promote the program to individuals living within or moving into rural areas of the Region. Also, internal outreach to groups within the Region, and providing education about the Private Well Abandonment Program, helps maximize opportunities for rural residents to take advantage of the program (see Figure 2).

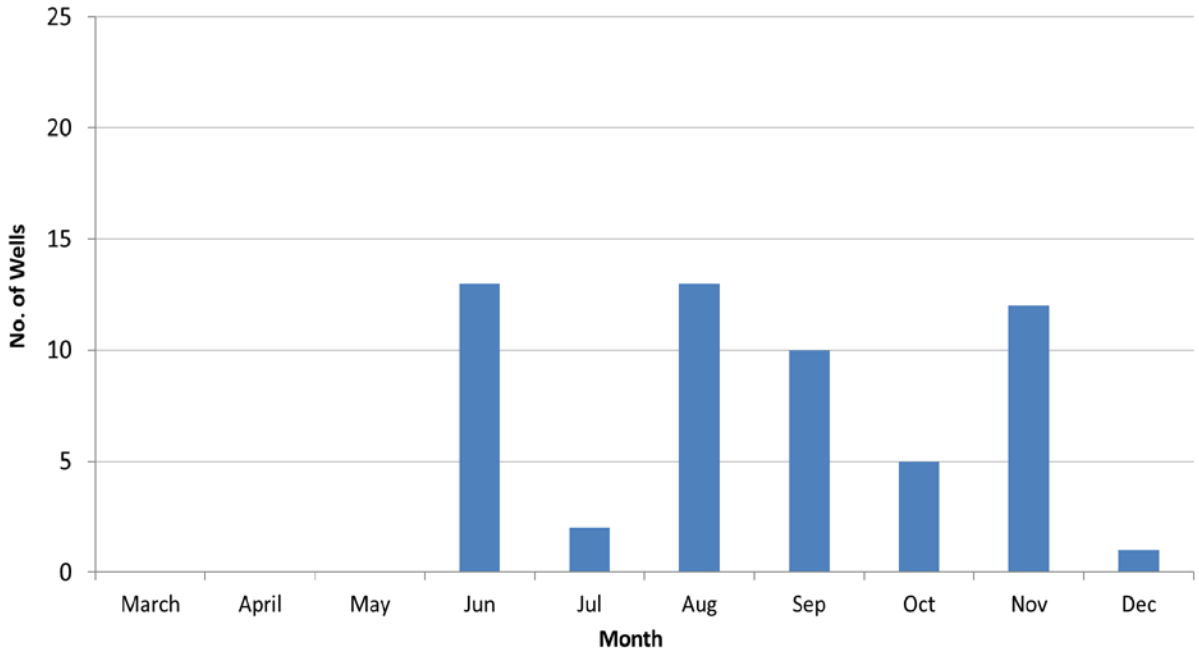


**FIGURE 1: TOTAL NUMBER OF WELLS DECOMMISSIONED IN 2018**

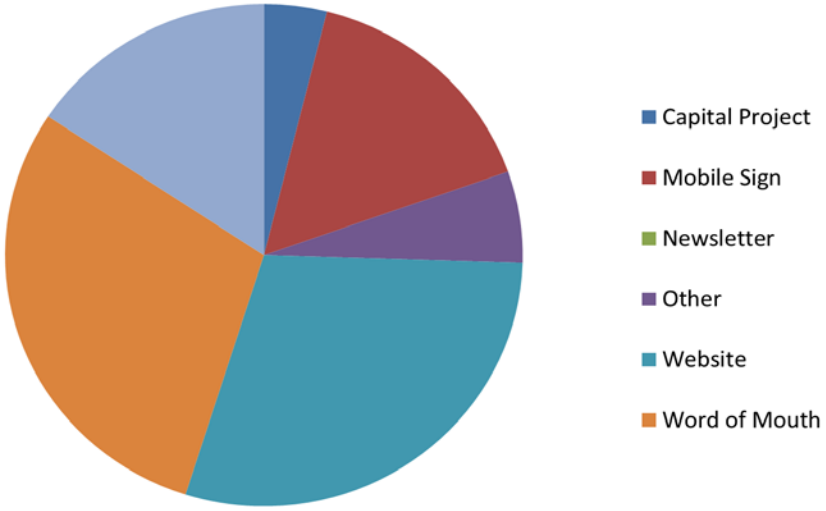


**FIGURE 2: PROGRAM PARTICIPATION RESULTS IN 2018**

For more information on the Region's Private Well Abandonment Program, please visit http://www.peelregion.ca/pw/water/water-trtmt/wellhead-abandon.htm or e-mail zzg-sourcewater@peelregion.ca.

## MUNICIPAL DRINKING WATER LICENSING PROGRAM

Under the *Safe Drinking Water Act, 2002* (the Act), all municipal residential drinking water system owners in Ontario must have a Municipal Drinking Water Licence (the Licence) to operate their system(s). In order to be issued a Licence, the Ministry requires owners to have the following five prerequisites:

### I. DRINKING WATER WORKS PERMIT (DWWP)

A permit describing the drinking water system and giving authority to establish or alter a drinking water system. The Region holds a valid DWWP for each of its five (5) drinking water systems.

### II. PERMIT TO TAKE WATER (PTTW)

A valid permit to take water issued under the *Ontario Water Resources Act* specifying the approved rate of water taking. The Region holds a valid PTTW for each of its drinking water sources.

### III. AN ACCEPTED OPERATIONAL PLAN

The Operational Plan defines and documents the Quality Management System (QMS) for the Region's drinking water systems in accordance with the requirements of the Ministry's Drinking Water Quality Management Standard

(DWQMS). The Operational Plan outlines the Region's commitments through the QMS policy, along with associated procedures, responsibilities and evaluation criteria that ensure quality drinking water supply. In February of 2017, the Ministry released version 2.0 of the DWQMS. The key changes to the Standard included added consideration of risk of climate change in water infrastructure planning and enhanced approach to continual improvement. As a result, the Region updated the Operational Plan to align with the new Standard and met the requirement of its completion by the end of 2018

## IV. Accredited Operating Authority (Third-Party Audit of the QMS)

Municipal residential drinking water system owners must ensure that at all times, an accredited operating authority is in charge of the drinking water systems. The Region owns five large municipal residential drinking water systems. As the operating authority of the South Peel Distribution System, and the four groundwater systems in Caledon (Caledon Village - Alton, Cheltenham, Inglewood, Palgrave - Caledon East). The Region became an accredited Operating Authority for these systems in August 2011 and has been successfully maintaining accreditation since then. The Ontario Clean Water Agency (OCWA), under contract, operates the Lakeview and Lorne Park Water Treatment Plants as well as the South Peel Transmission and Pumping System. OCWA has been, and remains, an accredited Operating Authority since July 2013.

Full Scope Accreditation recognizes that the operating authority has a QMS in place that conforms to the DWQMS as documented in the Operational Plan.

The Ministry has designated two accreditation bodies under the Act, and the Region works with the third-party auditor, SAI Global, who provides accreditation auditing services. Continuance of accreditation is based on a three-year review cycle comprised of annual offsite surveillance audits in years one and two; and an offsite systems audit followed by an onsite verification (reaccreditation) audit in year three. The offsite (year one) surveillance audit for DWQMS reaccreditation was completed by SAI Global in March 2019, which included documentation and records review. The auditor recommended continuation of accreditation. The next third-party surveillance audit (year two) will be conducted in the winter of 2020.

## V. Financial Plan

Ontario Regulation 453/07 Financial Plans mandates municipal drinking water system owners to prepare a long-term strategy to ensure the financial sustainability of drinking water systems. The Financial Plan for the drinking water systems was first prepared and approved by Council Resolution in June 2010 and submitted to the Ministry of Municipal Affairs and Housing (MMAH). The Financial Plan forecasts a period of at least six years and, at a minimum, must be updated and approved by Council Resolution and resubmitted to the MMAH every five years prior to an application for the renewal of the municipal drinking water licence. Pursuant to the Municipal Drinking Water Licence renewal applications, an update to the Financial Plan (2019 to 2024) has been prepared and endorsed by Council in March 2019. Council resolution will be submitted,

along with the endorsed Financial Plan, in May 2019 to the MMAH satisfying the requirements under Ontario Regulation 453/07.

### SUMMARY OF APPROVALS AND PERMITS

The Region holds valid approvals and permits, has satisfied all DWQMS accreditation requirements of the Municipal Drinking Water Licensing Program, and has been operating all its municipal drinking water systems in accordance with the approvals framework under the Act. Municipal Licences are valid for five years. To ensure continued authority to operate, owners are required to renew the Licences before the expiry date and renewal application deadline. The Region's current Licences are due to expire in November 2019, and the application process for their renewal has been started. To ensure a Licence remains current, amendments and reissues occur from time to time to reflect alterations to the drinking water system and/or changes to system-specific conditions.

For more information on the Region's Municipal Drinking Water Licensing Program, please visit the following link: www.peelregion.ca/pw/water/quality/dwqms-peel

## QUALITY MANAGEMENT SYSTEM PROGRAM INITIATIVES FOR 2019

The Region strives for continual improvement and progress is regularly assessed through various evaluation measures including internal and third-party audits; risk assessments; emergency preparedness and response testing; consumer feedback; staff suggestions; and the management review process. The Region is committed to the effective management of drinking water systems to provide safe, high-quality water that consistently meets the Ontario drinking water legislative standards and requirements and that incorporates the needs and expectations of customers. Continuation of this proactive approach throughout 2019 includes:

- Maintaining and continually improving the Drinking Water Quality Management System
- Implementing tools that allow more effective tracking of opportunities for improvement, incidents of non-conformance, and results of systematic processes identifying root causes of events.
- Advancing in emergency prevention, preparedness planning, response testing and recovery
- Monitoring and reporting of key performance indicators to identify priorities and optimize processes
- Building and maintaining Root Cause Analysis (RCA) processes
- Documenting and implementing best management practices and industry standards
- Improving communication to interested stakeholders on our QMS commitment of providing quality water supply and maintaining the integrity of drinking water systems

The Region continues to exercise the level of care, diligence and skill required to operate and manage its drinking water systems. This includes staff complying with the training and competency requirements under the Act as well as maintenance of the Region's water system accreditation to the Ontario DWQMS. Questions and comments on the Region's Drinking Water Quality Management System can be submitted through email to DWQMS@peelregion.ca

## WATER QUALITY OPTIMIZATION PROGRAM

Water quality control in the South Peel Distribution System is provided by the secondary disinfection process involving addition of chlorine to the finished water at the Lakeview and Lorne Park Water Treatment Plants. Maintaining an adequate level of chlorine residual in the distribution system is required by the Act to prevent waterborne illness from disease-causing microorganisms and protect public health. The Region optimizes secondary disinfection by implementing booster re-chlorination at strategic locations within the distribution system to compensate for the chlorine decay that occurs over time as water moves further from the water treatment plants. Booster chlorination provides a more even level of chlorine residual throughout the water system and improves residual in the peripheral areas of the distribution system. Re-chlorination takes place at Becket Sproule, Airport Road, North Brampton, and Bolton South Booster Pumping Stations. Construction of a re-chlorination system at the Meadowvale North Pumping Station was completed in 2018 and will be placed into service in 2019.

The Region monitors water quality in the distribution system to ensure that regulatory standards are maintained for chlorine residual in drinking water through the hydrant flushing. This program addresses areas of lower water demand and watermain dead ends where chlorine residuals are likely to be lower.

The Region completed its first ever water quality model in 2012. The model was used to propose a chlorination strategy for the South Peel water supply system in 2013, which was initiated in early 2014. The strategy focuses on reducing excess chlorination from the water treatment plants (Lakeview and Lorne Park) by optimizing re-chlorination at existing and proposed future booster chlorination points in the distribution system.

The water quality model was updated last in 2015. The hydraulic modelling results can also be used as a tool in the implementation of various operational and water quality initiatives. The next water quality model update is planned to take place in 2020.

## WATER AND WASTEWATER MASTER PLAN

The Region's long-term servicing plan is guided by a Water and Wastewater Master Plan that was finalized in 2013. A study has since been initiated, by a multi-disciplinary project team, to evaluate, update and build upon the current

2013 Master Plan for its lake-based systems (where Lake Ontario is the source of drinking water and the discharge point for treated wastewater). The Water and Wastewater Master Plan study is being undertaken as part of the Region's growth management work, which strives to ensure an integrated approach to planning for land use, transportation, infrastructure and finance.

The objective of the study is to identify long-term servicing plans for the Region's lake-based water and wastewater systems to support growth to 2041, and to consider longer-term servicing needs for growth beyond 2041. The study follows the master planning process of the Municipal Engineer's Association. The Master Plan will follow Approach #1 which will fulfill the requirements for Schedule A and A+ projects and become the basis for future investigations for specific Schedule B and C projects. This study is expected to be completed by the end of 2019.

## CRITICAL WATER USERS PROGRAM

The Region developed and maintains a Critical Water Users (CWU) Program to identify the location of individuals who use the municipal water supply to operate healthcare devices (such as for kidney haemodialysis) at home. This allows Region staff to provide direct notice of water supply interruption to these individuals when planned maintenance or emergency repairs to the drinking water system are required. With this notification system in place, CWU's are better able to make appropriate arrangements for their healthcare needs.

Program development spanned several years, with input from various internal and external stakeholders, as well as consultation with external healthcare organizations. The program launched in January 2015 and was updated based on staff suggestions and additional improvements in 2018. This program has been incredibly well received by health care professionals and the Region's critical water users.

While the CWU Program does not guarantee uninterrupted water supply, it allows Region staff to identify the whereabouts of critical water users, provide notification, and adjust work schedules appropriately.

## REGION OF PEEL WATER BY-LAW 20-2017

In January 2017, Regional Council approved the enactment of a new Water By-law to replace the outdated Water By-law No. 9-73. This new by-law, which came into effect April 1, 2017, provides a tool to manage the use of the Region's municipal dinking water systems that aligns with drinking water legislation and current water operations management. It supports the Region's vision to preserve, protect and enhance our natural environment and resources by ensuring the uses and condition of the water system do not have an adverse effect on the operation, repair, replacement or maintenance of the water works system.

The new Water By-law:

- Safeguards the Region's drinking water and protects public health by strengthening key elements of the Water Division's support programs
- Clarifies ownership and maintenance responsibilities through revised definitions and user-friendly language
- Enhances enforcement provisions and implements penalties for by-law violations
- Ensures consistency with current provincial by-law drafting guidelines
- Protects the Region's water infrastructure assets

### HOW DOES THE NEW WATER BY-LAW AFFECT WATER QUALITY?

The new Water By-law does not regulate the Region's drinking water quality, which is regulated by the *Safe Drinking Water Act, 2002* and its legislative framework. The by-law enhances the protection of public health with measures that prevent, control and minimize potential threats in the municipal water system that could lead to potential water quality issues and contamination.

### BY-LAW ENFORCEMENT 2018 UPDATE

A minimum of 1-meter clearance is required around all municipal hydrants to provide access by fire fighting personnel to protect public safety. In 2018, a total of 445 hydrants were identified as being blocked, all of which were cleared in a combined effort by residents and Region staff.

Approximately 200 warning letters were issued for various water by-law related infractions. No charges were laid, or tickets issued, indicating that matters were resolved in a timely and amicable fashion. Several instances of water theft were reported and investigated. Water haulers, companies or individuals that have been found to be illegally connecting trucks or tanks to the municipal drinking water system, without approval and adequate backflow prevention to protect the public water supply, are subject to recourse and action, including fines.

## WATER QUALITY SAMPLING STATIONS

The Region has installed drinking water sampling stations that allow for monitoring of water quality in the distribution system. The sampling stations are located at selected points throughout the network of municipal watermains and ensure the water samples collected accurately represent the drinking water supplied to the consumers.

The sampling stations allow the Region to meet its commitments to water quality with the least impact to its customers.

Additional sampling station installations are planned in conjunction with the watermain renewal program and capital projects, as well as in areas of new development. The number of sampling stations added will be determined by the population growth and drinking water system extension.

## II. NORTH PEEL DRINKING WATER SYSTEMS

### CALEDON EAST- PALGRAVE WATER SUPPLY SYSTEM

A comprehensive review of the current water supply in Caledon has identified the need for additional capacity for the Palgrave – Caledon East interconnected system to adequately supply the projected demand by the year 2031.

Exploration for new sources of water in Caledon East started in late 2018 and the study is expected to continue to early summer 2019.

A municipal Class Environmental Assessment (EA) to determine the best municipal well source is planned to start in late 2019. Design and construction timelines will be developed as part of the EA process.

Exploration for additional capacity for the Palgrave system will start in early 2019. The project includes a 72-hour pumping test on the existing Palgrave Well No. 4 to determine the potential of increasing the well's capacity or the need for a new well. If required, a new well will be drilled within the same aquifer, in the area of the Palgrave Well No. 4 water treatment facility.

### ALTON WELL NO. 4A – ALTON WELL NO. 4 REPLACEMENT PROJECT

A new municipal supply well was drilled in very close proximity to the existing Alton Well No. 4 and to a similar depth within the same aquifer. The new Alton Well No. 4A will replace the existing Well No. 4, which has been experiencing operational challenges with increased sand production and turbidity during pumping and consequently was out of service in 2018. Connection to the treatment facility is expected to be completed in 2019.

### INGLEWOOD WELL NO. 4 – INGLEWOOD WELL NO. 2 REPLACEMENT PROJECT

Inglewood Well No. 4 was drilled in August 2017 approximately 440 m from Well No. 3 and connected to the Inglewood No. 3 treatment facility in November 2018.

Upon approval from the Ministry of the amended Source Protection Plan and related monitoring conditions, the Region will initiate supply of water from the new well to the Inglewood community. It is anticipated that Well No. 4 will be in production in April 2019.

## OPERATIONAL IMPROVEMENTS

### ALTON WELLS NO. 3 AND 4 STATION IMPROVEMENT AND UV REPLACEMENT PROJECT

The Alton Well treatment facility houses Wells No. 3 and 4, process piping and treatment equipment, a standby power generator and associated electrical and control equipment. Primary disinfection is achieved through Ultraviolet (UV)

disinfection combined with sodium hypochlorite (chlorine). The UV equipment has reached the end of its useful life and requires replacement. Other improvements at the station include replacement of outdated flow meters, replacing fixed-in-place for portable standby power generation, addition of a pre-treatment filter, and overall building rehabilitation. The station improvements are expected to be completed by summer 2019.

## CHELTENHAM WELLS NO. 1 AND 2 MEDIA REPLACEMENT

The Cheltenham Water Treatment Plant achieves iron and manganese removal using oxidizing agents to form dissolved iron and manganese into particles. The water is then filtered through greensand media to physically remove the oxidized iron and manganese particulates. Due to the operational challenges in working and handling potassium permanganate as and oxidization chemical, in June 2018, the Region replaced greensand media with an alternate media (Greensand Plus+) that no longer requires the use of potassium permanganate, and now uses only sodium hypochlorite (chlorine) for oxidation. Extensive water quality monitoring was conducted during the commissioning stages, in both the treatment process and distribution system, to ensure effective iron and manganese removal was being achieved. The potassium permanganate system was fully removed from the treatment facility in October 2018.

## III. SOUTH PEEL DRINKING WATER SYSTEMS

### LAKEVIEW WATER TREATMENT PLANT (WTP) EXPANSION PROJECT

The introduction of the *Safe Drinking Water Act, 2002*, and rapid population and economic growth are key factors to the expansion and upgrades to Lakeview WTP. After more than a decade of plant expansions, it now contains some of the world's most advanced treatment technologies, offering the best protection against pathogens, addressing taste and odour concerns, and increasing water treatment capacity for our South Peel communities.

In 2018, rehabilitation of the conventional treatment plant was completed and included replacement of filter media and the addition of ultraviolet (UV) light disinfection. Future initiatives include the installation of additional standby power expected to be completed in early 2020 and will include three 4-Megawatt (MW) natural gas engines.

### LORNE PARK WATER TREATMENT PLANT (WTP) EXPANSION PROJECT

The Lorne Park WTP, delivering water primarily to the western side of Mississauga and Brampton, treats water using both a conventional treatment process and a membrane treatment process. Rehabilitation of the conventional treatment plant began in 2016 and is expected to be completed in early 2019. The work includes replacement of sedimentation tank equipment, replacement of filter media, and upgrades to various mechanical and electrical systems throughout the plant.

In 2018, process and mechanical equipment upgrades were completed, including replacement of the intake screening equipment, upgrades to the chemical systems throughout the plant, and refurbishment of the pumps. Additionally, energy efficiency initiatives have been undertaken in 2018 and will continue into 2019. This included upgrades to the lighting systems throughout the plant and installation of vehicle charging stations. Future initiatives include replacement and refurbishment of pumping station and equipment (commenced in 2018 and expected to be completed in 2020), replacement of membrane filtration equipment and upgrades to various mechanical and process equipment.

### MISSISSAUGA CITY CENTER SUB-TRANSMISSION MAIN

The Mississauga City Centre Sub-transmission watermain is 1500 mm (5 feet) in diameter and will be approximately 6.1 km in length and will carry water from Hanlan Reservoir and Pumping Station to the Mississauga city centre core area. This watermain will carry approximately 275 million litres a day. Phase 1 of this project was completed in 2018 which included construction of the watermain from the intersection of Burnhamthorpe Rd and Cawthra Rd. Phase 2, the construction of 3.5 km watermain up to Grand Park Rd, has now commenced and is expected to be completed in 2020.

## BOLTON SOUTH BOOSTER PUMPING STATION REHABILITATION PROJECT

The Bolton South Booster Pumping Station was originally designed to pump water to the next pressure zone. When the water supply was switched to lake-based in the early 2000s, this station's function was changed to reducing pressure from a higher to a lower pressure zone.

Rehabilitation of the booster station was completed in 2018 and included removal of the decommissioned booster pumps and backup power generator. Following removal of retired equipment, this station will continue to operate in its current function, providing pressure reduction between pressure zones and re-chlorination of the water supply, and will be renamed the Bolton Rechlorination Facility.

## HANLAN TRANSMISSION MAIN

The Hanlan Transmission Main was designed to support future growth and intensification in the Region and to meet water supply commitments to York Region while providing back-up for the existing Hanlan Feedermain. This 2400 mm (8 foot) diameter, 14.5 km long watermain began moving water in February 2019 from the Lakeview Water Treatment Plant to the Hanlan Reservoir located at Britannia Rd and Tomken Rd. Additional interconnections will be completed by the end of 2020.

## HANLAN RESERVOIR AND PUMPING STATION UPGRADES

The Hanlan Reservoir and Pumping Station is the second stop of the treated water from the Lakeview Water Treatment Plant. Planned electrical upgrades have been ongoing and are anticipated to be completed by the summer of 2019.

## HERRIDGE RESERVOIR AND PUMPING STATION UPGRADES

The Herridge Reservoir and Pumping Station is the first station in the distribution supply chain from the Lorne Park Water Treatment Plant. The plans have been completed to start the Herridge Pumping Station upgrades these include electrical upgrades and building expansion. The electrical upgrades portion of this project is set to commence in late 2019.

## SILVERTHORN RESERVOIR AND FEEDERMAINS

The Silverthorn Reservoir and Pumping Station, feeding Pressure Zones 2 and 3, was constructed in 1966 and is the first stop in the distribution supply chain from the Lakeview Water Treatment Plant.

Phase 1 work was completed in 2018, which included replacement of electrical and HVAC systems. Phase 2 design has been completed for the extension of the pumping station building with space for future pump installations, replacement of

electrical components and piping reconfiguration. Construction of Phase 2 is expected to begin in 2019 for completion by early 2021. Phase 3 work scope includes installation of an additional water storage reservoir cell, upgrades to the existing reservoir's overflow structure including the modification to create two separate cells, and installation of a reservoir distribution center and overflow management pond. Phase 3 is currently in the detailed design stage with an anticipated start date of late 2021 with completion expected in 2023.

## MEADOWVALE RESERVOIR PUMPING STATION UPGRADES

The Meadowvale Reservoir and Pumping Station has undergone several upgrades in the last two years. Work has been completed in 2018, including expansion of the reservoir overflow pond, replacement of pumps, and installation of a new chlorine gas re-chlorination facility. These additions were put into service upon completion, with the exception of there chlorination facility, which is expected to be in use in early 2019.

## VICTORIA RESERVOIR AND FEEDERMAINS

The Region's Water and Wastewater Master Plan (2013) identified the need for fire, equalization, and emergency water storage, using facilities not dependent solely upon a pumped water supply or the existing Snelgrove Elevated Tank to service the areas of North Brampton and Mayfield West. This water storage will be provided by a new reservoir and feedermain system for Pressure Zone 6. Detailed design of both the feedermain and reservoir projects is ongoing.

Construction of the feedermain will proceed in phases, using a combination of open cut and tunneling methods and will be staged to minimize disruption to traffic in the area.

Phase 1 of the feedermain construction is now complete, extending from the North Brampton Reservoir and Pumping Station to Old School Road in Caledon. Phase 2, which will run from Old School Road to the reservoir site, is pending budgetary approval in 2019.

The initial site preparation for the storage facility has commenced. Construction of the reservoir is anticipated to begin in 2020, pending budgetary approval, for a target completion date of 2022.

## ALLOW RESERVOIR, PUMPING STATION AND FEEDERMAIN PROJECT

Construction of the Alloa Reservoir and Pumping Station began in late 2015 to meet water demands in new development in northwest Brampton, feeding Pressure Zones 6 and 7. The Alloa Feedermain, has been constructed on Mississauga Rd and Mayfield Rd to supply this new Zone 5 reservoir from the West Brampton Reservoir and Pumping Station.

The Alloa Reservoir and Pumping Station and Alloa Feedermain are scheduled to be in service by early 2019.

## EAST BRAMPTON WATERMAIN PROJECTS

Two new watermains are in design, to support water demand in the City of Brampton:

- A 1500 mm diameter Zone 4 transmission main from Beckett Sproule Pumping Station to East Brampton Reservoir to twin with the existing East Brampton transmission main.
- A Zone 5 sub-transmission main from Beckett Sproule Pumping Station to connect to existing infrastructure south of North Park Drive, including pipe diameters of 1200 mm, 1050 mm and 900 mm along Heart Lake Road, Clark Boulevard and Dixie Road in Brampton.

Detailed design is underway and scheduled to wrap up in late 2019. Phased construction will use both tunnelling and open cut technology. Construction of Phase 1 will be commencing in late 2019, which includes the north end of both watermains, for completion in 2021. Phase 2, making up the south end of these watermains, is scheduled for construction to begin in late 2019 for completion in 2022.

## EAST BRAMPTON RESERVOIR AND PUMPING STATION

The East Brampton Reservoir and Pumping Station, originally built in 1973, is undergoing upgrades within the reservoir. Phase 1 is to install a mixing system, replace the washdown lines and improve the capacity of the overflow weir. The reservoir access building will be rebuilt as part of this project scope. This work is targeted for completion in early 2020. Phase 2 of this project consists of building an overflow pond and a reservoir distribution center which is anticipated to commence at the end of 2019.

## ZONE 5 WEST BRAMPTON WATERMAIN

Detailed design is underway for a new 900 mm Zone 5 watermain from the West Brampton Pumping Station, along Williams Pkwy, connecting to the existing Zone 5 system at optimum locations and ultimately, at Williams Pkwy and Dixie Rd, to another Zone 5 watermain proposed under the East Brampton watermain projects. This new watermain will support future growth and enhance the existing system as well as provide redundancy and security of water supply during rehabilitation/maintenance work or an unforeseen event of disruption.

Construction will take place in three phases. Phase 1 is expected to commence in early 2020, using tunnelling and open cut technology, and will be coordinated with future widening of Williams Parkway over the next five years.

## WATER DISTRIBUTION SYSTEM FLOW AND PRESSURE MONITORING STATIONS

Phase 1 of the plan was completed in 2018, including installation of permanent monitoring stations throughout the distribution system to monitor fluctuations in water pressure and to assure adequate fire flow protection and water supply. This work also included replacing flow meters at the Streetsville, Hanlan, and North Brampton Pumping Stations. Phase 2 detailed design is underway to install 27 new flow and pressure monitoring stations throughout the Region, which is expected to commence late 2019. Pressure and flow data trends will be continuously monitored and alarms for each monitoring station configured based on site-specific hydraulics and critical low and high set-points. Operator response and investigation may be undertaken, depending on the severity and duration of the event. This is yet another layer of protection in the multi-barrier approach in maintaining water supply and quality.