Canadian Nuclear Laboratories | Laboratoires Nucléaires Canadiens

Annual Compliance Monitoring Report

Port Hope Project Annual Compliance Monitoring Report for 2021

4501-508760-ACMR-004

Revision 1

Prepared by:		2023-01-09
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EXECUTIVE SUMMARY

This annual compliance monitoring report for the 2021 calendar year has been prepared as per licence condition 2.3 of the *Port Hope Long-Term Low-Level Radioactive Waste Management Project Licence WNSL-W1-2310.02/2022* (PHP Licence) [**1**] and of the *Port Hope Long-Term Low-Level Radioactive Waste Management Project Licence Conditions Handbook* (PHP LCH) [**2**] as a summary report of annual compliance monitoring and operational performance.

CNL's Historic Waste Program Management Office and the Port Hope Area Initiative projects are situated on the treaty lands of the Williams Treaties First Nations, specifically the treaty signed with the Mississauga First Nations of Alderville, Curve Lake, Hiawatha and Scugog Island.

The Mississauga First Nations are also signatories to various 18th and 19th century treaties that covered lands in different parts of south-central Ontario. In 1923, the Mississauga First Nations and the Chippewa First Nations consisting of Rama, Beausoleil and Georgina Island signed the Williams Treaties and together, over 90 years later in June 2018, joined to ensure that their rights to and the relationship with these lands is respected through a renewed agreement with Canada and the Province of Ontario.

The area in which we are situated is also home to Indigenous Peoples from across the region and Canada. CNL is grateful to have the opportunity to work on these traditionally and culturally significant lands and waterways.

The Port Hope Long-Term Low-Level Radioactive Waste Management Project (PHP) is part of the larger Port Hope Area Initiative (PHAI). The PHAI is a community-based project designed to develop and implement a safe, local, long-term management solution for historic low-level radioactive waste (LLRW) within the Port Hope and Clarington municipalities. The PHAI is defined by *An Agreement for the Cleanup and Long-Term Safe Management of Low-Level Radioactive Waste Situated in The Town of Port Hope, The Township of Hope and the Municipality of Clarington* (Legal Agreement) [**3**], which took effect on 2001 March 29, between the Government of Canada and the municipalities of Port Hope and Clarington for the management of the Low-Level Radioactive Waste (LLRW) within each of the communities. CNL is responsible for the direction and execution of the PHAI in compliance with the Legal Agreement [**3**], licences and Environmental Assessment decisions. CNL has overall responsibility for managing the PHAI on behalf of Atomic Energy of Canada Limited (AECL), a federal Crown corporation.

This report provides site-specific information to supplement information in the corporate *Annual Compliance Monitoring Report for Canadian Nuclear Laboratories* (ACMR for CNL) [**4**], which provides corporate updates to 14 Safety and Control Areas as they are applied across all CNL. Performance highlights for 2021 activities are outlined below.

PHAI Communications and Engagement

- Indigenous community relations, public consultation, and public stakeholder and activities continued to be conducted in accordance with the Port Hope Area Initiative Public Information Program.
- In 2021, twenty-two Tier 1 complaints were received and resolved at the CNL level. Five Tier 2 complaints were received and two were resolved at the CNL level. The remaining three complaints are on hold until spring of 2022 to be re-assessed at that time.

Management System

- CNL completed all required reporting as outlined in section 3.2.3, PHP LCH [**2**].
- In 2020, an annual Self-Assessment Plan for FY 2020/2021 stemming from the CNL Integrated Assessment Plan, was developed, and implemented for all HWP MO sites.
- There was one external audit conducted by SAI Global for the maintenance of CNL's ISO 9001:2015 certification specific to the PHP in 2021.

Human Performance Management

- A wide range of mandatory and other job-specific training activities were carried out in 2021 to ensure that all PHP employees and contractors acquired mandated training (including refresher training) as appropriate for their duties to ensure the safe operation of the PHP facility and to conduct work under the PHP Licence [**1**].
- The Curriculum Review Committee continued to meet throughout 2021 to support the PHAI's Systematic Approach to Training program.

Facility and Equipment

- Port Hope Long Term Waste Management Facility (PH LTWMF): In 2021 work continued with waste being placed within the mound.
- Small-Scale Sites: characterization and design of properties and roads continued throughout 2021; progress included work to confirm 4,609 properties with external lots have been characterized and 1,098 have been identified with LLRW.
  - 4,075 properties with interior spaces have been characterized and 218 have been identified with LLRW.
  - In 2021 a new contract was awarded (Road Allowance Contract 3) to characterize 56 high priority road allowance sites. Fieldwork began in 2012 October and 13 Road Allowance (RA) Sites under this contract were drilled in 2021.
  - Characterization of internal properties continued to be on hold during 2021 due to COVID-19 Pandemic restrictions.
  - 49 exterior property designs and five RA designs were completed with 127 exterior property designs and 11 RA designs in progress resulting in significant design production.
  - Excavations of exterior historic LLRW and backfilling to existing grades was completed at 29 properties.
  - Interior remediation was completed at one property.

- Temporary Storage Sites: No Temporary Storage Site (TSS) remediation activities were completed in 2021 as all TSS have proceeded through the remediation phase.
- Waterfront Area:
  - An enhanced delineation project was completed at the Viaducts site in spring 2021.
  - Remediation was completed on the 95 Mill Street site in summer 2021.
  - Remediation commenced at the Viaducts in 2021 October.
  - Remediation commenced at Strachan Street Consolidation site in summer 2021 and waste removal was completed in 2022 March.
  - Mechanical dredging of sediments from the Port Hope Harbour commenced in 2021 June.
  - Upgrades to the Harbour site water treatment system were commenced in spring 2021 and were nearing completion for commissioning in at the end of 2022 March.
  - The tender for the Waterworks West and Alexander Street ravine sites was posted to Merx in 2022 January.
- Highland Drive Area:
  - Finalized remediation design, technical specifications, and a statement of work for the remediation of the Highland Drive Landfill.
  - New conceptual plan was developed for the Highland Drive South Ravine remediation and Permeable Reactive Barrier installation.
  - A Designated Substance Survey (DSS) was conducted on the boathouse in the Highland Drive South Ravine.
  - The Highland Drive South Ravine property was approved by Municipality of Port Hope Council for severance to separate the house at 28 Bedford Street from the ravine lot associated with the Highland Drive South Ravine remediation.
- Industrial Sites:
  - Centre Pier: Additional Phase Two Environmental Site Assessment (ESA) sampling was completed.
  - Lions Park: Additional Phase Two Environmental Site Assessment (ESA) sampling was completed.
  - Coal Gasification Plant: Additional Phase Two Environmental Site Assessment (ESA) sampling was completed.
  - Chemetron Lagoon: Design for the remediation was updated in 2021 based on 2020 water and sediment sampling.
- Port Hope Waste Water Treatment Plant (PH WWTP) water treatment systems had an operational uptime of greater than 98%.
- 291,100 m^3 of influent was collected by the PH WWTP in 2021. This represents a decrease of 2% in volume from 2020 recorded volumes.

Physical Design

- The PHP adheres to the Corporate Design Program and utilizes CRL Design Engineering to implement modifications and upgrades to existing equipment following CNL's Engineering Change Control (ECC) process.
- Changes and planned upgrades included the following in 2021:
  - Optimization of the evaporator mechanical and process control systems in order to maximize operational efficiency.
  - Completed minor modifications to service water circulation process to improve performance of dependent sub-systems and to increase conservation of treated water usage.
  - Finalized planning and completed the installation of a supplemental Reverse Osmosis unit to increase water treatment capacity.
  - Continued planning for installation of larger storage tanks to hold an increased volume of soda-ash, sodium hydroxide, and sulphuric acid on site.
  - Implemented additional concentrate (brine) process modifications to further enhance salt removal and balance in pond return.
  - Completed installation and optimized the function of enhanced heat recovery processes. These changes have demonstrated very good results with respect to primary treatment efficiency and reduced fouling of the system in general.

Radiation Protection

- As Low As Reasonably Achievable (ALARA) initiatives and activities continued to be at the forefront of the PHP Radiation Protection Program (RPP).
- Radiation Protection doses for workers remained ALARA and doses for the public remain well below regulatory limits.
- Provided refresher training on the efficacy of the radiation work planning process with inclusion of the Radiation Work Permitting process as applied under the Integrated Work Control (IWC) program.
- There were no exceedances of regulatory limits and action levels in the dose monitoring program.

Conventional Health and Safety

- All licensed activities continued to be carried out safely and securely.
- The Historic Waste Program Management Office Site Safety and Health Committee increased its focus on the importance of the COVID-19 Pandemic and the shift to remote work for a significant number of the workers at PHAI project sites.
- There was a project safety pause due to a series of heavy equipment near misses and rising trend of personal injury events. The pause involved a project-wide assessment and subsequent verification of equipment related hazards and controls.
- There were 310 site health and safety inspections completed in 2021.

Environmental Protection

- Environmental protection and mitigation continues to be effective; changes from the baseline are minimal and generally within the EA predictions. EA follow-up and operational monitoring continued in 2021.

Emergency Management and Fire Protection

- All required annual fire response drills, were completed as per program and regulatory requirements.
- Site emergency plans were updated in conjunction with changed personnel and processes impacted by COVID-19 Pandemic restrictions.
- A PHAI five-year Exercise and Drill Plan was developed to support improved planning and monitoring of annual drill expectations.
- Comprehensive retraining for CNL Emergency Stewards and Officer in Charge Personnel was completed in conjunction with updated emergency plans.
- Staff training on emergency procedures was completed in parallel to improved emergency notification infrastructure upgrades.
- Fire screening assessments were completed in support of CNL's ECC process for capital and maintenance/repair projects.

Waste Management

- The PH LTWMF and PH WWTP continued to operate in conformance with the PHP LCH [**2**].
- On-site waste movement occurred from 2021 January 01 to 2021 December 31. Off-site waste deliveries to the PH LTWMF originated from various sites including Cameco, Waterfront Sites, Small-Scale Sites (SSS), the Harbour sediment, and other waste sources such as on-site waste transfers.
- 22 tonnes of process residual waste was received from the Port Granby Waste Water Treatment Plant (PG WWTP) for long term management.
- 4,446 tonnes of evaporator concentrate was received for treatment from PG WWTP at the PH WWTP.

Security

- Contractors conducting work at the PHP site continued to be in compliance with CNL's corporate security policies and programs including those requirements mandated in the Port Hope Area Initiative Security Plan, as confirmed through CNL's oversight program.
- No reportable security events occurred at the PHP in 2021.

Safeguards and Non-Proliferation

- The PHP continued to adhere to the Corporate Nuclear Materials and Safeguards Management (NM&SM) Program.
- The PH LTWMF (material balance area CNWF) received and placed approximately 25,428 kgU from Cameco.
- The inventory of nuclear materials in material balance area CN-2 decreased by three items in 2021 (two sources and one souvenir vial). Items were sent to Chalk River for long-term management/repurposing.
- The International Atomic Energy Agency (IAEA) conducted routine seal replacement on the IAEA Portal Monitor in 2021 August.

Packaging and Transport

- The PHAI Transportation of Dangerous Goods Program continued to operate the safe off-site transport and shipment of dangerous goods by conforming to all applicable laws and regulations, including company policies and procedures.
- Shipments of dangerous goods continued to be received at the PHP site from offsite vendors (consumable chemicals, diesel fuel, and propane).
- There were no reportable events related to the Transportation of Dangerous Goods Program in 2021.

CNL is committed to achieving high standards of operational safety and security. The information and data presented in this report support the conclusion that safe and secure performance was achieved at the Port Hope Project PHP) site in 2021, while enhancements were implemented to further improve results.

For a detailed description of CNL's robust mitigation initiatives and controls to protect its employees, contractors, visitors, and Site operations from the COVID Pandemic, see the Executive Summary in Reference [**4**].

Table of Contents

FIGURES

TABLES

Land Acknowledgement

CNL's Historic Waste Program Management Office and the Port Hope Area Initiative projects are situated on the traditional and treaty lands of the Williams Treaties First Nations, specifically the treaty signed with the Mississauga First Nations of Alderville, Curve Lake, Hiawatha and Scugog Island.

The Mississauga First Nations are also signatories to various 18th and 19th century treaties that covered lands in different parts of south-central Ontario. In 1923, the Mississauga First Nations and the Chippewa First Nations consisting of Rama, Beausoleil and Georgina Island signed the Williams Treaties and together, over 90 years later in 2018 June, joined to ensure that their rights to and the relationship with these lands is respected through a renewed agreement with Canada and the Province of Ontario.

The area in which we are situated is also home to Indigenous Peoples from across the region and Canada. CNL is grateful to have the opportunity to work on these traditionally and culturally significant lands and waterways.

The PHAI represents the federal government's response to the community-requested solution for the cleanup and local, long-term, safe management of historic low-level radioactive waste in the municipalities of Port Hope and Clarington. The waste is the result of the refining practices of the former Crown Corporation, Eldorado Nuclear Ltd., and its private sector predecessors. The original Eldorado refining operation and plant were established in the 1930s without consultation with Indigenous peoples of the area.

A legal agreement, finalized in 2001 March, between the Government of Canada and the two municipalities, launched the PHAI by defining the framework and setting out the responsibilities for the Port Hope Project and the Port Granby Project.

Through its Historic Waste Program Management Office, Canadian Nuclear Laboratories is implementing the PHAI on behalf of Atomic Energy of Canada Limited, a federal Crown corporation.

Indigenous History of the Port Hope Area

This Indigenous history has been generously provided by Curve Lake First Nation - publication reference: *Gitiga Migizi and Julie Kapyrka, 2015 Before, During, and After: Mississauga Presence in the Kawarthas*. In Peterborough, Archaeology, Dirk Verhulst, editor, pp. 127-136. Peterborough, Ontario: Peterborough Chapter of the Ontario Archaeological Society

The traditional homelands of the Michi Saagiig (Mississauga Anishinaabeg) encompass a vast area of what is now known as southern Ontario. The Michi Saagiig are known as "the people of the big river mouths" and were also known as the "Salmon People" who occupied and fished the north shore of Lake Ontario where the various tributaries emptied into the lake. Their territories extended north into and beyond the Kawarthas as winter hunting grounds on which they would break off into smaller social groups for the season, hunting and trapping on these lands, then returning to the lakeshore in spring for the summer months.

The Michi Saagiig were a highly mobile people, travelling vast distances to procure subsistence for their people. They were also known as the “Peacekeepers” among Indigenous nations. The Michi Saagiig homelands were located directly between two very powerful Confederacies: The Three Fires Confederacy to the north and the Haudenosaunee Confederacy to the south. The Michi Saagiig were the negotiators, the messengers, the diplomats, and they successfully mediated peace throughout this area of Ontario for countless generations.

Michi Saagiig oral histories speak to their people being in this area of Ontario for thousands of years. These stories recount the “Old Ones” who spoke an ancient Algonquian dialect. The histories explain that the current Ojibwa phonology is the 5th transformation of this language, demonstrating a linguistic connection that spans back into deep time. The Michi Saagiig of today are the descendants of the ancient peoples who lived in Ontario during the Archaic and Paleo-Indian periods. They are the original inhabitants of southern Ontario, and they are still here today.

The traditional territories of the Michi Saagiig span from Gananoque in the east, all along the north shore of Lake Ontario, west to the north shore of Lake Erie at Long Point. The territory spreads as far north as the tributaries that flow into these lakes, from Bancroft and north of the Haliburton highlands. This also includes all the tributaries that flow from the height of land north of Toronto like the Oak Ridges Moraine, and all the rivers that flow into Lake Ontario (the Rideau, the Salmon, the Ganaraska, the Moira, the Trent, the Don, the Rouge, the Etobicoke, the Humber, and the Credit, as well as Wilmot and 16 Mile Creeks) through Burlington Bay and the Niagara region including the Welland and Niagara Rivers, and beyond. The western side of the Michi Saagiig Nation was located around the Grand River which was used as a portage route as the Niagara portage was too dangerous. The Michi Saagiig would portage from present-day Burlington to the Grand River and travel south to the open water on Lake Erie.

Michi Saagiig oral histories also speak to the occurrence of people coming into their territories sometime between 500-1000 A.D. seeking to establish villages and a corn growing economy – these newcomers included peoples that would later be known as the Huron-Wendat, Neutral, Petun/Tobacco Nations. The Michi Saagiig made Treaties with these newcomers and granted them permission to stay with the understanding that they were visitors in these lands. Wampum was made to record these contracts, ceremonies would have bound each nation to their respective responsibilities within the political relationship, and these contracts would have been renewed annually (see Gitiga Migizi and Kapyrka 2015). These visitors were extremely successful as their corn economy grew as well as their populations. However, it was understood by all nations involved that this area of Ontario were the homeland territories of the Michi Saagiig.

The Odawa Nation worked with the Michi Saagiig to meet with the Huron-Wendat, the Petun, and Neutral Nations to continue the amicable political and economic relationship that existed – a symbiotic relationship that was mainly policed and enforced by the Odawa people. Problems arose for the Michi Saagiig in the 1600s when the European way of life was introduced into southern Ontario. Also, around the same time, the Haudenosaunee were given firearms by the colonial governments in New York and Albany which ultimately made an expansion possible for them into Michi Saagiig territories. There began skirmishes with the various nations living in Ontario at the time. The Haudenosaunee engaged in fighting with the Huron-Wendat and between that and the onslaught of European diseases, the Iroquoian speaking peoples in Ontario were decimated. The onset of colonial settlement and missionary involvement severely disrupted the original relationships between these Indigenous nations. Disease and warfare had a devastating impact upon the Indigenous peoples of Ontario, especially the large sedentary villages, which mostly included Iroquoian speaking peoples. The Michi Saagiig were largely able to avoid the devastation caused by these processes by retreating to their wintering grounds to the north, essentially waiting for the smoke to clear.

Michi Saagiig Elder Gitiga Migizi (2017) recounts[1]:

"We weren't affected as much as the larger villages because we learned to paddle away for several years until everything settled down. And we came back and tried to bury the bones of the Huron but it was overwhelming, it was all over, there were bones all over – that is our story.

There is a misnomer here, that this area of Ontario is not our traditional territory and that we came in here after the Huron-Wendat left or were defeated, but that is not true. That is a big misconception of our history that needs to be corrected. We are the traditional people, we are the ones that signed treaties with the Crown. We are recognized as the ones who signed these treaties and we are the ones to be dealt with officially in any matters concerning territory in southern Ontario.

We had peacemakers go to the Haudenosaunee and live amongst them in order to change their ways. We had also diplomatically dealt with some of the strong chiefs to the north and tried to make peace as much as possible. So we are very important in terms of keeping the balance of relationships in harmony.

Some of the old leaders recognized that it became increasingly difficult to keep the peace after the Europeans introduced guns. But we still continued to meet, and we still continued to have some wampum, which doesn't mean we negated our territory or gave up our territory – we did not do that. We still consider ourselves a sovereign nation despite legal challenges against that. We still view ourselves as a nation and the government must negotiate from that basis."

[1] This historical context was prepared by Gitiga Migizi, a respected Elder and Knowledge Keeper of the Michi Saagiig Nation.

Often times, southern Ontario is described as being “vacant” after the dispersal of the Huron-Wendat peoples in 1649 (who fled east to Quebec and south to the United States). This is misleading as these territories remained the homelands of the Michi Saagiig Nation.

The Michi Saagiig participated in eighteen treaties from 1781 to 1923 to allow the growing number of European settlers to establish in Ontario. Pressures from increased settlement forced the Michi Saagiig to slowly move into small family groups around the present day communities: Curve Lake First Nation, Hiawatha First Nation, Alderville First Nation, Scugog Island First Nation, New Credit First Nation, and Mississauga First Nation.

The Michi Saagiig have been in Ontario for thousands of years, and they remain here to this day.

Introduction

Name:	Port Hope Long-term Waste Management Facility
Location:	Plan 9R-734, Lots 13 and 14, Concession 2 Port Hope, Municipality of Hope, Northumberland County, Ontario L1A 3V7

Licence Information and Reporting Period

This annual compliance monitoring report is produced to comply with licence condition 2.3 of the *Port Hope Long Term Low Level Radioactive Waste Management Project Waste Nuclear Substance Licence* (WNSL-W1-2310.02/2022) [**1**], hereinafter referred to as the Port Hope Project (PHP) licence [**1**] e, in accordance with the compliance verification criteria listed in the *Port Hope Long-Term Low-Level Radioactive Waste Management Project Licence Conditions Handbook* [**2**], hereinafter referred to as the PHP LCH [**2**]. Information included in this report is for the period of 2021 January 01 to 2021 December 31.

This report provides site-specific information to supplement information in the *Annual Compliance Monitoring Report for Canadian Nuclear Laboratories* (ACMR for CNL) [4], which provides corporate updates to 14 Safety and Control Areas as they are applied across all CNL.

The intent of this report is to provide sufficient detail to demonstrate how PHP programs are meeting the regulatory requirements as specified in the PHP licence [**1**] and the PHP LCH [**2**].

Changes to Organizational Structure

In 2021 February, CNL's Environmental Remediation Management and Stewardship Renewal Group announced a change in Site Licence Holder position for the Port Hope and Port Granby waste management projects [**5**].

Facilities Included in this Report

Facilities discussed in this report include the Port Hope Long-term Waste Management Facility (PH LTWMF) and the Port Hope Waste Water Treatment Plant (PH WWTP).

Summary of Licensed Activities

The PHAI is defined by *An Agreement for the Cleanup and Long-Term Safe Management of -Low-level Radioactive Waste Situated in The Town of Port Hope, The Township of Hope and the Municipality of Clarington* [**3**], herein referred to as the Legal Agreement [**3**], which took effect on 2001 March 29, between the Government of Canada and the municipalities of Port Hope and Clarington for the management of Low-Level Radioactive Waste (LLRW) as prescribed under the PHP, and the Port Granby Long-Term Low-Level Radioactive Waste Management Project (PGP).

The Port Hope Area Initiative (PHAI) includes two distinct and separate projects:

- The Port Hope Long-Term Low-Level Radioactive Waste Management Project (PHP) that comprises the long-term management of the Low Level Radioactive Waste (LLRW) currently located at the existing Welcome Waste Management Facility (WWMF), the construction of a new Port Hope Long-Term Waste Management Facility (PH LTWMF), the remediation of LLRW and specified industrial waste at various sites within the Municipality of Port Hope (MPH) and the safe transportation of the waste to the new PH LTWMF for long-term storage.
- Port Granby Long-Term Low-Level Radioactive Waste Management Project (PGP).

The PHP will:

- Remediate sites containing historic LLRW and other specified industrial waste located in the Municipality of Port Hope (MPH). These sites are described in the Legal Agreement [**3**].
- Consolidate and manage this waste in a new long-term waste management facility at Port Hope (PH LTWMF), developed on lands comprised of and adjacent to the former WWMF. The contents of the former WWMF have been incorporated into the new PH LTWMF.

The historic LLRW within the community currently exists within licensed temporary storage and management facilities and miscellaneous unlicensed remediation sites (including the Port Hope Harbour and the former municipal landfill site).

The PHP comprises:

- Phase 1 (complete):
  - Securing regulatory approvals.
  - The management of the waste in the WWMF, currently owned by the Government of Canada and operated by CNL on behalf of Atomic Energy of Canada Limited (AECL), a federal Crown corporation.
- Phase 2 (2012-2025):
  - Development of a new LTWMF on and adjacent to the present site of the WWMF.
  - Incorporation of the current inventory of waste from the WWMF into the new LTWMF.
  - Remediation of sites within the MPH that are contaminated with historic LLRW.
- Phase 3 (2025-2120):
  - Long-term maintenance and monitoring of the PH LTWMF.

Additional Licenced Activities

A number of remediation sites in Port Hope are subjects of existing licences issued to CNL under the *Nuclear Safety and Control Act* (NSCA) [**6**], each of which submit independent annual compliance reports to the Canadian Nuclear Safety Commission (CNSC) as per the *Pine Street Extension Temporary Storage Site WNSL-W1-182.1/2022* [**7**] and the *Port Hope Radioactive Waste Management Facility WNSL-W1-344-1.8/ind.* [**8**] licence requirements.

As with all the PHAI remediation sites, those subject to these licences will be remediated to the project specific Cleanup criteria as part of the PHP Licence [**1**].

1 PHAI Communications and Engagement

CNL is committed to providing effective access to timely information about the PHAI. Aimed at strengthening understanding of and confidence in the projects, information is provided to ensure the public, Indigenous communities and organizations and key stakeholders are knowledgeable about upcoming work and project activities. Reports are also available on programs, schedules, environmental protection and mitigation measures, long-term benefits and economic opportunities.

CNL responds to the diverse needs of a wide range of audiences to increase project awareness and enhance relationship building through a variety of approaches, as depicted in Figure 1.

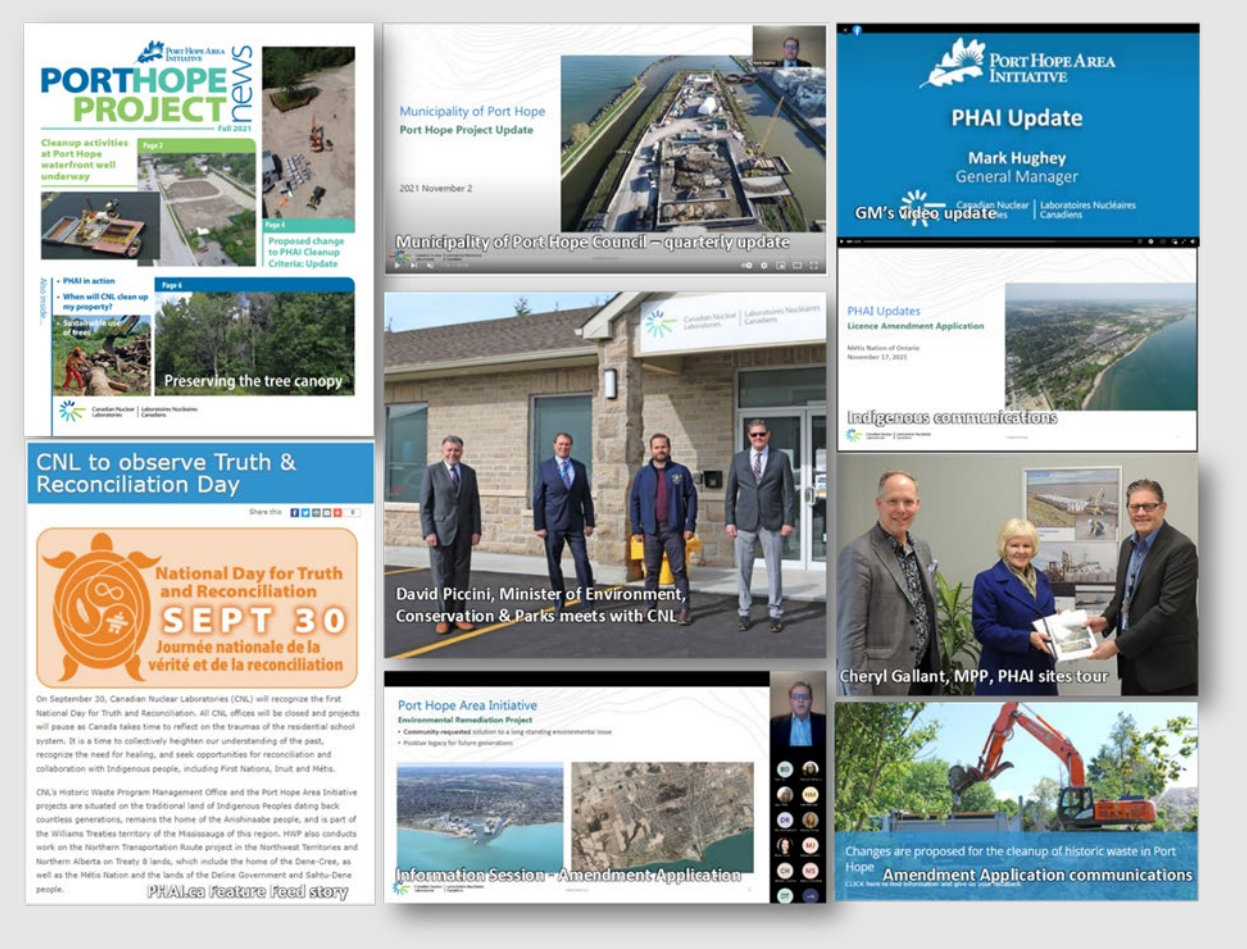

Figure 1: 2021 PHAI Engagements

As a result of COVID-19 restrictions in 2021, CNL's communications and engagement initiatives were adapted wherever possible to interactions regarding the Port Hope Project (PHP) by phone, email and online through virtual meetings, presentations, community updates and information sessions.

1.1 General Communications Approach

1.1.1 Public Information Office

CNL's Public Information Office is open Monday to Friday, 8:30 a.m. to 4:30 p.m. Printed material provides information on the planning, design, implementation, environmental assessment, monitoring and mitigation of the projects, and on the Complaints Resolution and the Property Value Protection (PVP) programs. Three-dimensional models of the Port Hope and Port Granby long-term waste management facilities are also on display.

As a result of COVID-19 restrictions, the office was closed to the public. Staff members were available to provide information and answer questions through email, telephone and social media. After-hours calls are received by an external agency and routed to a single-point of contact for follow-up.

1.1.1.1 Complaints Resolution Program

While CNL focuses on the prevention of complaints as a result of the PHAI, through proactively addressing public concerns, the Complaints Resolution Program (CRP) provides a mechanism for the raising, investigation and resolution of formal complaints which are identified as Tier 1 or Tier 2.

Tier 1 complaints focus on quick resolution through dialogue, where parties jointly identify the problem and agree on an acceptable resolution. Tier 2 complaints address complex complaints where there is no consensus regarding responsibility, cause, impact or an acceptable resolution. Tier 2 complaints often require a subject matter expert or consultation.

In 2021, twenty-two Tier 1 complaints were received and resolved at the CNL level. Five Tier 2 complaints were received and two were resolved at the CNL level. The remaining three complaints are on hold until spring of 2022 to be re-assessed at that time.

1.1.2 Website

The PHAI website – PHAI.ca – provides information on the Port Hope and Port Granby projects, including descriptions of current and upcoming work, environmental monitoring reports, public disclosures, the Complaints Resolution Program and the PVP Program. The website also provides telephone and email points of contact for enquiries.

In 2021, the PHAI website received 33,519 visits and 86,879 page views.

1.1.3 Social Media

The PHAI Facebook, Twitter, LinkedIn and Instagram social media accounts are used to engage the community and drive users to the PHAI website for more detailed information about current construction progress or events. CNL responds to questions or comments posted by members of the public on PHAI social media accounts as expeditiously as possible, to reflect the rapid response of internet communications. Dialogue of relevance to the PHAI on other social media accounts is monitored and consideration given to posting timely corrections to inaccurate information about the PHAI.

In 2021, 33 inquiries were received via Facebook. CNL circulated 351 Facebook/Twitter posts and 23 Instagram posts covering subjects from project updates to interesting facts about project work with an audience reach of more than 19,000.

PHAI online communications conducted during 2021 are summarized in Table 1.

Table 1: PHAI 2021 Online Communications Outreach Activities

Online Communications			**Total**
Website – PHAI.ca	***Visits to website***		33,519
	Pages Viewed		86,879
Social Media	Facebook	***Posts***	***User Reach***
		351	20,303
	Twitter	***Tweets***	***Profile Visits***
		351	2649
	Instagram	***Total Posts***	
		23	

1.1.4 Media Releases

CNL issued one media release in 2021 to announce the appointment of a new General Manager for the Historic Waste Program. Port Hope-area media outlets including Northumberland News, and Classic Rock 107.9 were engaged.

1.1.5 Project Newsletters

Port Hope Project newsletters update the community on the status of the projects, upcoming work and changes to planned work or programs. Newsletters are distributed to every household in the Municipality of Port Hope and to an extensive list of federal, provincial, regional and municipal stakeholders; newsletters are also available online at PHAI.ca.

The 2021 fall newsletter was distributed by mail to approximately 8,000 homes, businesses and farms in the Municipality of Port Hope and to approximately 400 contacts via email.

The newsletter covered a range of topics including updates on CNL's ongoing commitment to safety, work underway at the waterfront, CNL's application to the CNSC for a change to the PHAI cleanup criteria, an update on remediation of privately owned properties in Port Hope and the sustainable use of felled trees as a donation for woodwork projects at Port Hope High School.

1.2 Reporting and Disclosure

1.2.1 Performance Reports

Information is posted on PHAI.ca regarding environmental performance including environmental monitoring program results and PHAI Annual Compliance Reports to the CNSC.

1.2.2 Public Disclosures

CNL is committed to providing open and transparent public disclosure, in alignment with CNSC regulatory document REGDOC-3.2.1 *Public Information and Disclosure* [**9**], about unplanned project activities and non-routine events that have off-site effects or could result in public interest and concern and/or media attention. Disclosure about unplanned project activities and events with little or no impact on people and the environment are posted, typically within four business days, while key stakeholders may be notified through direct contact.

Consistent with REGDOC-3.2.1 [**9**], CNL informs the CNSC of disclosures made under this protocol at the time of or before the disclosure.

In 2021, CNL issued two public disclosures related to the Port Hope Project, one related to slight exceedances of the Provincial Water Quality Objectives in the inner Port Hope Harbour and the other pertaining to a dump truck coming into contact with an overhead utility cable at a PHAI construction site.

Public Disclosures are posted on the PHAI.ca website and circulated via email to Indigenous communities and organizations who have asked to receive them.

In 2021, there were 518 visits to the Public Disclosures website page.

1.3 Indigenous Relations

CNL is committed to recognizing constitutional rights and interests as we continue to build relationships with Indigenous communities through ongoing learning about values and interests. CNL's objective is to advance reconciliation through meaningful actions, and we are moving toward increased inclusion and participation with an approach to project planning that is focused on environmental protection and sustainability, inclusive of Indigenous knowledge systems. In addition, CNL is enhancing all communications, plans and reporting with balanced language and acknowledgement of constitutional rights and perspectives.

Recognizing Indigenous engagement as a critical component of the Port Hope Area Initiative, CNL acknowledges the continued need for open, honest and transparent communication with rights holders and Indigenous interest holders.

Historically, the *PHAI Phase 2 Public Information Program* (PIP) [**10**] has included Indigenous communities and organizations as a target audience. In support of CNL's objective to advance Reconciliation through meaningful actions and movement toward increased inclusion and participation, CNL is developing a PHAI Indigenous Communications & Engagement Program (ICEP) to be implemented in 2022 in tandem with forthcoming revisions to the PHAI PIP [**10**]. The PHAI ICEP will reflect CNL's commitment to recognizing constitutional rights and interests as we continue to build relationships with local Indigenous communities through ongoing learning about their values and interests.

As part the commitment to undertake meaningful actions toward Truth and Reconciliation, corporately CNL is enhancing its overall Indigenous Relations program. In 2021, CNL created a new position hiring a Director of Indigenous Relations. This position will focus on developing a fulsome Indigenous Relations program by creating new policies, procedures and integration of Indigenous considerations into all aspect of CNL's business and operations, while supporting ongoing relationship building and Indigenous opportunities through engagement with First Nations and Métis communities. Looking ahead to 2022, the PHAI will expand its resources with the addition of a Senior Advisor, Indigenous Relations.

1.3.1 Indigenous Communities and Organizations

When the PHAI moved to the implementation phase in 2012, the Mississaugas of the Williams Treaties First Nations asked to receive regular updates about the projects. CNL staff met at least annually with representatives from Hiawatha First Nation, Curve Lake First Nation, Mississaugas of Scugog Island and Alderville First Nations to provide project updates and engage in discussions. Topics included environmental protection, economic opportunity and heritage resource protection. In recent years CNL has also shared PHAI project updates with representatives from the Anishinabek Nation and Métis Nation of Ontario.

Other Indigenous communities including Mohawks of the Bay of Quinte and local Métis Councils have been identified as potentially having interest in the project based on their proximity and interest in other projects in the area. Over the years, CNL has provided these communities with project information mailings to keep them up to date and circulates invitations to special events including Industry Day, career fairs and information sessions.

1.3.2 Engagements

In 2012 March CNL provided a presentation and virtual tour of PHAI project sites for Métis Nation of Ontario representatives, staff and Region 5 and 6 Councillors. In 2021 June, a more focused session was provided to MNO representatives regarding the remediation of the Port Hope harbor and waterfront area sites as well as PHAI's environmental assessment follow-up and environmental monitoring program.

At the request of Curve Lake First Nation, beginning in 2021 March monthly CNL Indigenous engagement sessions and project updates were provided to consultation staff representatives of Curve Lake, Hiawatha, Mississaugas of Scugog Island, and Alderville First Nations as well as representatives from the Chippewa Nations. Each meeting was coordinated, and the agenda planned in consultation with community representatives and included round-table information sharing from each Nation and a focused topic/project theme as the featured discussion.

PHAI updates were also provided to staff, consultants and Grand Council representatives from Anishinabek Nation, including a general PHAI overview and then focus sessions on radiation protection and environmental monitoring.

CNL held additional meetings to focus on the CNSC licence application to amend the PHAI cleanup criteria.

1.3.2.1 Williams Treaties First Nations Monthly Meetings

At the request of Curve Lake First Nation, CNL's Indigenous Engagement team established monthly meetings in 2021 with representatives from the Mississauga First Nations as well as the Chippewa communities (Beausoleil, Georgina Island and Rama First Nations). These meetings are organized with input from the community representatives and each meeting is focused on CNL environmental remediation projects and/or the interests identified by these Nations. In 2021, nine meetings were held with two of those meetings focusing on CNL's application to amend the PHAI Cleanup Criteria.

1.3.3 Site Tours

Guided tours of project remediation sites and construction areas, led by expert CNL staff, provide a first-hand look at PHAI work, promoting an in-depth understanding and appreciation for the complexity and importance of the projects. Tours illustrate the scope of project planning and implementation including environmental protection, compliance with occupational health and safety requirements, and conformance with Environmental Assessment monitoring obligations and adaptive management practices.

Tours are provided, on request, to Indigenous communities and organizations to supplement information provided in meetings and presentations. As a result of COVID-19 restrictions in 2021, CNL's communications were adapted, and virtual tours were provided through detailed photographs, diagrams and video.

1.3.4 Direct Notifications

CNL routinely distributes PHAI newsletters, media releases, public disclosures and invitations to special events to these Indigenous communities and organizations. In 2021 invitations to CNL's Industry Day and Career Fair were also circulated to Indigenous contacts who have expressed interest in business opportunities and CNL contracting processes.

PHAI and PHP Indigenous communications and engagement activities conducted during 2021 are summarized in Table 2.

Table 2: PHAI 2021 Indigenous Communications and Engagement Activities

Indigenous Engagement	
Presentations	12
Tours	1
Williams Treaties First Nations monthly meetings	9
Direct Notifications *Media releases, event invitations, job opportunities, public disclosures, media releases, project newsletters, etc.*	16

1.4 Public Information Program

Strategic relationships are developed and maintained through information exchange and feedback, to increase support and cooperation as the PHP advances.

1.4.1 Presentations

Presentations are provided on current and planned project activities, and the PVP Program, to varied audiences including Indigenous groups and organizations, elected officials and staff at all levels of government, community groups, service clubs, and local/national/international education, scientific, technical and business communities.

During the reporting period, 16 presentations were provided to the public on the PHAI and Port Hope Project.

1.4.1.1 Education and Science Technology Communities

Presentations, site tours and program-specific information and demonstrations are provided on request to students at the elementary, high school, college and university level; and CNL participates on program advisory committees to provide industry perspective on the development of new programs and courses.

CNL participates in the annual Take Our Kids to Work Day event and other education initiatives including the Junior Achievement World of Opportunity program and judging local science fairs. National and international education institutions, industry and professional groups also participate in PHAI presentations and site tours and CNL continues to develop outreach activities related to Science, Technology, Engineering, and Math (STEM) education.

Although these activities were limited due to COVID-19 restrictions, CNL provided an overview of the PHAI update and a virtual tour to four groups: Port Hope High School environmental science students, Ontario Tech University Nuclear Engineering students and two Fleming College Monitoring in Waste Management classes.

As a member of the Fleming College Sustainable Waste Management Program Advisory Committee, CNL staff participated in in the committee's annual meeting in 2021 November.

During the reporting period, 17 presentations were provided to education and science and technology audiences on the PHAI.

1.4.2 Public Site Tours

As a result of COVID-19 restrictions in 2021, CNL's communications were adapted, and virtual tours were provided through detailed photographs, diagrams and video.

One tour was provided for MP Cheryl Gallant in 2021 November. The tour was facilitated according to COVID-19 guidelines in place at the time.

1.4.2.1 Public Information Sessions

Information sessions are held as required to inform the community about upcoming PHAI work, provide updates on planned or changed project activity and programs, and receive feedback from the public. As remediation continues, information sessions are held for targeted, smaller groups to convey information and discuss concerns specific to the neighbourhood in proximity to the PHAI work.

A virtual Public Information Session was held in 2021 October as part of the public engagement campaign in support of CNL's application to amend the PHAI Cleanup Criteria; 75 attendees participated. The session was recorded and posted on PHAI.ca and received 95 views in 2021.

1.4.2.2 Participation in External Events

As project ambassadors, CNL staff participates in external events to provide information about PHAI activities to a broader audience and increase awareness and understanding of the projects.

With COVID-19 restrictions in place over the year, CNL staff did not participate in external events in 2021.

1.4.2.3 Community Notifications

Residents and business owners in close proximity to PHAI-related activity are notified in advance of planned work and of notable changes to the schedule or nature of the work. Notification can occur through website postings, phone calls, emails or door-to-door visits/information drop-offs, depending on the timeframe and the capacity to receive the notification.

During the reporting period, CNL staff delivered 14 notifications to Port Hope homes and business.

PHAI public information activities conducted during 2021 are summarized in Table 3.

Table 3: PHAI 2021 Public Communications and Engagement Activity

Communication Approach	Total
Presentations	23
Tours	1
Community Notifications	14

1.4.3 Dedicated Engagement Campaigns

1.4.3.1 Application to Amend Cleanup Criteria

In 2021 January, CNL submitted a Stakeholder and Indigenous Engagement Report to the CNSC detailing the engagement initiatives undertaken from 2021 September to 2021 December in support of CNL's application for an amendment (Amendment application) of the Port Hope Long-Term Low-Level Radioactive Waste Management Project Waste Nuclear Substance Licence (WNSL-W1-2310.02/2022) [**1**]. The application resulted, in part, from community feedback on the impacts of the PHAI. Property owners and other residents expressed strong frustration with timelines and the extent of cleanups in their neighborhoods. Many shared concern that PHAI work will result in significant undesirable changes to the urban tree canopy, the preservation of which is important to many citizens.

CNL is committed to continuing engagement on the proposed change to the PHAI Cleanup Criteria to ensure identified audiences receive up-to-date information on the proposal have an opportunity to ask questions and provide feedback.

Part of the engagement process involves incorporating feedback from regulators and stakeholders into communications material. In the fall of 2021, CNL undertook a second engagement campaign to provide specific information on the risk management approach to the proposed licence amendment, the potential impacts of arsenic, and more details on the type of arsenic found in Port Hope soils.

Outreach included updates on the dedicated web page, engagement activities, print and social media advertising, community presentations and a virtual information session.

1.4.4 Small-Scale Sites Communications

All property owners in the urban Port Hope area receive a Consent and Scheduling Package explaining the Property Radiological Survey (PRS) process and requesting written confirmation of their participation. Individual phone calls are made to schedule survey appointments and provide testing results for those properties with LLRW requiring remediation. Dedicated design meetings are then held with owners to review remediation and restoration plans for each property, explain the process and review the Remedial Action Plan. Prior to the start of work, a Neighbourhood Information Session is held for property owners and adjacent residents where CNL and contractor staff explain work plans, answer questions and address concerns.

Communications staff is available by phone, email and in person to respond to property owner inquiries and concerns, and communications field staff are on site to address emerging issues.

More than 5,181 interactions related to Small-Scale Sites took place in 2021 including 3,359 phone calls and emails; 243 property owner meetings and 458 site visits.

On request by a property owner, CNL provides a Radiological Status Letter (RSL) confirming available results of any radiological investigation and remediation activities on the property to date. In 2021, CNL issued 349 RSLs for Port Hope properties.

1.4.4.1 Decline to Participate Letter Campaigns

In an ongoing effort to encourage participation in the PRS, CNL issued a total of 94 letters to Port Hope property owners who had not provided consent to participate in or continue the PRS. Letters were sent through four separate campaigns in an effort to confirm if the property owner wished to be included in the PRS process.

By the end of 2021, CNL had received confirmation of participation from 57 of the 94 property owners.

1.4.4.2 Port Hope Project-Related Participation Opportunities

CNL provides opportunities for property owners and community members directly impacted by project-related construction and remediation activities to provide feedback related to the PHAI PIP through targeted focus groups, neighbourhood information sessions and opportunities to observe remediation activities. CNL provides ongoing communication updates to these groups.

As part of the Amendment Application in 2021, CNL hosted an information session with approximately 75 participants.

1.5 Key Stakeholder Relations

1.5.1 Municipal Liaison

CNL regularly liaises with elected officials and staff of the host municipalities. As part of an agreed-upon framework for dialogue to keep municipalities informed of PHAI plans and progress, CNL provides regular project and communications updates to municipal councils, committees and staff through a variety of media, as well as topical presentations upon request.

In 2021, CNL provided quarterly updates to the Municipality of Port Hope on PHAI progress and provided updates on the Amendment Application as stakeholder engagement progressed.

1.5.2 Agreement Monitoring Group

Quarterly meetings of the Agreement Monitoring Group (AMG) bring together representatives of both municipalities, as signatories to the Legal Agreement, and representatives of Atomic Energy of Canada Limited (AECL) and CNL to provide updates on project activities, budget and schedule. The meetings also ensure project commitments outlined in the agreement are reviewed and actioned. Four meetings were held in 2021.

1.5.3 Business Community Liaison

CNL is a member of the Port Hope and District Chamber of Commerce, and staff provide monthly updates related to project progress, communications, and Port Hope project-related economic opportunities.

To provide access to CNL supply chain opportunities the PHAI website includes links to a; Contractor Portal, Supply Chain Registration, and Vendor Portal. These portals connect potential or current suppliers with information on procurement opportunities for goods, services, equipment, decommissioning and construction.

PHAI communications staff participated in CNL's annual Industry Day and annual Career Fair, providing a project overview and participating in two Q & A sessions during the day. Event information was posted on the PHAI.ca website and invitations were circulated to the Port Hope Chamber of Commerce.

1.5.4 Internal Communications

As representatives of the PHAI, CNL employees must be aware of PHAI project activities on an ongoing basis. A wide variety of opportunities are provided to update employees on a weekly, monthly and quarterly basis.

In 2021, 37 internal communications occurred including weekly project updates, all-staff emails, virtual coffee chats with the General Manager, quarterly all-staff meetings and regular project update emails. A 'General Manager's Corner' was added in the fall to highlight monthly messages and safety tips.

1.5.5 Atomic Energy of Canada Limited (AECL)

CNL's client, AECL, is kept apprised of CNL communications activities through ongoing engagement and weekly and monthly updates. AECL is informed of relevant communications issues and public disclosures as they arise.

In 2021, 47 notifications were provided to AECL staff on matters related to the Port Hope Project and CNL provided a tour of project sites for AECL staff.

1.5.6 Canadian Nuclear Safety Commission (CNSC)

CNL keeps the CNSC apprised of activities through quarterly and annual reporting and ongoing engagement on relevant regulatory issues. CNSC and CNL interactions are supplemented by regular meetings with regulatory, licensing, project and program staff.

In 2021, CNL provided quarterly reports on PHP communications activities.

1.6 Issues Management

Historically, the PHAI's PVP and Complaints Resolution programs have been administered and reported on through the Communications & Stakeholder Relations division.

In 2021, to streamline internal processes and provide dedicated staff to address issues management, CNL established a Public Programs division to focus on these two programs. Communications and stakeholder relations staff will work closely with Public Programs staff to ensure all issues are addressed quickly and efficiently. From 2021 onward, quarterly and annual information on these two programs will be reported through Public Programs.

2 Management System

2.1 Management System Program

The PHP adheres to the Corporate Management System. See Section 1 of the *Annual Compliance Monitoring Report for Canadian Nuclear Laboratories* (ACMR for CNL) [**4**] for details.

The Canadian Nuclear Safety Commission (CNSC) has previously been notified of revisions to the Historic Waste Program (HWP MO) Quality Assurance Plan [**11**]. There were no revisions to the Quality Plan [**11**] in 2021.

2.2 Audits, Inspections and Self-Assessments

As per the requirements of the Corporate Management System, both Safety Control Areas and Facilities conduct various audits, inspections, and self-assessments to ensure that the management system is functioning according to expectations; and, that any policy, programmatic, or procedural deficiencies are identified, and appropriate actions taken to resolve any deficiencies.

2.2.1 Audits

See Section 1.2 of the ACMR for CNL [**4**] for a list of all CNL-wide Audits for the reporting year 2021.

2.2.1.1 External Audits

The annual ISO 9001:2015 external audit was held by third party registrar SAI Global for the recertification of the Historic Waste Program Management Office. The audit identified one opportunity for improvement managed through ImpAct CTA-21-1634-9 and has been closed.

The external audit conducted at the PHP in 2021 is summarized in Table 4.

Table 4: External Audits

Title	Type of Audit	No. of Actions Raised[a]	No. of Actions Closed
ISO 9001:2015	ISO 9001:2015 Recertification Audit	1	1

a The Action raised is the result of the Opportunity for Improvement, no Non-Compliances were raised.

2.2.1.2 Internal Quality Audits

The tri-annual HWP MO internal audit was completed this year in two parts due to resource restrictions with COVID-19. The first part was a desk top audit performed in 2020 September. The second part involved direct field observations of material conditions and/or activities at the HWPMO. The actions stemming from the audit were tracked through CNL's ImpAct[2] system. The audit identified one non-conformance and one opportunity for improvement which have been addressed and are considered closed.

2.2.2 Inspections

CNSC Inspections

There were five CNSC compliance inspections associated with the Port Hope Project in 2021.

An inspection of both Port Hope and Port Granby projects Management Systems was conducted between 2021 January 12 and 15. The focus of the inspection was the PHAI Management System, including topics such as change control, contractor oversight, follow-up from previous inspections, and overall safety culture.

A remote compliance inspection of the Port Hope Project was conducted on 2021 March 29 and 31 that focused on the Radiation Protection Safety and Control Area. The inspection covered CNL's application of the As Low As Reasonably Achievable (ALARA) principle, worker dose control, the performance of the radiation protection program, and radiological hazard control.

A compliance inspection of select Major Sites was conducted on 2021 August 25 and 26. The inspection reviewed several work sites for compliance including Pine Street Extension, Viaducts, and Strachan Street Ravine. The inspection focused on Radiation Protection, Environmental Protection, and Conventional Health and Safety.

A compliance inspection of the Harbour and Centre Pier remediation areas was conducted 2021 October 21 and 22. The scope of the inspection focused on activities taking place at the Port Hope Harbour including the Centre Pier staging area for the harbour remediation and the surrounding harbour walls.

An inspection of both Port Hope and Port Granby projects Emergency Management and Fire Protection programs was conducted between 2021 December 10 to 17. The inspection was mainly on the Emergency Management and Fire Protection safety and control area with a focus on Fire Protection.

Inspections by Other Regulatory Bodies

No inspections from other regulatory bodies took place at the PHP in 2021.

[2] ImpAct – Abbreviation for Improvement and Action. It is an internal process used to identify events, problems, non-conformities, opportunities for improvements, and personnel injuries. The process also identifies and tracks actions to correct or remediate problems.

2.2.3 Self-Assessments

In 2020, six self-assessments were scheduled for the 2020/2021 period across all Historic Waste Program Management Office sites. The self-assessments covered various aspects of the management system, and included safety and control areas. The ERM HWP Self-Assessment 2020/2021 was being tracked through the corporate Improvement Action (ImpAct) system. Two self-assessments were cancelled due to already ongoing and overlapping program initiatives, and four were completed on schedule. The ERM HWP Self-Assessment 2021/2022 Plan is currently in progress. Nine self-assessments have been initiated for this period that will be resolved in 2022.

2.3 Compliance Oversight

An integrated approach to oversight, where all SCAs are streamlined into one process, is used by CNL to confirm the suitability, implementation, and effectiveness of processes applied to PHAI project activities. Compliance objectives for contractual obligations, licensing requirements, Acts and Regulations, environmental management and protection plans, compliance plans, and technical specifications are outlined in the Historic Waste Program Management Office Field Oversight Activities (HWP MO Field Oversight Activities) procedure [**12**].

Activities performed by CNL and by PHAI consultants, contractors, and service providers are subject to CNL's oversight. Recommendations for improvement raised from CNL's compliance oversight activities were dispositioned and implemented.

3 Human Performance Management

3.1 Human Performance Program

The PHP adheres to the Corporate Human Performance (HU) Program. See Section 2 of the ACMR for CNL [**4**] for details.

All CNL employees receive mandatory Human Performance Training. A dedicated CNL Human Performance Branch provides programs and support that help reduce human error and, as a result, the frequency and severity of unplanned events at CNL.

The effectiveness of the HU program at the PHP has been enhanced through a Systematic Approach to Training (SAT) for the following positions:

- CNL Safety Specialist,
- Environmental Technologist,
- Health Physicist, and
- Transportation of Dangerous Goods (TDG) Shipper

Further, there was increased vigilance around ensuring compliance to work practices that involve hoisting and rigging, working alone, hand safety, and confined spaces. There was a project safety pause due to a series of heavy equipment near misses and rising trend of personal injury events. The pause involved a project-wide assessment and subsequent verification of equipment related hazards and controls. A pedestrian machine interface assessment was implemented for high-risk project sites.

3.2 Training program

The PHP adheres to the Corporate Training Program. See Section 2 of the ACMR for CNL [**4**] for details. The *Port Hope Area Initiative Training Plan* (PHAI Training Plan) [**14**] is consistent with CNL's corporate training policies and programs and satisfies the conditions of the LCH [**2**].

3.2.1 Required Training

All PHP personnel, both employees and contractors, are adequately trained (and refreshed) to ensure safe operation of their facilities and to conduct work under the licence [**1**]. Section 2 of the ACMR for CNL [**4**] details the 2021 CNL Employee and Manager/Supervisor required training. Table 5 lists federally/provincially legislated training courses that appear in position-specific training plans at PHP, along with the number of attendees for 2021. CNL maintained a sufficient number of qualified workers in 2021 to carry out licenced activities safely.

The PHAI Training Plan [**14**] defines the training processes applied to the work performed at the PHP and promotes safe and effective workplaces through the cooperation of management, employees, contractors, and visitors. Compliance with the plan ensures that all project staff (including CNL employees and contractors) are qualified to perform their duties effectively and safely, using established processes and standards.

All workers assigned to the PHP are required to attend a PHAI Awareness session to gain general understanding of the project. Contractors are responsible to qualify staff as well as maintain and control their training. Records are inspected regularly by CNL staff during oversights and audits.

The PHAI has a SAT-based training program for the PH WWTP Operations Supervisor position and the PH WWTP Operations Technician position. The SAT-based training includes a specific Training Analysis using the Task Analysis method and Training Plans. Continued progress was made in developing SAT-based training initiatives.

A Curriculum Review Committee, which includes PH WWTP management and training support, has been established and meets regularly. Their mandate includes performance review, system changes and training compliance. The committee met four times during this reporting period. Updates and improvements are monitored in the ongoing action list.

No revisions were made to the PHAI Training Plan [**14**] in 2021.

Table 5 provides a list of federally/provincially legislated training courses that appear in PHAI position-specific training plans.

Table 5: PHAI Operating Staff Training in 2021

Course Code	Course Title	No. of Attendees
OSH-1004-Online	Lock Out Tag Out Exam	3
PHAI-2001	LOTO, WAH, and Pre-Job Brief Refresher	1
OSH-1005-Online	Working at Heights Theory	15
OSH-3005	Working at Heights Practical	4
OSH-1007	Asbestos Module 6E	3
OSH-1019-Online	Orientation on Health and Safety for New and Young Workers	2
OSH-1020	Standard First Aid	34
OSH-1001-Online	Crane (Safe Indoor Hoist) – Theory	12
OSH-1002-Online	Lift Truck Operation – Theory	10
OSH-3002	Pallet Jack – WWTP's	-
OSH-1003-Online	Aerial Work Platform – Theory	6
OSH-9011-Online	Canada Labour Code	-
OSH-1047	Spotter Safety	9
OSH-9070-Online	Arc Flash Safety for Canada	3
OSH-9071-Online	Electrical Safety Introduction for Canada	2
OSH-9076-Online	Electrical Shock	3
OSH-3017	Electrical Safety Watcher	-
TDG-1007	TDG Handler	-
TDG-9003	Transportation of Dangerous Goods by Ground All Classes for Shippers (Initial)	2
OSH-1004	*Lock Out Tag Out*	*3*
OSH-1005	*Working at Heights*	-
OSH-1006	*Confined Space Entry*	-

3.2.2 Contractor Training

Training records for all contractors are verified prior to work commencement and are verified regularly through our Compliance Oversight activities.

Before accessing the PHP, contractors are required to complete the minimum following training:

- Contractor Safety Orientation
- Radiation Protection Group 4 (if required)
- CNL Contractor Code of Conduct
- CNL COVID Awareness

3.2.3 Training Evaluations Summary

Contractors self-evaluate their training records and systems.

4 Operating Performance

4.1 Operating Program

The PHP adheres to the Corporate Operating and Decommissioning Programs. See Section 3.1 and Section 11.2 of the ACMR for CNL [**4**] for details.

4.1.1 Environmental Remediation Operations

This section provides a brief summary of the 2021 project activities. More detailed updates on the PHP activities, as well as a three-month prediction are provided to CNSC on a quarterly basis as required by section 2.3 of the PHP Licence [**1**] and section 3.2.3 (g) of the PHP LCH [**2**].

4.1.2 Enabling Infrastructure

The Phase 2 enabling infrastructure activities described in this section must be undertaken for the respective projects before waste transfer can begin for the described projects.

CNL continued to manage PHP licenced sites during remediation activities in accordance with approved procedures, as outlined in the PHP LCH [**2**].

4.1.2.1 Port Hope Long-Term Waste Management Facility (PH LTWMF)

Phase 2 project activities associated with the PH LTWMF, located at the site of the former Welcome WWMF and adjacent lands, include construction of an engineered above ground mound and associated infrastructure and support facilities. The following updates to this work include:

- Construct temporary on-site infrastructure and support facilities, as part of PH LTWMF operations (in progress)
  - Leachate transfer system installation (e.g., pump houses) was delayed due to COVID-19 Pandemic restrictions. Procurement and installation activities commenced in 2021.
- Construction of the base liner system for mound.
  - Construction of the Cell 2B base liner system was completed and deemed functionally ready for the intended use of waste containment in the fall of 2021. Placement of the select waste layer into Cell 2B was achieved to the prescribed thickness, and the cell became opened to accept bulk waste at the end of 2021.
- Placement of waste from the WWMF site into the PH LTWMF (complete).
  - Continued with excavation of residual contaminated lands (plumes) from the low-lying swamp area west of the mound, area also known as the ‘Future Brush Area to be Cleared’ (FBAC). Excavation activities are scheduled for completion in 2022.

- Placement of waste from other PHP clean-up sites into the PH LTWMF (in progress).
  - Continued with the receipt and long-term storage of historic LLRW from various PHP remediation sites. Maintenance of the PH LTWMF facility was conducted in accordance with maintenance and operational procedures established by CNL and as outlined in Section 3.2 Operations Licence Conditions of the PHP LCH [**2**].
- Preparation of cover liner system and closure of mound (in progress)
  - Continued to monitor design profile and shaping of cells 1, 3, and 2A; capping is scheduled to commence 2023.

4.1.3 Small-Scale Sites

The PHAI Small-Scale Sites (SSS) project involves the radiological survey of Urban Area (formerly Ward 1) properties and a select number of Rural Area (formerly Ward 2) properties in Port Hope (approximately 5,512 properties and 409 roads in total) for the presence of historic LLRW. Activities included remediation of LLRW and/or radiological artifacts on properties where identified by the survey; the restoration of remediated properties; and the safe transportation of the waste to the PH LTWMF for storage. Properties identified with high levels of radon continued to be evaluated. When COVID-19 Pandemic restrictions are lifted to permit access to residences, interior tasks to perform survey work and installation of radon mitigation systems will continue.

4.1.3.1 Characterization of External Properties

Of the 5,512 properties with external lots, 4,817 have been characterized and 1,098 have been identified with LLRW based on our current clean-up criteria. Of the remainder of the 695 exterior properties that have not been characterized, 156 are in some stage of characterization field work planning/execution or are waiting for analytical results; 413 have refused to participate, or CNL has not been granted access by property owners; and 126 represent properties awaiting access determination (e.g., railway lands and laneway properties). The current estimated total number of external properties with LLRW and requiring remediation is 1,181 properties.

4.1.3.2 Characterization of Internal Properties

Of the 4,422 properties with interior spaces, 4,075 have been characterized and 218 have been identified with LLRW. Of the remaining 347 interiors that have not been characterized, one is in-progress and 30 property owners have not granted CNL access, and 11 have recently granted access. There are an additional 305 properties awaiting characterization when COVID-19 Pandemic restrictions allow. The estimated total number of interior properties with LLRW is 237 properties.

4.1.3.3 Characterization of Roads

CNL reviewed boundaries of all Road Allowance (RA) sites and performed a Site ID remapping to align RA sites with the Site ID system that is used to describe site limits and locations for sites under the Properties Characterization scope. In doing so, the number of RA sites has changed since last reporting. Of the 465 (previously 409) RA sites in Port Hope, 132 RA sites (previously 163) were found to have areas of elevated gamma and were included in the Road Allowance Contract 2 (RAC2) for subsurface investigation. 132 RAs were characterized with 91 (previously 98) identified as having LLRW. RAC2 concluded in 2020.

Characterization of Properties work has revealed additional areas within Port Hope RAs that require further testing to confirm status in relation to PHAI Cleanup Criteria. In 2021 May a new contract was awarded (Road Allowance Contract 3 (RAC3)) to characterize 56 high priority sites which are suspected to contain LLRW based on adjacent property results. Fieldwork began in 2021 October and 13 RA Sites under this contract have been drilled in 2021. Also in 2021, development began on another RFP to characterize all remaining RA sites (277 sites) which are suspected to contain LLRW based on adjacent property results within Ward 1 of Port Hope. This Contract will be awarded in 2022.

4.1.3.4 Design of Exterior Properties

To date, 212 property designs have been completed and 240 are actively in the design queue (pre-design survey, 60 % design, 80 % design, etc.). Pre-design activities were maximized in the summer and fall months to prepare for the upcoming Characterization, Engineering Design, Remediation, and Restoration (CEDRR) contract, while design production intentionally decreased in the latter part of 2021 to prepare the CEDRR Task Order documentation and handover.

4.1.3.5 Remediation Design for Road Allowances

A total of five Road Allowance (RA) designs were completed in 2021 and 11 RA designs are in progress. RA designs have been strategically planned to align with the remediation of adjacent neighbourhoods.

4.1.3.6 Remediation of Small-Scale Sites

In 2021, excavations of exterior historic LLRW and backfilling to existing grades was completed at 29 properties.

Interior remediation was completed at one property. Interior remediation was put on hold due to restricted access to interiors of homes associated with COVID-19 Pandemic restrictions.

4.1.4 Major Sites

4.1.4.1 Temporary Storage Sites

No Temporary Storage Site remediation activities were completed in 2021 as all Temporary Storage Sites have proceeded through the remediation phase.

4.1.4.2 Waterfront Area

The Waterfront Area consists of the following sites: West Beach (former Waterworks), Alexander Street Ravine, Centre Pier, Port Hope Harbour, 95 Mill Street South, Canadian National/Canadian Pacific (CN/CP) Viaducts area and Strachan Street. Strachan Street is part of the Waterfront Area - Waterfront Package B.

The long-term contract for the remaining work at the Port Hope Harbour and Centre Pier was awarded. Production mechanical dredging commenced in 2021 June and is continuing. Production hydraulic dredging is scheduled to start and replace mechanical dredging in 2022 spring once the Portable Water Treatment System is commissioned and operational. Replacement/reinforcement of the harbour walls in the inner harbour is also scheduled to begin in 2022 spring.

Delays to the remediation of the former Waterworks (Waterworks East) site which occurred in 2019 as a result of ground water and the influx of lake water due to record levels of Lake Ontario were not recoverable. The COVID-19 Pandemic restrictions put the site into a min-safe state from 2020 March to 2020 June. At the end of FY 2019/2020, the Waterworks East site had all contaminated soils removed and by late 2020 summer, CNL and the contractor had removed as much contaminated sediment from the buried tanks as was feasibly safe. CNL has prepared two special circumstance applications, one for each property parcel owned by Cameco and MPH, respectively, for the sediments remaining in the tanks and for the tank walls. Site restoration was completed in 2021.

In 2020 October, remediation work began at the 95 Mill Street site. CNL worked with the contractor to develop systems to mitigate groundwater issues without shoring. Site remediation and restoration was completed in fall 2021; with minor grading rework to be performed in spring 2022.

A re-characterization on the CN/CP Viaducts was developed to provide more accurate site data before remediation occurred. This characterization was completed prior to the remediation starting in 2021 October. Remediation work is to be completed in late fall 2022, with restoration completion in spring/summer 2023.

In 2019/2020, an updated characterization program was executed at the Strachan Street Ravine site. This data was incorporated into an updated design package. The contract was awarded in 2020 November. Critical plan review progressed through 2020/2021 winter with mobilization expected in 2021 March. However, issues with the contractor delayed mobilization until summer 2021. The Strachan Street site contained approximately 3500 m^3 of LLRW and required a significant effort in the form of sheet piling to support the nearby road. Remediation was

completed in 2022 March but identified the need to apply for a Special Circumstance at depth within the road allowance. Restoration of the site will occur in summer 2022.

In 2019, Package B work included additional characterization drilling for Waterworks West and completion of a preliminary design package for constructability review. The preliminary design package identified a need for further delineation to the west of the creek which bisects the property. Trees were removed from the west of the creek in 2021 winter to accommodate further delineation works and additional characterization. A Special Circumstance has been applied to a very small, targeted area of elevated arsenic, at depth within the beach area. This package is currently out for tender, with mobilization scheduled to take place in summer 2022.

Due to various environmental constraints, CNL will apply a Special Circumstance to a large portion of the original Alexander Street site and to residentially-owned woodlot packages. CNL has begun socializing these applications with the landowners and the municipality. The Special Circumstance Decision Package for the largest portion of the ravine property (privately owned) has been finalized and the property owner has approved the decision. There will be a targeted remediation performed on the municipality owned parcels. The design work and corresponding Special Circumstance is in process. This work will be awarded as part of the new CEDRR task order.

4.1.4.3 Highland Drive Area

The Highland Drive Landfill Area (HDLA) is comprised of three (3) separate and unique sites: Highland Drive Landfill (HDLF) Site, Pine Street Consolidation (PSNE CS) Site and the Highland Drive South Ravine (HDSR).

In 2020 the Highland Drive Landfill Area project team paused the remediation design temporarily while they conducted a Remediation Options Assessment to ensure that the current designs were not only constructible but offered CNL/AECL the best remediation solution possible. These options were presented to AECL for their consideration and formed the basis for the remediation design going forward.

The HDLF achieved some major milestones during the year, the one of most concern to the project schedule was the ECA amendment. The team also finalized the 100% remediation design drawings and the technical specifications and the Statement of Work (SOW). The remediation work in the HDLF is unique in that it involves the removal of Low-Level Radioactive Waste (LLRW) in a Municipal Solid Waste (MSW) Landfill. As such, a site specific Remedial Verification Approach was developed.

The HDSR also realized some milestones. The project team had suspended the remediation design work in 2020 to evaluate the design. In 2021 with careful consideration for the desired outcome and in discussions with CRL and AECL, the project team developed a new conceptual plan that would better address the concerns of working in the ravine. The conceptual plan includes the installation of a Permeable Reactive Barrier (PRB), the remediation of the pond sediment and limited LLRW impacted soil removal. The plan also includes realignment of the creek, the infilling of one pond and the removal of the boathouse and related structures. In

order to validate this conceptual plan, a ground water study and risk evaluation for the application of a special circumstance was completed, and as the plan involved the removal of a building, a Designated Substance Survey (DSS) was conducted on the boathouse. 2021 also saw the development of legal plans and documents by an outside consultant to sever the home located at 28 Bedford Street from the ravine lot. This severance will maintain the ravine in CNL's control throughout the remediation and future monitoring requirements. Through the sale of the house (and large property) CNL intends to recoup some of the cost of the initial purchase. The severance was approved by the Committee of Adjustment dependent upon completion of a revised by-law and associated Cultural Heritage Impact Report, as the property is municipally designated as having Heritage Significance. This final activity will be completed in 2022.

The new CEDRR contract and Task Order 1 for Major sites was initiated in 2021. For the HDLA HDLF, HDSR and Pine Street North Extension roadbed this involved compiling all the necessary documentation (drawings, technical specifications, SOW, historic reports, etc.) as well as creating a technical scoring table and technical question sets for the selected proponents. The project team was required to review proponent questions and provide answers in a timely fashion to accommodate award of the contract.

Throughout the 2021 construction year, site upgrades continued on PSNE CS. The project team finalized the tree removal report and made a donation of several loads of tree trunks to the local high school for their wood working programs. Working with two contractors on site, infrastructure consisting of storm water management ponds, surface water diversion ditching, and contamination control buildings were constructed by one contractor while the other completed the asphalt on the Cavan Street entrance and the first 100m of the access road. The major milestone of starting the excavation of the LLRW was achieved on 2021 May 27 with a brief slowdown in work during the CNL Safety pause in 2021 August.

CNL continues to maintain, monitor, and inspect the PSNE CS and Strachan Street Ravine Consolidation Site as per the PHP Licence [**1**].

4.1.4.4 Industrial Sites

In accordance with the Legal Agreement [**3**], the MPH and the Government of Canada have agreed that CNL will remediate a total volume of 51,250 m^3 of waste at specified industrial (non-radioactive) sites within the MPH. These sites are: Centre Pier, Lions Recreation Centre Park, Former Coal Gasification Plant, Chemetron Lagoon, and the Sewage Treatment Plant Storage Cell (STPSC). The work also calls for the filing of a Record of Site Condition (RSC) per Ontario Regulation 153/04, which entails a Risk Assessment of the contamination identified and installation of Risk Management Measures (RMMs).

Characterization fieldwork was completed in 2019 and 2020. The first RSC submittal called the Pre-Submission Form (PSF) was submitted to the MPH in 2020. CNL then submitted the PSFs for the Industrial Sites to the Ministry of Environment, Climate and Parks (MECP) in 2021. The finalization of the total 51,250 m^3 volume allocation to the Industrial sites has been completed.

Remediation activities are planned to start in 2022.

The following activities were completed at the Industrial Sites in 2021:

- Centre Pier: Additional Phase Two Environmental Site Assessment (ESA) sampling was completed to develop the dataset. The PSF was submitted to the MECP. Remediation will be done after 2024 as part of the Harbour-Centre Pier works.
- Lions Park: Additional Phase Two Environmental Site Assessment (ESA) sampling was completed to develop the dataset. The PSF was submitted to the MECP. CNL conducted additional species at risk (SAR) assessments of the Lions Park property and a woodlot assessment based on the MPH Official Plan designating the site as a Natural Heritage Feature (Woodlot). The Risk Assessment (the next stage of the RSC process) was initiated.
- Coal Gasification Plant: Additional Phase Two Environmental Site Assessment (ESA) sampling was completed to develop the dataset. Some of the work was a direct result of MECP comments on the PSF submission. The Risk Assessment (the next stage of the RSC process) was initiated.
- Chemetron Lagoon: In late 2020 CNL conducted additional sludge and water sampling in the lagoon to better determine its contamination composition and distribution. As a result of this, the design for the remediation was updated in 2021, which was shared with MPH for review. CNL expects to start the remediation of this site in 2022 and then complete the RSC process in subsequent years.
- Sculthorpe Marsh: In 2021 CNL continued to discuss the potential remediation in and around the Marsh with MPH and provincial regulatory agencies. Advice was provided by the MECP and the Ministry of Northern Development, Mines, Resources and Forestry (MNDMNRF) as the Marsh is listed as a Provincially Significant Wetland. MPH is considering the advice provided, and additional discussions will occur in 2022 to determine the preferred path forward
- STPSC: The Industrial Site portion of the work was completed on this site in previous years.

4.1.5 Continued Operation of New Port Hope Waste Water Treatment Plant

The new PH WWTP operated on a fulltime basis throughout the 2021 period, other than the scheduled downtime associated with periodic maintenance. These activities required a full stop of the influent treatment system for a cumulative total of 4 days in August. In general, the PH WWTP water treatment systems had an operational uptime of greater than 98%.

4.1.5.1 Water Collection and Treatment System

The waste water collection system consists of interceptor ditches, a main collection pond and three settling ponds. The water treatment systems include a former treatment building (Old WTB) the new PH WWTP and twin discharge pipelines. The purpose of the former treatment building was to capture groundwater and surface water that came in contact with impacted materials deposited at the historic Welcome Waste Management Facility. The purpose of this system was treating the water to reduce arsenic, radium-226 and uranium concentrations, and discharge the treated water to Lake Ontario.

The new PH WWTP operated normally in 2021 and process interruptions were related only to maintenance related activities, intermittent disruptions to the electrical power grid and operational restrictions of the PH LTWMF (as noted in the preceding section).

A summary of analytical data of influent sampling is provided in Appendix B, Table 17.

A total of 291,100m^3 of influent was collected by the PH WWTP in 2021. This represents a decrease of 2% in volume from 2020 recorded volumes.

4.1.5.2 Operations of Residuals Management Systems

Regular operations of the residual management systems occurred in conjunction with normal water treatment activities throughout 2021. The residuals management equipment includes the clarifiers, evaporators, slurry dryers, and belt press systems. Both sludge and slurry processing streams continue to be optimized.

4.1.5.3 Off-Site Sampling

Water samples were taken monthly from an off-site stream (Brand Creek) within the same watershed as the facility. Samples from this location are intended to detect any migration of contaminants via leachate or runoff from the PH LTWMF. Brand Creek is the main stream in the watershed and is located west of the PH LTWMF. Brand Creek is sampled at the location where the creek crosses Marsh Road. Water samples were analysed for the same parameters as the PH WWTP design objectives. In 2021, results were generally found to be below the Provincial Water Quality Objectives (PWQO) [**15**] and Canada Water Quality Guidelines (CWQG) [**16**], with the exception of Aluminum which exceeded both the PWQO [**15**] and the CWQG [**16**] from 2021 January to 2021 December. Minor exceedances of CWQG [**16**] guidelines for Copper and Lead were reported in the 2021 June sample, for Copper reported in the 2021 February sample, and for Arsenic in the 2021 October sample. Additional details are provided in Appendix B, Table 20.

4.1.6 Port Hope Waste Water Treatment Plant

4.1.6.1 Waste Processing

The production and handling of residual wastes that were generated from the water treatment process was initiated upon final commissioning of the waste handling equipment (2017 December). Further testing and optimization of these and associated processes took place once commissioning activities were complete. Processing of the solids generated from operations began in 2018 April and has continued on a full-time basis since then. A total of approximately 2,710 tonnes of residual waste solids have been produced and transferred to the PH LTWMF holding cells to date.

4.1.6.2 Water Treatment

Ditches around the perimeter of the waste storage area collect surface runoff and direct it overland toward the northwest quadrant of the facility, where the surface water and groundwater are intercepted by a large ditch that leads to the collection pond. Formerly, water was pumped from the collection pond to the treatment building where ferric chloride was added, creating a ferric hydroxide precipitate. The treated water flowed by gravity to treatment ponds (south, centre and north) where the ferric hydroxide precipitate settles and removes arsenic and radium from solution/suspension. The clarified water in the north treatment pond was fed to the treatment building and pumped through twin 4-inch (100 mm) diameter pipelines that extend three kilometres underground from the PH LTWMF to Lake Ontario.

The new PH WWTP employs state of the art technologies including reverse osmosis, sand filtration, mechanical vapor recompression evaporators, slurry dryers and inclined plate clarifiers, but utilizes the same collection ditches and collection pond as its predecessor. The system utilizes these technologies to remove over 99 % of the arsenic, uranium, and other heavy metals in the influent water. The system discharges liquid effluent via the same twin four-inch pipelines that were used from the former WTB.

4.1.6.3 Water Treatment and Monitoring

Influent and effluent samples were collected from the PH WWTP from fixed locations on weekly intervals throughout 2021. Grab samples were taken from a sample point on the pipeline feeding the treatment system and represented the treatment inflow. The treated effluent from the facility was sampled continuously by means of an interval sampler. A composite sample was collected to provide data on the effluent discharge.

The samples of treatment inflow and treated effluent water were submitted to a laboratory on a weekly basis to determine concentrations of the following parameters:

- Aluminum
- Arsenic
- Copper
- Lead
- Uranium
- Zinc
- pH
- Total Suspended Solids
- Radium-226

For the reporting period, the monthly arithmetic mean values of the treatment inflow weekly analyses of the parameters listed above were calculated and are reported in Appendix B, Table 17.

The Effluent Discharge Limits for the PH WWTP, as listed in Appendix B of the PHP Licence [**1**], specifies the monthly arithmetic mean concentration (total) of the contaminants of concern in the effluent discharge water shall not exceed the stated release limits. Additionally, effluent should not be acutely toxic as determined by monthly testing of the effluent. During the reporting period, none of the release limits were exceeded and the effluent was found not to be toxic. A summary of these analyses is provided in Appendix B, Table 16 (final effluent) and Table 19 (effluent toxicity). Histogram charts (Figure 2, Figure 3, and Figure 4) have been prepared for the purposes of comparing year over year results of final effluent results from 2020 and 2021.

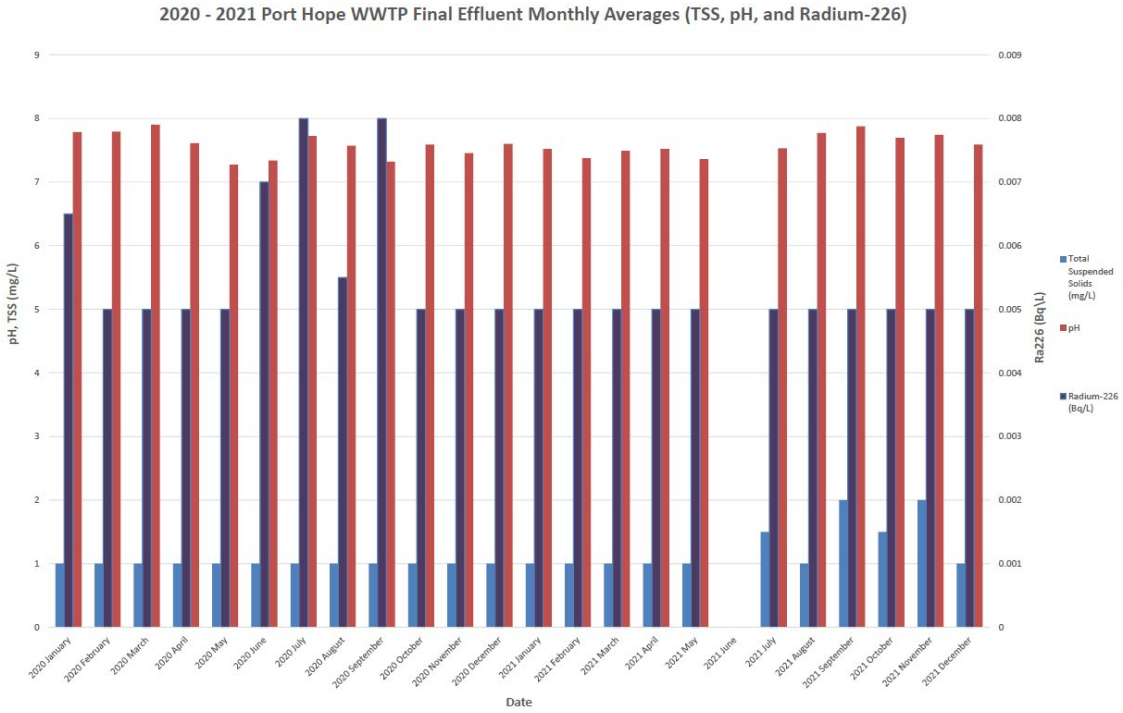

Figure 2: 2020 to 2021 PH WWTP Final Effluent Monthly Averages (TSS, pH and Radium-226) Histogram

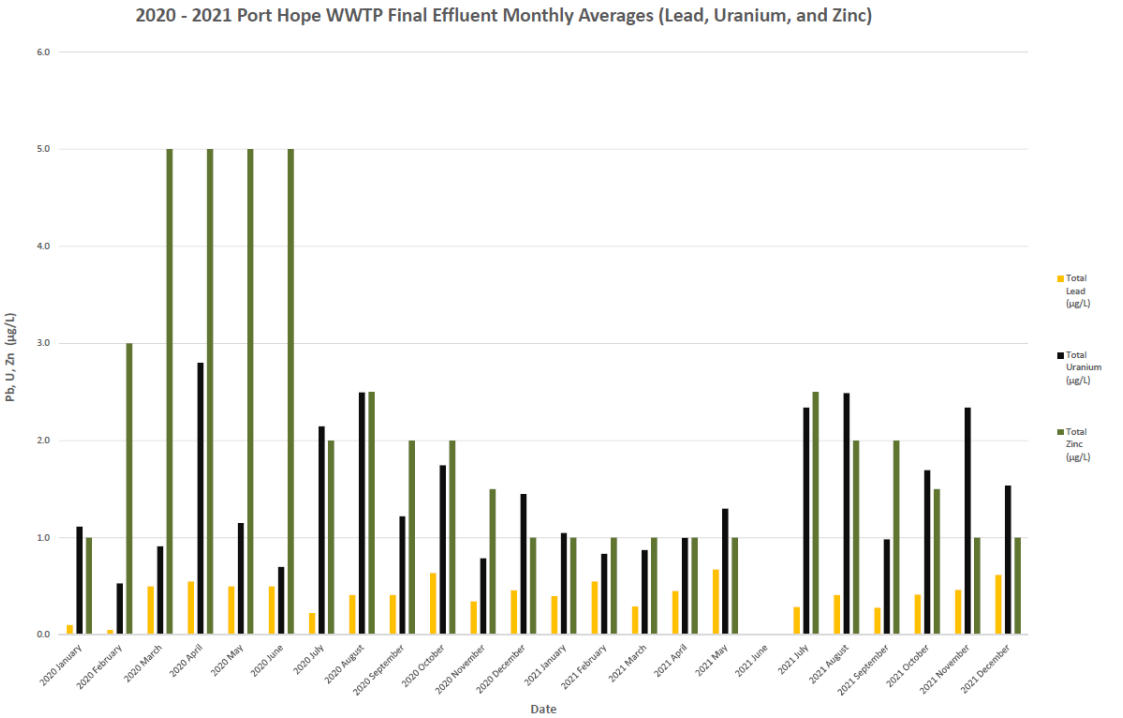

Figure 3: 2020 to 2021 PH WWTP Final Effluent Monthly Averages (Lead, Uranium and Zinc) Histogram

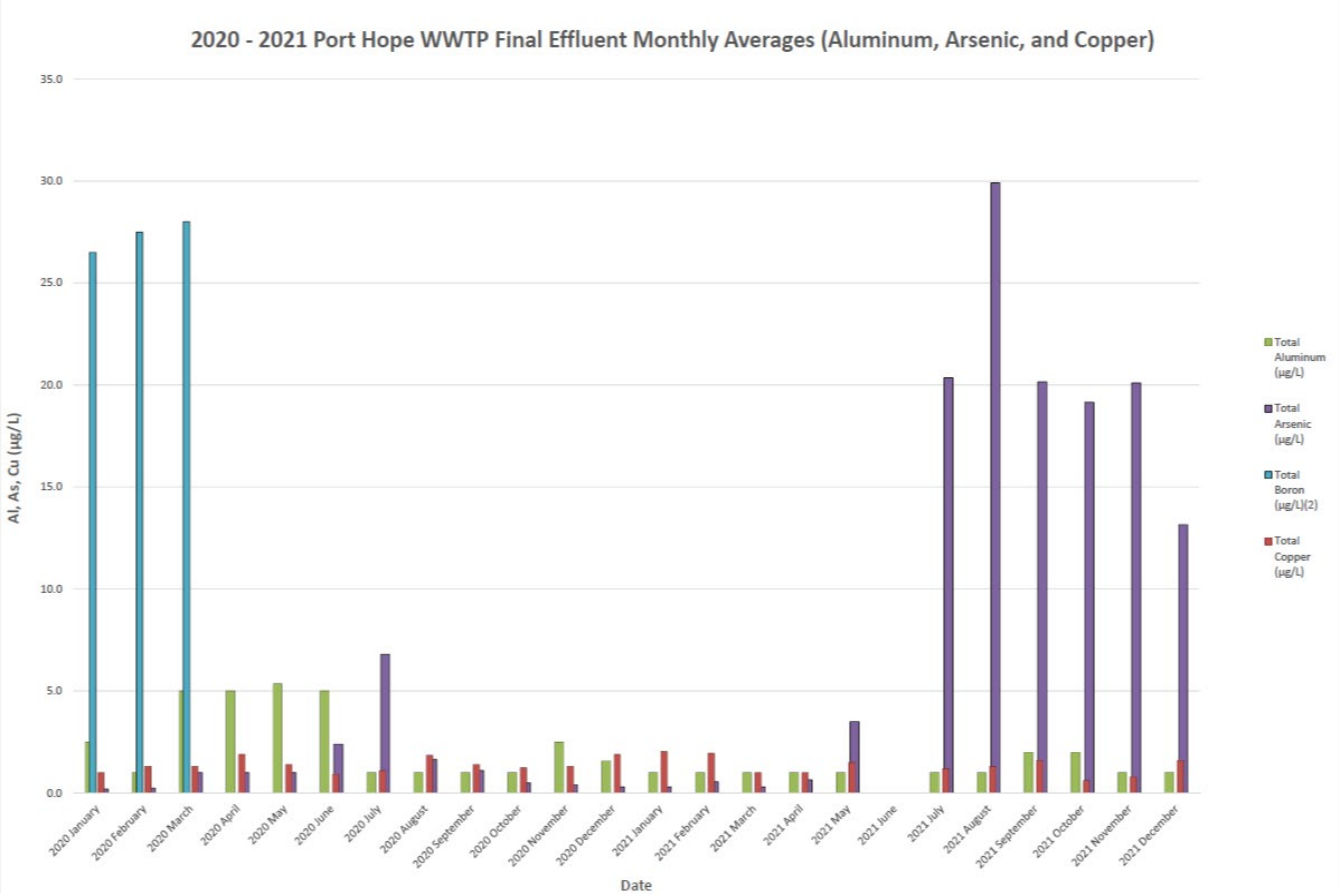

Figure 4: 2020 to 2021 PH WWTP Final Effluent Monthly Averages (Aluminum, Arsenic and Copper) Histogram

A total of 125,000m^3 of effluent was discharged by the WWTP in 2021. This represents a decrease of approximately 11% in volume from 2020 recorded volumes.

4.1.6.4 Residual Solids Treatment and Disposal

The two solid waste streams operated as designed in 2021. As noted above, several key optimizations were made to improve the efficiency and throughput of these processes. The evaporators treat concentrate produced by the reverse osmosis systems and are designed to reduce the overall volume of this waste through the production of condensate. The condensate is combined with permeate generated from the reverse osmosis units and ultimately discharged to Lake Ontario. The evaporated concentrate (slurry) is fed to mechanical dryers for further dewatering. The dried slurry is transferred into bulk storage totes as a flowable solid which are transferred to the PH LTWMF for permanent disposal.

Dissolved solids in the influent liquid waste stream are chemically precipitated and collected as sludge in the clarifier vessels. These solids are stabilized using polymer compounds and held in batches prior to dewatering in the belt filter press. The filtration step removes excess water from the sludge prior to deposition into bulk storage totes which are then transferred to the PH LTWMF for permanent disposal. The decanted water is discharged back to the main collection pond for recirculating treatment.

A combined total of 1,263,700 kg of residual solid wastes were generated by the PH WWTP in 2021. This represents an increase of 70% in production from recorded 2020 production.

4.1.7 Facility Staffing

There were no changes to the positions related to the PHP Licence [**1**] in 2021.

The PHP continued to maintain the minimum staffing requirements to provide the needed operational and safety support.

PH LTWMF: There were no changes to the PH LTWMF positions in 2021.

The PH LTWMF continued to maintain the minimum staffing requirements to provide the needed operational and safety support.

The PH LTWMF Staff complement at the end of 2021 was 25.

The PH WWTP Staff complement at the end of 2021 was 25.

Recruitment efforts continue to ensure CNL is resourced appropriately throughout Phase 2 to reflect increased scope and oversight. Continued growth in headcount will occur in 2022 as the Port Hope Project activities increase.

4.2 Reporting Requirements

4.2.1 Reportable Events to CNSC

In 2021, there were two events that occurred at the PHP that were deemed reportable to the CNSC. They are listed in the table below.

Table 6: Reportable Events to the CNSC at PHP in 2021

Event No.	Title	SCA	Facility (if applicable)
ERM-21-0596	HWP - PH HCP - Stormwater Discharge Exceedance	Environmental Protection	-
ERM-21-2269	HWP - PH SSS - Overhead Powerline Strike	-	-

4.2.2 Reportable Events to Other Regulators

Reports to other regulatory agencies consisted of:

- No Hazardous Occurrence Investigation Reports (HOIR) made to Employment and Social Development Canada (see Section 8 Conventional Health and Safety for further details)
- No reports made to Environment and Climate Change Canada (see Section 9 Environmental Protection for further details).

4.2.3 Trending of Events Related to Operational Activities

As events at the PHP occur, they are recorded in the ImpAct system. This information is regularly reviewed to identify any trends.

A total of four ImpActs with cognitive trending analysis were opened in 2021 across all the HWP, where three of the four trending searches were neither limited nor exclusive to either the Port Hope or Port Granby project sites and one was exclusive to Port Hope. The 2021 Trend ImpActs include the following event types:

- HWP - PH/PG WWTP - TREND "Spills, Over filling, and/or Leaks" Related Events/Incidents.
- HWP - PH/PG MO - TREND "Third-party Laboratory" Related Issues/Errors.
- HWP - PH/PG MO - Adverse TREND "Heavy Equipment" Safety Related Events/Issues.
- HWP - PH Bus Ops - TREND Contractor Data and Reporting Discrepancies.

Three of the four ImpActs were processed, and six corrective actions were assigned to address the event type and contributing factors, one is currently open and ongoing, the remaining three are closed as of 2022 January.

The following table summarizes ImpActs raised over the past five years by Significance Level[3].

Table 7: Number of ImpActs raised at PHP

Year	Level 0[a]	Level 1	Level 2	Level 3	Level 4	Total
2017	0	0	1	6	87	94
2018	7	0	1	38	155	203
2019	0	0	1	21	122	150
2020	3	0	0	5	81	89
2021	1	0	5	31	132	169[bc]

a Level 0 will be assigned if the ImpAct is deemed to be a “non- problem” and a recommendation to close the Impact will be given.
b Total does not include 161 committee-based ImpActs.
c Total does not include an additional five ImpActs and one committee-based ImpAct that were raised for tracking initiatives that span PHAI projects.

[3] Significance Level: Levels assigned to an event (SL1 being most significant, SL4 being least significant) based on the actual or potential result in safety, environmental, or business consequences.

4.2.4 Notification of Conflicts or Inconsistencies

In 2021, there were no conflicts or inconsistencies identified between licence conditions, codes or standards, operations, programs, methods, or regulatory documents referenced in the PHP Licence [**1**] or PHP LCH [**2**].

5 Safety Analysis

5.1 Safety Analysis Program

As per the PHP LCH [**2**] the Safety Analysis Program is not applicable to the PHP.

6 Physical Design

6.1 Design Program

The PHP adheres to the Corporate Design Program. See Section 5.1 of the ACMR for CNL [**4**] for details.

6.1.1 Old Welcome Treatment Building

After continuous operations of the Welcome Treatment Building (WTB) ceased in 2016 December, the system has been inspected by CNL on a weekly basis throughout 2021 to ensure readiness for service in the event of an emergency.

Preventive maintenance orders are generated to ensure routine inspections are conducted on key waste water treatment system components. CNL keeps on retainer certified contractors to provide electrical and mechanical services as needed.

The following operational activities occurred during the reporting period:

- Weekly inspections on WTB to ensure building is ready for service.
- Routine outside maintenance work included grass cutting, road maintenance and snow removal.

6.1.2 Port Hope Waste Water Treatment Plant (PH WWTP)

A remote telemetry and data acquisition system, complete with notification alarms, allows for 24-hour monitoring of water levels and other critical system parameters. The treatment plant process equipment is interfaced with a Supervisory Control and Data Acquisition (SCADA) computer systems.

The new PH WWTP utilizes state of the art technologies to treat water to a higher standard than the former WTB.

The PH WWTP consists of:

- Primary water treatment processes (clarifiers, sand filters, reverse osmosis, building services).
- Residuals management process (evaporators, slurry dryers, belt press).

6.1.3 PH WWTP Action Levels

As of 2020, approved action levels have been implemented at the PH WWTP and updated in the PHP Quarterly Effluent Reports. As per the written communication from the CNSC [**17**], revised release limits were communicated to CNL with regard to weekly composite sample results and the removal of Boron from the reported list of contaminants of concern [**17**].

6.1.4 Engineering Upgrades

In an effort to improve operation of the facility, CNL utilized CRL Design Engineering to implement modifications and upgrades to existing equipment following CNL's Engineering Change Control (ECC) process. These changes and planned upgrades included the following:

- Optimization of the evaporator mechanical and process control systems in order to maximize operational efficiency.
- Completed minor modifications to service water circulation process to improve performance of dependent sub-systems and to increase conservation of treated water usage.
- Finalized planning and completed the installation of a supplemental Reverse Osmosis unit to increase water treatment capacity.
- Continued planning for installation of larger storage tanks to hold an increased volume of soda-ash, sodium hydroxide, and sulphuric acid on site.
- Implemented additional concentrate (brine) process modifications to further enhance salt removal and balance in pond return.
- Completed installation and optimized the function of enhanced heat recovery processes. These changes have demonstrated very good results with respect to primary treatment efficiency and reduced fouling of the system in general.

7 Fitness for Service

7.1 Fitness for Service Program

As per the PHP LCH [**2**], the Fitness for Service Program is not applicable to the PHP.

8 Radiation Protection

8.1 Radiation Protection Program

The PHP adheres to the Corporate Radiation Protection Program. See Section 7 of the ACMR for CNL [**4**] for details.

The Port Hope Area Initiative Radiation Protection Plan (PHAI RP Plan) [**18**] defines the radiation protection measures applicable to PHAI projects at the PHP site and is consistent with CNL's Radiation Protection Program Requirements [**19**]. The purpose of these radiation protection measures is to ensure that the execution of PHAI projects complies with the level of radiation safety required by the relevant regulations pursuant to the Nuclear Safety and Control Act (NSCA) [**6**] and to ensure dose is kept ALARA.

The CNL Contractors (PHP Contractors) responsible for operating various sites in PHAI utilize a CNSC licensed Dosimetry Service Provider (DSP), specifically Health Canada, for monitoring dosimetry on site while CNL site and facility staff (i.e., CNL employees, contingent workers, and sub-contractors) utilize the Chalk River Laboratories (CRL) Licensed DSP. Dose to CNL site and facility staff is not measured independently – only the total dose per person is recorded, irrespective of the site at which the person works (e.g., licensed activities at both Port Hope and Port Granby). CNL site and facility staff and the PHP Contractors who work in, or frequently enter Controlled Areas are assigned Thermoluminescent Dosimeters (TLDs) or Health Canada issued Optically Stimulated Luminescent Dosimeters (OSLDs) respectively to monitor for external radiation deep and shallow dose radiation exposures.

The CNSC was recently notified [**20**] of revisions to the PHAI RP Plan [**18**] which has entered its 6th revision, as per the PHP LCH [**2**].

8.1.1 ALARA Initiatives and Activities

As Low As Reasonably Achievable (ALARA) initiatives and activities continue to be at the forefront of the PHP Radiation Protection (RP) Program. Recent policy changes related to Nuclear Energy Workers (NEWs) triggered an initiative to update and/or register all CNL staff, contractor, and sub-contractors as NEWs. In 2021, refresher training was offered for the use of Unconditional Release forms, Movement of Non-Waste Materials and Equipment, and filter analysis for long lived alpha monitoring. CNL provided training to the RP staff on portable air scrubber high efficiency particulate air (HEPA) filter replacements. Signage and boundary improvements were initiated in 2021 and continue to be implemented for all project sites. CNL provided clarification for nuclear density gauge use on site to contractors and sub-contractors at all project sites. This occurred at all project sites where CNL is required to know which nuclear sources are on CNL's CNSC licensed sites at any given time as well as the responsibility party for their care and control. CNL performed an extent of condition for all sources on PHAI sites based on the discovery of a non-exempt source being labeled incorrectly.

The revisions to the PHAI RP Plan [**18**] were implemented which included further guidance on internal dosimetry and instrumentation requirements. CNL had contractors provide confirmation that:

- Radiation Protection instrument and equipment used for radiation measurements are selected, tested, and calibrated for the task and hazard for which they will be utilized;
- The isotope(s) used for instrument calibration efficiency verification are approved by the HWP MO Manager, Radiation Protection and closely represent the energy and type of radiation (α, β, γ) encountered in the LLRW found in Port Hope and Port Granby;
- Instruments and equipment that are used for radiation measurements are selected, tested, and calibrated for their intended use; and
- Each instrument was calibrated to determine its detection efficiency using traceable, uniform planar sources with an active area of similar dimensions to the detector, where practical. The nuclear substance used should emit radiation similar to that of the potential contaminant.

ALARA initiatives and activities are practiced in every facet of the PHP activities and is specifically addressed through the implementation of the PHP environmental monitoring program's monthly and quarterly deployment of PHP Environmental Radon Monitors and TLDs. Results from the 2021 monitoring program confirm a public dose estimate to be 2.3 % of the annual limit for the public based on the maximum readings from Radon and TLD dose measured along the fence line, with a conservative occupancy period of 60 hours per year. The integrity of the ALARA program is managed through routine monitoring and reviews of dose records to confirm that no adverse trends or exceedance have occurred.

8.1.2 Contamination Control

Routine monitoring across the project has allowed us to confirm that current activities have been executed while minimizing the spread of contamination. For the PHP, 2021 had four personal contamination events and one exceedance within radiological safety zone limits. No exceedances of radiation dose Action Levels or Administrative Controls were noted as a result of these contamination events.

The following Table 8 outlines contamination events that occurred at PHP in 2021:

Table 8: Contamination Events

	Skin and Clothing Contamination				Workplace Contamination	
	Skin[a]	**Personal Clothing[b]**	**Radiological Work Clothing[c]**	**Total**	**Surface[d]**	**Vehicle /Materials [e]**
2017	0	0	0	0	0	1
2018	1	0	0	1	2	0
2019	0	3	0	3	0	0
2020	0	1	1	2	4	0
2021	1	3	0	4	1	0

a Contamination found is greater than 4 Bq/cm^2 beta-gamma or 0.1 Bq/cm^2 alpha
b Contamination detected above background on personal clothing
c Contamination detected is greater than 850 Bq/cm^2 beta/gamma or greater than 30 Bq/cm^2 alpha
d Fixed/loose contamination in excess of limits specified for the applicable radiological zone
e Removable surface contamination detected above background.

The contamination events noted in the table above occurred during planned routine work and regular operations. The total worst case fixed contamination was 0.38 Bq/cm^2 alpha and 0.47 Bq/cm^2 beta based on a 10 cm^2 area. Maximum skin dose received by the worker involved in the skin contamination event was assessed to be 1.91 µSv which is 0.03 % of the PHAI action level and 0.004 % of the public dose limit set by the CNSC.

8.1.3 Sealed Sources

As required by the PHAI RP Plan [**18**], all sealed sources used at the PHP are mandated to be below CNSC exempt quantities as defined in the CNSC Nuclear Substances and Radioactive Devices Regulations. If a non-exempt radioactive source is required to be brought on site, the HWP MO RPP Manager will be informed, and prior approval is required. The main function of the sealed sources at the PHP is for RP instrument function checks and validation. All CNL and contractor-controlled sources are required to be kept secure in a locked cabinet. A sealed source inventory is conducted a minimum of once per year.

CNL performed an extent of conditions for all registered sources on PHP site, based on the 2021 sealed sources inventory conducted at the PHP, there are three CNL and six contractor sources above exemption quantity under direct control of CNL and CNL's contractor, respectively.

All sources were accounted for in the 2021 inventory.

8.1.4 Interpretation of Reported Dose Quantities

The PHAI uses the CRL licensed DSP for external and internal dosimetry for HWP MO staff, contingent workers, and some sub-contractors. HWP MO staff, contingent workers, and sub-contractors whose external and internal dosimetry are monitored using the CRL dosimeters are not measured independent of the site location worked (i.e., staff or contractor may work at more than one PHAI project site); only the total dose per person is recorded, irrespective of the site at which the person works. PHP remediation Contractors use an alternate CNL and CNSC approved dosimetry service provider, where dose is monitored for the assigned PHAI PHP sites where work is performed. In certain instances, contractors my work on multiple sites.

HWP MO staff, contingent workers, and sub-contractors who work within or frequently enter the Controlled Area, are assigned a TLD or OSLD to monitor for external deep and shallow dose radiation exposures. Alternatively, contingent workers and sub-contractors use Optically Stimulated Luminescence Dosimetry equivalents (OSLDs) that are provided by CNSC licensed DSPs. CNL initiated a new quarterly dosimetry period commencing in 2021 January with contractor implementation transitioned where practicable. All external dosimetry are read on a routine basis. Visitors and non-NEWs are typically given Electronic Personal Dosimeters to track dose and to ensure trigger limits identified within the PHAI RP Plan [**18**] are not exceeded.

The Internal Dosimetry program is primarily provided to the CNL Operations and RP staff who work in close proximity with radiological hazards within the PH WWTP. The bioassay is tested for the presence of uranium through in-vivo submissions. All results for uranium bioassay reported were well below CNL's Bioassay Recommendation Level of Minor, which indicates little to no potential for uptake.

CNL's personnel radon exposure program for PHP sites monitors HWP MO staff, contingent workers, and sub-contractors and PHP contractors due to the increased work required to support Phase 2 construction. Phase 2 construction workers were assigned track-etch type Personal Radon detectors and doses are calculated and recorded if the monthly/quarterly average exceeds CNL's trigger level of 150 Bq/m^3. No exceedances were identified.

PHP continues to ensure that doses to staff and contractors are kept ALARA by strict compliance to its Dosimetry program as stipulated in the PHAI RP Plan [**18**].

8.2 Dosimetry

The dose data in all tables represent doses delivered at PHP for all monitored persons, which includes employees (including those in temporary employment such as students), contractors, sub-contractors, visitors, and the PHP Contractors. HWP MO staff, contingent worker, and sub-contractors whose external and internal dosimetry are monitored using the CRL dosimeters are not measured independent of the site location worked (i.e., individuals may work at more than one licensed PHAI project site); only the total dose per person is recorded, irrespective of the site at which the person works. The dose data pertaining the HWP MO staff, contingent workers, and sub-contractors are identical to those reported for PGP dose.

Doses have not been broken down by individual facilities because employees, contractors, and visitors routinely move between facilities without changing TLDs, making it difficult to accurately determine how much dose can be attributed to an employee, contractor, or visitor at a single facility.

The maximum individual effective dose during the current five-year period (2021 January 01 to 2025 December 31, effectively 2021 December 31) (Table 9) is 0.38 mSv, received by a CNL sub-contractor tradesperson.

Table 9: Effective Radiation Doses to PHAI Personnel, Current 5 Year Dosimetry Period (2021- 2025)

Monitored Person Type		Maximum Individual Effective Dose (mSv)				
		2021	2022	2023	2024	2025
NEW	Employee	0.26	-	-	-	-
	Contractor	0.43	-	-	-	-
Non-NEW	Contractor	0.00	-	-	-	-
	Visitor	0.00	-	-	-	-

Table 10: Effective Dose for PHP

Monitored Person Type		Total # of Persons	Dose Range (mSv)							Individual Dose (mSv)			Collective Dose (person·mSv)
			0	0.01-0.50	0.51-1.00	1.01-5.00	5.01-10.00	10.01-20.00	>20.00				
			Number of Persons							Max	Ø Avg[a]	Avg All[b]	
NEW	Employee	193	102	91	0	0	0	0	0	0.26	0.06	0.03	5.32
	Contractor	726	609	117	0	0	0	0	0	0.43	0.09	0.01	10.65
Non-NEW	Contractor	2	2	0	0	0	0	0	0	0	-	0	0
	Visitor	345	345	0	0	0	0	0	0	0	-	0	0
Totals		1266	1058	208	0	0	0	0	0	0.43	0.08	0.01	15.97

a Average of all measured doses that exclude the zero dose value, rounded to two decimal places.
b Average of all measured doses that include the zero dose value, rounded to two decimal places.

Table 11: Distribution of Equivalent Dose to the Skin for PHP

Monitored Person Type		Total # of Persons	Dose Range (mSv)							Individual Dose (mSv)			Collective Dose (person·mSv)
			0	0.01-0.50	0.51-1.00	1.01-5.00	5.01-10.00	10.01-20.00	>20.00				
			Number of Persons							Max	Ø Avg[a]	Avg All[b]	
NEW	Employee	193	101	92	0	0	0	0	0	0.32	0.07	0.03	6.14
	Contractor	726	647	79	0	0	0	0	0	0.44	0.09	0.01	7.34
Non-NEW	Contractor	2	2	0	0	0	0	0	0	0	-	0	0
	Visitor	345	345	0	0	0	0	0	0	0	-	0	0
Totals		1266	1095	171	0	0	0	0	0	0.44	0.08	0.01	13.48

a Average of all measured doses that exclude the zero dose value, rounded to two decimal places.
b Average of all measured doses that include the zero dose value, rounded to two decimal places.

Table 12: Summary of Dose Components Received as a Result of Licensed Activities for 2021 [a]

Monitored Person Type		External Penetrating Dose					External Surface Dose					Extremity Dose				
		Total # Persons	Collective (p·mSv)	Max	Ø Avg[b]	Avg All[c]	Total # Persons	Collective (p·mSv)	Max	Ø Avg[b]	Avg All[c]	Total # Persons	Collective (p·mSv)	Max	Ø Avg[b]	Avg All[c]
NEWs	Employee	193	5.32	0.26	0.06	0.03	193	6.14	0.32	0.07	0.03	-	-	-	-	-
	Contractor	726	6.54	0.38	0.08	0.01	726	7.34	0.44	0.09	0.01	-	-	-	-	-
Non-NEWs	Contractor	2	0	0	-	0	2	0	0	-	0	-	-	-	-	-
	Visitor	345	0	0	-	0	345	0	0	-	0	-	-	-	-	-
Total		1266	11.86	0.38	0.07	0.01	1226	13.46	0.44	0.08	0.01-	-	-	-	-	-

a All quantities are measured in mSv unless otherwise noted.
b Average of all measured doses that exclude the zero dose value, rounded to two decimal places.
c Average of all measured doses that include the zero dose value, rounded to two decimal places.
d Visitor NEWs are persons who were former employee and/or contractor NEWs, but who have returned to the site as visitor while retaining their historical NEW status.

8.2.1 Discussion of Dose Data

No anomalies were noted in the data above. All doses were measured to be less than the assigned dose control point (1 mSv) for all individuals on the project and well below all Action Levels for the project.

8.2.2 Radiation Dose Changes or Trends

As the project continued, Phase 2 Construction doses were expected to remain unchanged from the prior 2020 calendar year. The 2021 whole body dose to all workers (employees, contractors, and students) was determined to be approximately 0.01 mSv for both worker categories. These results are expected given no significant change in scope of work.

8.2.3 Program Exceedances

There were no exceedances of regulatory limits and action levels in the dose monitoring program for the 2021 calendar year.

9 Conventional Health and Safety

9.1 Conventional Health and Safety Program

The PHP adheres to the Corporate Conventional Health and Safety Program. See Section 8 of the ACMR for CNL [**4**] for details.

The *Port Hope Area Initiative Occupational Safety and Health Plan* (PHAI OSH Plan) [**13**] has been developed to define the OSH program applicable to PHAI projects and is consistent with CNL's corporate OSH Program. Contractors conducting work for the PHP project submit site specific health and safety plans for CNL's review and approval to ensure compliance with the PHAI OSH Plan [**13**].

Contractor compliance with their project-specific health and safety plan is examined as part of CNL's oversight program. Compliance oversight is a health and safety initiative that has been implemented to ensure consistency with the requirements of the PHAI OSH Plan [**13**]. CNL conducts routine oversights on contractor project activities to ensure compliance with the approved site-specific health and safety plan.

CNL's primary focus for duration of 2021 was the continued safe response to the COVID-19 Pandemic. This includes managing reported potential or suspected cases of exposure, on-going communication between CNL and contractor personnel on Occupational Health and Safety Act updates, implementation of remote work and project orientation, voluntary on-site nasal swab testing, and the implementation of CNL's vaccine policy. There was a focus on work from home ergonomics and the introduction of a wellness series podcast.

In addition, there was increased vigilance around ensuring compliance to work practices that involve hoisting and rigging, working alone, hand safety and confined space. There was a project safety pause due to a series of heavy equipment near misses and rising trend of personal injury events that involved a project wide assessment and verification of equipment related hazards and controls. A pedestrian machine interface assessment was implemented for high-risk project sites.

The CNSC was previously notified [**21**] of revisions to the *OSH Plan* for the PHAI [**13**].

9.1.1 Site Safety and Health Committee

The Site Safety and Health Committee (SSHC) had nine regular scheduled meetings and one special meeting in 2021.

The Site Safety and Health Committee (SSHC) conducted 10 inspections in 2021.

During 2021 the HWP SSHC maintained efforts on the COVID-19 Pandemic, while also focusing on mental health, workplace stress and supporting gradual return to "new normal" as the Pandemic permitted. A significant number of employees at the HWP sites continued to work remotely, either full time or part time. Workplace inspections were successfully carried out in workplaces during 2021. The majority of the lost time injuries were related to workplace transmission of COVID-19 at one HWP workplace. HWP SSHC did not participate in any investigations in 2021.

9.1.2 Inspections

There were 310 site health and safety inspections completed in 2021.

9.1.3 HOIRs and Lost-Time Injuries

There was one hazardous occurrence at the PHP that was reported to Employment and Social Development Canada in 2021. CNSC staff received copies of this notification, as per the requirements of the CNSC REGDOC-3.1.2 [**22**].

The following is a summary of injury rate data for the last 5 years.

Table 13: Summary of PHP Injury Rate Data

	2017	2018	2019	2020	2021
Port Hope Project					
Person Hours Worked	[redacted]	[redacted]	298,378	391,875	389, 016
Lost-Time Injuries	0	0	1	0	2
Working Days Lost	0	0	33	0	12
Frequency[a]	0	0	0.68	0	1.03
Severity[b]	0	0	22.57	0	6.17
PHP Contractors[c]					
Lost Time Injuries	0	0	0	0	0
Working Days Lost	0	0	0	0	0

a Frequency rate equals # of Lost-Time Injuries x 200 000 hrs of exposure divided by person hours worked (based on 100 Full Time workers).

b Severity rate equals # of Working Days Lost x 200 000 hrs of exposure divided by person hours worked (based on 100 Full Time workers).

c The Number of Person Hours worked are not divulged by Contractors. As such, Frequency and Severity rates cannot be calculated.

10 Environmental Protection

10.1 Environmental Protection Program

PHP adheres to the Corporate Environmental Protection (EnvP) Program. See Section 9 of the ACMR [**4**] for CNL for details.

The CNSC has previously been notified of revisions to Environmental Protection documents, as per the Licence Conditions Handbook [**2**].

10.2 Environmental Monitoring and Environmental Assessment Follow-Up Monitoring

10.2.1 Environmental Monitoring

The monitoring activities reported in this section were led by CNL, including the collection of the field data.

Laboratory analytical services were provided by an accredited laboratory under contract to CNL. The laboratories are accredited to ISO/IEC 17025:2017.

10.2.1.1 Methodology

The methodologies and protocols followed in performing the environmental monitoring are described in the *Port Hope Project Environmental and Biophysical Monitoring Plan* [**23**].

Operational Groundwater Monitoring

Fourteen on-site PH LTWMF observation wells were scheduled to be sampled in 2021, as identified in Appendix B, Table 16. Observation well 1-75 was decommissioned in 2016 as it was within the footprint of the LTWMF, and it will not be replaced. Observation Well 9-75 was damaged and was replaced by WC-LTWMF MW-06 in 2017. Observation Wells 2-75, 12-75 and 18-76 were decommissioned in 2018 as part of the LTWMF activities, with no plans to replace. Observation Wells 2-87 and 5-79 were decommissioned in 2017. Reinstallation of these wells took place in 2019 May with WC-OW2-19 (2-87) and WC-OW5-19 (5-79). Observation Well 36-76 cannot be located with no plans to replace. The remaining nine wells were sampled in 2021 spring and fall. The locations of the observation wells are shown in Appendix A, Figure 12. A summary of the results of the analyses are included in Appendix B, Table 16. Full results are provided in Appendix C. These results are consistent with historical data.

Domestic Wells

In 2021 November, CNL voluntarily sampled domestic wells on 14 residential properties near the WWMF and analysed the samples for arsenic, radium-226, uranium and nitrate concentrations as well as for pH. Residents will be notified in writing about the results. The results are currently being reviewed.

10.3 EA Follow-Up and Environmental Monitoring

Section 3.2.9, Environmental Protection and Monitoring, Conditions 2.9 to 2.11 of the PHP LCH [**2**] applies specifically to the natural environment and associated monitoring.

The purpose of an EA Follow-up Program and the associated Environmental Monitoring Program is to confirm that the environmental effects of a project are consistent with the predictions of the EA and, if they are not, to identify measures to further address those effects.

The primary objectives of the environmental monitoring program are the following:

- Confirm predicted effects by the EA by means of monitoring, sampling, measurements, and analysis.
- Demonstrate compliance with license requirements and follow-up program requirements as stipulated in the *Port Hope Project Environmental Biophysical Monitoring Plan* [**23**].
- Demonstrate the effectiveness of containment and effluent control and provide public assurance of the effectiveness of containment and effluent control.
- Provide data to refine the EA predictions and identify any deviations, positive or negative, in environmental parameters and COPCs.

The secondary objectives of the program are the following:

- Provide data to support operations and plan future phases of the PHAI.
- Provide resources and data that will be of value during unplanned events.
- Demonstrate due diligence.
- Meet stakeholder commitments.

The EA monitoring program is structured using as a framework the six sub-programs of follow up actions. These programs collectively incorporate all the individual activities required for tracking the follow-up actions prescribed in the *Screening Report for the Port Hope Long-Term Low-Level Radioactive Waste Management Project* (PHP Screening Report) [**24**] and involves monitoring the atmospheric environment (air pollution, noise pollution), geology and groundwater (groundwater flow and quality) and aquatic environment (surface water, drainage water quality). The details of the program can be found in the *Port Hope Project Environmental Assessment Follow-up Program* (PHP EA Follow-up Program) [**25**]. This report contains information collected during the 2021 monitoring programs; the status of the Environmental Assessment (EA) commitments for the biophysical effects follow-up monitoring are summarized in Appendix E.

10.3.1 Methodology

The monitoring activities reported in this section were led by CNL, including the collection of the field data. Laboratory analytical services were provided by a laboratory accredited to ISO/IEC 17025, under contract to CNL.

The methodologies used and protocols followed in performing the environmental monitoring are described in the PHP EA Follow-up Program [**25**].

10.3.2 Atmospheric Environmental Monitoring

The prescribed EA follow-up monitoring activities in the atmospheric environment include elements associated with air quality (radiological and non-radiological parameters), noise, and due to the commencement of sediment dredging, dewatering and remediation activities at Port Hope Harbour volatile organic compound (VOC) and odour monitoring.

10.3.2.1 Suspended Particulate Matter (TSP and $PM_{2.5}$)

Air quality monitoring addressed concentrations of suspended particulate that could have been caused by project activities. Two types of suspended particulate were measured:

- Total suspended particulate (TSP) comprising particle sizes < 44 µm in diameter.
- Particulate Matter 2.5 µm (PM2.5) comprising particulate matter with particle sizes < 2.5 µm in diameter.

Port Hope LTWMF

Air quality monitoring was conducted throughout 2021 around the PH LTWMF. A holiday shutdown took place from 2021 December 24 to 2022 January 04. The monitoring program used high-volume (Hi-Vol) air samplers operating at 4 locations for both TSP and $PM_{2.5}$. The locations included Welcome South, Welcome Northwest, Welcome Weather Station and 192 Toronto Road. Air quality monitoring locations are provided in Appendix A, Figure 5 for the PH LTWMF.

Between 217 and 223 samples were collected from each air sampler (TSP and $PM_{2.5}$), with the exception of 192 Toronto Road. In 2021, some electrical issues occurred at the station at 192 Toronto Road, the issues were rectified in 2022 March. A total of 1,559 samples were analyzed during the year. A summary of the sampling results is provided in Appendix B, Table 21, Table 22, Table 23, and Table 24. The Overriding Limit of 120 µg/m^3 for TSP, as defined in the *PHAI Dust Management Requirements and Plan* [**26**] was not exceeded in 2021 at the PH LTWMF. CNL notes that the same criteria are found in *Ontario's Ambient Air Quality Criteria* (AAQC) [**27**].

It should be noted that in 2012, the Canadian Council of Ministers of the Environment (CCME) adopted the Air Quality Management System as a new comprehensive approach to managing air issues [**28**]. Canadian Ambient Air Quality Standards (CAAQS) for Fine Particulate Matter ($PM_{2.5}$) are included, which replace the Canada-wide standards developed in 2000. A 2020 value of 27 µg/m^3 is used for $PM_{2.5}$. The $PM_{2.5}$ results (98th percentile averaged over three years) were compared to this value as a proactive approach to current industry guidelines. $PM_{2.5}$ values were below this level. The PHP Screening Report [**24**] predicted that $PM_{2.5}$ will exceed the 24-hour AAQC [**27**] at some off-site locations.

Additional Analysis – PH LTWMF

The sample containing the highest net weight of TSP collected each week at each of the Hi-Vol monitoring stations was sent for additional analysis to determine the concentration of metals and radionuclides in suspended dust. The PHP Screening Report [**24**] predicted that the 24-hour AAQC [**27**] will be exceeded on occasion for arsenic and cobalt at off-site locations. There were no exceedances for arsenic or cobalt in 2021.

There were no other exceedances of the AAQC [**27**] in 2021. A summary of the results is provided in Appendix B, Table 25, Table 26, Table 27, and Table 28.

The PHP Screening Report [**24**] identified that predicted levels of radionuclides would be below Health Canada Reference Levels. Radium-226 and thorium-232 exceeded the predicted values for some of the filters in 2021; however, they remained well below the Health Canada reference values. It should be noted that the exceedances of the predicted values appear to be related to laboratory detection limits (uncalculated laboratory results were less than the limit of detection for radium-226 and thorium-232).

There were exceedances of the PHP Screening Report [**24**] predicted values for uranium on some of the filters in 2021. The uranium concentrations above the predicted values in 2021 were not attributed to remediation activities. An increase in the laboratory detection limit for uranium since 2020 has resulted in an elevated annual average relative to previous years. Uranium concentrations remained well below the Health Canada reference values.

The predicted values were based on modeling PM_{10} concentrations. Comparing particulate radioactivity on TSP filters to the modelled predictions is taking a conservative approach.

Pine Street Extension Consolidation Site (PSNE CS) Remediation

Air quality monitoring was conducted throughout 2021 around the remediation of the PSNE CS. The locations for Hi-Vol stations were at the Jack Burger Sports Complex, Port Hope High School, and Cavan Candies. Monitoring commenced in 2021 January and continued when dust-generating activities were occurring at the PSE CS. The PSNE CS air quality monitoring locations are provided in Appendix A, Figure 6. Between 172 and 179 samples were collected from each air sampler (TSP and PM2.5).

A summary of the sampling results is provided in Appendix B, Table 29, Table 30, and Table 31. The Overriding Limit of 120 $\mu g/m^3$ for TSP, as defined in the *PHAI Dust Management Requirements and Plan* [**26**] was not exceeded in 2021 at the PSE CS. CNL notes that the same criteria are found in *Ontario's Ambient Air Quality Criteria* (AAQC) [**27**].

It should be noted that in 2012, the Canadian Council of Ministers of the Environment (CCME) adopted the Air Quality Management System as a new comprehensive approach to managing air issues [**28**]. Canadian Ambient Air Quality Standards for Fine Particulate Matter are included, which replace the Canada-wide standards developed in 2000. A 2020 value of 27 $\mu g/m^3$ is used for $PM_{2.5}$. The $PM_{2.5}$ results (98^{th} percentile averaged over 3 years) were compared to this value as a proactive approach to current industry guidelines. $PM_{2.5}$ values below this level. The PHP

Screening Report [**24**] predicted that $PM_{2.5}$ will exceed the 24-hour AAQC [**27**] at some off-site locations.

Additional Analysis – Pine Street Extension Consolidation Site

The sample containing the highest net weight of TSP collected each week at each of the Hi-Vol monitoring stations was sent for additional analysis to determine the concentration of metals and radionuclides in suspended dust. The PHP Screening Report [**24**] predicted that the 24-hour AAQC [**27**] will be exceeded on occasion for arsenic and cobalt at off-site locations. There were no exceedances for arsenic or cobalt in 2021.

There were no exceedances of the AAQC [**27**] in 2021. A summary of the results is provided in Appendix B, Table 32, Table 33, and Table 34.

The PHP Screening Report [**24**] identified that predicted levels of radionuclides would be below Health Canada Reference Levels. Radium-226 and thorium-232 exceeded the predicted values for some of the filters in 2021; however, they remained well below the Health Canada reference values. It should be noted that the exceedances of the predicted values appear to be related to laboratory detection limits (uncalculated laboratory results were less than the limit of detection for radium-226 and thorium-232).

There were exceedances of the PHP Screening Report [**24**] predicted values for uranium on some of the filters in 2021. The uranium concentrations above the predicted values in 2021 were not attributed to remediation activities. An increase in the laboratory detection limit for uranium since 2020 has resulted in an elevated annual average relative to previous years. Uranium concentrations remained well below the Health Canada reference values. The predicted values were based on modeling PM_{10} concentrations. Comparing particulate radioactivity on TSP filters to the modelled predictions is taking a conservative approach.

10.3.2.2 Independent Dust Monitoring

Per the *PHAI Dust Management Requirements and Plan* [**26**], an Independent Dust Monitoring Program is carried out in addition to that conducted by the prime contractor and CNL to ensure that perceived organizational conflicts regarding dust monitoring results and work activities are avoided. Continuous monitoring occurs during the work hours, and results are reported on a 15-minute interval.

The Independent Dust Monitoring Contractor uses real-time monitors to measure TSP at the work site perimeter. The *PHAI Dust Management Requirements and Plan* [**26**] identifies the dust Action Level (AL) for a TSP monitor reading at the work site perimeter to be > 120 $\mu g/m^3$ averaged over 15 minutes. An exceedance of a dust AL triggers an immediate response by CNL and the prime contractor to initiative corrective action to reduce dust levels.

Throughout the year, there were 0 confirmed instances when the 15-minute average exceeded the AL that were attributed to site activities at the PH LTWMF. Real-time dust monitoring results from the Independent Dust Monitoring Program for the PH LTWMF construction are

available at PHAI.ca. The weekly reports include daily real-time dust measurements and a site map illustrating the locations of the independent real-time dust monitors.

10.3.2.3 Volatile Organic Compound (VOC)

Volatile organic compound (VOC) verification monitoring is performed weekly during dredging activities at the Port Hope Harbour. The monitoring program used summa canisters provided by the 3rd party laboratory placed upwind and downwind of the dredging activities.

VOC monitoring commenced 2021 June 24 and samples were collected weekly during Port Hope Harbour dredging activities. Please note that dredging activities were not continuous in 2021 for several unrelated reasons. Results were compared to *Ontario's Ambient Air Quality Criteria* (AAQC) [**27**] 24-hour average, no exceedances were noted in 2021. A summary of the results is provided in Appendix B, Table 35, Table 36, Table 37, and Table 38.

10.3.2.4 Odour Monitoring

Per the Port Hope Environmental and Biophysical Monitoring Plan [**23**], an odour monitoring program is carried out during the sediment dredging, dewatering and remediation activities at the Port Hope Harbour. Twice daily off-site receptors upwind and downwind measurements are collected by a 3rd party consultant.

Based on the general understanding that odour annoyance for most offensive odours begins at about 5 dilution-to-threshold (D/T), this was applied as the threshold level above which mitigation measures were triggered, as per the Port Hope Environmental and Biophysical Monitoring Plan [**23**].

Odour monitoring commenced in 2021 June, prior to dredging activities to collect baseline odour data prior to dredging activities commencing. There were 0 confirmed instances when the threshold level of 5 D/T was reached during dredging activities at Port Hope Harbour off-site receptors.

10.3.2.5 Noise Monitoring

EA follow-up monitoring with respect to noise involves monitoring of noise levels at the PH LTWMF, intersection of the LTWMF Access Road and Toronto Road, selected remediation sites, and along the transportation routes to confirm the accuracy of predictions made during the EA and the effectiveness of the mitigation measures. Additional noise monitoring is also required at the remediation sites to confirm compliance with appropriate by-laws and regulations (*World Health Organization's Guideline for Community Noise* (WHO Guideline for Community Noise) [**29**]. In 2021 noise monitoring was conducted at the PH LTWMF, Highland Drive, and vicinity sites and along the North, Central and South Transportation Routes.

PH LTWMF

Noise monitoring is performed quarterly at several locations around the PH LTWMF and at the intersection of the LTWMF Access Road and Toronto Road to confirm the accuracy of predictions made during the EA and the effectiveness of mitigation measures. Four main monitoring campaigns were conducted in 2021 (January, April, August, and November). The results of the campaigns, averaged logarithmically over 3 working days, are provided in Appendix B, Table 39. The noise monitoring locations are presented in Appendix A, Figure 7.

The PHP Screening Report [**24**] predicted an increase in noise levels of 12 dBA for residents adjacent to the LTWMF during construction and development. In comparing 2021 results to the 2015 results prior to the start of the EW3a/EW1 construction (when levels of activity around the site were comparatively low), it can be observed that slight increases are observed in the 2021 results, however all values were below the predicted range of 12 dBA and the World Health Organization's Guideline for Community Noise (WHO Guideline for Community Noise) [**29**] level of 70 dBA over a 24-hour period. The 2021 results are similar to 2020.

Highland Drive Landfill and Vicinity Sites – PSNE CS

Noise monitoring is performed at three locations around the Highland Drive and vicinity sites. PSNE CS is considered to be part of the vicinity sites. The noise monitoring was conducted to confirm the accuracy of predictions made during the EA and the effectiveness of mitigation measures during peak construction. Two main monitoring campaigns were conducted in 2021 to represent spring/summer (June) and fall/winter (December), as per the as per PH Environmental Biophysical Monitoring Plan [**23**]. The results of the campaigns, averaged logarithmically over 3 working days, and are compared to 2020 results, as this was considered baseline. Noise monitoring locations are provided in Appendix B,

Table 41. Noise monitoring locations are presented in Appendix A, Figure 11.

Monitoring results for the Highland Drive and vicinity sites, as to the 2020 results, show a decrease in at HD-N-0001, slight increase at HD-N-0002 and little to no change at HD-N-0003. All values were below the World Health Organization's Guideline for Community Noise (WHO Guideline for Community Noise) [**29**] level of 70 dB over a 24-hour period.

North, Central and South Transportation Routes

Spot noise monitoring at 1-hour interval measurements, morning and evening, is required seasonally during peak transportation activities as discussed in the PH Environmental Biophysical Monitoring Plan [**23**]. Noise monitoring along the transportation routes took place in 2021 on the North Transportation Route, Central Transportation Route (which includes Strachan Street) and South Transportation Route as outlined in Appendix B, Table 40. The noise monitoring locations are presented in Appendix A, Figure 8, Figure 9, Figure 10. Additional baseline data was collected prior to the transportation routes being used by CNL in 2018, as indicated in Appendix B, Table 40. CNL collected hourly measurements from 7 am to 7 pm for each campaign. The daily averages are reported in Appendix B, Table 40. Monitoring occurred during February, April, September and December along the North, South and Central transportation routes.

Monitoring results for the South Transportation Route showed little to no increase from the 2018 baseline monitoring. The Central Transportation Route showed an increase in the 2021 monitoring when compared to the 2018 baseline. The Northern Transportation Route (NTR-001) showed a slight increase in the 2021 monitoring when compared to the revised 2020 baseline. In 2020, location NTR-002 from the Northern Transportation Route was relocated due to the loss of location to safely secure noise monitoring equipment. The new location for NTR-002 is within a few metres of the previous location. All values were below the World Health Organization's Guideline for Community Noise (WHO Guideline for Community Noise) [**29**] level of 70 dB over a 24-hour period.

10.3.3 Geology and Groundwater Monitoring

The prescribed follow-up monitoring activities in the geology and groundwater environment include elements associated with soil quality, groundwater quality, and drainage/leachate water quality. Results of the monitoring are summarized in the following sections.

10.3.3.1 Groundwater (Flow and Quality) Monitoring

Groundwater flow and quality monitoring is performed twice per year at both the PH LTWMF and Highland Drive as part of the PHP EA Follow-Up Program [**25**].

PH LTWMF

Of the 23 monitoring wells located around the PH LTWMF and monitored as part of the PHP EA Follow-Up Program [**25**], 21 wells were suitable for monitoring (levels and/or quality). These wells are presented in Appendix A, Figure 12 and Appendix C. Groundwater monitoring well WC-MW2-02 could not be located, as it is buried under the shoulder of Brand Road. WC-MW102 was not sampled in 2021 as it is in need of- inspection. CNL is currently developing a scope of work for well maintenance and repair. If WC-MW1-02 and WC-MW2-02 cannot be recovered, they will be re-installed during the Maintenance and Monitoring Phase. Note that wells WC-OW2A-75, WC-OW2-87 and WC-OW5-79 were decommissioned as part of the pond expansion project. Reinstallation of these wells took place in 2019 May with WC-OW2-19 (WC-OW2-87), WC-OW2A-19 (WC-OW2A-75) and WC-OW5-19 (WC OW5-79). In 2017, WC-LTWMF-MW-06 was installed to replace WC OW9-75, which was previously damaged and not operational.

Groundwater samples were collected and analyzed for contaminants twice in 2021. Results of these monitoring campaigns are provided in Appendix C. The results were compared against water quality criteria for potable groundwater conditions listed in Table A2.5 of the PHP Screening Report [**24**]. This is taking a conservative approach, as water is not potable on site, and ensures consistency with reporting from previous years. In addition, results were compared to the Ministry of the Environment and Climate Change groundwater standards; specifically, Table 3 Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition [**30**].

Exceedances near the WWMF are the result of the effects of the current waste management facility, which does not have a complete engineered liner or cover system in place. Monitoring of the groundwater conditions will continue through the phases of the project, and improvements to groundwater quality are expected to occur as the WWMF is remediated and through natural attenuation.

Groundwater monitoring locations are depicted in Appendix A, Figure 12. Groundwater levels were measured quarterly in 2021 and are presented in Appendix B, Table 42. The average groundwater levels in monitoring wells are generally comparable to previous years.

Highland Drive Landfill

In 2021, groundwater monitoring at the Highland Drive site took place as baseline monitoring prior to remediation activities. Of the 28 monitoring wells located around the Highland Drive site and monitored as part of the Port Hope Project Environmental Biophysical Monitoring Plan [**23**] for groundwater quality, 24 wells were located/suitable for groundwater quality monitoring, see Appendix A, Figure 13. PH-95-18 was unable to be sampled in 2021 as it was damaged. PH95-I was decommissioned in 2021 April. PH-90-4-I was blocked and was unable to be sampled in 2021. PH-90-4-II was dry and unable to be sampled in 2021. Sampling took place twice in 2021, as required by the Port Hope Project Environmental Biophysical Monitoring Plan [**23**].

Groundwater samples were collected and analyzed for contaminants twice in 2021 as required by the PHP EA Follow-Up Program [**25**]. Results of these monitoring campaigns are provided in Appendix D. The results were compared against water quality criteria for non-potable groundwater conditions as discussed in the PHP Screening Report [**24**] specifically, those depicted in Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition [**30**].

Exceedances are the result of the effects of the LLRW wastes comingled with the municipal solid wastes at the Highland Drive Landfill site. Monitoring of the groundwater conditions will continue through the phases of the project, and improvements to groundwater quality are expected to occur as the site is remediated. Once remediated, the source of the effects on groundwater will be removed and the groundwater in the vicinity of and downgradient of the landfill will naturally attenuate up through flushing and attenuation mechanisms and the installation of a permeable reactive barrier downgradient of the Highland Drive Landfill site.

Groundwater levels were measured quarterly in 2021 and are presented in Appendix B, Table 43. Of the 41 monitoring wells required to be monitored as part of the EA Follow-Up program, 33 wells were located and deemed suitable for groundwater level monitoring. Of these wells, 28 had calculated water levels as reference groundwater elevation data was not available for five wells. These wells are presented in Appendix A, Figure 13 and Appendix D. Groundwater levels decreased slightly in 2021 when compared to 2020 results.

10.3.3.2 Sentinel Well – PH LTWMF

Groundwater samples are collected twice per year, fall and spring, for the in-place management of arsenic under Cell 1 and Cell 2A/B at the PH LTWMF. Results are compared to averages from previous years to identify trends, as discussed in the PHP Environmental and Biophysical Monitoring Plan [**23**].

A trigger level concentration for arsenic that is 50 % of the PWQO [**15**] for arsenic has been established. The trigger levels have been created as the primary down-gradient receptor of groundwater leaving the site is the tributary to Brand Creek, and Brand Creek is located west of the PH LTWMF. The PWQO [**15**] for arsenic is 100 µg/L. Thus, the internal trigger level for arsenic groundwater monitoring at the sentinel wells at the PH LTWMF is 50 µg/L.

Monitoring results are presented in Appendix B, Table 44. No groundwater results in 2021 reached the internal trigger level of 50 µg/L. Note that wells WC-OW2-87, WC-OW2A-75 and WC-OW5-79 were decommissioned in 2017 fall due to the pond expansion activities. Reinstallation of these wells took place in 2019 May with WC-OW2-19 (WC-OW2-87), WC-OW2A-75 (WC-OW2A-19) and WC-OW5-19 (WC-OW5-79).

10.3.3.3 Soil Monitoring

Soil monitoring activities involved the collection and analyses of surface soil samples at off-site perimeter locations at the PH LTWMF and the Highland Drive remediation site to determine if there has been an increase in contaminant concentrations in these areas as a result of wind-blown dust deposition. Soil located around the PH LTWMF and Highland Drive Landfill was sampled and analyzed for metals and radionuclides in 2021 as presented in Appendix B, Table 45 to Table 51. The soil sampling locations are depicted in Appendix A, Figure 1 and Figure 15.

PH LTWMF

The PHP Screening Report [**24**] predicted maximum concentrations of arsenic and cobalt at the perimeter of the PH LTWMF of 4.7 µg/g and 6.67 µg/g, respectively. In 2021, concentrations of arsenic (5.3 µg/g and 19 µg/g) were greater than these predicted concentrations at PH-WWMF-SS-01 and PH-WWMF-SS-05, respectively. All other sampling location were below predicted concentrations. Values above the predicted concentrations have been observed in previous years at these locations.

The PHP Screening Report [**24**] also indicated that thorium-230 concentrations would increase 63 % over baseline during the construction of the PH LTWMF, to a predicted mean concentration of 97.7 Bq/kg (0.0977 Bq/g), and a maximum predicted concentration of 141.9 Bq/kg (0.1419 Bq/g). Thorium-230 concentrations in 2021 are above predicted mean and maximum values at some locations due to the laboratory detection limits. Results are provided in Appendix B, Table 45 to Table 49. PH LTWMF soil sampling location are depicted on Appendix A, Figure 14 .

Highland Drive Landfill

Remediation activities have not commenced at the Highland Drive landfill site, and therefore the data provided in Appendix B, Table 50 and Table 51 will be used to supplement existing baseline data. Sampling locations are provided in Appendix A, Figure 15. The 2021 results are similar to the data collected in previous years.

10.3.4 Aquatic Environmental Monitoring

The Aquatic Environment Monitoring Program includes sampling surface water at Brand Creek, and Lake Ontario to verify the accuracy of the predictions made during the EA. The expected long term environmental effect is the improved water quality of Brand Creek due to the expected decrease in the contaminated water that currently infiltrates from the underlying groundwater, which eventually discharges to the surface water. In addition, a considerable reduction in contaminant loading from the discharged leachate is considered a long-term beneficial environmental effect of the project. However, slight increases are expected during the construction and remediation phase of the project. As a result, monitoring continues on a quarterly basis for these locations to confirm the EA predictions.

In 2021, additional pre-construction monitoring data was obtained for Brewery Creek, Highland Drive South Creek, and Alexander Creek in anticipation of upcoming remediation activities. Results of the monitoring are summarized in the following sections.

10.3.4.1 Brand Creek Watershed

Surface Water Monitoring – Brand Creek

The water flowing in Brand Creek is sampled on a quarterly basis at four (4) locations. Location BC-U was unable to be sampled in 2021 August due to insufficient surface water. Results were compared to the PWQO [**15**] and CWQG [**16**] where available. The 2021 laboratory results are provided in Appendix B, Table 52, Table 53, Table 54, and Table 55. The surface water monitoring locations are presented in Appendix A, Figure 16.

Results are generally consistent with the monitoring data from 2016 to 2021, suggesting that construction of the PH LTWMF is not having an adverse effect on Brand Creek water quality.

An increase in uranium concentrations were observed in one of the tributaries of Brand Creek (sample location BC-T) relative to the other locations. Exceedances of the PWQO [**15**] were noted in the 2021 January, April, and November samples for uranium. The PWQO [**15**] for cobalt was exceeded at BC-T in 2021 January, April, and November. Arsenic exceeded the CWQG [**15**] at BC-T in 2021 August. This tributary is fed mainly by Clark's Ditch, which receives surface water runoff from the PH LTWMF. Exceedances for uranium and arsenic have been observed in previous years, prior to the construction of the PH LTWMF. The water quality of this tributary is expected to improve over time as remediation progresses. In 2021 August, the CWQG [**16**] for arsenic was exceeded at the downstream location (BC-D).

It should be noted that the provincial and/or federal criteria for iron, chloride and phosphorus were exceeded at the downstream locations in 2021; however, this is consistent with monitoring data from previous years. As discussed in the PHP Screening Report [**24**], the streams in the Local Study Area exceeded for phosphorus, iron, and aluminum, which is typical for agricultural/urban watersheds in the region. This suggests that an off-site source may be responsible for these elevated levels. Elevated levels of chloride are consistent with monitoring from previous years. It is suspected that the elevated chloride concentration may be due to road salt as Highway 401 is located just to the north of the PH LTWMF.

Storm Event Monitoring

Brand Creek was monitored hourly during one storm event in 2021. The laboratory results are provided in Appendix B, Table 56. The surface water monitoring location BC-M was sampled for the storm event, see Appendix A, Figure 16. The contaminant concentrations were observed to peak as Total Suspended Solids (TSS) increased. Concentrations of phosphorus, chloride and iron were observed to exceed the PWQO [**15**] and/or CWQG [**16**] as TSS increased. As noted above, elevated concentrations of aluminum, phosphorus, chloride, and iron are typical for agricultural/urban watersheds in the region. Concentrations of Contaminants of Potential Concern (COPC) associated with the PHAI are predicted to improve in surface water once the project is completed.

Surface Water Monitoring – Lake Ontario Diffuser

The surface water quality of Lake Ontario is sampled at the PHAI diffuser to verify that the water quality in the vicinity of the PH LTWMF leachate discharge and the associated mixing zone is not affected by PH LTWMF operations. The mixing zone is approximately 12 m around the diffuser. Sampling is conducted at the diffuser (location BC-LO-D) and approximately 20 m east and west of the diffuser (location BC-LO-E and BC-LO-W respectively), as presented in Appendix A, Figure 16 Figure A-12. Results are provided in Appendix B, Table 57, Table 58, and Table 59.

There were no exceedances of the PWQO [**15**] or CWQG [**16**], with the exception of fluoride, phosphorus, and iron. Exceedances of fluoride were noted when compared to the CWQG [**16**] in 2021 June and November at BC-LO-D and 2021 September at BC-LO-E. Phosphorus exceeded the PWQO [**15**] in 2021 November at BC-LO-W. Iron exceeded PWQO [**15**] or CWQG [**16**] in 2021 November at BC-LO-W.

As discussed in the PHP Screening Report [**24**], the elevated fluoride, phosphorus and iron concentrations are typical for the nearshore zone of the lake in this region. Other monitoring results are generally consistent with the monitoring data for the past few years, suggesting that PHAI operations are not having an adverse effect on water quality.

Drainage Water – PH LTWMF

The leachate from the PH LTWMF mound (called drainage water) collected in the treatment ponds was sampled twice in 2021 (May and October). Results are presented in Appendix B, Table 60, Table 61, Table 62, and Table 63. Locations are depicted in Appendix A, Figure 17. The drainage water location WC-SW4-02 was unable to be sampled in 2021 at this location due to insufficient water. Historically, this location has had intermittent drainage water present, and samples cannot always be collected.

Elevated concentrations of some COPCs (such as arsenic, uranium and Lead-210) were observed in the 2021 spring sampling campaign relative to previous years. Upon noticing the elevated results, CNL consulted the project team. Elevated concentrations were thought to be due to leachate from the cells. Results from the fall sampling campaign were similar to previous years. Changes in drainage water quality and volume are expected to occur after remediation work commences. It should be noted that drainage water on site is treated prior to release to the environment.

10.3.4.2 Brewery Creek Watershed

Surface Water Monitoring

The PHP Screening Report [**24**] predicted that the removal of contaminated materials from the remediation sites is expected to result in improvements to down-gradient surface water quality; for example, concentrations of arsenic and uranium in Brewery Creek should decrease by 78 % to 88 % in the longer term.

The water flowing in Brewery Creek is sampled on a quarterly basis at 2 locations. The sampling in 2021 is to be considered as pre-construction phase. Results were compared to the PWQO [**15**] or CWQG [**16**] where available. The 2021 laboratory results are provided in Appendix B, Table 64 and Table 65, and the monitoring locations are presented in Appendix A, Figure 18.

Results are all less than the PWQO [**15**] or CWQG [**16**] with the exception of chloride and phosphorus. Chloride was elevated above the CWQG [**16**] for all monitoring campaigns in 2021, which as stated in the PHP Screening Report [**24**] is typical downstream of a landfill. Phosphorus exceeded the PWQO [**15**] in 2021 May and October. As discussed in the PHP Screening Report [**24**], exceedances of phosphorus are typical for agricultural/urban watersheds in the region. No other exceedances of the PWQO [**15**] or CWQG [**16**] were noted in the Brewery Creek watershed.

10.3.4.3 Highland Drive South Creek Watershed

Surface Water Monitoring

Highland Drive South Creek is subject to the influences of the Highland Drive Landfill as it is located downgradient. As discussed in the Port Hope Project Environmental Assessment Study Report (PHP EA Study Report) [**31**] the evaluation of water quality changes in Highland Drive South Creek based on expected changes in loadings from groundwater, indicated that concentrations of key contaminants in the creek, uranium, and arsenic, would not be increased during the site remediation and would decrease by 78% to 88% in the longer term.

The water flowing in Highland Drive South Creek is sampled on a quarterly basis at two locations (HC-U and HC-D). Results were compared to the PWQO [**15**] or CWQG [**16**] where available. The 2021 laboratory results are provided in Appendix B,

Table 66 and Table 67 and the monitoring locations are presented in Appendix A, Figure 19.

The 2021 results are below the PWQO [**15**] or CWQG [**16**] with the exception of arsenic, boron, chloride, fluoride, phosphorus, and uranium at both the up- and down-stream locations and iron at the upstream location.

The sampling conducted in 2021 is considered to be pre-construction monitoring, as outlined in PHP Environmental and Biophysical Monitoring Plan [**23**]. Therefore, elevated results from the 2021 sampling have not been impacted by remediation activities and are consistent with the results from the baseline sampling in 2013.

Sediment Monitoring

The sediments in Highland Drive South Creek are required to be sampled twice in 2021, as outlined in the pre-construction phase of the PHP Environmental and Biophysical Monitoring Plan [**23**]. Results were less than the Provincial Sediment Quality Guidelines (PSQG) [**32**], and the Canadian Council of Ministers of the Environment (CCME) Sediment Quality Guidelines for the Protection of Aquatic Life [**33**], with the exception of arsenic and magnesium. Arsenic exceeded the PSQG [**32**] Lowest Effect Level (LEL) and CCME Interim Sediment Quality Guideline (ISQG) [**33**] for both sampling campaigns in 2021. Magnesium exceeded the PSQG [**32**] LEL and SEL in both campaigns in 2021.

These exceedances were predicted in the PHP EA Study Report [**31**], due to the influence of the Highland Drive Landfill. The PHP Screening Report [**24**] states that the effects on sediment quality are directly related to the effects on the surface water, therefore, contaminant concentrations are expected to decrease in the longer term, after the remediation of the Highland Drive Landfill is complete. The 2021 laboratory results are provided in Appendix B, Table 68 and Table 69, and the monitoring locations are presented in Appendix A, Figure 19. Sediment samples were collected at the upstream location only (HC-U). Insufficient sediment was available at the downstream location (HC-D) to collect a sample for both campaigns in 2021.

Storm Event Monitoring

Highland Drive South Creek was monitored hourly during one storm event in 2021. The sampling took place at the downstream location (HC-D) of the Highland Drive South Creek, as outlined in the pre-construction phase of the PHP Environmental Biophysical Monitoring Plan [**23**]. The contaminant concentrations were observed to peak as Total Suspended Solids (TSS) increased. Concentrations of chloride, arsenic, boron, copper, iron, phosphorus, and uranium were observed to exceed the PWQO [**15**] and/or CWQG [**16**] as TSS increased. Concentrations subsequently reduced as TSS levels declined. COPCs associated with the PHAI are predicted to improve in surface water once the project is completed. The 2021 laboratory results are provided in Appendix B, Table 70 and the monitoring locations are presented in Appendix A, Figure 19.

10.3.4.4 Alexander Creek Watershed

Surface Water Monitoring

The Alexander Creek watershed surface water is required to be sampled quarterly, as outlined in the PHP Environmental Biophysical Monitoring Plan [**23**]. The PHP EA Study Report [**31**] states that the removal of contaminated materials at the remediation sites, Alexander Street Ravine, is expected to result in a long-term improvement to the down-gradient surface water quality. Results were compared to the PWQO [**15**] or CWQG [**16**], where available. The 2021 laboratory results are provided in Appendix B, Table 71 and Table 72, and the monitoring locations are presented in Appendix A, Figure 20.

Results are less than the PWQO [**15**] or CWQG [**16**] with the exception of phosphorus, chloride and iron at both sampling locations, AC-1, and AC-3. Uranium exceeded only at the downstream location, AC-3. As discussed in the PHP Screening Report [**24**], the streams in the Local Study Area exceeded for phosphorus and iron, which is typical for agricultural/urban watersheds in the region. As well, uranium is historically elevated in Alexander Creek, likely due to the influence from Alexander Street Ravine.

The sampling conducted in 2021 is considered to be pre-construction monitoring, as outlined in PHP Environmental and Biophysical Monitoring Plan [**23**]. Therefore, elevated results from the 2021 sampling have not been impacted by remediation activities.

10.3.4.5 Port Hope Harbour

Surface Water Monitoring

Lake Ontario Surface Water Quality

Surface water quality was monitored at three (3) locations in the Port Hope Harbour as shown in Appendix A, Figure 21. The 2021 sampling results are provided in Appendix B, Table 73, Table 74, and Table 75. Concentrations of fluoride were at the CWQG [**16**] through all the sampling campaigns in 2021 at PHH-4. The PHP Screening Report [**24**] discussed fluoride exceedances are typical of agricultural/urban watersheds in the region. Phosphorus was observed outside the range of the PWQO [**15**] at PHH-4 in 2021 September. As discussed in the PHP Screening Report [**24**], concentrations for phosphorus were occasionally elevated above guideline levels in the Port Hope Harbour. Arsenic and uranium exceeded the PWQO [**15**] and CWQG [**16**] at PHH-2 from 2021 June through to November when dredging ceased. Beginning in 2021 September and continuing to November, the concentration of lead, iron, cobalt, and copper were also observed to exceed the PWQO [**15**] and CWQG [**16**] at PHH-2. The PHP Screening Report [**24**] predicted concentrations of uranium would increase in the area between the harbour and Ganaraska River. These exceedances were not noted at the far field location (PHH-4). Once contaminated sediment is removed from the harbour, water quality is predicted to improve as noted in the PHP EA Study Report [**31**].

Surface Water Quality – During Dredging Activities

During dredging operations at the Port Hope Harbour, the PHP Environmental Biophysical Monitoring Plan [**23**] requires weekly sampling in the confluence area beyond the temporary wave attenuator and fish/silt curtain, and in the Ganaraska River above the confluence (PHH-1 and PHH-2) as outlined in Appendix A, Figure 21. Sampling commenced 2021 June 30 and samples were collected weekly during Port Hope Harbour dredging activities. Please note that on 2021 September 16, sampling locations shifted slightly as outlined in Appendix A, Figure 22 (PHH-1a and PHH-2a). This shift in sampling locations occurred due to safety reasons and to ensure consistent monitoring points throughout the calendar year. An Algae Barrier System was also installed close to PHH-2 in 2021. PHH-2a was determined to be more representative of what is entering the Outer Harbour and the confluence. Weekly samples during dredging are currently being collected at PHH-1a and PHH-2a as outlined in Appendix A, Figure 22. Please note that dredging activities were not continuous in 2021. Results are provided in Appendix B, Table 76, and Table 77.

Exceedances of phosphorus and iron above the PWQO [**15**] and/or CWQG [**16**] have taken place since dredging activities commenced in 2021 June at both the PHH-1a and PHH-2/PHH-2a locations. Additional exceedances for arsenic, uranium, cobalt, copper, and lead were observed at the PHH-2/PHH-2a locations. The PHP Screening Report [**24**] predicted concentrations of iron and phosphorus are typical for the nearshore zone of the lake in this region and during dredging operations, and concentrations of uranium would be expected to increase in the area between the harbour and the Ganaraska River.

Predictions from the EA Study Report [**31**] used theoretical/predicted data inputs to a model. Actual conditions related to daily inputs of water to the inner harbour during dredging have resulted in a different set of conditions, requiring that the proposed EA mitigation measures be modified. CNL engaged Responsible Authorities to ensure a path forward for the protection of Lake Ontario and the Ganaraska River. This has resulted in the creation of a robust monitoring program to ensure the protection of the aquatic environment while dredging activities continue at the Port Hope Harbour.

Turbidity Monitoring

Turbidity monitoring was conducted by the Prime Contractor daily during in-water and near-water works in 2021. Dredging activities commenced in 2021 June 30 and continued until the holiday shutdown on 2021 December 24. Please note, dredging at the Port Hope Harbour was not continuous in 2021 due to statutory holidays, routine maintenance, safety stand down, and a pause in dredging due to contaminant exceedances. Monthly reports are provided to CNL with a summary of the turbidity monitoring completed by the Prime Contractor.

Turbidity was monitored at four locations as outlined in the *Port Hope Harbour Turbidity Monitoring Plan* [**34**] (1 location upstream in the Ganaraska River, 2 locations south of the Wave Attenuator and 1 location near the entrance channel in Lake Ontario). Remote turbidity monitors were installed by the Prime Contractor over 2021 April 8 and 9 for Locations 1, 2 and 3. Location 4 was installed 2021 April 19. The remote turbidity monitor at Location 4 in the *Port Hope Harbour Turbidity Monitoring Plan* [**34**] went missing in 2021 October, therefore, manual turbidity measurements were collected on days in which in-water works and/or dredging was taking place. Based on the *Port Hope Harbour Turbidity Monitoring Plan* [**34**], no turbidity exceedances were noted in 2021 attributable to CNL activities.

11 Emergency Management and Fire Protection

11.1 Emergency Preparedness Program

The PHP adheres to the Corporate Emergency Preparedness Program. See Section 10.1 of the ACMR for CNL [**4**] for details.

The Port Hope Area Initiative Emergency Plan (PHAI Emergency Plan) [**35**] has been developed to describe the planning and operational requirements for the response to an emergency directly or indirectly affecting the PHAI projects. The PHAI Emergency Plan is consistent with CNL's Corporate Emergency Preparedness Program which ensures all components of emergency preparedness and response are effectively maintained. Contractors conducting work as part of the PHAI submit emergency preparedness plans to CNL for review and approval to ensure contractor site plans meet the requirements of the PHAI Emergency Plan. Contractor compliance with project-specific emergency preparedness plans are examined as part of CNL's Oversight Program.

The Port Hope Area Initiative Emergency Plan was revised and republished on 2021 July 15. Change includes information on newly created five-year drill plan, significant changes to the independent construction sites section, and further clarifying requirements for contractor's site emergency response plans.

The CNSC has previously been notified [**36**] of revisions to the PHAI Emergency Plan [**35**].

11.1.1 Drills and Exercises

In 2021 a comprehensive five-year plan was created outlining all drills that are required to be conducted and an approximate timeline for those drills. In addition to the five-year drill plan, all drills were completed as per regulatory and programmatic requirements.

Two drills were completed internally.

11.1.2 Training

In 2021, comprehensive emergency steward and officer in charge training was offered to staff at all PHAI facilities and coaching sessions were conducted with all personnel who currently hold officer in charge and emergency steward positions.

11.1.3 External Collaborations

In 2021 May, a remote town hall session with all first responders servicing PHAI locations was held. Site tours were conducted with Port Hope Fire and Emergency Services and Northumberland EMS.

11.1.4 Unplanned Emergency Events

There were three unplanned emergency events at PHP:

- On 2021 June 7 and 2021 June 15 two different tri-axle trucks hauling LLRW soil experienced mechanical breakdowns. For each the site supervisor and support team responded to the event and applicable external notifications where completed. For both events there was no damage to the load or loss of material.
- On 2021 August 11 a dump truck delivering clean fill to a Shuter Street work site moved forward without lowering box and stuck an overhead electrical wire. Wire was pulled off the poll and fell onto the truck. The truck driver remained in vehicle. The site was evacuated, and the area was isolated. The electrical utility was called to respond to turn off power. The driver remained in the truck until electrical utility responders arrived and depowered the line. The event resulted in no injuries.

No PHP incidents required activation of the EOC/SEP in 2021.

11.2 Fire Protection Program

The PHP adheres to the Corporate Fire Protection Program. See Section 10.2 of the ACMR for CNL [**4**] for details.

There were no revisions to Fire Protection documents in 2021.

11.2.1 Fire Response Drills

In 2021 all required annual fire response drills were completed at the PH site. Drill responses identified requirements for updated notification processes, improved training, and awareness on response procedures for previously newly assigned Emergency Stewards. Updated Officer in Charge and Emergency Steward Training was conducted for all CNL sites to correct the deficiencies noted.

11.2.2 External Collaborations

In 2021 May, a remote town hall session with all first responders servicing PHAI locations was held. Site tours were conducted with Port Hope Fire and Emergency Services.

11.2.3 Third Party Audits & Inspections

In 2021, all required routine CNL fire protection program inspections were completed at the PHP. Inspections were completed using standard inspection forms and processes with no significant deficiencies noted with respect to fire hazards and necessary protective measures. Third-party fire system experts conducted inspections and follow-up maintenance on the PG WWTP updated fire system sensors.

11.2.4 Fire Hazard Analysis

In 2021, several fire screening assessments were completed for various maintenance and capital improvement projects in accordance with CNL's ECC program.

12 Waste Management

12.1 Waste Management Program

The PHP adheres to the Corporate Waste Management Program. See Section 11.1 of the ACMR for CNL [**4**] for details.

Additionally, the PHP follows Waste Management Plans to ensure continued support to all waste generators in meeting the strategic priorities and CNL business needs:

- Management of Historic Artefact Recovery Program (HARP).
- Port Hope Project – Management of Historic LLRW.
- Cameco Decommissioning Waste Management Plan.
- Reconfiguration of Administration Building at 196 Toronto Rd.

12.1.1 Waste Management Operations

The waste located at remediation sites in Port Hope will be transported to the PH LTWMF. The PH LTWMF site includes a wastewater treatment plant, an aboveground engineered storage mound (currently under construction) and supporting infrastructure under construction. The LTWMF will have a capacity of approximately 2 million cubic metres comprised of LLRW and non-radioactive Industrial Waste (including contingencies and daily clean soil cover materials).

The engineered aboveground mound at the PH LTWMF has been designed to isolate the historic LLRW that will be received from the remediation sites by securely encasing it on the top, bottom, and sides with thick, multiple layers of natural and specially manufactured materials. These layers form components of the cover and baseliner that, independently, are robust enough to prevent contaminants from entering the environment.

Systems are being installed within and around the mound that will monitor it for hundreds of years. Inspections and monitoring of the collection system for contaminated water (leachate) will confirm the effectiveness of the cover system. Sensors in both the cover and the baseliner will monitor performance, while groundwater quality will be monitored through ongoing testing of specially designed wells surrounding the base.

The waste is generated in accordance with the remediation project plans and is transported from the remediation sites to the PH LTWMF via tandem or triaxle dump trucks. Other non-radiological waste such as clean construction debris, hazardous waste (e.g., fuel spill product, residual chemicals), and general/lunchroom garbage is diverted away from the PH LTWMF site, and is delivered to off-site facilities for management, recycling, and/or disposal. The radioactive waste, or other waste deemed acceptable for receipt at the PH LTWMF is received and placed in accordance with standard operating procedures.

12.1.2 Waste Inventory

On-site waste movement occurred from 2021 January 01 to 2021 December 31. Off-site waste deliveries to the PH LTWMF originated from various sites including Cameco, Waterfront Sites,

SSS and the CMP, and other waste sources such as on-site waste transfers listed in Table 14 below.

Table 14: Waste Transferred to the PH LTWMF

Waste Type	Source	Total Estimated Quantity (volume/weight)	Total Estimated Radioactivity (Bq) [Calculated/ Measured]	Primary Radionuclides
Radioactive	PH WWTP	1,360 tonnes	2.70E+11	Uranium and Uranium Progeny
Radioactive	PH LTWMF – On-Site Waste Placement	0 tonnes	0.00E+00	Uranium and Uranium Progeny
Radioactive	PH LTWMF – Forested and Brush Area	19,910 tonnes	3.95E+12	Uranium and Uranium Progeny
Radioactive	Cameco – Supersacks and Drums	503 tonnes	4.06E+11	Uranium and Uranium Progeny
Radioactive	Cameco – Dump Trucks	4,305 tonnes	N/A	Uranium and Uranium Progeny
Radioactive	TSS (STP, SC)	0 tonnes	0.00E+00	Uranium and Uranium Progeny
Radioactive	Small-Scale Sites – Package 2, 3 and 4 Waste	38,482 tonnes	3.85E+10	Uranium and Uranium Progeny
Radioactive	Pine St	74,418 tonnes	6.50E+11	Uranium and Uranium Progeny
Radioactive	Waterfront Sites	49,976 tonnes	2.24E+11	Uranium and Uranium Progeny
Radioactive	Harbour-Centre Pier	20,749 tonnes	3.93E+12	Uranium and Uranium Progeny
Radioactive	Construction Monitoring Program	1,802 tonnes	1.80E+09	Uranium and Uranium Progeny
Radioactive	PG	36 tonnes	7.14E+09	Uranium and Uranium Progeny
Radioactive	Off-Site Waste Water	2,601 tonnes	N/A	Uranium and Uranium Progeny

[1] The total radioactivity of the offsite waste water is not included since the water is treated at the PH WWTP. The inventory is included in the PH WWTP contribution.

13 Security

13.1 Security Program

The PHP adheres to the Corporate Security Program. See Section 12 of the ACMR for CNL [**4**] for details.

The Port Hope Area Initiative Security Plan (PHAI Security Plan) [**37**] has been implemented for the PHP. The PHAI Security Plan [**37**] establishes the security arrangements that are required for PHAI project sites. It addresses the responsibilities, linkages with local law enforcement, functions, and elements of the security plan such as training, drills, exercises, and various physical security components. The purpose of the PHAI Security Plan [**37**] is to ensure the physical protection of the PHP assets and safeguarding of the public and personnel. The PHAI Security Plan [**37**] is based on applicable legislation, regulations and operating licences and is consistent with CNL's corporate security policies and programs.

Contractors conducting work as part of the PHAI submit security plans. As confirmed through CNL's mandated review and acceptance process, contractor plans are consistent with the requirements of the PHAI Security Plan [**37**]. Contractors' compliance with project-specific security plans is examined as part of CNL's oversight program. In 2021, a project wide security assessment on contractor security clearance and site access was completed. As a result, the PHAI implemented a graded personnel security assessment program.

The CNSC has previously been notified [**38**] of revisions to the PHAI Security Plan [**37**]. Major updates include the newly implemented graded security assessment process and additional cascaded changes to the visitor process.

13.1.1 Security Events

In 2021, there were no security event(s) that affected the PHP.

14 Safeguards and Non-Proliferation

14.1 Safeguards Program

The PHP adheres to the Corporate Nuclear Materials and Safeguards Management (NM&SM) Program. See Chapter 13 of the ACMR for CNL [**4**] for details.

14.1.1 Nuclear Materials Inventory

In 2021, the PH LTWMF (material balance area CNWF) received and placed approximately 25,428 kgU from Cameco (material balance area CNWE) in accordance with the requirements of CNL's Nuclear Materials and Safeguards Management (NM&SM) program. The emplaced inventory has been transferred to retained waste.

In addition, the inventory of nuclear materials in material balance area CN-2 decreased by three items in 2021. The items, which comprised of two sources and one souvenir vial, were sent to Chalk River for long-term management and repurposing.

Table 15: 2021 Nuclear Materials Inventory

Date	Shipment #	Cameco	PH LTWMF	Items	Safeguarded Waste kg U
2021-03-16	67650	CNWE	CNWF	20	8,401
2021-03-16	67651	CNWE	CNWF	20	8,523.9
2021-03-17	67652	CNWE	CNWF	21	8,402.5
2021-11-19	68782	CNWE	CNWF	47	3.701
2021-11-19	68781	CNWE	CNWF	48	3.48
2021-11-19	68807	CNWE	CNWF	44	2.62
2021-11-22	68780	CNWE	CNWF	48	3.453
2021-11-22	68806	CNWE	CNWF	44	5.996
2021-11-22	68812	CNWE	CNWF	48	4.39
2021-11-24	68799	CNWE	CNWF	48	3.826
2021-11-24	68798	CNWE	CNWF	48	2.705
2021-11-24	68800	CNWE	CNWF	48	3.257
2021-11-25	68811	CNWE	CNWF	48	2.377
2021-11-25	68853	CNWE	CNWF	48	4.953
2021-11-25	68857	CNWE	CNWF	48	3.38
2021-11-26	68854	CNWE	CNWF	48	3.136
2021-11-29	68864	CNWE	CNWF	46	5.312

Date	Shipment #	Cameco	PH LTWMF	Items	Safeguarded Waste kg U
2021-11-29	68856	CNWE	CNWF	48	3.969
2021-11-29	68855	CNWE	CNWF	46	4.945
2021-11-29	68859	CNWE	CNWF	42	2.219
2021-12-01	68861	CNWE	CNWF	48	2.662
2021-12-01	68862	CNWE	CNWF	48	4.792
2021-12-01	68868	CNWE	CNWF	48	4.445
2021-12-03	68858	CNWE	CNWF	48	2.759
2021-12-03	68860	CNWE	CNWF	48	2.834
2021-12-03	68871	CNWE	CNWF	48	3.128
2021-12-06	68870	CNWE	CNWF	48	3.743
2021-12-06	68872	CNWE	CNWF	10	0.869
2021-12-06	68873	CNWE	CNWF	10	0.988
2021-12-13	68905	CNWE	CNWF	48	3.375
2021-12-20	68908	CNWE	CNWF	48	2.702
			Total	1310	25,423,416

14.1.2 International Atomic Energy Agency (IAEA) Activities

The International Atomic Energy Agency (IAEA) conducted routine seal replacement on the IAEA Portal Monitor on 2021 August 5. The PH LTWMF was not selected for a Physical Inventory Verification in 2021.

A list of IAEA inspections conducted at all CNL sites can be found in Section 1.2, Management System of the ACMR for CNL [**4**].

15 Packaging and Transport

15.1 Packaging and Transport Program

The PHP adheres to the Corporate Transportation of Dangerous (TDG) Goods Program, which includes the requirements of the Packaging and Transport SCA. See Section 14 of the ACMR for CNL [**4**] for details.

The *Port Hope Area Initiative Transportation of Dangerous Goods Plan* (PHAI TDG Plan) [**39**] applies to any activities involving the transportation of dangerous goods to, or from CNL sites. The TDG program provides an operational framework for the safe off-site transport of dangerous goods by conforming to all applicable laws and regulations, as well as CNL policies and procedures.

In addition, firms or contractors performing work on behalf of CNL for the PHAI project under the PHP Licence [**1**] adhere to project specific work plans, which are compliant with the PHAI TDG Plan [**39**].

There were no revisions made to the PHAI TDG Plan [**39**] in 2021.

15.1.1 Shipments

The implementation of the TDG program for the PHAI project is detailed in the PHAI TDG Plan [**39**]. Each contract is required to adhere to the PHAI TDG Plan [**39**], and project specific implementation is reviewed against the requirements of this plan. Shipments of dangerous goods have occurred throughout 2021. Furthermore, ongoing oversight of each contract is performed to ensure continuous adherence to the plan or recommend incremental improvements to the means and methods to deliver a project.

There were no reportable events related to the TDG program in 2021.

16 Acronyms

AAQC	Ambient Air Quality Criteria
ALARA	As Low As Reasonably Achievable
AECL	Atomic Energy of Canada Limited
CCME	Canadian Council of Ministers of the Environment
CNL	Canadian Nuclear Laboratories
CNSC	Canadian Nuclear Safety Commission
CRL	Chalk River Laboratories
CLG	Citizen Liaison Group
CRP	Complaints Resolution Process
COPC	Contaminants of Potential Concern
dBA	Decibels
DSP	Dosimetry Service Provider
EGGC	East Gorge Groundwater Collection
ECC	Engineering Change Control
ECCC	Environment and Climate Change Canada
EA	Environmental Assessment
EQ	Equalization
HOIR	Hazardous Occurrence Investigation Reports
Hi-Vol	High Volume
HWP MO	Historic Waste Program Management Office
HU	Human Performance
ImpAct	Improvement Action
IWC	Integrated Work Control
ISQG	Interim Sediment Quality Guideline
LCH	Licence Conditions Handbook
LLRW	Low Level Radioactive Waste
LCV	Lowest Chronic Value
LEL	Lowest Effect Level
MECP	Ministry of the Environment, Conservation, and Parks (Ontario)
MNDMNRF	Ministry of Northern Development, Mines, Resources and Forestry

MPH	Municipality of Port Hope
NORM	Naturally Occurring Radioactive Material
NSDF	Near Surface Disposal Facility
NEW	Nuclear Energy Worker
NSCA	Nuclear Safety and Control Act
OSH	Occupational Safety and Health
OFI	Opportunity for Improvement
OSLD	Optically Stimulated Luminescence Dosimetry
PM	Particulate Matter
PG LTWMF	Port Granby Long-term Waste Management Facility
PGP	Port Granby Project
PG WMF	Port Granby Waste Management Facility
PG WWTP	Port Granby Waste Water Treatment Plant
PHAI	Port Hope Area Initiative
PHP	Port Hope Long-Term Low-Level Radioactive Waste Management Project
PH LTWMF	Port Hope Long-Term Waste Management Facility
PVP	Property Value Protection

17 References

[1] Canadian Nuclear Safety Commission, *Port Hope Long-Term Low-Level Radioactive Waste Management Project Waste Nuclear Substance Licence, WNSL-W1-2310.02/2022*, Expiry Date: 2022 December 31.

[2] Canadian Nuclear Safety Commission, *Port Hope Long-Term Low-Level Radioactive Waste Management - Licence Conditions Handbook WNSL-W1-LCH-2310*, Revision 1, 2014 December 04.

[3] *An Agreement for the Cleanup and Long-Term Safe Management of Low-Level Radioactive Waste Situated in The Town of Port Hope, The Township of Hope and the Municipality of Clarington*, LLRWMO-513700-110-11000-008, 2001 March 29.

[4] *Annual Compliance Monitoring Report for Canadian Nuclear Laboratories*, 145-00583-ACMR-2021, Revision 0, 2022 April.

[5] Letter, M. Gull to R. Jammal, J. Cameron, P. Elder, *Notification of Change in Site Licence Holder at Canadian Nuclear Laboratories,* 140-CNNO-21-0001-L, 2021 February 24.

[6] *Nuclear Safety and Control Act*, S.C. 1997, c. 9, 2013 July.

[7] Canadian Nuclear Safety Commission, *Waste Nuclear Substance Licence – Pine Street Extension Temporary Storage Site,* WNSL-W1-182.1/2022, Expiry Date: 2022 December 31.

[8] Canadian Nuclear Safety Commission, *Waste Nuclear Substance Licence – Port Hope Radioactive Management Facility,* WNSL-W1344.1.8/ind., Expiry Date: Indefinite.

[9] Canadian Nuclear Safety Commission, *Public Information and Disclosure*, REGDOC-3.2.1, 2018 April 27.

[10] *Port Hope Area Initiative (PHAI) Phase 2 Public Information Program Plan,* 4500-513000-PLA-003, Revision 4, 2020 March.

[11] *Historic Waste Program Quality Plan*, 236-514200-QAP-001, Revision 1, 2020 December.

[12] *HWP MO Field Oversight Activities.* 236-514200-PRO-001, Revision 2, 2021 December.

[13] *Occupational Safety and Health Plan*, Port Hope Area Initiative, 4500-510400-PLA-001, Revision 3, 2021 July 15.

[14] *Port Hope Area Initiative Training Plan*, 4500-510200-PLA-001, Revision 3, 2016 August.

[15] Ontario Ministry of the Environment, *Provincial Water Quality Objectives*, 1999 February.

[16] Canadian Council of Ministers of the Environment, *Canadian Water Quality Guidelines for Protection of Aquatic Life*, 1999.

[17] Letter, R. Buhr (CNSC) to S. Morris (CNL), *Port Hope Project Waste Water Treatment Plant Release Limits,* 4501-NOCN-20-0006-L, 2020 April 20.

[18] *Port Hope Area Initiative Radiation Protection Plan,* 4500-508740-PLA-001, Revision 6, 2021 September 01.

[19] CNL, *Radiation Protection Program Requirements Management System Documen*t, 900-508740-PRD-001. Revision 2, 2017 July 17.

[20] Letter, S. Morris (CNL) to R. Buhr (CNSC), *Revision to the Port Hope Area Initiative Radiation Protection Plan,* 4500-CNNO-21-0008-L, 2021 September 02.

[21] Letter, S. Morris (CNL) to R. Buhr (CNSC), *Revision to the Port Hope Area Initiative Occupational Safety and Health Plan*, 4500-CNNO-21-0017-L, 2021 December 10.

[22] Canadian Nuclear Safety Commission, *Reporting Requirements*, REGDOC-3.1.2, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills, April 2021.

[23] *Port Hope Project Environmental and Biophysical Monitoring Plan*, 4501-509247-PLA-001, Revision 2, 2018 October.

[24] Government of Canada, *Screening Report – The Port Hope Long-Term Low-Level Radioactive Waste,* 4501-03710-041-000-0002, Revision 0, 2006 December.

[25] *Port Hope Project Environmental Assessment Follow-up Program*, 4501-509246-PLA-001, Revision 2, 2015 April.

[26] *Port Hope Area Initiative Dust Management Requirements and Plan*, 4500-509200-PLA-001, Revision 3, 2018 March.

[27] Ontario Ministry of the Environment and Climate Change, *Ambient Air Quality Criteria (AAQC)*, 2020 April.

[28] Canadian Council of Ministers of the Environment, *Guidance Document on Achievement Determination Canadian Ambient Air Quality Standards for Fine Particulate Matter and Ozone.* Available at: https://ccme.ca/en/res/pn1483_gdad_eng-secured.pdf, Accessed: 2021 April.

[29] World Health Organization, *Guidelines for Community Noise*, Edited by B. Berglund, T., 1999.

[30] Ontario Ministry of the Environment, *Soil, ground water and sediment standards for use under Part XV.1 of the Environmental Protection Act*., 2011. Available at: https://www.ontario.ca/page/soil-ground water and-sediment-standards-use-under-part-xv1-environmental protection act, Accessed: 2021 April.

[31] *Port Hope Project Environmental Assessment Study Report,* LLRWMO-03710-ENA-12003, Revision 1D1, 2006 January.

[32] Ontario Ministry of the Environment, *Guidelines for Identifying, Assessing and Managing Contaminated Sediments in Ontario: An Integrated Approach - Provincial Sediment Quality Guidelines,* Revision 0, 2008 May.

[33] Canadian Council of Ministers of the Environment, *Sediment Quality Guidelines for the Protection of Aquatic Life,* 1993 August.

[34] *Port Hope Harbour Turbidity Monitoring Work Plan*, 4501-121250-PLA-069, Revision 0, 2020 October.

[35] *Port Hope Area Initiative Emergency Plan,* 4500-508730-PLA-001, Revision 3, 2021 July 15.

[36] Letter, S. Morris (CNL) to R. Buhr (CNSC), *Revision to the Port Hope Area Initiative Emergency Plan,* 4500-CNNO-21-0012-L, 2021 November 12.

[37] *Port Hope Area Initiative Security Plan,* 4500-508710-PLA-001, Revision 3, 2021 September 20.

[38] Letter, S. Morris (CNL) to R. Buhr (CNSC), *Revision to the Port Hope Area Initiative Security Plan*, 4500-CNNO-21-0013-L, 2021 November 12.

[39] P*ort Hope Area Initiative (PHAI) Transportation of Dangerous Goods Plan*. 4500-508520-PLA-001, Revision 4, 2018 June 21.

[40] *Port Hope Project Dust Management and Requirements Plan - Small-Scale Sites Remediation*, 4501-209200-PLA-01, Revision 0, 2018 March 26.

Appendix A EA MONITORING LOCATIONS

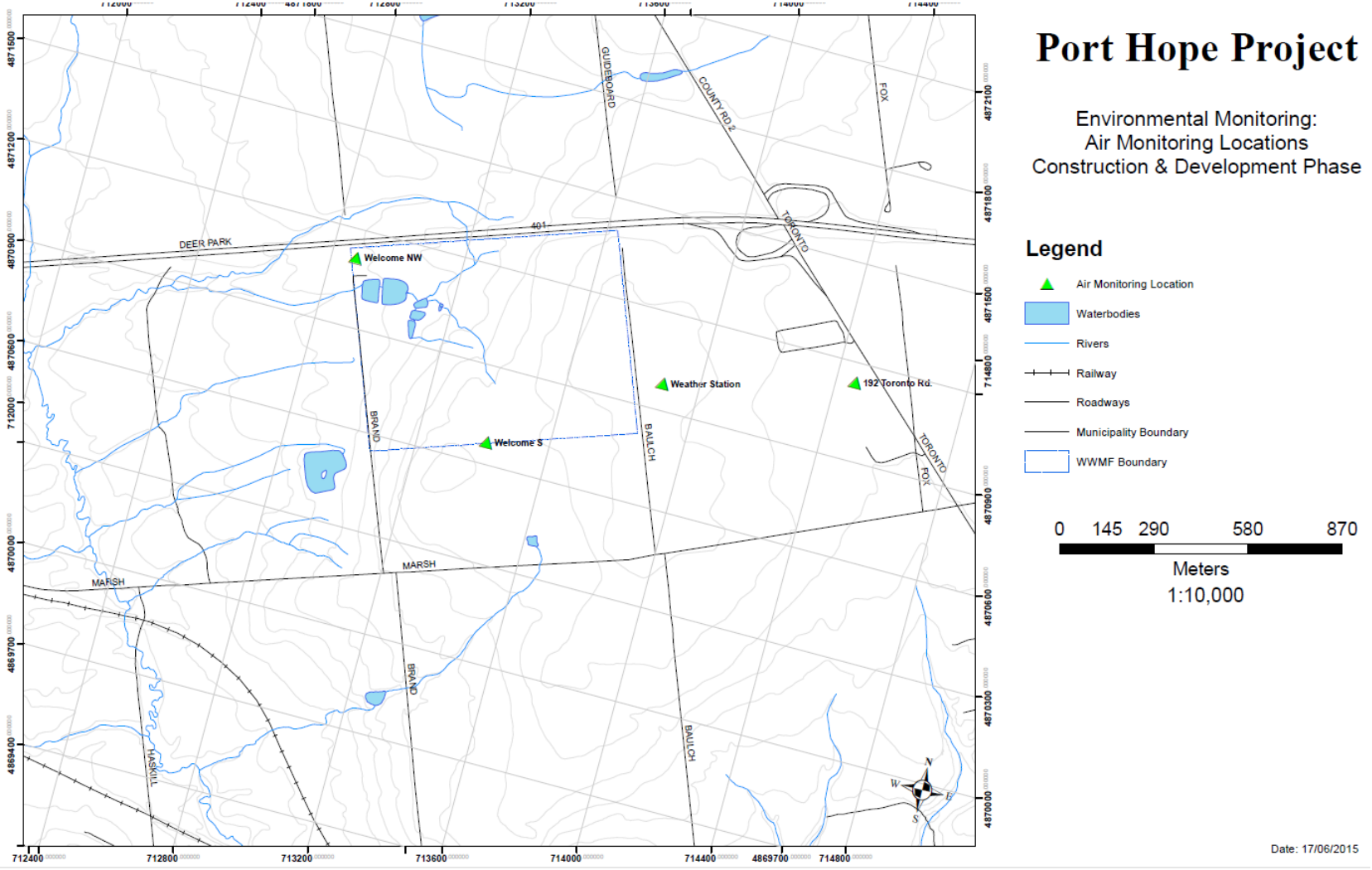

Figure 5: PHP LTWMF high-volume air sampler locations.

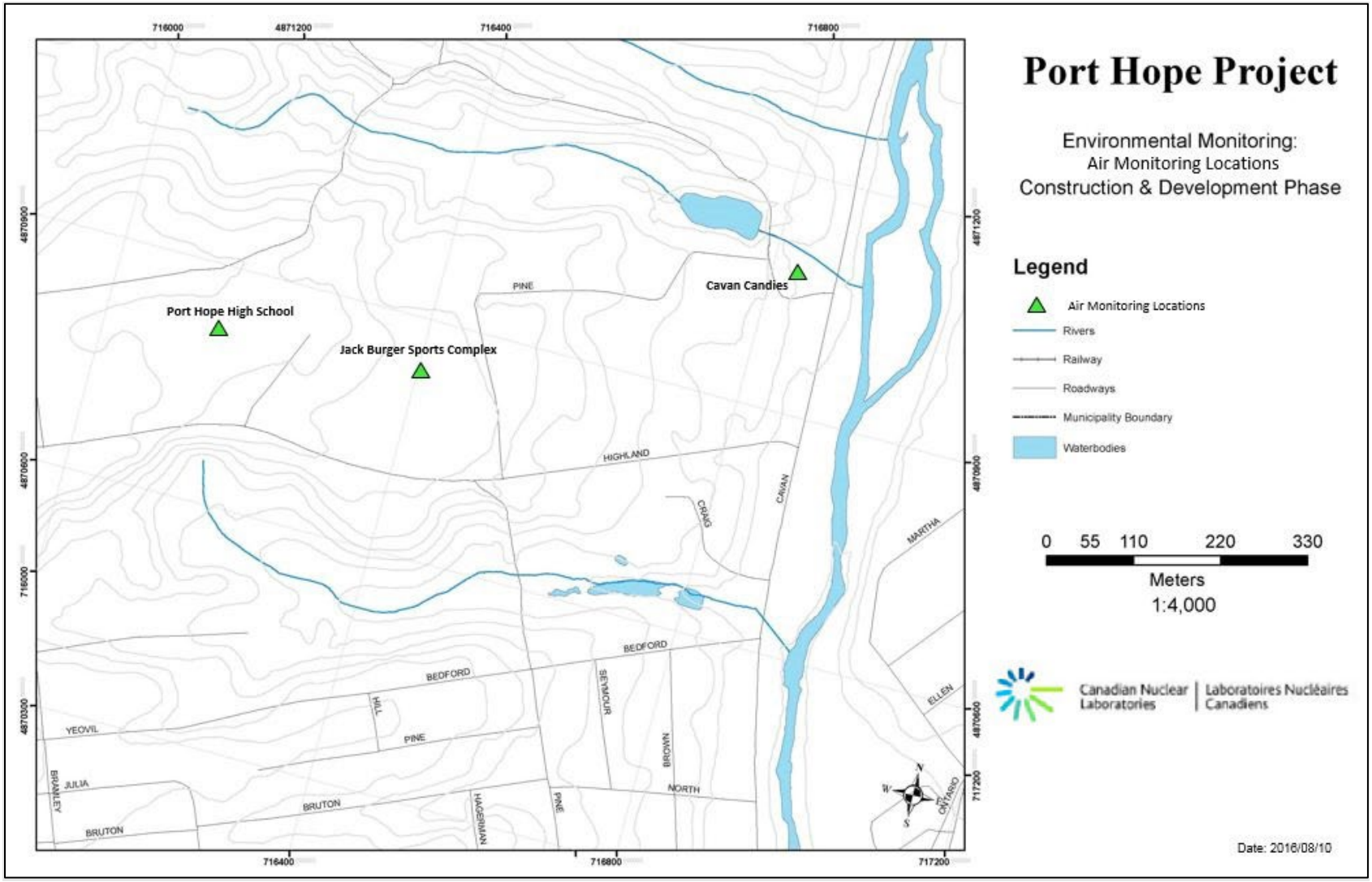

Figure 6: Pine Street Extension Consolidation Site air monitoring locations.

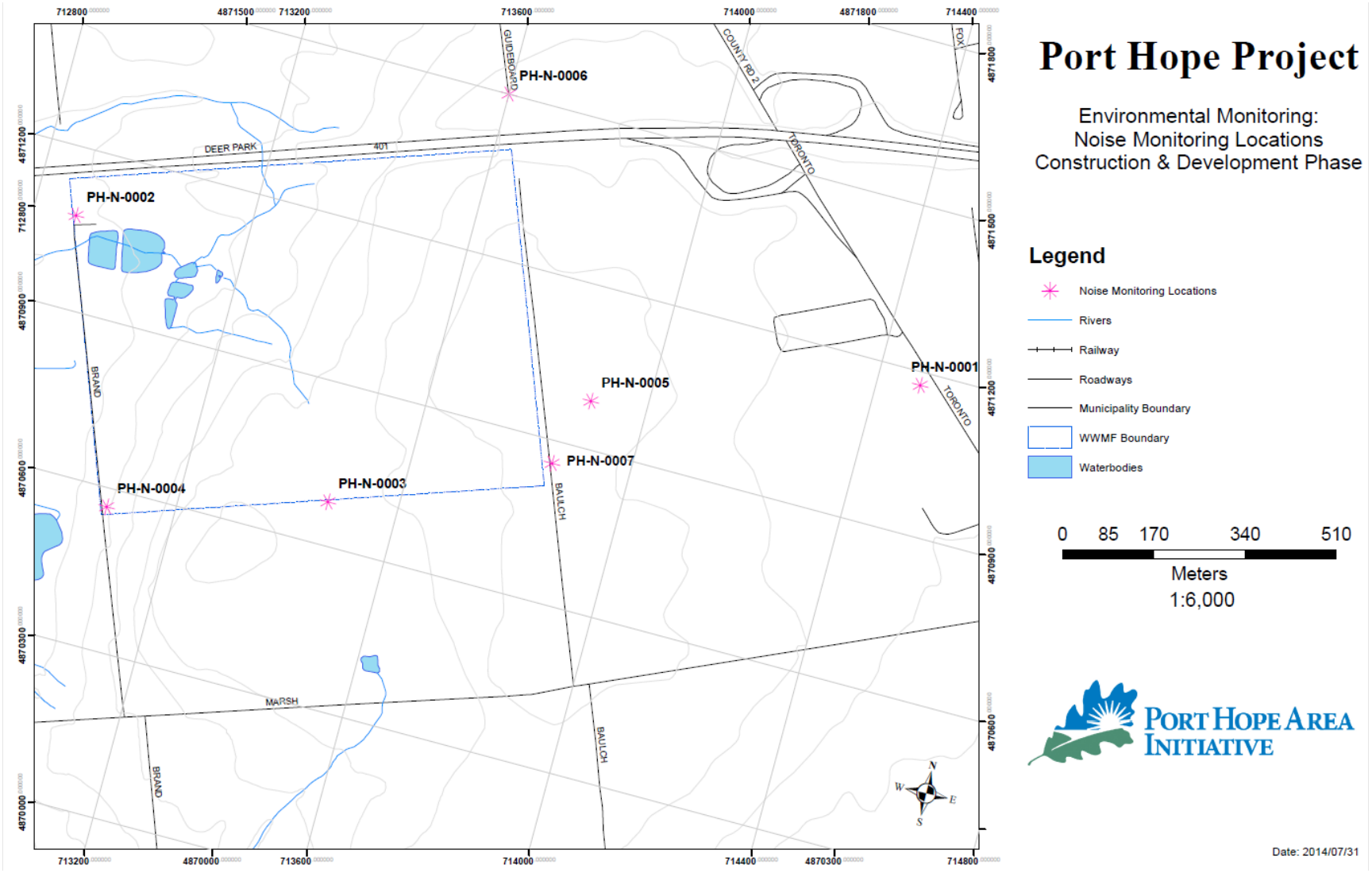

Figure 7: PH LTWMF noise monitoring locations.

Figure 8: Central Transportation Route noise monitoring locations.

Figure 9: Northern Transportation Route noise monitoring locations.

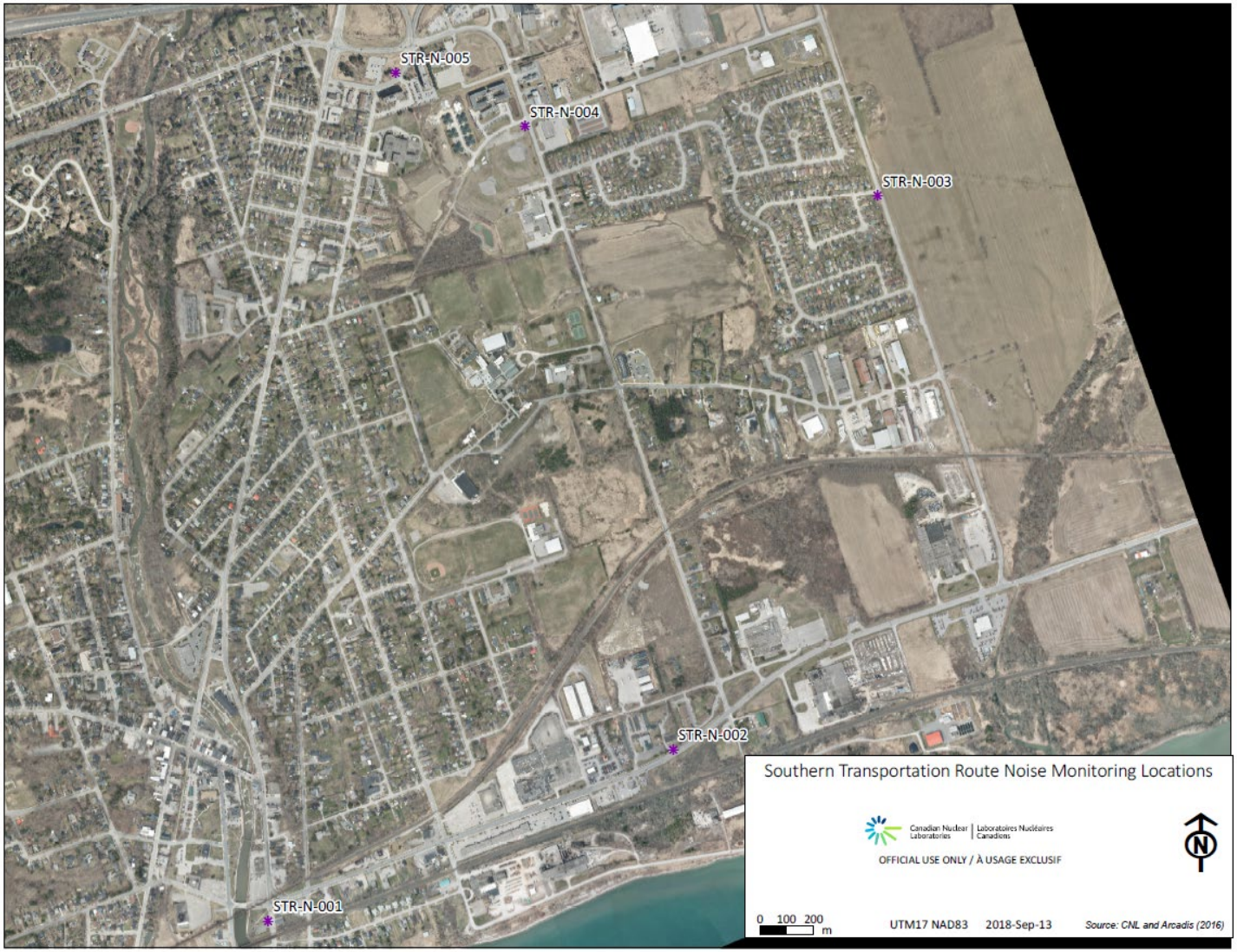

Figure 10: Southern Transportation Route noise monitoring locations.

Figure 11: Highland Drive Noise Monitoring Locations.

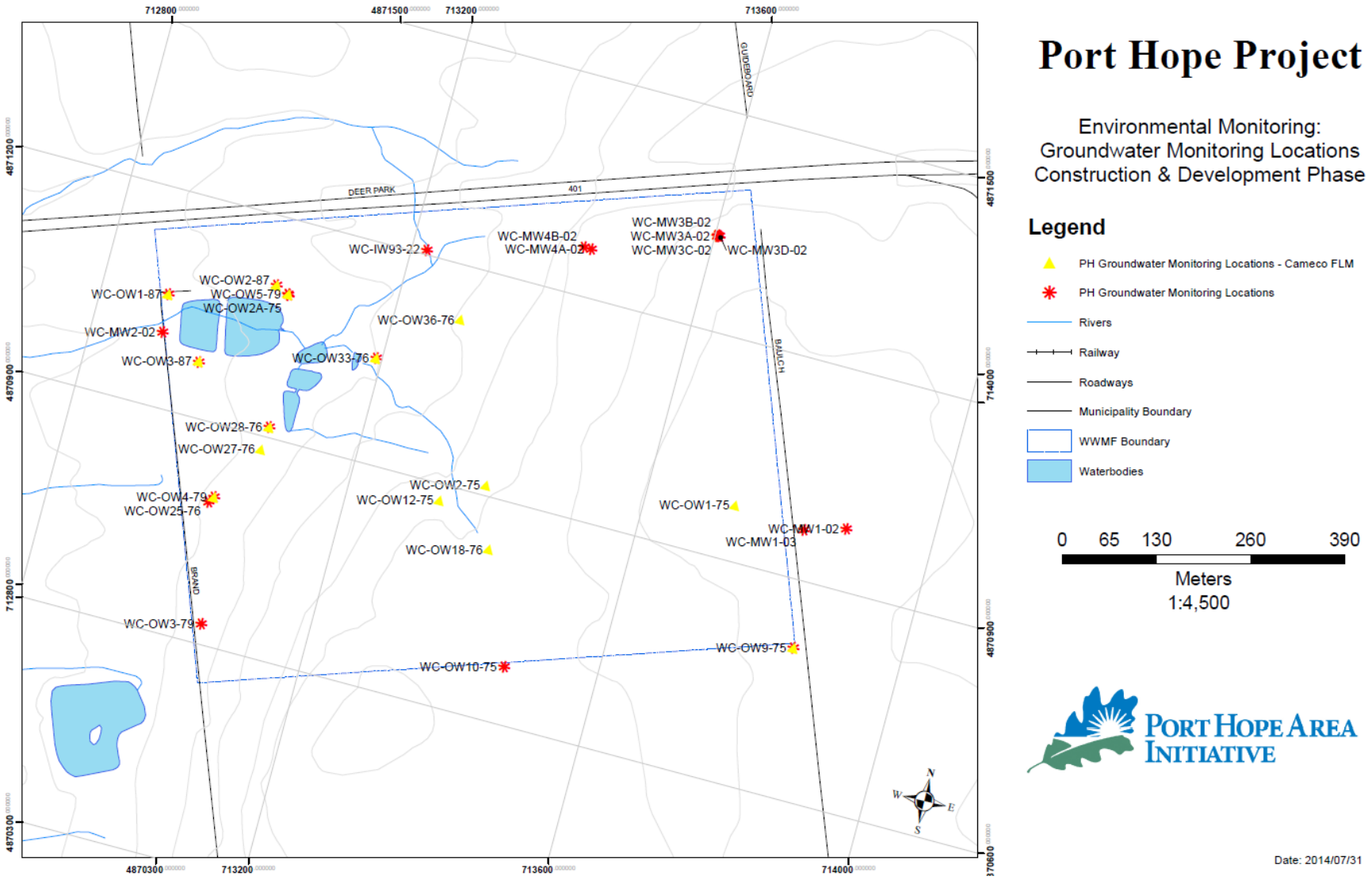

Figure 12: PH LTWMF groundwater monitoring locations.

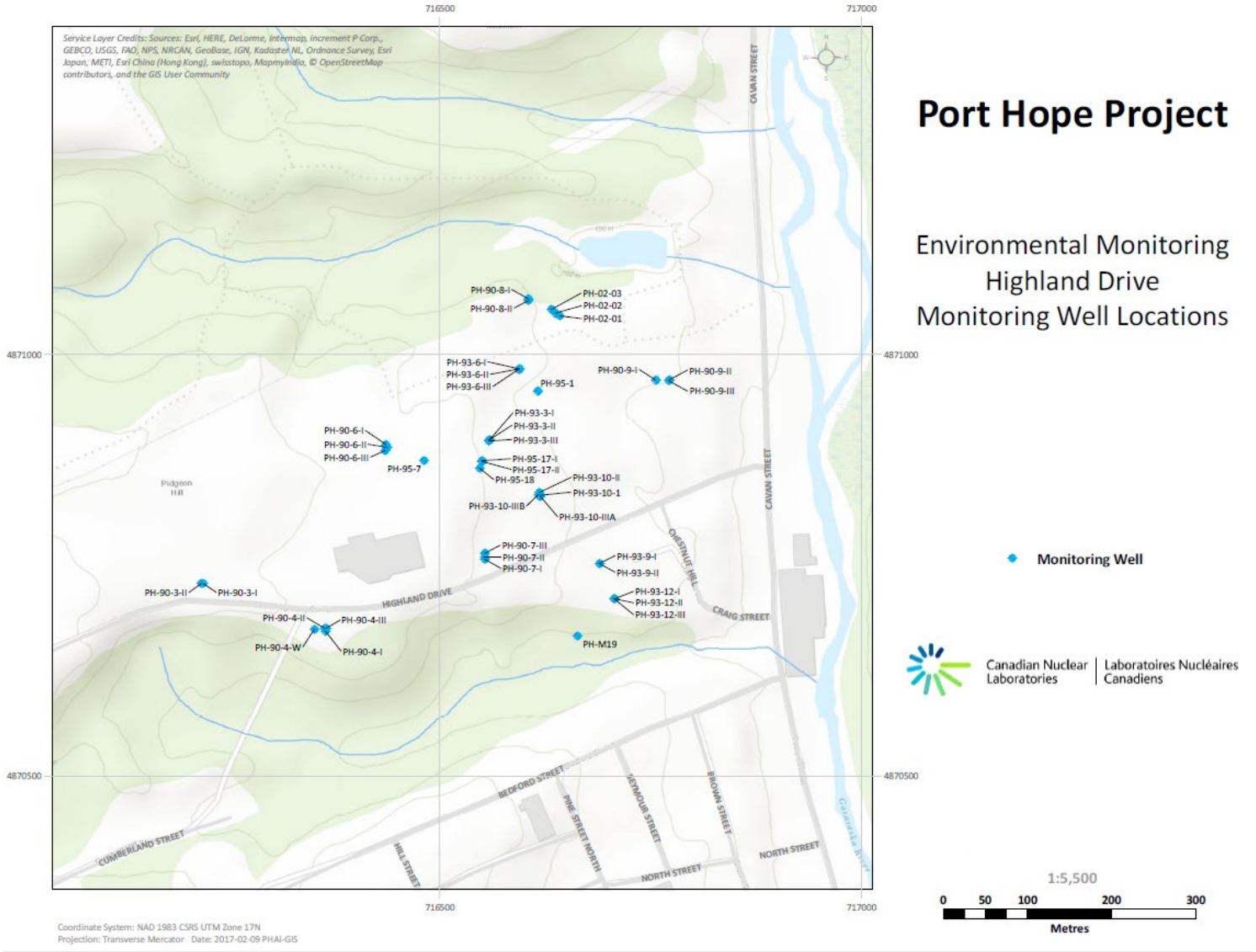

Figure 13: Highland Drive groundwater monitoring locations.

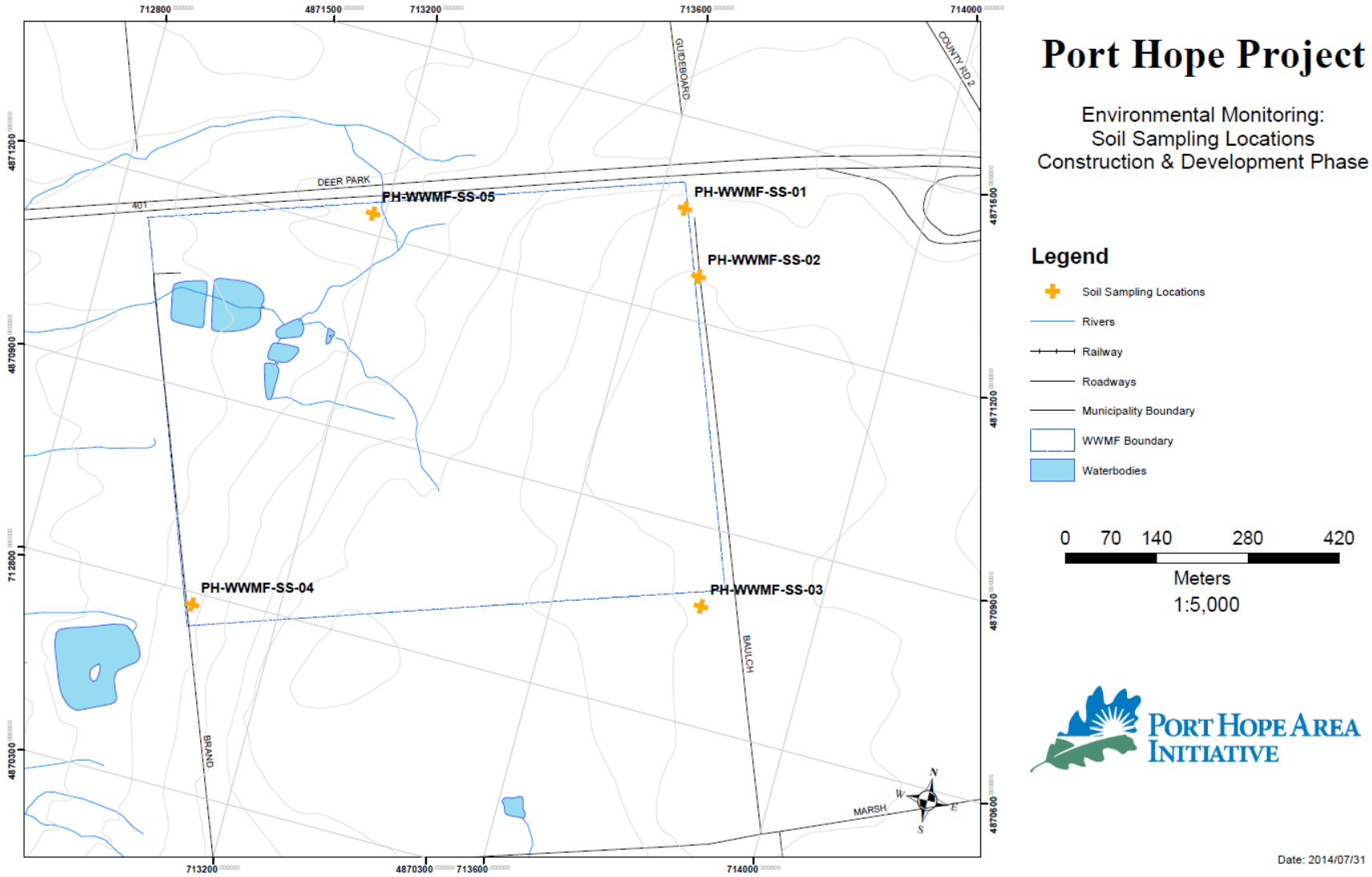

Figure 14: PH LTWMF soil sampling locations.

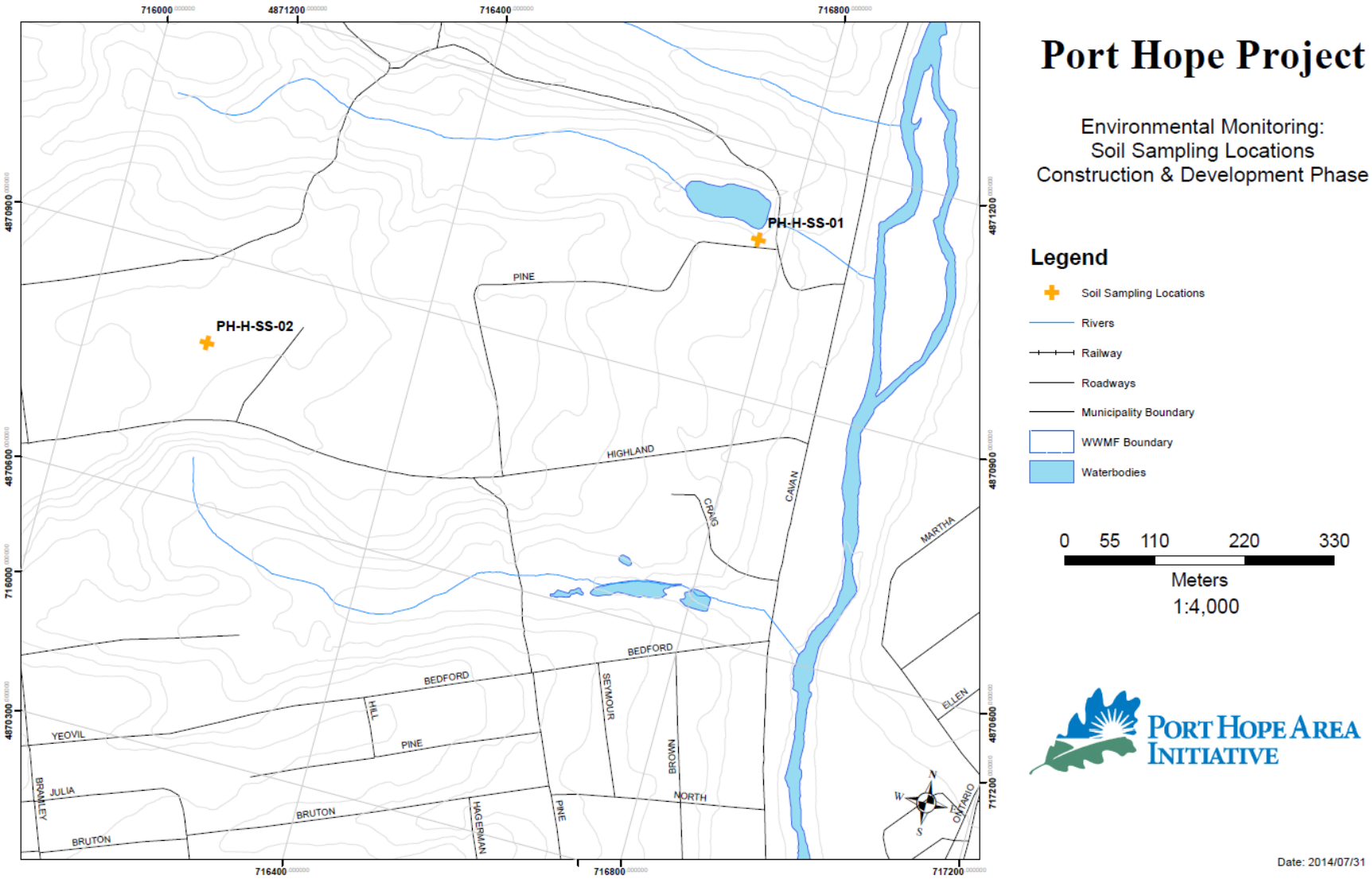

Figure 15: Highland Drive Landfill soil sampling locations.

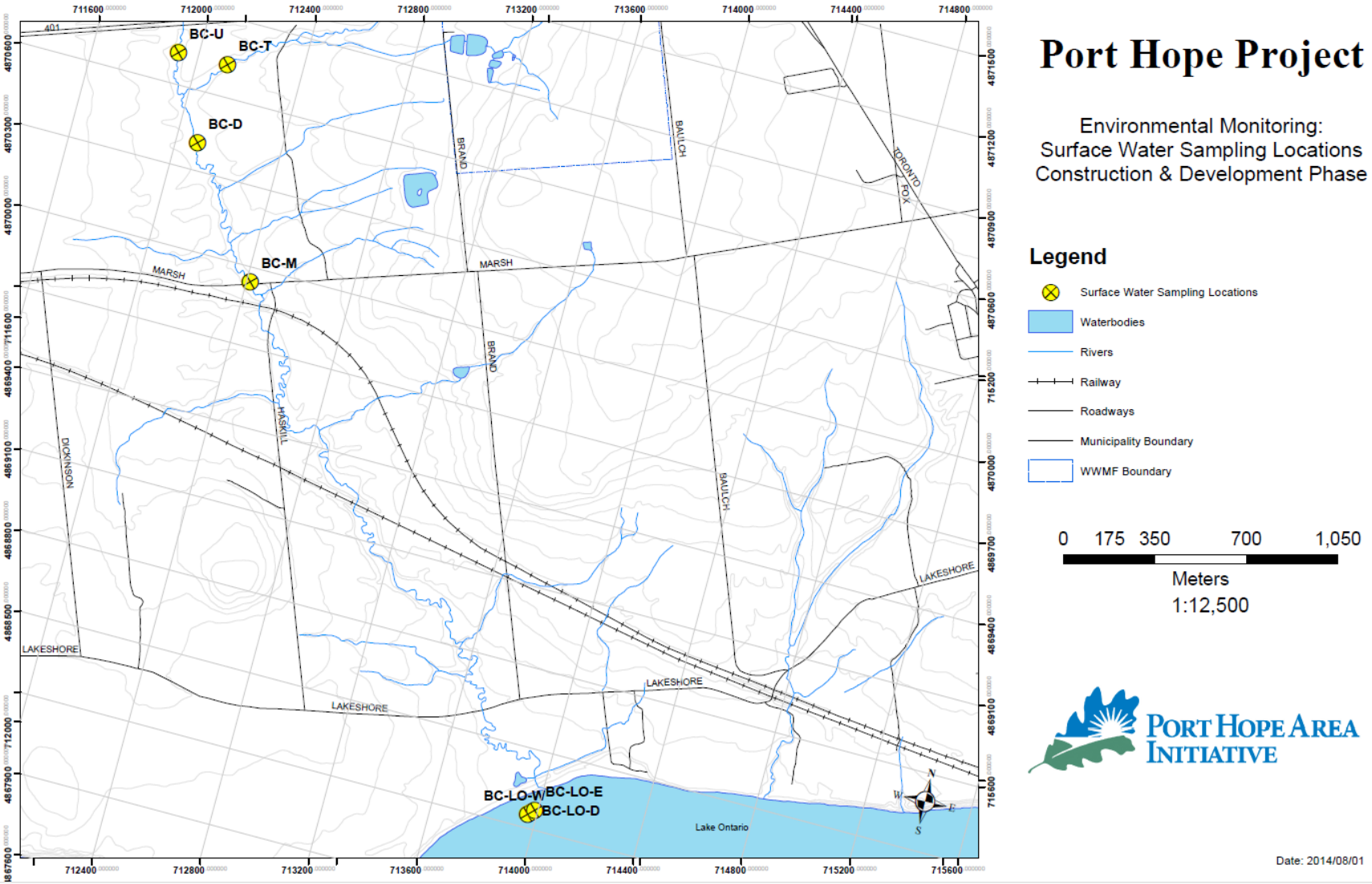

Figure 16: Brand Creek and Lake Ontario surface water sampling locations.

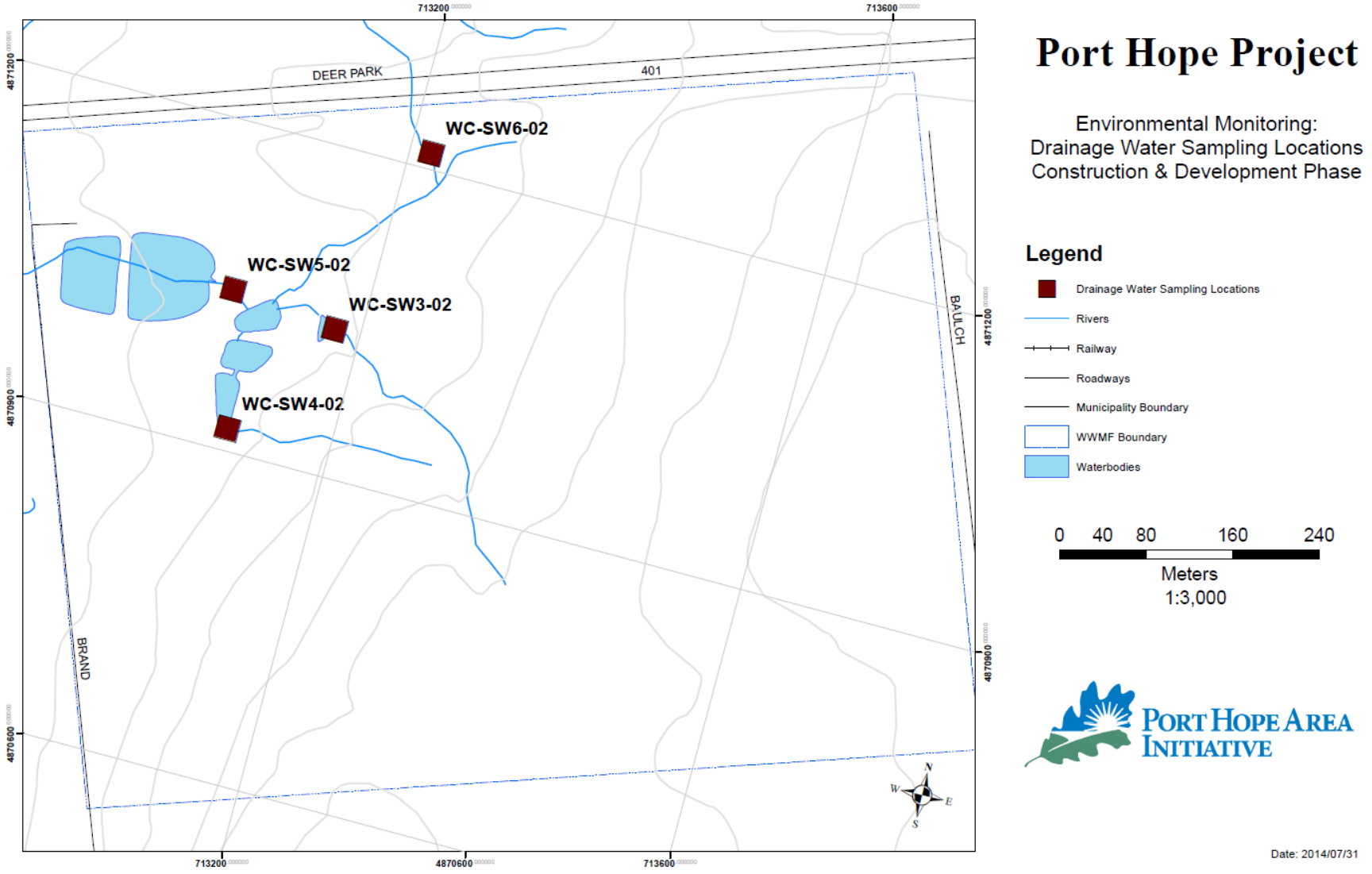

Figure 17: PH LTWMF drainage water sampling locations.

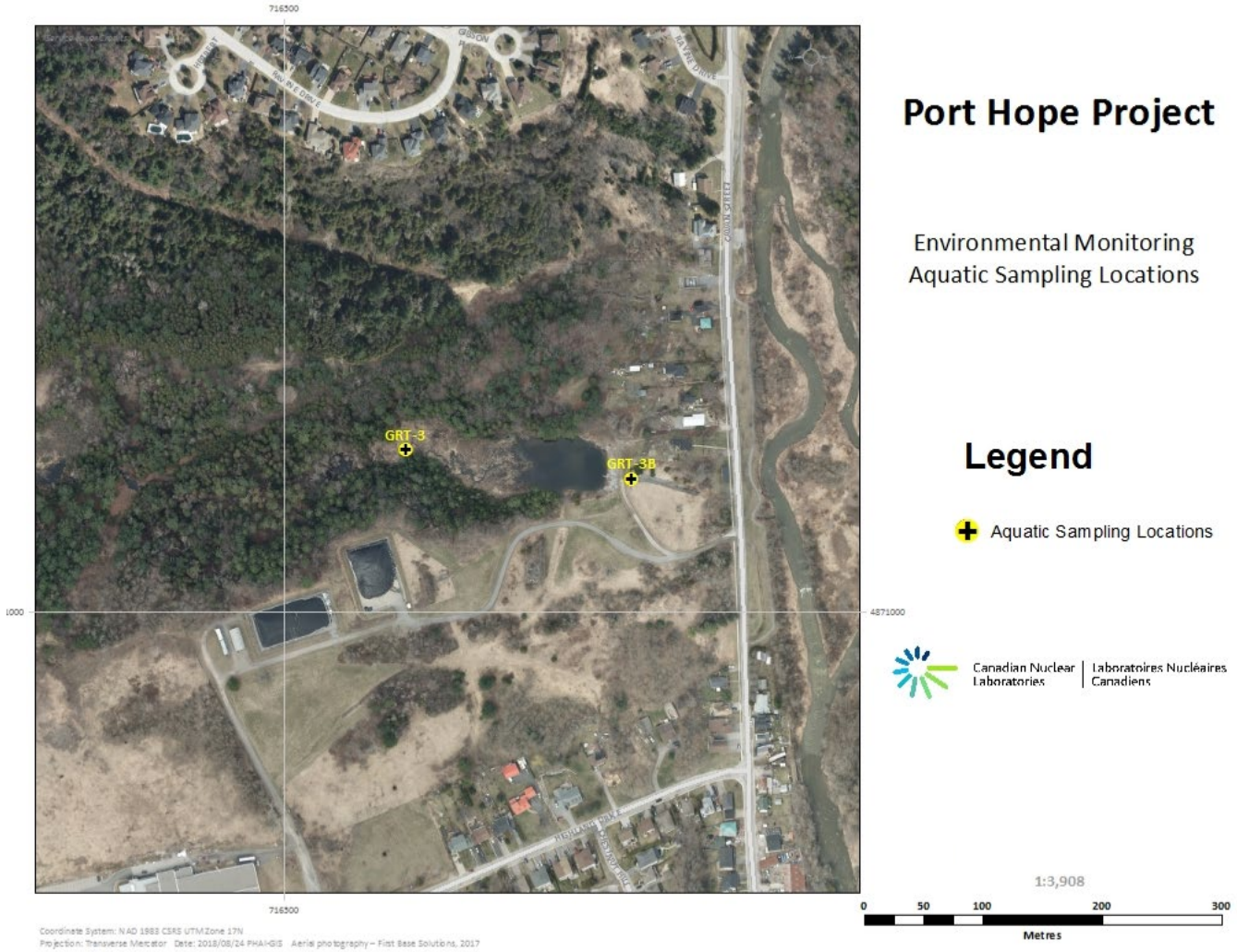

Figure 18: Brewery Creek aquatic sampling locations.

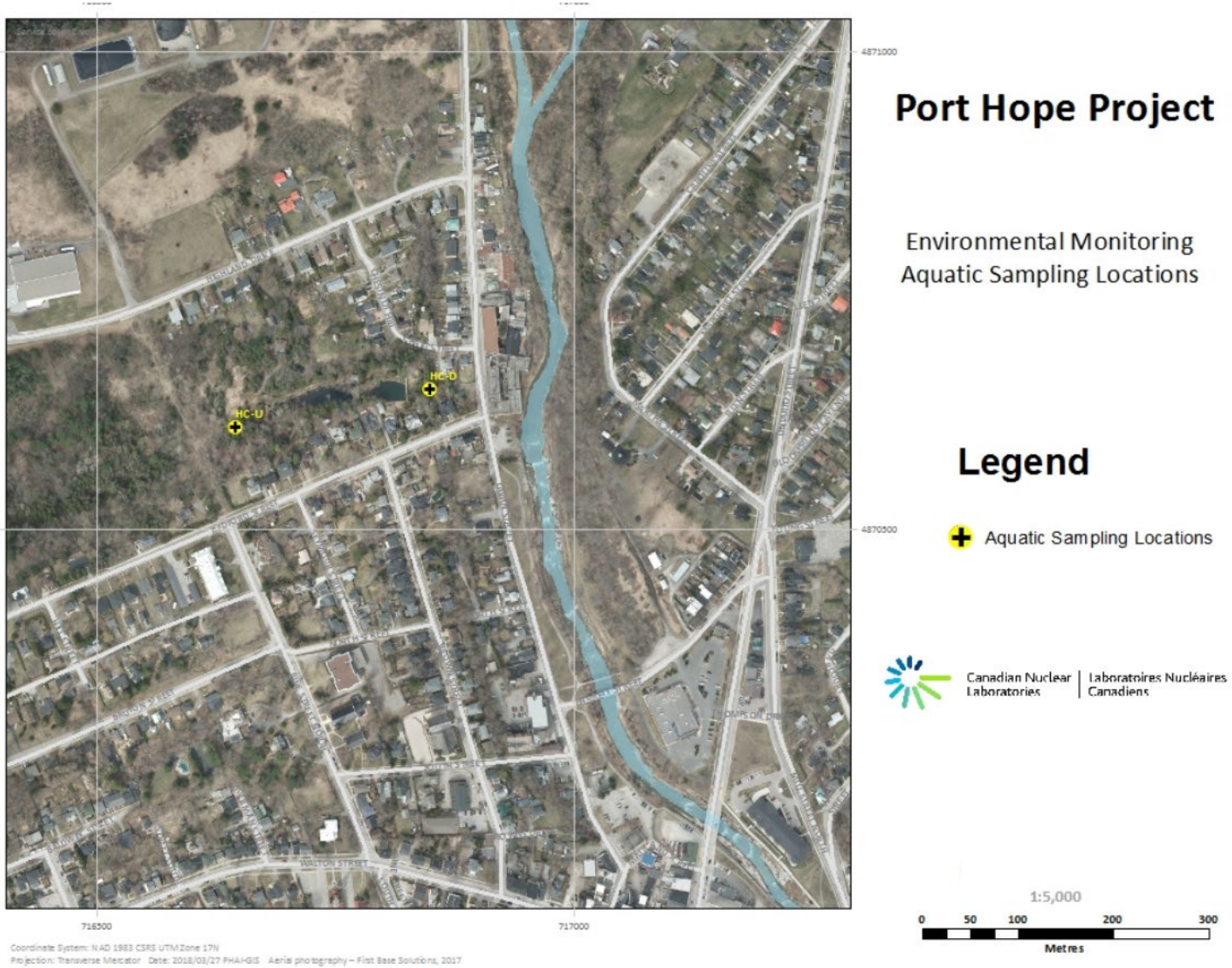

Figure 19: Highland Drive South Creek aquatic sampling locations.

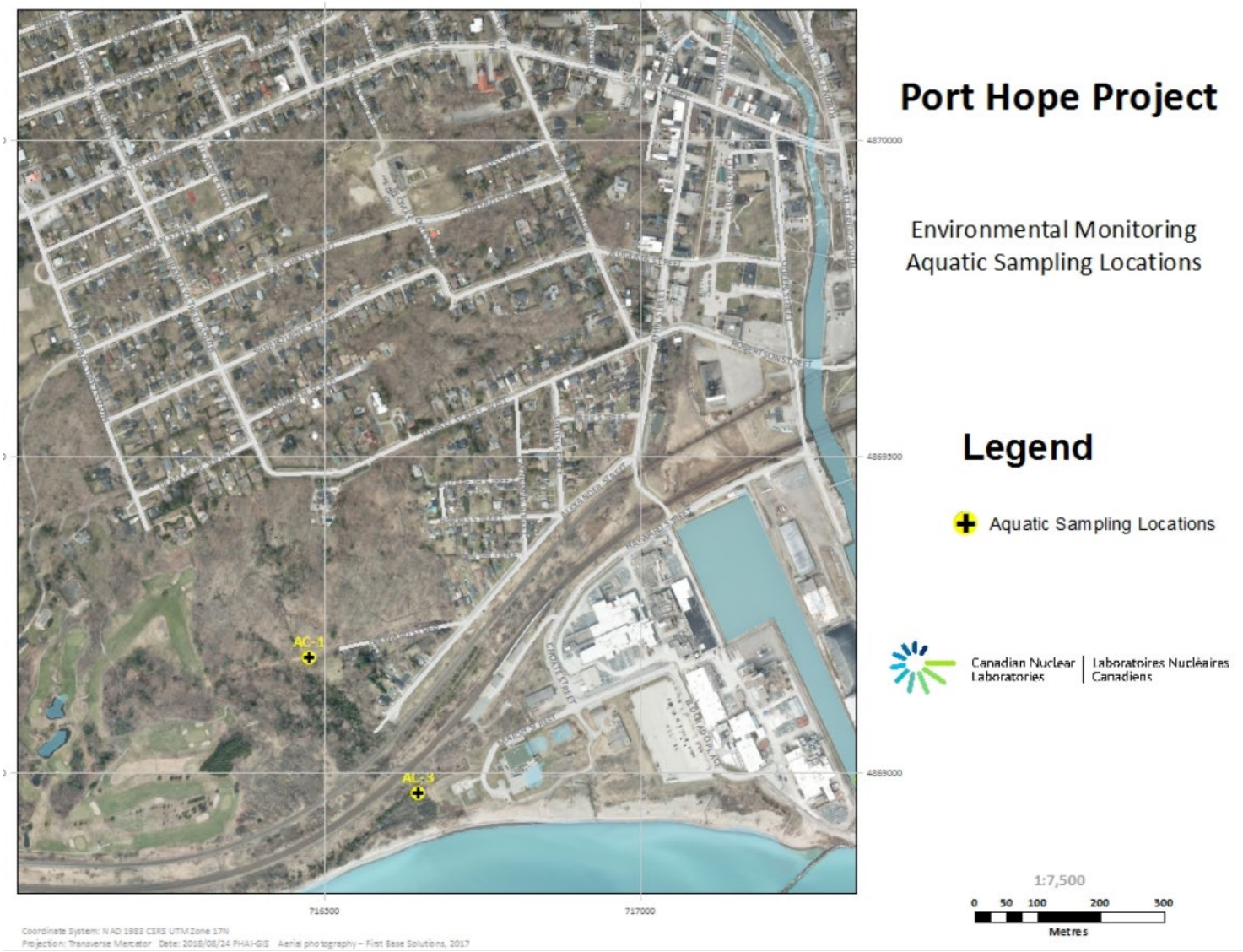

Figure 20: Alexander Creek aquatic sampling locations.

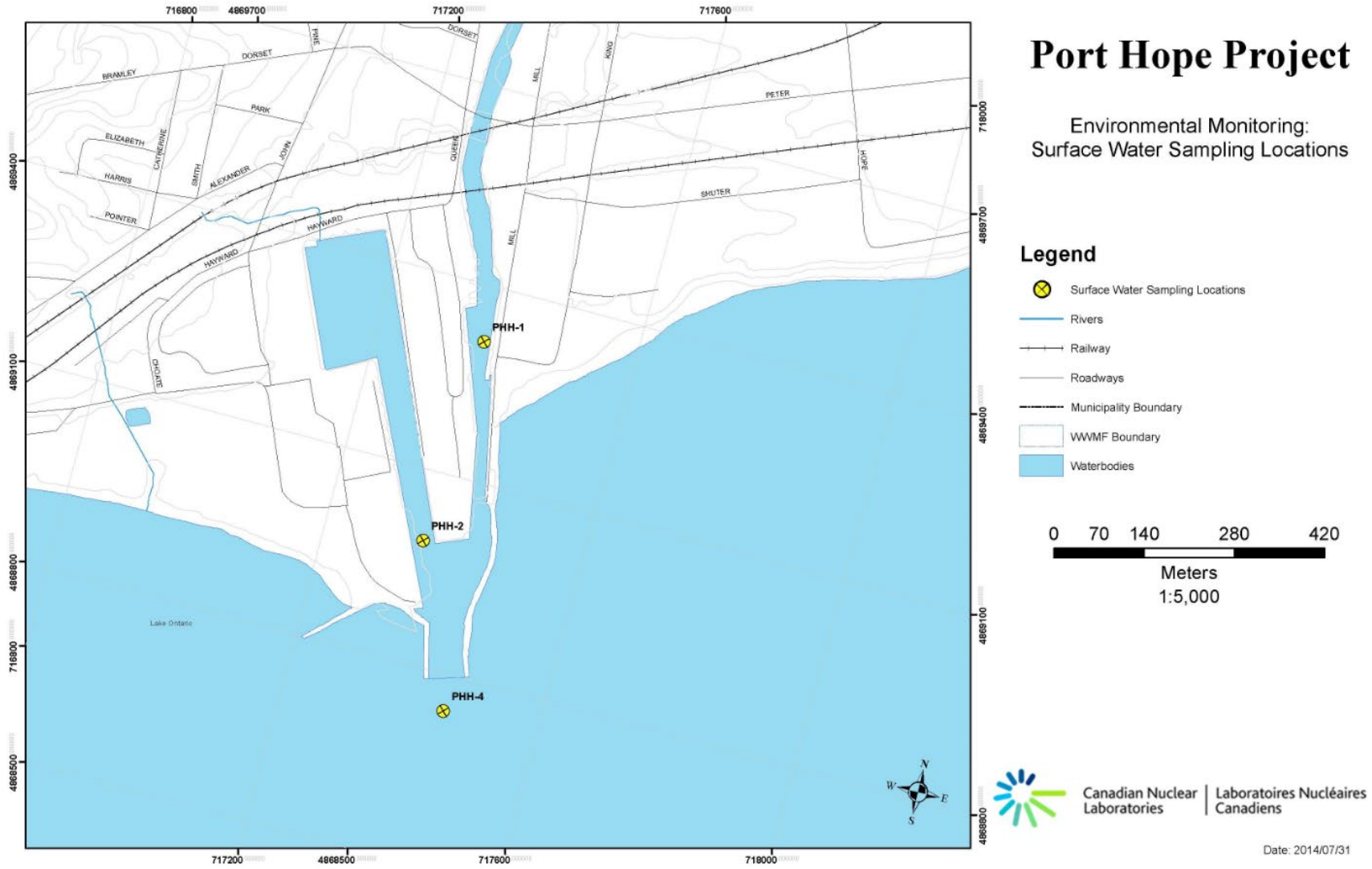

Figure 21: Port Hope Harbour surface water sampling locations.

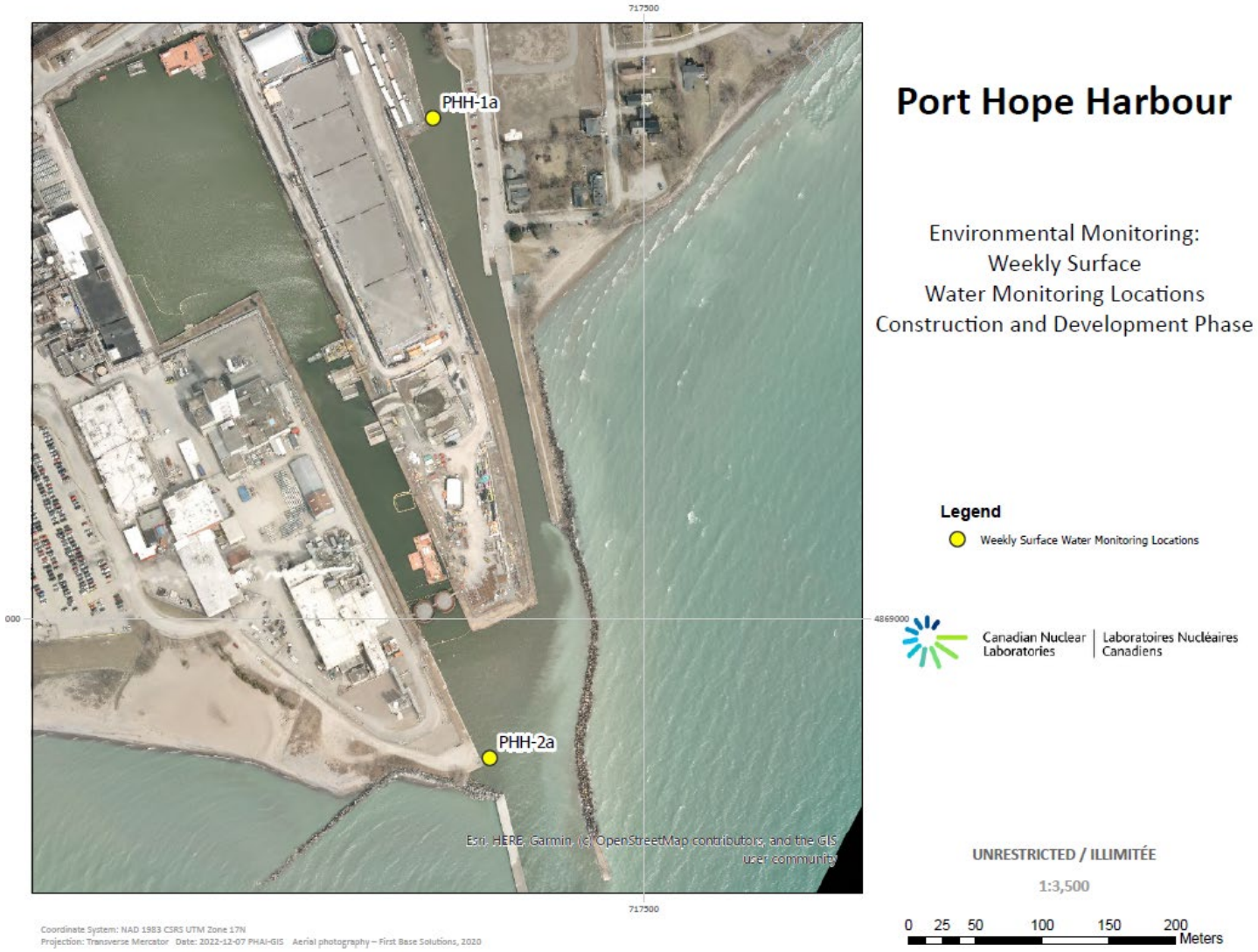

Figure 22: Port Hope Harbour surface water weekly sampling locations.

Appendix B PORT HOPE ENVIRONMENTAL MONITORING RESULTS

Table 16: 2021 PH LTWMF operational observation well sampling results

Observation Well Number	Arsenic (µg/L)	Uranium (µg/L)	Radium-226 (Bq/L)	pH	Notes
	Average				
1-75	--	--	--	--	**Well Decommissioned in 2016**
1-87	0.9	3.90	0.01	7.43	--
2-75	--	--	--	--	**Well Decommissioned in 2018**
WC-OW2-19 [1]	1.8	0.1	<0.01	7.42	**--**
3-87	5	0.68	0.01	7.87	--
4-79	0.8	0.08	<0.01	7.66	--
WC-OW5-19 [2]	2.6	0.1	<0.01	7.28	**--**
WC-LTWMF-MW-06 [3]	1.5	0.94	<0.01	8.21	--
12-75	--	--	--	--	**Well Decommissioned in 2018**
18-76	--	--	--	--	**Well Decommissioned in 2018**
27-76	0.4	0.13	<0.01	7.62	--
28-76	0.5	0.19	<0.01	--	--
33-76	0.6	3.35	<0.01	7.60	--
36-76	--	--	--	--	No sample – well not found

Notes:

Sampling is conducted semi-annually (spring and fall).

-- - No data.

[1] - Replaced 2-87 in 2019

[2] - Replaced 5-79 in 2019

[3] - Replaced 9-75 in 2017

Table 17: 2019 to 2021 Port Hope Waste Water Treatment Plant – Results of water sampling analysis (effluent)

Final Effluent Sample Monthly Average	Total Suspended Solids (mg/L)	pH	Total Aluminum (µg/L)	Total Arsenic (µg/L)	Total Boron (µg/L)[2]	Total Copper (µg/L)	Total Lead (µg/L)	Total Uranium (µg/L)	Total Zinc (µg/L)	Radium-226 (Bq/L)	Toxicity (Pass/Fail)	Totalized Effluent Volume (m^3)
Design Objective	15	6 - 9	66	41	1820	15	22.8	150	110	0.37	PASS	--
Action Level[1]	7.5	6.5 - 8.5	100	41	175	5	5	100	15	0.050	FAIL	--
2019 January	1	7.84	5	1.9	24	1.0	0.5	2.10	5.0	0.005	PASS	15,426
2019 February	1	7.86	6	1.8	27	1.0	0.5	2.25	5.0	0.005	PASS	15,034
2019 March	1	7.72	5	1.0	27	1.0	0.5	1.60	5.0	0.005	PASS	17,063
2019 April	1	7.93	5	1.0	23	1.0	0.5	1.20	5.0	0.005	PASS	16,039
2019 May	1	7.84	5	1.0	29	1.0	0.5	1.25	5.0	0.005	PASS	14,804
2019 June	1	7.86	6	1.1	40	1.0	0.5	1.50	5.0	0.005	PASS	14,845
2019 July	1	7.57	6	1.0	43	1.0	0.5	0.81	5.0	0.005	PASS	8,792
2019 August	1	7.56	5	1.1	47	2.5	0.5	0.78	5.0	0.005	PASS	10,799
2019 September	1	7.91	5	1.0	47	1.0	0.5	0.79	5.0	0.005	PASS	7,012
2019 October	1	7.89	5	1.0	44	1.0	0.5	0.89	5.0	0.005	PASS	9,507
2019 November	1	7.82	5	1.0	28	1.0	0.5	0.33	5.0	0.005	PASS	15,108
2019 December	1	7.90	5	1.0	32	1.0	0.5	0.41	5.0	0.005	PASS	11,872
2020 January	1	7.79	2.5	0.2	27	1.0	0.1	1.11	1.0	0.0065	PASS	19,382
2020 February	1	7.80	1.0	0.3	28	1.3	0.1	0.53	3.0	0.005	PASS	22,856
2020 March	1	7.90	5.0	1.0	28	1.3	0.5	0.91	5.0	0.005	PASS	22,756
2020 April	1	7.61	5.0	1.0	--	1.9	0.6	2.80	5.0	0.005	PASS	18,656
2020 May	1	7.28	5.4	1.0	--	1.4	0.5	1.15	5.0	0.005	PASS	8,221
2020 June	1	7.34	5.0	2.4	--	0.9	0.5	0.70	5.0	0.007	PASS	3,735
2020 July	1	7.73	1.0	6.8	--	1.1	0.2	2.15	2.0	0.008	PASS	7,600
2020 August	1	7.57	1.0	1.7	--	1.9	0.4	2.50	2.5	0.0055	PASS	10,621
2020 September	1	7.32	1.0	1.1	--	1.4	0.4	1.22	2.0	0.008	PASS	3,927
2020 October	1	7.59	1.0	0.5	--	1.3	0.6	1.75	2.0	0.005	PASS	9,591
2020 November	1	7.46	2.5	0.4	--	1.3	0.3	0.79	1.5	0.005	PASS	4,183
2020 December	1	7.60	1.6	0.3	--	1.9	0.5	1.45	1.0	0.005	PASS	8,689
2021 January	1	7.52	1.0	0.3	--	2.1	0.4	1.05	1.0	0.005	PASS	15,554
2021 February	1	7.38	1.0	0.6	--	2.0	0.6	0.83	1.0	0.005	PASS	3,870
2021 March	1	7.49	1.0	0.3	--	1.0	0.3	0.87	1.0	0.005	PASS	15,329
2021 April	1	7.52	1.0	0.7	--	1.0	0.5	1.00	1.0	0.005	PASS	14,488
2021 May	1	7.36	1.0	3.5	--	1.5	0.7	1.30	1.0	0.005	PASS	4,254
2021 June	NO EFF*	NO EFF	NO EFF	NO EFF	--	NO EFF	NO EFF	NO EFF	NO EFF	NO EFF	NO EFF	0
2021 July	1.5	7.53	1	20.4	--	1.2	0.29	2.34	2.5	0.005	PASS	7,130
2021 August	1	7.77	1	29.9	--	1.3	0.409	2.49	2.0	0.005	PASS	6,381
2021 September	2	7.88	2	20.2	--	1.6	0.278	0.98	2.0	0.005	PASS	9,089
2021 October	1.5	7.70	2	19.2	--	0.6	0.41	1.70	1.5	0.005	PASS	20,642
2021 November	2	7.74	1	20.1	--	0.8	0.46	2.34	1.0	0.005	PASS	15,581
2021 December	1	7.59	1	13.2	--	1.6	0.62	1.54	1.0	0.005	PASS	12,656

Notes: *(1) - The values shown are based on License Condition Handbook WNSL-W1-LCH-2310 R1. Revised values proposed by CNL were reviewed by the CNSC with formal acceptance provided on 2020 April 20.*
Notes: *(2) - Regulated monitoring of Boron was removed from the requirment of the Waste Nuclear Substance Licence WSNL-W1-2310.01/2022 as of 2020 April 20.*
Notes: ** NO EFF refers to No Effluent sampling. No effluent discharges from the PH WWTP occurred in 2021-June due to low collection pond level.*

Table 18: 2019 to 2021 Port Hope Waste Water Treatment Plant – Results of water sampling analysis (influent)

Influent Sample Monthly Average	Total Suspended Solids (mg/L)	pH	Total Aluminum (µg/L)	Total Arsenic (µg/L)	Total Boron (µg/L)[1]	Total Copper (µg/L)	Total Lead (µg/L)	Total Uranium (µg/L)	Total Zinc (µg/L)	Radium-226 (Bq/L)	Totalized Influent Volume (m^3)
2019 January	3	8.09	31	510	82	24	2.3	630	37	0.180	30,945
2019 February	4	8.08	44	530	90	35	5.0	730	51	0.535	30,436
2019 March	3	7.99	32	320	79	35	5.5	620	45	0.590	36,253
2019 April	3	8.48	25	240	67	22	3.0	480	29	0.400	36,474
2019 May	3	8.90	23	245	62	11	0.8	390	13	0.335	37,738
2019 June	3	8.93	22	230	64	8	0.5	325	5	0.330	37,309
2019 July	5	9.04	45	250	73	8	0.6	150	5	0.570	30,558
2019 August	18	9.03	250	315	82	17	2.3	115	10	1.750	31,176
2019 September	14	9.21	195	145	91	20	9.1	130	15	1.300	27,258
2019 October	8	8.80	110	120	83	21	3.8	110	16	0.530	23,275
2019 November	8	8.47	73	57	79	41	4.9	110	32	0.605	33,021
2019 December	9	8.75	61	80	105	63	11.5	190	33	0.505	25,483
2020 January	3	8.51	25	119	105	112	25.1	309	50	0.555	38,083
2020 February	4	8.58	32	109	117	103	21.5	305	50	0.505	39,912
2020 March	7	8.41	37	110	120	230	46.0	340	68	0.420	40,817
2020 April	18	8.49	110	90	--	330	75.0	705	140	0.700	35,230
2020 May	13	8.39	85	68	--	180	37.5	485	71	0.475	17,601
2020 June	11	8.61	120	140	--	41	12.0	350	38	0.540	20,485
2020 July	7	9.26	38	377	--	22	17.6	340	27	0.455	20,938
2020 August	9	8.83	259	252	--	39	33.3	319	41	0.455	23,933
2020 September	7	8.75	190	202	--	54	45.2	298	45	0.240	10,499
2020 October	8	8.47	178	123	--	32	44.3	326	60	0.155	19,494
2020 November	5	8.46	87	112	--	19	30.7	291	47	0.150	11,154
2020 December	2	7.99	29	114	--	134	47.8	379	54	0.140	18,636
2021 January	1	8.45	15	126	--	162	51	366	48	0.175	31,150
2021 February	2	8.61	14	171	--	144	52	303	51	0.190	11,912
2021 March	4	8.27	61	86	--	52	28	239	44	0.139	29,028
2021 April	4	8.05	57	206	--	95	48	394	58	0.203	28,320
2021 May	6	8.48	106	524	--	81	72	470	69	0.337	14,419
2021 June	7	8.28	100	752	--	23.4	41	416	78	0.244	20,485
2021 July	4	9.55	49	680	--	36.0	32	281	42	0.200	22,304
2021 August	6	9.17	31	999	--	33.4	40	397	70	0.371	15,659
2021 September	6.5	8.91	157	610	--	13.7	30	318	69	0.335	12,488
2021 October	6	8.21	127	574	--	26.9	46	317	49	0.428	40,754
2021 November	5	8.33	60	747.0	--	43.0	55.10	531.00	51.0	0.36	31,825
2021 December	8	8.12	78.5	478.5	--	151.0	76.00	439.50	49.0	0.414	29,019

Notes: *(1) - Regulated monitoring of Boron was removed from the requirment of the Waste Nuclear Substance Licence WSNL-W1-2310.01/2022 as of 2020 April 20.*

Table 19: 2019-2021 Port Hope Waste Water Treatment Plant and Old Water Treatment Building Operations - Results of water sampling analysis (effluent toxicity)

Sample Date	48 Hour Result	96 Hour Result	Old WTP 48 Hour Result	Old WTP 96 Hour Result
2019 January 01	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2019 February 05	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2019 March 12	Pass (3.3% mortality)	Pass (0.0% mortality)	--	--
2019 April 02	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2019 April 09	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2019 April 24	NA	NA	Pass (0.0% mortality)	Pass (0.0% mortality)
2019 May 01	NA	NA	Pass (0.0% mortality)	Pass (0.0% mortality)
2019 May 07	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2019 May 08	NA	NA	Pass (0.0% mortality)	Pass (0.0% mortality)
2019 May 14	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2019 May 15	NA	NA	Pass (0.0% mortality)	Pass (0.0% mortality)
2019 May 22	NA	NA	Pass (0.0% mortality)	Pass (0.0% mortality)
2019 May 29	NA	NA	Pass (0.0% mortality)	Pass (0.0% mortality)
2019 June 04	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2019 June 05	NA	NA	Pass (0.0% mortality)	Pass (0.0% mortality)
2019 June 12	NA	NA	Pass (0.0% mortality)	Pass (0.0% mortality)
2019 June 19	NA	NA	Pass (0.0% mortality)	Pass (0.0% mortality)
2019 July 02	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2019 July 09	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2019 August 13	Pass (10% mortality)	Pass (0.0% mortality)	--	--
2019 September 10	Pass (6.7% mortality)	Pass (0.0% mortality)	--	--
2019 October 08	Pass (0.0% mortality)	Pass (10% mortality)	--	--
2019 November 12	Pass (10% mortality)	Pass (0.0% mortality)	--	--
2019 December 10	Pass (3.3% mortality)	Pass (0.0% mortality)	--	--
2020 January 14	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2020 February 11	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2020 March 10	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2020 April 07	Pass (3.3% mortality)	Pass (0.0% mortality)	--	--
2020 May 12	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2020 June 09	Pass (3.3% mortality)	Pass (0.0% mortality)	--	--
2020 July 07	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2020 August 11	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2020 September 08	Pass (3.3% mortality)	Pass (0.0% mortality)	--	--
2020 October 06	Pass (3.3% mortality)	Pass (0.0% mortality)	--	--
2020 November 10	Pass (0.0% mortality)	Pass (30% mortality)	--	--
2020 November 24	Pass (3.3% mortality)	Pass (20% mortality)	--	--
2020 December 08	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 January 12	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 February 09	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 March 09	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 April 20	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 May 11	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 June 01	NO EFF	NO EFF	--	--
2021 July 13	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 August 24	Pass (0.0% mortality)	Pass (30% mortality)	--	--
2021 September 14	Pass (3.3% mortality)	Pass (0.0% mortality)	--	--
2021 October 12	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 November 09	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--
2021 December 14	Pass (0.0% mortality)	Pass (0.0% mortality)	--	--

Table 20: 2019 to 2021 PHWWTP Operations - Results of Brand Creek surface water sampling

Parameter/Criteria	Total Suspended Solids (mg/L)	pH	Total Aluminum (µg/L)	Total Arsenic (µg/L)	Total Boron (µg/L)	Total Copper (µg/L)	Total Lead (µg/L)	Total Uranium (µg/L)	Total Zinc (µg/L)	Radium-226 (Bq/L)
PWQO[1]	NV	6.5:8.5	75	100	200	5	5	5	30	1
CCME FWA-LT[2]	NV	6.5:9.0	100	5	1,500	2	1	15	30	NV[3]
Sample Date										
2019 January 01	45	8.08	820	<1.0	10	1.7	0.7	2.3	<5.0	<0.0050
2019 February 12	22	8.27	440	<1.0	11	<1.0	<0.50	3.3	14	<0.0050
2019 March 05	13	8.03	250	<1.0	10	<1.0	<0.50	3.7	<5.0	<0.0050
2019 April 02	45	8.11	960	<1.0	<10	1.5	0.7	3	5	<0.0050
2019 May 07	24	8.28	480	1.1	11	1.4	<0.50	2.8	<5.0	<0.0050
2019 June 04	3	8.22	70	<1.0	12	<1.0	<0.50	2.2	<5.0	<0.0050
2019 July 09	93	8.18	1,700	2.7	15	**2.7**	**1.3**	1.3	9.5	<0.0050
2019 August 06	89	8.27	1,600	2.5	18	**3.0**	**1.2**	1.4	11	<0.0050
2019 September 10	33	8.17	470	1.6	11	1.0	<0.50	1.1	<5.0	<0.0050
2019 September 17	16	8.28	500	1.7	12	1.2	<0.50	1.4	<5.0	<0.0050
2019 September 24	25	8.28	710	1.9	13	1.3	0.53	1.2	<5.0	<0.0050
2019 October 01	130	8.26	1,900	2.6	12	**2.2**	**1.4**	1.2	9.3	<0.0050
2019 October 08	28	8.22	790	1.8	13	1.2	0.58	1.2	<5.0	<0.0050
2019 November 05	11	8.29	210	<1.0	12	1.4	<0.50	3.3	<5.0	<0.0050
2019 December 03	22	8.17	460	<1.0	<10	<1.0	<0.50	3.3	<5.0	<0.0050
2020 January 07	20	8.30	260	0.8	<20	1.4	0.32	3.4	<10	0.007
2020 February 04	33	8.22	798	0.8	8	1.2	0.57	3.0	4.0	0.008
2020 March 17	14	8.16	350	<1.0	<10	<1.0	<0.50	2.5	<5.0	<0.0050
2020 April 21	13	8.17	410	<1.0	13	<1.0	<0.50	2.1	<5.0	<0.0050
2020 May 19	56	8.19	230	<1.0	13	<1.0	<0.50	2.8	<5.0	<0.0050
2020 June 02	14	8.14	220	1.1	<10	1.2	<0.50	2.0	<5.0	<0.0050
2020 July 14	44	8.13	1,720	3.3	16	**2.6**	**1.04**	2.8	9.0	0.006
2020 August 11	15	8.19	570	3.2	21	1.6	0.45	2.7	7.0	0.01
2020 September 01	24	8.17	621	3.8	17	1.5	0.46	2.4	7.0	0.008
2020 October 13	7	8.31	304	2.4	18	1.1	0.133	2.3	4.0	0.008
2020 November 03	5	8.09	284	1.5	60	0.9	0.23	3.1	4.0	0.01
2020 December 15	4	8.2	**95**	1.5	13	1.0	0.29	**5.7**	2.0	<0.0050
2021 January 24	13	8.17	143	0.5	11	0.7	<0.01	2.2	2.0	<0.005
2021 February 21	8	8.21	298	1.0	12	**2.1**	0.30	2.5	3.0	<0.005
2021 March 16	6	8.17	161	0.7	10	0.7	0.10	3.9	4.0	0.018
2021 April 24	8	8.4	243	0.9	0.9	0.9	0.18	3.2	2.0	<0.005
2021 May 18	11	8.24	342	1.2	13	1.0	0.32	2.8	3.0	<0.005
2021 June 13	35	8.25	1,470	3.1	18	**2.2**	**1.0**	1.8	9.0	0.01
2021 July 23	11	8.16	213	3.5	37	1.6	0.7	3.4	6.0	<0.005
2021 August 10	18	7.98	477	4.6	19	1.1	0.4	2.4	3.0	<0.005
2021 September 21	20	7.99	445	3.7	19	1.1	0.6	2.0	5.0	<0.005
2021 October 23	7	8.15	187	**6.0**	22	0.8	0.2	3.4	4.0	0.006
2021 November 20	13	8.15	155	1.2	16	1.0	0.2	2.5	3.0	<0.005
2021 December 14	14	8.15	237	0.8	29	0.9	0.3	2.5	8.0	<0.005

Notes:

1 - Ontario Ministry of the Environment and Energy Provincial Water Quality Objectives (1994)

2 - Canadian Council of Ministers of the Environment - Protection of Fresh Water Aquatic Life (Long Term)

3 - NA refers to "No Value" for selected criteria

Legend:

Bold *Exceedance of PWQO criteria*

Bold and Underlined *Exceedance of CCME criteria*

Shaded White Text *Exceedance of PWQO and CCME criteria*

Table 21: Air quality monitoring – PH LTWMF Weather Station

	2016		2017		2018		2019		2020		2021	
	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP
	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
Observations	205	209	194	196	252	248	240	237	171	169	223	222
Geometric Mean	6	21	6	22	8	23	5	16	5	18	7	19
Arithmetic Mean	7	26	7	27	10	29	5	19	8	22	9	24
Median	6	23	7	22	9	25	4	17	6	19	8	19
98^{th} Percentile	27	-	25	-	20	-	18	-	20	-	20 [1]	-
Maximum	28	95	20	116	50	104	17	158	21	85	49	116
Exceedances (%)	0%	0%	0%	0%	0%	0%	0%	0.4%	0%	0%	0%	0%

Note:
[1] 98^{th} Percentile for $PM_{2.5}$ averaged over 3 years (2019, 2020 & 2021).
TSP values are compared to Overrriding Limit of 120 $\mu g/m^3$ as defined in the PHAI Dust Management and Requirements Plan and AAQC.
$PM_{2.5}$ 98^{th} percentile is compared to the 2000 Canadian Air Quality Standards for Fine Particulate Matter value of 30 $\mu g/m^3$ and the proposed 2020 value of 27 $\mu g/m^3$.

Table 22: Air quality monitoring – PH LTWMF Northwest

	2016		2017		2018		2019		2020		2021	
	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP
	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
Observations	207	207	194	192	248	255	240	240	166	158	219	220
Geometric Mean	6	22	6	18	9	26	4	21	6	21	7	21
Arithmetic Mean	8	25	7	21	10	30	5	24	8	25	9	25
Median	7	23	7	18	9	26	4	19	6	22	8	21
98^{th} Percentile	28	-	24	-	19	-	18	-	19	-	20 [1]	-
Maximum	24	79	18	73	28	150	17	96	21	179	52	97
Exceedances (%)	0%	0%	0%	0%	0%	0.4%	0%	0%	0%	0.63%	0%	0%

Note:
[1] 98^{th} Percentile for $PM_{2.5}$ averaged over 3 years (2019, 2020 & 2021).
TSP values are compared to Overrriding Limit of 120 $\mu g/m^3$ as defined in the PHAI Dust Management and Requirements Plan and AAQC.
$PM_{2.5}$ 98^{th} percentile is compared to the 2000 Canadian Air Quality Standards for Fine Particulate Matter value of 30 $\mu g/m^3$ and the proposed 2020 value of 27 $\mu g/m^3$.

Table 23: Air quality monitoring – PH LTWMF South

	2016		2017		2018		2019		2020		2021	
	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP
	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
Observations	205	205	196	194	259	253	240	240	136	169	217	220
Geometric Mean	6	16	6	14	9	20	5	14	6	15	7	17
Arithmetic Mean	8	19	7	16	10	23	5	17	8	18	9	21
Median	7	16	6	16	10	20	4	14	8	17	9	18
98^{th} Percentile	25	-	22	-	19	-	19	-	19	-	20 [1]	-
Maximum	25	85	31	53	37	162	22	85	22	73	53	84
Exceedances (%)	0%	0%	0%	0%	0%	0.4%	0%	0%	0%	0%	0%	0%

Note:
[1] 98^{th} Percentile for $PM_{2.5}$ averaged over 3 years (2019, 2020 & 2021).
TSP values are compared to Overrriding Limit of 120 $\mu g/m^3$ as defined in the PHAI Dust Management and Requirements Plan and AAQC.
$PM_{2.5}$ 98^{th} percentile is compared to the 2000 Canadian Air Quality Standards for Fine Particulate Matter value of 30 $\mu g/m^3$ and the proposed 2020 value of 27 $\mu g/m^3$.

Table 24: Air quality monitoring – transportation route, 192 Toronto Road

	2016		2017		2018		2019		2020		2021	
	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$	TSP
	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
Observations	208	107	196	130	256	256	237	242	170	166	221	17
Geometric Mean	6	27	6	20	8	26	4	18	5	19	7	24
Arithmetic Mean	8	33	7	22	9	30	4	21	8	21	9	29
Median	7	27	6	20	9	28	3	18	6	21	8	30
98^{th} Percentile	-	-	27	-	18	-	17	-	19	-	20 [1]	-
Maximum	24	151	18	57	23	119	12	75	21	58	51	72
Exceedances (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Note:
[1] 98^{th} Percentile for $PM_{2.5}$ averaged over 3 years (2019, 2020 & 2021).
TSP values are compared to Overrriding Limit of 120 $\mu g/m^3$ as defined in the PHAI Dust Management and Requirements Plan and AAQC.
$PM_{2.5}$ 98^{th} percentile is compared to the 2000 Canadian Air Quality Standards for Fine Particulate Matter value of 30 $\mu g/m^3$ and the proposed 2020 value of 27 $\mu g/m^3$.

Table 25: Metals and radionuclides concentrations in total suspended particulates – PH LTWMF Weather Station

					Weather Station						
					2016	2017	2018	2019	2020	2021	
				Number of Samples Analyzed	45	38	50	51	38	49	
Analysis	Unit	AAQC	Predicted*	Health Canada Reference Levels*	Average					Average	Maximum
Total Mercury (Hg)	ng/m^3	-			0.01	0.01	0.01	0.08	0.89	1.06	1.23
Silver	ng/m^3	**1000**			4	3	3	4	23	23	25
Arsenic	ng/m^3	**300**			2.0	3.5	3.7	3.8	3.1	3.2	7.8
Barium	ng/m^3	**10000**			10	9	9	8	5	6	14
Beryllium	ng/m^3	**10**			0.13	0.58	0.58	0.55	0.03	0.03	0.03
Boron	ng/m^3	**120000**			9	4	4	4	12	21	95
Cadmium	ng/m^3	**25**			0.4	1.2	1.2	1.1	0.3	0.3	0.3
Cobalt	ng/m^3	**100**			0.5	1.2	1.6	1.5	0.3	0.3	0.8
Copper	ng/m^3	**50000**			17	10	13	13	13	11	33
Molybdenum	ng/m^3	**120000**			0.9	1.8	1.8	1.9	2.8	3.5	14.8
Nickel	ng/m^3	**200**			2	2	2	2	1	3	26
Lead	ng/m^3	**500**			3	3	3	3	3	3	5
Antimony	ng/m^3	**25000**			3	6	6	6	7	7	24
Selenium	ng/m^3	**10000**			2	6	6	6	4	4	14
Uranium	ng/m^3	**300**	**1.8**	**4070**	0.8	0.3	0.3	0.5	**3.0**	**3.0**	**4.9**
Vanadium	ng/m^3	**2000**			1.2	2.9	2.9	2.8	0.4	0.4	1.0
Zinc	ng/m^3	**12000**			25	20	24	22	24	19	47
Lead-210	Bq/m^3	-			0.1275	0.0005	0.0009	0.0009	0.0007	0.0007	0.0032
Radium-226	Bq/m^3	-	**0.000049**	**0.05**	0.000033	**0.000058**	**0.000060**	**0.000072**	0.000030	0.000033	**0.000058**
Thorium-230	Bq/m^3	-	**0.00042**	**0.01**	0.00011	0.00029	0.00030	0.00029	0.00006	0.00006	0.00012
Thorium-232	Bq/m^3	-	**0.000057**	**0.006**	**0.000106**	**0.000289**	**0.000289**	**0.000278**	**0.000059**	**0.000063**	**0.000115**

Note:
AAQC = Ambient Air Quality Criteria
*Predicted values and Health Canada reference levels obtained from Port Hope Screening Report (Table 12.1)
Bold values indicate an exceedance of the predicted values.

Table 26: Metals and radionuclides concentrations in total suspended particulates – PH LTWMF Northwest

					Welcome Northwest						
					2016	2017	2018	2019	2020	2021	
				Number of Samples Analyzed	45	38	51	51	34	49	
Analysis	Unit	AAQC	Predicted*	Health Canada Reference Levels*	Average					Average	Maximum
Total Mercury (Hg)	ng/m^3	-			0.01	0.01	0.01	0.08	0.94	1.03	1.20
Silver	ng/m^3	**1000**			2	3	3	4	22	22	24
Arsenic	ng/m^3	**300**			1.6	3.4	4.2	3.4	3.1	3.3	8.2
Barium	ng/m^3	**10000**			19	17	20	26	11	7	16
Beryllium	ng/m^3	**10**			0.14	0.56	0.56	0.54	0.03	0.03	0.05
Boron	ng/m^3	**120000**			10	4	3	4	11	20	104
Cadmium	ng/m^3	**25**			0.4	1.1	1.1	1.2	0.3	0.3	0.5
Cobalt	ng/m^3	**100**			0.3	1.1	2.5	1.1	0.4	0.3	0.8
Copper	ng/m^3	**50000**			12	9	11	12	11	10	25
Molybdenum	ng/m^3	**120000**			0.9	1.7	1.7	1.8	2.8	7.9	210.8
Nickel	ng/m^3	**200**			1	2	3	2	1	3	30
Lead	ng/m^3	**500**			3	3	3	2	3	2	5
Antimony	ng/m^3	**25000**			3	6	6	6	8	9	29
Selenium	ng/m^3	**10000**			2	6	6	6	4	4	15
Uranium	ng/m^3	**300**	**1.8**	**4070**	0.3	0.3	0.3	0.4	**3.0**	**2.9**	**6.3**
Vanadium	ng/m^3	**2000**			1.0	2.8	2.8	2.7	0.4	0.4	0.8
Zinc	ng/m^3	**12000**			29	22	26	26	23	21	47
Lead-210	Bq/m^3	-			0.0004	0.0006	0.0009	0.0007	0.0006	0.0007	0.0032
Radium-226	Bq/m^3	-	**0.000049**	**0.05**	0.000040	**0.000056**	**0.000059**	**0.000060**	0.000030	0.000031	**0.000057**
Thorium-230	Bq/m^3	-	**0.00042**	**0.01**	0.00011	0.00028	0.00030	0.00027	0.00006	0.00006	0.00011
Thorium-232	Bq/m^3	-	**0.000057**	**0.006**	**0.000108**	**0.000281**	**0.000281**	**0.000274**	0.000056	**0.000062**	**0.000113**

Note:
AAQC = Ambient Air Quality Criteria
*Predicted values and Health Canada reference levels obtained from Port Hope Screening Report (Table 12.1)
Bold values indicate an exceedance of the predicted values.

Table 27: Metals and radionuclides concentrations in total suspended particulates – PH LTWMF South

					Welcome South						
					2016	2017	2018	2019	2020	2021	
				Number of Samples Analyzed	45	38	50	51	38	49	
Analysis	Unit	AAQC	Predicted*	Health Canada Reference Levels*	Average					Average	Maximum
Total Mercury (Hg)	ng/m^3	-			0.01	0.01	0.01	0.08	0.87	1.04	1.20
Silver	ng/m^3	**1000**			2	3	3	4	21	23	24
Arsenic	ng/m^3	**300**			1.6	3.4	3.8	3.4	3.0	3.2	8.2
Barium	ng/m^3	**10000**			8	6	7	7	5	5	13
Beryllium	ng/m^3	**10**			0.13	0.57	0.57	0.54	0.03	0.03	0.03
Boron	ng/m^3	**120000**			9	4	4	4	11	22	133
Cadmium	ng/m^3	**25**			0.4	1.1	1.1	1.1	0.3	0.3	0.5
Cobalt	ng/m^3	**100**			0.4	1.1	1.9	1.1	0.3	0.3	0.8
Copper	ng/m^3	**50000**			21	8	11	12	12	10	30
Molybdenum	ng/m^3	**120000**			1.0	1.7	1.7	1.9	3.4	6.7	98.7
Nickel	ng/m^3	**200**			2	2	2	2	1	3	34
Lead	ng/m^3	**500**			3	3	3	2	3	2	5
Antimony	ng/m^3	**25000**			3	6	6	6	7	8	38
Selenium	ng/m^3	**10000**			2	6	6	6	4	4	13
Uranium	ng/m^3	**300**	**1.8**	**4070**	0.4	0.3	0.3	0.4	**2.7**	**3.0**	**6.0**
Vanadium	ng/m^3	**2000**			1.1	2.8	2.8	2.7	0.3	0.4	0.9
Zinc	ng/m^3	**12000**			29	17	20	19	19	18	45
Lead-210	Bq/m^3	-			0.0004	0.0005	0.0009	0.0008	0.0007	0.0007	0.0034
Radium-226	Bq/m^3	-	**0.000049**	**0.05**	0.000032	**0.000057**	**0.000059**	**0.000060**	0.000028	0.000032	**0.000056**
Thorium-230	Bq/m^3	-	**0.00042**	**0.01**	0.00011	0.00028	0.00029	0.00027	0.00006	0.00006	0.00011
Thorium-232	Bq/m^3	-	**0.000057**	**0.006**	**0.000107**	**0.000283**	**0.000284**	**0.000271**	0.000056	**0.000062**	**0.000113**

Note:
AAQC = Ambient Air Quality Criteria
*Predicted values and Health Canada reference levels obtained from Port Hope Screening Report (Table 12.1)
Bold values indicate an exceedance of the predicted values.

Table 28: Metals and radionuclides concentrations in total suspended particulates – 192 Toronto Road

					192 Toronto Rd						
					2016	2017	2018	2019	2020	2021	
				Number of Samples Analyzed	45	38	50	51	38	5	
Analysis	Unit	AAQC	Predicted*	Health Canada Reference Levels*	Average					Average	Maximum
Total Mercury (Hg)	ng/m^3	-			0.01	0.01	0.01	0.08	0.87	1.17	1.19
Silver	ng/m^3	**1000**			2	3	3	4	21	23	24
Arsenic	ng/m^3	**300**			1.7	3.5	3.4	3.4	2.8	3.3	4.6
Barium	ng/m^3	**10000**			7	7	9	9	6	6	7
Beryllium	ng/m^3	**10**			0.15	0.58	0.57	0.54	0.03	0.03	0.03
Boron	ng/m^3	**120000**			10	4	4	4	11	12	12
Cadmium	ng/m^3	**25**			0.4	1.2	1.1	1.1	0.3	0.3	0.3
Cobalt	ng/m^3	**100**			0.4	1.2	1.1	1.1	0.3	0.5	0.8
Copper	ng/m^3	**50000**			15	9	10	14	12	11	15
Molybdenum	ng/m^3	**120000**			0.9	1.8	1.7	1.8	2.9	4.6	10.5
Nickel	ng/m^3	**200**			1	2	2	2	1	20	46
Lead	ng/m^3	**500**			2	2	2	2	3	2	2
Antimony	ng/m^3	**25000**			3	6	6	6	10	22	41
Selenium	ng/m^3	**10000**			2	6	6	6	4	3	5
Uranium	ng/m^3	**300**	**1.8**	**4070**	0.7	0.3	0.3	0.4	**2.8**	**3.3**	**4.1**
Vanadium	ng/m^3	**2000**			1.3	2.9	2.8	2.7	0.3	0.4	0.6
Zinc	ng/m^3	**12000**			21	19	23	22	23	16	23
Lead-210	Bq/m^3	-			0.0004	0.0005	0.0008	0.0008	0.0007	0.0007	0.0022
Radium-226	Bq/m^3	-	**0.000049**	**0.05**	0.000034	**0.000058**	**0.000057**	**0.000056**	0.000030	0.000029	0.000030
Thorium-230	Bq/m^3	-	**0.00042**	**0.01**	0.00011	0.00029	0.00028	0.00027	0.00006	0.00006	0.00006
Thorium-232	Bq/m^3	-	**0.000057**	**0.006**	**0.000111**	**0.000285**	**0.000283**	**0.000271**	0.000056	**0.000059**	**0.000059**

Note:
AAQC = Ambient Air Quality Criteria
*Predicted values and Health Canada reference levels obtained from Port Hope Screening Report (Table 12.1)
Bold values indicate an exceedance of the predicted values.

Table 29: Air quality monitoring – Pine Street Extension Consolidation Site, Cavan Candies

	2020		2021	
	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)
Observations	36	36	177	179
Geometric Mean	3	9	6	17
Arithmetic Mean	4	11	8	21
Median	3	10	8	20
98^{th} Percentile	10	-	20 [1]	-
Maximum	11	22	53	83
Exceedances (%)	0%	0%	0%	0%

Note:
[1] 98^{th} Percentile for $PM_{2.5}$ averaged over 2 years (2020 & 2021).
TSP values are compared to Overrriding Limit of 120 $\mu g/m^3$ as defined in the PHAI Dust Management and Requirements Plan and AAQC.
$PM_{2.5}$ 98^{th} percentile is compared to the 2000 Canadian Air Quality Standards for Fine Particulate Matter value of 30 $\mu g/m^3$ and the proposed 2020 value of 27 $\mu g/m^3$.

Table 30: Air quality monitoring – Pine Street Extension Consolidation Site, Jack Burger Sports Complex

	2020		2021	
	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)
Observations	36	35	179	177
Geometric Mean	2	10	6	16
Arithmetic Mean	3	12	9	20
Median	2	11	8	17
98^{th} Percentile	10	-	24 [1]	-
Maximum	13	45	52	89
Exceedances (%)	0%	0%	0%	0%

Note:
[1] 98^{th} Percentile for $PM_{2.5}$ averaged over 2 years (2020 & 2021).
TSP values are compared to Overrriding Limit of 120 $\mu g/m^3$ as defined in the PHAI Dust Management and Requirements Plan and AAQC.
$PM_{2.5}$ 98^{th} percentile is compared to the 2000 Canadian Air Quality Standards for Fine Particulate Matter value of 30 $\mu g/m^3$ and the proposed 2020 value of 27 $\mu g/m^3$.

Table 31: Air quality monitoring – Pine Street Extension Consolidation Site, Port Hope High School

	2020		2021	
	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)
Observations	36	34	177	172
Geometric Mean	3	9	7	15
Arithmetic Mean	4	11	9	19
Median	2	9	8	16
98^{th} Percentile	12	-	23 [1]	-
Maximum	13	26	51	86
Exceedances (%)	0%	0%	0%	0%

Note:
[1] 98^{th} Percentile for $PM_{2.5}$ averaged over 2 years (2020 & 2021).
TSP values are compared to Overrriding Limit of 120 $\mu g/m^3$ as defined in the PHAI Dust Management and Requirements Plan and AAQC.
$PM_{2.5}$ 98^{th} percentile is compared to the 2000 Canadian Air Quality Standards for Fine Particulate Matter value of 30 $\mu g/m^3$ and the proposed 2020 value of 27 $\mu g/m^3$.

Table 32: Metals and radionuclides concentrations in total suspended particulates – Pine Street Extension Consolidation Site, Cavan Candies

					Cavan Candies		
					2020	2021	
				Number of Samples Analyzed	9	43	
Analysis	Unit	AAQC	Predicted*	Health Canada Reference Levels*	Average	Average	Maximum
Total Mercury (Hg)	ng/m^3	-			1.14	0.96	1.20
Silver	ng/m^3	**1000**			23	22	24
Arsenic	ng/m^3	**300**			2.8	2.9	5.4
Barium	ng/m^3	**10000**			4	6	21
Beryllium	ng/m^3	**10**			0.03	0.03	0.03
Boron	ng/m^3	**120000**			11	25	107
Cadmium	ng/m^3	**25**			0.3	0.3	0.4
Cobalt	ng/m^3	**100**			0.3	0.3	0.9
Copper	ng/m^3	**50000**			4	9	24
Molybdenum	ng/m^3	**120000**			4.1	3.7	14.5
Nickel	ng/m^3	**200**			1	2	21
Lead	ng/m^3	**500**			3	3	10
Antimony	ng/m^3	**25000**			11	7	17
Selenium	ng/m^3	**10000**			3	3	12
Uranium	ng/m^3	**300**	**1.8**	**4070**	**3.0**	**2.9**	**6.1**
Vanadium	ng/m^3	**2000**			0.3	0.3	0.7
Zinc	ng/m^3	**12000**			12	19	49
Lead-210	Bq/m^3	-			0.0008	0.0007	0.0032
Radium-226	Bq/m^3	-	**0.000049**	**0.05**	0.000028	0.000032	**0.000057**
Thorium-230	Bq/m^3	-	**0.00042**	**0.01**	0.00006	0.00007	0.00017
Thorium-232	Bq/m^3	-	**0.000057**	**0.006**	0.000057	**0.000062**	**0.000114**

Note:
AAQC = Ambient Air Quality Criteria
*Predicted values and Health Canada reference levels obtained from Port Hope Screening Report (Table 12.1)
Bold values indicate an exceedance of the predicted values.

Table 33: Metals and radionuclides concentrations in total suspended particulates – Pine Street Extension Consolidation Site, Jack Burger Sports Complex

					Jack Burger Sports Complex			
					2018	2020	2021	
				Number of Samples Analyzed	15	9	43	
Analysis	Unit	AAQC	Predicted*	Health Canada Reference Levels*	Average		Average	Maximum
Total Mercury (Hg)	ng/m^3	-			0.01	1.14	0.97	1.19
Silver	ng/m^3	**1000**			3	23	22	24
Arsenic	ng/m^3	**300**			3.3	2.8	3.0	8.7
Barium	ng/m^3	**10000**			5	3	5	15
Beryllium	ng/m^3	**10**			0.55	0.03	0.03	0.03
Boron	ng/m^3	**120000**			3	11	26	130
Cadmium	ng/m^3	**25**			1.1	0.3	0.3	0.3
Cobalt	ng/m^3	**100**			1.1	0.3	0.3	0.8
Copper	ng/m^3	**50000**			5	3	9	19
Molybdenum	ng/m^3	**120000**			1.7	2.9	3.1	7.9
Nickel	ng/m^3	**200**			2	1	2	17
Lead	ng/m^3	**500**			2	3	2	6
Antimony	ng/m^3	**25000**			6	11	7	35
Selenium	ng/m^3	**10000**			6	3	3	12
Uranium	ng/m^3	**300**	**1.8**	**4070**	0.3	**2.8**	**3.0**	**4.9**
Vanadium	ng/m^3	**2000**			2.8	0.3	0.3	1.0
Zinc	ng/m^3	**12000**			15	12	18	43
Lead-210	Bq/m^3	-			0.0008	0.0009	0.0007	0.0034
Radium-226	Bq/m^3	-	**0.000049**	**0.05**	**0.000055**	0.000028	0.000032	**0.000057**
Thorium-230	Bq/m^3	-	**0.00042**	**0.01**	0.00028	0.00006	0.00006	0.00011
Thorium-232	Bq/m^3	-	**0.000057**	**0.006**	**0.000277**	0.000057	**0.000063**	**0.000114**

Note:
AAQC = Ambient Air Quality Criteria
*Predicted values and Health Canada reference levels obtained from Port Hope Screening Report (Table 12.1)
Bold values indicate an exceedance of the predicted values.

Table 34: Metals and radionuclides concentrations in total suspended particulates – Pine Street Extension Consolidation Site, Port Hope High School

					Port Hope High School			
					2018	2020	2021	
				Number of Samples Analyzed	20	9	43	
Analysis	Unit	AAQC	Predicted*	Health Canada Reference Levels*	Average		Average	Maximum
Total Mercury (Hg)	ng/m^3	-			0.01	1.14	0.97	1.20
Silver	ng/m^3	**1000**			3	23	22	24
Arsenic	ng/m^3	**300**			3.4	2.9	2.9	6.5
Barium	ng/m^3	**10000**			6	3	4	13
Beryllium	ng/m^3	**10**			0.56	0.03	0.03	0.03
Boron	ng/m^3	**120000**			3	11	22	90
Cadmium	ng/m^3	**25**			1.1	0.3	0.3	0.5
Cobalt	ng/m^3	**100**			1.1	0.3	0.4	0.6
Copper	ng/m^3	**50000**			6	9	9	23
Molybdenum	ng/m^3	**120000**			1.7	2.9	11.3	226.1
Nickel	ng/m^3	**200**			2	1	2	13
Lead	ng/m^3	**500**			2	3	3	7
Antimony	ng/m^3	**25000**			6	10	7	28
Selenium	ng/m^3	**10000**			6	3	3	12
Uranium	ng/m^3	**300**	**1.8**	**4070**	0.3	**3.0**	**2.9**	**4.4**
Vanadium	ng/m^3	**2000**			2.8	0.3	0.3	0.6
Zinc	ng/m^3	**12000**			16	14	17	38
Lead-210	Bq/m^3	-			0.0009	0.0007	0.0007	0.0030
Radium-226	Bq/m^3	-	**0.000049**	**0.05**	**0.000056**	0.000029	0.000033	**0.000109**
Thorium-230	Bq/m^3	-	**0.00042**	**0.01**	0.00028	0.00006	0.00006	0.00011
Thorium-232	Bq/m^3	-	**0.000057**	**0.006**	**0.000282**	**0.000057**	**0.000063**	**0.000114**

Note:
AAQC = Ambient Air Quality Criteria
*Predicted values and Health Canada reference levels obtained from Port Hope Screening Report (Table 12.1)
Bold values indicate an exceedance of the predicted values.

Table 35: Air quality monitoring – Harbour/Centre Pier – Volatile Organic Compound Monitoring (June and July 2021)

Monitoring Location			2021-06-24		2021-06-28[1]	2021-07-14[1]		2021-07-20		2021-07-26	
			HCP NW Corner	HCP SE Corner	No Sample	HCP NW Corner	No Sample	HCP NW Corner	West Harbour	HCP NW Corner	NW of Sediment
Wind Direction at time of Deployment			SE	SE	--	SW	SW	NW	NW	W	W
Analysis MS Volatiles (ONMOEAPH)	**Units**	**Criteria (AAQC)**									
Benzene	µg/m³	**2.3**	0.256	0.164		0.433		1.35	1.37	0.787	0.673
Ethylbenzene	µg/m³	**1000**	0.246	< 0.217		< 0.217		< 0.217	0.228	0.218	< 0.217
Toluene	µg/m³	**2000**	0.631	0.423		1.68		1.43	1.66	1.43	1.23
m,p-Xylene	µg/m³	**730**	0.814	< 0.434		0.606		0.545	0.597	0.668	0.578
o-Xylene	µg/m³	**730**	0.238	< 0.217		0.237		< 0.217	0.225	0.276	0.222
Naphthalene	µg/m³	**22.5**	< 0.524	< 0.524		0.675		< 0.524	< 0.524	< 0.524	< 0.524
PHC F1 (C6-C10)	µg/m³		--	--		--		--	--	--	--
PHC F1 (C6-C10) - BTEX	µg/m³		24.1	28.7		45.9		36.8	45.2	48.2	80.7
PHC F2 (>C10-C16)	µg/m³		13.2	39.9		17.4		16.1	24.4	15.2	29.8
PHC F2 (>C10-C16) - Nap	µg/m³		--	--		--		--	--	--	--
Aliphatic >C5-C6	µg/m³		< 5.0	< 5.0		< 5.0		< 5.0	< 5.0	< 5.0	< 5.0
Aliphatics C6-C8 (Unadj.)	µg/m³		< 5.0	< 5.0		< 5.0		< 5.0	< 5.0	< 5.0	7.5
Aliphatics >C8-C10 (Unadj.)	µg/m³		< 5.0	< 5.0		< 5.0		< 5.0	< 5.0	< 5.0	7.1
Aliphatics >C10-C12 (Unadj.)	µg/m³		< 5.0	< 5.0		< 5.0		< 5.0	< 5.0	< 5.0	9.2
Aliphatic >C12-C16	µg/m³		< 5.0	< 5.0		< 5.0		< 5.0	< 5.0	< 5.0	< 5.0
Aromatic >C7-C8 (TEX Excluded)	µg/m³		< 5.0	< 5.0		< 5.0		< 5.0	< 5.0	< 5.0	< 5.0
Aromatics >C8-C10 (Unadj.)	µg/m³		< 5.0	< 5.0		< 5.0		< 5.0	< 5.0	< 5.0	< 5.0
Aromatics >C10-C12 (Unadj.)	µg/m³		< 5.0	< 5.0		< 5.0		< 5.0	< 5.0	< 5.0	< 5.0
Aromatic >C12-C16	µg/m³		< 5.0	< 5.0		< 5.0		< 5.0	< 5.0	< 5.0	< 5.0
MS Volatiles (TO-15)	µg/m3										
Acetone (2-Propanone)	µg/m³	**11880**	6.01	3.77		5.50		11.8	13.7	6.35	7.64
1,3-Butadiene	µg/m³	**2**	< 1.11	< 1.11		< 0.11		< 1.11	< 1.11	< 1.11	< 1.11
Benzene	µg/m³	**2.3**	0.256	0.164		0.433		1.35	1.370	0.787	0.673
Bromodichloromethane	µg/m³		< 1.34	< 1.34		< 1.34		< 1.34	< 1.34	< 1.34	< 1.34
Bromoform	µg/m³	**55**	< 1.03	< 1.03		< 1.03		< 1.03	< 1.03	< 1.03	< 1.03
Bromomethane	µg/m³		< 0.194	< 0.194		< 0.194		< 0.194	< 0.194	< 0.194	< 0.194
Bromoethene	µg/m³		--	--		--		--	--	--	--
Benzyl Chloride	µg/m³		< 2.59	< 2.59		< 2.59		< 2.59	< 2.59	< 2.59	< 2.59
Carbon disulfide	µg/m³		< 1.56	< 1.56		< 1.56		< 1.56	< 1.56	< 1.56	< 1.56
Chlorobenzene	µg/m³		< 0.230	< 0.230		< 0.230		< 0.230	< 0.230	< 0.230	< 0.230
Chloroethane	µg/m³		< 7.92	< 7.92		< 0.792		< 0.792	< 0.792	< 0.792	< 0.792
Chloroform	µg/m³	**1**	< 0.195	< 0.195		0.209		0.221	0.250	0.929	0.200
Chloromethane	µg/m³	**5600**	1.66	1.69		0.919		1.03	1.08	0.983	0.939
3-Chloropropene	µg/m³		--	--		--		--	--	--	--
2-Chlorotoluene	µg/m³		--	--		--		--	--	--	--
Carbon tetrachloride	µg/m³	**2.4**	0.805	0.826		0.749		0.911	0.885	0.685	0.664
Cyclohexane	µg/m³	**6100**	0.69	0.69		< 1		< 0.688	< 0.688	< 0.688	< 0.688
1,1-Dichloroethane	µg/m³	**165**	< 0.202	< 0.202		< 0.202		< 0.202	< 0.202	< 0.202	< 0.202
1,1-Dichloroethylene	µg/m³		< 0.198	< 0.198		< 0.198		< 0.198	< 0.198	< 0.198	< 0.198
1,2-Dibromoethane (EDB)	µg/m³	**3**	< 0.0768	< 0.0768		< 0.0768		< 0.0768	< 0.0768	< 0.0768	< 0.0768
1,2-Dichloroethane	µg/m³		0.0785	0.073		0.0675		0.0842	0.088	0.0523	0.0518
1,2-Dichloropropane	µg/m³		< 0.231	< 0.231		< 0.231		< 0.231	< 0.231	< 0.231	< 0.231
1,4-Dioxane	µg/m³		< 3.60	< 3.60		< 3.60		< 3.60	< 3.60	< 3.60	< 3.60
Dichlorodifluoromethane	µg/m³		2.40	2.25		2.51		3.08	3.16	2.62	2.37
Dibromochloromethane	µg/m³		< 1.70	< 1.70		< 1.70		< 1.70	< 1.70	< 1.70	< 1.70
trans-1,2-Dichloroethylene	µg/m³	**105**	< 0.396	< 0.396		< 0.396		< 0.396	< 0.396	< 0.396	< 0.396
cis-1,2-Dichloroethylene	µg/m³	**105**	< 0.198	< 0.198		< 0.198		< 0.198	< 0.198	1.11	< 0.198
cis-1,3-Dichloropropene	µg/m³		< 0.227	< 0.227		< 0.227		< 0.227	< 0.227	< 0.227	< 0.227
m-Dichlorobenzene	µg/m³		--	--		--		--	--	--	--
o-Dichlorobenzene	µg/m³	**30500**	< 0.301	< 0.301		< 0.301		< 0.301	< 0.301	< 0.301	< 0.301
p-Dichlorobenzene	µg/m³	**95**	< 0.301	< 0.301		< 0.301		< 0.301	< 0.301	< 0.301	< 0.301
trans-1,3-Dichloropropene	µg/m³		< 0.227	< 0.227		< 0.227		< 0.227	< 0.227	< 0.227	< 0.227
Ethanol	µg/m³		3.96	5.10		8.44		7.00	35.2	4.68	37.4
Ethylbenzene	µg/m³	**1000**	0.246	< 0.217		< 0.217		< 0.217	0.228	0.218	< 0.217
Ethyl Acetate	µg/m³		< 3.60	< 3.60		< 3.60		< 3.60	8.35	< 3.60	< 3.60
4-Ethyltoluene	µg/m³		< 2.46	< 2.46		< 2.46		< 2.46	< 2.46	< 2.46	< 2.46
Freon 113	µg/m³		--	--		--		--	--	--	--
Freon 114	µg/m³	**700000**	--	--		--		--	--	--	--
Heptane	µg/m³	**11000**	< 1.23	< 1.23		< 1.23		< 1.23	< 1.23	< 1.23	< 1.23
Hexachlorobutadiene	µg/m³		< 0.0501	< 0.0501		< 0.0501		< 0.0501	< 0.0501	< 0.0501	< 0.0501
Hexane	µg/m³	**7500**	0.430	< 0.352		0.588		< 1.06	< 1.76	0.646	0.512
2-Hexanone	µg/m³		< 4.10	< 4.10		< 4.10		< 4.10	< 4.10	< 4.10	< 4.10
Isopropyl Alcohol	µg/m³	**7300**	--	--		--		--	--	--	--
Methylene chloride	µg/m³	**220**	0.657	0.354		0.704		0.670	1.44	0.682	0.563
Methyl ethyl ketone	µg/m³	**1000**	1.30	1.42		1.26		2.21	3.33	1.12	2.09
Methyl Isobutyl Ketone	µg/m³	**1200**	< 0.410	< 0.41		< 0.410		< 0.410	< 0.410	< 0.410	< 0.410
Methyl Tert Butyl Ether	µg/m³	**7000**	< 0.361	< 0.361		< 0.361		< 0.361	< 0.361	< 0.361	< 0.361
Methylmethacrylate	µg/m³		--	--		--		--	--	--	--
Naphthalene	µg/m³	**22.5**	< 0.524	< 0.524		0.675		< 0.524	< 0.524	< 0.524	< 0.524
Propylene	µg/m³	**4000**	--	--		--		--	--	--	--
Styrene	µg/m³	**400**	< 0.213	< 0.213		< 0.213		< 0.213	< 0.213	< 0.213	< 0.213
1,1,1-Trichloroethane	µg/m³	**115000**	< 0.273	< 0.273		< 0.273		< 0.273	< 0.273	< 0.273	< 0.273
1,1,1,2-Tetrachloroethane	µg/m³		< 0.144	< 0.144		< 0.144		< 0.144	< 0.144	< 0.144	< 0.144
1,1,2,2-Tetrachloroethane	µg/m³		< 0.0185	< 0.0185		< 0.0185		< 0.0185	< 0.0185	< 0.0185	< 0.0185
1,1,2-Trichloroethane	µg/m³		< 0.0655	< 0.0655		< 0.0655		< 0.0655	< 0.0655	< 0.0655	< 0.0655
1,2,4-Trichlorobenzene	µg/m³	**400**	< 0.742	< 0.742		< 0.742		< 0.742	< 0.742	< 0.742	< 0.742
1,2,4-Trimethylbenzene	µg/m³	**220**	< 2.45	< 2.45		< 2.45		< 2.45	< 2.45	< 2.45	< 2.45
1,3,5-Trimethylbenzene	µg/m³	**220**	< 2.45	< 2.45		< 2.45		< 2.45	< 2.45	< 2.45	< 2.45
2,2,4-Trimethylpentane	µg/m³		< 0.934	< 0.934		< 0.934		< 0.934	< 0.934	< 0.934	< 0.934
Tertiary Butyl Alcohol	µg/m³		--	--		--		--	--	--	--
Tetrachloroethylene	µg/m³		< 0.339	< 0.339		< 0.339		< 0.339	< 0.339	3.07	< 0.339
Tetrahydrofuran	µg/m³	**93000**	< 1.18	< 1.18		< 1.18		< 1.18	< 1.18	< 1.18	< 1.18
Toluene	µg/m³	**2000**	0.631	0.423		1.68		1.43	1.66	1.43	1.23
Trichloroethylene	µg/m³	**12**	< 0.269	< 0.269		< 0.269		< 0.269	< 0.269	2.13	< 0.269
Trichlorofluoromethane	µg/m³	**6000**	1.23	< 1.12		1.62		2.12	2.25	1.69	1.67
Vinyl chloride	µg/m³	**1**	< 0.0511	< 0.0511		< 0.0511		< 0.0511	< 0.0511	< 0.0511	< 0.0511
Vinyl Acetate	µg/m³		< 0.704	< 0.704		< 0.704		< 0.704	< 0.704	< 0.704	< 0.704
m,p-Xylene	µg/m³	**730**	0.814	< 0.434		0.606		0.545	0.597	0.668	0.578
o-Xylene	µg/m³	**730**	0.238	< 0.217		0.237		< 0.217	0.225	0.276	0.222
Xylenes (total)	µg/m³	**730**	1.05	< 0.651		0.843		< 0.651	0.82	0.944	0.800

AAQC = Ambient Air Quality Criteria, Ontario Ministry of the Environment, May 2020
Bold values indicate an exceedance of a AAQC value
-- indicates parameter not analyzed by the contract lab
ND = Not Detected
[1] No Sample due to equipment issues

Table 36: Air quality monitoring – Harbour/Centre Pier – Volatile Organic Compound Monitoring (August and September 2021)

Monitoring Location			2021-08-03		2021-08-11[2]		2021-09-15		2021-09-20[1]		2021-09-27	
			HCP NW Corner	NW of Sediment	HCP NW Corner	NW of Sediment	HCP NW Corner	West Side of Harbour	No Sample	West Side of Site -	HCP NW Corner	West Side of Harbour
Wind Direction at time of Deployment			SW	SW	SW	SW	NW	NW	E	E	SW	SW
Analysis **MS Volatiles (ONMOE APH)**	**Units**	**Criteria (AAQC)**										
Benzene	µg/m³	**2.3**	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64		< 0.64	< 0.64	< 0.64
Ethylbenzene	µg/m³	**1000**	1	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87	< 0.87	< 0.87
Toluene	µg/m³	**2000**	1.6	0.75	< 0.75	0.87	1.2	1.1		< 0.75	< 0.75	< 0.75
m,p-Xylene	µg/m³	**730**	7.8	< 0.87	< 0.87	< 0.87	1.0	1.3		< 0.87	< 0.87	< 0.87
o-Xylene	µg/m³	**730**	0.91	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87	< 0.87	< 0.87
Naphthalene	µg/m³	**22.5**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
PHC F1 (C6-C10)	µg/m³		52.4	20	21	29	21	407		28	24	12
PHC F1 (C6-C10) - BTEX	µg/m³		41.8	19	20	26	19	403		27	23	11
PHC F2 (>C10-C16)	µg/m³		13	< 3.5	9.3	13	15	322		11	7.6	< 3.5
PHC F2 (>C10-C16) - Nap	µg/m³		13	< 3.5	9.3	13	15	321		11	7.6	< 3.5
Aliphatic >C5-C6	µg/m³		--	--	--	--	--	--		--	--	--
Aliphatics C6-C8 (Unadj.)	µg/m³		11	15	9.2	9.2	< 3.5	< 3.5		8.8	6.3	6.0
Aliphatics >C8-C10 (Unadj.)	µg/m³		42	4.4	15.0	24	26	561		24	22	6.3
Aliphatics >C10-C12 (Unadj.)	µg/m³		13	< 3.5	9.3	13	15	314		9.9	7.6	< 3.5
Aliphatic >C12-C16	µg/m³		--	--	--	--	--	--		--	--	--
Aromatic >C7-C8 (TEX Excluded)	µg/m³		--	--	--	--	--	--		--	--	--
Aromatics >C8-C10 (Unadj.)	µg/m³		< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3		< 2.3	< 2.3	< 2.3
Aromatics >C10-C12 (Unadj.)	µg/m³		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	6.9		< 2.0	< 2.0	< 2.0
Aromatic >C12-C16	µg/m³		--	--	--	--	--	--		--	--	--
MS Volatiles (TO-15)	µg/m3											
Acetone (2-Propanone)	µg/m³	**11880**	57.2	32.8	13	9	5.7	7.6		11	4.8	5.2
1,3-Butadiene	µg/m³	**2**	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44		< 0.44	< 0.44	< 0.44
Benzene	µg/m³	**2.3**	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64		< 0.64	< 0.64	< 0.64
Bromodichloromethane	µg/m³		< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3		< 1.3	< 1.3	< 1.3
Bromoform	µg/m³	**55**	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1		< 2.1	< 2.1	< 2.1
Bromomethane	µg/m³		< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78		< 0.78	< 0.78	< 0.78
Bromoethene	µg/m³		< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87	< 0.87	< 0.87
Benzyl Chloride	µg/m³		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Carbon disulfide	µg/m³		< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62		< 0.62	< 0.62	< 0.62
Chlorobenzene	µg/m³		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92		< 0.92	< 0.92	< 0.92
Chloroethane	µg/m³		< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53		< 0.53	< 0.53	< 0.53
Chloroform	µg/m³	**1**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98		< 0.98	< 0.98	< 0.98
Chloromethane	µg/m³	**5600**	0.93	0.87	1.2	1.1	0.91	1.0		1.1	1.0	0.87
3-Chloropropene	µg/m³		< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63		< 0.63	< 0.63	< 0.63
2-Chlorotoluene	µg/m³		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Carbon tetrachloride	µg/m³	**2.4**	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3		< 1.3	< 1.3	< 1.3
Cyclohexane	µg/m³	**6100**	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69		< 0.69	< 0.69	< 0.69
1,1-Dichloroethane	µg/m³	**165**	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81		< 0.81	< 0.81	< 0.81
1,1-Dichloroethylene	µg/m³		< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79		< 0.79	< 0.79	< 0.79
1,2-Dibromoethane (EDB)	µg/m³	**3**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5		< 1.5	< 1.5	< 1.5
1,2-Dichloroethane	µg/m³		< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81		< 0.81	< 0.81	< 0.81
1,2-Dichloropropane	µg/m³		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92		< 0.92	< 0.92	< 0.92
1,4-Dioxane	µg/m³		< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72		< 0.72	< 0.72	< 0.72
Dichlorodifluoromethane	µg/m³		2.0	1.9	2.8	2.7	2.6	2.4		2.5	2.5	2.6
Dibromochloromethane	µg/m³		< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7		< 1.7	< 1.7	< 1.7
trans-1,2-Dichloroethylene	µg/m³	**105**	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79		< 0.79	< 0.79	< 0.79
cis-1,2-Dichloroethylene	µg/m³	**105**	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79		< 0.79	< 0.79	< 0.79
cis-1,3-Dichloropropene	µg/m³		< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91		< 0.91	< 0.91	< 0.91
m-Dichlorobenzene	µg/m³		< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2		< 1.2	< 1.2	< 1.2
o-Dichlorobenzene	µg/m³	**30500**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2		< 1.2	< 1.2	< 1.2
p-Dichlorobenzene	µg/m³	**95**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2		< 1.2	< 1.2	< 1.2
trans-1,3-Dichloropropene	µg/m³		< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91		< 0.91	< 0.91	< 0.91
Ethanol	µg/m³		9.4	6.6	6.0	4.0	5.8	4.7		5.1	6.0	6.2
Ethylbenzene	µg/m³	**1000**	1.0	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87	< 0.87	< 0.87
Ethyl Acetate	µg/m³		2.6	2.4	2.5	3.0	10	3.0		2.5	< 0.72	< 0.72
4-Ethyltoluene	µg/m³		< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98		< 0.98	< 0.98	< 0.98
Freon 113	µg/m³		< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5		< 1.5	< 1.5	< 1.5
Freon 114	µg/m³	**700000**	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4		< 1.4	< 1.4	< 1.4
Heptane	µg/m³	**11000**	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82		< 0.82	< 0.82	< 0.82
Hexachlorobutadiene	µg/m³		< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1		< 2.1	< 2.1	< 2.1
Hexane	µg/m³	**7500**	< 0.70	8.1	0.70	< 0.70	< 0.70	< 0.70		< 0.70	< 0.70	0.78
2-Hexanone	µg/m³		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82		< 0.82	< 0.82	< 0.82
Isopropyl Alcohol	µg/m³	**7300**	0.93	0.84	2.1	0.84	1.6	1.4		< 0.49	0.64	0.57
Methylene chloride	µg/m³	**220**	4.5	0.73	12	1.1	4.5	0.8		< 0.69	3.8	15
Methyl ethyl ketone	µg/m³	**1000**	1.6	0.77	2.4	1.5	< 0.59	0.65		1.4	< 0.59	< 0.59
Methyl Isobutyl Ketone	µg/m³	**1200**	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82		< 0.82	< 0.82	< 0.82
Methyl Tert Butyl Ether	µg/m³	**7000**	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72		< 0.72	< 0.72	< 0.72
Methylmethacrylate	µg/m³		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82		< 0.82	< 0.82	< 0.82
Naphthalene	µg/m³	**22.5**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.0		< 1.0	< 1.0	< 1.0
Propylene	µg/m³	**4000**	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86		< 0.86	< 0.86	< 0.86
Styrene	µg/m³	**400**	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85		< 0.85	< 0.85	< 0.85
1,1,1-Trichloroethane	µg/m³	**115000**	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1		< 1.1	< 1.1	< 1.1
1,1,1,2-Tetrachloroethane	µg/m³		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4		< 1.4	< 1.4	< 1.4
1,1,2,2-Tetrachloroethane	µg/m³		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4		< 1.4	< 1.4	< 1.4
1,1,2-Trichloroethane	µg/m³		< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1		< 1.1	< 1.1	< 1.1
1,2,4-Trichlorobenzene	µg/m³	**400**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5		< 1.5	< 1.5	< 1.5
1,2,4-Trimethylbenzene	µg/m³	**220**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98		< 0.98	< 0.98	< 0.98
1,3,5-Trimethylbenzene	µg/m³	**220**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98		< 0.98	< 0.98	< 0.98
2,2,4-Trimethylpentane	µg/m³		< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93		< 0.93	< 0.93	< 0.93
Tertiary Butyl Alcohol	µg/m³		0.82	< 0.61	< 0.61	0.70	< 0.61	< 0.61		< 0.61	< 0.61	< 0.61
Tetrachloroethylene	µg/m³		3.5	2.5	< 0.27	0.37	< 0.27	< 0.27		< 0.27	< 0.27	< 0.27
Tetrahydrofuran	µg/m³	**93000**	< 0.59	< 0.59	0.65	< 0.59	< 0.59	< 0.59		< 0.59	< 0.59	< 0.59
Toluene	µg/m³	**2000**	1.5	0.87	< 0.75	0.79	1.1	1.0		< 0.75	< 0.75	< 0.75
Trichloroethylene	µg/m³	**12**	0.23	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21		< 0.21	2.0	< 0.21
Trichlorofluoromethane	µg/m³	**6000**	1.4	1.2	2.4	1.6	2.2	1.2		1.2	1.3	1.8
Vinyl chloride	µg/m³	**1**	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51		< 0.51	< 0.51	< 0.51
Vinyl Acetate	µg/m³		< 0.70	< 0.70	2.0	1.1	< 0.70	0.77		< 0.70	< 0.70	< 0.70
m,p-Xylene	µg/m³	**730**	4.0	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87	< 0.87	< 0.87
o-Xylene	µg/m³	**730**	0.96	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87	< 0.87	< 0.87
Xylenes (total)	µg/m³	**730**	4.8	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87		< 0.87	< 0.87	< 0.87

AAQC = Ambient Air Quality Criteria, Ontario Ministry of the Environment
Bold values indicate an exceedance of a AAQC value
-- indicates parameter not analyzed by the contract lab
[1] No Sample due to equipment issues
[2] Dredging activities haulted mid-morning due to w eather

Table 37: Air quality monitoring – Harbour/Centre Pier – Volatile Organic Compound Monitoring (October 2021)

Monitoring Location			2021-10-06		2021-10-12		2021-10-18		2021-10-28	
			HCP NW Corner	West Side of Site - HCP	HCP NW Corner	NW of Sediment	HCP NW Corner	West Side of Harbour	HCP NW Corner	East of Dredging
Wind Direction at time of Deployment			NE	E	SE	SE	NW	NW	E	E
Analysis MS Volatiles (ONMOE APH)	**Units**	**Criteria (AAQC)**								
Benzene	µg/m³	**2.3**	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64
Ethylbenzene	µg/m³	**1000**	< 0.87	0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87
Toluene	µg/m³	**2000**	1.1	1.3	1.7	< 0.75	2.6	< 0.75	< 0.75	1.4
m,p-Xylene	µg/m³	**730**	1.2	5.6	1.0	1.0	< 0.87	< 0.87	< 0.87	< 0.87
o-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87
Naphthalene	µg/m³	**22.5**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
PHC F1 (C6-C10)	µg/m³		15	53.1	26	78	14	9.4	12	23
PHC F1 (C6-C10) - BTEX	µg/m³		12	45.2	23	75.4	11	8.3	10	20
PHC F2 (>C10-C16)	µg/m³		< 3.5	< 3.5	16	35	< 3.5	< 3.5	13	10
PHC F2 (>C10-C16) - Nap	µg/m³		< 3.5	< 3.5	16	35	< 3.5	< 3.5	13	10
Aliphatic >C5-C6	µg/m³		--	--	--	--	--	--	--	--
Aliphatics C6-C8 (Unadj.)	µg/m³		6.0	6.7	6.0	9.9	6.0	4.2	< 3.5	7.0
Aliphatics >C8-C10 (Unadj.)	µg/m³		8.4	53	23	90.2	5.8	5.2	10	18
Aliphatics >C10-C12 (Unadj.)	µg/m³		< 3.5	< 3.5	16	34	< 3.5	< 3.5	10	9.3
Aliphatic >C12-C16	µg/m³		--	--	--	--	--	--	--	--
Aromatic >C7-C8 (TEX Excluded)	µg/m³		--	--	--	--	--	--	--	--
Aromatics >C8-C10 (Unadj.)	µg/m³		< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3
Aromatics >C10-C12 (Unadj.)	µg/m³		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aromatic >C12-C16	µg/m³		--	--	--	--	--	--	--	--
MS Volatiles (TO-15)	µg/m3									
Acetone (2-Propanone)	µg/m³	**11880**	6.2	19	14	33.7	2.6	7.1	7.8	898
1,3-Butadiene	µg/m³	**2**	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44
Benzene	µg/m³	**2.3**	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64
Bromodichloromethane	µg/m³		< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
Bromoform	µg/m³	**55**	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1
Bromomethane	µg/m³		< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78
Bromoethene	µg/m³		< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87
Benzyl Chloride	µg/m³		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.0	1.0
Carbon disulfide	µg/m³		< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62
Chlorobenzene	µg/m³		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92
Chloroethane	µg/m³		< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53
Chloroform	µg/m³	**1**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98
Chloromethane	µg/m³	**5600**	0.99	1.1	1.1	1.1	0.85	1.1	1.0	1.3
3-Chloropropene	µg/m³		< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63
2-Chlorotoluene	µg/m³		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbon tetrachloride	µg/m³	**2.4**	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
Cyclohexane	µg/m³	**6100**	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69
1,1-Dichloroethane	µg/m³	**165**	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81
1,1-Dichloroethylene	µg/m³		< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79
1,2-Dibromoethane (EDB)	µg/m³	**3**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
1,2-Dichloroethane	µg/m³		< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81
1,2-Dichloropropane	µg/m³		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92
1,4-Dioxane	µg/m³		< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72
Dichlorodifluoromethane	µg/m³		2.5	2.7	1.9	2.0	2.0	2.1	2.0	2.0
Dibromochloromethane	µg/m³		< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7
trans-1,2-Dichloroethylene	µg/m³	**105**	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79
cis-1,2-Dichloroethylene	µg/m³	**105**	< 0.79	< 0.79	< 0.79	< 0.79	0.91	< 0.79	< 0.79	< 0.79
cis-1,3-Dichloropropene	µg/m³		< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91
m-Dichlorobenzene	µg/m³		< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
o-Dichlorobenzene	µg/m³	**30500**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
p-Dichlorobenzene	µg/m³	**95**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
trans-1,3-Dichloropropene	µg/m³		< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91
Ethanol	µg/m³		11	11	5.1	4.9	3.6	3.2	8.5	12
Ethylbenzene	µg/m³	**1000**	< 0.87	0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87
Ethyl Acetate	µg/m³		1.2	1.2	6.1	5.0	0.76	1.1	7.6	4.0
4-Ethyltoluene	µg/m³		< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98
Freon 113	µg/m³		< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Freon 114	µg/m³	**700000**	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Heptane	µg/m³	**11000**	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82
Hexachlorobutadiene	µg/m³		< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1
Hexane	µg/m³	**7500**	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	0.78
2-Hexanone	µg/m³		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82
Isopropyl Alcohol	µg/m³	**7300**	2.1	2.5	0.88	1.1	< 0.49	< 0.49	0.71	1.5
Methylene chloride	µg/m³	**220**	< 0.69	1.6	< 0.69	< 0.69	1.1	< 0.69	0.94	< 0.69
Methyl ethyl ketone	µg/m³	**1000**	0.62	0.86	0.97	3.5	< 0.59	< 0.59	< 0.59	1.2
Methyl Isobutyl Ketone	µg/m³	**1200**	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82
Methyl Tert Butyl Ether	µg/m³	**7000**	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72
Methylmethacrylate	µg/m³		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82
Naphthalene	µg/m³	**22.5**	< 1.0	< 1.0	< 1.0	1.2	< 1.0	< 1.0	< 1.0	< 1.0
Propylene	µg/m³	**4000**	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86
Styrene	µg/m³	**400**	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85
1,1,1-Trichloroethane	µg/m³	**115000**	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
1,1,1,2-Tetrachloroethane	µg/m³		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
1,1,2,2-Tetrachloroethane	µg/m³		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
1,1,2-Trichloroethane	µg/m³		< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
1,2,4-Trichlorobenzene	µg/m³	**400**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
1,2,4-Trimethylbenzene	µg/m³	**220**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98
1,3,5-Trimethylbenzene	µg/m³	**220**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98
2,2,4-Trimethylpentane	µg/m³		< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93
Tertiary Butyl Alcohol	µg/m³		< 0.61	< 0.61	0.91	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61
Tetrachloroethylene	µg/m³		0.88	< 0.27	< 0.27	1.9	< 0.27	< 0.27	< 0.27	1.0
Tetrahydrofuran	µg/m³	**93000**	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	1.9
Toluene	µg/m³	**2000**	1.1	1.3	1.8	0.75	2.9	< 0.75	< 0.75	1.4
Trichloroethylene	µg/m³	**12**	< 0.21	0.86	< 0.21	0.64	< 0.21	< 0.21	< 0.21	< 0.21
Trichlorofluoromethane	µg/m³	**6000**	1.2	1.9	1.2	1.2	1.4	< 1.1	< 1.1	< 1.1
Vinyl chloride	µg/m³	**1**	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51
Vinyl Acetate	µg/m³		< 0.70	0.95	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	0.77
m,p-Xylene	µg/m³	**730**	< 0.87	2.6	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87
o-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87
Xylenes (total)	µg/m³	**730**	< 0.87	2.6	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87

AAQC = Ambient Air Quality Criteria, Ontario Ministry of the Environment
Bold values indicate an exceedance of a AAQC value
-- indicates parameter not analyzed by the contract lab

Table 38: Air quality monitoring – Harbour/Centre Pier – Volatile Organic Compound Monitoring (November 2021)

Monitoring Location			2021-11-01		2021-11-08		2021-11-15		2021-11-23		2021-11-29	
			HCP NW Corner	East of Dredging	HCP NW Corner	SE of Dredging	HCP NW Corner	West Side of Site - HCP	HCP NW Corner	SE of Dredging	HCP NW Corner	West Side of Harbour
Wind Direction at time of Deployment			W	W	S	S	NW	NW	NW	NW	W	W
Analysis MS Volatiles (ONMOE APH)	**Units**	**Criteria (AAQC)**										
Benzene	µg/m³	**2.3**	< 0.64	< 0.64	< 0.64	0.64	< 0.64	< 0.64	0.64	< 0.64	0.73	0.73
Ethylbenzene	µg/m³	**1000**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87
Toluene	µg/m³	**2000**	< 0.75	1.5	1.2	1.6	< 0.75	< 0.75	1.2	0.79	2.2	1.9
m,p-Xylene	µg/m³	**730**	< 0.87	< 0.87	1.1	1.8	< 0.87	< 0.87	1.1	0.91	2.1	2.1
o-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87
Naphthalene	µg/m³	**22.5**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
PHC F1 (C6-C10)	µg/m³		7.5	12	12	18	7.5	20	11	12	13	11
PHC F1 (C6-C10) - BTEX	µg/m³		6.4	9.4	9.4	14	6.0	18	7.2	9.4	7.9	6.4
PHC F2 (>C10-C16)	µg/m³		4.7	< 3.5	< 3.5	13	< 3.5	9.3	< 3.5	4.8	< 3.5	< 3.5
PHC F2 (>C10-C16) - Nap	µg/m³		4.7	< 3.5	< 3.5	13	< 3.5	9.3	< 3.5	4.8	< 3.5	< 3.5
Aliphatic >C5-C6	µg/m³		--	--	--	--	--	--	--	--	--	--
Aliphatics C6-C8 (Unadj.)	µg/m³		< 3.5	5.3	4.9	5.6	3.5	< 3.5	4.9	6.3	7.4	6.0
Aliphatics >C8-C10 (Unadj.)	µg/m³		3.5	5.2	5.8	10	< 3.1	21.0	< 3.1	3.4	< 3.1	< 3.1
Aliphatics >C10-C12 (Unadj.)	µg/m³		4.7	< 3.5	< 3.5	13	< 3.5	9.3	< 3.5	4.8	< 3.5	< 3.5
Aliphatic >C12-C16	µg/m³		--	--	--	--	--	--	--	--	--	--
Aromatic >C7-C8 (TEX Excluded)	µg/m³		--	--	--	--	--	--	--	--	--	--
Aromatics >C8-C10 (Unadj.)	µg/m³		< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3	< 2.3
Aromatics >C10-C12 (Unadj.)	µg/m³		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aromatic >C12-C16	µg/m³		--	--	--	--	--	--	--	--	--	--
MS Volatiles (TO-15)	µg/m3											
Acetone (2-Propanone)	µg/m³	**11880**	4.0	7.6	5.0	4.8	2.6	2.9	3.3	2.2	4.5	4.0
1,3-Butadiene	µg/m³	**2**	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44
Benzene	µg/m³	**2.3**	< 0.64	< 0.64	< 0.64	0.70	< 0.64	< 0.64	< 0.64	< 0.64	0.73	0.67
Bromodichloromethane	µg/m³		< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
Bromoform	µg/m³	**55**	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1
Bromomethane	µg/m³		< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78	< 0.78
Bromoethene	µg/m³		< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87
Benzyl Chloride	µg/m³		< 1.0	< 1.0	1.0	1.0	< 1.0	< 1.0	1.0	1.0	1.0	1.0
Carbon disulfide	µg/m³		< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62	< 0.62
Chlorobenzene	µg/m³		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92
Chloroethane	µg/m³		< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53
Chloroform	µg/m³	**1**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98
Chloromethane	µg/m³	**5600**	0.99	1.1	0.95	1.0	0.78	0.78	0.85	0.87	1.1	1.0
3-Chloropropene	µg/m³		< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63
2-Chlorotoluene	µg/m³		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbon tetrachloride	µg/m³	**2.4**	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
Cyclohexane	µg/m³	**6100**	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69	< 0.69
1,1-Dichloroethane	µg/m³	**165**	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81
1,1-Dichloroethylene	µg/m³		< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79
1,2-Dibromoethane (EDB)	µg/m³	**3**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
1,2-Dichloroethane	µg/m³		< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81	< 0.81
1,2-Dichloropropane	µg/m³		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92
1,4-Dioxane	µg/m³		< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72
Dichlorodifluoromethane	µg/m³		1.9	2.1	2.0	2.0	1.8	1.8	1.9	1.9	2.1	2.1
Dibromochloromethane	µg/m³		< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7
trans-1,2-Dichloroethylene	µg/m³	**105**	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79
cis-1,2-Dichloroethylene	µg/m³	**105**	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	1.0	< 0.79	< 0.79
cis-1,3-Dichloropropene	µg/m³		< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91
m-Dichlorobenzene	µg/m³		< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
o-Dichlorobenzene	µg/m³	**30500**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
p-Dichlorobenzene	µg/m³	**95**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
trans-1,3-Dichloropropene	µg/m³		< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91	< 0.91
Ethanol	µg/m³		5.1	20.3	4.9	5.7	3.8	3.8	5.3	4.5	9.6	10
Ethylbenzene	µg/m³	**1000**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87
Ethyl Acetate	µg/m³		0.72	49.3	2.1	2.7	< 0.72	1.6	< 0.72	< 0.72	< 0.72	1.1
4-Ethyltoluene	µg/m³		< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98
Freon 113	µg/m³		< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Freon 114	µg/m³	**700000**	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Heptane	µg/m³	**11000**	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82
Hexachlorobutadiene	µg/m³		< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1
Hexane	µg/m³	**7500**	< 0.70	1.2	< 0.70	0.81	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70
2-Hexanone	µg/m³		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82
Isopropyl Alcohol	µg/m³	**7300**	1.6	3.2	0.59	0.54	< 0.49	< 0.49	2.0	0.71	1.7	1.7
Methylene chloride	µg/m³	**220**	< 0.69	3.2	0.73	1.0	< 0.69	< 0.69	0.73	0.80	0.90	0.87
Methyl ethyl ketone	µg/m³	**1000**	< 0.59	0.65	0.68	0.71	< 0.59	1.4	< 0.59	< 0.59	< 0.59	0.71
Methyl Isobutyl Ketone	µg/m³	**1200**	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82
Methyl Tert Butyl Ether	µg/m³	**7000**	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72	< 0.72
Methylmethacrylate	µg/m³		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82
Naphthalene	µg/m³	**22.5**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Propylene	µg/m³	**4000**	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86	< 0.86
Styrene	µg/m³	**400**	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85	< 0.85
1,1,1-Trichloroethane	µg/m³	**115000**	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
1,1,1,2-Tetrachloroethane	µg/m³		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
1,1,2,2-Tetrachloroethane	µg/m³		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
1,1,2-Trichloroethane	µg/m³		< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
1,2,4-Trichlorobenzene	µg/m³	**400**	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
1,2,4-Trimethylbenzene	µg/m³	**220**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98
1,3,5-Trimethylbenzene	µg/m³	**220**	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98	< 0.98
2,2,4-Trimethylpentane	µg/m³		< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93
Tertiary Butyl Alcohol	µg/m³		< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61
Tetrachloroethylene	µg/m³		< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27
Tetrahydrofuran	µg/m³	**93000**	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59
Toluene	µg/m³	**2000**	< 0.75	1.4	1.4	1.8	< 0.75	< 0.75	1.1	< 0.75	2.1	1.7
Trichloroethylene	µg/m³	**12**	< 0.21	< 0.21	< 0.21	< 0.21	0.29	< 0.21	< 0.21	3.5	< 0.21	< 0.21
Trichlorofluoromethane	µg/m³	**6000**	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	1.2	1.2	1.3	1.3
Vinyl chloride	µg/m³	**1**	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51
Vinyl Acetate	µg/m³		< 0.70	0.74	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70	< 0.70
m,p-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	1.0	< 0.87	< 0.87	< 0.87	< 0.87	1.0	1.0
o-Xylene	µg/m³	**730**	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87
Xylenes (total)	µg/m³	**730**	< 0.87	< 0.87	< 0.87	1.0	< 0.87	< 0.87	< 0.87	< 0.87	1.0	1.0

AAQC = Ambient Air Quality Criteria, Ontario Ministry of the Environment
Bold values indicate an exceedance of a AAQC value
-- indicates parameter not analyzed by the contract lab

Table 39: Noise monitoring levels – PH LTWMF

		2015 Average L_{eq} (dBA) Pre-Early Works 3a			2017 Average L_{eq} (dBA) During Early Works 1			2018 Average L_{eq} (dBA)			2019 Average L_{eq} (dBA)			2020 Average L_{eq} (dBA)			2021 Average L_{eq} (dBA)		
Monitoring Location	Monitoring Location	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)
PH-N-0001	192 Toronto Rd	63	61	59	67	63	61	66	63	60	67	62	61	65	62	59	66	61	60
PH-N-0002	NW WWMF, Brand Rd	66	67	64	66	67	64	66	66	64	66	66	64	65	66	63	64	64	63
PH-N-0003	South WWMF	52	53	52	54	54	53	58	55	53	58	54	51	53	52	49	54	52	51
PH-N-0004	SW WWMF, Brand Rd	56	55	53	58	55	55	58	56	55	56	57	55	56	58	55	56	54	54
PH-N-0005	Weather Station	54	54	52	63	54	54	65	56	55	62	55	56	57	52	50	58	53	55
PH-N-0006	Welcome North	62	61	58	67	67	65	67	67	65	66	65	63	64	65	63	67	67	65
PH-N-0007	SE Corner WWMF	---	---	---	59	56	52	56	55	53	58	56	55	56	52	52	55	55	54

Note:
-- = Data not available
Noise monitoring results are compared to:
1. 12 dBA difference from Baseline (2015) monitoring results
2. 70 dB over a 24 hour period as per the World Health Organization's *Guideline for Community Noise*, 1999

Table 40: Noise monitoring levels – Port Hope Central, North and South transportation routes

Central Transporation Route	Yearly Average Hourly Measurements Leq (dBA)			February Hourly Measurements Leq (dBA)	April Hourly Measurements Leq (dBA)	September Hourly Measurements Leq (dBA)	December Hourly Measurements Leq (dBA)	
	2018	2019	2020	2021				Yearly Average
Monitoring Location	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)
C-TR-N-001	61	64	62	61	65	65	65	64
C-TR-N-002	69	71	69	68	68	69	70	69

North Transporation Route	Yearly Average Hourly Measurements Leq (dBA)			February Hourly Measurements Leq (dBA)	April Hourly Measurements Leq (dBA)	September Hourly Measurements Leq (dBA)	December Hourly Measurements Leq (dBA)	
	2018	2019	2020	2021				Yearly Average
Monitoring Location	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)
N-TR-N-001	63	61	62	62	62	62	63	62
N-TR-N-002	62	61	65	67	67	66	72	68

South Transporation Route	Yearly Average Hourly Measurements Leq (dBA)			February Hourly Measurements Leq (dBA)	April Hourly Measurements Leq (dBA)	September Hourly Measurements Leq (dBA)	November Hourly Measurements Leq (dBA)	
	2018	2019	2020	2021				Yearly Average
Monitoring Location	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)	Day (07:00-19:00)
S-TR-N-001	70	70	70	70	69	68	69	69
S-TR-N-002	69	70	70	70	70	70	70	70
S-TR-N-003	68	68	68	67	67	69	69	68
S-TR-N-004	63	65	65	63	65	66	66	65
S-TR-N-005	61	60	61	61	62	60	61	61

Table 41: Noise monitoring levels – Highland Drive and Vicinity Sites – PSE CS

	2020 Average L_{eq} (dBA)			2021 Average L_{eq} (dBA)		
Monitoring Location	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)
HD-N-0001	48	48	47	45	47	46
HD-N-0002	50	48	48	53	51	52
HD-N-0003	61	55	54	61	56	52

Table 42: PH LTWMF groundwater levels

Well ID	2016	2017	2018	2019	2020	2021		
	Average (mASL)					Min	Max	Average
WC-IW93-22	123.44	123.94	123.81	123.74	123.47	123.03	123.88	123.48
WC-MW1-02	127.37	127.87	128.57	**Well Damaged**				
WC-MW1-03	148.14	148.26	148.30	148.48	148.16	148.14	148.45	148.25
WC-MW2-02	**Well Not Found**							
WC-MW3A-02 [1]	--	--	--	--	--	--	--	--
WC-MW3A-11R	--	--	--	--	--	--	--	--
WC-MW3B-02	129.48	129.57	129.66	130.93	130.72	129.80	130.45	130.11
WC-MW3C-02	135.34	135.52	135.98	136.15	135.81	135.18	135.86	135.56
WC-MW3D-02	136.39	136.53	136.91	136.85	136.86	136.32	136.57	136.46
WC-MW4A-02	127.29	127.03	127.15	127.09	126.87	126.39	126.79	126.62
WC-MW4B-02	127.09	127.18	127.25	127.17	126.92	126.70	127.09	126.94
WC-OW2-75	133.60	134.86	**Well Decommissioned**					
WC-OW2A-75	119.87	120.23	**Well Decommissioned**					
WC-OW2A-19 [2]	--			120.14	119.76	119.50	120.49	120.04
WC-OW2-87	119.46	119.63	**Well Decommissioned**					
WC-OW2-19 [3]	--			120.02	120.38	119.89	120.93	120.54
WC-OW3-79	119.18	119.47	119.50	119.31	116.73	118.84	119.28	119.11
WC-OW5-79	119.91	119.68	**Well Decommissioned**					
WC-OW9-75	--	**Well Decommissioned**						
WC-OW10-75	139.92	140.33	140.56	140.30	140.14	139.78	140.81	140.33
WC-OW25-76	118.42	118.75	118.74	118.76	118.66	118.52	118.81	118.71
WC-OW-27-76	120.28	120.80	120.58	120.83	120.71	120.69	121.10	120.93

Note:
mASL – meters above sea level
- = Data not available
[1] WC-MW3A-11R was installed in 2011 to replace WC-MW3A-02
[2] WC-OW2A-19 was installed in 2019 to replace WC-OW2A-75
[3] WC-OW2-19 was installed in 2019 to replace WC-OW2-87
[4] WC-OW5-19 was installed in 2019 to replace WC-OW5-79
[5] LTWMF-MW-06 was installed in 2017 to replace WC-OW9-75

Table 43: Highland Drive groundwater levels

Well ID	2018	2019	2020	2021		
	Average			Min	Max	Average
	(mASL)					
PH-02-01	104.08	104.20	104.13	103.82	103.99	103.89
PH-02-02	104.07	104.29	104.11	103.72	103.95	103.88
PH-02-03	104.08	105.58	104.11	103.77	103.96	103.90
PH-90-3-I	110.16	110.00	110.19	109.30	110.49	109.89
PH-90-3-II	--	119.54	120.19	119.07	119.74	119.45
PH-90-4-W	107.29	107.67	107.77	107.46	107.67	107.57
PH-90-4-I	106.38	106.38	106.43	106.08	106.24	106.16
PH-90-4-II	107.27	--	--	--	--	--
PH-90-4-III	115.58	115.50	115.47	115.04	115.33	115.16
PH-90-6-I	107.36	111.34	107.30	106.93	107.28	107.06
PH-90-6-II	114.16	114.70	109.94	107.28	115.22	112.54
PH-90-6-III	115.92	116.25	115.88	115.36	118.12	116.44
PH-90-7-I	--	105.01	105.01	104.54	104.54	104.54
PH-90-7-II	105.42	105.48	105.36	105.05	105.20	105.12
PH-90-7-III	112.49	112.79	112.57	111.85	112.49	112.17
PH-90-8-I	104.03	104.07	103.99	103.79	103.92	103.88
PH-90-8-II	104.08	104.15	104.09	103.79	104.04	103.93
PH-90-9-I	**Well Not Found**					
PH-90-9-II	--	94.77	90.40	90.25	90.25	90.25
PH-90-9-III	95.18	96.85	96.18	95.42	96.21	95.92
PH-93-3-I	--	106.09	106.21	105.67	105.84	105.74
PH-93-3-II	105.98	106.09	106.06	105.55	105.82	105.70
PH-93-3-III	112.46	112.58	112.50	111.99	112.19	112.10
PH-93-6-I	--	--	--	--	--	--
PH-93-6-II	--	--	--	--	--	--
PH-93-6-III	--	--	--	--	--	--
PH-93-9-I	--	--	--	--	--	--
PH-93-9-II	--	--	--	--	--	--
PH-93-10-I	105.39	105.50	105.48	104.89	105.27	105.15
PH-93-10-II	105.44	105.50	105.49	104.94	105.32	105.14
PH-93-10-IIIA	--	--	--	--	--	--
PH-93-10-IIIB	--	110.15	110.19	109.94	110.04	110.00
PH-93-12-I	**Well Not Found**					
PH-93-12-II	--	--	--	--	--	--
PH-93-12-III	**Well Not Found**					
PH-95-I	105.37	105.53	105.49	105.29	108.37	106.33
PH-95-7	--	--	--	--	--	--
PH-95-17-I	106.04	106.13	106.09	105.70	105.90	105.77
PH-95-17-II	112.91	113.00	113.00	112.51	112.70	112.61
PH-95-18	106.11	106.16	106.22	**Well Damaged**		
PH-M-19	100.17	100.17	100.16	100.11	100.12	100.12

Note:
mASL – meters above sea level
-- = Data not available

Table 44: PH LTWMF sentinel well monitoring program

Arsenic (dissolved) **PWQO** *Trigger Level* **50 (µg/L)**						
	2018	**2019**	**2020**	**2021**		
Well ID	**Average**			**Sample Dates**		**Average**
WC-IW93-22				2021-05-19	2021-12-14	
	1.4	1.3	1.5	1.4	1.5	1.5
WC-OW1-87				2021-04-23	2021-11-22	
	<1.0	<1.0	0.8	0.9	0.9	0.9
WC-OW2A-75	**WELL DECOMMISSIONED**					
WC-OW2A-19 [1]				2021-04-22	2021-11-29	
		1.4	0.6	0.7	0.7	0.7
WC-OW2-87	**WELL DECOMMISSIONED**					
WC-OW2-19 [2]				2021-04-22	2021-11-26	
		<1.0	1.5	1.8	1.7	1.8
WC-OW3-79				2021-04-21	2021-12-03	
	3.1	3.2	3.8	3.8	3.6	3.7
WC-OW3-87				2021-04-23	2021-12-13	
	4.5	4.2	5.1	4.1	5.9	5.0
WC-OW4-79				2021-04-15	2021-12-01	
	1.1	<1.0	0.7	1.1	0.5	0.8
WC-OW5-79	**WELL DECOMMISSIONED**					
WC-OW5-19 [3]				2021-05-13	2021-11-29	
		2.8	3.4	0.8	4.3	2.6
WC-OW25-76				2021-04-15	2021-12-01	
	<1.0	<1.0	0.8	0.7	--	0.7
WC-OW27-76				2021-04-15	2021-12-01	
	<1.0	<1.0	0.4	0.3	0.4	0.4
WC-OW28-76				2021-04-15	2021-12-01	
	<1.0	<1.0	0.6	0.5	--	0.5
WC-OW33-76				2021-05-20	2021-12-09	
	<1.0	<1.0	1.2	0.5	0.7	0.6

PWQO Trigger Level based on 50% of the Provincial Water Quality Objective of 100 µg/L for arsenic
Waste Nuclear Substance Licence, Port Hope Long-Term Low-Level Radioactive Waste Management Project
-- = Data not available
[1] WC-OW2A-19 was installed in 2019 to replace WC-OW2A-75
[2] WC-OW2-19 was installed in 2019 to replace WC-OW2-87
[3] WC-OW5-19 was installed in 2019 to replace WC-OW5-79

Table 45: Soil monitoring- PH LTWMF – Location 1 (PH-WWMF-SS-01)

Parameter	Units	PH-WWMF-SS-01					
		2016	2017	2018	2019	2020	2021
Water Soluble Boron	µg/g	-[1]	0.50	0.51	0.54	< 0.50	< 0.50
Mercury	µg/g	< 0.05	0.067	< 0.05	< 0.05	0.06	0.05
Silver	µg/g	0.98	< 0.40	0.22	0.25	0.47	0.48
Arsenic	µg/g	3.5	5.7	4.0	4.1	4.8	5.3
Barium	µg/g	54	52	48	53	66	55
Beryllium	µg/g	0.39	0.43	0.37	0.45	0.40	0.37
Boron	µg/g	6.0	< 5.0	5.6	6.4	5.0	5.0
Cadmium	µg/g	0.84	0.34	0.35	0.31	0.49	0.42
Cobalt	µg/g	5.2	8.8	6.0	6.7	8.2	6.6
Copper	µg/g	9.4	13	11	11	18	12
Molybdenum	µg/g	0.40	< 0.50	0.53	< 0.50	0.60	0.40
Nickel	µg/g	8.2	11	8.3	9.1	12	9.0
Lead	µg/g	18	20	20	20	23	21
Selenium	µg/g	< 0.70	< 0.50	< 0.50	< 0.50	< 0.70	< 0.70
Antimony	µg/g	< 0.80	0.24	0.22	< 0.20	< 0.80	< 0.80
Uranium	µg/g	2.1	3.1	2.4	3.4	4.1	4.0
Vanadium	µg/g	17	22	22	27	23	19
Zinc	µg/g	380	75	510	310	80	120
Lead-210	Bq/g	0.04	0.10	0.14	0.10	0.40	0.12
Radium-226	Bq/g	0.10	< 0.10	< 0.05	0.06	0.10	0.19
Thorium-230	Bq/g	< 0.02	< 0.50	< 0.40	< 0.40	< 0.40	< 0.40
Thorium-232	Bq/g	-[1]	< 0.30	< 0.04	< 0.30	0.02	0.02

[1] Analysis not included in laboratory contract.

Table 46: Soil monitoring- PH LTWMF – Location 2 (PH-WWMF-SS-02)

Parameter	Units	PH-WWMF-SS-02					
		2016	2017	2018	2019	2020	2021
Water Soluble Boron	µg/g	-[1]	0.75	0.69	0.70	< 0.50	< 0.50
Mercury	µg/g	0.06	0.052	< 0.05	< 0.05	0.05	< 0.05
Silver	µg/g	0.29	< 0.20	< 0.20	< 0.20	0.15	0.15
Arsenic	µg/g	2.6	2.4	3.3	3.8	3.5	3.7
Barium	µg/g	41	30	36	39	40	38
Beryllium	µg/g	0.29	0.25	0.29	0.32	0.26	0.25
Boron	µg/g	3.0	< 5.0	< 5.0	< 5.0	3.0	3.0
Cadmium	µg/g	0.35	0.20	0.27	0.22	0.26	0.23
Cobalt	µg/g	3.4	3.4	4.1	4.8	4.9	4.1
Copper	µg/g	6.1	5.3	6.7	7.5	7.9	7.0
Molybdenum	µg/g	0.30	< 0.50	< 0.50	< 0.50	0.30	0.30
Nickel	µg/g	5.4	5.2	6.0	6.8	7.0	5.7
Lead	µg/g	19	14	17	16	17	16
Selenium	µg/g	< 0.70	< 0.50	< 0.50	< 0.50	< 0.70	< 0.70
Antimony	µg/g	< 0.80	< 0.20	< 0.20	< 0.20	< 0.80	< 0.80
Uranium	µg/g	2.2	0.9	1.2	1.3	1.4	1.2
Vanadium	µg/g	15	18	20	24	19	14
Zinc	µg/g	47	37	38	44	44	35
Lead-210	Bq/g	0.08	< 0.05	0.06	0.08	0.08	0.08
Radium-226	Bq/g	0.06	< 0.10	< 0.05	< 0.05	0.13	0.12
Thorium-230	Bq/g	0.03	< 0.50	< 0.40	< 0.40	< 0.08	< 0.30
Thorium-232	Bq/g	-[1]	< 0.30	< 0.04	< 0.30	0.01	0.01

[1] Analysis not included in laboratory contract.

Table 47: Soil monitoring- PH LTWMF – Location 3 (PH-WWMF-SS-03)

Parameter	Units	PH-WWMF-SS-03					
		2016	2017	2018	2019	2020	2021
Water Soluble Boron	µg/g	-[1]	0.42	0.57	0.59	< 0.50	< 0.50
Mercury	µg/g	< 0.05	0.064	0.05	< 0.05	< 0.05	< 0.05
Silver	µg/g	0.07	< 0.20	< 0.20	< 0.20	0.08	0.06
Arsenic	µg/g	2.9	3.2	3.5	3.8	3.4	3.7
Barium	µg/g	95	87	110	98	100	94
Beryllium	µg/g	0.50	0.54	0.57	0.56	0.50	0.44
Boron	µg/g	5.0	< 5.0	6.6	7.3	5.0	4.0
Cadmium	µg/g	0.23	0.20	0.22	0.23	0.28	0.21
Cobalt	µg/g	5.8	6.1	7.1	6.5	7.5	6.2
Copper	µg/g	11	11	13	13	14	12
Molybdenum	µg/g	0.40	< 0.50	< 0.50	< 0.50	0.40	0.30
Nickel	µg/g	11	12	13	13	14	11
Lead	µg/g	11	11	13	13	12	11
Selenium	µg/g	< 0.70	< 0.50	< 0.50	< 0.50	< 0.70	< 0.70
Antimony	µg/g	< 0.80	0.22	< 0.20	< 0.20	< 0.80	< 0.80
Uranium	µg/g	1.2	1.1	1.3	1.3	1.4	1.2
Vanadium	µg/g	27	31	35	35	35	28
Zinc	µg/g	53	54	62	58	63	49
Lead-210	Bq/g	0.13	0.06	0.07	< 0.05	0.10	0.09
Radium-226	Bq/g	0.04	< 0.10	< 0.05	< 0.05	0.08	< 0.05
Thorium-230	Bq/g	0.04	< 0.50	< 0.40	< 0.40	< 0.20	< 0.20
Thorium-232	Bq/g	-[1]	< 0.30	< 0.04	< 0.30	0.02	0.02

[1] Analysis not included in laboratory contract.

Table 48: Soil monitoring- PH LTWMF – Location 4 (PH-WWMF-SS-04)

Parameter	Units	PH-WWMF-SS-04					
		2016	2017	2018	2019	2020	2021
Water Soluble Boron	µg/g	-[1]	0.58	0.59	0.58	< 0.50	< 0.50
Mercury	µg/g	< 0.05	< 0.050	< 0.05	< 0.05	< 0.05	< 0.05
Silver	µg/g	0.04	< 0.20	< 0.20	< 0.20	< 0.05	< 0.05
Arsenic	µg/g	2.1	1.8	2.1	1.4	2.5	2.9
Barium	µg/g	23	21	34	20	28	36
Beryllium	µg/g	0.26	< 0.20	< 0.20	< 0.20	0.22	0.23
Boron	µg/g	4.0	< 5.0	< 5.0	< 5.0	4.0	3.0
Cadmium	µg/g	0.21	0.22	0.19	0.12	0.21	0.26
Cobalt	µg/g	2.5	2.2	2.4	1.8	3.0	2.8
Copper	µg/g	5.3	4.0	4.6	4.1	6.7	5.8
Molybdenum	µg/g	0.30	< 0.50	< 0.50	< 0.50	0.30	0.20
Nickel	µg/g	4.2	3.7	4.1	3.2	5.1	4.5
Lead	µg/g	11	11	40	10	11	19
Selenium	µg/g	0.80	< 0.50	< 0.50	< 0.50	< 0.70	< 0.70
Antimony	µg/g	< 0.80	< 0.20	< 0.20	0.23	< 0.80	< 0.80
Uranium	µg/g	0.66	0.56	0.50	0.43	0.67	0.6
Vanadium	µg/g	13	14	13	15	15	11
Zinc	µg/g	310	140	220	550	260	99
Lead-210	Bq/g	< 0.04	< 0.05	0.07	< 0.05	0.08	0.08
Radium-226	Bq/g	0.04	< 0.10	< 0.05	< 0.05	< 0.04	0.09
Thorium-230	Bq/g	0.03	< 0.50	< 0.40	< 0.40	< 0.30	< 0.30
Thorium-232	Bq/g	-[1]	< 0.30	< 0.04	< 0.30	0.01	0.01

[1] Analysis not included in laboratory contract.

Table 49: Soil monitoring- PH LTWMF – Location 5 (PH-WWMF-SS-05)

Parameter	Units	PH-WWMF-SS-05					
		2016	2017	2018	2019	2020	2021
Water Soluble Boron	µg/g	-[1]	0.54	0.71	0.46	< 0.50	< 0.50
Mercury	µg/g	< 0.05	< 0.050	< 0.05	< 0.05	< 0.05	< 0.05
Silver	µg/g	0.04	< 0.20	< 0.20	< 0.20	< 0.05	< 0.05
Arsenic	µg/g	57	50	34	30	2.0	19.0
Barium	µg/g	100	50	62	69	81	78
Beryllium	µg/g	0.36	0.31	0.33	0.36	0.41	0.32
Boron	µg/g	7.0	< 5.0	6.4	7.0	6.0	6.0
Cadmium	µg/g	0.16	0.24	0.22	0.19	0.26	0.17
Cobalt	µg/g	5.3	3.4	4.1	4.4	6.3	4.4
Copper	µg/g	13	8.3	11	9.6	14	9.7
Molybdenum	µg/g	0.40	< 0.50	< 0.50	< 0.50	0.40	0.30
Nickel	µg/g	11	6.9	7.6	8.3	12	8.6
Lead	µg/g	12	19	24	22	34	21
Selenium	µg/g	< 0.70	< 0.50	< 0.50	< 0.50	< 0.70	< 0.70
Antimony	µg/g	< 0.80	< 0.20	0.21	< 0.20	< 0.80	< 0.80
Uranium	µg/g	9.6	9.5	8.9	6.5	0.6	7.5
Vanadium	µg/g	24	20	22	25	29	21
Zinc	µg/g	62	45	180	59	84	55
Lead-210	Bq/g	0.04	0.07	0.06	0.06	0.08	0.08
Radium-226	Bq/g	0.03	< 0.10	< 0.05	< 0.05	0.09	0.13
Thorium-230	Bq/g	0.03	< 0.50	< 0.40	< 0.40	< 0.20	< 0.20
Thorium-232	Bq/g	-[1]	< 0.30	< 0.04	< 0.30	0.02	0.02

[1] Analysis not included in laboratory contract.

Table 50: Soil monitoring- Highland Drive – Location 1 (PH-H-SS-01)

Parameter	Units	PH-H-SS-01					
		2016	2017	2018	2019	2020	2021
Water Soluble Boron	µg/g	-[1]	0.42	0.34	0.30	< 0.50	< 0.50
Mercury	µg/g	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Silver	µg/g	0.07	< 0.20	< 0.20	< 0.20	0.07	0.06
Arsenic	µg/g	2.1	1.6	2.0	2.3	2.4	2.2
Barium	µg/g	100	66	120	110	140	95
Beryllium	µg/g	0.49	0.34	0.56	0.52	0.50	0.38
Boron	µg/g	5.0	5.8	7.1	6.6	6.0	5.0
Cadmium	µg/g	0.17	0.14	0.14	0.19	0.22	0.15
Cobalt	µg/g	5.9	4.7	7.2	7.0	8.9	6.0
Copper	µg/g	13	10	15	14	19	13
Molybdenum	µg/g	0.30	< 0.50	< 0.50	< 0.50	0.40	0.30
Nickel	µg/g	12	8.7	15	13	18	12
Lead	µg/g	15	8.4	16	14	14	8.9
Selenium	µg/g	< 0.70	< 0.50	< 0.50	< 0.50	< 0.70	< 0.70
Antimony	µg/g	< 0.80	< 0.20	0.25	< 0.20	< 0.80	< 0.80
Uranium	µg/g	0.71	0.51	0.78	0.70	0.89	0.60
Vanadium	µg/g	31	25	38	36	44	29
Zinc	µg/g	54	43	87	71	89	50
Lead-210	Bq/g	< 0.04	0.06	< 0.05	0.06	< 0.20	0.11
Radium-226	Bq/g	0.03	< 0.10	< 0.05	< 0.05	0.08	< 0.04
Thorium-230	Bq/g	< 0.02	< 0.5	< 0.40	< 0.40	0.07	< 0.30
Thorium-232	Bq/g	-[1]	< 0.30	< 0.04	< 0.30	0.02	0.02

[1] Analysis not included in laboratory contract.

Table 51: Soil monitoring- Highland Drive – Location 2 (PH-H-SS-02)

Parameter	Units	PH-H-SS-02					
		2016	2017	2018	2019	2020	2021
Water Soluble Boron	µg/g	-[1]	0.57	0.47	0.40	< 0.50	< 0.50
Mercury	µg/g	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Silver	µg/g	0.12	< 0.20	< 0.20	< 0.20	0.10	0.12
Arsenic	µg/g	4.8	3.1	3.9	3.2	4.2	4.0
Barium	µg/g	110	82	99	96	95	108
Beryllium	µg/g	0.48	0.44	0.52	0.45	0.38	0.42
Boron	µg/g	5.0	6.2	6.3	6.5	5.0	5.0
Cadmium	µg/g	0.19	0.19	0.22	0.19	0.19	0.19
Cobalt	µg/g	6.1	5.8	6.9	6.2	6.5	6.4
Copper	µg/g	14	13	15	13	15	15
Molybdenum	µg/g	0.40	< 0.50	0.52	< 0.50	0.40	0.30
Nickel	µg/g	12	11	13	12	13	12
Lead	µg/g	18	12	15	13	19	16
Selenium	µg/g	< 0.70	< 0.50	< 0.50	< 0.50	< 0.70	< 0.70
Antimony	µg/g	< 0.80	0.21	0.24	0.21	< 0.80	< 0.80
Uranium	µg/g	2.3	1.4	2.3	2.0	1.7	2.3
Vanadium	µg/g	31	30	34	33	31	30
Zinc	µg/g	55	54	53	49	54	49
Lead-210	Bq/g	< 0.04	0.05	0.06	0.07	< 0.20	0.06
Radium-226	Bq/g	0.05	< 0.10	< 0.05	< 0.05	< 0.03	< 0.04
Thorium-230	Bq/g	0.04	< 0.5	< 0.40	< 0.40	0.10	< 0.30
Thorium-232	Bq/g	-[1]	< 0.30	< 0.04	< 0.30	0.01	0.02

[1] Analysis not included in laboratory contract.

Table 52: Surface water quality – Brand Creek – downstream of PH LTWMF (BC-D)

		Criteria		BC-D									
				2016	2017	2018	2019	2020	2021				
Parameter	**Units**	**PWQO**	**CWQG**	**Average**					2021-01-14	2021-04-08	2021-08-06	2021-11-01	**Average**
Total Suspended Solids	mg/L			52	13	72	24	21	5	6	10	10	8
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.00	8.18	8.11	8.14	8.07	8.15	8.02	7.77	7.89	7.96
Alkalinity	mg/L as $CaCO_3$			258	275	285	273	262	269	269	287	302	282
Carbonate	mg/L as $CaCO_3$			4	4	3	4	< 1	< 1	< 1	< 1	< 1	< 1
Bicarbonate	mg/L as $CaCO_3$			256	273	278	265	262	269	269	287	302	282
Total Dissolved Solids	mg/L			667	505	620	609	630	610	540	811	537	625
Fluoride	mg/L		**0.12**	0.11	0.10	< 0.10	0.10	0.08	0.08	0.10	0.09	0.08	0.09
Total Organic Carbon	mg/L			3	3	4	3	3	2	2	7	3	4
Ammonia+Ammonium (N)	as N mg/L			0.06	< 0.05	0.06	0.07	0.06	0.04	< 0.04	0.09	0.16	0.08
Chloride (Dissolved)	mg/L		**120**	**193**	100	**165**	**159**	**203**	**150**	**140**	**300**	85	**169**
Sulphate (dissolved)	mg/L			33	21	22	22	25	28	24	18	22	23
Bromide (dissolved)	mg/L			0.5	< 1.0	< 1.0	< 1.0	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.03	< 0.01	< 0.01	0.02	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	3.37	4.19	3.65	3.36	4.08	5.38	5.06	1.23	7.47	4.79
Nitrate + Nitrite (as N)	as N mg/L			3.37	4.20	3.65	3.37	4.08	5.38	5.06	1.23	7.47	4.79
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			366	315	340	360	384	384	419	374	375	388
Silver (total)	µg/L	**0.1**	**0.25**	0.03	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aluminum (Al)	µg/L			265	288	813	480	434	83	111	431	152	194
Aluminum (0.2µm)	µg/L	**75**	**100**	-[1]	< 5	< 5	< 5	26	7	1	3	4	4
Arsenic (total)	µg/L	**100**	**5**	1.5	1.5	1.7	1.4	1.6	0.6	0.6	**5.7**	1.0	2.0
Barium (total)	µg/L			80.2	59.3	83.0	78.3	88.8	68.5	63.7	92.8	57.2	70.6
Beryllium (total)	µg/L	**1100**		0.1	< 0.5	< 0.5	< 0.5	0.018	< 0.007	< 0.007	0.020	0.007	0.010
Boron (total)	µg/L	**200**	**1500**	11	16	10	12	14	10	10	17	51	22
Bismuth (total)	µg/L			0.3	< 1.0	< 1.0	< 1.0	0.040	0.007	0.008	0.020	< 0.010	0.011
Calcium (total)	µg/L			120750	106750	117500	112500	125000	130000	143000	124000	129000	131500
Cadmium (total)	µg/L	**0.2**	**0.09**	0.03	< 0.10	< 0.10	< 0.10	0.02	0.02	0.01	0.02	0.01	0.02
Cobalt (total)	µg/L	**0.9**		0.305	< 0.500	0.630	< 0.500	0.301	0.513	0.330	0.503	0.308	0.414
Chromium (total)	µg/L			2.0	< 5.0	< 5.0	< 5.0	0.91	1.06	0.65	0.92	0.61	0.81
Copper (total)	µg/L	**5**		1.2	< 1.1	1.7	1.2	1.7	1.5	0.8	1.1	0.7	1.0
Iron (total)	µg/L	**300**	**300**	**492**	**343**	**968**	**565**	**484**	82	114	**632**	182	253
Potassium (total)	µg/L			1725	1575	1600	1700	1735	1370	1710	2420	1730	1808
Magnesium (total)	µg/L			15650	11650	15000	14750	17300	14300	15000	15300	12900	14375
Manganese (total)	µg/L			56	30	79	47	69	18	22	319	30	97
Molybdenum (total)	µg/L	**40**	**73**	0.44	< 0.50	0.51	< 0.50	0.43	0.31	0.56	0.74	0.25	0.47
Sodium (total)	µg/L			101650	57500	96250	93750	96525	71900	70000	120000	39500	75350
Nickel (total)	µg/L	**25**	**25**	0.7	1.1	1.4	1.0	0.7	0.8	0.6	1.1	0.8	0.8
Phosphorus (total)	µg/L	**10-30**		**38**	**35**	**75**	**46**	**36**	16	20	**88**	25	**37**
Lead (total)	µg/L	**5**	**7**	0.36	< 0.50	0.83	0.56	0.37	0.14	0.10	0.50	0.14	0.22
Antimony (total)	µg/L	**20**		0.3	< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.6	< 2.0	< 2.0	< 2.0	0.19	0.27	0.31	0.15	0.16	0.22
Tin (total)	µg/L			0.3	< 1.0	< 1.0	< 1.0	0.09	0.14	< 0.06	< 0.06	0.09	0.09
Strontium (total)	µg/L			323	258	295	285	335	338	307	361	290	324
Titanium (total)	µg/L			24.0	17.3	45.7	29.8	21.4	3.4	6.1	23.2	9.3	10.5
Thallium (total)	µg/L	**0.3**	**0.8**	0.02	< 0.05	< 0.05	< 0.05	0.008	< 0.005	< 0.005	0.010	< 0.005	0.006
Uranium (total)	µg/L	**5**	**15**	2.01	2.25	2.03	1.60	2.02	4.42	2.41	3.42	2.70	3.24
Vanadium (total)	µg/L	**6**		1.40	1.28	2.11	1.63	1.51	0.68	0.73	1.98	0.97	1.09
Zinc (total)	µg/L	**30**	**30**	4	< 5	8	5	5	3	2	4	3	3
Lead-210	Bq/L			< 0.02	0.03	< 0.10	< 0.10	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		0.02	0.03	< 0.04	< 0.04	0.01	0.01	< 0.01	0.01	< 0.01	0.01
Thorium-230	Bq/L			0.03	< 0.06	< 0.07	< 0.07	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.02	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters													
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	105.2	99.6	86.7	83.3	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	209	139.5	127.7	137.4	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	1031	875	1307	883	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	3.974	4.685	21.868	10.707	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	7.2	4.88	10.01	38.37	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	8.14	8.18	8.01	7.84	--
Staff Gauge	cm			-[2]	-[2]	-[2]	-[2]	-[2]	--	--	--	--	--

Note:

PWQO = Provincial Water Quality Objectives, Ministry of the Environment

CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life

Bold values indicate an exceedance of a PWQO or CWQG value

[1] Analysis not included in laboratory contract.

[2] Field parameters included for current sampling year only.

-- - No data.

Table 53: Surface water quality – Brand Creek – upstream of PH LTWMF (BC-U)

		Criteria		BC-U									
				2016	2017	2018	2019	2020	2021				
Parameter	**Units**	**PWQO**	**CWQG**	**Average**					2021-01-14	2021-04-08	2021-08-06	2021-11-01	**Average**
Total Suspended Solids	mg/L			48	9	34	165	16	< 2	4	No Sample[3]	4	3
pH	no unit	**6.5-8.5**	**6.5-9.0**	7.86	8.11	8.06	8.06	8.03	8.14	8.04		7.97	8.05
Alkalinity	mg/L as $CaCO_3$			244	275	255	250	245	266	261		309	279
Carbonate	mg/L as $CaCO_3$			2	3.3	3.1	3.0	< 1.0	< 1	< 1		< 1	< 1
Bicarbonate	mg/L as $CaCO_3$			243	268	250	248	245	266	261		309	279
Total Dissolved Solids	mg/L			638	438	554	469	418	450	440		506	465
Fluoride	mg/L		**0.12**	0.09	0.11	0.11	< 0.10	0.10	0.11	0.09		0.08	0.09
Total Organic Carbon	mg/L			5	3	4	9	6	2	2		2	2
Ammonia+Ammonium (N)	as N mg/L			0.05	0.05	0.08	0.27	0.11	0.04	0.04		0.10	0.06
Chloride (Dissolved)	mg/L		**120**	**169**	59	**138**	103	75	69	64		48	60
Sulphate (dissolved)	mg/L			33	20	21	13	11	21	19		19	20
Bromide (dissolved)	mg/L			0.5	< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3		< 0.3	< 0.3
Nitrite (as N)	as N mg/L			0.02	0.01	< 0.01	0.02	< 0.03	< 0.03	< 0.03		< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	2.87	4.37	3.27	2.72	3.74	6.71	5.96		8.74	7.14
Nitrate + Nitrite (as N)	as N mg/L			2.87	4.37	3.27	2.74	3.74	6.71	5.96		8.74	7.14
Mercury (dissolved)	µg/L	**0.2**	**0.026**	0.01	0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01		< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			334	305	300	305	301	363	383		369	372
Silver (total)	µg/L	**0.1**	**0.25**	0.04	< 0.10	< 0.10	0.11	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05
Total Aluminum (Al)	µg/L			252	182	685	6200	423	33	85		77	65
Aluminum (0.2µm)	µg/L	**75**	**100**	-[1]	5	54	< 5	16	7	1		5	4
Arsenic (total)	µg/L	**100**	**5**	0.6	< 1.0	1.1	1.7	2.0	< 0.2	< 0.2		< 0.2	< 0.2
Barium (total)	µg/L			61.6	48.8	58.5	113.5	46.9	50.2	48.0		51.5	49.9
Beryllium (total)	µg/L	**1100**		0.2	< 0.5	< 0.5	0.6	0.018	< 0.007	< 0.007		< 0.007	< 0.007
Boron (total)	µg/L	**200**	**1500**	11	16	12	17	16	10	17		45	24
Bismuth (total)	µg/L			0.3	< 1.0	< 1.0	< 1.0	0.017	< 0.007	0.007		< 0.010	0.008
Calcium (total)	µg/L			113333	108250	103000	112250	100467	125000	132000		127000	128000
Cadmium (total)	µg/L	**0.2**	**0.09**	0.04	< 0.10	< 0.10	0.22	0.02	0.01	0.01		0.01	0.01
Cobalt (total)	µg/L	**0.9**		0.324	< 0.500	0.608	**3.625**	0.444	0.061	0.089		0.073	0.074
Chromium (total)	µg/L			2.3	< 5.0	< 5.0	12.3	0.89	0.45	0.54		0.45	0.48
Copper (total)	µg/L	**5**		1.4	1.7	1.9	**7.5**	1.9	0.7	0.6		0.5	0.6
Iron (total)	µg/L	**300**	**300**	**406**	220	**853**	**7478**	**569**	35	81		82	66
Potassium (total)	µg/L			2680	1700	1775	3085	1827	1520	1630		1620	1590
Magnesium (total)	µg/L			12000	11600	11500	12500	11933	12700	13100		12600	12800
Manganese (total)	µg/L			151	29	96	776	603	10	17		21	16
Molybdenum (total)	µg/L	**40**	**73**	0.41	< 0.50	2.03	0.63	0.43	0.18	0.25		0.19	0.21
Sodium (total)	µg/L			104933	34250	79500	57500	40467	33600	32600		23100	29767
Nickel (total)	µg/L	**25**	**25**	0.7	1.2	1.4	6.8	1.0	0.2	0.3		0.3	0.3
Phosphorus (total)	µg/L	**10-30**		**68**	**35**	**71**	**604**	**74**	19	14		21	18
Lead (total)	µg/L	**5**	**7**	0.38	< 0.50	0.63	**5.13**	0.43	0.09	0.07		< 0.09	0.08
Antimony (total)	µg/L	**20**		0.3	< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9		< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.8	< 2.0	< 2.0	< 2.0	0.28	0.35	0.31		0.21	0.29
Tin (total)	µg/L			< 0.5	< 1.0	< 1.0	1.1	0.08	0.14	< 0.06		0.11	0.10
Strontium (total)	µg/L			284	248	263	250	245	291	251		291	278
Titanium (total)	µg/L			< 14	12.98	37.75	287	18.75	1.80	4.65		4.31	3.59
Thallium (total)	µg/L	**0.3**	**0.8**	0.02	< 0.05	< 0.05	0.10	0.007	< 0.005	< 0.005		< 0.005	< 0.005
Uranium (total)	µg/L	**5**	**15**	1.103	1.103	0.528	0.673	0.487	0.648	0.623		0.957	0.743
Vanadium (total)	µg/L	**6**		1.35	1.08	2.02	**13.06**	1.68	0.56	0.70		0.76	0.67
Zinc (total)	µg/L	**30**	**30**	4	< 5	6	**36**	5	< 2	2		2	2
Lead-210	Bq/L			< 0.02	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02
Radium-226	Bq/L	**1**		0.02	< 0.03	< 0.04	< 0.04	0.01	< 0.01	< 0.01		< 0.01	< 0.01
Thorium-230	Bq/L			0.04	< 0.06	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02
Thorium-232	Bq/L			< 0.02	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02
Field Parameters													
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	108.1	106.8	--	94.7	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	211.2	137.6	--	138.6	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	787	692	--	794	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	4.118	5.22	--	11.094	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	1.98	4.78	--	2.06	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	8.06	8.21	--	7.9	--
Staff Gauge	cm			-[2]	-[2]	-[2]	-[2]	-[2]	--	--	--	--	--

Note:

PWQO = Provincial Water Quality Objectives, Ministry of the Environment

CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life

Bold values indicate an exceedance of a PWQO or CWQG value

[1] Analysis not included in laboratory contract.

[2] Field parameters included for current sampling year only.

[3] Insufficient surface water at this location for sample collection

-- - No data.

Table 54: Surface water quality – Brand Creek – Marsh Road (BC-M)

		Criteria		BC-M									
				2016	2017	2018	2019	2020	2021				
Parameter	**Units**	**PWQO**	**CWQG**	**Average**					2021-01-14	2021-04-08	2021-08-06	2021-11-01	**Average**
Total Suspended Solids	mg/L			27	20	26	32	45	6	7	16	7	9
pH	no unit	**6.5-8.5**	**6.5-9.0**	7.94	8.18	8.14	8.19	8.13	8.17	8.05	7.98	8.02	8.06
Alkalinity	mg/L as $CaCO_3$			258	275	280	268	254	263	258	282	290	273
Carbonate	mg/L as $CaCO_3$			6	4	4	4	< 1	< 1	< 1	< 1	< 1	< 1
Bicarbonate	mg/L as $CaCO_3$			254	270	280	265	254	263	258	282	290	273
Total Dissolved Solids	mg/L			802	482	575	574	545	500	534	660	520	554
Fluoride	mg/L		**0.12**	0.10	< 0.10	< 0.10	< 0.10	0.08	0.10	0.07	0.07	0.08	0.08
Total Organic Carbon	mg/L			3	3	3	3	3	2	2	6	3	3
Ammonia+Ammonium (N)	as N mg/L			0.06	< 0.05	0.06	0.08	0.06	< 0.04	< 0.04	0.12	0.10	0.08
Chloride (Dissolved)	mg/L		**120**	**151**	84	**129**	**135**	**161**	**130**	**120**	**240**	73	**141**
Sulphate (dissolved)	mg/L			29	21	22	22	23	27	24	21	21	23
Bromide (dissolved)	mg/L			1.5	< 1.0	< 1.0	< 1.0	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.03	0.01	0.01	0.01	0.04	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	3.70	4.14	3.81	3.60	4.00	5.09	4.80	2.00	6.80	4.67
Nitrate + Nitrite (as N)	as N mg/L			3.70	4.15	3.82	3.60	4.01	5.09	4.80	2.00	6.80	4.67
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			351	310	335	360	374	404	412	359	365	385
Silver (total)	µg/L	**0.1**	**0.25**	0.03	< 0.10	< 0.10	< 0.10	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aluminum (Al)	µg/L			281	538	473	635	580	107	96	338	255	199
Aluminum (0.2µm)	µg/L	**75**	**100**	-[1]	5	< 5	< 5	44	15	< 1	5	13	9
Arsenic (total)	µg/L	**100**	**5**	1.3	1.5	1.3	1.4	1.5	0.7	0.7	3.2	1.2	1.5
Barium (total)	µg/L			71.4	58.5	68.3	74.8	78.2	68.6	63.2	73.8	52.6	64.6
Beryllium (total)	µg/L	**1100**		0.1	< 0.5	< 0.5	< 0.5	0.028	< 0.007	< 0.007	0.014	0.019	0.012
Boron (total)	µg/L	**200**	**1500**	11	15	< 10	13	14	11	13	14	81	30
Bismuth (total)	µg/L			0.3	< 1.0	< 1.0	< 1.0	0.032	0.009	< 0.007	0.030	< 0.010	0.014
Calcium (total)	µg/L			116750	108500	110000	115000	122500	137000	140000	119000	125000	130250
Cadmium (total)	µg/L	**0.2**	**0.09**	0.04	< 0.10	< 0.10	< 0.10	0.03	0.02	0.01	0.02	0.02	0.02
Cobalt (total)	µg/L	**0.9**		0.376	0.553	< 0.500	0.533	0.435	0.493	0.292	0.267	0.359	0.353
Chromium (total)	µg/L			2.1	< 5.0	< 5.0	< 5.0	1.24	0.76	0.72	0.72	0.80	0.75
Copper (total)	µg/L	**5**		1.0	2.2	1.2	1.3	1.9	1.0	0.7	0.9	0.9	0.9
Iron (total)	µg/L	**300**	**300**	**550**	**653**	**575**	**780**	**673**	135	103	**425**	**323**	247
Potassium (total)	µg/L			1790	1625	1550	1875	2048	1550	1570	2650	1670	1860
Magnesium (total)	µg/L			15000	12150	14250	14250	16375	14900	15000	15200	12900	14500
Manganese (total)	µg/L			65	48	50	59	72	34	29	51	50	41
Molybdenum (total)	µg/L	**40**	**73**	0.34	< 0.50	0.54	< 0.50	0.40	0.27	0.32	0.58	0.27	0.36
Sodium (total)	µg/L			77125	48250	75750	76000	69750	64900	63200	85900	33800	61950
Nickel (total)	µg/L	**25**	**25**	0.8	1.1	1.1	1.1	0.8	0.9	0.6	0.9	0.7	0.8
Phosphorus (total)	µg/L	**10-30**		**45**	**48**	**46**	**59**	**52**	26	16	**57**	**35**	**34**
Lead (total)	µg/L	**5**	**7**	0.46	0.62	0.54	0.57	0.58	0.20	0.08	0.32	0.26	0.22
Antimony (total)	µg/L	**20**		0.3	< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.6	< 2.0	< 2.0	< 2.0	0.17	0.28	0.25	0.13	0.20	0.22
Tin (total)	µg/L			0.3	< 1.0	< 1.0	< 1.0	0.11	0.16	< 0.06	0.10	0.12	0.11
Strontium (total)	µg/L			304	253	280	280	318	350	306	324	281	315
Titanium (total)	µg/L			13.0	32.4	27.9	37.0	28.9	7.8	5.2	17.7	12.9	10.9
Thallium (total)	µg/L	**0.3**	**0.8**	0.02	0.05	< 0.05	< 0.05	0.016	< 0.005	< 0.005	0.007	< 0.005	0.006
Uranium (total)	µg/L	**5**	**15**	1.85	2.70	2.38	1.98	2.22	4.91	2.92	2.42	2.64	3.22
Vanadium (total)	µg/L	**6**		1.59	1.90	1.62	2.10	2.00	0.82	0.80	1.69	1.20	1.13
Zinc (total)	µg/L	**30**	**30**	4	7	< 5	6	6	2	2	3	3	3
Lead-210	Bq/L			< 0.02	0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		0.02	0.03	< 0.04	< 0.04	0.01	< 0.01	< 0.01	0.02	< 0.01	0.01
Thorium-230	Bq/L			0.03	0.06	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.02	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters													
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-	103.7	100.2	93.7	93.8	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-	216.8	120.8	129.1	131.7	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-	959	825	1132	836	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-	4.125	4.405	18.818	10.366	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-	4.6	4.68	21.73	8.11	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-	8.23	8.15	8.33	7.88	--
Staff Gauge	cm			-[2]	-[2]	-[2]	-[2]	-	18	27	--[3]	29	--

Note:

PWQO = Provincial Water Quality Objectives, Ministry of the Environment

CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life

Bold values indicate an exceedance of a PWQO or CWQG value

[1] Analysis not included in laboratory contract.

[2] Field parameters included for current sampling year only.

-- - No data.

Table 55: Surface Water Quality – Brand Creek – tributary of Brand Creek (BC-T)

				BC-T									
		Criteria		2016	2017	2018	2019	2020	2021				
Parameter	**Units**	**PWQO**	**CWQG**	**Average**					2021-01-14	2021-04-08	2021-08-06	2021-11-01	**Average**
Total Suspended Solids	mg/L			23	9	20	27	31	8	19	61	4	23
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.06	8.22	8.13	8.23	8.21	8.19	8.16	8.22	8.14	8.18
Alkalinity	mg/L as $CaCO_3$			249	285	285	270	249	256	267	269	297	272
Carbonate	mg/L as $CaCO_3$			5	4.3	3.8	4.3	< 1.0	< 1	< 1	< 1	< 1	< 1
Bicarbonate	mg/L as $CaCO_3$			245	280	283	265	249	256	267	269	297	272
Total Dissolved Solids	mg/L			825	803	958	874	817	950	955	960	894	940
Fluoride	mg/L		**0.12**	0.10	0.11	< 0.10	< 0.10	0.10	0.08	0.10	0.08	0.10	0.09
Total Organic Carbon	mg/L			3	5	4	3	3	3	3	3	5	4
Ammonia+Ammonium (N)	as N mg/L			0.05	< 0.05	0.06	0.12	0.05	0.04	< 0.04	< 0.04	0.04	0.04
Chloride (Dissolved)	mg/L		**120**	**300**	**280**	**368**	**323**	**345**	**390**	**380**	**420**	**270**	**365**
Sulphate (dissolved)	mg/L			38	27	29	29	30	50	42	32	35	40
Bromide (dissolved)	mg/L			0.5	2.3	< 1.0	< 5.0	0.3	0.5	0.4	< 0.3	0.4	0.4
Nitrite (as N)	as N mg/L			0.03	< 0.01	< 0.01	0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	1.74	1.48	1.43	1.37	2.20	1.34	1.52	2.20	2.08	1.79
Nitrate + Nitrite (as N)	as N mg/L			1.74	1.48	1.43	1.37	2.20	1.34	1.52	2.20	2.08	1.79
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			357	330	358	368	401	470	483	375	372	425
Silver (total)	µg/L	**0.1**	**0.25**	0.03	< 0.10	< 0.10	< 0.10	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aluminum (Al)	µg/L			90	183	714	284	830	117	137	1300	51	401
Aluminum (0.2µm)	µg/L	**75**	**100**	-[1]	< 5	< 5	< 5	53	31	2	4	6	11
Arsenic (total)	µg/L	**100**	**5**	2.7	**5.3**	4.2	3.3	3.5	1.9	2.0	**5.2**	3.1	3.1
Barium (total)	µg/L			98.3	87.5	115.3	100.8	112.3	116.0	111.0	125.0	86.5	109.6
Beryllium (total)	µg/L	**1100**		0.1	< 0.5	< 0.5	< 0.5	0.027	< 0.007	< 0.007	0.055	< 0.007	0.019
Boron (total)	µg/L	**200**	**1500**	11	15	12	14	14	11	25	14	37	22
Bismuth (total)	µg/L			0.3	< 1.0	< 1.0	< 1.0	0.031	0.013	0.013	0.040	< 0.010	0.019
Calcium (total)	µg/L			118750	120000	132500	122500	131750	157000	164000	121000	125000	141750
Cadmium (total)	µg/L	**0.2**	**0.09**	0.03	< 0.10	< 0.10	< 0.10	0.02	0.05	0.03	0.03	0.02	0.03
Cobalt (total)	µg/L	**0.9**		0.296	< 0.500	0.750	< 0.500	0.557	**2.080**	**1.320**	0.772	**1.400**	**1.393**
Chromium (total)	µg/L			1.9	< 5.0	< 5.0	< 5.0	1.61	1.26	0.72	2.67	0.25	1.23
Copper (total)	µg/L	**5**		1.2	1.4	2.1	1.6	2.4	2.3	1.2	2.2	0.9	1.7
Iron (total)	µg/L	**300**	**300**	**419**	288	**945**	**378**	**961**	198	198	**1550**	136	**521**
Potassium (total)	µg/L			1598	1348	1700	1675	1840	1460	1740	1760	1440	1600
Magnesium (total)	µg/L			15580	13000	16500	16500	17750	19000	18100	17900	14600	17400
Manganese (total)	µg/L			36	39	73	34	63	36	36	77	24	43
Molybdenum (total)	µg/L	**40**	**73**	0.51	0.64	0.61	0.57	0.60	0.49	0.62	0.60	0.45	0.54
Sodium (total)	µg/L			156750	170000	232500	192500	161000	192000	197000	171000	133000	173250
Nickel (total)	µg/L	**25**	**25**	2.4	< 1.0	1.5	< 1.0	1.2	2.7	2.1	1.5	2.4	2.2
Phosphorus (total)	µg/L	**10-30**		27	20	24	**73**	**51**	20	19	**108**	8	**39**
Lead (total)	µg/L	**5**	**7**	0.32	< 0.50	0.90	< 0.50	0.68	0.30	0.18	1.36	< 0.09	0.48
Antimony (total)	µg/L	**20**		0.3	< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.6	< 2.0	< 2.0	< 2.0	0.13	0.13	0.13	0.10	0.14	0.13
Tin (total)	µg/L			0.3	< 1.0	< 1.0	< 1.0	0.10	0.21	< 0.06	0.09	0.08	0.11
Strontium (total)	µg/L			361	340	393	353	397	487	439	363	367	414
Titanium (total)	µg/L			15	12	40	18	40.62	7.1	8.5	71.9	4.1	22.9
Thallium (total)	µg/L	**0.3**	**0.8**	0.02	< 0.05	< 0.05	< 0.05	0.022	< 0.005	< 0.005	0.021	< 0.005	0.009
Uranium (total)	µg/L	**5**	**15**	4	**9**	**7**	**6**	**5**	**18**	**10**	2	**12**	**10**
Vanadium (total)	µg/L	**6**		1.20	0.97	1.91	1.12	2.26	0.91	0.79	3.13	0.50	1.33
Zinc (total)	µg/L	**30**	**30**	5	< 5	8	6	9	5	4	10	2	5
Lead-210	Bq/L			< 0.02	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		0.02	< 0.03	< 0.04	< 0.04	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L			< 0.03	< 0.06	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.02	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters													
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	99	95.9	92.4	97.3	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	222.4	148.4	108.9	134.6	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	1706	1505	1657	1465	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	3.178	6.415	18.479	9.204	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	9.58	9.31	30.56	4.89	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	8.1	8.28	8.38	8.19	--
Staff Gauge	cm			-[2]	-[2]	-[2]	-[2]	-[2]	--	--	--	--	--

Note:

PWQO = Provincial Water Quality Objectives, Ministry of the Environment

CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life

Bold values indicate an exceedance of a PWQO or CWQG value

[1] Analysis not included in laboratory contract.

[2] Field parameters included for current sampling year only.

-- - No data.

Table 56: Storm event sampling – Brand Creek Watershed (BC-M)

Analysis	Units	Criteria		BC-M					
		PWQO	CWQG	2021/07/08 10:30AM	2021/07/08 11:30AM	2021/07/08 12:30PM	2021/07/08 1:30PM	2021/07/08 2:30PM	2021/07/08 3:30PM
Total Suspended Solids	mg/L			49	71	56	56	46	83
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.02	8.00	8.00	7.97	7.95	7.97
Alkalinity	mg/L as CaCO3			296	281	291	293	261	256
Carbonate	mg/L as CaCO3			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as CaCO3			296	281	291	293	261	256
Total Dissolved Solids	mg/L			637	669	654	637	617	603
Fluoride	mg/L		**0.12**	0.11	0.08	0.08	0.08	0.08	0.07
Total Organic Carbon	mg/L			4	4	4	5	5	5
Ammonia+Ammonium (N)	as N mg/L			0.10	0.08	0.10	0.10	0.12	0.11
Chloride (Dissolved)	mg/L		**120**	**190**	**190**	**190**	**180**	**180**	**180**
Sulphate (dissolved)	mg/L			23	23	23	22	21	21
Bromide (dissolved)	mg/L			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	2.32	2.35	2.29	2.16	1.95	1.82
Nitrate + Nitrite (as N)	as N mg/L			2.34	2.37	2.31	2.19	1.97	1.84
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as CaCO3			407	388	387	383	370	379
Silver (total)	µg/L	**0.1**	**0.25**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			850	632	1270	626	693	1390
Aluminum (0.2µm)	µg/L	**75**	**100**	5	4	4	11	11	6
Arsenic (total)	µg/L	**100**	**5**	3.6	3.1	3.6	3.4	3.4	4.1
Barium (total)	µg/L			94.9	83.1	91.5	86.5	86.2	94.6
Beryllium (total)	µg/L	**1100**		0.047	0.027	0.048	0.044	0.037	0.073
Boron (total)	µg/L	**200**	**1500**	15	16	15	15	15	17
Bismuth (total)	µg/L			0.040	0.020	0.030	0.020	0.020	0.030
Calcium (total)	µg/L			136000	130000	129000	128000	123000	127000
Cadmium (total)	µg/L	**0.20**	**0.09**	0.042	0.026	0.040	0.033	0.028	0.052
Cobalt (total)	µg/L	**0.9**		0.751	0.469	0.747	0.664	0.606	**1.07**
Chromium (total)	µg/L			1.38	0.97	2.05	1.17	1.08	1.89
Copper (total)	µg/L	**5**		1.9	1.3	1.8	1.8	1.8	2.3
Iron (total)	µg/L	**300**	**300**	**1120**	**758**	**1410**	**914**	**890**	**1720**
Potassium (total)	µg/L			2030	1980	2110	2010	2290	2500
Magnesium (total)	µg/L			16100	15700	15900	15300	15300	15200
Manganese (total)	µg/L			155	99	121	158	122	180
Molybdenum (total)	µg/L	**40**	**73**	0.45	0.51	0.52	0.44	0.44	0.43
Sodium (total)	µg/L			89700	87300	86300	86200	85600	85900
Nickel (total)	µg/L	**25**	**25**	1.2	0.9	1.5	1.2	1.1	1.6
Phosphorus (total)	µg/L	**10-30**		**98**	**75**	**118**	**92**	**95**	**135**
Lead (total)	µg/L	**5**	**7**	1.20	0.63	1.06	1.06	0.96	1.70
Antimony (total)	µg/L	**20**		< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.14	0.16	0.16	0.14	0.18	0.18
Tin (total)	µg/L			0.08	0.19	0.08	0.15	0.13	0.11
Strontium (total)	µg/L			389	366	368	365	360	356
Titanium (total)	µg/L			40.6	35.5	63.5	29.3	34.6	69.0
Thallium (total)	µg/L	**0.3**	**0.8**	0.011	0.010	0.014	0.009	0.013	0.020
Uranium (total)	µg/L	**5**	**15**	2.32	2.07	2.18	2.11	2.18	2.37
Vanadium (total)	µg/L	**6**		3.21	2.40	3.52	2.82	2.80	4.41
Zinc (total)	µg/L	**30**	**30**	6	7	6	7	6	9
Lead-210	Bq/L			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1.0**		< 0.01	< 0.01	< 0.01	0.03	< 0.01	0.01
Thorium-230	Bq/L			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			86	86.8	83.4	83.4	81.7	88.8
ORP	mV			115.5	96.9	92.5	102.7	101.3	106.3
SPC	us/cm			1253	1128	1115	1114	1077	1058
Temperature	°C			14.877	15.088	15.177	15.318	15.516	16.148
Turbidity	FNU			27.87	22.94	40.58	22.15	32.26	60.57
pH	Units			8.10	7.83	7.84	7.79	7.73	7.79
Staff Gauge	cm			--	--	--	--	--	--

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value

Table 57: Surface water – Lake Ontario diffuser (BC-LO-D)

		Criteria		BC-LO-D								
				2016	2017	2018	2019	2020	2021			
Parameter	**Units**	**PWQO**	**CWQG**	**Average**					2021-06-16	2021-09-13	2021-11-03	**Average**
Total Suspended Solids	mg/L			2	3	< 1	2	3	13	2	9	8
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.45	8.14	8.15	8.21	8.02	8.17	8.11	7.81	8.03
Alkalinity	mg/L as $CaCO_3$			94	97	99	95	92	91	93	99	94
Carbonate	mg/L as $CaCO_3$			< 2.0	1.3	1.3	1.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			94	95	98	93	92	91	93	99	94
Total Dissolved Solids	mg/L			167	185	135	177	185	149	189	183	174
Fluoride	mg/L		**0.12**	**0.12**	**0.12**	**0.12**	0.10	**0.12**	**0.12**	0.11	**0.12**	**0.12**
Total Organic Carbon	mg/L			2.4	2.4	2.3	2.1	1.5	2.0	2.0	2.0	2.0
Ammonia+Ammonium (N)	as N mg/L			< 0.04	< 0.05	< 0.05	< 0.05	0.06	< 0.04	< 0.04	< 0.04	< 0.04
Chloride (Dissolved)	mg/L		**120**	24	22	26	23	24	26	24	26	25
Sulphate (dissolved)	mg/L			24	23	31	23	22	22	23	23	23
Bromide (dissolved)	mg/L			< 0.3	< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.03	< 0.01	< 0.01	< 0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	0.25	0.24	0.29	0.26	0.31	0.30	0.31	0.48	0.36
Nitrate + Nitrite (as N)	as N mg/L			0.25	0.24	0.29	0.26	0.31	0.30	0.31	0.48	0.36
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	0.01
Hardness	mg/L as $CaCO_3$			125	125	130	130	119	125	125	124	125
Silver (total)	µg/L	**0.1**	**0.25**	0.003	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			5	48	18	43	32	4	16	137	52
Aluminum (0.2µm)	µg/L	**75**	**100**	-[1]	< 5.0	< 5.0	< 5.0	4.0	1.0	< 1.0	< 1.0	1.0
Arsenic (total)	µg/L	**100**	**5**	0.9	< 1.0	2.4	< 1.0	0.8	0.9	0.8	1.4	1.0
Barium (total)	µg/L			22.0	23.0	22.0	21.0	23.2	22.9	22.3	21.2	22.1
Beryllium (total)	µg/L	**1100**		< 0.01	< 0.5	< 0.5	< 0.5	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	**200**	**1500**	29	23	22	23	20	24	73	16	38
Bismuth (total)	µg/L			< 0.01	< 1.0	< 1.0	< 1.0	0.011	< 0.010	< 0.010	0.040	0.020
Calcium (total)	µg/L			35300	33500	34500	36333	34150	34800	35800	37200	35933
Cadmium (total)	µg/L	**0.2**	**0.09**	0.006	< 0.100	< 0.100	< 0.100	0.006	0.003	0.006	0.010	0.006
Cobalt (total)	µg/L	**0.9**		0.081	< 0.500	< 0.500	< 0.500	0.062	0.012	0.013	0.212	0.079
Chromium (total)	µg/L			0.4	< 5.0	< 5.0	< 5.0	0.21	0.24	0.25	0.39	0.29
Copper (total)	µg/L	**5**		1.0	1.7	1.5	< 1.0	0.9	0.9	0.7	0.9	0.8
Iron (total)	µg/L	**300**	**300**	18	< 100	< 100	< 100	43	< 7	16	174	66
Potassium (total)	µg/L			1625	1700	1550	1533	1580	1620	1520	1700	1613
Magnesium (total)	µg/L			8865	8700	8800	8733	8205	9260	8700	7560	8507
Manganese (total)	µg/L			0.9	3.9	3.2	3.4	3.11	1.11	1.27	9.74	4.04
Molybdenum (total)	µg/L	**40**	**73**	1.4	1.2	1.2	1.1	1.18	1.20	1.17	1.16	1.18
Sodium (total)	µg/L			13650	13500	17500	14667	12550	14100	14300	14100	14167
Nickel (total)	µg/L	**25**	**25**	0.6	< 1.0	1.2	< 1.0	0.8	0.6	0.5	0.8	0.6
Phosphorus (total)	µg/L	**10-30**		5	**8**	**6**	10	10	15	< **3**	17	12
Lead (total)	µg/L	**5**	**7**	0.02	< 0.50	< 0.50	< 0.50	0.09	< 0.09	< 0.09	0.16	0.11
Antimony (total)	µg/L	**20**		0.3	< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.15	< 2.0	< 2.0	< 2.0	0.11	0.15	0.16	0.14	0.15
Tin (total)	µg/L			0.03	< 1.0	< 1.0	< 1.0	0.09	0.10	0.07	< 0.06	0.08
Strontium (total)	µg/L			176	165	170	163	184	191	183	155	176
Titanium (total)	µg/L			-[1]	5.10	< 5.00	5.70	1.45	0.26	0.76	6.69	2.57
Thallium (total)	µg/L	**0.3**	**0.8**	0.007	< 0.050	< 0.050	< 0.050	0.008	0.005	< 0.005	0.006	0.005
Uranium (total)	µg/L	**5**	**15**	0.362	0.350	**9.690**	0.377	0.351	0.390	0.348	0.615	0.451
Vanadium (total)	µg/L	**6**		0.20	0.51	< 0.50	0.59	0.25	0.20	0.25	0.52	0.32
Zinc (total)	µg/L	**30**	**30**	2.5	< 5.0	< 5.0	< 5.0	3.0	< 2.0	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L			< 0.02	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		0.02	< 0.04	< 0.04	< 0.04	0.01	< 0.01	0.01	< 0.01	0.01
Thorium-230	Bq/L			< 0.02	< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.02	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	109.2	97.7	98.9	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	128.4	--	118.3	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	320.9	304.1	324.2	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	10.805	13.202	8.207	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	0.26	1.69	12.88	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	8.73	--	7.99	--
Staff Gauge	cm			-[2]	-[2]	-[2]	-[2]	-[2]	--	--	--	--

Notes:
PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 58: Surface water – Lake Ontario diffuser – outside eastern edge of mixing zone (BC-LO-E)

		Criteria		BC-LO-E								
				2016	2017	2018	2019	2020	2021			
Parameter	**Units**	**PWQO**	**CWQG**	Average					2021-06-16	2021-09-13	2021-11-03	**Average**
Total Suspended Solids	mg/L			2	3	< 1	2	4	42	2	11	18
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.41	8.20	8.18	8.21	8.06	8.2	8.03	7.87	8.03
Alkalinity	mg/L as $CaCO_3$			96	97	98	98	89	102	92	105	100
Carbonate	mg/L as $CaCO_3$			< 2.0	1.4	1.4	1.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			95	95	96	94	89	102	92	105	100
Total Dissolved Solids	mg/L			182	157	113	235	182	129	197	169	165
Fluoride	mg/L		**0.12**	**0.12**	**0.11**	**0.12**	0.11	**0.13**	0.11	**0.15**	0.11	**0.12**
Total Organic Carbon	mg/L			1.6	2.4	2.0	2.1	1.5	2.0	2.0	2.0	2.0
Ammonia+Ammonium (N)	as N mg/L			< 0.04	< 0.05	< 0.05	< 0.05	0.05	< 0.04	< 0.04	< 0.04	< 0.04
Chloride (Dissolved)	mg/L		**120**	24	22	22	23	25	26	24	26	25
Sulphate (dissolved)	mg/L			24	23	23	23	22	23	23	23	23
Bromide (dissolved)	mg/L			< 0.3	< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.03	< 0.01	< 0.01	< 0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	0.24	0.24	0.28	0.27	0.30	0.30	0.31	0.54	0.38
Nitrate + Nitrite (as N)	as N mg/L			0.24	0.24	0.28	0.27	0.30	0.30	0.31	0.54	0.38
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			128	125	120	130	125	131	121	133	128
Silver (total)	µg/L	**0.1**	**0.25**	0.002	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			6	65	12	35	40	7	12	76	32
Aluminum (0.2µm)	µg/L	**75**	**100**	-[1]	< 5.0	< 5.0	< 5.0	11.0	2.0	< 1.0	< 1.0	1.3
Arsenic (total)	µg/L	**100**	**5**	0.9	< 1.0	< 1.0	< 1.0	0.9	0.9	0.8	0.9	0.9
Barium (total)	µg/L			21.6	23.0	22.0	22.7	24.6	24.2	21.6	23.3	23.0
Beryllium (total)	µg/L	**1100**		< 0.01	< 0.5	< 0.5	< 0.5	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	**200**	**1500**	27	23	22	22	22	26	56	17	33
Bismuth (total)	µg/L			< 0.01	< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010	< 0.010
Calcium (total)	µg/L			36800	34500	32500	36667	36150	36200	34800	39500	36833
Cadmium (total)	µg/L	**0.2**	**0.09**	0.005	< 0.100	< 0.100	< 0.100	0.004	0.005	0.008	0.003	0.005
Cobalt (total)	µg/L	**0.9**		0.787	< 0.500	< 0.500	< 0.500	0.059	0.019	0.012	0.089	0.040
Chromium (total)	µg/L			0.4	< 5.0	< 5.0	< 5.0	0.74	0.27	0.19	0.31	0.26
Copper (total)	µg/L	**5**		0.9	2.0	1.4	1.0	1.0	0.9	0.7	0.9	0.8
Iron (total)	µg/L	**300**	**300**	14	120	< 100	< 100	43	9	10	96	38
Potassium (total)	µg/L			1630	1650	1500	1533	1655	1690	1510	1710	1637
Magnesium (total)	µg/L			8635	8800	8550	8933	8250	9940	8320	8300	8853
Manganese (total)	µg/L			1.2	5.6	< 2.0	3.0	2.61	1.46	0.91	5.76	2.71
Molybdenum (total)	µg/L	**40**	**73**	1.5	1.2	1.2	1.2	1.96	1.24	1.21	1.22	1.22
Sodium (total)	µg/L			13300	13500	13500	14000	12800	15200	13700	14100	14333
Nickel (total)	µg/L	**25**	**25**	0.6	< 1.0	< 1.0	< 1.0	0.6	0.5	0.6	0.6	0.6
Phosphorus (total)	µg/L	**10-30**		**7**	11	**5**	**8**	**8**	13	< **3**	12	**9**
Lead (total)	µg/L	**5**	**7**	0.03	< 0.50	< 0.50	< 0.50	0.02	< 0.09	< 0.09	0.11	0.10
Antimony (total)	µg/L	**20**		0.2	< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.17	< 2.0	< 2.0	< 2.0	0.14	0.15	0.21	0.17	0.18
Tin (total)	µg/L			0.04	< 1.0	< 1.0	< 1.0	0.09	0.12	0.07	< 0.06	0.08
Strontium (total)	µg/L			178	165	165	163	205	200	175	176	184
Titanium (total)	µg/L			-[1]	5.55	< 5.00	5.25	1.78	0.42	0.41	3.71	1.51
Thallium (total)	µg/L	**0.3**	**0.8**	0.005	< 0.050	< 0.050	< 0.050	0.007	0.005	< 0.005	0.008	0.006
Uranium (total)	µg/L	**5**	**15**	0.452	0.355	0.540	0.380	0.381	0.425	0.317	0.381	0.374
Vanadium (total)	µg/L	**6**		0.19	0.58	< 0.50	0.62	0.45	0.22	0.19	0.36	0.26
Zinc (total)	µg/L	**30**	**30**	2.5	< 5.0	< 5.0	< 5.0	< 2.0	< 2.0	< 2.0	3.0	2.3
Lead-210	Bq/L			< 0.02	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		0.01	< 0.04	< 0.04	< 0.04	< 0.01	< 0.01	< 0.01	0.01	0.01
Thorium-230	Bq/L			< 0.02	< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.02	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	107.4	98.5	102.8	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	130.7	--	118.8	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	313.4	303.8	327.6	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	9.471	13.349	8.154	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	7.1	0.79	12.33	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	8.62	--	7.98	--
Staff Gauge	cm			-[2]	-[2]	-[2]	-[2]	-[2]	--	--	--	--

Notes:
PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 59: Surface water – Lake Ontario diffuser – outside western edge of mixing zone (BC-LO-W)

		Criteria		BC-LO-W								
				2016	2017	2018	2019	2020	2021			
Parameter	**Units**	**PWQO**	**CWQG**	Average					2021-06-16	2021-09-13	2021-11-03	**Average**
Total Suspended Solids	mg/L			2	4	1	2	3	6	< 2	11	6
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.43	8.18	8.16	8.26	8.09	8.23	8.08	7.86	8.06
Alkalinity	mg/L as $CaCO_3$			93	97	98	99	95	93	98	95	95
Carbonate	mg/L as $CaCO_3$			< 2.0	1.4	1.3	1.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			93	95	96	94	95	93	98	95	95
Total Dissolved Solids	mg/L			176	199	143	162	214	154	177	154	162
Fluoride	mg/L		**0.12**	**0.13**	**0.11**	**0.13**	0.10	**0.11**	0.11	0.11	**0.12**	0.11
Total Organic Carbon	mg/L			2.1	2.3	2.1	2.3	1.5	2.0	2.0	2.0	2.0
Ammonia+Ammonium (N)	as N mg/L			< 0.04	< 0.05	< 0.05	0.05	0.05	< 0.04	< 0.04	< 0.04	< 0.04
Chloride (Dissolved)	mg/L		**120**	24	22	22	22	24	25	23	25	24
Sulphate (dissolved)	mg/L			24	23	24	23	22	22	23	22	22
Bromide (dissolved)	mg/L			< 0.3	< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.03	< 0.01	< 0.01	0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	0.23	0.23	0.30	0.28	0.30	0.30	0.30	0.38	0.33
Nitrate + Nitrite (as N)	as N mg/L			0.23	0.23	0.30	0.28	0.30	0.30	0.30	0.38	0.33
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			125	125	120	137	125	126	119	144	130
Silver (total)	µg/L	**0.1**	**0.25**	0.002	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			5	45	12	43	50	5	11	259	92
Aluminum (0.2µm)	µg/L	**75**	**100**	-[1]	< 5.0	< 5.0	< 5.0	4.5	2.0	< 1.0	< 1.0	1.3
Arsenic (total)	µg/L	**100**	**5**	0.8	< 1.0	< 1.0	< 1.0	0.9	0.8	0.7	1.0	0.8
Barium (total)	µg/L			21.6	22.0	22.5	22.3	23.3	23.2	21.3	26.2	23.6
Beryllium (total)	µg/L	**1100**		< 0.01	< 0.5	< 0.5	< 0.5	< 0.007	< 0.007	< 0.007	0.008	0.007
Boron (total)	µg/L	**200**	**1500**	27	24	22	23	20	25	60	21	35
Bismuth (total)	µg/L			< 0.01	< 1.0	< 1.0	< 1.0	0.010	< 0.010	< 0.010	0.010	0.010
Calcium (total)	µg/L			35800	33500	32000	36667	36050	34800	34100	43600	37500
Cadmium (total)	µg/L	**0.2**	**0.09**	0.008	< 0.100	< 0.100	< 0.100	0.007	0.003	0.005	0.015	0.008
Cobalt (total)	µg/L	**0.9**		0.254	< 0.500	< 0.500	< 0.500	0.047	0.015	< 0.004	0.158	0.059
Chromium (total)	µg/L			0.4	< 5.0	< 5.0	< 5.0	0.25	0.22	0.35	0.62	0.40
Copper (total)	µg/L	**5**		0.8	1.7	2.0	< 1.0	1.1	0.8	0.6	1.2	0.9
Iron (total)	µg/L	**300**	**300**	11	< 100	< 100	< 100	63	< 7	12	**317**	112
Potassium (total)	µg/L			1610	1600	1500	1533	1640	1630	1510	1940	1693
Magnesium (total)	µg/L			8660	8750	8350	9000	8385	9520	8320	8620	8820
Manganese (total)	µg/L			0.7	3.8	< 2.0	3.0	4.54	0.98	0.83	16.98	6.26
Molybdenum (total)	µg/L	**40**	**73**	1.3	1.2	1.2	1.1	1.24	1.24	1.20	1.73	1.39
Sodium (total)	µg/L			13350	14000	13500	13667	12600	14500	13800	14100	14133
Nickel (total)	µg/L	**25**	**25**	0.6	< 1.0	< 1.0	< 1.0	0.8	0.5	0.6	0.9	0.7
Phosphorus (total)	µg/L	**10-30**		**5**	**9**	**5**	**9**	**9**	**6**	**4**	**31**	14
Lead (total)	µg/L	**5**	**7**	0.02	< 0.50	< 0.50	< 0.50	0.09	< 0.09	< 0.09	0.29	0.16
Antimony (total)	µg/L	**20**		0.3	< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.16	< 2.0	< 2.0	< 2.0	0.13	0.13	0.16	0.20	0.16
Tin (total)	µg/L			< 0.01	< 1.0	< 1.0	< 1.0	0.09	0.11	< 0.06	< 0.06	0.08
Strontium (total)	µg/L			173	165	160	167	191	190	175	195	187
Titanium (total)	µg/L			[1]	< 5.00	< 5.00	< 5.40	2.34	0.18	0.44	12.90	4.51
Thallium (total)	µg/L	**0.3**	**0.8**	0.006	< 0.050	< 0.050	< 0.050	0.007	0.005	< 0.005	0.008	0.006
Uranium (total)	µg/L	**5**	**15**	0.353	0.355	0.325	0.380	0.353	0.375	0.311	0.391	0.359
Vanadium (total)	µg/L	**6**		0.20	0.55	< 0.50	< 0.59	0.31	0.20	0.20	0.78	0.39
Zinc (total)	µg/L	**30**	**30**	2.5	< 5.0	< 5.0	< 5.0	2.5	3.0	< 2.0	2.0	2.3
Lead-210	Bq/L			0.03	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		0.02	< 0.04	< 0.04	< 0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L			< 0.02	< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.02	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	111.3	98.8	100.8	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	130.3	--	118.2	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	312.6	303.7	308.2	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	9.978	13.291	7.903	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	3.24	0.9	12.44	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	8.66	--	7.96	--
Staff Gauge	cm			-[2]	-[2]	-[2]	-[2]	-[2]	--	--	--	--

Notes:
PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 60: Drainage water quality – PH LTWMF – Location 1 (WC-SW3-02)

		WC-SW3-02							
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**Average**					2021-05-11	2021-11-16	**Average**
Total Suspended Solids	mg/L	11	5	190	11	38	112	52	82
pH	no unit	8.26	8.17	8.16	8.07	8.10	8.02	7.87	7.95
Alkalinity	mg/L as $CaCO_3$	285	305	300	265	256	554	220	387
Carbonate	mg/L as $CaCO_3$	3.6	4.2	4.2	3.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	280	300	300	255	256	554	220	387
Total Dissolved Solids	mg/L	371	337	610	1190	1210	2530	674	1602
Fluoride	mg/L	0.10	< 0.10	< 0.10	< 0.10	< 0.06	0.13	0.10	0.12
Total Organic Carbon	mg/L	4.6	3.5	4.3	3.3	3.0	3.0	6.0	4.5
Ammonia+Ammonium (N)	as N mg/L	0.05	< 0.05	0.06	< 0.05	0.05	0.05	0.21	0.13
Chloride (Dissolved)	mg/L	11.4	15	99	385	455	760	160	460
Sulphate (dissolved)	mg/L	29	25	40	64	68	300	64	182
Bromide (dissolved)	mg/L	0.7	< 1	2	7	8	13.2	2.1	8
Nitrite (as N)	as N mg/L	0.023	< 0.014	< 0.010	< 0.020	< 0.030	2.24	0.09	1.17
Nitrate (as N)	as N mg/L	0.51	1.41	1.56	2.21	1.64	2.54	1.45	2.00
Nitrate + Nitrite (as N)	as N mg/L	0.52	1.41	1.56	2.23	1.64	4.78	1.54	3.16
Mercury (dissolved)	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$	304	310	455	780	915	1490	430	960
Silver (total)	µg/L	0.08	< 0.10	0.23	< 0.10	< 0.05	0.09	0.05	0.07
Aluminum (total)	µg/L	192	130	3000	81	69	1100	146	623
Aluminum (0.2µm)	µg/L	-[1]	< 5	21	6	6	15	6	11
Arsenic (total)	µg/L	1425	830	890	335	430	2070	182	1126
Barium (total)	µg/L	30	30	81	106	90	318	116	217
Beryllium (total)	µg/L	0.25	< 0.50	< 0.50	< 0.50	< 0.007	0.028	< 0.007	0.018
Boron (total)	µg/L	42	32	42	51	63	104	141	123
Bismuth (total)	µg/L	0.5	< 1.0	5.5	< 1.0	0.3	94.6	1.23	47.9
Calcium (total)	µg/L	99050	107500	170000	220000	267000	369000	116000	242500
Cadmium (total)	µg/L	0.05	< 0.10	< 0.10	< 0.10	0.09	4.92	0.071	2.50
Cobalt (total)	µg/L	5.5	1.4	54.1	3.0	39.0	4370	90.3	2230
Chromium (total)	µg/L	2.7	< 5.0	< 5.0	< 5.0	0.6	2.95	0.70	1.8
Copper (total)	µg/L	4.5	1.4	52.6	2.9	22.8	4380	68	2224
Iron (total)	µg/L	377	200	3150	140	433	5980	361	3171
Potassium (total)	µg/L	1112	870	1650	2150	1910	6650	4130	5390
Magnesium (total)	µg/L	12550	13500	20500	51500	60200	139000	34200	86600
Manganese (total)	µg/L	65	58	175	75	212	3880	56	1968
Molybdenum (total)	µg/L	3.7	2.6	3.2	2.0	2.8	9.51	4.31	6.9
Sodium (total)	µg/L	28400	23000	36000	53500	57100	257000	31700	144350
Nickel (total)	µg/L	6.4	3.6	41.7	4.7	26.0	3030	75.6	1553
Phosphorus (total)	mg/L	0.096	0.040	0.215	0.043	0.009	98	29	64
Lead (total)	µg/L	0.88	< 0.50	9.75	< 0.50	4.62	1270	14	642
Antimony (total)	µg/L	5.3	2.5	3.8	2.6	2.5	8.6	3.5	6.1
Selenium (total)	µg/L	3.1	< 2.0	< 2.0	< 2.0	1.9	0.61	0.35	0.48
Tin (total)	µg/L	0.5	< 1.0	< 1.0	< 1.0	0.1	0.08	< 0.06	0.07
Strontium (total)	µg/L	188	200	405	635	803	1110	438	774
Titanium (total)	µg/L	16	7.6	145	7	2.8	52.4	8.67	30.5
Thallium (total)	µg/L	0.03	< 0.05	0.05	< 0.05	< 0.005	0.085	0.010	0.048
Uranium (total)	µg/L	542	450	425	445	528	3610	341	1976
Vanadium (total)	µg/L	2.7	1.9	7.3	1.5	1.6	4.51	1.31	2.91
Zinc (total)	µg/L	4	9	22	8	15	710	14	362
Lead-210	Bq/L	< 0.02	0.03	0.15	< 0.10	0.18	79	0.80	40
Radium-226	Bq/L	0.11	< 0.04	0.28	0.16	0.08	0.26	0.12	0.19
Thorium-230	Bq/L	0.05	< 0.07	0.28	< 0.07	< 0.02	0.07	< 0.02	0.05
Thorium-232	Bq/L	-[1]	< 0.06	< 0.06	< 0.06	< 0.02	0.09	< 0.02	0.06
Field Parameters									
ODO % Sat	%	-[2]	-[2]	-[2]	-[2]	-[2]	96.1	101.1	--
ORP	mV	-[2]	-[2]	-[2]	-[2]	-[2]	146.7	116.2	--
SPC	us/cm	-[2]	-[2]	-[2]	-[2]	-[2]	3070	973	--
Temperature	°C	-[2]	-[2]	-[2]	-[2]	-[2]	9.039	8.413	--
Turbidity	FNU	-[2]	-[2]	-[2]	-[2]	-[2]	47.7	62.97	--
pH	Units	-[2]	-[2]	-[2]	-[2]	-[2]	7.86	7.79	--

Note:
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
n/a – Not Applicable.
-- - No data.

Table 61: Drainage water quality – PH LTWMF – Location 2 (WC-SW4-02)

		WC-SW4-02					
		2016	2017	2018	2019	2020	2021
Parameter	**Units**	**Average**		**No Sample**	**No Sample**	**No Sample**	**No Sample**
Total Suspended Solids	mg/L	9	310				
pH	no unit	8.09	7.92				
Alkalinity	mg/L as $CaCO_3$	250	310				
Carbonate	mg/L as $CaCO_3$	2.8	2.4				
Bicarbonate	mg/L as $CaCO_3$	250	300				
Total Dissolved Solids	mg/L	452	492				
Fluoride	mg/L	0.10	< 0.10				
Total Organic Carbon	mg/L	4.6	12.0				
Ammonia+Ammonium (N)	as N mg/L	< 0.05	< 0.05				
Chloride (Dissolved)	mg/L	61.0	80				
Sulphate (dissolved)	mg/L	65	56				
Bromide (dissolved)	mg/L	< 1.0	< 1				
Nitrite (as N)	as N mg/L	0.012	< 0.010				
Nitrate (as N)	as N mg/L	< 0.10	< 0.10				
Nitrate + Nitrite (as N)	as N mg/L	< 0.10	< 0.10				
Mercury (dissolved)	µg/L	< 0.01	< 0.01				
Hardness	mg/L as $CaCO_3$	310	360				
Silver (total)	µg/L	< 0.10	< 0.10				
Aluminum (total)	µg/L	36	1500				
Aluminum (0.2µm)	µg/L	-[1]	< 5.0				
Arsenic (total)	µg/L	< 1	23				
Barium (total)	µg/L	23.0	44				
Beryllium (total)	µg/L	< 0.50	< 0.50				
Boron (total)	µg/L	11	19				
Bismuth (total)	µg/L	< 1.0	< 1.0				
Calcium (total)	µg/L	110000	140000				
Cadmium (total)	µg/L	< 0.10	< 0.10				
Cobalt (total)	µg/L	< 0.5	6.8				
Chromium (total)	µg/L	< 5.0	< 5.0				
Copper (total)	µg/L	< 1.0	5.7				
Iron (total)	µg/L	210	4400				
Potassium (total)	µg/L	1700	420				
Magnesium (total)	µg/L	5800	6800				
Manganese (total)	µg/L	7	420				
Molybdenum (total)	µg/L	< 0.5	< 0.5				
Sodium (total)	µg/L	42000	48000				
Nickel (total)	µg/L	< 1.0	4.7				
Phosphorus (total)	mg/L	0.01	0.11				
Lead (total)	µg/L	< 0.50	3.10				
Antimony (total)	µg/L	< 0.5	< 0.5				
Selenium (total)	µg/L	< 2.0	< 2.0				
Tin (total)	µg/L	< 1.0	< 1.0				
Strontium (total)	µg/L	260	330				
Titanium (total)	µg/L	< 5	64.0				
Thallium (total)	µg/L	< 0.05	< 0.05				
Uranium (total)	µg/L	1	2				
Vanadium (total)	µg/L	< 0.5	3.1				
Zinc (total)	µg/L	< 5	9				
Lead-210	Bq/L	< 0.02	0.08				
Radium-226	Bq/L	< 0.04	0.15				
Thorium-230	Bq/L	< 0.07	0.31				
Thorium-232	Bq/L	-[1]	< 0.06				
Field Parameters							
ODO % Sat	%	-[2]	-[2]				
ORP	mV	-[2]	-[2]				
SPC	us/cm	-[2]	-[2]				
Temperature	°C	-[2]	-[2]				
Turbidity	FNU	-[2]	-[2]				
pH	Units	-[2]	-[2]				

Note:
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
n/a – Not Applicable.
-- - No data.

Table 62: Drainage water quality – PH LTWMF – Location 3 (WC-SW5-02)

		WC-SW5-02							
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**Average**					2021-05-11	2021-11-16	**Average**
Total Suspended Solids	mg/L	7	7	68	31	16	66	51	59
pH	no unit	8.13	8.10	8.16	7.66	8.08	8.09	7.84	7.97
Alkalinity	mg/L as $CaCO_3$	244	245	270	158	302	514	231	373
Carbonate	mg/L as $CaCO_3$	5.4	3.0	3.9	2.4	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	240	240	260	158	302	514	231	373
Total Dissolved Solids	mg/L	315	1347	663	1650	3240	2410	720	1565
Fluoride	mg/L	0.10	0.18	0.10	< 0.10	0.08	0.15	0.08	0.12
Total Organic Carbon	mg/L	8	11	6	6	13	2	6	4.0
Ammonia+Ammonium (N)	as N mg/L	0.05	0.06	0.08	0.10	< 0.04	0.04	0.19	0.12
Chloride (Dissolved)	mg/L	8.7	330	125	890	810	720	180	450
Sulphate (dissolved)	mg/L	25	415	81	732	743	290	65	178
Bromide (dissolved)	mg/L	0.7	< 1.0	2.5	9.5	9.9	12	2	7
Nitrite (as N)	as N mg/L	0.02	< 0.01	< 0.01	0.02	0.17	1.99	0.07	1.03
Nitrate (as N)	as N mg/L	0.24	0.34	1.10	0.99	1.51	2.40	1.27	1.84
Nitrate + Nitrite (as N)	as N mg/L	0.24	0.34	1.10	1.01	1.52	4.40	1.34	2.87
Mercury (dissolved)	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$	268	795	450	555	833	1460	460	960
Silver (total)	µg/L	0.06	< 0.10	< 0.10	< 0.10	< 0.05	0.06	< 0.05	0.06
Aluminum (total)	µg/L	107	150	1590	466	366	793	168	481
Aluminum (0.2µm)	µg/L	-[1]	5.5	21	< 7	21	15	3	9
Arsenic (total)	µg/L	1155	170	585	168	205	1800	240	1020
Barium (total)	µg/L	29	56	83	81	87	290.0	106.0	198
Beryllium (total)	µg/L	0.25	< 0.50	< 0.50	< 0.50	0.01	0.018	0.008	0.013
Boron (total)	µg/L	39	47	42	63	58	99	140	120
Bismuth (total)	µg/L	0.53	< 1.0	1.6	< 1.0	0.2	87.0	0.89	43.9
Calcium (total)	µg/L	88500	285000	135000	160000	240000	358000	124000	241000
Cadmium (total)	µg/L	0.06	< 0.10	< 0.10	< 0.10	0.18	4.46	0.142	2.30
Cobalt (total)	µg/L	2.3	2.2	19.5	11.5	104.8	3920	163	2042
Chromium (total)	µg/L	2.7	< 5.0	< 5.0	< 5.0	1.4	2.71	1.53	2.1
Copper (total)	µg/L	2.5	9.5	20.0	18.4	61.5	3740	60	1900
Iron (total)	µg/L	192	275	1625	865	903	5120	1740	3430
Potassium (total)	µg/L	928	6900	2150	5750	5930	5990	33300	19645
Magnesium (total)	µg/L	9950	36000	23500	39500	56500	137000	36400	86700
Manganese (total)	µg/L	30	122	145	219	389	3400	352	1876
Molybdenum (total)	µg/L	3.4	5.0	2.9	1.4	5.7	8.55	27.60	18.1
Sodium (total)	µg/L	25550	132500	54000	724500	611300	241000	383000	312000
Nickel (total)	µg/L	3.3	16.3	16.2	35.6	78.2	2700	142	1421
Phosphorus (total)	mg/L	0.08	0.04	0.09	0.05	0.03	76	47	62
Lead (total)	µg/L	0.43	< 0.50	4.05	1.49	12.94	1120	17.9	569
Antimony (total)	µg/L	3.3	1.3	2.3	1.3	1.7	7.9	3.1	5.5
Selenium (total)	µg/L	2.0	< 2.0	< 2.0	< 2.0	2.1	0.84	0.48	0.66
Tin (total)	µg/L	0.5	< 1.0	< 1.0	< 1.0	0.2	0.06	< 0.06	0.06
Strontium (total)	µg/L	166	570	410	500	817	1060	485	773
Titanium (total)	µg/L	7.7	9.1	67	25	20	37.8	7.9	22.8
Thallium (total)	µg/L	0.03	< 0.05	< 0.05	< 0.05	0.01	0.067	0.010	0.039
Uranium (total)	µg/L	323	460	295	246	388	3380	311	1846
Vanadium (total)	µg/L	2.2	0.9	3.9	1.8	1.9	3.95	1.39	2.67
Zinc (total)	µg/L	4	39	15	16	29	635	22	329
Lead-210	Bq/L	0.03	0.02	0.12	0.46	0.65	60	0.33	30
Radium-226	Bq/L	0.07	0.06	0.27	0.36	0.12	0.21	0.12	0.17
Thorium-230	Bq/L	0.05	< 0.07	0.26	0.18	< 0.02	0.09	< 0.02	0.06
Thorium-232	Bq/L	-[1]	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[2]	-[2]	-[2]	-[2]	-[2]	109.2	98.7	--
ORP	mV	-[2]	-[2]	-[2]	-[2]	-[2]	78.3	130.8	--
SPC	us/cm	-[2]	-[2]	-[2]	-[2]	-[2]	3206	1121	--
Temperature	°C	-[2]	-[2]	-[2]	-[2]	-[2]	10.041	6.97	--
Turbidity	FNU	-[2]	-[2]	-[2]	-[2]	-[2]	36.8	53.46	--
pH	Units	-[2]	-[2]	-[2]	-[2]	-[2]	8.07	7.85	--

Note:
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
n/a – Not Applicable.
-- - No data.

Table 63: Drainage water quality – PH LTWMF – Location 4 (WC-SW6-02)

		WC-SW6-02							
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**Average**					2021-05-11	2021-11-16	**Average**
Total Suspended Solids	mg/L	28	19	29	7	309	54	104	79
pH	no unit	8.06	8.05	8.04	8.01	7.93	8.11	7.93	8.02
Alkalinity	mg/L as $CaCO_3$	181	190	190	220	294	232	181	207
Carbonate	mg/L as $CaCO_3$	4.0	2.0	2.0	2.1	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	178	185	185	215	294	232	181	207
Total Dissolved Solids	mg/L	236	231	315	353	549	1080	840	960
Fluoride	mg/L	0.11	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	0.06
Total Organic Carbon	mg/L	8.5	5.8	6.9	7.8	2.0	3	3	3.0
Ammonia+Ammonium (N)	as N mg/L	0.05	< 0.05	0.08	< 0.05	0.04	< 0.04	0.04	0.04
Chloride (Dissolved)	mg/L	5.2	16	31	36	137	360	260	310
Sulphate (dissolved)	mg/L	15	10	16	21	41	68	51	60
Bromide (dissolved)	mg/L	0.7	< 1	< 1	< 1	2	5	4	4
Nitrite (as N)	as N mg/L	0.020	< 0.010	< 0.010	< 0.010	< 0.030	< 0.03	< 0.03	0.03
Nitrate (as N)	as N mg/L	0.14	0.45	0.50	0.72	1.97	2.06	0.96	1.51
Nitrate + Nitrite (as N)	as N mg/L	0.14	0.45	0.50	0.72	1.97	2.06	0.96	1.51
Mercury (dissolved)	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$	205	210	250	280	520	859	652	756
Silver (total)	µg/L	0.05	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	0.05
Aluminum (total)	µg/L	156	340	129	50	4780	439	669	554
Aluminum (0.2µm)	µg/L	-[1]	6.0	6.5	6.0	9.0	4	5	5
Arsenic (total)	µg/L	176	81	126	83	43	55.5	70.7	63
Barium (total)	µg/L	30	29	32	37	137	134	97	115
Beryllium (total)	µg/L	0.26	< 0.50	< 0.50	< 0.50	0.17	0.016	0.038	0.027
Boron (total)	µg/L	35	26	25	24	34	49	47	48
Bismuth (total)	µg/L	0.5	< 1.0	< 1.0	< 1.0	0.0	0.090	0.010	0.1
Calcium (total)	µg/L	71450	75000	78500	89000	177500	262000	212000	237000
Cadmium (total)	µg/L	0.07	< 0.10	< 0.10	< 0.10	0.02	0.01	0.012	0.01
Cobalt (total)	µg/L	0.3	< 0.5	< 0.5	< 0.5	2.7	1.9	0.9	1
Chromium (total)	µg/L	2.9	< 5.0	< 5.0	< 5.0	6.8	1.01	0.95	1.0
Copper (total)	µg/L	1.2	< 1.1	< 1.0	< 1.1	7.9	2	2	2
Iron (total)	µg/L	321	415	295	140	5200	541	803	672
Potassium (total)	µg/L	790	710	685	890	2750	2240	1280	1760
Magnesium (total)	µg/L	5635	6150	7100	8100	18700	49900	30000	39950
Manganese (total)	µg/L	32	25	30	18	182	77	131	104
Molybdenum (total)	µg/L	1.8	1.2	1.3	1.2	1.3	1.77	1.42	1.6
Sodium (total)	µg/L	8705	7850	10200	13000	21300	31800	25100	28450
Nickel (total)	µg/L	1.5	< 1.0	1.1	< 1.0	4.4	3.2	1.1	2
Phosphorus (total)	mg/L	0.07	0.04	0.04	0.04	0.26	39	169	104
Lead (total)	µg/L	1.29	0.87	0.80	< 0.50	2.11	0.73	0.75	1
Antimony (total)	µg/L	0.35	< 0.50	< 0.50	< 0.50	< 0.90	< 0.9	< 0.9	0.9
Selenium (total)	µg/L	1.2	< 2.0	< 2.0	< 2.0	1.2	2.98	1.02	2.00
Tin (total)	µg/L	0.6	< 1.0	< 1.0	< 1.0	0.2	0.08	< 0.06	0.07
Strontium (total)	µg/L	123	125	130	160	402	659	427	543
Titanium (total)	µg/L	6	16.4	9	< 5	256	24	27	25.6
Thallium (total)	µg/L	0.03	< 0.05	< 0.05	< 0.05	0.06	0.009	0.007	0.008
Uranium (total)	µg/L	61	42	57	75	66	457	193	325
Vanadium (total)	µg/L	1.7	1.4	1.3	1.0	10.8	2.3	2.3	2.34
Zinc (total)	µg/L	14	< 5	< 5	< 5	14	75	4	40
Lead-210	Bq/L	0.02	0.02	< 0.10	< 0.10	< 0.02	0.02	< 0.02	0.02
Radium-226	Bq/L	0.03	< 0.04	< 0.04	< 0.04	0.01	0.02	< 0.01	0.02
Thorium-230	Bq/L	0.05	< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	-[1]	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[2]	-[2]	-[2]	-[2]	-[2]	85.2	99.1	--
ORP	mV	-[2]	-[2]	-[2]	-[2]	-[2]	131.3	95.7	--
SPC	us/cm	-[2]	-[2]	-[2]	-[2]	-[2]	405.9	1170	--
Temperature	°C	-[2]	-[2]	-[2]	-[2]	-[2]	12.529	3.223	--
Turbidity	FNU	-[2]	-[2]	-[2]	-[2]	-[2]	18.5	104.37	--
pH	Units	-[2]	-[2]	-[2]	-[2]	-[2]	8.14	8.20	--

Note:
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
n/a – Not Applicable.
-- - No data.

Table 64: Surface water quality – Brewery Creek – upstream – (GRT-3)

		Criteria		GRT-3							
				2018	2019	2020	2021				
Analysis	**Units**	**PWQO**	**CWQG**	**Average**			2021-01-13	2021-05-12	2021-07-22	2021-10-19	**Average**
Total Suspended Solids	mg/L			12	12	13	9	4	3	4	5
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.20	8.21	8.24	8.14	8.21	8.22	8.22	8.20
Alkalinity	mg/L as $CaCO_3$			258	248	248	242	239	261	244	247
Carbonate	mg/L as $CaCO_3$			3.8	3.7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			258	243	248	242	239	261	244	247
Total Dissolved Solids	mg/L			560	584	570	590	609	614	614	607
Fluoride	mg/L		**0.12**	< 0.10	0.11	0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			2	2	1	2	2	2	1	2
Ammonia+Ammonium (N)	as N mg/L			0.06	0.06	0.04	0.04	< 0.04	< 0.04	< 0.04	0.04
Chloride (Dissolved)	mg/L		**120**	**145**	**150**	**172**	**170**	**200**	**200**	**170**	**185**
Sulphate (dissolved)	mg/L			24	25	24	25	24	24	24	24
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.01	< 0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	3.34	3.43	3.83	4.32	4.08	4.01	4.01	4.11
Nitrate + Nitrite (as N)	as N mg/L			3.34	3.43	3.83	4.32	4.08	4.02	4.01	4.11
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			313	330	355	360	351	360	368	360
Silver (total)	µg/L	**0.1**	**0.25**	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			82	68	111	29	18	37	25	27
Aluminum (0.2µm)	µg/L	**75**	**100**	6	5	3	3	4	4	3	4
Arsenic (total)	µg/L	**100**	**5**	< 1.0	< 1.0	0.4	0.3	0.3	0.5	0.4	0.4
Barium (total)	µg/L			120	115	123	127	143	131	134	134
Beryllium (total)	µg/L	**1100**		< 0.500	< 0.500	0.009	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	**200**	**1500**	33	32	30	31	40	35	28	34
Bismuth (total)	µg/L			< 1.0	< 1.0	0.008	< 0.007	< 0.010	< 0.010	0.030	0.014
Calcium (total)	µg/L			99000	99250	112250	113000	109000	115000	116000	113250
Cadmium (total)	µg/L	**0.2**	**0.09**	< 0.10	< 0.10	0.012	0.004	0.006	0.010	0.005	0.006
Cobalt (total)	µg/L	**0.9**		< 0.50	< 0.50	0.102	0.073	0.052	0.075	0.058	0.065
Chromium (total)	µg/L			< 5.0	< 5.0	1.92	1.78	1.25	1.20	1.24	1.37
Copper (total)	µg/L	**5**		< 1.0	< 1.1	1.1	0.5	0.3	0.7	0.3	0.5
Iron (total)	µg/L	**300**	**300**	170	138	168	94	53	196	87	108
Potassium (total)	µg/L			1125	1150	1250	1260	1250	1660	1490	1415
Magnesium (total)	µg/L			18750	17750	18200	18800	19000	17900	18800	18625
Manganese (total)	µg/L			18.3	16.0	17.2	14.0	9.1	13.1	15.0	12.8
Molybdenum (total)	µg/L	**40**	**73**	< 0.50	< 0.50	0.24	0.22	0.20	0.18	0.20	0.20
Sodium (total)	µg/L			85500	80500	83400	81600	82500	86600	87800	84625
Nickel (total)	µg/L	**25**	**25**	< 1.0	< 1.0	0.4	0.4	0.3	2.3	0.3	0.8
Phosphorus (total)	mg/L	**10-30**		18	17	19	10	**8**	21	12	13
Lead (total)	µg/L	**5**	**7**	0.54	0.51	0.34	0.34	0.12	0.23	0.13	0.21
Antimony (total)	µg/L	**20**		< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	< 2.0	< 2.0	0.34	0.33	0.30	0.26	0.28	0.29
Tin (total)	µg/L			< 1.0	< 1.0	0.09	0.22	< 0.06	0.09	0.07	0.11
Strontium (total)	µg/L			230	228	248	279	295	254	276	276
Titanium (total)	µg/L			5.70	6.13	4.11	1.23	0.70	1.40	1.26	1.15
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.050	< 0.050	0.006	< 0.005	< 0.005	0.005	0.005	0.005
Uranium (total)	µg/L	**5**	**15**	1.07	1.03	0.99	1.15	1.26	0.97	0.89	1.07
Vanadium (total)	µg/L	**6**		0.94	0.90	0.89	0.80	0.68	0.66	0.63	0.69
Zinc (total)	µg/L	**30**	**30**	< 5	< 5	4	3	< 2	3	2	3
Lead-210	Bq/L			< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		< 0.04	< 0.04	< 0.01	< 0.01	< 0.01	0.02	0.02	0.02
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	mg/L			-[1]	-[1]	-[1]	89.9	98.5	98.5	98	--
ORP	mV			-[1]	-[1]	-[1]	144.4	142.4	116.7	148	--
SPC	µs/cm			-[1]	-[1]	-[1]	877	1000	1059	1077	--
Temperature	°C			-[1]	-[1]	-[1]	5.668	11.461	14.056	10.271	--
Turbidity	FNU			-[1]	-[1]	-[1]	-2.46	1.23	1.67	--	--
pH	Units			-[1]	-[1]	-[1]	8.21	8.33	8.00	8.13	--
Staff Gauge	cm			-[1]	-[1]	-[1]	--	--	--	--	--

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] Field parameters included for current sampling year only.
-- - No data.

Table 65: Surface water quality – Brewery Creek – downstream – (GRT-3B)

		Criteria		GRT-3B							
				2018	2019	2020	2021				
Analysis	**Units**	**PWQO**	**CWQG**	**Average**			2021-01-13	2021-05-12	2021-07-22	2021-10-19	**Average**
Total Suspended Solids	mg/L			1	6	2	2	< 2	2	2	2
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.09	8.17	8.18	8.11	8.22	8.07	8.08	8.12
Alkalinity	mg/L as $CaCO_3$			253	233	244	244	234	219	240	234
Carbonate	mg/L as $CaCO_3$			2.9	3.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			248	228	244	244	234	219	240	234
Total Dissolved Solids	mg/L			551	535	565	610	620	580	583	598
Fluoride	mg/L		**0.12**	< 0.10	< 0.10	0.06	0.07	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			2	3	2	2	2	3	2	2
Ammonia+Ammonium (N)	as N mg/L			0.09	0.11	0.05	0.05	< 0.04	0.05	0.07	0.05
Chloride (Dissolved)	mg/L		**120**	**145**	**145**	**166**	**170**	**200**	**180**	**170**	**180**
Sulphate (dissolved)	mg/L			38	23	23	24	23	22	23	23
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			0.02	0.01	< 0.03	< 0.03	< 0.03	0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	2.71	2.67	3.40	4.10	3.71	2.94	3.44	3.55
Nitrate + Nitrite (as N)	as N mg/L			2.72	2.68	3.40	4.10	3.71	2.97	3.44	3.56
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			305	313	352	362	327	342	341	343
Silver (total)	µg/L	**0.1**	**0.25**	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			17	71	15	20	10	5	3	10
Aluminum (0.2µm)	µg/L	**75**	**100**	< 5	5	4	3	3	< 1	3	3
Arsenic (total)	µg/L	**100**	**5**	< 1.0	< 1.0	0.4	0.3	0.3	0.4	0.5	0.4
Barium (total)	µg/L			110	109	118	129	138	120	122	127
Beryllium (total)	µg/L	**1100**		< 0.500	< 0.500	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	**200**	**1500**	34	35	35	33	42	34	31	35
Bismuth (total)	µg/L			< 1.0	< 1.0	< 0.007	< 0.007	< 0.010	0.010	< 0.010	0.009
Calcium (total)	µg/L			92750	95000	110825	114000	101000	107000	108000	107500
Cadmium (total)	µg/L	**0.2**	**0.09**	< 0.10	< 0.10	0.005	0.005	0.008	0.003	0.003	0.005
Cobalt (total)	µg/L	**0.9**		< 0.50	< 0.50	0.051	0.058	0.051	0.067	0.043	0.055
Chromium (total)	µg/L			< 5.0	< 5.0	0.93	1.27	1.04	0.77	0.87	0.99
Copper (total)	µg/L	**5**		1.0	1.1	0.9	0.5	0.2	0.3	< 0.2	0.3
Iron (total)	µg/L	**300**	**300**	100	193	44	70	48	239	36	98
Potassium (total)	µg/L			1173	1300	1328	1360	1240	1300	1570	1368
Magnesium (total)	µg/L			18500	17250	18375	19100	18000	18100	17600	18200
Manganese (total)	µg/L			25.0	42.0	13.6	23.3	15.4	13.4	9.8	15.5
Molybdenum (total)	µg/L	**40**	**73**	< 0.50	< 0.50	0.21	0.19	0.18	0.18	0.22	0.19
Sodium (total)	µg/L			83750	80750	83425	80500	76500	86100	82500	81400
Nickel (total)	µg/L	**25**	**25**	< 1.0	< 1.0	0.2	0.3	0.2	1.3	0.2	0.5
Phosphorus (total)	mg/L	**10-30**		7	22	6	13	< **3**	13	**8**	**9**
Lead (total)	µg/L	**5**	**7**	< 0.50	0.60	0.05	0.17	< 0.09	< 0.09	< 0.09	0.11
Antimony (total)	µg/L	**20**		< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	< 2.0	< 2.0	0.26	0.34	0.31	0.23	0.22	0.28
Tin (total)	µg/L			< 1.0	< 1.0	0.07	0.14	< 0.06	0.13	< 0.06	0.10
Strontium (total)	µg/L			223	213	250	289	275	251	265	270
Titanium (total)	µg/L			< 5.00	6.33	0.52	0.81	0.43	0.26	0.31	0.45
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (total)	µg/L	**5**	**15**	1.85	1.85	1.56	1.80	1.99	1.18	1.01	1.50
Vanadium (total)	µg/L	**6**		0.74	0.88	0.64	0.72	0.62	0.54	0.53	0.60
Zinc (total)	µg/L	**30**	**30**	5	< 5	3	2	< 2	2	< 2	2
Lead-210	Bq/L			< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		< 0.04	< 0.04	0.01	< 0.01	< 0.01	0.02	< 0.01	0.01
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	mg/L			-[1]	-[1]	-[1]	91.5	124.2	124.8	113.3	--
ORP	mV			-[1]	-[1]	-[1]	149.2	159.2	99.3	175.3	--
SPC	µs/cm			-[1]	-[1]	-[1]	836	974	1007	1048	--
Temperature	°C			-[1]	-[1]	-[1]	3.93	13.596	17.656	11.352	--
Turbidity	FNU			-[1]	-[1]	-[1]	-3.59	0.41	1.95	--	--
pH	Units			-[1]	-[1]	-[1]	8.06	8.32	7.82	7.98	--
Staff Gauge	cm			-[1]	-[1]	-[1]	--	--	--	--	--

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] Field parameters included for current sampling year only.
-- - No data.

Table 66: Surface water quality – Highland Drive South Creek – downstream – (HC-D)

		Criteria		HC-D							
				2018	2019	2020	2021				
Analysis	**Units**	**PWQO**	**CWQG**	**Average**			2021-01-19	2021-05-17	2021-09-07	2021-11-09	**Average**
Total Suspended Solids	mg/L			2	8	5	< 2	2	2	< 2	2
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.14	8.19	8.17	8.12	8.16	8.17	8.21	8.17
Alkalinity	mg/L as $CaCO_3$			295	280	279	275	273	275	287	278
Carbonate	mg/L as $CaCO_3$			3.8	4.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			293	275	279	275	273	275	287	278
Total Dissolved Solids	mg/L			670	673	659	711	711	663	669	689
Fluoride	mg/L		**0.12**	**0.14**	0.11	**0.13**	0.11	0.11	**0.13**	**0.12**	**0.12**
Total Organic Carbon	mg/L			2	3	3	2	3	2	2	2
Ammonia+Ammonium (N)	as N mg/L			0.10	0.11	0.08	0.13	< 0.04	< 0.04	0.05	0.07
Chloride (Dissolved)	mg/L		**120**	**175**	**173**	**195**	**190**	**200**	**190**	**190**	**193**
Sulphate (dissolved)	mg/L			35	32	34	37	35	36	32	35
Bromide (dissolved)	mg/L			< 1.0	1.25	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Nitrite (as N)	as N mg/L			0.02	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	3.54	3.16	3.79	4.19	3.77	3.53	3.73	3.81
Nitrate + Nitrite (as N)	as N mg/L			3.56	3.19	3.79	4.19	3.77	3.55	3.73	3.81
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			400	395	448	444	412	399	467	431
Silver (total)	µg/L	**0.1**	**0.25**	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			16	40	31	5	7	10	< 1	6
Aluminum (0.2µm)	µg/L	**75**	**100**	5	< 5	2	4	4	7	2	4
Arsenic (total)	µg/L	**100**	**5**	**7.9**	**8.4**	**8.0**	**5.7**	**6.6**	**8.2**	**7.7**	**7.1**
Barium (total)	µg/L			195	180	208	191	192	216	209	202
Beryllium (total)	µg/L	**1100**		< 0.500	< 0.500	0.016	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	**200**	**1500**	**460**	**458**	**484**	**379**	**417**	**536**	**421**	**438**
Bismuth (total)	µg/L			< 1.0	< 1.0	0.010	< 0.007	0.010	0.030	0.020	0.017
Calcium (total)	µg/L			120000	117500	137250	136000	125000	121000	142000	131000
Cadmium (total)	µg/L	**0.2**	**0.09**	< 0.10	< 0.10	0.006	0.007	0.004	< 0.003	0.012	0.007
Cobalt (total)	µg/L	**0.9**		< 0.50	< 0.50	0.221	0.135	0.125	0.098	0.184	0.136
Chromium (total)	µg/L			< 5.0	< 5.0	0.48	0.81	0.50	0.40	0.41	0.53
Copper (total)	µg/L	**5**		< 1.0	< 1.0	1.1	0.5	0.3	0.2	0.3	0.3
Iron (total)	µg/L	**300**	**300**	228	**315**	290	244	220	133	272	217
Potassium (total)	µg/L			3025	3175	3833	3470	3060	2930	3700	3290
Magnesium (total)	µg/L			25250	24000	25450	25700	24300	23300	27500	25200
Manganese (total)	µg/L			37.0	52.0	38.2	40.6	32.4	12.0	46.3	32.8
Molybdenum (total)	µg/L	**40**	**73**	0.94	0.67	2.21	0.62	0.71	0.57	0.64	0.64
Sodium (total)	µg/L			80250	88250	87625	82400	79000	73200	89300	80975
Nickel (total)	µg/L	**25**	**25**	1.2	< 1.0	1.1	1.1	0.9	0.8	0.9	0.9
Phosphorus (total)	µg/L	**10-30**		8	17	**35**	**4**	13	12	**9**	10
Lead (total)	µg/L	**5**	**7**	< 0.50	< 0.50	0.39	0.12	< 0.09	< 0.09	0.17	0.12
Antimony (total)	µg/L	**20**		< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	< 2.0	< 2.0	0.65	0.59	0.37	0.24	0.30	0.38
Tin (total)	µg/L			< 1.0	< 1.0	0.12	0.19	0.06	< 0.06	0.08	0.10
Strontium (total)	µg/L			313	298	347	366	382	336	383	367
Titanium (total)	µg/L			< 5.0	5.40	3.01	0.43	0.38	0.44	0.26	0.38
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.050	< 0.050	0.023	< 0.005	< 0.005	0.009	< 0.005	0.006
Uranium (total)	µg/L	**5**	**15**	**36.3**	**33.8**	**35.3**	**39.4**	**40.9**	**25.1**	**26.0**	**32.9**
Vanadium (total)	µg/L	**6**		0.55	0.74	0.53	0.52	0.36	0.30	0.31	0.37
Zinc (total)	µg/L	**30**	**30**	< 5	5	3	3	< 2	< 2	11	5
Lead-210	Bq/L			< 0.10	0.11	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		< 0.04	< 0.04	0.01	< 0.01	< 0.01	< 0.01	0.02	0.01
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.02	< 0.02	0.03	< 0.02	< 0.02	0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	mg/L			-[1]	-[1]	--	96.5	103.8	102.9	99.8	--
ORP	mV			-[1]	-[1]	--	173.5	132.7	--	129.6	--
SPC	µs/cm			-[1]	-[1]	--	981	1146	1149	1184	--
Temperature	°C			-[1]	-[1]	--	3.308	12.901	15.44	8.117	--
Turbidity	FNU			-[1]	-[1]	--	3.71	1.46	1.51	1.44	--
pH	Units			-[1]	-[1]	--	8.08	8.16	--	7.97	--
Staff Gauge	cm			-[1]	-[1]	--	20	20	20	19	--

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] Field parameters included for current sampling year only.
-- - No data.

Table 67: Surface water quality – Highland Drive South Creek – upstream – (HC-U)

		Criteria		HC-U							
				2018	2019	2020	2021				
Analysis	**Units**	**PWQO**	**CWQG**	**Average**			2021-01-19	2021-05-17	2021-09-07	2021-11-09	**Average**
Total Suspended Solids	mg/L			5	6	9	4	5	6	3	5
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.07	8.17	8.05	7.96	8.09	8.07	8.01	8.03
Alkalinity	mg/L as $CaCO_3$			295	278	277	274	282	272	285	278
Carbonate	mg/L as $CaCO_3$			3.2	3.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			288	275	277	274	282	272	285	278
Total Dissolved Solids	mg/L			666	695	693	671	743	657	651	681
Fluoride	mg/L		**0.12**	**0.13**	**0.12**	**0.14**	0.10	0.10	0.10	**0.13**	0.11
Total Organic Carbon	mg/L			3	3	2	2	2	2	2	2
Ammonia+Ammonium (N)	as N mg/L			0.07	0.06	0.05	0.06	< 0.04	0.05	0.04	0.05
Chloride (Dissolved)	mg/L		**120**	**152**	**173**	**213**	**190**	**200**	**200**	**200**	**198**
Sulphate (dissolved)	mg/L			30	35	36	37	36	38	34	36
Bromide (dissolved)	mg/L			< 1.0	2.25	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Nitrite (as N)	as N mg/L			< 0.01	< 0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	3.75	3.64	3.99	4.41	4.10	3.90	3.92	4.08
Nitrate + Nitrite (as N)	as N mg/L			3.75	3.64	3.99	4.41	4.10	3.90	3.92	4.08
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			398	393	450	427	429	449	440	436
Silver (total)	µg/L	**0.1**	**0.25**	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			35	34	27	11	17	44	65	34
Aluminum (0.2µm)	µg/L	**75**	**100**	8	< 5	4	2	3	2	3	3
Arsenic (total)	µg/L	**100**	**5**	4.6	2.9	3.9	2.7	3.4	**5.6**	**6.3**	4.5
Barium (total)	µg/L			200	190	217	188	203	233	212	209
Beryllium (total)	µg/L	**1100**		< 0.500	< 0.500	0.010	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	**200**	**1500**	**490**	**433**	**462**	**346**	**356**	**491**	**394**	**397**
Bismuth (total)	µg/L			< 1.0	< 1.0	0.018	< 0.007	0.020	< 0.010	< 0.010	0.012
Calcium (total)	µg/L			125000	122500	138500	129000	131000	138000	133000	132750
Cadmium (total)	µg/L	**0.2**	**0.09**	< 0.10	< 0.10	0.008	0.005	0.007	< 0.003	0.013	0.007
Cobalt (total)	µg/L	**0.9**		< 0.50	< 0.50	0.229	0.134	0.135	0.155	0.235	0.165
Chromium (total)	µg/L			< 5.0	< 5.0	0.63	0.97	0.62	0.63	1.09	0.83
Copper (total)	µg/L	**5**		< 1.0	< 1.0	1.5	0.5	0.4	0.4	0.5	0.5
Iron (total)	µg/L	**300**	**300**	**503**	**445**	**452**	**382**	**401**	**673**	**1720**	**794**
Potassium (total)	µg/L			2675	2550	3515	2750	2570	2510	2760	2648
Magnesium (total)	µg/L			26250	25000	25350	25400	24500	25500	26300	25425
Manganese (total)	µg/L			52.3	47.0	54.0	41.5	37.1	70.9	75.4	56.2
Molybdenum (total)	µg/L	**40**	**73**	0.69	0.65	8.47	0.62	0.87	0.53	0.58	0.65
Sodium (total)	µg/L			81250	84500	96300	80200	78200	78400	83600	80100
Nickel (total)	µg/L	**25**	**25**	1.2	1.1	1.1	1.0	0.9	0.8	1.0	0.9
Phosphorus (total)	µg/L	**10-30**		11	14	**37**	**3**	13	29	30	19
Lead (total)	µg/L	**5**	**7**	< 0.50	< 0.50	0.18	0.19	0.16	0.53	0.62	0.38
Antimony (total)	µg/L	**20**		< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	< 2.0	< 2.0	1.82	0.60	0.33	0.33	0.38	0.41
Tin (total)	µg/L			< 1.0	< 1.0	0.17	0.22	0.09	0.06	0.07	0.11
Strontium (total)	µg/L			315	300	340	347	388	363	351	362
Titanium (total)	µg/L			5.2	5.13	2.60	0.69	0.85	2.14	3.60	1.82
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.050	< 0.050	0.015	< 0.005	0.005	0.009	0.007	0.007
Uranium (total)	µg/L	**5**	**15**	**8.7**	**8.8**	**8.7**	**10.2**	**10.6**	**7.2**	**8.2**	**9.1**
Vanadium (total)	µg/L	**6**		0.67	0.74	0.57	0.58	0.48	0.56	0.95	0.64
Zinc (total)	µg/L	**30**	**30**	< 5	5	4	4	2	4	11	5
Lead-210	Bq/L			< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		< 0.04	< 0.04	0.01	< 0.01	0.02	0.02	< 0.01	0.02
Thorium-230	Bq/L			< 0.07	< 0.07	0.03	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.02	< 0.02	0.04	< 0.02	< 0.02	0.03
Field Parameters											
ODO % Sat	mg/L			-[1]	-[1]	--	89.5	91.3	88.8	90.2	--
ORP	mV			-[1]	-[1]	--	28.9	120.9	--	124.9	--
SPC	µs/cm			-[1]	-[1]	--	988	1156	1159	1166	--
Temperature	°C			-[1]	-[1]	--	4.643	11.568	12.931	9.528	--
Turbidity	FNU			-[1]	-[1]	--	3.18	3.97	2.93	1.88	--
pH	Units			-[1]	-[1]	--	7.93	8.11	--	7.84	--
Staff Gauge	cm			-[1]	-[1]	--	--	--	--	--	--

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] Field parameters included for current sampling year only.
-- - No data.

Table 68: Sediment quality – Highland Drive South Creek (HC-D)

		Criteria				HC-D					
		PSQG		CCME		2010	2012	2018	2019	2020	2021
Parameter	**Units**	**LEL**	**SEL**	**ISQG**	**PEL**	Average					
Water Soluble Boron	µg/g					-[1]	8.8	No Sample	No Sample	No Sample	No Sample
Mercury	µg/g	**0.2**	**2**	**0.17**	**0.486**	-[1]	0.07				
Silver	µg/g					< 0.20	< 0.20				
Aluminum	µg/g					3500	3800				
Arsenic	µg/g	**6.0**	**33**	**5.9**	**17**	**27**	**28**				
Barium	µg/g					150	150				
Beryllium	µg/g					0.20	0.20				
Bismuth	µg/g					< 1.0	-[1]				
Boron	µg/g					21	-[1]				
Cadmium	µg/g	**0.6**	**10**	**0.6**	**3.5**	0.20	0.38				
Calcium	µg/g					120000	120000				
Cobalt	µg/g					3.9	4.4				
Copper	µg/g	**16**	**110**	**35.7**	**197**	10	12				
Chromium	µg/g	**26**	**110**			14	15				
Iron	µg/g					13000	14000				
Lithium	µg/g					-[1]	-[1]				
Manganese	µg/g					720	810				
Magnesium	µg/g	**460**	**1100**			**3100**	**3400**				
Molybdenum	µg/g					< 0.50	0.59				
Nickel	µg/g	**16**	**75**			5.3	6.0				
Lead	µg/g	**31**	**250**	**35**	**91.3**	21	24				
Phosphorus	µg/g					740	760				
Potassium	µg/g					440	420				
Antimony	µg/g					0.40	0.81				
Selenium	µg/g					1.2	1.6				
Sodium	µg/g					260	300				
Strontium	µg/g					130	140				
Thallium	µg/g					0.06	0.10				
Tin	µg/g					< 5.0	-[1]				
Titanium	µg/g					-[1]	-[1]				
Uranium	µg/g					23	29				
Vanadium	µg/g					18	19				
Zinc	µg/g	**120**	**820**			110	**120**				
Lead-210	Bq/g					0.10	< 0.50				
Radium-226	Bq/g					0.03	0.10				
Thorium-230	Bq/g					0.01	0.10				
Thorium-232	Bq/g					0.03	< 0.01				

Note:
PSQG = Provincial Sediment Quality Guidelines , LEL - lowest effect level, SEL - severe effect level
CCME = Canadian Council of Ministers of the Environment, Sediment Quality Guidelines for the Protection of Aquatic Life,
ISQG = Interim Sediment Quality Guidelines, PEL = Probable Effect Level
Bold values indicate an exceedance of a PSQG or CCME value.
[1] Analysis not included in laboratory contract.

Table 69: Sediment quality – Highland Drive South Creek (HC-U)

		Criteria				HC-U							
		PSQG		CCME		2010	2012	2018	2019	2020	2021		
Parameter	**Units**	**LEL**	**SEL**	**ISQG**	**PEL**	**Average**					2021-05-17	2021-11-09	**Average**
Water Soluble Boron	µg/g					-[1]	3.9	0.4	0.7	1.2	< 0.5	< 0.5	< 0.5
Mercury	µg/g	**0.2**	**2**	**0.17**	**0.486**	-[1]	< 0.05	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05
Silver	µg/g					< 0.20	< 0.20	< 0.20	< 0.20	0.05	< 0.05	< 0.05	< 0.05
Aluminum	µg/g					1500	1700	1500	1950	2500	1500	1400	1450
Arsenic	µg/g	**6.0**	**33**	**5.9**	**17**	**11**	**23**	**6**	**10**	**32**	**6.8**	**9.7**	**8.3**
Barium	µg/g					34	79	28	39	98	31	31	31
Beryllium	µg/g					< 0.20	< 0.20	< 0.20	< 0.20	0.16	0.06	0.07	0.07
Bismuth	µg/g					< 1.0	-[1]	< 1.0	< 1.0	< 0.09	< 0.09	< 0.09	< 0.09
Boron	µg/g					7	-[1]	< 5	< 5	6	2	2	2
Cadmium	µg/g	**0.6**	**10**	**0.6**	**3.5**	< 0.10	0.16	< 0.10	< 0.10	0.11	< 0.02	< 0.05	0.04
Calcium	µg/g					65000	65000	71000	67000	102000	58000	60000	59000
Cobalt	µg/g					1.6	2.2	1.2	1.4	2.6	1.1	1.3	1.2
Copper	µg/g	**16**	**110**	**35.7**	**197**	3.8	5.7	1.7	2.3	5.2	1.1	1.7	1.4
Chromium	µg/g	**26**	**110**			7.0	10	5.3	6.1	11.2	4.5	4.8	4.7
Iron	µg/g					8600	13000	8650	8900	18850	6200	6800	6500
Lithium	µg/g					-[1]	-[1]	2.2	2.7	3.5	2.0	< 2.0	2.0
Manganese	µg/g					250	500	135	195	470	140	150	145
Magnesium	µg/g	**460**	**1100**			**3000**	**3200**	**2700**	**3350**	**3750**	**2900**	**2900**	**2900**
Molybdenum	µg/g					< 0.50	< 0.50	< 0.50	< 0.50	1.20	0.20	0.20	0.20
Nickel	µg/g	**16**	**75**			2.4	3.5	2.0	2.3	4.0	1.8	2.2	2.0
Lead	µg/g	**31**	**250**	**35**	**91.3**	6.0	9.5	4.0	4.5	9.7	3.4	3.6	3.5
Phosphorus	µg/g					690	700	630	675	590	610	600	605
Potassium	µg/g					< 200	< 200	< 200	245	320	170	180	175
Antimony	µg/g					< 0.20	0.38	< 0.20	< 0.20	< 0.80	< 0.80	< 0.80	< 0.80
Selenium	µg/g					< 0.50	0.62	< 0.50	< 0.50	< 0.70	< 0.70	< 0.70	< 0.70
Sodium	µg/g					110	140	86	175	155	120	150	135
Strontium	µg/g					95	110	100	93	137	90	110	100
Thallium	µg/g					< 0.05	0.25	< 0.05	< 0.05	0.05	< 0.02	< 0.02	< 0.02
Tin	µg/g					< 5.0	-[1]	< 1.0	2.8	2.4	< 0.5	1.1	0.8
Titanium	µg/g					-[1]	-[1]	245	255	170	190	170	180
Uranium	µg/g					0.71	1.10	0.46	0.64	1.18	0.48	0.39	0.44
Vanadium	µg/g					11	12	11	11	14	8	8	8
Zinc	µg/g	**120**	**820**			26	37	17	18	71	12	16	14
Lead-210	Bq/g					< 0.10	< 0.50	< 0.05	< 0.05	0.12	< 0.20	0.04	0.12
Radium-226	Bq/g					0.04	< 0.10	0.08	< 0.05	0.04	< 0.04	< 0.02	0.03
Thorium-230	Bq/g					0.02	< 0.10	0.45	< 0.40	0.17	< 0.03	< 0.10	0.07
Thorium-232	Bq/g					0.03	< 0.01	< 0.04	< 0.04	0.01	0.01	0.01	0.01

Note:
PSQG = Provincial Sediment Quality Guidelines , LEL - lowest effect level, SEL - severe effect level
CCME = Canadian Council of Ministers of the Environment, Sediment Quality Guidelines for the Protection of Aquatic Life,
ISQG = Interim Sediment Quality Guidelines, PEL = Probable Effect Level
Bold values indicate an exceedance of a PSQG or CCME value.
[1] Analysis not included in laboratory contract.

Table 70: 2021 Storm event sampling – Highland Drive South Creek watershed

		Criteria		HC-D					
Analysis	**Units**	**PWQO**	**CWQG**	2021/09/22 9:00AM	2021/09/22 10:00AM	2021/09/22 11:00AM	2021/09/22 12:00PM	2021/09/22 1:00PM	2021/09/22 2:00PM
Total Suspended Solids	mg/L			6	4	2	3	3	5
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.17	8.18	8.18	8.19	8.17	8.18
Alkalinity	mg/L as CaCO3			275	284	276	277	276	276
Carbonate	mg/L as CaCO3			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as CaCO3			275	284	276	277	276	276
Total Dissolved Solids	mg/L			637	669	700	637	654	649
Fluoride	mg/L		**0.12**	0.11	0.09	0.09	0.09	0.09	0.10
Total Organic Carbon	mg/L			2.0	2.0	2.0	2.0	2.0	2.0
Ammonia+Ammonium (N)	as N mg/L			< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	0.04
Chloride (Dissolved)	mg/L		**120**	**220**	**210**	**210**	**220**	**210**	**210**
Sulphate (dissolved)	mg/L			37	36	36	35	36	35
Bromide (dissolved)	mg/L			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	3.63	3.58	3.55	3.52	3.45	3.40
Nitrate + Nitrite (as N)	as N mg/L			3.63	3.58	3.55	3.52	3.45	3.40
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as CaCO3			426	393	407	399	416	383
Silver (total)	µg/L	**0.1**	**0.25**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			23	7	9	12	13	16
Aluminum (0.2µm)	µg/L	**75**	**100**	2	2	2	2	2	4
Arsenic (total)	µg/L	**100**	**5**	**10.1**	**8.6**	**8.7**	**8.8**	**9.2**	**8.8**
Barium (total)	µg/L			208	199	210	206	205	200
Beryllium (total)	µg/L	**1100**		< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	**200**	**1500**	**419**	**417**	**449**	**452**	**470**	**438**
Bismuth (total)	µg/L			0.020	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Calcium (total)	µg/L			130000	120000	124000	122000	128000	117000
Cadmium (total)	µg/L	**0.2**	**0.09**	0.008	< 0.003	0.005	0.003	0.003	0.012
Cobalt (total)	µg/L	**0.9**		0.118	0.103	0.102	0.106	0.125	0.111
Chromium (total)	µg/L			0.34	0.40	0.33	0.36	0.32	0.57
Copper (total)	µg/L	**5**		**5.1**	0.7	1.3	1.1	0.9	4.9
Iron (total)	µg/L	**300**	**300**	**321**	192	200	234	262	254
Potassium (total)	µg/L			3350	3070	3200	3260	3400	3210
Magnesium (total)	µg/L			24800	22600	23500	23000	23500	22100
Manganese (total)	µg/L			21.4	16.8	16.6	20.0	22.2	22.0
Molybdenum (total)	µg/L	**40**	**73**	0.65	0.64	0.60	0.60	0.60	0.60
Sodium (total)	µg/L			81300	74300	76600	74900	75300	72900
Nickel (total)	µg/L	**25**	**25**	1.0	0.9	0.9	0.8	1.0	0.9
Phosphorus (total)	µg/L	**10-30**		10	**6**	**5**	**7**	**7**	**4**
Lead (total)	µg/L	**5**	**7**	0.20	0.10	0.11	0.16	0.16	0.21
Antimony (total)	µg/L	**20**		< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.3	0.3	0.2	0.3	0.3	0.3
Tin (total)	µg/L			0.14	0.08	0.12	0.14	0.13	0.09
Strontium (total)	µg/L			349	314	328	327	337	311
Titanium (total)	µg/L			1.26	0.37	0.79	0.59	0.64	0.79
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005
Uranium (total)	µg/L	**5**	**15**	**27.1**	**25.3**	**25.9**	**26.3**	**25.4**	**24.9**
Vanadium (total)	µg/L	**6**		0.46	0.35	0.35	0.40	0.40	0.40
Zinc (total)	µg/L	**30**	**30**	4	3	3	3	5	3
Cation sum	meq/L			12.15	11.16	11.53	11.32	11.68	10.91
Anion Sum	meq/L			12.53	12.41	12.25	12.53	12.24	12.22
Anion-Cation Balance	% difference			-1.55	-5.30	-2.99	-5.05	-2.35	-5.68
Ion Ratio				0.97	0.90	0.94	0.90	0.95	0.89
Lead-210	Bq/L			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		< 0.01	< 0.01	0.02	0.02	0.01	0.02
Thorium-230	Bq/L			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	mg/L			96.7	96.6	96.5	96.4	96.2	96.3
ORP	mV			--	--	--	--	--	--
SPC	us/cm			1152	1151	1150	1144	1135	1131
Temperature	°C			14.814	14.777	14.763	14.77	14.78	14.82
Turbidity	FNU			2.57	1.67	1.41	1.61	2.21	2.11
pH	Units			--	--	--	--	--	--
Staff Gauge	cm			24	24	23	22	21	20

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value

Table 71: Surface water quality – Alexander Creek – upstream (AC-1)

		Criteria		AC-1							
				2018	2019	2020	2021				
Analysis	**Units**	**PWQO**	**CWQG**	**Average**			2021-01-13	2021-05-12	2021-07-22	2021-10-19	**Average**
Total Suspended Solids	mg/L			22	32	30	11	15	15	9	13
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.00	8.09	8.02	7.94	7.94	8.03	7.97	7.97
Alkalinity	mg/L as $CaCO_3$			295	278	277	270	273	275	280	275
Carbonate	mg/L as $CaCO_3$			2.7	3.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			288	278	277	270	273	275	280	275
Total Dissolved Solids	mg/L			711	713	697	710	789	774	700	743
Fluoride	mg/L		**0.12**	< 0.10	< 0.10	0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			2.3	2.2	1.8	2.0	2.0	2.0	2.0	2.0
Ammonia+Ammonium (N)	as N mg/L			0.06	0.06	0.05	< 0.04	< 0.04	0.04	0.05	0.04
Chloride (Dissolved)	mg/L		**120**	**193**	**190**	**213**	**220**	**250**	**250**	**210**	**233**
Sulphate (dissolved)	mg/L			31	30	30	32	32	31	30	31
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.01	< 0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	4.04	3.95	4.22	4.76	4.24	4.13	4.22	4.34
Nitrate + Nitrite (as N)	as N mg/L			4.04	3.95	4.22	4.76	4.24	4.14	4.22	4.34
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.010	< 0.010	0.013	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Hardness	mg/L as $CaCO_3$			400	408	438	434	403	433	429	425
Silver (total)	µg/L	**0.1**	**0.25**	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			183	164	251	90	43	181	96	103
Aluminum (0.2µm)	µg/L	**75**	**100**	< 5	< 5	3	5	2	2	3	3
Arsenic (total)	µg/L	**100**	**5**	2.0	1.9	2.2	1.3	1.1	1.9	1.7	1.5
Barium (total)	µg/L			138	130	140	146	154	138	149	147
Beryllium (total)	µg/L	**1100**		< 0.50	< 0.50	0.01	0.007	< 0.007	0.009	< 0.007	0.008
Boron (total)	µg/L	**200**	**1500**	53	51	53	52	69	48	51	55
Bismuth (total)	µg/L			< 1.0	< 1.0	0.028	0.018	0.020	0.010	0.020	0.017
Calcium (total)	µg/L			120000	125000	136750	134000	125000	137000	135000	132750
Cadmium (total)	µg/L	**0.2**	**0.09**	< 0.10	< 0.10	0.01	0.006	0.006	0.010	0.006	0.007
Cobalt (total)	µg/L	**0.9**		< 0.50	< 0.50	0.19	0.121	0.073	0.115	0.107	0.104
Chromium (total)	µg/L			< 5.0	< 5.0	1.7	1.49	0.84	0.91	1.24	1.12
Copper (total)	µg/L	**5**		1.0	< 1.0	1.4	0.8	0.5	0.6	0.5	0.6
Iron (total)	µg/L	**300**	**300**	**348**	**303**	**419**	194	92	261	199	187
Potassium (total)	µg/L			1425	1500	1580	1690	1370	1680	1940	1670
Magnesium (total)	µg/L			23750	22500	23450	24000	22400	22200	22500	22775
Manganese (total)	µg/L			25.8	25.0	32.4	14.4	10.9	21.3	22.1	17.2
Molybdenum (total)	µg/L	**40**	**73**	< 0.50	< 0.50	0.20	0.21	0.24	0.18	0.20	0.21
Sodium (total)	µg/L			93000	90750	94975	96800	87700	95800	98000	94575
Nickel (total)	µg/L	**25**	**25**	< 1.0	< 1.0	0.5	0.4	0.3	1.4	0.4	0.6
Phosphorus (total)	µg/L	**10-30**		**38**	**34**	**46**	22	16	**44**	**32**	29
Lead (total)	µg/L	**5**	**7**	0.80	0.69	0.69	0.56	0.30	0.44	0.28	0.40
Antimony (total)	µg/L	**20**		< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	< 2.0	< 2.0	0.83	0.92	0.90	0.84	0.80	0.87
Tin (total)	µg/L			< 1.0	< 1.0	0.07	0.24	< 0.06	0.10	0.08	0.12
Strontium (total)	µg/L			288	278	310	341	339	303	323	327
Titanium (total)	µg/L			11.4	10.9	11.5	4.2	2.3	2.6	4.2	3.3
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.05	< 0.05	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (total)	µg/L	**5**	**15**	3.05	3.30	2.95	3.52	3.62	2.95	2.64	3.18
Vanadium (total)	µg/L	**6**		1.23	1.25	1.24	1.02	0.74	0.94	0.90	0.90
Zinc (total)	µg/L	**30**	**30**	5	6	4	3	3	4	3	3
Lead-210	µg/L			< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		< 0.04	< 0.04	0.01	< 0.01	0.01	0.01	< 0.01	0.01
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	mg/L			-[1]	-[1]	-	90.2	85.4	82.6	84.3	--
ORP	mV			-[1]	-[1]	-	153.8	155	121.3	114.9	--
SPC	µs/cm			-[1]	-[1]	-	972	1195	1244	1248	--
Temperature	°C			-[1]	-[1]	-	5.537	12.472	13.911	11.689	--
Turbidity	FNU			-[1]	-[1]	-	2.24	2.19	4.41	--	--
pH	Units			-[1]	-[1]	-	7.88	7.97	7.63	7.81	--
Staff Gauge	cm			-[1]	-[1]	-	--	--	--	--	--

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] Field parameters included for current sampling year only.
-- - No data.

Table 72: Surface Water Quality – Alexander Creek – downstream (AC-3)

		Criteria		AC-3							
				2018	2019	2020	2021				
Analysis	**Units**	**PWQO**	**CWQG**	**Average**			2021-01-13	2021-05-12	2021-07-22	2021-10-19	**Average**
Total Suspended Solids	mg/L			14	20	39	10	7	11	33	15
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.17	8.21	8.24	8.16	8.19	8.22	8.27	8.21
Alkalinity	mg/L as $CaCO_3$			288	270	270	268	269	291	271	275
Carbonate	mg/L as $CaCO_3$			4.0	4.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			283	265	270	268	269	291	271	275
Total Dissolved Solids	mg/L			675	656	647	630	694	680	660	666
Fluoride	mg/L		**0.12**	< 0.10	< 0.10	0.07	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			2.1	2.7	1.8	2.0	2.0	2.0	1.0	1.8
Ammonia+Ammonium (N)	as N mg/L			0.06	0.08	0.05	0.04	< 0.04	0.04	< 0.04	< 0.04
Chloride (Dissolved)	mg/L		**120**	**163**	**165**	**184**	**180**	**220**	**220**	**180**	**200**
Sulphate (dissolved)	mg/L			31	32	31	32	32	31	31	32
Bromide (dissolved)	mg/L			< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.01	< 0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	3.67	3.65	3.81	4.37	3.86	3.74	3.79	3.94
Nitrate + Nitrite (as N)	as N mg/L			3.67	3.65	3.81	4.37	3.86	3.75	3.79	3.94
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Hardness	mg/L as $CaCO_3$			403	405	437	428	392	438	420	420
Silver (total)	µg/L	**0.1**	**0.25**	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			125	177	229	77	71	142	363	163
Aluminum (0.2µm)	µg/L	**75**	**100**	5	< 5	5	3	3	1	4	3
Arsenic (total)	µg/L	**100**	**5**	2.3	2.4	3.0	1.7	1.6	2.3	3.7	2.3
Barium (total)	µg/L			140	138	155	146	154	146	151	149
Beryllium (total)	µg/L	**1100**		< 0.50	< 0.50	0.01	0.007	< 0.007	0.009	0.012	0.009
Boron (total)	µg/L	**200**	**1500**	47	47	51	46	58	42	42	47
Bismuth (total)	µg/L			< 1.0	< 1.0	0.030	0.013	0.020	0.030	0.040	0.026
Calcium (total)	µg/L			117500	122500	136250	132000	121000	139000	132000	131000
Cadmium (total)	µg/L	**0.2**	**0.09**	< 0.10	< 0.10	0.02	0.011	< 0.003	0.005	0.019	0.010
Cobalt (total)	µg/L	**0.9**		0.50	< 0.50	0.26	0.141	0.089	0.232	0.384	0.212
Chromium (total)	µg/L			< 5.0	< 5.0	1.4	1.15	1.02	0.99	2.08	1.31
Copper (total)	µg/L	**5**		1.6	1.7	1.7	0.8	0.7	0.8	1.3	0.9
Iron (total)	µg/L	**300**	**300**	**540**	**375**	**554**	239	171	271	**726**	**352**
Potassium (total)	µg/L			1400	1500	1573	1730	1340	1700	1930	1675
Magnesium (total)	µg/L			23250	22750	23350	24000	22000	22400	22100	22625
Manganese (total)	µg/L			26.3	29.8	58.9	22.0	16.4	19.6	78.0	34.0
Molybdenum (total)	µg/L	**40**	**73**	< 0.50	< 0.50	0.25	0.24	0.29	0.26	0.29	0.27
Sodium (total)	µg/L			73500	73000	77275	77400	69700	78400	74900	75100
Nickel (total)	µg/L	**25**	**25**	1.1	1.3	0.6	0.5	0.4	1.6	0.9	0.9
Phosphorus (total)	µg/L	**10-30**		26	**37**	**46**	23	16	**38**	**67**	**36**
Lead (total)	µg/L	**5**	**7**	0.63	0.99	1.17	0.77	0.43	0.64	1.23	0.77
Antimony (total)	µg/L	**20**		< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	< 2.0	< 2.0	0.72	0.89	0.78	0.82	0.79	0.82
Tin (total)	µg/L			3.5	< 1.0	0.10	0.20	0.06	0.19	0.06	0.13
Strontium (total)	µg/L			275	270	306	323	327	303	311	316
Titanium (total)	µg/L			8.5	11.7	10.6	3.4	3.4	6.3	16.1	7.3
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.05	< 0.05	0.01	< 0.005	< 0.005	0.005	0.007	0.006
Uranium (total)	µg/L	**5**	**15**	**7.10**	**8.78**	**7.03**	**7.80**	**7.43**	**5.35**	4.47	**6.26**
Vanadium (total)	µg/L	**6**		0.99	1.15	1.22	0.87	0.74	0.98	1.51	1.03
Zinc (total)	µg/L	**30**	**30**	5	6	7	5	4	5	6	5
Lead-210	µg/L			< 0.10	< 0.10	0.03	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		< 0.04	< 0.04	0.02	< 0.01	< 0.01	0.02	0.03	0.02
Thorium-230	Bq/L			< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	mg/L			-[1]	-[1]	-	97.1	97.7	97.2	89.1	--
ORP	mV			-[1]	-[1]	-	147.4	150.3	115.6	38.3	--
SPC	µs/cm			-[1]	-[1]	-	920	1104	1138	1141	--
Temperature	°C			-[1]	-[1]	-	5.275	13.249	15.122	11.383	--
Turbidity	FNU			-[1]	-[1]	-	5.62	17.94	13.26	--	--
pH	Units			-[1]	-[1]	-	8.12	8.28	8.05	8.16	--
Staff Gauge	cm			-[1]	-[1]	-	--	--	--	--	--

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] Field parameters included for current sampling year only.
-- - No data.

Table 73: Surface water quality – Lake Ontario Port Hope Harbour – Location 1 (PHH-1)

		Criteria		PHH-1								
				2016	2017	2018	2019	2020	2021			
Parameter	**Units**	**PWQO**	**CWQG**	**Average**					2021-06-16	2021-09-13	2021-11-03	**Average**
Total Suspended Solids	mg/L			6	11	5	3	4	3	7	< 2	4
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.39	8.29	8.36	8.38	8.36	8.30	8.41	8.37	8.36
Alkalinity	mg/L as $CaCO_3$			188	205	203	200	197	175	194	222	197
Carbonate	mg/L as $CaCO_3$			8.5	3.8	4.3	4.4	3.5	< 1.0	11.0	7.0	6.3
Bicarbonate	mg/L as $CaCO_3$			179	205	203	193	194	175	184	215	191
Total Dissolved Solids	mg/L			236	326	207	245	270	209	266	294	256
Fluoride	mg/L		**0.12**	0.08	0.10	< 0.10	< 0.10	0.07	< 0.06	0.06	< 0.06	0.06
Total Organic Carbon	mg/L			1.7	4.8	3.2	2.8	2.0	2.0	2.0	3.0	2.3
Ammonia+Ammonium (N)	as N mg/L			0.05	0.06	< 0.05	0.16	0.10	< 0.04	0.06	< 0.04	0.05
Chloride (Dissolved)	mg/L		**120**	14	15	22	14	15	17	14	20	17
Sulphate (dissolved)	mg/L			15	13	15	13	13	14	14	14	14
Bromide (dissolved)	mg/L			< 0.3	< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.03	0.01	< 0.01	0.02	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	0.58	0.71	1.09	0.77	0.66	0.55	0.65	1.32	0.84
Nitrate + Nitrite (as N)	as N mg/L			0.58	0.72	1.09	0.79	0.66	0.55	0.65	1.32	0.84
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			219	225	220	237	218	199	209	255	221
Silver (total)	µg/L	**0.1**	**0.25**	0.003	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			16	162	75	44	68	41	48	32	40
Aluminum (0.2µm)	µg/L	**75**	**100**	-[1]	7.5	< 5.0	6.0	8.0	1.0	2.0	< 1.0	1.3
Arsenic (total)	µg/L	**100**	**5**	0.6	< 1.0	< 1.0	< 1.0	0.7	0.6	0.5	0.3	0.5
Barium (total)	µg/L			57.4	59.5	51.3	53.7	65.0	62.6	57.6	58.0	59.4
Beryllium (total)	µg/L	**1100**		< 0.01	< 0.5	< 0.5	< 0.5	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	**200**	**1500**	20	17	15	15	17	18	45	11	25
Bismuth (total)	µg/L			< 0.01	< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010	< 0.010
Calcium (total)	µg/L			67300	73000	66000	70000	68700	58400	63700	84600	68900
Cadmium (total)	µg/L	**0.2**	**0.09**	0.01	< **0.1**	< **0.1**	< **0.1**	0.006	0.004	0.010	< 0.003	0.006
Cobalt (total)	µg/L	**0.9**		0.235	< 0.500	< 0.500	< 0.500	0.064	0.066	0.046	0.046	0.053
Chromium (total)	µg/L			0.45	< 5.0	< 5.0	< 5.0	0.70	0.33	0.26	0.30	0.30
Copper (total)	µg/L	**5**		2.6	1.5	1.1	< 1.0	0.8	0.5	0.3	0.3	0.4
Iron (total)	µg/L	**300**	**300**	109	290	167	117	141	107	111	127	115
Potassium (total)	µg/L			1085	1550	1083	1013	1155	963	1090	1390	1148
Magnesium (total)	µg/L			12450	11000	10700	11667	11350	12800	12200	10600	11867
Manganese (total)	µg/L			18.1	32.0	22.3	22.7	22.6	19.9	17.4	17.1	18.1
Molybdenum (total)	µg/L	**40**	**73**	0.57	< 0.50	0.51	< 0.50	1.09	0.48	0.46	0.45	0.46
Sodium (total)	µg/L			8425	9650	9833	9533	8290	9170	9090	11000	9753
Nickel (total)	µg/L	**25**	**25**	0.3	< 1.0	< 1.0	< 1.0	0.2	0.1	0.2	0.1	0.1
Phosphorus (total)	µg/L	**10-30**		15	**39**	16	**37**	22	20	15	14	16
Lead (total)	µg/L	**5**	**7**	0.14	< 0.50	< 0.50	< 0.50	0.14	0.20	0.13	< 0.09	0.14
Antimony (total)	µg/L	**20**		0.2	< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.12	< 2.0	< 2.0	< 2.0	0.09	0.10	0.06	0.13	0.10
Tin (total)	µg/L			0.01	< 1.0	< 1.0	< 1.0	0.09	0.09	< 0.06	< 0.06	0.07
Strontium (total)	µg/L			174	170	160	163	202	183	173	191	182
Titanium (total)	µg/L			-[1]	9.00	6.43	5.70	2.81	2.02	1.32	1.48	1.61
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.01	< 0.05	< 0.05	< 0.05	0.006	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (total)	µg/L	**5**	**15**	0.76	0.75	0.84	0.74	0.78	0.89	0.68	0.74	0.77
Vanadium (total)	µg/L	**6**		0.61	1.11	0.72	0.95	0.88	0.71	0.72	0.47	0.63
Zinc (total)	µg/L	**30**	**30**	2	< 5	< 5	< 5	2	2	< 2	< 2	2
Lead-210	Bq/L			0.02	0.03	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		< 0.01	< 0.04	< 0.04	< 0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L			< 0.02	< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.02	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	109.1	104.1	103.3	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	122.9	--	123.5	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	414.4	427.5	491.5	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	19.076	16.842	6.643	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	6.94	5.44	3.8	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	8.58	--	8.36	--
Staff Gauge	cm			-[2]	-[2]	-[2]	-[2]	-[2]	--	--	--	--

Note:
PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 74: Surface water quality – Lake Ontario Port Hope Harbour – Location 2 (PHH-2)

		Criteria		PHH-2								
				2016	2017	2018	2019	2020	2021			
Parameter	**Units**	**PWQO**	**CWQG**	**Average**					2021-06-16	2021-09-13	2021-11-03	**Average**
Total Suspended Solids	mg/L			3	5	18	2	4	5	7	3	5
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.05	8.22	8.25	8.32	8.19	8.14	8.29	8.18	8.20
Alkalinity	mg/L as $CaCO_3$			153	185	190	150	188	156	181	214	184
Carbonate	mg/L as $CaCO_3$			< 2.0	2.9	3.2	2.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			152	185	187	147	188	156	181	214	184
Total Dissolved Solids	mg/L			223	270	215	200	270	206	249	289	248
Fluoride	mg/L		**0.12**	0.10	< 0.10	< 0.10	< 0.10	< 0.06	0.07	0.07	0.08	0.07
Total Organic Carbon	mg/L			1.6	3.5	3.8	2.7	3.0	3.0	2.0	3.0	2.7
Ammonia+Ammonium (N)	as N mg/L			0.12	0.12	0.06	0.11	0.04	< 0.04	0.06	0.04	0.05
Chloride (Dissolved)	mg/L		**120**	19	18	20	19	15	21	16	22	20
Sulphate (dissolved)	mg/L			19	14	16	18	13	16	16	14	15
Bromide (dissolved)	mg/L			< 0.3	< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.03	0.02	< 0.01	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	0.40	0.57	0.94	0.49	0.47	0.43	0.59	1.34	0.79
Nitrate + Nitrite (as N)	as N mg/L			0.40	0.58	0.94	0.51	0.47	0.44	0.59	1.34	0.79
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			182	200	203	193	224	181	200	230	204
Silver (total)	µg/L	**0.1**	**0.25**	< 0.002	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	0.09	0.06
Aluminum (total)	µg/L			14	84	157	40	158	45	30	41	39
Aluminum (0.2µm)	µg/L	**75**	**100**	-[1]	< 5.0	< 5.0	5.3	10.0	2.0	1.0	< 1.0	1.3
Arsenic (total)	µg/L	**100**	**5**	1.9	2.0	3.0	2.5	2.3	**6.3**	1.6	**17.4**	**8.4**
Barium (total)	µg/L			47.2	52.5	52.0	40.7	65.5	54.9	52.5	55.2	54.2
Beryllium (total)	µg/L	**1100**		< 0.01	< 0.5	< 0.5	< 0.5	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	**200**	**1500**	24	23	18	20	18	21	83	13	39
Bismuth (total)	µg/L			0.03	< 1.0	< 1.0	< 1.0	0.009	0.110	0.040	1.070	0.407
Calcium (total)	µg/L			54450	62500	63000	53000	71100	52800	60300	75700	62933
Cadmium (total)	µg/L	**0.2**	**0.09**	0.00	< **0.1**	< **0.1**	< **0.1**	0.005	0.003	0.007	0.005	0.005
Cobalt (total)	µg/L	**0.9**		0.095	< 0.500	< 0.500	< 0.500	0.129	0.116	0.057	0.771	0.315
Chromium (total)	µg/L			0.43	< 5.0	< 5.0	< 5.0	0.54	0.32	0.27	0.25	0.28
Copper (total)	µg/L	**5**		1.3	2.4	2.3	< 1.5	0.8	0.8	0.5	2.0	1.1
Iron (total)	µg/L	**300**	**300**	75	185	297	< 100	253	145	80	133	119
Potassium (total)	µg/L			1370	1600	1267	1333	1280	1220	1160	1340	1240
Magnesium (total)	µg/L			11180	10500	10367	10267	11200	12000	11900	9970	11290
Manganese (total)	µg/L			20.8	31.0	40.3	16.7	50.6	29.8	16.2	18.5	21.5
Molybdenum (total)	µg/L	**40**	**73**	0.95	0.56	0.56	0.76	0.48	0.71	0.65	0.68	0.68
Sodium (total)	µg/L			10830	11500	10833	12333	8660	11000	10400	11200	10867
Nickel (total)	µg/L	**25**	**25**	0.3	< 1.0	< 1.0	< 1.0	0.3	0.5	0.3	1.6	0.8
Phosphorus (total)	µg/L	**10-30**		17	30	**42**	23	23	28	11	17	19
Lead (total)	µg/L	**5**	**7**	0.24	0.57	1.37	< 0.50	0.35	1.38	0.46	**12.04**	4.63
Antimony (total)	µg/L	**20**		< 0.2	< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.13	< 2.0	< 2.0	< 2.0	0.10	0.11	0.19	0.10	0.13
Tin (total)	µg/L			< 0.01	< 1.0	< 1.0	< 1.0	0.12	0.09	0.07	< 0.06	0.07
Strontium (total)	µg/L			172	160	163	167	190	186	175	175	179
Titanium (total)	µg/L			-[1]	6.95	10.37	< 5.00	6.53	2.44	1.56	2.02	2.01
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.01	< 0.05	< 0.05	< 0.05	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (total)	µg/L	**5**	**15**	1.77	3.80	2.70	2.30	1.67	**7.01**	1.98	**97.06**	**35.35**
Vanadium (total)	µg/L	**6**		0.49	0.91	0.91	0.84	0.96	0.68	0.57	0.61	0.62
Zinc (total)	µg/L	**30**	**30**	2	< 5	< 5	< 5	3	3	< 2	< 2	< 2
Lead-210	Bq/L			< 0.02	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	0.02	< 0.02
Radium-226	Bq/L	**1**		0.02	< 0.04	0.05	< 0.04	0.03	0.02	0.01	0.19	0.07
Thorium-230	Bq/L			< 0.02	< 0.07	0.10	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.02	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	104.2	94.6	105.2	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	130.6	--	125.7	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	395.7	411.7	511	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	18.437	16.56	6.476	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	5.68	3.46	3.43	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	8.38	--	8.21	--
Staff Gauge	cm			-[2]	-[2]	-[2]	-[2]	-[2]	--	--	--	--

Note:
PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 75: Surface water quality – Lake Ontario Port Hope Harbour – Location 3 (PHH-4)

		Criteria		PHH-4								
				2016	2017	2018	2019	2020	2021			
Parameter	**Units**	**PWQO**	**CWQG**	**Average**					2021-06-16	2021-09-13	2021-11-03	**Average**
Total Suspended Solids	mg/L			2	1	2	2	3	2	< 2	3	2
pH	no unit	**6.5-8.5**	**6.5-9.0**	8.37	8.18	8.34	8.31	8.15	8.07	8.19	7.86	8.04
Alkalinity	mg/L as $CaCO_3$			126	94	144	122	96	92	93	93	93
Carbonate	mg/L as $CaCO_3$			4.5	1.3	3.4	2.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			123	93	143	118	96	92	93	93	93
Total Dissolved Solids	mg/L			193	255	158	185	180	131	171	151	151
Fluoride	mg/L		**0.12**	0.11	**0.13**	0.11	< 0.10	0.11	**0.12**	**0.12**	**0.12**	**0.12**
Total Organic Carbon	mg/L			1.3	2.3	2.6	2.4	1.5	2.0	2.0	2.0	2.0
Ammonia+Ammonium (N)	as N mg/L			0.06	< 0.05	< 0.05	0.05	0.05	< 0.04	< 0.04	< 0.04	< 0.04
Chloride (Dissolved)	mg/L		**120**	21	22	20	21	24	27	23	24	25
Sulphate (dissolved)	mg/L			21	23	19	20	21	23	22	22	22
Bromide (dissolved)	mg/L			< 0.3	< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.03	< 0.01	< 0.01	0.01	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L		**13**	0.35	0.20	0.50	0.36	0.29	0.30	0.25	0.38	0.31
Nitrate + Nitrite (as N)	as N mg/L			0.35	0.20	0.50	0.36	0.29	0.30	0.25	0.38	0.31
Mercury (dissolved)	µg/L	**0.2**	**0.026**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			159	120	165	160	126	123	122	144	130
Silver (total)	µg/L	**0.1**	**0.25**	< 0.002	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			16	20	26	76	45	3	4	65	24
Aluminum (0.2µm)	µg/L	**75**	**100**	-[1]	< 5.0	< 5.0	< 5.3	4.5	3.0	< 1.0	2.0	2.0
Arsenic (total)	µg/L	**100**	**5**	0.8	< 1.0	< 1.0	1.0	0.9	0.9	0.7	0.9	0.8
Barium (total)	µg/L			34.1	21.5	36.0	27.7	25.6	22.0	21.3	24.8	22.7
Beryllium (total)	µg/L	**1100**		< 0.01	< 0.5	< 0.5	< 0.5	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	**200**	**1500**	25	21	19	21	22	25	33	20	26
Bismuth (total)	µg/L			< 0.01	< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010	< 0.010
Calcium (total)	µg/L			47000	32500	45500	45333	36550	34100	35100	43100	37433
Cadmium (total)	µg/L	**0.2**	**0.09**	0.01	< **0.1**	< **0.1**	< **0.1**	0.005	0.010	0.006	0.007	0.008
Cobalt (total)	µg/L	**0.9**		0.157	< 0.500	< 0.500	< 0.500	0.036	0.009	0.004	0.039	0.017
Chromium (total)	µg/L			0.49	< 5.0	< 5.0	< 5.0	0.74	0.26	0.26	0.28	0.27
Copper (total)	µg/L	**5**		0.9	1.6	1.1	< 1.1	0.9	1.0	0.6	0.9	0.8
Iron (total)	µg/L	**300**	**300**	47	< 100	105	< 163	49	< 7	< 7	79	31
Potassium (total)	µg/L			1415	1500	1200	1400	1635	1650	1520	1980	1717
Magnesium (total)	µg/L			9985	8500	9100	9100	8295	9150	8470	8940	8853
Manganese (total)	µg/L			10.0	< 2.0	13.0	12.3	2.8	0.6	0.4	4.5	1.8
Molybdenum (total)	µg/L	**40**	**73**	1.43	1.10	0.75	0.93	1.86	1.32	1.37	1.57	1.42
Sodium (total)	µg/L			12100	13500	11500	13333	12200	13800	13500	14900	14067
Nickel (total)	µg/L	**25**	**25**	0.5	< 1.0	< 1.0	< 1.0	0.6	0.6	0.6	0.6	0.6
Phosphorus (total)	µg/L	**10-30**		**8**	**6**	**9**	10	**8**	10	< **3**	14	**9**
Lead (total)	µg/L	**5**	**7**	0.07	< 0.50	< 0.50	< 0.50	0.06	< 0.09	< 0.09	0.10	0.09
Antimony (total)	µg/L	**20**		< 0.2	< 0.5	< 0.5	< 0.5	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.15	< 2.0	< 2.0	< 2.0	0.12	0.15	0.16	0.18	0.16
Tin (total)	µg/L			< 0.01	< 1.0	< 1.0	< 1.0	0.18	0.09	< 0.06	< 0.06	0.07
Strontium (total)	µg/L			181	160	160	163	205	191	182	198	190
Titanium (total)	µg/L			-[1]	< 5.00	5.20	< 5.00	1.87	0.18	0.20	3.04	1.14
Thallium (total)	µg/L	**0.3**	**0.8**	0.01	< 0.05	< 0.05	< 0.05	0.006	< 0.005	< 0.005	0.006	0.005
Uranium (total)	µg/L	**5**	**15**	0.66	0.35	0.62	0.45	0.40	0.40	0.31	0.46	0.39
Vanadium (total)	µg/L	**6**		0.36	< 0.50	0.54	0.77	0.46	0.20	0.19	0.39	0.26
Zinc (total)	µg/L	**30**	**30**	< 2	< 5	< 5	< 5	< 2	< 2	< 2	< 2	< 2
Lead-210	Bq/L			< 0.02	0.11	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**1**		0.01	< 0.04	< 0.04	< 0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L			< 0.02	< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.02	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	98	100.6	102.4	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	128.1	--	119.9	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	313.6	301.5	307.1	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	9.468	15.84	7.819	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	1.48	0.36	5.11	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	8.63	--	8.02	--
Staff Gauge	cm			-[2]	-[2]	-[2]	-[2]	-[2]	--	--	--	--

Note:
PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 76: Surface water quality – Lake Ontario Port Hope Harbour – During Dredging Activities (PHH-1a)

		Criteria		PHH-1a																
Analysis	**Units**	**PWQO**	**CWQG**	2021-06-30	2021-07-16[1]	2021-07-09[1]	2021-07-23[1]	2021-08-05	2021-09-16	2021-09-21	2021-09-29	2021-10-13	2021-10-18	2021-10-28	2021-11-03	2021-11-09	2021-11-15	2021-11-23	2021-11-29
Total Suspended Solids	mg/L			13	No Sample	No Sample	No Sample	25	3	6	12	5	8	4	< 2	2	10	4	10
Hardness	mg/L as $CaCO_3$			--				222	201	190	206	225	272	274	255	249	250	261	242
Silver (total)	µg/L	**0.1**	**0.25**	< 0.05				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (total)	µg/L			102				181	82	48	110	53	123	46	32	29	105	36	97
Arsenic (total)	µg/L	**100**	**5**	0.7				0.6	0.6	0.5	0.5	0.4	0.5	0.3	0.3	0.4	0.5	0.3	0.4
Barium (total)	µg/L			60.3				70.8	63.9	59.4	63.4	66.6	64.5	58.2	58.0	62.4	57.9	61.4	58.7
Beryllium (total)	µg/L	**1100**		< 0.007				< 0.007	< 0.007	< 0.007	0.008	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	**200**	**1500**	21				15	18	16	22	23	20	15	11	18	24	25	11
Bismuth (total)	µg/L			0.01				< 0.01	0.03	0.02	< 0.01	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.04	0.06
Calcium (total)	µg/L			66200				68800	61100	58700	66200	71200	91700	91400	84600	80000	82000	84600	77900
Cadmium (total)	µg/L	**0.2**	**0.09**	0.006				0.010	0.005	< 0.003	0.015	0.005	0.007	< 0.003	< 0.003	0.011	0.006	0.003	< 0.003
Cobalt (total)	µg/L	**0.9**		0.083				0.130	0.084	0.045	0.105	0.060	0.088	0.067	0.046	0.096	0.088	0.059	0.072
Chromium (total)	µg/L			0.52				1.26	0.55	0.24	0.40	0.35	0.44	0.18	0.30	0.30	0.54	0.48	0.44
Copper (total)	µg/L	**5**		0.5				1.0	0.4	0.3	0.5	0.5	0.5	0.4	0.3	0.8	0.5	0.7	0.3
Iron (total)	µg/L	**300**	**300**	201				**389**	180	123	223	129	206	143	127	169	200	149	161
Potassium (total)	µg/L			1240				1060	1180	1040	1190	1350	1950	1570	1390	1180	1890	1330	1160
Magnesium (total)	µg/L			11400				12300	11600	10500	10000	11300	10400	11200	10600	11900	11100	12100	11500
Manganese (total)	µg/L			26.0				35.2	21.9	15.6	25.4	15.6	23.2	17.8	17.1	24.2	26.1	20.6	22.9
Molybdenum (total)	µg/L	**40**	**73**	0.51				0.42	0.50	0.43	0.68	0.45	0.38	0.36	0.45	0.44	0.34	0.42	0.46
Sodium (total)	µg/L			9340				9870	8940	8020	12500	10900	11800	13100	11000	11000	13800	15400	23800
Nickel (total)	µg/L	**25**	**25**	0.2				0.7	0.2	0.3	0.2	0.4	0.3	0.3	0.1	< 0.1	0.3	0.5	< 0.1
Phosphorus (total)	µg/L	**10-30**		28				**50**	**33**	22	**33**	14	**33**	**6**	14	15	25	12	**8**
Lead (total)	µg/L	**5**	**7**	0.70				0.91	0.83	0.23	0.34	0.20	0.18	0.10	< 0.09	0.25	0.16	0.09	0.19
Antimony (total)	µg/L	**20**		< 0.9				< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Selenium (total)	µg/L	**100**	**1**	0.10				0.12	0.08	0.08	0.17	0.11	0.13	0.11	0.13	0.10	0.14	0.09	0.13
Tin (total)	µg/L			0.11				0.17	0.07	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.06	< 0.06	< 0.06	< 0.06
Strontium (total)	µg/L			180				181	175	173	166	203	213	207	191	201	186	199	199
Titanium (total)	µg/L			5.15				8.79	3.84	2.36	7.15	2.00	5.42	5.08	1.48	1.40	6.34	2.41	2.36
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.005				< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (total)	µg/L	**5**	**15**	0.67				0.64	0.71	0.82	0.81	0.88	0.78	0.88	0.74	0.79	0.98	1.05	0.97
Vanadium (total)	µg/L	**6**		1.0				0.96	0.85	0.59	0.85	0.72	0.84	0.65	0.47	0.43	0.65	0.46	0.40
Zinc (total)	µg/L	**30**	**30**	14				6	2	2	< 2	< 2	3	2	< 2	12	< 2	3	< 2
Radium-226	Bq/L	**1**		< 0.005				0.009	< 0.005	< 0.005	< 0.005	0.019	< 0.005	< 0.005	< 0.010	0.027	< 0.005	< 0.005	< 0.005

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] No Sample due to logistical isssues

Table 77: Surface water quality – Lake Ontario Port Hope Harbour – During Dredging Activities (PHH-2a)

		Criteria		PHH-2a																
Analysis	**Units**	**PWQO**	**CWQG**	2021-06-16[2]	2021-07-09[1,2]	2021-07-16[1,2]	2021-07-23[1,2]	2021-08-05[2]	2021-09-16	2021-09-21	2021-09-29	2021-10-13	2021-10-18	2021-10-28	2021-11-03	2021-11-09	2021-11-15	2021-11-23	2021-11-29
Total Suspended Solids	mg/L			66	No Sample	No Sample	No Sample	14	7	22	8	5	6	10	3	3	21	5	7
Hardness	mg/L as $CaCO_3$			--				211	175	167	208	236	276	220	230	258	254	257	252
Silver (total)	µg/L	**0.1**	**0.25**	< 0.05				< 0.05	< 0.05	< 0.05	< 0.05	0.05	< 0.05	< 0.05	0.09	< 0.05	< 0.05	< 0.05	0.09
Aluminum (total)	µg/L			199				115	63	185	81	89	104	70	41	34	143	72	95
Arsenic (total)	µg/L	**100**	**5**	**7.1**				**78.4**	**5.3**	4.6	**5.7**	**22.2**	**20.2**	2.8	**17.4**	**21.8**	**13.7**	**39.2**	**29.2**
Barium (total)	µg/L			76.8				67.0	50.6	50.1	63.9	68.0	66.9	45.3	55.2	62.8	59.0	63.0	62.2
Beryllium (total)	µg/L	**1100**		0.010				< 0.007	< 0.007	0.010	< 0.007	0.009	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Boron (total)	µg/L	**200**	**1500**	33				25	20	22	24	24	20	16	13	15	23	28	10
Bismuth (total)	µg/L			0.11				2.64	0.51	0.33	0.56	1.55	0.69	0.15	1.07	1.98	0.34	1.63	2.09
Calcium (total)	µg/L			66300				65400	52700	51600	66600	75100	94000	70900	75700	83000	82900	82900	80600
Cadmium (total)	µg/L	**0.2**	**0.09**	0.013				0.005	0.004	0.007	0.013	< 0.003	0.006	< 0.003	0.005	0.011	0.007	0.006	0.006
Cobalt (total)	µg/L	**0.9**		0.242				**1.420**	0.253	0.252	0.340	0.661	0.368	0.146	0.771	**0.923**	0.393	**1.280**	**1.090**
Chromium (total)	µg/L			0.60				0.59	0.40	0.51	0.52	0.18	0.54	0.30	0.25	0.39	0.79	0.39	0.47
Copper (total)	µg/L	**5**		1.2				4.5	1.1	1.1	1.2	1.6	1.2	0.8	2.0	2.0	1.0	3.0	2.4
Iron (total)	µg/L	**300**	**300**	**434**				290	142	**322**	182	161	198	165	133	193	239	168	183
Potassium (total)	µg/L			1580				1650	1290	1340	1330	1410	2110	1580	1340	1280	1990	1380	1260
Magnesium (total)	µg/L			11600				11600	10600	9370	10200	11800	10100	10500	9970	12300	11400	12100	12200
Manganese (total)	µg/L			83.6				41.8	18.3	32.3	25.1	22.6	26.4	17.8	18.5	29.1	29.8	25.9	28.8
Molybdenum (total)	µg/L	**40**	**73**	0.70				1.06	0.75	0.74	0.66	0.75	0.58	0.80	0.68	0.65	0.50	0.76	0.73
Sodium (total)	µg/L			11200				13600	9970	9860	13200	11600	11700	12900	11200	11800	14200	15600	25600
Nickel (total)	µg/L	**25**	**25**	0.7				3.7	0.7	0.7	0.9	1.4	1.1	0.7	1.6	1.6	1.0	2.7	1.6
Phosphorus (total)	µg/L	**10-30**		**58**				24	16	**49**	**34**	**36**	**36**	15	17	19	28	18	26
Lead (total)	µg/L	**5**	**7**	2.40				**20.7**	3.0	2.8	**5.7**	**10.5**	**5.4**	2.3	**12.0**	**19.1**	4.9	**24.5**	**32.2**
Antimony (total)	µg/L	**20**		< 0.9				1.1	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	1.1	1.0
Selenium (total)	µg/L	**100**	**1**	0.13				0.12	0.12	0.11	0.09	0.07	0.15	0.11	0.10	0.09	0.20	0.09	0.09
Tin (total)	µg/L			0.08				0.13	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.07	< 0.06	< 0.06	< 0.06
Strontium (total)	µg/L			203				194	173	182	173	209	216	197	175	213	191	196	195
Titanium (total)	µg/L			8.32				6.02	3.14	9.12	3.84	3.76	4.55	3.55	2.02	1.74	7.27	2.41	2.35
Thallium (total)	µg/L	**0.3**	**0.8**	< 0.005				0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (total)	µg/L	**5**	**15**	**6.26**				**222**	**6.68**	**8.44**	**26.5**	**60.9**	**53.8**	**8.2**	**97.06**	**101**	**74.3**	**220**	**147**
Vanadium (total)	µg/L	**6**		1.16				1.19	0.66	0.80	0.83	0.94	0.93	0.53	0.61	0.56	0.79	0.80	0.55
Zinc (total)	µg/L	**30**	**30**	5				5	3	3	2	< 2	< 2	3	< 2	11	< 2	2	< 2
Radium-226	Bq/L	**1**		0.045				0.462	< 0.005	0.010	0.136	0.282	0.680	0.047	0.190	0.291	0.154	0.510	0.492

PWQO = Provincial Water Quality Objectives, Ministry of the Environment
CWQG= Canadian Water Quality Guidelines for Protection of Aquatic Life
Bold values indicate an exceedance of a PWQO or CWQG value
[1] No Sample due to logistical issues
[2] Sample location PHH-2

Appendix C PORT HOPE GROUNDWATER MONITORING RESULTS

Table 78: WC-IW93-22

		Criteria		WC-IW93-22							
		COPC	Table 3	2016	2017	2018	2019	2020	2021		
Parameter	**Units**			Average					2021-05-19	2021-12-14	**Average**
pH	pH			8.14	8.26	8.24	8.23	8.30	8.33	8.36	8.35
Alkalinity	mg/L as $CaCO_3$			97	100	100	98	99	100	105	103
Carbonate	mg/L as $CaCO_3$			1.7	1.7	1.6	1.6	1.5	2.0	2.0	2.0
Bicarbonate	mg/L as $CaCO_3$			96	98	99	96	98	98	103	101
Total Dissolved Solids	mg/L			91	131	78	80	127	134	106	120
Fluoride	mg/L	**1.5**		0.33	0.33	0.30	0.32	0.33	0.32	0.34	0.33
Total Organic Carbon	mg/L			0.87	0.49	0.57	0.62	< 1.00	1.0	< 1.0	1.0
Dissolved Organic Carbon	mg/L			0.53	0.43	0.52	0.59	< 1.00	1.0	< 1.0	1.0
Ammonia+Ammonium (N)	as N mg/L			0.26	0.16	0.26	0.20	0.18	0.19	0.21	0.20
Chloride (dissolved)	mg/L			0.8	< 1.0	< 1.0	< 1.0	0.6	0.50	0.60	0.55
Sulphate (dissolved)	mg/L			9.0	8.9	9.1	9.2	9.8	10	11	10
Bromide (dissolved)	mg/L			1.3	< 1.0	< 1.0	< 1.0	< 0.3	< 0.30	< 0.30	< 0.30
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	< 0.010	0.012	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	0.06	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			75	76	75	75	78	83.5	86.2	84.9
Silver (dissolved)	µg/L		**1.5**	0.05	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			3.0	< 5.0	< 5.0	< 5.0	4.0	1	3	2
Arsenic (dissolved)	µg/L	**25**	**1900**	1.4	1.3	1.4	1.3	1.6	1.4	1.5	1.5
Barium (dissolved)	µg/L	**1000**	**29000**	51	52	54	54	57	58.5	57.0	57.8
Beryllium (dissolved)	µg/L		**67**	0.25	< 0.50	< 0.50	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	73	70	73	73	70	73	55	64
Bismuth (dissolved)	µg/L			0.5	< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			11450	12000	12000	12000	13400	13600	12900	13250
Cadmium (dissolved)	µg/L	**5**	**2.7**	0.05	< 0.10	< 0.10	< 0.10	< 0.00	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		**66**	0.50	< 0.50	< 0.50	< 0.50	0.01	0.009	0.031	0.020
Chromium (dissolved)	µg/L		**810**	2.7	< 5.0	< 5.0	< 5.0	0.4	0.2	0.3	0.3
Copper (dissolved)	µg/L	**1000**	**87**	0.3	< 1.0	< 1.0	< 1.0	< 0.2	< 0.20	0.30	0.25
Iron (dissolved)	µg/L			71	< 100	< 100	< 100	33	29	36	33
Potassium (dissolved)	µg/L			620	595	610	580	612	619	617	618
Magnesium (dissolved)	µg/L			11100	11500	11000	11000	11300	11800	11400	11600
Manganese (dissolved)	µg/L			1.8	< 2.0	< 2.0	< 2.0	1.8	1.44	1.54	1.49
Molybdenum (dissolved)	µg/L		**9200**	1.8	1.8	1.9	1.9	1.8	1.80	2.00	1.90
Sodium (dissolved)	µg/L			14100	15000	14000	14000	14000	15000	14900	14950
Nickel (dissolved)	µg/L		**490**	0.6	< 1.0	< 1.0	< 1.0	< 0.1	< 0.10	< 0.10	< 0.10
Phosphorus (dissolved)	µg/L			19	11	9	8	3	< 3	< 3	< 3
Lead (dissolved)	µg/L	**10**	**25**	0.26	< 0.50	< 0.50	< 0.50	0.01	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	0.35	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	1.0	< 2.0	< 2.0	< 2.0	< 0.0	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L			0.6	< 1.0	< 1.0	< 1.0	< 0.1	< 0.06	0.08	0.07
Strontium (dissolved)	µg/L			494	480	490	490	589	572	453	513
Titanium (dissolved)	µg/L			2.5	< 5.0	< 5.0	< 5.0	0.1	< 0.05	< 0.05	< 0.05
Thallium (dissolved)	µg/L		**510**	0.028	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	0.06	< 0.10	< 0.10	< 0.10	0.03	0.065	0.006	0.036
Vanadium (dissolved)	µg/L		**250**	0.26	< 0.50	< 0.50	< 0.50	0.01	< 0.01	0.05	0.03
Zinc (dissolved)	µg/L		**1100**	3.5	< 5.0	< 5.0	< 5.0	< 2.0	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	**0.20**		< 0.02	0.06	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		0.03	< 0.03	< 0.04	< 0.04	0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		< 0.01	< 0.04	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		-[1]	-[1]	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	32.1	31.6	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	71.6	--	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	229.4	208.9	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	10.747	9.157	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	5.73	10.21	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	8.57	--	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 79: WC-MW1-02

		Criteria		WC-MW1-02					
		COPC	Table 3	2016	2017	2018	2019	2020	2021
Parameter	**Units**			Average			No Sample		
pH	pH			8.27	8.26	8.31	Well Damaged		
Alkalinity	mg/L as $CaCO_3$			155	160	200			
Carbonate	mg/L as $CaCO_3$			5.4	2.7	3.8			
Bicarbonate	mg/L as $CaCO_3$			146	155	200			
Total Dissolved Solids	mg/L			195	197	200			
Fluoride	mg/L	**1.5**		0.80	0.68	0.76			
Total Organic Carbon	mg/L			1.67	1.08	1.10			
Dissolved Organic Carbon	mg/L			0.83	0.83	0.78			
Ammonia+Ammonium (N)	as N mg/L			0.57	0.63	0.60			
Chloride (dissolved)	mg/L			7.9	8.8	8.1			
Sulphate (dissolved)	mg/L			10.0	9.9	9.3			
Bromide (dissolved)	mg/L			0.7	< 1.0	< 1.0			
Nitrite (as N)	as N mg/L			0.010	< 0.010	< 0.010			
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10			
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10			
Mercury (dissolved)	µg/L	**1**	**0.29**	0.06	< 0.10	< 0.10			
Hardness	mg/L as $CaCO_3$			59	59	54			
Silver (dissolved)	µg/L		**1.5**	0.05	< 0.10	< 0.10			
Aluminum (dissolved)	µg/L			7.5	44.5	16.0			
Arsenic (dissolved)	µg/L	**25**	**1900**	0.6	< 1.0	< 1.0			
Barium (dissolved)	µg/L	**1000**	**29000**	93	78	81			
Beryllium (dissolved)	µg/L		**67**	0.25	< 0.50	< 0.50			
Boron (dissolved)	µg/L	**5000**	**45000**	270	270	250			
Bismuth (dissolved)	µg/L			0.5	< 1.0	< 1.0			
Calcium (dissolved)	µg/L			11500	12000	11000			
Cadmium (dissolved)	µg/L	**5**	**2.7**	0.05	< 0.10	< 0.10			
Cobalt (dissolved)	µg/L		**66**	0.54	< 0.50	< 0.50			
Chromium (dissolved)	µg/L		**810**	2.7	< 5.0	< 5.0			
Copper (dissolved)	µg/L	**1000**	**87**	0.3	< 1.0	< 1.0			
Iron (dissolved)	µg/L			54	< 100	< 100			
Potassium (dissolved)	µg/L			2920	2550	2600			
Magnesium (dissolved)	µg/L			7255	6800	6500			
Manganese (dissolved)	µg/L			1.7	6.3	2.9			
Molybdenum (dissolved)	µg/L		**9200**	2.4	2.2	2.2			
Sodium (dissolved)	µg/L			49950	49500	47000			
Nickel (dissolved)	µg/L		**490**	0.6	< 1.0	< 1.0			
Phosphorus (dissolved)	µg/L			67	270	160			
Lead (dissolved)	µg/L	**10**	**25**	0.26	< 0.50	< 0.50			
Antimony (dissolved)	µg/L	**6**	**20000**	0.35	< 0.50	< 0.50			
Selenium (dissolved)	µg/L	**10**	**63**	1.1	< 2.0	< 2.0			
Tin (dissolved)	µg/L			0.5	< 1.0	< 1.0			
Strontium (dissolved)	µg/L			894	760	770			
Titanium (dissolved)	µg/L			2.5	< 5.0	< 5.0			
Thallium (dissolved)	µg/L		**510**	0.028	< 0.050	< 0.050			
Uranium (dissolved)	µg/L	**20**	**420**	0.06	0.14	< 0.10			
Vanadium (dissolved)	µg/L		**250**	0.26	< 0.50	< 0.50			
Zinc (dissolved)	µg/L		**1100**	3.5	< 5.0	< 5.0			
Lead-210	Bq/L	**0.20**		< 0.02	< 0.02	< 0.10			
Radium-226	Bq/L	**0.49**		0.030	< 0.040	< 0.040			
Thorium-230	Bq/L	**0.65**		< 0.010	< 0.070	< 0.070			
Thorium-232	Bq/L	**0.60**		-[1]	< 0.060	< 0.060			
Field Parameters									
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	--	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	--	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	--	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	--	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	--	--
pH	Units			-[2]	-[2]	-[2]	-[2]	--	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 80: WC-MW1-03

		Criteria		WC-MW1-03							
		COPC	Table 3	2016	2017	2018	2019	2020	2021		
Parameter	**Units**			Average					2021-05-18	2021-11-26	**Average**
pH	pH			7.94	7.90	7.62	7.70	7.52	7.28	7.20	7.24
Alkalinity	mg/L as $CaCO_3$			494	430	450	400	460	389	409	399
Carbonate	mg/L as $CaCO_3$			3.0	3.2	1.8	2.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			494	425	450	400	460	389	409	399
Total Dissolved Solids	mg/L			595	496	678	648	715	900	751	826
Fluoride	mg/L	**1.5**		0.25	0.24	0.21	0.19	0.25	0.20	0.21	0.21
Total Organic Carbon	mg/L			8.6	9.0	3.7	4.2	2.5	3.0	3.0	3.0
Dissolved Organic Carbon	mg/L			2.9	3.4	2.7	2.3	2.5	3.0	3.0	3.0
Ammonia+Ammonium (N)	as N mg/L			< 0.05	0.11	0.09	0.09	0.06	< 0.04	0.04	0.04
Chloride (dissolved)	mg/L			43	51	61	85	115	150	180	165
Sulphate (dissolved)	mg/L			30	16	71	67	104	95	56	76
Bromide (dissolved)	mg/L			0.7	< 1.0	< 1.0	< 1.0	0.3	0.40	1.00	0.70
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	< 0.010	< 0.010	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	0.07	0.07
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	0.07	0.07
Mercury (dissolved)	µg/L	**1**	**0.29**	0.06	< 0.10	< 0.10	< 0.10	0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			520	455	560	540	524	621	609	615
Silver (dissolved)	µg/L		**1.5**	0.05	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			3.0	132.5	< 31.0	< 5.0	1.5	2.0	1.0	1.5
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	1.2	1.3	1.2	0.9	1.2	0.8	1.0
Barium (dissolved)	µg/L	**1000**	**29000**	119	115	140	160	140	161	171	166
Beryllium (dissolved)	µg/L		**67**	0.25	< 0.50	< 0.50	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	45	26	38	29	24	21	29	25
Bismuth (dissolved)	µg/L			0.5	< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			133000	130000	160000	155000	111100	178000	186000	182000
Cadmium (dissolved)	µg/L	**5**	**2.7**	0.05	< 0.10	< 0.10	< 0.10	0.00	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		**66**	1.13	0.62	0.87	< 0.50	0.15	0.676	0.189	0.433
Chromium (dissolved)	µg/L		**810**	2.7	< 5.0	< 5.0	< 5.0	0.4	0.2	0.1	0.16
Copper (dissolved)	µg/L	**1000**	**87**	0.3	< 1.0	< 1.0	< 1.0	0.4	0.50	< 0.20	0.35
Iron (dissolved)	µg/L			224	750	1510	560	25	1670	2520	2095
Potassium (dissolved)	µg/L			2130	1030	1500	2200	2135	1750	1860	1805
Magnesium (dissolved)	µg/L			44400	32000	38500	37500	25200	40400	37600	39000
Manganese (dissolved)	µg/L			88	94	127	145	35	128	278.00	203.00
Molybdenum (dissolved)	µg/L		**9200**	8.5	5.4	1.9	3.7	10.0	3.9	2.5	3.2
Sodium (dissolved)	µg/L			31700	33000	33500	36000	29350	37600	39200	38400
Nickel (dissolved)	µg/L		**490**	1.8	1.7	1.4	< 1.0	0.6	1.6	0.6	1.1
Phosphorus (dissolved)	µg/L			120	1450	185	182	< 3	14	23	19
Lead (dissolved)	µg/L	**10**	**25**	0.26	0.51	< 0.50	< 0.50	0.02	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	0.35	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	1.0	< 2.0	< 2.0	< 2.0	0.0	0.06	0.08	0.07
Tin (dissolved)	µg/L			0.5	< 1.0	< 1.0	< 1.0	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			784	550	670	755	762	1080	1130	1105
Titanium (dissolved)	µg/L			2.5	7.5	< 5.0	< 5.0	0.1	0.14	< 0.05	0.10
Thallium (dissolved)	µg/L		**510**	0.028	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	9.0	7.6	4.2	4.9	5.6	6.7	3.4	5.1
Vanadium (dissolved)	µg/L		**250**	1.2	0.8	< 0.5	1.0	1.2	0.14	0.17	0.16
Zinc (dissolved)	µg/L		**1100**	4.0	< 5.0	< 5.0	< 5.0	3.0	2.0	< 2.0	2.0
Lead-210	Bq/L	**0.20**		< 0.02	0.05	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.01	< 0.04	< 0.04	< 0.04	0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		< 0.01	< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		-[1]	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	25.6	39.6	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	-71.8	-52.0	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	1215	1384.0	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	10.275	9.323	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	67.22	23.82	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	7.22	6.97	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 81: WC-MW2-02

		Criteria		WC-MW2-02					
		COPC	Table 3	2016	2017	2018	2019	2020	2021
Parameter	**Units**			WELL NOT FOUND					
pH	pH								
Alkalinity	mg/L as $CaCO_3$								
Carbonate	mg/L as $CaCO_3$								
Bicarbonate	mg/L as $CaCO_3$								
Total Dissolved Solids	mg/L								
Fluoride	mg/L	1.5							
Total Organic Carbon	mg/L								
Dissolved Organic Carbon	mg/L								
Ammonia+Ammonium (N)	as N mg/L								
Chloride (dissolved)	mg/L								
Sulphate (dissolved)	mg/L								
Bromide (dissolved)	mg/L								
Nitrite (as N)	as N mg/L								
Nitrate (as N)	as N mg/L								
Nitrate + Nitrite (as N)	as N mg/L								
Mercury (dissolved)	µg/L	1	0.29						
Hardness	mg/L as $CaCO_3$								
Silver (dissolved)	µg/L		1.5						
Aluminum (dissolved)	µg/L								
Arsenic (dissolved)	µg/L	25	1900						
Barium (dissolved)	µg/L	1000	29000						
Beryllium (dissolved)	µg/L		67						
Boron (dissolved)	µg/L	5000	45000						
Bismuth (dissolved)	µg/L								
Calcium (dissolved)	µg/L								
Cadmium (dissolved)	µg/L	5	2.7						
Cobalt (dissolved)	µg/L		66						
Chromium (dissolved)	µg/L		810						
Copper (dissolved)	µg/L	1000	87						
Iron (dissolved)	µg/L								
Potassium (dissolved)	µg/L								
Magnesium (dissolved)	µg/L								
Manganese (dissolved)	µg/L								
Molybdenum (dissolved)	µg/L		9200						
Sodium (dissolved)	µg/L								
Nickel (dissolved)	µg/L		490						
Phosphorus (dissolved)	µg/L								
Lead (dissolved)	µg/L	10	25						
Antimony (dissolved)	µg/L	6	20000						
Selenium (dissolved)	µg/L	10	63						
Tin (dissolved)	µg/L								
Strontium (dissolved)	µg/L								
Titanium (dissolved)	µg/L								
Thallium (dissolved)	µg/L		510						
Uranium (dissolved)	µg/L	20	420						
Vanadium (dissolved)	µg/L		250						
Zinc (dissolved)	µg/L		1100						
Lead-210	Bq/L	0.20							
Radium-226	Bq/L	0.49							
Thorium-230	Bq/L	0.65							
Thorium-232	Bq/L	0.60							
Field Parameters									
ODO % Sat	%								
ORP	mV								
SPC	µs/cm								
Temperature	°C								
Turbidity	FNU								
pH	Units								

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Table 82: WC-MW3A-11R

		Criteria		WC-MW3A-11R[3]								
		COPC	Table 3	2015	2016	2017	2018	2019	2020	2021		
Parameter	**Units**			Average						2021-04-28	2021-12-17	**Average**
pH	pH			7.61	7.50	7.63	7.64	7.65	7.64	7.48	7.42	7.45
Alkalinity	mg/L as $CaCO_3$			142	123	130	140	145	152	150	160	155
Carbonate	mg/L as $CaCO_3$			< 2.0	1.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			142	123	130	140	145	152	150	160	155
Total Dissolved Solids	mg/L			3695	7445	7980	4210	4010	4885	4620	3950	4285
Fluoride	mg/L	**1.5**		0.37	0.28	0.28	0.29	0.37	0.49	0.46	0.57	0.52
Total Organic Carbon	mg/L			< 1.0	1.1	1.5	1.5	1.4	1.0	1.0	1.0	1.0
Dissolved Organic Carbon	mg/L			-[1]	0.95	0.90	1.23	0.87	1.00	1.0	1.0	1.0
Ammonia+Ammonium (N)	as N mg/L			-[1]	7.2	4.9	4.5	4.0	4.4	4.13	3.89	4.0
Chloride (dissolved)	mg/L			1900	4150	2800	2300	2050	2600	2700	2200	2450
Sulphate (dissolved)	mg/L			8	27	12	< 2	< 10	1	< 2	< 2	< 2
Bromide (dissolved)	mg/L			25	54	35	38	32	34	33	31	32
Nitrite (as N)	as N mg/L			-[1]	< 0.010	< 0.010	< 0.010	< 0.010	< 0.300	< 0.30	< 0.30	< 0.30
Nitrate (as N)	as N mg/L			-[1]	< 0.10	< 0.10	< 0.10	< 0.10	< 0.60	< 0.06	< 0.60	0.33
Nitrate + Nitrite (as N)	as N mg/L			-[1]	< 0.10	< 0.10	< 0.10	< 0.10	< 0.60	< 0.30	< 0.60	0.45
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.01	0.06	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			1178	3350	2300	1850	1600	2220	2120	2240	2180
Silver (dissolved)	µg/L		**1.5**	0.030	0.25	< 0.10	< 0.10	< 0.10	0.28	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			5	13	< 5	< 5	33	9	< 1	2	2
Arsenic (dissolved)	µg/L	**25**	**1900**	13.5	2.6	< 1.0	< 1.0	< 1.0	1.4	< 0.2	< 0.2	< 0.2
Barium (dissolved)	µg/L	**1000**	**29000**	**1615**	**6180**	**3550**	**2800**	**2650**	**3060**	**2990**	**3370**	**3180**
Beryllium (dissolved)	µg/L		**67**	< 0.01	1.25	< 0.50	< 0.50	< 0.50	0.04	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	217	457	440	380	455	453	418	449	434
Bismuth (dissolved)	µg/L			0.02	2.5	< 1.0	< 1.0	< 1.0	0.039	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			279000	706000	485000	390000	340000	513500	503000	651000	577000
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.003	0.25	< 0.10	< 0.10	< 0.10	0.02	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		**66**	0.32	2.53	< 0.50	< 0.50	< 0.50	0.04	0.05	0.10	0.07
Chromium (dissolved)	µg/L		**810**	0.06	12.7	< 5.0	< 5.0	< 5.0	0.6	1.0	0.2	0.6
Copper (dissolved)	µg/L	**1000**	**87**	2.8	1.3	< 1.0	< 1.0	< 1.0	1.1	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L			536	1155	800	440	520	656	675	771	723
Potassium (dissolved)	µg/L			18100	33900	26500	22000	19500	21100	19800	20900	20350
Magnesium (dissolved)	µg/L			159500	385000	270000	215000	180000	213500	192000	198000	195000
Manganese (dissolved)	µg/L			17	51	46	34	23	29	23.5	19.4	21
Molybdenum (dissolved)	µg/L		**9200**	1.9	1.8	0.7	0.5	< 0.5	0.5	0.1	0.3	0.2
Sodium (dissolved)	µg/L			600000	1106500	850000	665000	605000	636500	583000	628000	605500
Nickel (dissolved)	µg/L		**490**	2.6	2.6	< 1.0	< 1.0	< 1.0	0.6	< 0.1	0.2	0.2
Phosphorus (dissolved)	µg/L			75	56	81	34	56	17	10	23	17
Lead (dissolved)	µg/L	**10**	**25**	0.03	1.26	< 0.50	< 0.50	< 0.50	0.06	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	0.65	1.35	< 0.50	< 0.50	< 0.50	4.95	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	**57.0**	5.0	< 2.0	< 2.0	< 2.0	0.2	< 0.04	0.07	0.06
Tin (dissolved)	µg/L			0.12	2.6	< 1.0	< 1.0	< 1.0	0.3	< 0.06	0.10	0.08
Strontium (dissolved)	µg/L			22850	60350	42000	32500	31000	35350	37800	38000	37900
Titanium (dissolved)	µg/L			0.5	13	< 5.0	< 5.0	< 5.0	0.3	0.08	0.05	0.07
Thallium (dissolved)	µg/L		**510**	0.008	0.128	< 0.050	< 0.050	< 0.050	< 0.028	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	0.0	0.3	< 0.1	< 0.1	< 0.1	0.0	0.005	0.015	0.010
Vanadium (dissolved)	µg/L		**250**	0.1	2.6	0.5	< 0.5	< 0.5	0.2	0.23	0.12	0.18
Zinc (dissolved)	µg/L		**1100**	17.5	13.5	< 5.0	< 5.0	< 5.0	11.0	3.0	5.0	4.0
Lead-210	Bq/L	**0.20**		< 0.02	< 0.02	< 0.02	0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		0.04	0.10	0.11	< 0.04	0.07	0.02	0.04	0.10	0.07
Thorium-230	Bq/L	**0.65**		< 0.01	0.04	< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		-[1]	-[1]	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters												
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	19	37.8	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	-54	177.7	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	7213	5239.9	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	10.181	8.749	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	50.93	22.91	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	7.50	6.23	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.
[3] Installation took place in 2011 to replace WC-MW3A-02.

Table 83: WC-MW3B-02

		Criteria		WC-MW3B-02							
		COPC	Table 3	2016	2017	2018	2019	2020	2021		
Parameter	**Units**				Average				2021-04-29	2021-12-08	**Average**
pH	pH			**No Sample**	8.19	8.24	8.29	8.36	8.35	8.31	8.33
Alkalinity	mg/L as $CaCO_3$				120	140	150	383	169	480	325
Carbonate	mg/L as $CaCO_3$				1.8	2.3	2.8	2.5	3.0	< 1.0	2.0
Bicarbonate	mg/L as $CaCO_3$				120	140	145	381	165	480	323
Total Dissolved Solids	mg/L				--	480	480	280	140	475	308
Fluoride	mg/L	**1.5**			0.44	0.38	0.43	0.45	0.42	0.44	0.43
Total Organic Carbon	mg/L				--	1.9	9.2	1.0	1.0	1.0	1.0
Dissolved Organic Carbon	mg/L				--	0.75	1.35	1.00	1.0	1.0	1.0
Ammonia+Ammonium (N)	as N mg/L				--	0.230	0.062	0.055	< 0.04	0.07	0.06
Chloride (dissolved)	mg/L				2.5	2.1	4.3	2.9	2.1	2.4	2.3
Sulphate (dissolved)	mg/L				14	13	18	14	11	12	12
Bromide (dissolved)	mg/L				< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L				< 0.010	< 0.010	0.011	< 0.030	< 0.030	< 0.030	< 0.030
Nitrate (as N)	as N mg/L				< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	0.07	0.07
Nitrate + Nitrite (as N)	as N mg/L				< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	0.07	0.07
Mercury (dissolved)	µg/L	**1**	**0.29**		< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$				53	55	56	987	87	1310	699
Silver (dissolved)	µg/L		**1.5**		< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L				< 5.0	< 5.0	5.5	3.0	< 1.0	115	58
Arsenic (dissolved)	µg/L	**25**	**1900**		1.2	< 1.0	1.4	1.4	1.0	1.4	1.2
Barium (dissolved)	µg/L	**1000**	**29000**		34	39	34	30	28	32	30
Beryllium (dissolved)	µg/L		**67**		< 0.50	< 0.50	< 0.50	< 0.01	< 0.007	0.011	0.009
Boron (dissolved)	µg/L	**5000**	**45000**		97	98	110	100	94	87	91
Bismuth (dissolved)	µg/L				< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L				11000	12000	12400	16450	13500	18700	16100
Cadmium (dissolved)	µg/L	**5**	**2.7**		< 0.10	< 0.10	< 0.10	0.01	0.017	< 0.003	0.010
Cobalt (dissolved)	µg/L		**66**		< 0.50	< 0.50	< 0.50	0.04	0.004	0.218	0.111
Chromium (dissolved)	µg/L		**810**		< 5.0	< 5.0	< 5.0	0.3	0.2	0.4	0.3
Copper (dissolved)	µg/L	**1000**	**87**		< 1.0	< 1.0	3.6	0.4	0.2	0.2	0.2
Iron (dissolved)	µg/L				< 100	< 100	< 100	10	< 7	172	90
Potassium (dissolved)	µg/L				920	860	815	940	752	652	702
Magnesium (dissolved)	µg/L				6000	6300	5950	6200	6030	6710	6370
Manganese (dissolved)	µg/L				< 2.0	4.2	2.1	3.2	0.1	13.6	6.8
Molybdenum (dissolved)	µg/L		**9200**		9	8	13	6	5.70	7.32	6.51
Sodium (dissolved)	µg/L				37000	34000	36000	30950	30200	37900	34050
Nickel (dissolved)	µg/L		**490**		< 1.0	< 1.0	1.1	0.2	< 0.1	0.3	0.2
Phosphorus (dissolved)	µg/L				--	1700	2280	5	< 3	16	10
Lead (dissolved)	µg/L	**10**	**25**		< 0.50	< 0.50	< 0.50	0.02	< 0.09	0.17	0.13
Antimony (dissolved)	µg/L	**6**	**20000**		3.4	1.3	1.6	1.1	< 0.9	< 0.9	< 0.9
Selenium (dissolved)	µg/L	**10**	**63**		< 2.0	< 2.0	< 2.0	< 0.0	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L				< 1.0	< 1.0	< 1.0	0.4	0.13	0.13	0.13
Strontium (dissolved)	µg/L				340	370	350	398	373	367	370
Titanium (dissolved)	µg/L				< 5.0	< 5.0	< 5.0	0.3	0.09	7.34	3.72
Thallium (dissolved)	µg/L		**510**		< 0.050	< 0.050	< 0.050	< 0.005	0.005	< 0.005	0.005
Uranium (dissolved)	µg/L	**20**	**420**		0.49	0.45	0.71	0.31	0.19	0.44	0.32
Vanadium (dissolved)	µg/L		**250**		0.5	0.7	1.5	0.2	0.16	0.82	0.49
Zinc (dissolved)	µg/L		**1100**		< 5.0	< 5.0	5.3	2.5	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	**0.20**			0.03	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**			< 0.04	< 0.04	< 0.04	< 0.01	< 0.01	0.01	0.01
Thorium-230	Bq/L	**0.65**			< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**			< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[1]	-[1]	-[1]	-[1]	-[1]	54.9	58.4	--
ORP	mV			-[1]	-[1]	-[1]	-[1]	-[1]	83.6	--	--
SPC	µs/cm			-[1]	-[1]	-[1]	-[1]	-[1]	268.7	262.1	--
Temperature	°C			-[1]	-[1]	-[1]	-[1]	-[1]	9.893	7.232	--
Turbidity	FNU			-[1]	-[1]	-[1]	-[1]	-[1]	8027.2	2125.0	--
pH	Units			-[1]	-[1]	-[1]	-[1]	-[1]	8.79	--	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Field parameters included for current sampling year only.
-- - No data.

Table 84: WC-MW3C-02

		Criteria		WC-MW3C-02							
		COPC	Table 3	2016	2017	2018	2019	2020	2021		
Parameter	**Units**			Average					2021-04-29	2021-12-08	**Average**
pH	pH			8.17	8.19	8.23	8.21	7.95	7.83	8.03	7.93
Alkalinity	mg/L as $CaCO_3$			194	180	180	195	722	337	350	344
Carbonate	mg/L as $CaCO_3$			5.3	2.5	2.9	2.9	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			190	175	175	190	722	337	350	344
Total Dissolved Solids	mg/L			294	195	210	273	473	406	320	363
Fluoride	mg/L	**1.5**		0.38	0.29	0.26	0.30	0.25	0.24	0.24	0.24
Total Organic Carbon	mg/L			1.2	1.4	4.2	2.0	2.5	3.0	3.0	3.0
Dissolved Organic Carbon	mg/L			0.8	0.8	0.8	1.4	3.0	3.0	3.0	3.0
Ammonia+Ammonium (N)	as N mg/L			0.16	0.26	0.34	0.09	0.13	0.25	0.21	0.23
Chloride (dissolved)	mg/L			2.3	2.2	2.4	3.0	19.5	15	14	15
Sulphate (dissolved)	mg/L			29	25	24	25	22	20	21	21
Bromide (dissolved)	mg/L			0.7	< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.010	0.031	< 0.010	< 0.010	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L			0.16	< 0.10	< 0.10	< 0.11	0.12	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			0.16	< 0.10	< 0.10	< 0.11	0.13	0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	0.06	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			123	130	135	140	1675	1180	465	823
Silver (dissolved)	µg/L		**1.5**	0.05	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			4	< 5	< 5	< 5	22	9	3	6
Arsenic (dissolved)	µg/L	**25**	**1900**	6.1	4.4	4.4	3.0	4.3	4.0	1.8	2.9
Barium (dissolved)	µg/L	**1000**	**29000**	77	82	97	95	116	149	209	179
Beryllium (dissolved)	µg/L		**67**	0.25	< 0.50	< 0.50	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	43	48	38	38	44	42	38	40
Bismuth (dissolved)	µg/L			0.5	< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			18600	20000	19500	21000	26700	38800	52100	45450
Cadmium (dissolved)	µg/L	**5**	**2.7**	0.05	< 0.10	< 0.10	< 0.10	< 0.00	0.007	< 0.003	0.005
Cobalt (dissolved)	µg/L		**66**	0.51	< 0.50	< 0.50	< 0.50	0.07	0.130	0.179	0.155
Chromium (dissolved)	µg/L		**810**	2.7	< 5.0	< 5.0	< 5.0	0.4	0.2	0.1	0.2
Copper (dissolved)	µg/L	**1000**	**87**	0.3	< 1.0	< 1.0	< 1.0	0.3	1.5	< 0.2	0.9
Iron (dissolved)	µg/L			55	< 100	< 100	< 100	23	33	42	38
Potassium (dissolved)	µg/L			1410	1500	1350	1400	1565	1470	1870	1670
Magnesium (dissolved)	µg/L			18030	19500	20500	20500	22300	27600	35800	31700
Manganese (dissolved)	µg/L			1.7	5.9	5.9	3.7	3.3	8.2	15.5	11.9
Molybdenum (dissolved)	µg/L		**9200**	16.9	10.3	6.2	11.6	6.7	2.90	4.81	3.86
Sodium (dissolved)	µg/L			44150	34500	24500	35500	63900	66500	77200	71850
Nickel (dissolved)	µg/L		**490**	0.6	< 1.0	< 1.0	< 1.0	0.2	0.60	0.80	0.7
Phosphorus (dissolved)	µg/L			1	2	4	2	5	< 3	< 3	< 3
Lead (dissolved)	µg/L	**10**	**25**	0.26	< 0.50	< 0.50	< 0.50	< 0.01	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	0.50	0.80	< 0.50	0.55	< 0.90	< 0.90	< 0.90	< 0.9
Selenium (dissolved)	µg/L	**10**	**63**	1.0	< 2.0	< 2.0	< 2.0	0.1	0.05	< 0.04	0.05
Tin (dissolved)	µg/L			0.5	< 1.0	< 1.0	< 1.0	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			420	440	460	435	572	762	898	830
Titanium (dissolved)	µg/L			2.5	< 5.0	< 5.0	< 5.0	0.6	0.77	< 0.05	0.41
Thallium (dissolved)	µg/L		**510**	0.028	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	2.30	1.35	0.76	1.67	2.16	2.50	2.60	2.55
Vanadium (dissolved)	µg/L		**250**	1.7	1.1	0.6	1.7	1.0	1.13	1.57	1.35
Zinc (dissolved)	µg/L		**1100**	3.5	< 5.0	< 5.0	< 5.0	3.0	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	**0.20**		< 0.02	0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		0.025	< 0.040	< 0.040	< 0.040	0.025	0.01	0.01	0.01
Thorium-230	Bq/L	**0.65**		0.040	< 0.070	< 0.070	< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		-[1]	< 0.060	< 0.060	< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	64.2	43.5	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	119	--	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	611	574.9	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	10.297	7.762	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	640.04	766.2	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	7.90	--	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 85: WC-MW3D-02

		Criteria		WC-MW3D-02							
		COPC	Table 3	2016	2017	2018	2019	2020	2021		
Parameter	**Units**			Average					2021-04-29	2021-12-08	**Average**
pH	pH			8.08	8.24	8.11	8.00	7.71	7.44	7.68	7.56
Alkalinity	mg/L as $CaCO_3$			310	310	445	510	788	765	695	730
Carbonate	mg/L as $CaCO_3$			10.0	4.9	5.4	4.7	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			300	300	440	500	788	765	695	730
Total Dissolved Solids	mg/L			383	291	498	600	722	846	820	833
Fluoride	mg/L	**1.5**		0.31	0.29	0.23	0.19	0.18	0.17	0.15	0.16
Total Organic Carbon	mg/L			1.8	3.3	6.8	8.5	9.0	9.0	10.0	9.5
Dissolved Organic Carbon	mg/L			-[1]	2.4	5.9	7.6	8.5	9.0	10.0	9.5
Ammonia+Ammonium (N)	as N mg/L			-[1]	0.065	0.120	0.074	0.255	0.18	0.12	0.15
Chloride (dissolved)	mg/L			14	15	25	33	63	65	79	72
Sulphate (dissolved)	mg/L			32	23	18	14	16	15	17	16
Bromide (dissolved)	mg/L			0.3	< 1.0	< 1.0	< 1.0	0.8	0.8	0.9	0.9
Nitrite (as N)	as N mg/L			-[1]	< 0.010	< 0.010	< 0.010	< 0.030	< 0.03	< 0.03	< 0.030
Nitrate (as N)	as N mg/L			-[1]	0.13	0.17	0.17	0.26	0.18	0.31	0.25
Nitrate + Nitrite (as N)	as N mg/L			-[1]	0.13	0.17	0.17	0.26	0.18	0.31	0.25
Mercury (dissolved)	µg/L	**1**	**0.29**	0.06	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			157	160	240	285	1071	1450	660	1055
Silver (dissolved)	µg/L		**1.5**	0.05	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			3.0	26.5	< 5.0	< 5.0	8.5	< 1.0	< 1.0	< 1
Arsenic (dissolved)	µg/L	**25**	**1900**	4.5	4.4	3.4	2.8	4.6	1.6	1.9	1.8
Barium (dissolved)	µg/L	**1000**	**29000**	64	83	140	155	208	324	393	359
Beryllium (dissolved)	µg/L		**67**	0.25	< 0.50	< 0.50	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	47	53	48	51	53	54	53	54
Bismuth (dissolved)	µg/L			0.5	< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			20750	20500	31500	36500	56450	78600	96200	87400
Cadmium (dissolved)	µg/L	**5**	**2.7**	0.05	< 0.10	< 0.10	< 0.10	0.01	0.009	0.005	0.007
Cobalt (dissolved)	µg/L		**66**	0.52	< 0.50	< 0.50	< 0.50	0.22	0.440	0.576	0.508
Chromium (dissolved)	µg/L		**810**	2.7	< 5.0	< 5.0	< 5.0	0.3	0.3	0.2	0.2
Copper (dissolved)	µg/L	**1000**	**87**	0.3	< 1.0	< 1.0	< 1.0	0.2	0.4	0.6	0.5
Iron (dissolved)	µg/L			58	< 100	< 100	< 100	158	22	12	17
Potassium (dissolved)	µg/L			1939	1950	2300	2450	3120	3110	3420	3265
Magnesium (dissolved)	µg/L			25400	26500	39500	47000	62350	81000	94600	87800
Manganese (dissolved)	µg/L			1.4	10.1	8.9	17.7	19.6	13.0	11.9	12.5
Molybdenum (dissolved)	µg/L		**9200**	9.5	6.2	4.9	5.0	5.1	3.9	4.8	4.4
Sodium (dissolved)	µg/L			75850	87500	97500	120000	110300	90400	97200	93800
Nickel (dissolved)	µg/L		**490**	0.7	< 1.0	< 1.0	< 1.1	1.0	1.8	1.9	1.9
Phosphorus (dissolved)	µg/L			450	256	350	665	32	< 3	< 3	< 3
Lead (dissolved)	µg/L	**10**	**25**	0.26	< 0.50	< 0.50	< 0.50	0.02	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	0.55	0.58	0.61	0.75	1.35	< 0.90	1.20	1.1
Selenium (dissolved)	µg/L	**10**	**63**	1.0	< 2.0	< 2.0	< 2.0	0.2	0.23	0.32	0.28
Tin (dissolved)	µg/L			0.5	< 1.0	< 1.0	< 1.0	< 0.1	< 0.06	0.06	0.06
Strontium (dissolved)	µg/L			723	685	1075	1200	1730	2470	3010	2740
Titanium (dissolved)	µg/L			2.5	5.5	< 5.0	< 5.0	0.6	0.36	0.15	0.26
Thallium (dissolved)	µg/L		**510**	0.028	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	2.6	3.1	2.6	3.4	3.2	3.40	3.15	3.28
Vanadium (dissolved)	µg/L		**250**	1.2	1.4	1.6	0.8	2.2	2.90	4.64	3.77
Zinc (dissolved)	µg/L		**1100**	3.5	< 5.0	< 5.0	< 5.0	2.0	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	**0.20**		< 0.02	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		0.025	< 0.040	< 0.040	< 0.040	0.020	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		0.040	< 0.070	< 0.070	< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		-[1]	< 0.060	< 0.060	< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	55.2	-[3]	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	134.6	-[3]	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	1385	-[3]	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	9.907	-[3]	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	684.84	-[3]	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	7.38	-[3]	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
[3] Insufficient volume of groundw ater for field parameters
-- - No data.

Table 86: WC-MW4A-02

		Criteria		WC-MW4A-02							
		COPC	Table 3	2016	2017	2018	2019	2020	2021		
Parameter	**Units**			Average					2021-05-05	2021-12-08	**Average**
pH	pH			7.99	8.09	7.92	8.07	7.96	7.97	8.22	8.10
Alkalinity	mg/L as $CaCO_3$			190	190	190	180	216	336	194	265
Carbonate	mg/L as $CaCO_3$			1.9	2.2	1.5	2.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			190	190	185	180	216	336	194	265
Total Dissolved Solids	mg/L			233	224	233	215	243	266	220	243
Fluoride	mg/L	**1.5**		0.20	0.19	0.17	0.16	0.21	0.19	0.20	0.20
Total Organic Carbon	mg/L			0.84	0.77	0.78	1.19	< 1.00	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L			0.61	0.60	0.56	< 0.50	1.00	< 1.0	< 1.0	< 1.0
Ammonia+Ammonium (N)	as N mg/L			0.062	0.078	0.093	0.078	0.075	< 0.04	0.06	0.05
Chloride (dissolved)	mg/L			5	6	6	14	6	6.4	6.3	6.4
Sulphate (dissolved)	mg/L			31	31	29	28	36	28	25	27
Bromide (dissolved)	mg/L			0.7	< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	< 0.010	0.010	< 0.030	< 0.030	< 0.030	< 0.03
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	0.11	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	0.11	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	0.06	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			211	200	200	190	247	674	261	468
Silver (dissolved)	µg/L		**1.5**	0.05	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			3	6	11	< 5	6	3	2	3
Arsenic (dissolved)	µg/L	**25**	**1900**	3.6	3.7	4.6	6.1	5.5	5.3	5.1	5.2
Barium (dissolved)	µg/L	**1000**	**29000**	101	100	100	88	97	104	95	99
Beryllium (dissolved)	µg/L		**67**	0.25	< 0.50	< 0.50	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	26	28	19	18	20	20	20	20
Bismuth (dissolved)	µg/L			0.5	< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			44750	42500	43000	41000	45000	43200	45300	44250
Cadmium (dissolved)	µg/L	**5**	**2.7**	0.05	< 0.10	< 0.10	< 0.10	0.00	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		**66**	0.50	< 0.50	< 0.50	< 0.50	0.03	0.031	0.022	0.027
Chromium (dissolved)	µg/L		**810**	2.6	< 5.0	< 5.0	< 5.0	0.1	0.2	0.1	0.2
Copper (dissolved)	µg/L	**1000**	**87**	0.3	< 1.0	< 1.0	< 1.0	< 0.2	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L			272	255	175	< 100	85	87	93	90
Potassium (dissolved)	µg/L			1740	1700	1700	1700	1715	1740	1600	1670
Magnesium (dissolved)	µg/L			23650	22500	22000	21500	21450	22100	21400	21750
Manganese (dissolved)	µg/L			6.8	7.1	37.0	13.0	10.7	9.4	8.9	9.1
Molybdenum (dissolved)	µg/L		**9200**	1.7	1.7	1.8	2.6	1.5	2.1	1.8	1.9
Sodium (dissolved)	µg/L			9015	9400	9450	11100	9160	9830	10000	9915
Nickel (dissolved)	µg/L		**490**	0.6	< 1.0	< 1.0	1.1	0.1	< 0.1	< 0.1	< 0.1
Phosphorus (dissolved)	µg/L			38	77	257	69	7	6	< 3	5
Lead (dissolved)	µg/L	**10**	**25**	0.26	< 0.50	< 0.50	< 0.50	0.03	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	0.35	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	1.0	< 2.0	< 2.0	< 2.0	< 0.0	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L			0.5	< 1.0	< 1.0	< 1.0	< 0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			348	325	325	285	349	330	321	326
Titanium (dissolved)	µg/L			2.5	< 5.0	< 5.0	< 5.0	0.3	0.18	< 0.05	0.12
Thallium (dissolved)	µg/L		**510**	0.028	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	0.1	0.2	0.4	2.7	0.8	0.564	0.378	0.471
Vanadium (dissolved)	µg/L		**250**	0.28	< 0.50	< 0.50	< 0.50	0.06	0.04	0.03	0.04
Zinc (dissolved)	µg/L		**1100**	3.5	< 5.0	< 5.0	< 5.0	2.5	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	**0.20**		< 0.02	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		0.030	< 0.040	< 0.040	< 0.040	0.010	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		0.040	< 0.070	< 0.070	< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		-[1]	< 0.060	< 0.060	< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	27.1	74.4	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	94.4	--	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	397.3	379.1	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	10.695	9.686	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	506.83	54.43	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	7.69	--	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 87: WC-MW4B-02

		Criteria		WC-MW4B-02							
		COPC	Table 3	2016	2017	2018	2019	2020	2021		
Parameter	**Units**					**Average**			2021-05-06	2021-12-09	**Average**
pH	pH			8.02	8.04	7.94	8.05	8.03	8.04	8.02	8.03
Alkalinity	mg/L as $CaCO_3$			215	195	160	170	220	212	211	212
Carbonate	mg/L as $CaCO_3$			2.1	2.0	1.3	1.8	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			215	195	155	170	220	212	211	212
Total Dissolved Solids	mg/L			274	240	318	303	259	286	303	295
Fluoride	mg/L	**1.5**		0.18	0.18	0.18	0.17	0.19	0.17	0.19	0.18
Total Organic Carbon	mg/L			< 1.0	2.3	2.2	2.0	1.0	1.0	1.0	1.0
Dissolved Organic Carbon	mg/L			-[1]	1.37	1.04	0.79	1.00	1.0	1.0	1.0
Ammonia+Ammonium (N)	as N mg/L			-[1]	0.050	0.081	< 0.050	< 0.040	< 0.04	< 0.04	< 0.04
Chloride (dissolved)	mg/L			7	8	59	28	20	24	32	28
Sulphate (dissolved)	mg/L			39	36	62	49	48	47	41	44
Bromide (dissolved)	mg/L			0.7	< 1.0	< 1.0	< 1.0	< 0.3	< 0.30	0.40	0.4
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	< 0.010	< 0.010	< 0.030	< 0.030	< 0.030	< 0.030
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	0.06	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			226	205	195	205	395	382	300	341
Silver (dissolved)	µg/L		**1.5**	0.05	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			3.0	7.1	< 5.0	< 5.0	2.0	< 1.0	< 1.0	< 1.0
Arsenic (dissolved)	µg/L	**25**	**1900**	1.8	1.4	< 1.0	1.1	1.0	1.0	1.2	1.1
Barium (dissolved)	µg/L	**1000**	**29000**	120	109	85	105	141	125	134	130
Beryllium (dissolved)	µg/L		**67**	0.25	< 0.50	< 0.50	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	23	28	30	24	30	26	18	22
Bismuth (dissolved)	µg/L			0.5	< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			46000	43500	51500	47500	96850	48000	53200	50600
Cadmium (dissolved)	µg/L	**5**	**2.7**	0.06	< 0.10	< 0.10	< 0.10	0.01	0.012	< 0.003	0.008
Cobalt (dissolved)	µg/L		**66**	0.53	< 0.50	< 0.50	< 0.50	0.34	0.010	0.036	0.023
Chromium (dissolved)	µg/L		**810**	2.7	< 5.0	< 5.0	< 5.0	0.4	0.25	0.14	0.20
Copper (dissolved)	µg/L	**1000**	**87**	0.3	< 1.0	< 1.0	< 1.0	0.4	0.5	< 0.2	0.4
Iron (dissolved)	µg/L			55	< 100	< 100	< 100	654	< 7	< 7	< 7
Potassium (dissolved)	µg/L			2420	2350	3250	2750	2515	2670	2510	2590
Magnesium (dissolved)	µg/L			26850	23000	16500	20500	31600	23600	26500	25050
Manganese (dissolved)	µg/L			10.2	5.0	4.3	2.6	120	0.4	3.0	1.7
Molybdenum (dissolved)	µg/L		**9200**	17	13	19	13	8	11.7	10.6	11.2
Sodium (dissolved)	µg/L			13500	11500	50500	27000	26050	20100	22700	21400
Nickel (dissolved)	µg/L		**490**	0.7	< 1.0	< 1.0	< 1.0	0.8	0.2	0.3	0.3
Phosphorus (dissolved)	µg/L			560	1245	375	620	9	8	< 3	6
Lead (dissolved)	µg/L	**10**	**25**	0.26	< 0.50	< 0.50	< 0.50	0.02	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	0.35	< 0.50	0.55	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	1.0	< 2.0	< 2.0	< 2.0	0.1	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L			0.5	< 1.0	< 1.0	< 1.0	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			440	350	330	380	686	416	458	437
Titanium (dissolved)	µg/L			2.5	< 5.0	< 5.0	< 5.0	0.1	0.08	< 0.05	0.07
Thallium (dissolved)	µg/L		**510**	0.028	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	0.4	0.4	2.2	1.6	3.1	1.33	1.05	1.19
Vanadium (dissolved)	µg/L		**250**	1.20	0.85	0.64	0.60	0.54	0.91	0.98	0.95
Zinc (dissolved)	µg/L		**1100**	3.5	< 5.0	< 5.0	< 5.0	2.5	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	**0.20**		< 0.02	< 0.02	< 0.10	< 0.10	0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		0.030	< 0.040	< 0.040	< 0.040	< 0.010	0.01	< 0.01	0.01
Thorium-230	Bq/L	**0.65**		0.040	< 0.070	< 0.070	< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		-[1]	< 0.060	< 0.060	< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	74.9	82.2	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	138.9	--	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	381	516.0	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	10.672	10.231	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	117.2	127.20	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	8.14	--	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 88: WC-OW1-87

		Criteria		WC-OW1-87							
		COPC	Table 3	2016	2017	2018	2019	2020	2021		
Parameter	**Units**			Average					2021-04-23	2021-11-22	**Average**
pH	pH			7.75	7.94	7.80	7.82	7.58	7.47	7.39	7.43
Alkalinity	mg/L as $CaCO_3$			307	345	325	320	323	335	310	323
Carbonate	mg/L as $CaCO_3$			1.8	2.9	1.9	2.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			307	345	325	315	323	335	310	323
Total Dissolved Solids	mg/L			370	403	345	468	452	494	551	523
Fluoride	mg/L	**1.5**		0.09	< 0.10	0.12	0.10	0.09	0.10	0.11	0.11
Total Organic Carbon	mg/L			1.9	2.1	1.7	2.0	1.5	2.0	2.0	2.0
Dissolved Organic Carbon	mg/L			2.1	1.7	1.6	1.7	2.0	2.0	2.0	2.0
Ammonia+Ammonium (N)	as N mg/L			< 0.050	< 0.050	0.095	< 0.050	< 0.040	< 0.04	< 0.04	< 0.04
Chloride (dissolved)	mg/L			16	12	14	31	31	42	74.00	58
Sulphate (dissolved)	mg/L			25	11	26	46	56	61	100	81
Bromide (dissolved)	mg/L			0.7	< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	0.4	0.4
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	< 0.010	< 0.010	< 0.030	< 0.030	< 0.030	< 0.030
Nitrate (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L			< 0.10	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	0.06	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$			330	325	325	360	463	472	432	452
Silver (dissolved)	µg/L		**1.5**	0.05	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			3.7	< 5.0	< 5.0	< 5.0	< 1.0	1.0	2.0	1.5
Arsenic (dissolved)	µg/L	**25**	**1900**	1.0	< 1.0	< 1.0	< 1.0	0.8	0.9	0.9	0.9
Barium (dissolved)	µg/L	**1000**	**29000**	67	80	79	84	89	95	114	104
Beryllium (dissolved)	µg/L		**67**	0.25	< 0.50	< 0.50	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	20	28	21	15	16	13	16	15
Bismuth (dissolved)	µg/L			0.5	< 1.0	< 1.0	< 1.0	< 0.007	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L			106000	105000	103000	110000	116500	113000	122000	117500
Cadmium (dissolved)	µg/L	**5**	**2.7**	0.05	< 0.10	< 0.10	< 0.10	0.00	0.009	< 0.003	0.006
Cobalt (dissolved)	µg/L		**66**	0.59	< 0.50	< 0.51	0.51	0.45	0.584	0.858	0.721
Chromium (dissolved)	µg/L		**810**	2.5	< 5.0	< 5.0	< 5.0	0.1	0.23	0.11	0.17
Copper (dissolved)	µg/L	**1000**	**87**	0.4	< 1.0	< 1.0	1.8	0.3	0.4	0.3	0.4
Iron (dissolved)	µg/L			135	190	175	200	203	215	259	237
Potassium (dissolved)	µg/L			668	705	615	580	657	623	687	655
Magnesium (dissolved)	µg/L			15550	16500	16500	20500	21050	21800	27100	24450
Manganese (dissolved)	µg/L			48	55	55	61	63	69	83	76
Molybdenum (dissolved)	µg/L		**9200**	0.77	0.51	< 0.50	< 0.50	0.35	0.40	0.38	0.39
Sodium (dissolved)	µg/L			18200	26000	18000	17000	21400	19700	28600	24150
Nickel (dissolved)	µg/L		**490**	0.7	< 1.0	< 1.0	< 1.0	0.6	0.8	1.5	1.2
Phosphorus (dissolved)	µg/L			52	130	71	46	< 3	4	8	6
Lead (dissolved)	µg/L	**10**	**25**	0.26	< 0.50	< 0.50	< 0.50	0.02	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	0.35	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	1.0	< 2.0	< 2.0	< 2.0	< 0.0	0.05	< 0.04	< 0.05
Tin (dissolved)	µg/L			0.5	< 1.0	< 1.0	< 1.0	< 0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			225	225	220	245	268	274	332	303
Titanium (dissolved)	µg/L			2.5	< 5.0	< 5.0	< 5.0	0.1	0.13	0.11	0.12
Thallium (dissolved)	µg/L		**510**	0.028	< 0.050	< 0.050	< 0.050	< 0.005	0.011	< 0.005	0.008
Uranium (dissolved)	µg/L	**20**	**420**	7.7	8.1	5.8	5.0	3.8	4.2	3.6	3.9
Vanadium (dissolved)	µg/L		**250**	0.27	< 0.50	< 0.50	< 0.50	0.11	0.11	0.12	0.12
Zinc (dissolved)	µg/L		**1100**	3.5	< 5.0	5.5	5.2	2.0	3.0	2.0	2.5
Lead-210	Bq/L	**0.20**		< 0.02	< 0.06	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		0.03	< 0.03	< 0.04	< 0.04	< 0.01	0.01	< 0.01	0.01
Thorium-230	Bq/L	**0.65**		0.04	0.04	0.04	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	**0.60**		-[1]	-[1]	0.04	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters											
ODO % Sat	%			-[2]	-[2]	-[2]	-[2]	-[2]	41.2	47.1	--
ORP	mV			-[2]	-[2]	-[2]	-[2]	-[2]	86.1	74.5	--
SPC	µs/cm			-[2]	-[2]	-[2]	-[2]	-[2]	747	918.0	--
Temperature	°C			-[2]	-[2]	-[2]	-[2]	-[2]	10.559	10.015	--
Turbidity	FNU			-[2]	-[2]	-[2]	-[2]	-[2]	145.88	59.34	--
pH	Units			-[2]	-[2]	-[2]	-[2]	-[2]	7.55	7.30	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 89: WC-OW2-75

		Criteria		WC-OW2-75		
		COPC	Table 3	2016	2017	2018
Parameter	**Units**			**Average**		**WELL DECOMMISSIONED**
pH	pH			8.09	8.06	
Alkalinity	mg/L as $CaCO_3$			254	185	
Carbonate	mg/L as $CaCO_3$			2.6	2.1	
Bicarbonate	mg/L as $CaCO_3$			254	185	
Total Dissolved Solids	mg/L			309	234	
Fluoride	mg/L	**1.5**		0.08	< 0.10	
Total Organic Carbon	mg/L			1.2	1.5	
Dissolved Organic Carbon	mg/L			1.3	1.5	
Ammonia+Ammonium (N)	as N mg/L			< 0.050	< 0.050	
Chloride (dissolved)	mg/L			13.0	10.3	
Sulphate (dissolved)	mg/L			15	7	
Bromide (dissolved)	mg/L			0.7	< 1.0	
Nitrite (as N)	as N mg/L			< 0.010	< 0.010	
Nitrate (as N)	as N mg/L			0.72	0.60	
Nitrate + Nitrite (as N)	as N mg/L			0.72	0.60	
Mercury (dissolved)	µg/L	**1**	**0.29**	0.06	< 0.10	
Hardness	mg/L as $CaCO_3$			235	170	
Silver (dissolved)	µg/L		**1.5**	0.05	< 0.10	
Aluminum (dissolved)	µg/L			3.5	10.3	
Arsenic (dissolved)	µg/L	**25**	**1900**	**359**	**310**	
Barium (dissolved)	µg/L	**1000**	**29000**	19	13	
Beryllium (dissolved)	µg/L		**67**	0.25	< 0.50	
Boron (dissolved)	µg/L	**5000**	**45000**	13	15	
Bismuth (dissolved)	µg/L			0.5	< 1.0	
Calcium (dissolved)	µg/L			84000	60000	
Cadmium (dissolved)	µg/L	**5**	**2.7**	0.05	< 0.10	
Cobalt (dissolved)	µg/L		**66**	0.88	1.05	
Chromium (dissolved)	µg/L		**810**	2.8	< 5.0	
Copper (dissolved)	µg/L	**1000**	**87**	0.3	< 0.5	
Iron (dissolved)	µg/L			56	< 100	
Potassium (dissolved)	µg/L			506	400	
Magnesium (dissolved)	µg/L			5775	3900	
Manganese (dissolved)	µg/L			1	< 2	
Molybdenum (dissolved)	µg/L		**9200**	1.6	1.5	
Sodium (dissolved)	µg/L			31400	15500	
Nickel (dissolved)	µg/L		**490**	0.6	< 1.0	
Phosphorus (dissolved)	µg/L			150	32	
Lead (dissolved)	µg/L	**10**	**25**	0.26	< 0.50	
Antimony (dissolved)	µg/L	**6**	**20000**	4.5	3.7	
Selenium (dissolved)	µg/L	**10**	**63**	2.1	< 2.0	
Tin (dissolved)	µg/L			0.5	< 1.0	
Strontium (dissolved)	µg/L			149	101	
Titanium (dissolved)	µg/L			2.5	< 5.0	
Thallium (dissolved)	µg/L		**510**	0.028	< 0.050	
Uranium (dissolved)	µg/L	**20**	**420**	**182**	**130**	
Vanadium (dissolved)	µg/L		**250**	1.05	0.92	
Zinc (dissolved)	µg/L		**1100**	3.5	< 5.0	
Lead-210	Bq/L	**0.20**		0.02	< 0.02	
Radium-226	Bq/L	**0.49**		0.025	< 0.040	
Thorium-230	Bq/L	**0.65**		0.040	< 0.070	
Thorium-232	Bq/L	**0.60**		-[1]	-[1]	
Field Parameters						
ODO % Sat	%			-[2]	-[2]	
ORP	mV			-[2]	-[2]	
SPC	µs/cm			-[2]	-[2]	
Temperature	°C			-[2]	-[2]	
Turbidity	FNU			-[2]	-[2]	
pH	Units			-[2]	-[2]	

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 90: WC-OW2A-75 and WC-OW2A-19

		WC-OW2A-75			WC-OW2A-19				
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**Average**		**WELL DECOMMISSIONED**	**Average**		2021-04-22	2021-11-29	**Average**
pH	pH	7.90	7.82	**Replaced by WC-OW2A-19**	7.76	7.50	7.40	7.44	7.42
Alkalinity	mg/L as $CaCO_3$	486	470		420	478	478	553	516
Carbonate	mg/L as $CaCO_3$	2.9	3.1		2.3	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	486	470		420	478	478	553	516
Total Dissolved Solids	mg/L	576	610		450	497	514	494	504
Fluoride	mg/L	0.09	< 0.10		< 0.10	0.07	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L	3.6	2.7		1.7	1.5	1.0	1.0	1.0
Dissolved Organic Carbon	mg/L	2.2	2.1		1.1	1.0	1.0	2.0	1.5
Ammonia+Ammonium (N)	as N mg/L	< 0.050	0.076		0.061	< 0.040	< 0.04	0.05	0.05
Chloride (dissolved)	mg/L	4.3	4.6		6.6	6.7	7.80	7.10	7
Sulphate (dissolved)	mg/L	57	58		31	28	26	22	24
Bromide (dissolved)	mg/L	0.7	< 1.0		< 1.0	< 0.3	< 0.30	< 0.30	< 0.30
Nitrite (as N)	as N mg/L	< 0.010	< 0.010		< 0.010	< 0.030	< 0.030	< 0.030	< 0.030
Nitrate (as N)	as N mg/L	< 0.10	< 0.10		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L	< 0.10	< 0.10		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	0.06	< 0.10		< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$	399	385		465	1372	1710	1000	1355
Silver (dissolved)	µg/L	0.05	< 0.10		< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L	3.0	< 5.0		< 5	< 1	3	2	3
Arsenic (dissolved)	µg/L	1.6	1.5		< 1.0	0.6	0.7	0.7	0.7
Barium (dissolved)	µg/L	234	240		135	146	125	108	117
Beryllium (dissolved)	µg/L	0.25	< 0.50		< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	9	11		11	11	9	13	11
Bismuth (dissolved)	µg/L	0.5	< 1.0		< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L	114500	110000		125000	130000	128000	129000	128500
Cadmium (dissolved)	µg/L	0.05	< 0.10		< 0.10	< 0.00	0.018	0.003	0.011
Cobalt (dissolved)	µg/L	0.52	< 0.50		0.97	0.41	0.500	0.564	0.532
Chromium (dissolved)	µg/L	2.7	< 5.0		< 5.0	0.4	0.23	0.20	0.22
Copper (dissolved)	µg/L	0.3	< 1.0		< 1.0	0.5	0.5	< 0.2	0.4
Iron (dissolved)	µg/L	1740	1750		355	452	299	239	269
Potassium (dissolved)	µg/L	1760	1700		1150	1100	977	1020	999
Magnesium (dissolved)	µg/L	28950	28000		36500	35350	37800	34800	36300
Manganese (dissolved)	µg/L	22	22		51	20	18	17	17
Molybdenum (dissolved)	µg/L	0.73	0.68		0.68	0.39	0.29	0.30	0.30
Sodium (dissolved)	µg/L	72700	68500		11000	11000	11700	11900	11800
Nickel (dissolved)	µg/L	0.6	< 1.0		1.5	0.7	0.8	0.9	0.9
Phosphorus (dissolved)	µg/L	261	148		1165	< 3	< 3	< 3	< 3
Lead (dissolved)	µg/L	0.26	< 0.50		< 0.50	0.03	0.06	< 0.09	0.08
Antimony (dissolved)	µg/L	0.35	< 0.50		< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	1.0	< 2.0		< 2.0	0.1	0.10	0.13	0.12
Tin (dissolved)	µg/L	0.5	< 1.0		< 1.0	< 0.1	< 0.06	0.06	0.06
Strontium (dissolved)	µg/L	307	300		320	344	344	335	340
Titanium (dissolved)	µg/L	2.5	< 5.0		< 5.0	0.1	0.06	0.36	0.21
Thallium (dissolved)	µg/L	0.028	< 0.050		< 0.050	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	0.1	< 0.1		4.1	2.7	4.6	6.6	5.6
Vanadium (dissolved)	µg/L	0.27	< 0.50		< 0.50	0.21	0.26	0.33	0.30
Zinc (dissolved)	µg/L	4	< 5		< 5	2	7	< 2	5
Lead-210	Bq/L	< 0.02	0.03		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.030	< 0.040		< 0.040	0.010	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.040	< 0.070		< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	-[1]	< 0.060		< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[2]	-[2]		-[2]	-[2]	67.2	86.2	--
ORP	mV	-[2]	-[2]		-[2]	-[2]	121.9	113.1	--
SPC	µs/cm	-[2]	-[2]		-[2]	-[2]	751	805.0	--
Temperature	°C	-[2]	-[2]		-[2]	-[2]	5.915	10.724	--
Turbidity	FNU	-[2]	-[2]		-[2]	-[2]	1528.7	288.3	--
pH	Units	-[2]	-[2]		-[2]	-[2]	7.51	7.27	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 91: WC-OW2-87 and WC-OW2-19

		WC-OW2-87			WC-OW2-19				
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**Average**		**WELL DECOMMISSIONED**	**Average**		2021-04-22	2021-11-26	**Average**
pH	pH	7.84	7.77	**Replaced by WC-OW2-19**	7.77	7.66	7.51	7.32	7.42
Alkalinity	mg/L as $CaCO_3$	501	495		440	413	410	407	409
Carbonate	mg/L as $CaCO_3$	2.6	2.7		2.5	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	501	495		440	413	410	407	409
Total Dissolved Solids	mg/L	639	631		680	646	706	594	650
Fluoride	mg/L	0.09	< 0.10		< 0.10	0.08	0.06	< 0.06	0.06
Total Organic Carbon	mg/L	10.1	2.8		3.0	2.5	2.0	2.0	2.0
Dissolved Organic Carbon	mg/L	2.7	2.5		2.8	2.5	3.0	3.0	3.0
Ammonia+Ammonium (N)	as N mg/L	< 0.050	0.105		0.050	0.045	< 0.04	< 0.04	< 0.04
Chloride (dissolved)	mg/L	5.2	6.6		4.8	4.9	5.3	4.8	5.1
Sulphate (dissolved)	mg/L	74	79		150	135	130	54	92
Bromide (dissolved)	mg/L	0.7	< 1.0		< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	< 0.010	< 0.010		< 0.010	< 0.030	< 0.030	< 0.030	< 0.030
Nitrate (as N)	as N mg/L	< 0.10	< 0.10		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L	< 0.10	< 0.10		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	0.06	< 0.10		< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$	328	320		305	262	277	243	260
Silver (dissolved)	µg/L	0.05	< 0.10		< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L	3.0	< 5.0		< 5.0	5.0	< 1.0	3.0	2.0
Arsenic (dissolved)	µg/L	1.2	1.3		1.4	1.5	1.8	1.7	1.8
Barium (dissolved)	µg/L	130	135		27	25	26	26	26
Beryllium (dissolved)	µg/L	0.25	< 0.50		< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	10	< 10		< 10	9	8	9	9
Bismuth (dissolved)	µg/L	0.5	< 1.0		< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L	98000	95000		90500	78800	80200	74600	77400
Cadmium (dissolved)	µg/L	0.05	< 0.10		< 0.10	< 0.00	0.052	< 0.003	0.028
Cobalt (dissolved)	µg/L	0.52	< 0.50		< 0.50	0.06	0.08	0.07	0.07
Chromium (dissolved)	µg/L	2.7	< 5.0		< 5.0	< 0.1	0.3	0.1	0.2
Copper (dissolved)	µg/L	0.5	< 1.0		< 1.0	< 0.2	0.3	< 0.2	0.3
Iron (dissolved)	µg/L	1655	1650		1350	1165	1070	1190	1130
Potassium (dissolved)	µg/L	1515	1600		1600	1445	1480	1360	1420
Magnesium (dissolved)	µg/L	19800	20000		19500	16750	17500	15500	16500
Manganese (dissolved)	µg/L	26	19		18	16	18	14	16
Molybdenum (dissolved)	µg/L	0.89	1.15		8.2	9.5	11.7	11.6	11.6
Sodium (dissolved)	µg/L	110500	115000		150000	137500	146000	133000	139500
Nickel (dissolved)	µg/L	0.6	< 1.0		< 1.0	0.2	< 0.1	0.2	0.2
Phosphorus (dissolved)	µg/L	43	51		9	4	13	10	12
Lead (dissolved)	µg/L	0.26	< 0.50		< 0.50	0.02	0.02	< 0.09	0.06
Antimony (dissolved)	µg/L	0.35	< 0.50		< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	1.0	< 2.0		< 2.0	0.1	0.10	0.06	0.08
Tin (dissolved)	µg/L	0.51	< 1.0		< 1.0	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L	237	225		150	138	138	139	139
Titanium (dissolved)	µg/L	2.5	< 5.0		< 5.0	0.1	0.06	0.23	0.15
Thallium (dissolved)	µg/L	0.028	< 0.050		< 0.050	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	0.09	0.11		0.14	0.13	0.12	0.08	0.10
Vanadium (dissolved)	µg/L	0.29	< 0.50		< 0.50	0.08	0.09	0.05	0.07
Zinc (dissolved)	µg/L	3.5	< 5.0		< 5.0	< 2.0	4.0	6.0	5.0
Lead-210	Bq/L	< 0.02	< 0.02		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.025	< 0.040		< 0.04	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.040	< 0.070		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	-[1]	< 0.060		< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[2]	-[2]		-[2]	-[2]	28.5	24.2	--
ORP	mV	-[2]	-[2]		-[2]	-[2]	-52.7	-27.4	--
SPC	µs/cm	-[2]	-[2]		-[2]	-[2]	932	982.0	--
Temperature	°C	-[2]	-[2]		-[2]	-[2]	9.061	8.986	--
Turbidity	FNU	-[2]	-[2]		-[2]	-[2]	2.81	2.8	--
pH	Units	-[2]	-[2]		-[2]	-[2]	7.41	7.37	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 92: WC-OW3-79

		WC-OW3-79							
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**Average**					2021-04-21	2021-12-03	**Average**
pH	pH	7.90	8.05	7.95	8.06	8.17	8.01	7.92	7.97
Alkalinity	mg/L as $CaCO_3$	167	170	175	170	172	166	167	167
Carbonate	mg/L as $CaCO_3$	1.6	1.8	1.5	1.8	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	167	170	175	170	172	166	167	167
Total Dissolved Solids	mg/L	184	172	158	213	229	266	177	222
Fluoride	mg/L	0.20	0.18	0.21	0.17	0.18	0.17	0.19	0.18
Total Organic Carbon	mg/L	1.05	0.59	0.68	0.71	< 1.00	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L	0.69	0.54	0.59	0.55	< 1.00	< 1.0	< 1.0	< 1.0
Ammonia+Ammonium (N)	as N mg/L	< 0.050	0.060	0.080	0.068	0.055	0.08	0.04	0.06
Chloride (dissolved)	mg/L	1.6	1.5	1.7	1.8	1.8	2.3	1.9	2.1
Sulphate (dissolved)	mg/L	25	25	26	26	25	25	25	25
Bromide (dissolved)	mg/L	0.7	< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.030	< 0.030	< 0.030	< 0.030
Nitrate (as N)	as N mg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	0.06	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$	183	133	170	180	176	164	179	172
Silver (dissolved)	µg/L	0.05	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L	3.0	127.5	< 5.0	< 5.0	1.5	< 1.0	< 1.0	< 1.0
Arsenic (dissolved)	µg/L	2.9	1.9	3.1	3.2	3.8	3.8	3.6	3.7
Barium (dissolved)	µg/L	127	85	135	140	135	131	145	138
Beryllium (dissolved)	µg/L	0.25	< 0.50	< 0.50	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	37	15	20	19	20	20	20	20
Bismuth (dissolved)	µg/L	0.5	< 1.0	< 1.0	< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L	39850	33000	37000	40000	41150	39200	46300	42750
Cadmium (dissolved)	µg/L	0.05	< 0.10	< 0.10	< 0.10	0.00	0.013	< 0.003	0.008
Cobalt (dissolved)	µg/L	0.52	< 0.50	< 0.50	< 0.50	0.01	< 0.004	0.025	0.015
Chromium (dissolved)	µg/L	2.6	< 5.0	< 5.0	< 5.0	0.4	0.2	< 0.1	0.1
Copper (dissolved)	µg/L	0.3	2.5	< 1.0	< 1.0	0.4	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L	161	160	200	215	215	211	243	227
Potassium (dissolved)	µg/L	1515	985	1400	1400	1465	1380	1730	1555
Magnesium (dissolved)	µg/L	19700	12650	19000	19500	19450	20600	18300	19450
Manganese (dissolved)	µg/L	19	23	15	14	16	15	16	16
Molybdenum (dissolved)	µg/L	1.1	0.9	1.2	1.2	1.2	1.2	1.1	1.1
Sodium (dissolved)	µg/L	9050	7900	8300	8500	8710	8920	9830	9375
Nickel (dissolved)	µg/L	0.6	1.1	< 1.0	< 1.0	< 0.1	< 0.1	1.9	1.0
Phosphorus (dissolved)	µg/L	29	18	12	19	8	8	58	33
Lead (dissolved)	µg/L	0.26	0.74	< 0.50	< 0.50	0.04	< 0.01	< 0.09	0.05
Antimony (dissolved)	µg/L	0.35	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	1.0	< 2.0	< 2.0	< 2.0	< 0.0	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L	0.5	< 1.0	< 1.0	< 1.0	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L	368	240	385	380	417	389	422	406
Titanium (dissolved)	µg/L	2.5	< 5.0	< 5.0	< 5.0	0.1	< 0.05	< 0.05	< 0.05
Thallium (dissolved)	µg/L	0.028	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	0.1	0.4	< 0.1	< 0.1	0.0	0.05	0.04	0.04
Vanadium (dissolved)	µg/L	0.26	0.62	< 0.50	< 0.50	0.02	< 0.01	0.12	0.07
Zinc (dissolved)	µg/L	3.5	23	< 5.0	< 5.0	3.5	2.0	2.0	2.0
Lead-210	Bq/L	< 0.02	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.03	< 0.04	< 0.04	< 0.04	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	< 0.01	< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	-[1]	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[2]	-[2]	-[2]	-[2]	-[2]	49.7	49.4	--
ORP	mV	-[2]	-[2]	-[2]	-[2]	-[2]	97	68.8	--
SPC	µs/cm	-[2]	-[2]	-[2]	-[2]	-[2]	187.1	358.8	--
Temperature	°C	-[2]	-[2]	-[2]	-[2]	-[2]	9.572	8.262	--
Turbidity	FNU	-[2]	-[2]	-[2]	-[2]	-[2]	1.33	0.78	--
pH	Units	-[2]	-[2]	-[2]	-[2]	-[2]	8.12	7.95	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 93: WC-OW3-87

		WC-OW3-87							
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**Average**					2021-04-23	2021-12-13	**Average**
pH	pH	8.04	8.07	7.92	8.10	7.99	7.79	7.94	7.87
Alkalinity	mg/L as $CaCO_3$	207	185	195	185	185	203	210	207
Carbonate	mg/L as $CaCO_3$	2.2	2.1	1.5	2.2	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	207	185	195	185	185	203	210	207
Total Dissolved Solids	mg/L	241	190	235	265	245	249	214	232
Fluoride	mg/L	0.11	0.12	0.12	0.11	0.11	0.12	0.12	0.12
Total Organic Carbon	mg/L	1.8	1.8	1.8	2.0	1.5	2.0	2.0	2.0
Dissolved Organic Carbon	mg/L	1.90	1.55	1.70	1.70	2.00	2.0	2.0	2.0
Ammonia+Ammonium (N)	as N mg/L	< 0.050	< 0.050	0.075	0.052	0.060	< 0.04	0.06	0.05
Chloride (dissolved)	mg/L	6.1	4.1	4.0	6.0	4.9	8.0	5.4	6.7
Sulphate (dissolved)	mg/L	12.6	9.2	7.9	8.7	8.5	9	9	9
Bromide (dissolved)	mg/L	0.7	3.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	< 0.010	0.010	< 0.010	< 0.010	< 0.030	< 0.030	< 0.030	< 0.030
Nitrate (as N)	as N mg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	0.06	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$	217	180	180	190	196	215	189	202
Silver (dissolved)	µg/L	0.05	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L	3.0	< 5.0	< 5.0	< 5.0	6.0	< 1.0	2.0	1.5
Arsenic (dissolved)	µg/L	4.4	5.0	4.5	4.2	5.1	4.1	5.9	5.0
Barium (dissolved)	µg/L	165	160	155	165	160	156	164	160
Beryllium (dissolved)	µg/L	0.25	< 0.50	< 0.50	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	15	12	10	11	12	10	18	14
Bismuth (dissolved)	µg/L	0.5	< 1.0	< 1.0	< 1.0	< 0.0	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L	66400	54500	54000	58500	60650	59900	58300	59100
Cadmium (dissolved)	µg/L	0.05	< 0.10	< 0.10	< 0.10	0.00	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L	0.52	< 0.50	< 0.50	< 0.50	0.02	0.01	0.05	0.03
Chromium (dissolved)	µg/L	2.6	< 5.0	< 5.0	< 5.0	0.3	0.2	< 0.1	0.2
Copper (dissolved)	µg/L	0.3	< 1.0	< 1.0	2.1	0.2	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L	171	200	155	< 155	162	93	151	122
Potassium (dissolved)	µg/L	1070	1000	970	975	1065	916	1100	1008
Magnesium (dissolved)	µg/L	11650	10500	10000	10450	10450	9760	10500	10130
Manganese (dissolved)	µg/L	10.6	9.9	10.1	10.8	9.6	9	9	9
Molybdenum (dissolved)	µg/L	0.4	< 0.5	< 0.5	< 0.5	0.2	0.3	0.4	0.4
Sodium (dissolved)	µg/L	8005	5000	5000	5600	5250	5940	5600	5770
Nickel (dissolved)	µg/L	0.6	< 1.0	< 1.0	< 1.0	0.2	0.2	0.2	0.2
Phosphorus (dissolved)	µg/L	27	27	43	23	4	3	5	4
Lead (dissolved)	µg/L	0.26	< 0.50	< 0.50	< 0.50	0.01	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	0.35	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	1.0	< 2.0	< 2.0	< 2.0	< 0.0	< 0.04	0.07	0.06
Tin (dissolved)	µg/L	0.5	< 1.0	< 1.0	< 1.0	< 0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L	215	195	195	205	207	212	217	215
Titanium (dissolved)	µg/L	2.5	< 5.0	< 5.0	< 5.0	0.3	0.18	0.19	0.19
Thallium (dissolved)	µg/L	0.028	< 0.050	< 0.050	< 0.050	< 0.005	0.005	< 0.005	0.005
Uranium (dissolved)	µg/L	0.66	0.14	0.16	0.30	0.15	1.19	0.18	0.68
Vanadium (dissolved)	µg/L	0.26	< 0.50	< 0.50	< 0.50	0.07	0.05	0.20	0.13
Zinc (dissolved)	µg/L	3.5	< 5	< 5.0	< 5.0	2.5	< 2.0	3.0	2.5
Lead-210	Bq/L	< 0.02	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.03	< 0.04	< 0.04	< 0.04	0.01	0.01	< 0.01	0.01
Thorium-230	Bq/L	0.04	< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	-[1]	< 0.06	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[2]	-[2]	-[2]	-[2]	-[2]	49.8	68.8	--
ORP	mV	-[2]	-[2]	-[2]	-[2]	-[2]	83.3	--	--
SPC	µs/cm	-[2]	-[2]	-[2]	-[2]	-[2]	207.6	362.1	--
Temperature	°C	-[2]	-[2]	-[2]	-[2]	-[2]	11.358	10.206	--
Turbidity	FNU	-[2]	-[2]	-[2]	-[2]	-[2]	55.76	65.99	--
pH	Units	-[2]	-[2]	-[2]	-[2]	-[2]	7.77	--	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 94: WC-OW4-79

		WC-OW4-79							
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**Average**					2021-04-15	2021-12-01	**Average**
pH	pH	7.97	8.09	7.85	8.17	7.99	7.72	7.60	7.66
Alkalinity	mg/L as $CaCO_3$	149	150	150	145	162	153	157	155
Carbonate	mg/L as $CaCO_3$	1.7	1.7	1.2	2.0	1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	144	145	150	140	162	153	157	155
Total Dissolved Solids	mg/L	156	101	158	183	151	134	183	159
Fluoride	mg/L	0.21	0.21	0.20	0.21	0.23	0.24	0.11	0.18
Total Organic Carbon	mg/L	1.0	0.8	1.1	1.3	1.0	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L	0.82	0.62	0.77	0.83	1.00	< 1.0	< 1.0	< 1.0
Ammonia+Ammonium (N)	as N mg/L	0.10	0.10	0.11	0.12	0.09	0.06	0.07	0.07
Chloride (dissolved)	mg/L	1.8	1.3	1.8	1.6	1.9	2.3	2.1	2.2
Sulphate (dissolved)	mg/L	11.0	9.1	13.5	10.9	13.0	13	14	14
Bromide (dissolved)	mg/L	0.7	< 1.0	< 1.0	< 1.0	0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	< 0.010	< 0.010	< 0.010	< 0.010	0.030	< 0.030	< 0.030	< 0.030
Nitrate (as N)	as N mg/L	< 0.10	< 0.10	< 0.10	< 0.10	0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L	< 0.10	< 0.10	< 0.10	< 0.10	0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	0.06	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$	142	135	140	140	232	170	157	164
Silver (dissolved)	µg/L	0.05	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L	3.0	< 5.0	< 5.0	< 5.0	7.0	1.0	4.0	2.5
Arsenic (dissolved)	µg/L	2.8	< 1.0	1.1	< 1.0	0.7	1.1	0.5	0.8
Barium (dissolved)	µg/L	107	102	110	91	74	115	109	112
Beryllium (dissolved)	µg/L	0.25	< 0.50	< 0.50	< 0.50	< 0.01	0.034	< 0.007	< 0.021
Boron (dissolved)	µg/L	30	24	24	22	42	28	33	31
Bismuth (dissolved)	µg/L	0.5	< 1.0	< 1.0	< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L	31000	28500	30500	30000	32400	31100	36900	34000
Cadmium (dissolved)	µg/L	0.05	< 0.10	< 0.10	< 0.10	< 0.00	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L	1.00	< 0.50	< 0.50	< 0.50	0.10	0.24	0.13	0.19
Chromium (dissolved)	µg/L	2.6	< 5.0	< 5.0	< 5.0	0.3	0.2	0.1	0.2
Copper (dissolved)	µg/L	0.3	< 1.0	< 1.0	< 1.0	0.4	0.3	< 0.2	0.3
Iron (dissolved)	µg/L	3660	2600	2950	1765	341	3610	3140	3375
Potassium (dissolved)	µg/L	972	900	950	1025	836	924	857	891
Magnesium (dissolved)	µg/L	15950	15000	15500	15000	13850	15000	13400	14200
Manganese (dissolved)	µg/L	67	78	69	53	25	54	107	80
Molybdenum (dissolved)	µg/L	1.4	1.4	1.2	2.0	1.1	1.1	1.2	1.1
Sodium (dissolved)	µg/L	9620	8900	9350	9500	9550	9350	8760	9055
Nickel (dissolved)	µg/L	0.6	< 1.0	< 1.0	< 1.0	0.3	0.5	0.7	0.6
Phosphorus (dissolved)	µg/L	17	8	12	39	< 3	< 3	< 3	< 3
Lead (dissolved)	µg/L	0.40	< 0.50	< 0.50	< 0.50	0.02	0.30	< 0.09	0.20
Antimony (dissolved)	µg/L	0.40	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	1.0	< 2.0	< 2.0	< 2.0	< 0.0	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L	0.5	< 1.0	< 1.0	< 1.0	< 0.1	0.28	0.10	0.19
Strontium (dissolved)	µg/L	302	305	320	315	468	342	387	365
Titanium (dissolved)	µg/L	2.5	< 5.0	< 5.0	< 5.0	0.4	0.07	0.21	0.14
Thallium (dissolved)	µg/L	0.028	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	1.12	< 0.10	< 0.10	0.18	0.09	0.02	0.14	0.08
Vanadium (dissolved)	µg/L	0.26	< 0.50	< 0.50	< 0.50	0.90	0.02	0.02	0.02
Zinc (dissolved)	µg/L	4.5	< 5	< 5.0	< 5.0	12.0	22.0	6.0	14.0
Lead-210	Bq/L	< 0.02	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.030	< 0.040	< 0.040	< 0.040	< 0.010	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.010	< 0.070	< 0.070	< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	-[1]	< 0.060	< 0.060	< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[2]	-[2]	-[2]	-[2]	-[2]	25.2	64.8	--
ORP	mV	-[2]	-[2]	-[2]	-[2]	-[2]	-128.5	-90.7	--
SPC	µs/cm	-[2]	-[2]	-[2]	-[2]	-[2]	311.1	322.7	--
Temperature	°C	-[2]	-[2]	-[2]	-[2]	-[2]	8.999	8.685	--
Turbidity	FNU	-[2]	-[2]	-[2]	-[2]	-[2]	67.67	61.57	--
pH	Units	-[2]	-[2]	-[2]	-[2]	-[2]	7.91	7.74	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
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[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 95: WC-OW5-79 and WC-OW5-19

		WC-OW5-79			WC-OW5-19				
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**Average**		**WELL DECOMMISSIONED**	**Average**		2021-05-13	2021-11-29	**Average**
pH	pH	7.95	7.85	**Replaced by WC-OW5-19**	7.44	7.20	7.26	7.29	7.28
Alkalinity	mg/L as $CaCO_3$	253	260		280	327	351	379	365
Carbonate	mg/L as $CaCO_3$	2.1	1.7		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	253	255		280	327	351	379	365
Total Dissolved Solids	mg/L	458	412		1620	1557	1630	1510	1570
Fluoride	mg/L	0.13	0.15		< 0.10	0.07	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L	3	2		14	9	8.0	8.0	8.0
Dissolved Organic Carbon	mg/L	2	2		12	8	8.0	8.0	8.0
Ammonia+Ammonium (N)	as N mg/L	0.13	0.15		0.20	0.13	0.14	0.19	0.17
Chloride (dissolved)	mg/L	3.3	2.9		8.5	6.0	5.0	6.5	5.8
Sulphate (dissolved)	mg/L	108	99		885	780	660	810	735
Bromide (dissolved)	mg/L	0.7	< 1.0		< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	< 0.010	< 0.010		< 0.010	< 0.030	< 0.030	< 0.030	< 0.030
Nitrate (as N)	as N mg/L	< 0.10	< 0.10		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L	< 0.10	< 0.10		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	0.06	< 0.10		< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$	286	290		1000	897	896	944	920
Silver (dissolved)	µg/L	0.05	< 0.10		< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L	3.0	< 5.0		< 5.0	4.0	2.0	3.0	2.5
Arsenic (dissolved)	µg/L	1.8	1.5		2.8	3.4	0.8	4.3	2.6
Barium (dissolved)	µg/L	172	165		29	24	21	22	22
Beryllium (dissolved)	µg/L	0.25	< 0.50		< 0.50	< 0.01	< 0.007	0.015	0.011
Boron (dissolved)	µg/L	26	21		22	18	17	19	18
Bismuth (dissolved)	µg/L	0.5	< 1.0		< 1.0	< 0.007	0.090	< 0.010	0.050
Calcium (dissolved)	µg/L	77850	76000		335000	299500	270000	285000	277500
Cadmium (dissolved)	µg/L	0.05	< 0.10		< 0.10	< 0.00	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L	0.53	< 0.50		< 0.51	0.35	0.31	0.43	0.37
Chromium (dissolved)	µg/L	2.7	< 5.0		< 5.0	0.1	< 0.1	0.3	0.2
Copper (dissolved)	µg/L	0.3	< 1.0		< 1.0	< 0.2	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L	1050	695		5300	5340	< 7	5180	2594
Potassium (dissolved)	µg/L	1085	1150		1500	1320	1290	1340	1315
Magnesium (dissolved)	µg/L	21950	23000		48000	43300	39000	41500	40250
Manganese (dissolved)	µg/L	15	15		79	73	65	72	68
Molybdenum (dissolved)	µg/L	1.1	1.3		1.8	0.6	0.9	0.8	0.8
Sodium (dissolved)	µg/L	31350	33500		120000	112000	116000	133000	124500
Nickel (dissolved)	µg/L	0.6	< 1.0		< 1.0	0.8	0.7	0.8	0.8
Phosphorus (dissolved)	µg/L	20	9		20	10	11	9	10
Lead (dissolved)	µg/L	0.26	< 0.50		< 0.50	0.01	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	0.35	< 0.50		< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	1.0	< 2.0		< 2.0	0.3	0.17	0.22	0.20
Tin (dissolved)	µg/L	0.5	< 1.0		< 1.0	0.1	0.11	< 0.06	0.09
Strontium (dissolved)	µg/L	501	475		460	471	510	492	501
Titanium (dissolved)	µg/L	2.5	< 5.0		< 5.0	0.5	0.17	0.60	0.39
Thallium (dissolved)	µg/L	0.028	< 0.050		< 0.050	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	0.06	< 0.10		1.23	0.11	0.11	0.08	0.10
Vanadium (dissolved)	µg/L	0.27	< 0.50		< 0.50	0.20	0.09	0.21	0.15
Zinc (dissolved)	µg/L	3.5	10.0		< 5.0	< 2.0	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	< 0.02	< 0.02		< 0.10	< 0.02	0.04	< 0.02	0.03
Radium-226	Bq/L	0.025	< 0.040		< 0.040	< 0.010	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.040	< 0.070		< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	-[1]	< 0.060		< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[2]	-[2]		-[2]	-[2]	44.1	60.0	--
ORP	mV	-[2]	-[2]		-[2]	-[2]	-95.3	-69.0	--
SPC	µs/cm	-[2]	-[2]		-[2]	-[2]	953	1790.4	--
Temperature	°C	-[2]	-[2]		-[2]	-[2]	12.797	8.486	--
Turbidity	FNU	-[2]	-[2]		-[2]	-[2]	20.58	8.7	--
pH	Units	-[2]	-[2]		-[2]	-[2]	7.55	7.52	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 96: WC-OW9-75 and WC-LTWMF-MW-06

		WC-OW9-75	WC-LTWMF-MW-06						
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**WELL DAMAGED**	**Average**				2021-05-06	2021-12-08	**Average**
pH	pH	**Replaced by**	8.15	8.14	8.25	7.96	8.17	8.25	8.21
Alkalinity	mg/L as $CaCO_3$	**WC-LTWMF-MW-06**	145	140	135	159	155	174	165
Carbonate	mg/L as $CaCO_3$		1.9	1.8	2.3	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$		135	140	135	159	155	174	165
Total Dissolved Solids	mg/L		223	213	263	250	266	246	256
Fluoride	mg/L		0.79	0.70	0.68	0.76	0.73	0.74	0.74
Total Organic Carbon	mg/L		0.88	1.03	0.88	< 1.00	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L		0.6	0.6	0.6	1.0	1.0	1.0	1.0
Ammonia+Ammonium (N)	as N mg/L		0.184	0.068	0.073	0.050	< 0.04	0.09	0.07
Chloride (dissolved)	mg/L		22	20	26	35	40	38	39
Sulphate (dissolved)	mg/L		34	38	41	43	49	45	47
Bromide (dissolved)	mg/L		< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L		< 0.010	< 0.010	0.011	< 0.030	< 0.030	< 0.030	< 0.030
Nitrate (as N)	as N mg/L		< 0.10	< 0.10	< 0.10	0.08	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L		< 0.10	< 0.10	< 0.10	0.08	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L		< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$		115	115	120	233	222	286	254
Silver (dissolved)	µg/L		< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L		56.5	9.8	8.3	3.0	5.0	5.0	5.0
Arsenic (dissolved)	µg/L		1.6	2.1	1.9	1.3	1.1	1.9	1.5
Barium (dissolved)	µg/L		60	54	59	35	81	65	73
Beryllium (dissolved)	µg/L		< 0.50	< 0.50	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L		165	165	155	94	147	129	138
Bismuth (dissolved)	µg/L		< 1.0	< 1.0	< 1.0	< 0.0	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L		22000	17000	17500	15050	26000	19500	22750
Cadmium (dissolved)	µg/L		< 0.10	< 0.10	< 0.10	0.02	0.005	< 0.003	0.004
Cobalt (dissolved)	µg/L		< 0.50	< 0.50	< 0.50	0.01	0.004	0.02	0.01
Chromium (dissolved)	µg/L		< 5.0	< 5.0	< 5.0	0.1	0.3	0.1	0.2
Copper (dissolved)	µg/L		< 1.0	< 1.0	< 1.0	0.5	0.4	< 0.2	0.3
Iron (dissolved)	µg/L		115	< 100	< 100	< 7	< 7	< 7	< 7
Potassium (dissolved)	µg/L		3900	1950	1800	1267	2240	1800	2020
Magnesium (dissolved)	µg/L		14000	17500	18500	10165	20400	20800	20600
Manganese (dissolved)	µg/L		13.4	< 2.0	< 2.0	0.4	0.07	0.95	0.51
Molybdenum (dissolved)	µg/L		17.5	10.1	8.8	3.2	9.2	7.4	8.3
Sodium (dissolved)	µg/L		42500	42500	43500	21660	48700	49500	49100
Nickel (dissolved)	µg/L		< 1.0	< 1.0	< 1.0	12.4	< 0.1	< 0.1	< 0.1
Phosphorus (dissolved)	µg/L		76	75	103	5	6	5	6
Lead (dissolved)	µg/L		< 0.50	< 0.50	< 0.50	0.03	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L		< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L		< 2.0	< 2.0	< 2.0	0.1	0.13	< 0.04	< 0.09
Tin (dissolved)	µg/L		< 1.0	< 1.0	< 1.0	0.2	0.14	< 0.06	0.10
Strontium (dissolved)	µg/L		490	625	695	374	861	776	819
Titanium (dissolved)	µg/L		5.6	< 5.0	< 5.0	< 0.1	0.17	< 0.05	0.11
Thallium (dissolved)	µg/L		< 0.050	< 0.050	< 0.050	0.008	0.009	< 0.005	0.007
Uranium (dissolved)	µg/L		1.40	0.95	0.79	0.33	1.26	0.62	0.94
Vanadium (dissolved)	µg/L		1.7	1.8	1.5	0.6	1.32	1.25	1.29
Zinc (dissolved)	µg/L		< 5.0	< 5.0	< 5.0	22.5	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L		0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L		< 0.04	< 0.04	< 0.04	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L		< 0.07	< 0.07	< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L		-[1]	< 0.06	< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%		-[2]	-[2]	-[2]	-[2]	80.7	74.8	--
ORP	mV		-[2]	-[2]	-[2]	-[2]	153.8	--	--
SPC	µs/cm		-[2]	-[2]	-[2]	-[2]	251	466.7	--
Temperature	°C		-[2]	-[2]	-[2]	-[2]	9.298	10.711	--
Turbidity	FNU		-[2]	-[2]	-[2]	-[2]	99.44	96.1	--
pH	Units		-[2]	-[2]	-[2]	-[2]	8.48	--	--

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Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 97: WC-OW10-75

		WC-OW10-75							
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**Average**					2021-04-21	2021-12-03	**Average**
pH	pH	8.04	8.08	8.05	8.05	8.01	8.09	7.91	8.00
Alkalinity	mg/L as $CaCO_3$	174	170	180	170	165	247	181	214
Carbonate	mg/L as $CaCO_3$	1.9	1.9	1.9	1.8	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	169	170	180	170	165	247	181	214
Total Dissolved Solids	mg/L	242	183	555	230	260	277	206	242
Fluoride	mg/L	0.19	0.19	0.15	0.13	0.15	0.15	0.14	0.15
Total Organic Carbon	mg/L	1.50	1.15	1.09	0.84	< 1.00	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L	0.86	0.72	0.71	0.57	1.00	< 1.0	< 1.0	< 1.0
Ammonia+Ammonium (N)	as N mg/L	0.050	0.065	0.145	0.069	0.065	0.08	0.10	0.09
Chloride (dissolved)	mg/L	2.6	2.5	3.6	4.2	4.2	4	6	5
Sulphate (dissolved)	mg/L	28	28	35	39	39	40	40	40
Bromide (dissolved)	mg/L	0.7	< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (as N)	as N mg/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.030	< 0.030	< 0.030	< 0.030
Nitrate (as N)	as N mg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	0.06	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$	177	170	190	195	207	655	237	446
Silver (dissolved)	µg/L	0.05	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L	3.0	< 5.0	< 5.0	< 5.0	< 1.0	3.0	< 1.0	2.0
Arsenic (dissolved)	µg/L	1.6	1.5	2.0	2.6	2.8	2.8	2.8	2.8
Barium (dissolved)	µg/L	123	125	135	135	154	150	158	154
Beryllium (dissolved)	µg/L	0.25	< 0.50	< 0.50	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	27	23	15	16	12	13	13	13
Bismuth (dissolved)	µg/L	0.5	< 1.0	< 1.0	< 1.0	< 0.0	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L	33650	31000	35500	39500	43550	43100	47700	45400
Cadmium (dissolved)	µg/L	0.05	< 0.10	< 0.10	< 0.10	< 0.00	0.032	< 0.003	0.018
Cobalt (dissolved)	µg/L	0.53	< 0.50	< 0.50	< 0.50	0.01	< 0.004	0.05	0.03
Chromium (dissolved)	µg/L	2.6	< 5.0	< 5.0	< 5.0	0.3	0.3	0.1	0.2
Copper (dissolved)	µg/L	0.3	< 1.0	< 1.0	< 1.0	< 0.2	0.2	< 0.2	0.2
Iron (dissolved)	µg/L	65	< 100	125	245	258	229	270	250
Potassium (dissolved)	µg/L	1310	1200	1250	1200	1255	1260	1570	1415
Magnesium (dissolved)	µg/L	23100	22500	24500	24500	23000	24900	21900	23400
Manganese (dissolved)	µg/L	12.8	12.5	11.5	10.4	9.2	8.5	12.2	10.4
Molybdenum (dissolved)	µg/L	1.05	1.15	0.99	0.85	0.75	1.2	0.7	1.0
Sodium (dissolved)	µg/L	9115	9200	7350	5950	5740	6410	7580	6995
Nickel (dissolved)	µg/L	0.6	< 1.0	1.7	< 1.0	< 0.1	< 0.1	2.8	1.5
Phosphorus (dissolved)	µg/L	24	34	5	18	3	8	60	34
Lead (dissolved)	µg/L	0.26	< 0.50	< 0.50	< 0.50	0.02	0.04	< 0.09	0.07
Antimony (dissolved)	µg/L	0.35	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	1.0	< 2.0	< 2.0	< 2.0	< 0.0	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L	0.5	< 1.0	< 1.0	< 1.0	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L	399	380	390	360	350	343	376	360
Titanium (dissolved)	µg/L	2.5	< 5.0	< 5.0	< 5.0	0.1	0.27	< 0.05	0.16
Thallium (dissolved)	µg/L	0.028	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	0.07	< 0.10	< 0.10	< 0.10	0.03	0.03	0.02	0.03
Vanadium (dissolved)	µg/L	0.29	< 0.50	< 0.50	< 0.50	< 0.01	0.02	0.11	0.07
Zinc (dissolved)	µg/L	5.0	< 5	< 5.0	< 5.0	< 2.0	3.0	< 2.0	2.5
Lead-210	Bq/L	0.03	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.025	< 0.040	< 0.040	< 0.040	0.015	< 0.01	0.01	0.01
Thorium-230	Bq/L	0.040	< 0.070	< 0.070	< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	-[1]	< 0.060	< 0.060	< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[2]	-[2]	-[2]	-[2]	-[2]	40.9	90.1	--
ORP	mV	-[2]	-[2]	-[2]	-[2]	-[2]	120.4	54.5	--
SPC	µs/cm	-[2]	-[2]	-[2]	-[2]	-[2]	373.4	396.7	--
Temperature	°C	-[2]	-[2]	-[2]	-[2]	-[2]	6.977	5.914	--
Turbidity	FNU	-[2]	-[2]	-[2]	-[2]	-[2]	5.89	93.73	--
pH	Units	-[2]	-[2]	-[2]	-[2]	-[2]	7.97	7.96	--

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[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
-- - No data.

Table 98: WC-OW12-75

		WC-OW12-75		
		2016	2017	2018
Parameter	**Units**	**Average**		**WELL DECOMMISSIONED**
pH	pH	8.00	7.84	
Alkalinity	mg/L as $CaCO_3$	299	220	
Carbonate	mg/L as $CaCO_3$	2.3	1.5	
Bicarbonate	mg/L as $CaCO_3$	294	220	
Total Dissolved Solids	mg/L	536	309	
Fluoride	mg/L	0.08	< 0.10	
Total Organic Carbon	mg/L	1.20	1.00	
Dissolved Organic Carbon	mg/L	1.50	0.97	
Ammonia+Ammonium (N)	as N mg/L	< 0.050	< 0.050	
Chloride (dissolved)	mg/L	26.0	16.0	
Sulphate (dissolved)	mg/L	80	28	
Bromide (dissolved)	mg/L	0.7	< 1.0	
Nitrite (as N)	as N mg/L	< 0.010	< 0.010	
Nitrate (as N)	as N mg/L	13.10	2.93	
Nitrate + Nitrite (as N)	as N mg/L	13.10	2.93	
Mercury (dissolved)	µg/L	0.06	< 0.10	
Hardness	mg/L as $CaCO_3$	423	255	
Silver (dissolved)	µg/L	0.06	< 0.10	
Aluminum (dissolved)	µg/L	3.0	< 5.0	
Arsenic (dissolved)	µg/L	0.6	< 1.0	
Barium (dissolved)	µg/L	44	26	
Beryllium (dissolved)	µg/L	0.25	< 0.50	
Boron (dissolved)	µg/L	23	11	
Bismuth (dissolved)	µg/L	0.5	< 1.0	
Calcium (dissolved)	µg/L	153500	93500	
Cadmium (dissolved)	µg/L	0.05	< 0.10	
Cobalt (dissolved)	µg/L	0.84	< 0.50	
Chromium (dissolved)	µg/L	2.8	< 5.0	
Copper (dissolved)	µg/L	0.3	< 1.0	
Iron (dissolved)	µg/L	67	< 100	
Potassium (dissolved)	µg/L	729	575	
Magnesium (dissolved)	µg/L	8405	5000	
Manganese (dissolved)	µg/L	1.0	< 2.0	
Molybdenum (dissolved)	µg/L	0.35	< 0.50	
Sodium (dissolved)	µg/L	20250	7850	
Nickel (dissolved)	µg/L	0.6	< 1.0	
Phosphorus (dissolved)	µg/L	17	6	
Lead (dissolved)	µg/L	0.26	< 0.50	
Antimony (dissolved)	µg/L	0.40	< 0.50	
Selenium (dissolved)	µg/L	1.2	< 2.0	
Tin (dissolved)	µg/L	0.5	< 1.0	
Strontium (dissolved)	µg/L	281	170	
Titanium (dissolved)	µg/L	2.5	< 5.0	
Thallium (dissolved)	µg/L	0.028	< 0.050	
Uranium (dissolved)	µg/L	0.87	0.60	
Vanadium (dissolved)	µg/L	0.45	< 0.50	
Zinc (dissolved)	µg/L	3.5	< 5.0	
Lead-210	Bq/L	0.02	< 0.02	
Radium-226	Bq/L	0.030	< 0.040	
Thorium-230	Bq/L	0.040	< 0.070	
Thorium-232	Bq/L	-[1]	-[1]	
Field Parameters				
ODO % Sat	%	-[2]	-[2]	
ORP	mV	-[2]	-[2]	
SPC	µs/cm	-[2]	-[2]	
Temperature	°C	-[2]	-[2]	
Turbidity	FNU	-[2]	-[2]	
pH	Units	-[2]	-[2]	

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[2] Field parameters included for current sampling year only.
-- - No data.

Table 99: WC-OW18-76

		WC-OW18-76		
		2016	2017	2018
Parameter	**Units**	**Average**		**WELL DECOMMISSIONED**
pH	pH	--	7.97	
Alkalinity	mg/L as $CaCO_3$	--	200	
Carbonate	mg/L as $CaCO_3$	--	1.7	
Bicarbonate	mg/L as $CaCO_3$	--	200	
Total Dissolved Solids	mg/L	--	246	
Fluoride	mg/L	--	< 0.10	
Total Organic Carbon	mg/L	--	5.70	
Dissolved Organic Carbon	mg/L	-[1]	0.91	
Ammonia+Ammonium (N)	as N mg/L	-[1]	< 0.050	
Chloride (dissolved)	mg/L	--	19.0	
Sulphate (dissolved)	mg/L	--	12	
Bromide (dissolved)	mg/L	--	< 1.0	
Nitrite (as N)	as N mg/L	--	< 0.010	
Nitrate (as N)	as N mg/L	-[1]	< 0.10	
Nitrate + Nitrite (as N)	as N mg/L	-[1]	< 0.10	
Mercury (dissolved)	µg/L	--	< 0.10	
Hardness	mg/L as $CaCO_3$	199	200	
Silver (dissolved)	µg/L	0.05	< 0.10	
Aluminum (dissolved)	µg/L	3.0	< 5.0	
Arsenic (dissolved)	µg/L	2.0	4.0	
Barium (dissolved)	µg/L	23	27	
Beryllium (dissolved)	µg/L	0.3	< 0.50	
Boron (dissolved)	µg/L	10	< 10	
Bismuth (dissolved)	µg/L	0.5	< 1.0	
Calcium (dissolved)	µg/L	58700	65000	
Cadmium (dissolved)	µg/L	0.06	< 0.10	
Cobalt (dissolved)	µg/L	0.72	< 0.50	
Chromium (dissolved)	µg/L	2.7	< 5.0	
Copper (dissolved)	µg/L	0.85	< 1.0	
Iron (dissolved)	µg/L	447	2100	
Potassium (dissolved)	µg/L	980	770	
Magnesium (dissolved)	µg/L	7405	8500	
Manganese (dissolved)	µg/L	147	55	
Molybdenum (dissolved)	µg/L	3.0	0.97	
Sodium (dissolved)	µg/L	19900	20000	
Nickel (dissolved)	µg/L	5.1	3.2	
Phosphorus (dissolved)	µg/L	---	850	
Lead (dissolved)	µg/L	0.3	< 0.50	
Antimony (dissolved)	µg/L	0.4	< 0.50	
Selenium (dissolved)	µg/L	1.1	< 2.0	
Tin (dissolved)	µg/L	0.5	< 1.0	
Strontium (dissolved)	µg/L	161	170	
Titanium (dissolved)	µg/L	2.5	< 5.0	
Thallium (dissolved)	µg/L	0.03	< 0.050	
Uranium (dissolved)	µg/L	**99**	**120**	
Vanadium (dissolved)	µg/L	0.3	< 0.50	
Zinc (dissolved)	µg/L	739	**1200**	
Lead-210	Bq/L	< 0.02	< 0.02	
Radium-226	Bq/L	0.035	< 0.040	
Thorium-230	Bq/L	0.040	< 0.070	
Thorium-232	Bq/L	-[1]	< 0.060	
Field Parameters				
ODO % Sat	%	-[2]	-[2]	
ORP	mV	-[2]	-[2]	
SPC	µs/cm	-[2]	-[2]	
Temperature	°C	-[2]	-[2]	
Turbidity	FNU	-[2]	-[2]	
pH	Units	-[2]	-[2]	

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[2] Field parameters included for current sampling year only.
-- - No data.

Table 100: WC-OW25-76

		WC-OW25-76							
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**Average**					2021-04-15	2021-12-01	**Average**
pH	pH	--	7.77	--	8.19	7.75	-[4]	-[4]	--
Alkalinity	mg/L as $CaCO_3$	--	160	--	140	163	-[4]	-[4]	--
Carbonate	mg/L as $CaCO_3$	--	< 1.0	--	2.1	< 1.0	-[4]	-[4]	--
Bicarbonate	mg/L as $CaCO_3$	--	--	--	140	163	-[4]	-[4]	--
Total Dissolved Solids	mg/L	--	--	--	--	160	-[4]	-[4]	--
Fluoride	mg/L	--	--	--	--	0.24	-[4]	-[4]	--
Total Organic Carbon	mg/L	--	2.3	--	--	< 1.0	-[4]	-[4]	--
Dissolved Organic Carbon	mg/L	--	2.9	--	--	1.0	-[4]	-[4]	--
Ammonia+Ammonium (N)	as N mg/L	--	1.7	--	--	0.07	-[4]	-[4]	--
Chloride (dissolved)	mg/L	--	--	--	--	1.9	-[4]	-[4]	--
Sulphate (dissolved)	mg/L	--	--	--	--	14	-[4]	-[4]	--
Bromide (dissolved)	mg/L	--	--	--	--	< 0.30	-[4]	-[4]	--
Nitrite (as N)	as N mg/L	--	--	--	--	< 0.03	-[4]	-[4]	--
Nitrate (as N)	as N mg/L	--	--	--	--	< 0.06	-[4]	-[4]	--
Nitrate + Nitrite (as N)	as N mg/L	--	--	--	--	< 0.06	-[4]	-[4]	--
Mercury (dissolved)	µg/L	0.06	< 0.10	--	< 0.10	< 0.01	-[4]	-[4]	--
Hardness	mg/L as $CaCO_3$	123	--	110	115	159	-[4]	-[4]	--
Silver (dissolved)	µg/L	0.01	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	-[4]	< 0.05
Aluminum (dissolved)	µg/L	2.0	8.0	< 5.0	< 5.0	2.0	1.0	-[4]	1.0
Arsenic (dissolved)	µg/L	1.6	< 1.0	< 1.0	< 1.0	0.8	0.7	-[4]	0.7
Barium (dissolved)	µg/L	27	30	25	35	69.50	35	-[4]	35
Beryllium (dissolved)	µg/L	< 0.01	< 0.50	< 0.50	< 0.50	< 0.007	< 0.007	-[4]	< 0.007
Boron (dissolved)	µg/L	71	70	62	63	41	61	-[4]	61
Bismuth (dissolved)	µg/L	< 0.0	< 1.0	< 1.0	< 1.0	< 0.007	< 0.007	-[4]	< 0.007
Calcium (dissolved)	µg/L	30000	28000	26500	25500	27700	33600	-[4]	33600
Cadmium (dissolved)	µg/L	0.01	< 0.10	< 0.10	< 0.10	< 0.003	0.005	-[4]	0.005
Cobalt (dissolved)	µg/L	0.20	< 0.50	< 0.50	< 0.50	0.097	0.04	-[4]	0.04
Chromium (dissolved)	µg/L	0.3	< 5.0	< 5.0	< 5.0	0.32	0.2	-[4]	0.2
Copper (dissolved)	µg/L	0.1	< 1.0	< 1.0	< 1.0	0.25	< 0.2	-[4]	< 0.2
Iron (dissolved)	µg/L	34	< 100	< 100	< 100	1289	29	-[4]	29
Potassium (dissolved)	µg/L	696	955	695	715	760	716	-[4]	716
Magnesium (dissolved)	µg/L	11700	11000	11500	11500	12600	14900	-[4]	14900
Manganese (dissolved)	µg/L	4	30	5	12	28	10.5	-[4]	10.5
Molybdenum (dissolved)	µg/L	1.7	1.6	1.5	1.7	1.35	1.2	-[4]	1.2
Sodium (dissolved)	µg/L	11200	11000	11000	10500	9385	11100	-[4]	11100
Nickel (dissolved)	µg/L	0.2	< 1.0	< 1.0	< 1.0	0.3	< 0.1	-[4]	< 0.1
Phosphorus (dissolved)	µg/L	--	410	--	--	6	< 3	-[4]	< 3
Lead (dissolved)	µg/L	0.01	< 0.50	< 0.50	< 0.50	0.07	0.01	-[4]	0.01
Antimony (dissolved)	µg/L	0.30	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	-[4]	< 0.90
Selenium (dissolved)	µg/L	0.1	< 2.0	< 2.0	< 2.0	< 0.04	0.05	-[4]	0.05
Tin (dissolved)	µg/L	0.1	< 1.0	< 1.0	< 1.0	0.08	< 0.06	-[4]	< 0.06
Strontium (dissolved)	µg/L	444	420	430	425	402	676	-[4]	676
Titanium (dissolved)	µg/L	0.1	< 5.0	< 5.0	< 5.0	0.07	< 0.05	-[4]	< 0.05
Thallium (dissolved)	µg/L	0.005	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	-[4]	< 0.005
Uranium (dissolved)	µg/L	0.31	0.12	0.11	0.14	0.142	0.13	-[4]	0.13
Vanadium (dissolved)	µg/L	1.6	1.4	1.5	3.2	0.88	1.47	-[4]	1.47
Zinc (dissolved)	µg/L	2.0	< 5.0	< 5.0	< 5.0	10	2.0	-[4]	2.0
Lead-210	Bq/L	0.02	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.035	< 0.040	< 0.040	< 0.040	0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.010	< 0.070	< 0.070	< 0.070	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	-[1]	< 0.060	< 0.060	< 0.060	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	-[3]	--
ORP	mV	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	-[3]	--
SPC	µs/cm	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	-[3]	--
Temperature	°C	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	-[3]	--
Turbidity	FNU	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	-[3]	--
pH	Units	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	-[3]	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria.

[1] Analysis not included in laboratory contract.

[2] Field parameters included for current sampling year only.

[3] Insufficient volume of groundwater for field parameters

[4] Insufficient volume of groundwater for full sample collection

-- - No data.

Table 101: WC-OW27-76

		WC-OW27-76							
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**Average**					2021-04-15	2021-12-01	**Average**
pH	pH	---	8.00	7.88	8.04	7.81	7.63	7.60	7.62
Alkalinity	mg/L as $CaCO_3$	205	215	210	210	255	217	214	216
Carbonate	mg/L as $CaCO_3$	< 2.0	2.1	1.5	2.1	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	205	210	210	205	255	217	214	216
Total Dissolved Solids	mg/L	292	338	680	390	353	343	409	376
Fluoride	mg/L	0.14	0.14	0.13	0.11	0.14	0.11	0.23	0.17
Total Organic Carbon	mg/L	< 1.0	1.4	9.4	1.6	1.0	1.0	1.0	1.0
Dissolved Organic Carbon	mg/L	-[1]	1.2	1.3	1.3	1.5	1.0	1.0	1.0
Ammonia+Ammonium (N)	as N mg/L	-[1]	0.093	0.210	0.077	0.065	0.10	0.10	0.10
Chloride (dissolved)	mg/L	20	28	31	46	54	67	91	79
Sulphate (dissolved)	mg/L	31	29	26	31	32	33	32	33
Bromide (dissolved)	mg/L	< 0.3	< 1.0	< 1.0	< 1.0	< 0.3	< 0.3	0.7	0.5
Nitrite (as N)	as N mg/L	-[1]	< 0.010	0.022	0.023	< 0.030	< 0.030	< 0.030	< 0.030
Nitrate (as N)	as N mg/L	---	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	0.07	0.07
Nitrate + Nitrite (as N)	as N mg/L	---	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	0.07	0.07
Mercury (dissolved)	µg/L	0.06	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$	255	270	250	305	417	351	351	351
Silver (dissolved)	µg/L	0.05	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L	3.0	< 5.0	< 5.0	< 5.0	2.0	2.0	1.0	1.5
Arsenic (dissolved)	µg/L	0.9	< 1.0	< 1.0	< 1.0	0.4	0.3	0.4	0.4
Barium (dissolved)	µg/L	113	125	110	155	158	152	160	156
Beryllium (dissolved)	µg/L	0.25	< 0.50	< 0.50	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	51	45	46	40	39	39	50	45
Bismuth (dissolved)	µg/L	0.5	< 1.0	< 1.0	< 1.0	< 0.0	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L	67000	70000	65500	82500	88300	96200	94900	95550
Cadmium (dissolved)	µg/L	0.05	< 0.10	< 0.10	< 0.10	0.01	< 0.003	0.006	0.005
Cobalt (dissolved)	µg/L	0.61	< 0.50	< 0.50	< 0.50	0.05	0.07	0.06	0.07
Chromium (dissolved)	µg/L	2.6	< 5.0	< 5.0	< 5.0	0.3	0.2	0.2	0.2
Copper (dissolved)	µg/L	0.3	< 1.0	< 1.0	< 1.0	0.3	0.3	0.2	0.3
Iron (dissolved)	µg/L	55	< 100	< 100	< 100	8	< 7	9	8
Potassium (dissolved)	µg/L	802	820	810	885	939	892	1020	956
Magnesium (dissolved)	µg/L	21500	22000	21500	23500	24700	26900	23600	25250
Manganese (dissolved)	µg/L	20	19	78	46	36	37.7	37.4	37.6
Molybdenum (dissolved)	µg/L	0.70	0.56	0.55	0.51	0.52	0.46	0.49	0.48
Sodium (dissolved)	µg/L	9320	9650	9700	11000	12450	14700	13700	14200
Nickel (dissolved)	µg/L	0.7	< 1.0	< 1.0	1.2	0.5	0.3	0.7	0.5
Phosphorus (dissolved)	µg/L	30	47	18	38	< 3	< 3	< 3	< 3
Lead (dissolved)	µg/L	0.26	< 0.50	< 0.50	< 0.50	0.02	< 0.01	0.17	0.09
Antimony (dissolved)	µg/L	0.35	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	1.0	< 2.0	< 2.0	< 2.0	< 0.0	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L	0.5	< 1.0	< 1.0	< 1.0	< 0.1	< 0.06	0.09	0.08
Strontium (dissolved)	µg/L	688	695	715	765	928	993	836	915
Titanium (dissolved)	µg/L	2.5	< 5.0	< 5.0	< 5.0	0.1	0.08	0.12	0.10
Thallium (dissolved)	µg/L	0.028	< 0.050	< 0.050	< 0.050	0.006	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	0.16	0.14	0.15	0.13	0.14	0.13	0.13	0.13
Vanadium (dissolved)	µg/L	0.60	0.54	< 0.50	< 0.50	0.56	0.41	0.43	0.42
Zinc (dissolved)	µg/L	3.5	< 5.0	< 5.0	< 5.0	2.0	7.0	4.0	5.5
Lead-210	Bq/L	< 0.02	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.040	< 0.040	< 0.040	< 0.040	0.010	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	< 0.010	< 0.070	< 0.070	< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	-[1]	< 0.060	< 0.060	< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	-[3]	--
ORP	mV	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	-[3]	--
SPC	µs/cm	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	-[3]	--
Temperature	°C	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	-[3]	--
Turbidity	FNU	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	-[3]	--
pH	Units	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	-[3]	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
[3] Insufficient volume of groundw ater for field parameters
-- - No data.

Table 102: WC-OW28-76

		WC-OW28-76							
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**Average**					2021-04-15	2021-12-01	**Average**
pH	pH	--	--	--	8.19	8.10	-[4]	-[4]	--
Alkalinity	mg/L as $CaCO_3$	--	--	--	140	132	-[4]	-[4]	--
Carbonate	mg/L as $CaCO_3$	--	--	--	2.05	< 1	-[4]	-[4]	--
Bicarbonate	mg/L as $CaCO_3$	--	--	--	140	132	-[4]	-[4]	--
Total Dissolved Solids	mg/L	--	--	--	205	166	-[4]	-[4]	--
Fluoride	mg/L	--	--	--	0.22	0.24	-[4]	-[4]	--
Total Organic Carbon	mg/L	--	1.2	--	1.3	1.0	-[4]	-[4]	--
Dissolved Organic Carbon	mg/L	--	--	--	1.0	1.0	-[4]	-[4]	--
Ammonia+Ammonium (N)	as N mg/L	--	0.079	--	0.067	< 0.040	-[4]	-[4]	--
Chloride (dissolved)	mg/L	--	--	--	16	18	-[4]	-[4]	--
Sulphate (dissolved)	mg/L	--	--	--	13	12	-[4]	-[4]	--
Bromide (dissolved)	mg/L	--	--	--	1	< 0	-[4]	-[4]	--
Nitrite (as N)	as N mg/L	--	--	--	0	< 0	-[4]	-[4]	--
Nitrate (as N)	as N mg/L	--	--	--	< 0	< 0	-[4]	-[4]	--
Nitrate + Nitrite (as N)	as N mg/L	--	--	--	0	< 0	-[4]	-[4]	--
Mercury (dissolved)	µg/L	< 0.01	< 0.10	< 0.10	< 0.10	< 0.01	-[4]	-[4]	--
Hardness	mg/L as $CaCO_3$	156	--	120	130	146	-[4]	-[4]	--
Silver (dissolved)	µg/L	< 0.00	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	-[4]	< 0.05
Aluminum (dissolved)	µg/L	< 1.0	< 5.0	6.7	< 5.0	1.5	13.0	-[4]	13.0
Arsenic (dissolved)	µg/L	1.0	< 1.0	< 1.0	< 1.0	0.6	0.5	-[4]	0.5
Barium (dissolved)	µg/L	67	64	63	73	81	101	-[4]	101
Beryllium (dissolved)	µg/L	< 0.01	< 0.50	< 0.50	< 0.50	< 0.01	< 0.007	-[4]	< 0.007
Boron (dissolved)	µg/L	89	81	74	80	93	80	-[4]	80
Bismuth (dissolved)	µg/L	< 0.0	< 1.0	< 1.0	< 1.0	< 0.0	< 0.007	-[4]	< 0.007
Calcium (dissolved)	µg/L	36000	29500	28000	30000	34600	41900	-[4]	41900
Cadmium (dissolved)	µg/L	< 0.00	< 0.10	< 0.10	< 0.10	0.00	< 0.003	-[4]	< 0.003
Cobalt (dissolved)	µg/L	0.23	< 0.50	< 0.50	< 0.50	0.03	0.034	-[4]	0.034
Chromium (dissolved)	µg/L	0.4	< 5.0	< 5.0	< 5.0	0.4	0.29	-[4]	0.29
Copper (dissolved)	µg/L	0.1	< 1.0	< 1.0	< 1.0	0.5	1.20	-[4]	1.20
Iron (dissolved)	µg/L	14	< 100	< 100	< 100	< 7	14	-[4]	14
Potassium (dissolved)	µg/L	760	710	690	715	747	842	-[4]	842
Magnesium (dissolved)	µg/L	16000	13500	12500	13500	14600	18800	-[4]	18800
Manganese (dissolved)	µg/L	9.4	6.5	3.0	< 2.4	3.0	2.2	-[4]	2.20
Molybdenum (dissolved)	µg/L	1.5	1.6	1.5	1.6	1.2	1.21	-[4]	1.21
Sodium (dissolved)	µg/L	12200	11000	11000	11000	11750	14500	-[4]	14500
Nickel (dissolved)	µg/L	0.4	< 1.0	< 1.0	< 1.0	0.4	1.00	-[4]	1.0
Phosphorus (dissolved)	µg/L	--	9	--	7	4	< 3	-[4]	< 3
Lead (dissolved)	µg/L	0.14	< 0.50	< 0.50	< 0.50	0.05	0.04	-[4]	0.04
Antimony (dissolved)	µg/L	0.20	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	-[4]	< 0.90
Selenium (dissolved)	µg/L	< 0.0	< 2.0	< 2.0	< 2.0	< 0.0	< 0.04	-[4]	< 0.04
Tin (dissolved)	µg/L	0.1	< 1.0	< 1.0	< 1.0	< 0.1	< 0.06	-[4]	< 0.06
Strontium (dissolved)	µg/L	653	500	520	525	686	892	-[4]	892
Titanium (dissolved)	µg/L	< 0.1	< 5.0	< 5.0	< 5.0	0.1	0.77	-[4]	0.77
Thallium (dissolved)	µg/L	< 0.005	< 0.050	< 0.050	< 0.050	< 0.005	< 0.005	-[4]	< 0.005
Uranium (dissolved)	µg/L	0.26	0.17	0.17	0.16	0.17	0.19	-[4]	0.19
Vanadium (dissolved)	µg/L	0.63	< 0.50	< 0.50	2.76	0.84	0.64	-[4]	0.64
Zinc (dissolved)	µg/L	4.0	< 5.0	< 5.0	< 5.0	3.5	< 2.0	-[4]	< 2.0
Lead-210	Bq/L	< 0.02	< 0.02	< 0.10	< 0.10	0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.030	< 0.040	< 0.040	< 0.040	0.010	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.010	< 0.070	< 0.070	< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	-[1]	< 0.060	< 0.060	< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[2]	-[2]	-[2]	-[2]	-	-[3]	-[3]	--
ORP	mV	-[2]	-[2]	-[2]	-[2]	-	-[3]	-[3]	--
SPC	µs/cm	-[2]	-[2]	-[2]	-[2]	-	-[3]	-[3]	--
Temperature	°C	-[2]	-[2]	-[2]	-[2]	-	-[3]	-[3]	--
Turbidity	FNU	-[2]	-[2]	-[2]	-[2]	-	-[3]	-[3]	--
pH	Units	-[2]	-[2]	-[2]	-[2]	-	-[3]	-[3]	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria.
[1] Analysis not included in laboratory contract.
[2] Field parameters included for current sampling year only.
[3] Insufficient volume of groundw ater for field parameters
[4] Insufficient volume of groundw ater for full sample collection
-- - No data.

Table 103: WC-OW33-76

		WC-OW33-76							
		2016	2017	2018	2019	2020	2021		
Parameter	**Units**	**Average**					2021-05-20	2021-12-09	**Average**
pH	pH	7.62	7.82	7.85	7.63	7.36	7.62	7.58	7.60
Alkalinity	mg/L as $CaCO_3$	390	380	385	370	380	1053	454	754
Carbonate	mg/L as $CaCO_3$	1.8	2.4	2.7	1.5	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$	385	380	385	370	380	1050	454	752
Total Dissolved Solids	mg/L	438	445	423	435	460	446	474	460
Fluoride	mg/L	0.10	< 0.10	< 0.10	< 0.10	0.07	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L	2.5	2.9	2.6	2.5	2.0	2.0	2.0	2.0
Dissolved Organic Carbon	mg/L	2.40	2.2	2.2	2.0	2.5	3.0	2.0	2.5
Ammonia+Ammonium (N)	as N mg/L	< 0.050	< 0.050	0.058	< 0.050	0.040	< 0.04	< 0.04	< 0.04
Chloride (dissolved)	mg/L	2.7	4.8	5.0	6.8	23.5	30	12	21
Sulphate (dissolved)	mg/L	30	34	30	30	27	28	27	28
Bromide (dissolved)	mg/L	0.7	< 1.0	< 1.0	< 1.0	0.4	0.4	< 0.3	0.4
Nitrite (as N)	as N mg/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.030	< 0.030	< 0.030	< 0.030
Nitrate (as N)	as N mg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	0.06	< 0.10	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness	mg/L as $CaCO_3$	253	265	265	295	337	10100	493	5297
Silver (dissolved)	µg/L	0.05	< 0.10	< 0.10	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L	3.5	< 5.0	< 5.0	5.7	93.5	< 1.0	< 1.0	< 1.0
Arsenic (dissolved)	µg/L	2.0	1.4	< 1.0	< 1.0	1.2	0.5	0.7	0.6
Barium (dissolved)	µg/L	74	78	78	77	76	91	83	87
Beryllium (dissolved)	µg/L	0.25	< 0.50	< 0.50	< 0.50	0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	46	38	38	43	92	39	37	38
Bismuth (dissolved)	µg/L	0.5	< 1.0	< 1.0	< 1.0	< 0.0	< 0.010	< 0.010	< 0.010
Calcium (dissolved)	µg/L	87500	91000	92500	99500	68450	119000	110000	114500
Cadmium (dissolved)	µg/L	0.05	< 0.10	< 0.10	< 0.10	< 0.00	0.003	< 0.003	0.003
Cobalt (dissolved)	µg/L	0.58	< 0.50	< 0.50	< 0.50	0.12	0.13	0.36	0.24
Chromium (dissolved)	µg/L	2.7	< 5.0	< 5.0	< 5.0	0.7	0.2	0.1	0.1
Copper (dissolved)	µg/L	0.3	< 1.0	< 1.0	< 1.0	0.5	< 0.2	0.6	0.4
Iron (dissolved)	µg/L	1335	910	240	410	139	33	14	24
Potassium (dissolved)	µg/L	1145	1100	1100	1150	1545	1260	1370	1315
Magnesium (dissolved)	µg/L	8865	9050	9000	10000	14950	10900	10100	10500
Manganese (dissolved)	µg/L	63	64	65	87	58	84	157	121
Molybdenum (dissolved)	µg/L	3.1	2.9	2.8	3.0	4.9	2.79	3.94	3.37
Sodium (dissolved)	µg/L	75300	69000	61000	61000	47250	54500	62900	58700
Nickel (dissolved)	µg/L	1.4	1.3	< 1.0	< 1.0	0.3	0.3	0.9	0.6
Phosphorus (dissolved)	µg/L	31	264	45	52	17	< 3	< 3	< 3
Lead (dissolved)	µg/L	0.26	< 0.50	< 0.50	< 0.50	0.16	< 0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	0.35	< 0.50	< 0.50	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	1.0	< 2.0	< 2.0	< 2.0	0.1	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L	0.5	< 1.0	< 1.0	< 1.0	0.1	< 0.06	0.10	0.08
Strontium (dissolved)	µg/L	195	195	200	205	538	247	223	235
Titanium (dissolved)	µg/L	2.6	< 5.0	< 5.0	< 5.0	5.0	< 0.05	< 0.05	< 0.05
Thallium (dissolved)	µg/L	0.028	< 0.050	< 0.050	< 0.050	0.013	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	2.6	2.5	2.1	2.0	1.5	4.15	2.55	3.35
Vanadium (dissolved)	µg/L	0.28	< 0.50	< 0.50	< 0.50	0.88	0.03	< 0.01	0.02
Zinc (dissolved)	µg/L	7.0	7.2	6.2	< 5.0	< 2.0	< 2.0	< 2.0	< 2.0
Lead-210	Bq/L	< 0.02	< 0.02	< 0.10	< 0.10	< 0.02	< 0.02	< 0.03	0.03
Radium-226	Bq/L	0.025	< 0.040	< 0.040	< 0.040	0.010	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	0.040	< 0.070	< 0.070	< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L	-[1]	-[1]	< 0.060	< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters									
ODO % Sat	%	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	66.4	--
ORP	mV	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	--	--
SPC	µs/cm	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	757	--
Temperature	°C	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	10.158	--
Turbidity	FNU	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	2332.6	--
pH	Units	-[2]	-[2]	-[2]	-[2]	-[2]	-[3]	--	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground W[3] Insufficient volume of groundw ater for field parameters
Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria.

[1] Analysis not included in laboratory contract.

[2] Field parameters included for current sampling year only.

[3] Insufficient volume of groundw ater for field parameters

-- - No data.

Appendix D HIGHLAND DRIVE GROUNDWATER RESULTS

Table 104: PH-02-01

		Criteria		PH-02-01				
		COPC	Table 3	2019	2020	2021		
Analysis	**Units**		(MECP)	Average		2021/03/25	2021/11/12	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.46	7.43	7.50	7.41	7.46
Alkalinity	mg/L as $CaCO_3$			325	318	433	434	434
Carbonate	mg/L as $CaCO_3$			1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			325	318	433	434	434
Total Dissolved Solids	mg/L			423	356	477	440	459
Fluoride	mg/L	**1.5**		< 0.10	0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			3.4	2.0	2.0	2.0	2.0
Dissolved Organic Carbon	mg/L			2.3	2.0	2.0	2.0	2.0
Total Ammonia-N	mg/l			0.10	< 0.04	< 0.04	0.04	0.04
Chloride	mg/L			15	8	24	12	18
Sulphate	mg/L			6.4	6.0	11	9.3	10.2
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	0.73	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			0.81	0.61	1.63	3.21	2.42
Nitrate + Nitrite (N)	mg/L			0.81	1.29	1.63	3.21	2.42
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			350	390	435	683	559
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	6	< 1	4	3
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	0.2	< 0.2	< 0.2	< 0.2
Barium (dissolved)	µg/L	**1000**	**29000**	24	22	37	29	33
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	27	25	20	30	25
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			130000	122500	162000	171000	166500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	< 0.003	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		**66**	< 0.50	0.05	0.056	0.055	0.056
Chromium (dissolved)	µg/L		**810**	< 5.0	0.2	0.13	0.15	0.14
Copper (dissolved)	µg/L	**1000**	**87**	1.3	1.6	0.8	1.3	1.1
Iron (dissolved)	µg/L			< 100	10	< 7	< 7	< 7
Potassium (dissolved)	µg/L			2050	2295	3110	2920	3015
Magnesium (dissolved)	µg/L			7100	6485	7460	9210	8335
Manganese (dissolved)	µg/L			< 2.0	1.9	0.06	0.90	0.48
Molybdenum (dissolved)	µg/L		**9200**	0.50	0.44	0.44	0.35	0.40
Sodium (dissolved)	µg/L			3450	5380	5510	4930	5220
Nickel (dissolved)	µg/L		**490**	< 1.0	0.3	< 0.1	0.3	0.2
Phosphorus (total)	µg/L			215	8	< 3	7	5
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	0.02	< 0.01	< 0.09	0.05
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.6	0.38	0.46	0.42
Tin (dissolved)	µg/L			< 1.0	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			200	210	299	277	288
Titanium (dissolved)	µg/L			< 5.0	0.3	0.08	0.24	0.16
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	< 3.4	2.9	2.90	3.15	3.03
Vanadium (dissolved)	µg/L		**250**	< 0.50	0.31	0.25	0.45	0.35
Zinc (dissolved)	µg/L		**1100**	< 5.0	< 2.0	3	< 2	3
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.04	0.02	< 0.01	0.01	0.01
Thorium-230	Bq/L	**0.65**		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	72.1	59.6	--
ORP	mV			-[1]	-[1]	146.7	116.6	--
SPC	us/cm			-[1]	-[1]	708.0	763	--
Temperature	°C			-[1]	-[1]	8.716	11.689	--
Turbidity	FNU			-[1]	-[1]	16.61	130.84	--
pH	Units			-[1]	-[1]	7.20	7.17	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria
[1] Field parameters included for current sampling year only.
-- - No data.

Table 105: PH-02-02

		Criteria		PH-02-02				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/25	2021/11/12	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.47	7.37	7.60	7.39	7.50
Alkalinity	mg/L as $CaCO_3$			335	347	405	375	390
Carbonate	mg/L as $CaCO_3$			1.2	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			335	347	405	375	390
Total Dissolved Solids	mg/L			415	375	423	391	407
Fluoride	mg/L	**1.5**		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			2.6	2.0	2.0	1.0	1.5
Dissolved Organic Carbon	mg/L			2.0	2.5	2.0	2.0	2.0
Total Ammonia-N	mg/l			0.08	0.12	0.13	0.13	0.13
Chloride	mg/L			14	4	13	23	18
Sulphate	mg/L			5.6	5.5	7.7	6.4	7.1
Bromide	mg/L			< 1.0	< 0.3	< 0.3	0.4	0.4
Nitrite (N)	mg/L			0.017	0.500	0.05	< 0.03	0.04
Nitrate (N)	mg/L			0.81	0.67	1.13	0.96	1.05
Nitrate + Nitrite (N)	mg/L			0.82	1.12	1.18	0.96	1.07
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			360	473	365	558	462
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			5	21	54	< 1	28
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	0.3	< 0.2	< 0.2	< 0.2
Barium (dissolved)	µg/L	**1000**	**29000**	37	33	48	48	48
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	34	32	29	30	30
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			130000	131000	136000	153000	144500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	0.005	< 0.003	0.004	0.004
Cobalt (dissolved)	µg/L		**66**	< 0.50	0.13	0.123	0.068	0.096
Chromium (dissolved)	µg/L		**810**	< 5.0	0.1	0.15	< 0.08	0.12
Copper (dissolved)	µg/L	**1000**	**87**	1.6	1.8	1.4	1.3	1.4
Iron (dissolved)	µg/L			< 100	37	< 7	< 7	< 7
Potassium (dissolved)	µg/L			2400	2810	3430	2940	3185
Magnesium (dissolved)	µg/L			7950	8160	6150	7520	6835
Manganese (dissolved)	µg/L			70	195	216	142	179
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.28	0.62	0.29	0.46
Sodium (dissolved)	µg/L			5700	4255	3540	5060	4300
Nickel (dissolved)	µg/L		**490**	< 1.0	0.8	< 0.1	0.4	0.3
Phosphorus (total)	µg/L			73	< 3	< 3	< 3	< 3
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.05	< 0.01	< 0.09	0.05
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.3	0.25	0.39	0.32
Tin (dissolved)	µg/L			< 1.0	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			205	206	248	246	247
Titanium (dissolved)	µg/L			< 5.0	1.1	0.07	< 0.05	0.06
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	2.2	2.1	3.5	2.38	2.94
Vanadium (dissolved)	µg/L		**250**	< 0.50	0.43	0.48	0.26	0.37
Zinc (dissolved)	µg/L		**1100**	< 5.0	< 2.0	< 2	< 2	< 2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.04	< 0.01	< 0.01	0.01	0.01
Thorium-230	Bq/L	**0.65**		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	54.4	42.3	--
ORP	mV			-[1]	-[1]	135.4	123.6	--
SPC	us/cm			-[1]	-[1]	615.0	657	--
Temperature	°C			-[1]	-[1]	9.449	11.356	--
Turbidity	FNU			-[1]	-[1]	211.43	180.41	--
pH	Units			-[1]	-[1]	7.22	7.15	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria
[1] Field parameters included for current sampling year only.
-- - No data.

Table 106: PH-02-03

		Criteria		PH-02-03				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/25	2021/11/12	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.65	7.43	7.54	7.52	7.53
Alkalinity	mg/L as $CaCO_3$			300	285	300	249	275
Carbonate	mg/L as $CaCO_3$			1.3	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			295	285	300	249	275
Total Dissolved Solids	mg/L			403	323	451	483	467
Fluoride	mg/L	**1.5**		< 0.10	0.07	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			2.5	2.0	2.0	2.0	2.0
Dissolved Organic Carbon	mg/L			2.1	2.0	2.0	2.0	2.0
Total Ammonia-N	mg/l			0.13	0.10	0.16	0.15	0.16
Chloride	mg/L			11	7	50	100	75
Sulphate	mg/L			6.9	3.3	6.6	9.6	8.1
Bromide	mg/L			< 1.0	< 0.3	< 0.3	1.7	1.0
Nitrite (N)	mg/L			< 0.010	0.330	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			0.24	0.18	0.25	0.31	0.28
Nitrate + Nitrite (N)	mg/L			0.24	0.47	0.25	0.31	0.28
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			325	345	373	440	407
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	< 1	14	< 1	8
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	< 0.2	< 0.2	< 0.2	< 0.2
Barium (dissolved)	µg/L	**1000**	**29000**	23	20	27	29	28
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	30	22	28	18	23
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			120000	114500	143000	172000	157500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	< 0.003	< 0.003	0.003	0.003
Cobalt (dissolved)	µg/L		**66**	< 0.50	0.13	0.139	0.285	0.212
Chromium (dissolved)	µg/L		**810**	< 5.0	0.1	0.09	< 0.08	0.09
Copper (dissolved)	µg/L	**1000**	**87**	1.7	1.5	1.4	1.8	1.6
Iron (dissolved)	µg/L			< 100	< 7	< 7	< 7	< 7
Potassium (dissolved)	µg/L			1850	2080	3310	3480	3395
Magnesium (dissolved)	µg/L			5700	5330	4200	5900	5050
Manganese (dissolved)	µg/L			475	194	195	668	432
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.23	0.36	0.23	0.30
Sodium (dissolved)	µg/L			5450	3425	7020	4870	5945
Nickel (dissolved)	µg/L		**490**	< 1.0	0.7	0.2	0.7	0.5
Phosphorus (total)	µg/L			11	< 3	< 3	3	3
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.01	< 0.01	< 0.09	0.05
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.1	0.11	0.09	0.10
Tin (dissolved)	µg/L			< 1.0	0.1	0.17	< 0.06	0.12
Strontium (dissolved)	µg/L			185	198	271	260	266
Titanium (dissolved)	µg/L			< 5.0	0.1	0.05	0.05	0.05
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	13.5	10.5	14.1	14.0	14.1
Vanadium (dissolved)	µg/L		**250**	< 0.50	0.16	0.23	0.19	0.21
Zinc (dissolved)	µg/L		**1100**	< 5.0	< 2.0	< 2	< 2	< 2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	0.03	0.03
Radium-226	Bq/L	**0.49**		< 0.04	0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	54.7	33.1	--
ORP	mV			-[1]	-[1]	135.9	127.1	--
SPC	us/cm			-[1]	-[1]	593.0	854	--
Temperature	°C			-[1]	-[1]	9.847	11.049	--
Turbidity	FNU			-[1]	-[1]	19.36	41.02	--
pH	Units			-[1]	-[1]	7.34	7.07	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria
[1] Field parameters included for current sampling year only.
-- - No data.

Table 107: PH-90-3-I

		Criteria		PH-90-3-I				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/29	2021/10/27	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	8.02	7.88	7.88	7.72	7.80
Alkalinity	mg/L as $CaCO_3$			210	260	225	208	217
Carbonate	mg/L as $CaCO_3$			2.1	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			205	260	225	208	217
Total Dissolved Solids	mg/L			465	579	606	437	522
Fluoride	mg/L	**1.5**		< 0.10	0.07	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L			0.5	< 1.0	1.0	< 1.0	< 1.0
Total Ammonia-N	mg/l			0.09	< 0.04	0.04	0.08	0.06
Chloride	mg/L			104	140	160	140	150
Sulphate	mg/L			38	40	36	40	38
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			1.56	1.94	2.29	1.72	2.01
Nitrate + Nitrite (N)	mg/L			1.56	1.94	2.29	1.72	2.01
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	0.01	< 0.01	0.01
Hardness (dissolved)	mg/L as $CaCO_3$			330	807	1070	377	724
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	5	< 1	1	1
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	< 0.2	< 0.2	< 0.2	< 0.2
Barium (dissolved)	µg/L	**1000**	**29000**	275	287	328	289	309
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	15	13	11	14	13
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			84500	98750	125000	100000	112500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	< 0.003	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		**66**	< 0.50	0.17	0.110	0.076	0.093
Chromium (dissolved)	µg/L		**810**	< 5.0	0.2	0.36	0.33	0.35
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	0.4	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L			170	151	203	256	230
Potassium (dissolved)	µg/L			1800	1780	2040	1970	2005
Magnesium (dissolved)	µg/L			28000	31000	36200	30800	33500
Manganese (dissolved)	µg/L			15.0	13.8	11.5	12.7	12.1
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.41	0.33	0.37	0.35
Sodium (dissolved)	µg/L			35000	29500	28400	23700	26050
Nickel (dissolved)	µg/L		**490**	< 1.0	< 0.1	0.1	< 0.1	0.1
Phosphorus (total)	µg/L			4150	< 3	< 3	< 3	< 3
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	0.04	< 0.01	< 0.09	0.05
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.3	0.31	0.27	0.29
Tin (dissolved)	µg/L			< 1.0	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			395	429	545	465	505
Titanium (dissolved)	µg/L			< 5.0	0.2	0.10	0.13	0.12
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	1.7	2.0	2.1	1.65	1.88
Vanadium (dissolved)	µg/L		**250**	< 0.50	0.21	0.27	0.16	0.22
Zinc (dissolved)	µg/L		**1100**	< 5.0	4.0	< 2	< 2	< 2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.04	< 0.01	< 0.01	0.01	0.01
Thorium-230	Bq/L	**0.65**		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	47.9	58	--
ORP	mV			-[1]	-[1]	47.1	-81.7	--
SPC	us/cm			-[1]	-[1]	860.0	732	--
Temperature	°C			-[1]	-[1]	9.230	10.339	--
Turbidity	FNU			-[1]	-[1]	250.66	293.72	--
pH	Units			-[1]	-[1]	7.72	7.65	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 108: PH-90-4-III

		Criteria		PH-90-4-III				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/29	2021/10/27	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	6.81	6.76	6.66	6.56	6.61
Alkalinity	mg/L as $CaCO_3$			740	669	664	694	679
Carbonate	mg/L as $CaCO_3$			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			740	669	664	694	679
Total Dissolved Solids	mg/L			2735	3920	4394	3920	4157
Fluoride	mg/L	**1.5**		< 0.10	0.52	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			3.8	2.5	4.0	6.0	5.0
Dissolved Organic Carbon	mg/L			3.2	3.5	5.0	6.0	5.5
Total Ammonia-N	mg/l			0.48	0.44	0.36	0.28	0.32
Chloride	mg/L			1215	1800	2200	1800	2000
Sulphate	mg/L			19	28	27	28	28
Bromide	mg/L			7.5	0.4	< 3.0	0.5	1.8
Nitrite (N)	mg/L			0.023	< 0.30	< 0.30	< 0.30	< 0.30
Nitrate (N)	mg/L			< 0.10	< 0.06	< 0.60	0.16	0.38
Nitrate + Nitrite (N)	mg/L			< 0.10	0.45	< 0.60	< 0.30	0.45
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			1300	1614	2440	1540	1990
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	2	< 1	1	1
Arsenic (dissolved)	µg/L	**25**	**1900**	7.3	8.1	12.0	11.9	12.0
Barium (dissolved)	µg/L	**1000**	**29000**	305	352	591	469	530
Beryllium (dissolved)	µg/L		**67**	< 0.50	0.012	0.008	0.007	0.008
Boron (dissolved)	µg/L	**5000**	**45000**	300	501	1360	2810	2085
Bismuth (dissolved)	µg/L			< 1.0	0.024	0.018	< 0.010	0.014
Calcium (dissolved)	µg/L			450000	544500	770000	549000	659500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	0.007	0.006	0.011	0.009
Cobalt (dissolved)	µg/L		**66**	15	16.7	32.1	25.1	28.6
Chromium (dissolved)	µg/L		**810**	< 5.0	0.33	0.63	0.48	0.56
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	1.7	0.3	0.3	0.3
Iron (dissolved)	µg/L			48500	47150	76400	61500	68950
Potassium (dissolved)	µg/L			2050	2365	2880	2280	2580
Magnesium (dissolved)	µg/L			41500	38150	55900	42000	48950
Manganese (dissolved)	µg/L			4150	4900	6890	4390	5640
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.36	0.32	0.38	0.35
Sodium (dissolved)	µg/L			525000	715500	878000	699000	788500
Nickel (dissolved)	µg/L		**490**	4.3	5.8	10.3	8.1	9.2
Phosphorus (total)	µg/L			23	7	3	11	7
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.01	0.02	< 0.09	< 0.06
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.21	0.12	0.14	0.13
Tin (dissolved)	µg/L			< 1.0	0.13	0.14	0.19	0.17
Strontium (dissolved)	µg/L			1010	1355	2000	1440	1720
Titanium (dissolved)	µg/L			< 5.0	0.34	0.34	0.33	0.34
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.005	< 0.005	0.005	0.005
Uranium (dissolved)	µg/L	**20**	**420**	**30**	**40**	**80**	**54**	**67**
Vanadium (dissolved)	µg/L		**250**	< 0.50	0.39	0.42	0.42	0.42
Zinc (dissolved)	µg/L		**1100**	< 5.0	3	2	< 2	2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	0.04	0.03
Radium-226	Bq/L	**0.49**		< 0.04	0.03	0.05	0.04	0.05
Thorium-230	Bq/L	**0.65**		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	31.9	38.8	--
ORP	mV			-[1]	-[1]	-61.9	-49.2	--
SPC	us/cm			-[1]	-[1]	63.8	6477	--
Temperature	°C			-[1]	-[1]	10.918	12.123	--
Turbidity	FNU			-[1]	-[1]	26.34	14.42	--
pH	Units			-[1]	-[1]	6.52	6.50	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 109: PH-90-6-I

		Criteria		PH-90-6-I				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/31	2021/12/03	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.69	7.65	7.39	7.53	7.46
Alkalinity	mg/L as $CaCO_3$			155	165	160	166	163
Carbonate	mg/L as $CaCO_3$			1.1	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			150	165	160	166	163
Total Dissolved Solids	mg/L			2960	3105	3240	3270	3255
Fluoride	mg/L	**1.5**		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			0.7	1.0	< 1.0	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L			0.6	1.0	< 1.0	< 1.0	< 1.0
Total Ammonia-N	mg/l			0.10	0.07	0.05	0.10	0.08
Chloride	mg/L			1750	1800	1900	2100	2000
Sulphate	mg/L			36	38	38	40	39
Bromide	mg/L			3	2	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.300	< 0.30	< 0.30	< 0.30
Nitrate (N)	mg/L			< 0.10	0.33	< 0.06	0.10	0.08
Nitrate + Nitrite (N)	mg/L			< 0.10	0.33	< 0.30	< 0.30	< 0.30
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			1200	1185	1510	1160	1335
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	< 1	< 1	2	2
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	0.8	0.6	0.4	0.5
Barium (dissolved)	µg/L	**1000**	**29000**	575	551	631	507	569
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	17	20	64	20	42
Bismuth (dissolved)	µg/L			< 1.0	0.011	0.019	< 0.010	0.015
Calcium (dissolved)	µg/L			300000	319500	397000	319000	358000
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	< 0.003	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		**66**	< 1	0.255	0.610	0.243	0.427
Chromium (dissolved)	µg/L		**810**	< 5.0	1.0	0.68	0.20	0.44
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	0.2	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L			1500	1510	2220	1390	1805
Potassium (dissolved)	µg/L			4150	4555	5810	4180	4995
Magnesium (dissolved)	µg/L			105000	96800	118000	100000	109000
Manganese (dissolved)	µg/L			46.5	46.3	54.3	44.9	49.6
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.32	0.44	0.46	0.45
Sodium (dissolved)	µg/L			620000	635000	816000	715000	765500
Nickel (dissolved)	µg/L		**490**	< 1.0	0.3	0.2	0.2	0.2
Phosphorus (total)	µg/L			16	7	8	< 3	6
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.01	< 0.01	< 0.09	0.05
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.1	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L			< 1.0	0.4	< 0.06	0.19	0.13
Strontium (dissolved)	µg/L			1700	1770	2150	1760	1955
Titanium (dissolved)	µg/L			< 5.0	0.1	< 0.05	< 0.05	< 0.05
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	1	1	1.3	1.55	1.45
Vanadium (dissolved)	µg/L		**250**	< 0.50	0.25	0.10	0.30	0.20
Zinc (dissolved)	µg/L		**1100**	< 5.0	< 2.0	3	9	6
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	0.02	0.02
Radium-226	Bq/L	**0.49**		< 0.04	0.03	0.01	0.02	0.02
Thorium-230	Bq/L	**0.65**		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	87.0	52.8	--
ORP	mV			-[1]	-[1]	-26.0	-1.8	--
SPC	us/cm			-[1]	-[1]	5382.0	5796.4	--
Temperature	°C			-[1]	-[1]	9.417	9.299	--
Turbidity	FNU			-[1]	-[1]	33.64	43.26	--
pH	Units			-[1]	-[1]	7.50	7.41	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 110: PH-90-6-II

		Criteria		PH-90-6-II				
		COPC	Table 3	2019	2020	2021		
Analysis	**Units**		**(MECP)**	**Average**		2021/03/31	2021/12/03	**Average**
pH	pH	**6.5-8.5**	**6.5-9.0**	7.55	7.41	7.24	7.60	7.42
Alkalinity	mg/L as $CaCO_3$			765	456	341	314	328
Carbonate	mg/L as $CaCO_3$			3.5	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			765	456	341	314	328
Total Dissolved Solids	mg/L			880	667	560	514	537
Fluoride	mg/L	**1.5**		0.11	0.13	0.11	0.11	0.11
Total Organic Carbon	mg/L			20	8	2	2	2
Dissolved Organic Carbon	mg/L			20	7	2	2	2
Total Ammonia-N	mg/l			44	20	9.5	2.7	6.1
Chloride	mg/L			133	115	160	130	145
Sulphate	mg/L			14	28	41	41	41
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (N)	mg/L			< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			540	431	492	401	447
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	< 1.0	< 1	1	1
Arsenic (dissolved)	µg/L	**25**	**1900**	9.9	10.4	15.1	11.2	13.2
Barium (dissolved)	µg/L	**1000**	**29000**	910	477	382	230	306
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	605	140	75	125	100
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			140000	125000	137000	112000	124500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	< 0.003	< 0.003	0.003	0.003
Cobalt (dissolved)	µg/L		**66**	1.22	0.38	0.230	0.093	0.162
Chromium (dissolved)	µg/L		**810**	< 5.0	0.3	0.36	0.24	0.30
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	< 0.2	1.1	< 0.2	0.7
Iron (dissolved)	µg/L			13700	10320	7240	6150	6695
Potassium (dissolved)	µg/L			35500	16250	9590	3420	6505
Magnesium (dissolved)	µg/L			49000	40150	36300	30500	33400
Manganese (dissolved)	µg/L			235	219	169	171	170
Molybdenum (dissolved)	µg/L		**9200**	0.50	0.47	0.91	0.84	0.88
Sodium (dissolved)	µg/L			109000	53150	58300	53400	55850
Nickel (dissolved)	µg/L		**490**	12.6	3.7	0.9	0.6	0.8
Phosphorus (total)	µg/L			255	18	11	< 3	7
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.01	0.04	< 0.09	0.07
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.1	< 0.04	< 0.04	< 0.04
Tin (dissolved)	µg/L			< 1.0	0.5	0.08	< 0.06	0.07
Strontium (dissolved)	µg/L			745	544	435	355	395
Titanium (dissolved)	µg/L			< 5.0	0.1	0.11	0.19	0.15
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	< 0.1	0.1	0.1	0.04	0.05
Vanadium (dissolved)	µg/L		**250**	< 0.61	0.24	0.12	0.23	0.18
Zinc (dissolved)	µg/L		**1100**	< 5.0	< 2.0	< 2	3	3
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.04	0.05	0.03	< 0.01	0.02
Thorium-230	Bq/L	**0.65**		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	53.3	58.5	--
ORP	mV			-[1]	-[1]	-95.0	-72	--
SPC	us/cm			-[1]	-[1]	1046.0	490.3	--
Temperature	°C			-[1]	-[1]	9.641	9.265	--
Turbidity	FNU			-[1]	-[1]	919.33	10.39	--
pH	Units			-[1]	-[1]	7.25	7.19	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 111: PH-90-6-III

		Criteria		PH-90-6-III				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/31	2021/12/03	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	6.99	7.16	6.74	6.97	6.86
Alkalinity	mg/L as $CaCO_3$			485	498	768	594	681
Carbonate	mg/L as $CaCO_3$			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			485	498	768	594	681
Total Dissolved Solids	mg/L			535	586	840	585	713
Fluoride	mg/L	**1.5**		0.52	0.63	0.53	0.50	0.52
Total Organic Carbon	mg/L			13	6	11	6	9
Dissolved Organic Carbon	mg/L			5	6	11	6	9
Total Ammonia-N	mg/l			13.5	10.5	27.4	13.2	20.3
Chloride	mg/L			48	56	84	57	71
Sulphate	mg/L			1.2	0.9	1.3	0.5	0.9
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			0.12	< 0.06	0.09	< 0.06	0.08
Nitrate + Nitrite (N)	mg/L			0.12	< 0.06	0.09	< 0.06	0.08
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			440	494	797	517	657
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			9.2	5.0	< 1	5	3
Arsenic (dissolved)	µg/L	**25**	**1900**	6.6	7.8	7.5	6.3	6.9
Barium (dissolved)	µg/L	**1000**	**29000**	660	583	**1580**	941	**1261**
Beryllium (dissolved)	µg/L		**67**	< 0.50	0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	545	506	1200	669	935
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			155000	180000	270000	193000	231500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	< 0.003	< 0.003	0.008	0.006
Cobalt (dissolved)	µg/L		**66**	0.80	0.89	2.10	1.12	1.61
Chromium (dissolved)	µg/L		**810**	< 5.0	1.2	2.10	1.24	1.67
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	0.2	0.5	< 0.2	0.4
Iron (dissolved)	µg/L			29500	29250	45500	39300	42400
Potassium (dissolved)	µg/L			9850	10175	17700	12500	15100
Magnesium (dissolved)	µg/L			10950	11750	22700	15300	19000
Manganese (dissolved)	µg/L			515	552	847	650	749
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.13	0.18	0.16	0.17
Sodium (dissolved)	µg/L			31500	32800	56100	51300	53700
Nickel (dissolved)	µg/L		**490**	< 1.0	1.0	2.3	1.0	1.7
Phosphorus (total)	µg/L			285	218	145	233	189
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	0.03	0.01	< 0.09	0.05
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.1	0.13	0.09	0.11
Tin (dissolved)	µg/L			< 1.0	0.3	0.68	0.33	0.51
Strontium (dissolved)	µg/L			340	421	690	516	603
Titanium (dissolved)	µg/L			< 5.0	0.6	0.54	0.36	0.45
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	0.5	0.8	1.9	1.7	1.8
Vanadium (dissolved)	µg/L		**250**	0.70	0.86	1.4	1.2	1.3
Zinc (dissolved)	µg/L		**1100**	< 5.0	3.0	2	2	2
Lead-210	Bq/L	**0.20**		< 0.10	0.02	< 0.02	0.02	0.02
Radium-226	Bq/L	**0.49**		0.08	0.07	0.04	0.14	0.09
Thorium-230	Bq/L	**0.65**		< 0.07	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	39.1	66	--
ORP	mV			-[1]	-[1]	-86.7	-48.6	--
SPC	us/cm			-[1]	-[1]	949.0	644.8	--
Temperature	°C			-[1]	-[1]	10.308	9.147	--
Turbidity	FNU			-[1]	-[1]	79.87	35.7	--
pH	Units			-[1]	-[1]	6.88	6.95	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 112: PH-90-7-III

		Criteria		PH-90-7-III				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/22	2021/11/11	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.41	7.17	7.14	7.25	7.20
Alkalinity	mg/L as $CaCO_3$			505	683	513	631	572
Carbonate	mg/L as $CaCO_3$			1.3	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			505	683	513	631	572
Total Dissolved Solids	mg/L			1195	830	849	945	897
Fluoride	mg/L	**1.5**		< 0.10	0.09	< 0.06	0.07	0.07
Total Organic Carbon	mg/L			8	6	5	5	5
Dissolved Organic Carbon	mg/L			4	6	4	5	5
Total Ammonia-N	mg/l			0.08	0.04	0.04	0.07	0.06
Chloride	mg/L			395	185	200	270	235
Sulphate	mg/L			18	21	33	200	117
Bromide	mg/L			3.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			0.15	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (N)	mg/L			0.15	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			755	4080	512	465	489
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	10.5	< 1.0	4	3
Arsenic (dissolved)	µg/L	**25**	**1900**	**32**	**51**	**31**	24	**28**
Barium (dissolved)	µg/L	**1000**	**29000**	135	109	81.9	135	108
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	19	17	13	58	36
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			255000	199000	176000	163000	169500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	0.004	0.013	0.016	0.015
Cobalt (dissolved)	µg/L		**66**	1.60	1.57	2.80	3.64	3.22
Chromium (dissolved)	µg/L		**810**	< 5.0	0.5	0.19	0.33	0.26
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	0.5	0.8	0.5	0.7
Iron (dissolved)	µg/L			1700	1311	433	113	273
Potassium (dissolved)	µg/L			1055	1195	989	1420	1205
Magnesium (dissolved)	µg/L			28000	20050	17500	16200	16850
Manganese (dissolved)	µg/L			465	458	348	372.00	360
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.19	0.18	0.12	0.15
Sodium (dissolved)	µg/L			165000	139000	146000	161000	153500
Nickel (dissolved)	µg/L		**490**	1.2	0.9	1.0	1.5	1.3
Phosphorus (total)	µg/L			8300	6	4	< 3	4
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	0.02	0.09	< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	1.45	0.95	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.1	0.05	0.09	0.07
Tin (dissolved)	µg/L			< 1.0	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			435	342	323	328	326
Titanium (dissolved)	µg/L			< 5.0	0.5	< 0.05	2.48	1.27
Thallium (dissolved)	µg/L		**510**	< 0.05	0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	15	**24**	16	14	15
Vanadium (dissolved)	µg/L		**250**	1.34	0.90	0.22	0.41	0.32
Zinc (dissolved)	µg/L		**1100**	< 5.0	3.0	2	< 2	2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		0.04	0.05	0.02	0.05	0.04
Thorium-230	Bq/L	**0.65**		< 0.07	0.05	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.06	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	71.4	81.3	--
ORP	mV			-[1]	-[1]	46.8	103.5	--
SPC	us/cm			-[1]	-[1]	662.0	1597	--
Temperature	°C			-[1]	-[1]	10.679	11.072	--
Turbidity	FNU			-[1]	-[1]	589.15	719.8	--
pH	Units			-[1]	-[1]	7.39	7.15	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria
[1] Field parameters included for current sampling year only.
-- - No data.

Table 113: PH-90-8-I

		Criteria		PH-90-8-I				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/25	2021/11/15	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.64	7.50	7.71	7.43	7.57
Alkalinity	mg/L as $CaCO_3$			220	431	741	515	628
Carbonate	mg/L as $CaCO_3$			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			220	431	741	515	628
Total Dissolved Solids	mg/L			1700	1730	1646	1580	1613
Fluoride	mg/L	**1.5**		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			2	1	1	1	1
Dissolved Organic Carbon	mg/L			1	1	1	1	1
Total Ammonia-N	mg/l			0.09	0.04	< 0.04	0.06	0.05
Chloride	mg/L			840	860	880	870	875
Sulphate	mg/L			48	49	52	47	50
Bromide	mg/L			5.5	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			0.050	< 0.300	< 0.30	< 0.30	< 0.30
Nitrate (N)	mg/L			0.55	0.58	0.44	0.60	0.52
Nitrate + Nitrite (N)	mg/L			0.60	0.58	0.44	0.60	0.52
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			725	1460	724	795	760
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	3.5	98.0	< 1	< 50
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	2.7	0.5	0.4	0.5
Barium (dissolved)	µg/L	**1000**	**29000**	520	451	484	431	458
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	27	29	47	32	40
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			205000	209500	213000	193000	203000
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	< 0.0	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		**66**	< 0.5	0.2	0.291	0.270	0.281
Chromium (dissolved)	µg/L		**810**	< 5.0	0.6	0.23	0.11	0.17
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	0.4	< 0.2	< 0.2	< 0.2
Iron (dissolved)	µg/L			575	418	307	238	273
Potassium (dissolved)	µg/L			3350	3685	4050	3320	3685
Magnesium (dissolved)	µg/L			54500	54050	46900	48400	47650
Manganese (dissolved)	µg/L			36	35	40	40.00	40
Molybdenum (dissolved)	µg/L		**9200**	0.57	0.51	1.27	0.51	0.89
Sodium (dissolved)	µg/L			280000	326500	320000	349000	334500
Nickel (dissolved)	µg/L		**490**	< 1.0	0.4	< 0.1	0.7	0.4
Phosphorus (total)	µg/L			2100	10	< 3	< 3	< 3
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.01	< 0.01	< 0.09	0.05
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.5	< 0.9	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	< 0.0	0.05	< 0.04	0.05
Tin (dissolved)	µg/L			< 1.0	0.1	0.07	< 0.06	0.07
Strontium (dissolved)	µg/L			835	848	837	692	765
Titanium (dissolved)	µg/L			< 5.0	0.2	0.06	0.27	0.17
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.01	0.005	< 0.005	0.005
Uranium (dissolved)	µg/L	**20**	**420**	**27**	**36**	**41**	**34**	**38**
Vanadium (dissolved)	µg/L		**250**	< 0.50	0.12	0.49	0.04	0.27
Zinc (dissolved)	µg/L		**1100**	< 5.0	3.0	< 2	< 2	< 2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.040	0.020	0.01	0.02	0.02
Thorium-230	Bq/L	**0.65**		< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	47.1	34	--
ORP	mV			-[1]	-[1]	68.9	71.4	--
SPC	us/cm			-[1]	-[1]	2516.0	2997	--
Temperature	°C			-[1]	-[1]	10.672	10.05	--
Turbidity	FNU			-[1]	-[1]	2257.30	789.1	--
pH	Units			-[1]	-[1]	7.32	7.06	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria
[1] Field parameters included for current sampling year only.
-- - No data.

Table 114: PH-90-8-II

		Criteria		PH-90-8-II				
		COPC	Table 3	2019	2020	2021		
Analysis	**Units**		**(MECP)**	**Average**		2021/03/25	2021/11/15	**Average**
pH	pH	**6.5-8.5**	**6.5-9.0**	7.40	7.25	7.58	7.22	7.40
Alkalinity	mg/L as $CaCO_3$			390	379	368	429	399
Carbonate	mg/L as $CaCO_3$			1.1	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			390	379	368	429	399
Total Dissolved Solids	mg/L			543	587	546	549	548
Fluoride	mg/L	**1.5**		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			3	2	1	3	2
Dissolved Organic Carbon	mg/L			1	2	2	3	3
Total Ammonia-N	mg/l			0.066	0.040	< 0.04	< 0.04	< 0.04
Chloride	mg/L			43	66	76	43	60
Sulphate	mg/L			14	23	9	29	19
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.030	< 0.03	< 0.30	0.17
Nitrate (N)	mg/L			4.58	6.91	2.57	2.35	2.46
Nitrate + Nitrite (N)	mg/L			4.58	6.91	2.57	2.35	2.46
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	0.01	0.01
Hardness (dissolved)	mg/L as $CaCO_3$			475	526	472	482	477
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	3.5	114	5	60
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	< 0.2	0.2	< 0.2	0.2
Barium (dissolved)	µg/L	**1000**	**29000**	63	70	75	73	74
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	44	44	37	39	38
Bismuth (dissolved)	µg/L			< 1.0	0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			165000	183500	168000	165000	166500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	< 0.0	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		**66**	< 0.50	0.16	0.062	0.152	0.107
Chromium (dissolved)	µg/L		**810**	< 5.0	0.6	0.34	0.33	0.34
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	0.8	< 0.2	0.5	0.4
Iron (dissolved)	µg/L			< 100	15	8	9	9
Potassium (dissolved)	µg/L			5950	6630	6600	6860	6730
Magnesium (dissolved)	µg/L			15000	16450	12600	15000	13800
Manganese (dissolved)	µg/L			2.0	7.9	2.71	8.61	5.7
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.07	0.54	0.05	0.30
Sodium (dissolved)	µg/L			7250	10250	15800	25800	20800
Nickel (dissolved)	µg/L		**490**	< 1.0	0.3	< 0.10	0.30	0.2
Phosphorus (total)	µg/L			51	7	< 3	6	5
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.01	< 0.01	< 0.09	0.05
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.5	0.52	0.53	0.53
Tin (dissolved)	µg/L			< 1.0	< 0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			290	352	325	318	322
Titanium (dissolved)	µg/L			< 5.0	0.3	< 0.05	0.25	0.15
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	5	5	**21**	14	17
Vanadium (dissolved)	µg/L		**250**	< 0.50	0.18	0.70	0.07	0.39
Zinc (dissolved)	µg/L		**1100**	< 5.0	3.0	< 2	< 2	< 2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.040	< 0.010	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	68.6	61.2	--
ORP	mV			-[1]	-[1]	42.8	103.9	--
SPC	us/cm			-[1]	-[1]	979.0	927.0	--
Temperature	°C			-[1]	-[1]	10.150	10.8	--
Turbidity	FNU			-[1]	-[1]	68.79	22.4	--
pH	Units			-[1]	-[1]	7.33	6.94	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria
[1] Field parameters included for current sampling year only.
-- - No data.

Table 115: PH-90-9-III

		Criteria		PH-90-9-III				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/29	2021/11/19	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.60	7.70	7.58	7.35	7.47
Alkalinity	mg/L as $CaCO_3$			305	1337	767	1250	1009
Carbonate	mg/L as $CaCO_3$			1.2	95.5	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			305	1242	767	1250	1009
Total Dissolved Solids	mg/L			343	619	349	334	342
Fluoride	mg/L	**1.5**		< 0.10	0.11	< 0.06	0.08	0.07
Total Organic Carbon	mg/L			4.3	1.0	1	1	1
Dissolved Organic Carbon	mg/L			1.4	1.0	< 1	1	1
Total Ammonia-N	mg/l			< 0.050	0.055	< 0.04	0.04	0.04
Chloride	mg/L			3.6	4.7	5	4	4
Sulphate	mg/L			17	17	16	17	17
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			0.013	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (N)	mg/L			< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	0.01	< 0.01	0.01
Hardness (dissolved)	mg/L as $CaCO_3$			320	2935	9580	277	4929
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			6.1	17.5	6	2	4
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	< 0.2	< 0.2	0.5	0.4
Barium (dissolved)	µg/L	**1000**	**29000**	60	58	67	57	62
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	20	18	25	20	23
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			96500	96200	116000	88500	102250
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	0.0	0.003	< 0.003	0.003
Cobalt (dissolved)	µg/L		**66**	< 0.50	0.04	0.042	0.291	0.167
Chromium (dissolved)	µg/L		**810**	< 5.0	0.8	0.99	0.24	0.62
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	0.5	0.8	0.2	0.5
Iron (dissolved)	µg/L			< 100	23	21	< 7	14
Potassium (dissolved)	µg/L			710	693	814	700	757
Magnesium (dissolved)	µg/L			19500	19300	21100	19200	20150
Manganese (dissolved)	µg/L			9.1	1.6	1.6	10.3	6.0
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.14	0.18	0.23	0.21
Sodium (dissolved)	µg/L			5450	5115	6170	6510	6340
Nickel (dissolved)	µg/L		**490**	< 1.0	< 0.1	0.20	0.30	0.25
Phosphorus (total)	µg/L			9250	4	< 3	8	6
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	0.05	0.02	< 0.09	0.06
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.2	0.20	0.18	0.19
Tin (dissolved)	µg/L			< 1.0	0.1	0.08	< 0.06	0.07
Strontium (dissolved)	µg/L			215	219	246	225	236
Titanium (dissolved)	µg/L			< 5.0	0.9	0.44	< 0.05	0.25
Thallium (dissolved)	µg/L		**510**	< 0.05	0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	2.8	2.9	3	3	3
Vanadium (dissolved)	µg/L		**250**	< 0.50	0.36	0.36	0.46	0.41
Zinc (dissolved)	µg/L		**1100**	< 5.0	4.0	2	< 2	2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.040	< 0.010	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	71.5	77.7	--
ORP	mV			-[1]	-[1]	141.7	131.0	--
SPC	us/cm			-[1]	-[1]	597.0	579.0	--
Temperature	°C			-[1]	-[1]	8.308	9.3	--
Turbidity	FNU			-[1]	-[1]	4116.00	1473.4	--
pH	Units			-[1]	-[1]	7.49	7.23	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 116: PH-93-3-III

		Criteria		PH-93-3-III				
		COPC	Table 3	2019	2020	2021		
Analysis	**Units**		**(MECP)**	**Average**		2021/03/24	2021/11/19	**Average**
pH	pH	**6.5-8.5**	**6.5-9.0**	7.70	7.35	No Sample[2]	-[3]	-[3]
Alkalinity	mg/L as $CaCO_3$			370	352		-[3]	-[3]
Carbonate	mg/L as $CaCO_3$			1.7	< 1.0		-[3]	-[3]
Bicarbonate	mg/L as $CaCO_3$			370	352		-[3]	-[3]
Total Dissolved Solids	mg/L			440	374		-[3]	-[3]
Fluoride	mg/L	**1.5**		< 0.10	< 0.06		-[3]	-[3]
Total Organic Carbon	mg/L			1.3	1.0		-[3]	-[3]
Dissolved Organic Carbon	mg/L			1.2	1.0		-[3]	-[3]
Total Ammonia-N	mg/l			0.54	2.90		-[3]	-[3]
Chloride	mg/L			12	29		-[3]	-[3]
Sulphate	mg/L			3.7	3.9		-[3]	-[3]
Bromide	mg/L			< 1.0	< 0.3		-[3]	-[3]
Nitrite (N)	mg/L			0.166	0.080		-[3]	-[3]
Nitrate (N)	mg/L			2.22	1.61		-[3]	-[3]
Nitrate + Nitrite (N)	mg/L			2.39	1.69		-[3]	-[3]
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01		< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			360	425		-[3]	-[3]
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1		< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	6		4	4
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	< 0.2		< 0.2	< 0.2
Barium (dissolved)	µg/L	**1000**	**29000**	45	52		48.6	48.6
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.01		< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	250	243		71	71
Bismuth (dissolved)	µg/L			< 1.0	< 0.0		< 0.010	< 0.010
Calcium (dissolved)	µg/L			130000	129000		89500	89500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	< 0.0		< 0.003	< 0.003
Cobalt (dissolved)	µg/L		**66**	< 0.50	0.18		0.099	0.099
Chromium (dissolved)	µg/L		**810**	< 5.0	0.3		0.22	0.22
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	0.5		0.6	0.6
Iron (dissolved)	µg/L			< 100	12		< 7	< 7
Potassium (dissolved)	µg/L			3800	5420		4960	4960
Magnesium (dissolved)	µg/L			10000	10400		9020	9020
Manganese (dissolved)	µg/L			< 2	4		0.28	0.28
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.06		0.14	0.14
Sodium (dissolved)	µg/L			12000	10800		4910	4910
Nickel (dissolved)	µg/L		**490**	< 1.0	0.1		0.30	0.30
Phosphorus (total)	µg/L			33	8		6	6
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.01		< 0.09	< 0.09
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90		< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.4		0.33	0.33
Tin (dissolved)	µg/L			< 1.0	0.1		< 0.06	< 0.06
Strontium (dissolved)	µg/L			230	226		178	178
Titanium (dissolved)	µg/L			< 5.0	0.6		0.09	0.09
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.01		< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	9	9		**37**	**37**
Vanadium (dissolved)	µg/L		**250**	0.56	0.53		0.73	0.73
Zinc (dissolved)	µg/L		**1100**	< 5.0	< 2.0		< 2	< 2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02		< 0.06	< 0.06
Radium-226	Bq/L	**0.49**		< 0.040	< 0.010		< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		< 0.070	< 0.020		< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.020		< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]		67.7	--
ORP	mV			-[1]	-[1]		89.9	--
SPC	us/cm			-[1]	-[1]		568	--
Temperature	°C			-[1]	-[1]		10.664	--
Turbidity	FNU			-[1]	-[1]		27.87	--
pH	Units			-[1]	-[1]		7.23	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

[2] Insufficient volume of groundwater for sample collection

[3] Insufficient volume of groundwater for full sample collection

-- - No data.

Table 117: PH-93-6-I

		Criteria		PH-93-6-I				
		COPC	Table 3	2019	2020	2021		
Analysis	**Units**		**(MECP)**	**Average**		2021/03/25	2021/11/12	**Average**
pH	pH	**6.5-8.5**	**6.5-9.0**	7.89	7.61	7.78	7.49	7.64
Alkalinity	mg/L as $CaCO_3$			290	286	260	582	421
Carbonate	mg/L as $CaCO_3$			2.6	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			290	286	260	582	421
Total Dissolved Solids	mg/L			1635	1457	1720	1351	1536
Fluoride	mg/L	**1.5**		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			6	2	2	2	2
Dissolved Organic Carbon	mg/L			6	2	2	2	2
Total Ammonia-N	mg/l			23.6	0.57	0.16	0.19	0.18
Chloride	mg/L			795	800	840	570	705
Sulphate	mg/L			37.5	34.0	38	29	34
Bromide	mg/L			< 5.5	< 0.3	< 0.3	0.3	0.3
Nitrite (N)	mg/L			0.041	0.530	< 0.30	< 0.03	0.17
Nitrate (N)	mg/L			1.46	0.70	1.19	1.42	1.31
Nitrate + Nitrite (N)	mg/L			1.50	1.21	1.19	1.42	1.31
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			520	668	609	1830	1220
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			5.1	2.0	< 1	32	17
Arsenic (dissolved)	µg/L	**25**	**1900**	1.4	0.7	0.4	0.5	0.5
Barium (dissolved)	µg/L	**1000**	**29000**	320	334	413	348	381
Beryllium (dissolved)	µg/L		**67**	< 0.50	0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	47	87	38	104	71
Bismuth (dissolved)	µg/L			< 1.0	< 0.0	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			145000	175000	183000	198000	190500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	0.0	0.081	0.068	0.075
Cobalt (dissolved)	µg/L		**66**	0.71	1.10	0.868	0.871	0.870
Chromium (dissolved)	µg/L		**810**	< 5.0	0.4	0.22	0.45	0.34
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	0.8	0.4	1.1	0.8
Iron (dissolved)	µg/L			225	120	11	71	41
Potassium (dissolved)	µg/L			36500	4805	4530	4750	4640
Magnesium (dissolved)	µg/L			39500	37700	36800	43800	40300
Manganese (dissolved)	µg/L			400	665	506	532	519
Molybdenum (dissolved)	µg/L		**9200**	0.67	0.45	0.59	0.40	0.50
Sodium (dissolved)	µg/L			335000	298500	335000	266000	300500
Nickel (dissolved)	µg/L		**490**	2.0	2.1	0.8	2.6	1.7
Phosphorus (total)	µg/L			605	32	20	45	33
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	0.02	0.01	< 0.09	0.05
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.4	0.38	0.40	0.39
Tin (dissolved)	µg/L			< 1.0	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			535	612	705	874	790
Titanium (dissolved)	µg/L			< 5.0	0.1	0.06	2.16	1.11
Thallium (dissolved)	µg/L		**510**	< 0.05	0.01	0.008	0.022	0.015
Uranium (dissolved)	µg/L	**20**	**420**	2	2	2	2	2
Vanadium (dissolved)	µg/L		**250**	0.73	0.53	0.50	0.66	0.58
Zinc (dissolved)	µg/L		**1100**	74	43	26	11	19
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.040	0.020	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	43.4	39.5	--
ORP	mV			-[1]	-[1]	79.5	105.7	--
SPC	us/cm			-[1]	-[1]	2549.0	2353.0	--
Temperature	°C			-[1]	-[1]	12.208	10.6	--
Turbidity	FNU			-[1]	-[1]	14.34	2264.4	--
pH	Units			-[1]	-[1]	7.73	7.08	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 118: PH-93-6-II

		Criteria		PH-93-6-II				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/25	2021/11/12	Average
pH	pH	6.5-8.5	6.5-9.0	7.37	7.30	7.51	7.22	7.37
Alkalinity	mg/L as $CaCO_3$			525	428	369	581	475
Carbonate	mg/L as $CaCO_3$			1.2	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			520	428	369	581	475
Total Dissolved Solids	mg/L			598	472	680	694	687
Fluoride	mg/L	1.5		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			13	3	4	4	4
Dissolved Organic Carbon	mg/L			4	3	4	4	4
Total Ammonia-N	mg/l			1.53	0.07	< 0.04	0.05	0.05
Chloride	mg/L			10	8	30	25	28
Sulphate	mg/L			20.5	15.0	19	32	26
Bromide	mg/L			< 1.0	< 0.3	0.5	< 0.3	0.4
Nitrite (N)	mg/L			0.053	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			0.41	1.34	0.45	5.58	3.02
Nitrate + Nitrite (N)	mg/L			0.46	1.34	0.45	5.58	3.02
Mercury (dissolved)	µg/L	1	0.29	< 0.10	0.02	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			570	516	676	658	667
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			8.0	3.0	< 1	< 1	< 1
Arsenic (dissolved)	µg/L	25	1900	< 1.0	0.4	0.2	0.2	0.2
Barium (dissolved)	µg/L	1000	29000	58	50	75	90	82
Beryllium (dissolved)	µg/L		67	< 0.50	0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	26	45	26	71	49
Bismuth (dissolved)	µg/L			< 1.0	< 0.0	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			200000	181000	254000	256000	255000
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	0.0	< 0.003	0.004	0.004
Cobalt (dissolved)	µg/L		66	1.00	0.38	0.519	0.675	0.597
Chromium (dissolved)	µg/L		810	< 5.0	0.1	< 0.08	0.28	0.18
Copper (dissolved)	µg/L	1000	87	2.6	1.0	0.8	1.2	1.0
Iron (dissolved)	µg/L			1500	202	74	92	83
Potassium (dissolved)	µg/L			3350	2935	4030	3470	3750
Magnesium (dissolved)	µg/L			16000	12265	10100	13900	12000
Manganese (dissolved)	µg/L			211	213	398	329	364
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.13	0.18	0.10	0.14
Sodium (dissolved)	µg/L			5850	6380	4560	10800	7680
Nickel (dissolved)	µg/L		490	1.2	0.8	0.8	1.5	1.2
Phosphorus (total)	µg/L			1028	38	20	18	19
Lead (dissolved)	µg/L	10	25	< 0.50	0.02	< 0.01	< 0.09	0.05
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.2	0.11	0.14	0.13
Tin (dissolved)	µg/L			< 1.0	0.1	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			350	297	360	469	415
Titanium (dissolved)	µg/L			< 5.0	0.2	0.15	0.20	0.18
Thallium (dissolved)	µg/L		510	< 0.05	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	13	**36**	**81**	**38**	**59**
Vanadium (dissolved)	µg/L		250	< 0.50	0.27	0.11	0.64	0.38
Zinc (dissolved)	µg/L		1100	< 5	3	4	3	4
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040	< 0.010	0.01	0.02	0.02
Thorium-230	Bq/L	0.65		< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	44.4	68.6	--
ORP	mV			-[1]	-[1]	71.2	92.5	--
SPC	us/cm			-[1]	-[1]	653.0	1156.0	--
Temperature	°C			-[1]	-[1]	10.806	11.0	--
Turbidity	FNU			-[1]	-[1]	4.56	12.7	--
pH	Units			-[1]	-[1]	6.97	7.04	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 119: PH-93-9-I

		Criteria		PH-93-9-I				
		COPC	Table 3	2019	2020	2021		
Analysis	**Units**		**(MECP)**	**Average**		2021/03/30	2021/10/28	**Average**
pH	pH	**6.5-8.5**	**6.5-9.0**	7.26	7.08	7.26	6.92	7.09
Alkalinity	mg/L as $CaCO_3$			600	604	614	718	666
Carbonate	mg/L as $CaCO_3$			1.2	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			600	604	614	718	666
Total Dissolved Solids	mg/L			905	863	966	997	982
Fluoride	mg/L	**1.5**		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			6	6	5	7	6
Dissolved Organic Carbon	mg/L			6	6	5	7	6
Total Ammonia-N	mg/l			11.0	11.5	13.8	16.4	15.1
Chloride	mg/L			175	160	190	140	165
Sulphate	mg/L			34.5	34	42	67	55
Bromide	mg/L			1.2	0.30	0.3	0.4	0.4
Nitrite (N)	mg/L			< 0.010	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			0.43	< 0.09	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (N)	mg/L			0.43	< 0.09	0.06	< 0.06	0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	0.01	< 0.01	0.01
Hardness (dissolved)	mg/L as $CaCO_3$			645	799	799	689	744
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			12.5	1.0	22	< 1	12
Arsenic (dissolved)	µg/L	**25**	**1900**	1.4	0.6	0.5	0.6	0.6
Barium (dissolved)	µg/L	**1000**	**29000**	180	166	203	241	222
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.007	0.008	< 0.007	0.008
Boron (dissolved)	µg/L	**5000**	**45000**	1100	949	1030	1540	1285
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			185000	192000	189000	206000	197500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	0.005	0.007	< 0.003	0.005
Cobalt (dissolved)	µg/L		**66**	2.35	2.7	3.000	2.880	2.940
Chromium (dissolved)	µg/L		**810**	< 5.0	0.38	0.50	0.55	0.53
Copper (dissolved)	µg/L	**1000**	**87**	3.6	4.3	4.3	2.9	3.6
Iron (dissolved)	µg/L			115	69	172	65	119
Potassium (dissolved)	µg/L			21000	22250	24000	37600	30800
Magnesium (dissolved)	µg/L			43000	41450	49300	42100	45700
Manganese (dissolved)	µg/L			390	479	465	607	536
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.24	0.27	0.23	0.25
Sodium (dissolved)	µg/L			87000	80300	91600	73000	82300
Nickel (dissolved)	µg/L		**490**	7.7	8.9	9.4	7.6	8.5
Phosphorus (total)	µg/L			102	14	7	12	10
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	0.03	0.41	< 0.09	0.25
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.2	0.17	0.34	0.26
Tin (dissolved)	µg/L			< 1.0	0.3	0.21	0.57	0.39
Strontium (dissolved)	µg/L			745	830	918	954	936
Titanium (dissolved)	µg/L			< 5.0	0.1	0.22	0.12	0.17
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	**2200**	**2075**	**3600**	**10700**	**7150**
Vanadium (dissolved)	µg/L		**250**	< 0.50	0.33	0.63	0.33	0.48
Zinc (dissolved)	µg/L		**1100**	< 17.0	5	3	< 2	3
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	**0.74**	**0.38**
Radium-226	Bq/L	**0.49**		< 0.040	0.02	0.02	0.02	0.02
Thorium-230	Bq/L	**0.65**		< 0.070	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	34.4	23.0	--
ORP	mV			-[1]	-[1]	134.2	140.8	--
SPC	us/cm			-[1]	-[1]	786.0	1752.0	--
Temperature	°C			-[1]	-[1]	10.230	11.1	--
Turbidity	FNU			-[1]	-[1]	99.52	1.7	--
pH	Units			-[1]	-[1]	6.92	6.73	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 120: PH-93-9-II

		Criteria		PH-93-9-II				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/30	2021/10/28	Average
pH	pH	6.5-8.5	6.5-9.0	7.51	7.33	7.67	7.28	7.48
Alkalinity	mg/L as $CaCO_3$			390	413	368	346	357
Carbonate	mg/L as $CaCO_3$			1.2	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			390	413	368	346	357
Total Dissolved Solids	mg/L			448	542	471	609	540
Fluoride	mg/L	1.5		< 0.10	0.09	< 0.06	0.10	0.08
Total Organic Carbon	mg/L			3	1	2	< 1	2
Dissolved Organic Carbon	mg/L			2	2	1	1	1
Total Ammonia-N	mg/l			0.63	< 0.04	< 0.04	< 0.04	< 0.04
Chloride	mg/L			25	82	200	200	200
Sulphate	mg/L			6.4	12.3	11	12	12
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.030	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			0.54	3.75	2.32	4.82	3.57
Nitrate + Nitrite (N)	mg/L			0.54	3.75	2.32	4.82	3.57
Mercury (dissolved)	µg/L	1	0.29	< 0.10	< 0.01	0.03	< 0.01	0.02
Hardness (dissolved)	mg/L as $CaCO_3$			410	488	492	289	391
Silver (dissolved)	µg/L		1.5	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	25.0	< 1	< 1	< 1
Arsenic (dissolved)	µg/L	25	1900	< 1.0	0.2	< 0.2	< 0.2	< 0.2
Barium (dissolved)	µg/L	1000	29000	29	46	47	59	53
Beryllium (dissolved)	µg/L		67	< 0.50	0.01	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	5000	45000	12	35	1460	34	747
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			155000	174500	168000	138000	153000
Cadmium (dissolved)	µg/L	5	2.7	< 0.1	0.0	0.007	0.014	0.011
Cobalt (dissolved)	µg/L		66	< 0.50	0.15	0.083	0.157	0.120
Chromium (dissolved)	µg/L		810	< 5.0	0.8	0.45	1.45	0.95
Copper (dissolved)	µg/L	1000	87	< 1.0	0.6	0.6	0.4	0.5
Iron (dissolved)	µg/L			< 100	43	10	< 7	9
Potassium (dissolved)	µg/L			580	879	1720	962	1341
Magnesium (dissolved)	µg/L			5300	7200	6000	5690	5845
Manganese (dissolved)	µg/L			12	2.4	0.08	0.07	0.08
Molybdenum (dissolved)	µg/L		9200	< 0.50	0.76	0.30	0.92	0.61
Sodium (dissolved)	µg/L			8050	49350	41900	104000	72950
Nickel (dissolved)	µg/L		490	< 1.0	< 0.1	0.3	0.3	0.3
Phosphorus (total)	µg/L			320	12	< 3	3	3
Lead (dissolved)	µg/L	10	25	< 0.50	0.02	0.01	< 0.09	0.05
Antimony (dissolved)	µg/L	6	20000	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	10	63	< 2.0	0.8	0.81	0.65	0.73
Tin (dissolved)	µg/L			< 1.0	< 0.1	< 0.06	0.08	0.07
Strontium (dissolved)	µg/L			255	326	303	292	298
Titanium (dissolved)	µg/L			< 5.0	2.1	0.45	< 0.05	0.25
Thallium (dissolved)	µg/L		510	< 0.05	< 0.01	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	20	420	3	8	11	6	8
Vanadium (dissolved)	µg/L		250	< 0.50	0.35	0.28	0.26	0.27
Zinc (dissolved)	µg/L		1100	8.5	3.5	4	2	3
Lead-210	Bq/L	0.20		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	0.49		< 0.040	< 0.010	< 0.01	0.02	0.02
Thorium-230	Bq/L	0.65		< 0.070	< 0.020	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.020	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	81.1	66.1	--
ORP	mV			-[1]	-[1]	114.0	141.4	--
SPC	us/cm			-[1]	-[1]	833.0	1136.0	--
Temperature	°C			-[1]	-[1]	5.846	13.5	--
Turbidity	FNU			-[1]	-[1]	77.13	118.3	--
pH	Units			-[1]	-[1]	7.56	7.09	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 121: PH-93-10-I

		Criteria		PH-93-10-I				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/22	2021/11/18	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.22	7.11	7.00	6.96	6.98
Alkalinity	mg/L as $CaCO_3$			620	588	548	491	520
Carbonate	mg/L as $CaCO_3$			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			620	588	548	491	520
Total Dissolved Solids	mg/L			898	842	900	845	873
Fluoride	mg/L	**1.5**		< 0.10	0.07	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			13	11	11	7	9
Dissolved Organic Carbon	mg/L			12	11	10	7	9
Total Ammonia-N	mg/l			8.8	12.9	11.30	8.65	9.98
Chloride	mg/L			150	155	210	240	225
Sulphate	mg/L			15.0	25	21	21	21
Bromide	mg/L			< 1.0	0.30	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (N)	mg/L			< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			575	689	615	605	610
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5.0	447	< 1	2	2
Arsenic (dissolved)	µg/L	**25**	**1900**	17.5	24.3	21.9	19.1	20.5
Barium (dissolved)	µg/L	**1000**	**29000**	500	623	511	477	494
Beryllium (dissolved)	µg/L		**67**	< 0.50	0.019	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	560	683	410	346	378
Bismuth (dissolved)	µg/L			< 1.0	0.010	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			150000	171000	172000	158000	165000
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	0.008	< 0.003	< 0.003	< 0.003
Cobalt (dissolved)	µg/L		**66**	6.50	8.245	6.900	5.840	6.370
Chromium (dissolved)	µg/L		**810**	< 5.0	1.40	0.43	0.28	0.36
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	2.2	0.6	0.4	0.5
Iron (dissolved)	µg/L			13000	14750	10900	8730	9815
Potassium (dissolved)	µg/L			15000	18300	15800	12300	14050
Magnesium (dissolved)	µg/L			46000	49150	45100	41000	43050
Manganese (dissolved)	µg/L			615	745.0	768.00	774.00	771.00
Molybdenum (dissolved)	µg/L		**9200**	0.64	0.73	0.67	0.72	0.70
Sodium (dissolved)	µg/L			89500	82000	103000	92100	97550
Nickel (dissolved)	µg/L		**490**	10.1	11.4	10.5	7.7	9.1
Phosphorus (total)	µg/L			350	47	27	17	22
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	0.31	0.02	< 0.09	0.06
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.1	0.08	0.11	0.10
Tin (dissolved)	µg/L			< 1.0	0.51	0.27	0.20	0.24
Strontium (dissolved)	µg/L			645	787	735	677	706
Titanium (dissolved)	µg/L			< 5.0	34.17	0.27	0.14	0.21
Thallium (dissolved)	µg/L		**510**	< 0.05	0.027	< 0.005	0.011	0.008
Uranium (dissolved)	µg/L	**20**	**420**	7	5	4	3	3
Vanadium (dissolved)	µg/L		**250**	< 0.50	1.49	0.47	0.39	0.43
Zinc (dissolved)	µg/L		**1100**	< 5.0	5	2	2	2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	0.03	0.04	0.04
Radium-226	Bq/L	**0.49**		< 0.040	0.03	0.01	0.02	0.02
Thorium-230	Bq/L	**0.65**		< 0.070	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	35.6	43.2	--
ORP	mV			-[1]	-[1]	-84.3	-58.5	--
SPC	us/cm			-[1]	-[1]	1469.0	1612.0	--
Temperature	°C			-[1]	-[1]	10.370	10.1	--
Turbidity	FNU			-[1]	-[1]	31.45	78.6	--
pH	Units			-[1]	-[1]	7.01	6.83	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 122: PH-93-10-II

		Criteria		PH-93-10-II				
		COPC	Table 3	2019	2020	2021		
Analysis	**Units**		(MECP)	Average		2021/03/22	2021/11/18	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.17	6.99	6.89	6.86	6.88
Alkalinity	mg/L as $CaCO_3$			805	709	819	814	817
Carbonate	mg/L as $CaCO_3$			1.1	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			805	709	819	814	817
Total Dissolved Solids	mg/L			1008	893	1180	1010	1095
Fluoride	mg/L	**1.5**		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			7	6	8	7	8
Dissolved Organic Carbon	mg/L			6	6	8	6	7
Total Ammonia-N	mg/l			17.0	17.9	22.2	19.9	21.1
Chloride	mg/L			71	70	100	100	100
Sulphate	mg/L			66	62	70	72	71
Bromide	mg/L			< 1.0	0.5	0.5	0.5	0.5
Nitrite (N)	mg/L			0.018	0.09	< 0.03	0.03	0.03
Nitrate (N)	mg/L			1.58	2.30	1.86	2.63	2.25
Nitrate + Nitrite (N)	mg/L			1.59	2.39	1.86	2.66	2.26
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	0.01	< 0.01	0.01
Hardness (dissolved)	mg/L as $CaCO_3$			705	830	777	795	786
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	2	< 1	2	2
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	0.6	0.6	0.5	0.6
Barium (dissolved)	µg/L	**1000**	**29000**	175	168	205	209	207
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.007	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	2850	3290	3770	4190	3980
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.010	< 0.009
Calcium (dissolved)	µg/L			210000	212500	238000	204000	221000
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	0.005	0.005	< 0.003	0.004
Cobalt (dissolved)	µg/L		**66**	3.15	2.71	3.40	2.86	3.13
Chromium (dissolved)	µg/L		**810**	< 5.0	0.90	0.69	0.52	0.61
Copper (dissolved)	µg/L	**1000**	**87**	4.5	7.5	8.5	6.8	7.7
Iron (dissolved)	µg/L			< 100	18	7	< 7	< 7
Potassium (dissolved)	µg/L			40000	39250	54400	42100	48250
Magnesium (dissolved)	µg/L			44500	39550	44700	41500	43100
Manganese (dissolved)	µg/L			485	424	620	546	583
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.17	0.20	0.22	0.21
Sodium (dissolved)	µg/L			72000	75600	99600	86200	92900
Nickel (dissolved)	µg/L		**490**	6.6	7.0	9.3	8.1	8.7
Phosphorus (total)	µg/L			415	13	21	13	17
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	0.02	0.02	< 0.09	0.06
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.5	0.26	0.32	0.29
Tin (dissolved)	µg/L			< 1.0	0.30	0.34	0.29	0.32
Strontium (dissolved)	µg/L			815	801	1050	901	976
Titanium (dissolved)	µg/L			< 5.0	0.27	0.22	0.18	0.20
Thallium (dissolved)	µg/L		**510**	< 0.05	0.020	0.019	0.020	0.020
Uranium (dissolved)	µg/L	**20**	**420**	**5450**	**4970**	**7170**	**6130**	**6650**
Vanadium (dissolved)	µg/L		**250**	0.72	0.87	0.76	0.71	0.74
Zinc (dissolved)	µg/L		**1100**	< 5	< 2	< 2	< 2	< 2
Lead-210	Bq/L	**0.20**		< 0.10	0.03	0.04	< 0.02	< 0.03
Radium-226	Bq/L	**0.49**		< 0.040	0.02	0.02	< 0.01	< 0.02
Thorium-230	Bq/L	**0.65**		< 0.070	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	42.8	30.7	--
ORP	mV			-[1]	-[1]	7.2	-19.5	--
SPC	us/cm			-[1]	-[1]	1647.0	1788.0	--
Temperature	°C			-[1]	-[1]	10.391	10.3	--
Turbidity	FNU			-[1]	-[1]	8.33	12.9	--
pH	Units			-[1]	-[1]	6.86	6.65	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 123: PH-93-12-II

		Criteria		PH-93-12-II				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/30	2021/11/04	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.39	7.07	7.05	7.05	7.05
Alkalinity	mg/L as $CaCO_3$			540	3210	3900	478	2189
Carbonate	mg/L as $CaCO_3$			1.3	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			540	3210	3900	478	2189
Total Dissolved Solids	mg/L			655	633	694	655	675
Fluoride	mg/L	**1.5**		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			6	3	3	3	3
Dissolved Organic Carbon	mg/L			3	3	4	3	4
Total Ammonia-N	mg/l			7.8	8.5	5.4	7.3	6.3
Chloride	mg/L			57	52	63	57	60
Sulphate	mg/L			33	31	34	33	34
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			1.18	1.12	1.91	1.78	1.85
Nitrate + Nitrite (N)	mg/L			1.18	1.12	1.91	1.78	1.85
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			535	6795	12600	7770	10185
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.05	< 0.05	< 0.50	0.28
Aluminum (dissolved)	µg/L			6	70	< 1	< 10	6
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	0.3	0.2	< 2.0	1.1
Barium (dissolved)	µg/L	**1000**	**29000**	165	193	206	222	214
Beryllium (dissolved)	µg/L		**67**	< 0.50	0.008	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	785	779	657	800	729
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.100	0.054
Calcium (dissolved)	µg/L			175000	194500	216000	189000	202500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	0.012	0.004	< 0.030	0.017
Cobalt (dissolved)	µg/L		**66**	0.65	0.77	0.66	0.93	0.80
Chromium (dissolved)	µg/L		**810**	< 5.0	0.40	0.42	< 0.80	0.61
Copper (dissolved)	µg/L	**1000**	**87**	1.5	3.4	1.4	< 2.0	1.7
Iron (dissolved)	µg/L			< 100	81	10	< 70	40
Potassium (dissolved)	µg/L			23500	26900	22900	30700	26800
Magnesium (dissolved)	µg/L			23500	23000	23100	25900	24500
Manganese (dissolved)	µg/L			75	69	74	123	99
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.15	0.13	< 0.40	0.27
Sodium (dissolved)	µg/L			33500	33250	33600	40500	37050
Nickel (dissolved)	µg/L		**490**	2.2	2.4	2.2	3.0	2.6
Phosphorus (total)	µg/L			15500	15	< 3	< 30	17
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	0.09	< 0.01	< 0.90	0.46
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.2	0.25	< 0.40	0.33
Tin (dissolved)	µg/L			< 1.0	0.25	0.15	< 0.60	0.38
Strontium (dissolved)	µg/L			520	612	624	628	626
Titanium (dissolved)	µg/L			< 5.0	4.13	0.30	2.20	1.25
Thallium (dissolved)	µg/L		**510**	< 0.05	0.008	< 0.005	< 0.050	0.028
Uranium (dissolved)	µg/L	**20**	**420**	**3450**	**3330**	**3210**	**4150**	**3680**
Vanadium (dissolved)	µg/L		**250**	< 0.50	0.61	0.43	0.50	0.47
Zinc (dissolved)	µg/L		**1100**	< 12.0	8	6	< 20	13
Lead-210	Bq/L	**0.20**		< 0.10	0.02	< 0.02	0.13	0.08
Radium-226	Bq/L	**0.49**		< 0.040	0.01	0.01	0.02	0.02
Thorium-230	Bq/L	**0.65**		< 0.070	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	45.1	27.7	--
ORP	mV			-[1]	-[1]	154.6	159.3	--
SPC	us/cm			-[1]	-[1]	1034.0	1210.0	--
Temperature	°C			-[1]	-[1]	9.098	10.7	--
Turbidity	FNU			-[1]	-[1]	4366.30	2316.5	--
pH	Units			-[1]	-[1]	7.22	6.75	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 124: PH-95-I

		Criteria		PH-95-I				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/04/14	2021/07/12	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.64	7.62	7.20	Decommissioned	7.20
Alkalinity	mg/L as $CaCO_3$			335	290	339		339
Carbonate	mg/L as $CaCO_3$			1.5	< 1.0	< 1.0		< 1.0
Bicarbonate	mg/L as $CaCO_3$			330	290	339		339
Total Dissolved Solids	mg/L			360	315	343		343
Fluoride	mg/L	**1.5**		< 0.10	0.08	< 0.06		< 0.06
Total Organic Carbon	mg/L			5	2	2		2
Dissolved Organic Carbon	mg/L			2	2	2		2
Total Ammonia-N	mg/l			0.13	< 0.04	< 0.04		< 0.04
Chloride	mg/L			4	2	3		3
Sulphate	mg/L			6	4	9		9
Bromide	mg/L			< 1.0	< 0.3	< 0.3		< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.03	< 0.03		< 0.03
Nitrate (N)	mg/L			< 0.10	< 0.06	< 0.06		< 0.06
Nitrate + Nitrite (N)	mg/L			< 0.10	< 0.06	< 0.06		< 0.06
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	0.01		0.01
Hardness (dissolved)	mg/L as $CaCO_3$			345	363	1120		1120
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.05	< 0.05		< 0.05
Aluminum (dissolved)	µg/L			< 5	< 1	4		4
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	< 0.2	< 0.2		< 0.2
Barium (dissolved)	µg/L	**1000**	**29000**	16	13	17		17
Beryllium (dissolved)	µg/L		**67**	< 0.50	< 0.007	< 0.007		< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	19	21	29		29
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.007		0.007
Calcium (dissolved)	µg/L			125000	109500	155000		155000
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	< 0.003	< 0.003		< 0.003
Cobalt (dissolved)	µg/L		**66**	< 0.50	0.05	0.03		0.03
Chromium (dissolved)	µg/L		**810**	< 5.0	0.21	0.17		0.17
Copper (dissolved)	µg/L	**1000**	**87**	1.9	0.4	0.4		0.4
Iron (dissolved)	µg/L			< 100	< 7	< 7		< 7
Potassium (dissolved)	µg/L			725	694	882		882
Magnesium (dissolved)	µg/L			6100	4845	6780		6780
Manganese (dissolved)	µg/L			4	26	1		1
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.24	0.96		0.96
Sodium (dissolved)	µg/L			2200	1855	2500		2500
Nickel (dissolved)	µg/L		**490**	< 1.0	< 0.1	0.2		0.2
Phosphorus (total)	µg/L			2595	7	3		3
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	0.03	0.01		0.01
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90		< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.2	0.42		0.42
Tin (dissolved)	µg/L			< 1.0	0.09	< 0.06		< 0.06
Strontium (dissolved)	µg/L			185	167	220		220
Titanium (dissolved)	µg/L			< 5.0	< 0.05	0.45		0.45
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.005	< 0.005		< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	9	8	8		8
Vanadium (dissolved)	µg/L		**250**	< 0.50	0.28	0.31		0.31
Zinc (dissolved)	µg/L		**1100**	< 5.0	2	< 2		< 2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02		< 0.02
Radium-226	Bq/L	**0.49**		< 0.040	< 0.01	< 0.01		< 0.01
Thorium-230	Bq/L	**0.65**		< 0.070	< 0.02	< 0.02		< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02		< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	37.6		--
ORP	mV			-[1]	-[1]	147.6		--
SPC	us/cm			-[1]	-[1]	583.0		--
Temperature	°C			-[1]	-[1]	5.753		--
Turbidity	FNU			-[1]	-[1]	74.85		--
pH	Units			-[1]	-[1]	7.04		--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria
[1] Field parameters included for current sampling year only.
-- - No data.

Table 125: PH-95-17-I

		Criteria		PH-95-17-I				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/24	2021/11/02	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.35	7.15	7.15	6.92	7.04
Alkalinity	mg/L as $CaCO_3$			805	947	878	816	847
Carbonate	mg/L as $CaCO_3$			1.8	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			800	947	878	816	847
Total Dissolved Solids	mg/L			1023	842	963	1020	992
Fluoride	mg/L	**1.5**		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			7	6	6	7	7
Dissolved Organic Carbon	mg/L			6	6	6	6	6
Total Ammonia-N	mg/l			12.8	10.4	14.6	14.7	14.7
Chloride	mg/L			52	49	70	51	61
Sulphate	mg/L			104	45	44	42	43
Bromide	mg/L			1.1	0.4	0.6	0.4	0.5
Nitrite (N)	mg/L			< 0.010	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			< 0.10	0.15	0.14	0.17	0.16
Nitrate + Nitrite (N)	mg/L			< 0.10	0.15	0.14	0.17	0.16
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			790	1585	766	1180	973
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	4	4	3	4
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0	0.4	0.5	0.6	0.6
Barium (dissolved)	µg/L	**1000**	**29000**	240	191	238	228	233
Beryllium (dissolved)	µg/L		**67**	< 0.50	0.011	0.012	0.027	0.020
Boron (dissolved)	µg/L	**5000**	**45000**	1500	1340	1500	1760	1630
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	0.008	< 0.010	0.009
Calcium (dissolved)	µg/L			260000	238000	244000	220000	232000
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	0.009	0.013	0.057	0.035
Cobalt (dissolved)	µg/L		**66**	4.55	3.95	4.77	4.18	4.48
Chromium (dissolved)	µg/L		**810**	< 5.0	0.25	0.43	0.58	0.51
Copper (dissolved)	µg/L	**1000**	**87**	2.2	2.5	2.2	3.3	2.8
Iron (dissolved)	µg/L			< 100	33	65	14	40
Potassium (dissolved)	µg/L			32500	31650	34500	35600	35050
Magnesium (dissolved)	µg/L			33500	33150	38300	33500	35900
Manganese (dissolved)	µg/L			7550	6615	8190	7590	7890
Molybdenum (dissolved)	µg/L		**9200**	0.65	0.51	0.67	0.60	0.64
Sodium (dissolved)	µg/L			43500	40000	42800	46000	44400
Nickel (dissolved)	µg/L		**490**	5.3	4.7	5.7	5.0	5.4
Phosphorus (total)	µg/L			840	11	17	17	17
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.01	0.02	< 0.09	< 0.06
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.2	0.24	0.51	0.38
Tin (dissolved)	µg/L			< 1.0	0.27	0.24	0.33	0.29
Strontium (dissolved)	µg/L			930	935	1060	879	970
Titanium (dissolved)	µg/L			< 5.0	0.43	0.37	< 0.05	0.21
Thallium (dissolved)	µg/L		**510**	< 0.05	0.034	0.027	0.145	0.086
Uranium (dissolved)	µg/L	**20**	**420**	**6150**	**9735**	**14200**	**10800**	**12500**
Vanadium (dissolved)	µg/L		**250**	< 0.50	0.50	0.53	0.71	0.62
Zinc (dissolved)	µg/L		**1100**	< 5.0	5	2	10	6
Lead-210	Bq/L	**0.20**		< 0.10	0.05	0.06	**0.64**	**0.35**
Radium-226	Bq/L	**0.49**		< 0.040	0.03	0.02	0.03	0.03
Thorium-230	Bq/L	**0.65**		< 0.070	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	38.5	32.0	--
ORP	mV			-[1]	-[1]	-6.1	101.5	--
SPC	us/cm			-[1]	-[1]	14.9	1565.0	--
Temperature	°C			-[1]	-[1]	10.286	10.7	--
Turbidity	FNU			-[1]	-[1]	589.53	229.6	--
pH	Units			-[1]	-[1]	6.72	6.58	--

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Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 126: PH-95-17-II

		Criteria		PH-95-17-II				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/24	2021/11/02	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.42	7.19	7.4	7.34	7.37
Alkalinity	mg/L as $CaCO_3$			530	1015	655	519	587
Carbonate	mg/L as $CaCO_3$			1.4	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			530	1015	655	519	587
Total Dissolved Solids	mg/L			558	546	529	517	523
Fluoride	mg/L	**1.5**		< 0.10	< 0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			7	5	4	4	4
Dissolved Organic Carbon	mg/L			5	6	4	4	4
Total Ammonia-N	mg/l			21.0	22.2	17.6	10.8	14.2
Chloride	mg/L			30	35	44	22	33
Sulphate	mg/L			7	6	6	4	5
Bromide	mg/L			< 1.0	< 0.3	0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			0.011	0.11	< 0.03	0.12	0.08
Nitrate (N)	mg/L			0.77	1.12	1.22	1.25	1.24
Nitrate + Nitrite (N)	mg/L			0.77	1.22	1.22	1.37	1.30
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			400	3996	404	547	476
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	4	86	3	45
Arsenic (dissolved)	µg/L	**25**	**1900**	1.9	2.4	1.5	1.6	1.6
Barium (dissolved)	µg/L	**1000**	**29000**	225	192	170	104	137
Beryllium (dissolved)	µg/L		**67**	< 0.50	0.009	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	1350	1150	487	809	648
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			120000	131000	133000	114000	123500
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	0.008	< 0.003	0.010	0.007
Cobalt (dissolved)	µg/L		**66**	4.10	4.90	3.08	3.66	3.37
Chromium (dissolved)	µg/L		**810**	< 5.0	0.53	0.27	0.35	0.31
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	1.3	0.9	1.2	1.1
Iron (dissolved)	µg/L			4000	3770	2120	1720	1920
Potassium (dissolved)	µg/L			36000	35850	27400	15800	21600
Magnesium (dissolved)	µg/L			22500	21750	17800	15700	16750
Manganese (dissolved)	µg/L			735	706	825	584	705
Molybdenum (dissolved)	µg/L		**9200**	< 0.50	0.18	1.04	0.12	0.58
Sodium (dissolved)	µg/L			35500	36100	20300	24200	22250
Nickel (dissolved)	µg/L		**490**	4.8	4.9	1.5	2.2	1.9
Phosphorus (total)	µg/L			20850	22	9	14	12
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	< 0.01	< 0.01	< 0.09	0.05
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50	< 0.90	< 0.90	< 0.90	< 0.90
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	0.2	0.21	0.20	0.21
Tin (dissolved)	µg/L			< 1.0	0.26	0.12	0.10	0.11
Strontium (dissolved)	µg/L			490	506	496	335	416
Titanium (dissolved)	µg/L			< 5.0	0.39	0.09	< 0.05	0.07
Thallium (dissolved)	µg/L		**510**	< 0.05	0.078	0.064	0.040	0.052
Uranium (dissolved)	µg/L	**20**	**420**	**31**	**99**	5	4	5
Vanadium (dissolved)	µg/L		**250**	0.79	1.09	1.16	0.83	1.00
Zinc (dissolved)	µg/L		**1100**	< 5.0	< 2	< 2	< 2	< 2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.040	0.02	< 0.01	0.03	0.02
Thorium-230	Bq/L	**0.65**		< 0.070	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	28.1	65.2	--
ORP	mV			-[1]	-[1]	-33.5	21.2	--
SPC	us/cm			-[1]	-[1]	1050.0	740.0	--
Temperature	°C			-[1]	-[1]	9.821	10.8	--
Turbidity	FNU			-[1]	-[1]	815.79	861.3	--
pH	Units			-[1]	-[1]	6.87	6.95	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

-- - No data.

Table 127: PH-95-18

		Criteria		PH-95-18		
		COPC	Table 3	2019	2020	2021
Analysis	**Units**		**(MECP)**	**Average**	Well Damaged	
pH	pH	**6.5-8.5**	**6.5-9.0**	7.14		
Alkalinity	mg/L as $CaCO_3$			870		
Carbonate	mg/L as $CaCO_3$			1.1		
Bicarbonate	mg/L as $CaCO_3$			860		
Total Dissolved Solids	mg/L			1080		
Fluoride	mg/L	**1.5**		< 0.10		
Total Organic Carbon	mg/L			11.0		
Dissolved Organic Carbon	mg/L			8.8		
Total Ammonia-N	mg/l			40.00		
Chloride	mg/L			46		
Sulphate	mg/L			120.0		
Bromide	mg/L			< 1.0		
Nitrite (N)	mg/L			< 0.010		
Nitrate (N)	mg/L			0.59		
Nitrate + Nitrite (N)	mg/L			0.59		
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10		
Hardness (dissolved)	mg/L as $CaCO_3$			710		
Silver (dissolved)	µg/L		**1.5**	< 0.1		
Aluminum (dissolved)	µg/L			250.0		
Arsenic (dissolved)	µg/L	**25**	**1900**	< 1.0		
Barium (dissolved)	µg/L	**1000**	**29000**	160		
Beryllium (dissolved)	µg/L		**67**	< 0.50		
Boron (dissolved)	µg/L	**5000**	**45000**	2000		
Bismuth (dissolved)	µg/L			< 1.0		
Calcium (dissolved)	µg/L			220000		
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1		
Cobalt (dissolved)	µg/L		**66**	18.00		
Chromium (dissolved)	µg/L		**810**	< 5.0		
Copper (dissolved)	µg/L	**1000**	**87**	18.0		
Iron (dissolved)	µg/L			430		
Potassium (dissolved)	µg/L			61000		
Magnesium (dissolved)	µg/L			42000		
Manganese (dissolved)	µg/L			5700		
Molybdenum (dissolved)	µg/L		**9200**	0.57		
Sodium (dissolved)	µg/L			48000		
Nickel (dissolved)	µg/L		**490**	15.0		
Phosphorus (total)	µg/L			1800		
Lead (dissolved)	µg/L	**10**	**25**	0.51		
Antimony (dissolved)	µg/L	**6**	**20000**	< 0.50		
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0		
Tin (dissolved)	µg/L			< 1.0		
Strontium (dissolved)	µg/L			1100		
Titanium (dissolved)	µg/L			11.0		
Thallium (dissolved)	µg/L		**510**	0.27		
Uranium (dissolved)	µg/L	**20**	**420**	**5000**		
Vanadium (dissolved)	µg/L		**250**	1.40		
Zinc (dissolved)	µg/L		**1100**	5.2		
Lead-210	Bq/L	**0.20**		< 0.10		
Radium-226	Bq/L	**0.49**		< 0.040		
Thorium-230	Bq/L	**0.65**		< 0.070		
Thorium-232	Bq/L			< 0.060		
Field Parameters						
ODO % Sat	mg/L			-[1]		
ORP	mV			-[1]		
SPC	us/cm			-[1]		
Temperature	°C			-[1]		
Turbidity	FNU			-[1]		
pH	Units			-[1]		

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.
Bold values indicate an exceedance of the COPC or Table 3 criteria
[1] Field parameters included for current sampling year only.
-- - No data.

Table 128: PH-M-19

		Criteria		PH-M-19				
		COPC	Table 3	2019	2020	2021		
Analysis	Units		(MECP)	Average		2021/03/31	2021/11/25	Average
pH	pH	**6.5-8.5**	**6.5-9.0**	7.85	7.57	7.55	7.4	7.48
Alkalinity	mg/L as $CaCO_3$			370	363	361	587	474
Carbonate	mg/L as $CaCO_3$			2.8	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	mg/L as $CaCO_3$			365	363	361	587	474
Total Dissolved Solids	mg/L			820	737	911	760	836
Fluoride	mg/L	**1.5**		< 0.10	0.06	< 0.06	< 0.06	< 0.06
Total Organic Carbon	mg/L			3	2	1	1	1
Dissolved Organic Carbon	mg/L			2	2	2	2	2
Total Ammonia-N	mg/l			0.1	< 0.04	0.05	< 0.04	0.05
Chloride	mg/L			250	235	380	290	335
Sulphate	mg/L			11	9	10	10	10
Bromide	mg/L			< 1.0	< 0.3	< 0.3	< 0.3	< 0.3
Nitrite (N)	mg/L			< 0.010	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (N)	mg/L			1.11	0.93	1.02	0.64	0.83
Nitrate + Nitrite (N)	mg/L			1.11	0.93	1.02	0.64	0.83
Mercury (dissolved)	µg/L	**1**	**0.29**	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01
Hardness (dissolved)	mg/L as $CaCO_3$			365	676	491	347	419
Silver (dissolved)	µg/L		**1.5**	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05
Aluminum (dissolved)	µg/L			< 5	6	< 1	< 1	< 1
Arsenic (dissolved)	µg/L	**25**	**1900**	**310**	**379**	**370**	**339**	**355**
Barium (dissolved)	µg/L	**1000**	**29000**	50	48	63	50	56
Beryllium (dissolved)	µg/L		**67**	< 0.50	0.017	< 0.007	< 0.007	< 0.007
Boron (dissolved)	µg/L	**5000**	**45000**	31	33	29	24	27
Bismuth (dissolved)	µg/L			< 1.0	< 0.007	< 0.007	< 0.010	0.009
Calcium (dissolved)	µg/L			115000	110000	154000	116000	135000
Cadmium (dissolved)	µg/L	**5**	**2.7**	< 0.1	0.004	0.006	0.008	0.007
Cobalt (dissolved)	µg/L		**66**	< 0.50	0.11	0.10	0.14	0.12
Chromium (dissolved)	µg/L		**810**	< 5.0	0.65	0.74	0.32	0.53
Copper (dissolved)	µg/L	**1000**	**87**	< 1.0	0.6	0.4	0.5	0.5
Iron (dissolved)	µg/L			< 100	10	22	< 7	15
Potassium (dissolved)	µg/L			935	1055	1150	913	1032
Magnesium (dissolved)	µg/L			16000	12550	18000	16300	17150
Manganese (dissolved)	µg/L			2	5	1	5	3
Molybdenum (dissolved)	µg/L		**9200**	0.73	0.91	0.82	0.89	0.86
Sodium (dissolved)	µg/L			170000	164000	218000	197000	207500
Nickel (dissolved)	µg/L		**490**	< 1.0	0.3	0.1	0.2	0.2
Phosphorus (total)	µg/L			330	28	7	13	10
Lead (dissolved)	µg/L	**10**	**25**	< 0.50	0.03	< 0.01	< 0.09	0.05
Antimony (dissolved)	µg/L	**6**	**20000**	3.20	2.70	3.80	3.60	3.70
Selenium (dissolved)	µg/L	**10**	**63**	< 2.0	1.5	1.70	1.10	1.40
Tin (dissolved)	µg/L			< 1.0	< 0.06	< 0.06	< 0.06	< 0.06
Strontium (dissolved)	µg/L			375	334	456	371	414
Titanium (dissolved)	µg/L			< 5.0	0.49	0.15	0.11	0.13
Thallium (dissolved)	µg/L		**510**	< 0.05	< 0.005	< 0.005	< 0.005	< 0.005
Uranium (dissolved)	µg/L	**20**	**420**	**225**	**187**	**229**	**178**	**204**
Vanadium (dissolved)	µg/L		**250**	4.10	5.19	6.60	4.16	5.38
Zinc (dissolved)	µg/L		**1100**	< 5.0	< 2	< 2	< 2	< 2
Lead-210	Bq/L	**0.20**		< 0.10	< 0.02	< 0.02	< 0.02	< 0.02
Radium-226	Bq/L	**0.49**		< 0.040	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-230	Bq/L	**0.65**		< 0.070	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232	Bq/L			< 0.060	< 0.02	< 0.02	< 0.02	< 0.02
Field Parameters								
ODO % Sat	mg/L			-[1]	-[1]	-[2]	-[2]	--
ORP	mV			-[1]	-[1]	-[2]	-[2]	--
SPC	us/cm			-[1]	-[1]	-[2]	-[2]	--
Temperature	°C			-[1]	-[1]	-[2]	-[2]	--
Turbidity	FNU			-[1]	-[1]	-[2]	-[2]	--
pH	Units			-[1]	-[1]	-[2]	-[2]	--

COPC = Contaminants of Potential Concern criteria for Potable Groundwater Conditions derived from Port Hope Screening Report.
Table 3 = Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Ontario Ministry of the Environment and Climate Change, 2011.

Bold values indicate an exceedance of the COPC or Table 3 criteria

[1] Field parameters included for current sampling year only.

[2] Insufficient volume of groundw ater for field parameters

-- - No data.

Appendix E EA FOLLOW-UP PROGRAM SUMMARY TABLE

Table 129: Scope of biophysical effects EA Follow-Up Monitoring Plan, 2021

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2021	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2021	Status of EA Commitments - 2021
Atmospheric Environment						
Air Quality 24-hour average Ambient Air Quality Criteria (AAQC) will be exceeded for arsenic and cobalt on occasions at offsite locations, including public receptor locations. Total suspended particulates of PM_{10}, $PM_{2.5}$ and NO_2 will exceed the 24-hour AAQC at some offsite locations.	Reduce travel distances within LTWMF from 200 m to 50 m, for equipment distributing off-loaded contaminants. Install a fence-type barrier or other movable barrier at specific targeted locations. Construction equipment to meet Off-Road Compression-Ignition Engine Emission Regulations for use in areas of denser urbanization, where practicable.	No residual adverse effects.	Construction equipment met Off-Road Compression-Ignition Engine Emission Regulations for PH LTWMF activities.	Verify implementation of mitigation measures. Monitor arsenic and cobalt at offsite locations, including public receptor locations. Compare measured concentrations to predictions. Monitor levels of $PM_{2.5}$ at offsite locations. Compare measured levels of $PM_{2.5}$ to correlate the predicted air quality relationships between PM_{10} and $PM_{2.5}$; and relationships between NO_2 and $PM_{2.5}$.	There were no exceedances of the 24-hour AAQC [1] for arsenic or cobalt in 2021. CCME adopted the Air Quality Management System [2]. Canadian Ambient Air Quality Standards (CAAQS) for Fine Particulate Matter ($PM_{2.5}$) are included, which replace the Canada-wide standards developed in 2000. A 2020 value of 27 µg/m^3 is used for $PM_{2.5}$ (98^{th} percentile averaged over 3 years) was not exceeded in 2021. As described in the *Port Hope Environmental and Biophysical Monitoring Plan* [3], compliance with this criterion will also be protective of the potential effects from PM_{10} and NO_2.	Air quality monitoring was conducted throughout 2021 at the PH LTWMF Site. A holiday shutdown took place from 2021 December 24 to 2022 January 04. The Overriding Limit of 120 µg/m^3 for TSP, as defined in the Dust Management Requirements and Plan [4] was not exceeded in 2021. The CAAQS for $PM_{2.5}$ of 27 µg/m^3 (98^{th} percentile averaged over 3 years) was not exceeded in 2021. The sample containing the highest net weight of TSP collected each week at each of the monitoring stations was sent for additional analysis to determine the concentration of metals and radionuclides in suspended dust. There were no exceedances of the AAQC [1] for metals in 2021. Radionuclide analysis results are discussed under *Radiological, Particulate Radioactivity*.

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2021	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2021	Status of EA Commitments - 2021
Odour MOE guideline for odour may be exceeded at properties near Highland Drive Landfill and the Port Hope Harbour.	Lime may be added to waste, for sulphur-related odours; foaming agents may be used to minimize surface odours; odour suppression sprays may be used.	No residual adverse effects.	Dredging at the Port Hope Harbour commenced in 2021 July. A 3rd party odour monitoring consultant performed twice daily off-site upwind and downwind odour measurements when dredging was taking place in 2021. There were 0 confirmed instances when the threshold level of 5 D/T was reached during dredging activities at Port Hope Harbour off-site receptors. Remediation at the Highland Drive Landfill to commence in 2022.	During pre-construction and construction phases, conduct odour analysis at Highland Drive Landfill and Port Hope Harbour sites. Implement mitigation measures if odour analysis indicates they are necessary.	A 3rd party odour monitoring contractor performed pre-construction and construction phase odour monitoring to support the dredging activities at the Port Hope Harbour in 2021. Pre-construction odour monitoring was conducted in 2021 June ahead of the commencement of dredging in 2021 July. Construction phase odour monitoring was conducted twice daily off-site upwind and downwind measurements when dredging was taking place in 2021.	A 3rd party odour monitoring contractor was procured in 2020 to support the monitoring during dredging in the Port Hope Harbour. Odour monitoring commenced in 2021 June. Remediation at the Highland Drive Landfill to commence in 2022.
Noise Noise levels will increase by 12 dBA, to 63 dBA, for residents adjacent to the LTWMF, during construction and development; by 13 dBA, to 67 dBA, for residents adjacent to the Alexander Ravine; and by 12 dBA, to 61 dBA, for residents along the Strachan Street transportation route.	Hours of work will comply with Port Hope By-Law No 30/2002, which prohibits construction between 11:00 pm and 7:00 am. At small and medium scale remediation sites in residential areas, activities would be limited to daylight hours and would conclude by 7:00 p.m. Construction equipment will comply with emission standards as outlined in NPC-115 of the Ontario Model	Nuisance noise impacts on local receptors.	Complied with Port Hope By-Law No 30/2002 and World Health Organization's 70 dBA over a 24-hour period [5]. Trucks and other equipment will be equipped with mufflers. Tailgate banging was avoided. Physical and operational elements were built into the design of the new access road; construction of a berm and installation of traffic lights.	Verify implementation of mitigation measures. Measure noise levels at the LTWMF including the intersection of the proposed access road [now constructed] and Toronto Road during construction; at Alexander Ravine during remediation; and along the Strachan Street transportation route, to verify accuracy of predictions and effectiveness of mitigation measures.	Noise monitoring was conducted around the LTWMF in 2021. If 2021 results are compared to 2015 results prior to the start of the EW3a construction (when levels of activity around the site were comparatively low), it can be observed that the 2021 results are similar to 2020 with no notable increases of results. All values were below the predicted range of 12 dBA and the World Health	Implementation of mitigation measures is verified during compliance inspections. Work was scheduled in compliance with local by laws. Four main monitoring campaigns (January, April, August, and November) were completed for noise monitoring in 2021 at the PH LTWMF. The 2021 results are similar to 2020 with no notable increases.

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2021	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2021	Status of EA Commitments - 2021
	Municipal Noise Control By-Law. Trucks and other equipment will be equipped with mufflers. Tailgate banging will be avoided. Empty trucks will be required to reduce speed at construction sites and on local roads to avoid excessive cargo box and tray noise. Construction hoarding will be erected where practical. Develop and implement a noise mitigation plan for the intersection of the new access road and Toronto Road involving physical (e.g., berms) and operational (e.g., transportation protocols) elements.			Monitor noise levels for compliance with appropriate by laws and regulations governing hours of work and levels of noise.	Organization's *Guideline for Community Noise* level of 70 dBA over a 24-hour period [5]. The North, South and Central Transportation Routes were also monitored in 2021. Monitoring along the Transportation Routes showed little to no increase from the baseline monitoring that took place prior to the remedial activities.	The North, South and Central Transportation Routes were also monitored in 2021. Please note, the Central Transportation Route monitoring incorporates Strachan Street Consolidation Site. Remediation commenced at the Strachan Street Consolidation Site 0n 2021 October 28. Monitoring along the Transportation Routes showed little to no increase from the baseline monitoring that took place prior to the remedial activities.
Radiological, Radon Annual average radon concentrations, downwind from the LTWMF during construction and development, are expected to be 25.3 Bq/m^3. The radon pathway will be eliminated.	Covering stockpiles and exposed areas overnight and on weekends. Applying dust suppressants. Restricting or ceasing work under high wind conditions. Minimizing the exposed working face.	No residual adverse effects.	CNL approved dust suppressants are used. Work was restricted or ceased under high wind conditions Revegetation of the work areas is to be completed at the end of the PH LTWMF project.	Stockpiles and exposed areas were covered with spray-on technology at the end of each workday. CNL approved dust suppressants are used. Work was restricted or ceased under high wind conditions	Radon measurements are taken monthly at the fenceline as a representative reading to the public and around the existing mound. Measurements taken are located at the fenceline around boundary. At the fenceline, the average radon measurements ranged between 22 Bq/m^3 to 118 Bq/m^3.	Radon gas and radon progeny was monitored on a routine monthly basis at the LTWMF during the 2021 calendar year.

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2021	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2021	Status of EA Commitments - 2021
	Re-vegetation of completed cells and excavation areas as soon as possible. Modify methane gas piping exit vents to mitigate radon gas emanating from Cell 3 of the LTWMF.		Remediation activity began in 2017 December and included the arsenic pile and marginally contaminated soil.	Revegetation of the work areas is to be completed at the end of the PH LTWMF project.		
Radiological, Particulate Radioactivity The predicted levels for the following radionuclides are below Health Canada reference levels: ^{226}Ra (0.000049 Bq/m^3, compared with 0.05 Bq/m^3); ^{230}Th (0.00042 Bq/m^3, compared with 0.01 Bq/m^3), ^{232}Th (0.000057 µg/m^3 compared with 0.006 Bq/m^3); and uranium (0.0018 µg/m^3 compared with 4.07 µg/m^3).	Implement watering, to control dust on unpaved roads and excavation areas. Implement vacuum sweeping and water flushing on paved roads.	No residual adverse effects.	Watering trucks and spray on technology used in areas of excavation.	Verify implementation of mitigation measures. Measure levels of ^{226}Ra; ^{230}Th; ^{232}Th, and uranium at work sites and along haul roads, to verify modelling predictions.	TSP high volume air sampler filters were sent for additional laboratory analysis in 2021. Radium-226 thorium-232, and uranium exceeded the predicted values for some of the filters in 2021; however, they remained well below the Health Canada reference values. It should be noted that the exceedances of the predicted values appear to be related to laboratory detection limits (uncalculated laboratory results were less than the limit of detection for radium-226 and thorium-232). The predicted values were based on modeling PM_{10} concentrations. Comparing particulate radioactivity on TSP filters to the modelled predictions is taking a conservative approach.	The sample containing the highest net weight of TSP collected each week at each of the monitoring stations was sent for additional analysis to determine the concentration of COPCs in suspended dust.
Aquatic Environment						

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2021	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2021	Status of EA Commitments - 2021
Sediment Quality (Sculthorpe Marsh) If remediation work is carried out in the Sculthorpe Marsh, the effect resulting from the sediment removal is expected to reduce invertebrate productivity temporarily. (See also, *Terrestrial Environment Component*)	Conduct sediment toxicity testing to confirm the need for remediation and /or refine area/extent/scope of any required sediment removal. Develop a Marsh Protection and Restoration Plan, which could include replacement of coarse organic matter and re-planting of shoreline vegetation.	No residual adverse effects.	Remediation is still being discussed with MPH. Site Specific Risk Assessment will be conducted prior to any remediation activities.	The remediation of the Sculthorpe Marsh is not required at this time. The following follow up actions with respect to the Sculthorpe Marsh; monitor recovery of benthic invertebrates and aquatic communities against predicted timelines are not incorporated into this plan.	Remediation is still being discussed with MPH. Site Specific Risk Assessment will be conducted prior to any remediation activities.	Remediation is still being discussed with MPH. Site Specific Risk Assessment will be conducted prior to any remediation activities.
Surface Water Quality, Radiological Concentrations of arsenic and uranium will decrease by 78-88 % in the Highland Drive, South Creek, and Brewery Creek. Concentrations of uranium and ^{226}Ra would decrease similarly in Alexander Creek. Concentrations of ^{226}Ra and uranium are expected to increase in the area between the harbour and the Ganaraska River, during dredging of the harbour, but to remain below Provincial Water Quality Guidelines (PWQOs). Uranium concentrations in the groundwater and down-gradient surface water in the	The mitigation measures include the design (e.g., the low-permeability cover on the LTWMF and permeable reactive barriers installed in Highland Drive South Ravine), operation and management (e.g., storm water management) features of the project proposal. The detailed design (PHP-PHH-N-031) includes a temporary wave attenuator and use of a turbidity curtain for construction of the wave attenuator. An Emergency Response Plan will be developed to address unexpected events. A Spill Contingency Plan will be developed to deal with unexpected spills of fuels	No residual adverse effects.	Temporary wave attenuation curtain to be installed during construction of wave attenuation. A Spill Contingency Plan has been developed to deal with unexpected spills of fuels and lubricants. Spill control and clean-up equipment is provided in all work locations. Erosion and sediment control structures are in place and are inspected and maintained regularly.	Measure concentrations of arsenic and uranium at the Highland Drive South Creek and Brewery Creek; and concentrations of uranium and ^{226}Ra in Alexander Creek; concentrations of ^{226}Ra and uranium in the area between the harbour and the Ganaraska River during dredging of the harbour; and uranium concentrations in the groundwater and down-gradient surface water in the area of the LTWMF, to verify accuracy of predictions. Review Emergency Response Plan, Spill Contingency Plan and require revisions if necessary, until plans are deemed acceptable. Verify presence of spill control and clean-up	No residual adverse effects on surface water. There was no observable decrease in uranium concentrations in Brand Creek (downgradient of the LTWMF). This is not expected until the project evolves, and the waste is remediated. In the Port Hope Harbour, uranium concentrations were observed to exceed the PWQO [15] during dredging. The original EA prediction used theoretical/predicted data inputs to the model. Actual conditions related to daily inputs of water to the inner harbour during dredging have resulted in a different set of conditions, requiring that the proposed EA mitigation measures be modified. CNL engaged	Pre-construction monitoring of surface water at the Highland Drive South Ravine Creek, Brewery Creek and Alexander Creek was completed in 2013. Confirmatory sampling took place in 2021, in anticipation of the start of construction at various remediation sites. Surface water sampling was completed during the Port Hope Harbour dredging activities. Uranium exceeded the PWQO [6] and CWQG [7] at PHH-2 in 2021 June and November. Monitoring of the surface water downgradient of the LTWMF (including Lake Ontario) is performed on a continuous, quarterly basis. (Section 10.3.4.1) Oversight is used by CNL

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2021	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2021	Status of EA Commitments - 2021
area of the LTWMF are expected to decrease by 63 %.	and lubricants. Spill control and clean-up equipment will be provided in all work locations. Erosion and sediment control structures will be in place and will be inspected and maintained regularly.			equipment at all work locations. Verify presence of erosion and sediment control structures, and review inspection and maintenance protocol.	Responsible Authorities to ensure a path forward for the protection of Lake Ontario and the Ganaraska River. This has resulted in the creation of a robust monitoring program to ensure the protection of the aquatic environment while dredging activities continue at the Port Hope Harbour.	personnel to confirm the suitability, implementation and effectiveness of processes applied to PHAI project activities in order to comply with contractual obligations, licensing requirements, federal/provincial acts and regulations, environmental management and protection plans, compliance plans and technical specifications. Oversight is applied by CNL taking into consideration the importance and complexity of activities and the organization(s) involved in the management of these activities. Activities performed by PHAI consultants, contractors and service providers are subject to oversight.
Surface Water Quality, Non-Radiological Long-term improvement to down-gradient surface water quality; reduced contaminant loadings to down-gradient streams; and no measurable change to Ganaraska River are the effects predicted. Any storm water flow which permeates the dike during harbour cleanup is not	Groundwater, stormwater, and drainage water collection and treatment systems, including flow control and quality control, will be in place. Dike and silt screen will isolate harbour work from Lake Ontario. It is to be noted that subsequent to the acceptance of the	No residual adverse effects.	Required sampling of groundwater, storm water and drainage water took place during the PH LTWMF construction activities. No residual adverse effects for the PH LTWMF construction work. Confirmatory sampling took place at Highland Drive South Ravine Creek, Brewery Creek, and Alexander Creek	Verify predicted improvements in surface water. Proponent must ensure that discharge is not deleterious to aquatic environment (fish) at point of discharge and appropriate monitoring must be employed to confirm this. Monitor contaminant concentrations in the harbour and Ganaraska River	There was no observable decrease in contaminant concentrations to downgradient Brand Creek; however, this is not expected until the project evolves, and the waste is remediated. Confirmatory sampling took place at Highland Drive South Ravine Creek, Brewery Creek, and Alexander Creek in 2021 in anticipation of construction activities.	Pre-construction monitoring of surface water at the Highland Drive South Ravine Creek, Brewery Creek and Alexander Creek was completed in 2013. Confirmatory sampling is planned to occur in 2022, in anticipation of the start of construction at various remediation sites. Monitoring of surface water at the Port Hope Harbour

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expected to raise contaminant concentrations above PWQOs in the harbour or Ganaraska River. Surface water infiltration into and through contaminated materials, to groundwater and down-gradient surface water, is expected to decrease. Contaminant loadings from LTWMF leachate, discharging to the lake, would be reduced by 44 %.	Environmental Assessment by the RAs, the preliminary design for the Port Hope Project continued to be refined in support of the licence application and some changes to preliminary design concepts were made. Among the design changes was the substitution of the proposed dike for purposes of separating the Approach Channel and Turning Basin from the Outer Harbour during dredging operations with a series of silt curtains to prevent transmission of suspended solids out of the Harbour during dredging; with the curtains being protected from wave damage by a floating wave attenuator designed for the dissipation of wave energy in harbours. This (and all other design refinements), and the potential environmental effects associated with the change, were described in the Engineering Change Summary Report, which was submitted to, and approved by, the RAs. Therefore, the silt barrier and wave attenuator are incorporated		in 2021 and will continue to take place in 2022.	during the harbour cleanup following any storms. Monitor mercury and levels of other contaminant of potential concern (COPC) in fish tissue to verify predictions. Verify reduction of contaminant loadings due to leachate discharging to Lake Ontario. Monitor the maintenance of silt curtains.		and Ganaraska River Confluence was completed in 2020 and will continue in 2021. Monitoring of the surface water downgradient of the LTWMF (including Lake Ontario) is performed on a continuous, quarterly basis. The PH LTWMF construction activities did not appear to be affecting surface water quality. (Section 10.3.3) Monitoring of COPCs in fish tissue to occur in the project's Maintenance and Monitoring Phase. Monitoring of the maintenance of the silt curtains will occur during the construction period around water features at Alexander Creek Highland Drive South Creek, Brand Creek, if necessary, and near Lake Ontario.

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	into the detailed design description report.					
Sediment Quality (Harbour) A long-term improvement to harbour sediment quality and habitat conditions is predicted.	Beneficial effects will be enhanced by the development of fish habitat enhancement incorporated into the harbour detailed design.	Beneficial effect.	Design of harbour incorporates enhancement to fish habitat. Monitoring to take place in the maintenance and monitoring phase.	Verify design enhancements have improved the fish habitat in the harbour. Monitor sediment quality and habitat conditions.	Not applicable. Expected to be a beneficial effect. Monitoring to take place in the maintenance and monitoring phase.	Monitoring to occur during Maintenance and Monitoring Phase.
Geology and Groundwater Environment						
Soil Quality, Radiological The mean incremental concentrations of radiological contaminants are expected to be less than 10 % of background at remediation sites. The incremental concentrations at the LTWMF would be less than 20 % of background. The exception is ^{230}Th, with an expected 63 % increase in concentration over baseline, during construction and development of the LTWMF, to a predicted mean concentration of 97.7 Bq/kg, with a maximum predicted concentration of 141.9 Bq/kg.	Reduce travel distances within LTWMF from 200 m to 50 m, for equipment distributing off-loaded contaminants. Implementation of a Dust Management Requirements and Plan.	No residual adverse effects.	The *Dust Management and Requirements Plan* [4] was implemented during the PH LTWMF construction activities and Waterfront sites remediation activities. The *Dust Management and Requirements Plan – Small-Scale Sites Remediation* [8] was implemented and used for the Package 3, 4 and 5 Small-Scale Sites remediation in 2021.	Measure concentrations of all radiological contaminants at all remediation sites and at the LTWMF to verify modelling predictions. Monitor concentrations of 230Th at the LTWMF perimeter fence, and in the surface soils adjacent to it.	No residual adverse effects. LTWMF: In 2021, Thorium-230 soil concentrations have not increased from baseline (Section 10.3.3.3) Highland Drive: Remediation activities have not commenced at the Highland Drive Site; therefore, the data collected in 2021 can be used to supplement existing baseline data. The 2021 results are similar to the data collected in previous years.	Surface soil monitoring for radiological contaminants of interest around the PH LTWMF and the Highland Drive Landfill Site were monitored in 2021. Monitoring is planned annually for the remainder of the project for both Sites.
Soil Quality, Non-Radiological	See *Atmospheric Environment Component*.	No residual adverse effects.	No residual adverse effects for PH LTWMF construction work.	Verify predicted soil concentrations of arsenic	LTWMF: In 2021, concentrations of arsenic 5.3 µg/g and 19 µg/g)	Surface soil monitoring for non-radiological contaminants of interest

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Relates to potential disposition of contaminants on surface at perimeter of LTWMF (see *Atmospheric Environmental Component*). Predicted maximum concentrations: arsenic 4.7 mg/kg; cobalt – 6.67 mg/kg.			Watering trucks and spray on technology used in areas of excavation.	and cobalt at perimeter of LTWMF.	were greater than the predicted concentrations at PH-WWMF-SS-01 and PH-WWWMF-SS-05, respectively. All other sampling locations were below predicted concentrations. (Section 10.3.3.3) There are no immediate environmental concerns.	around the perimeter of the PH LTWMF and the Highland Drive Landfill Site occurred in the 2021. Remediation activities have not commenced at the Highland Drive Site; therefore, the data collected in 2021 can be used to supplement existing baseline data. The 2021 results are similar to the data collected in previous years. Monitoring is planned annually for the remainder of the project for both Sites.
Groundwater Quality, Radiological With removal of source contamination, uranium concentrations at Mill Street and Alexander Street sites are predicted to decline below applicable criterion value within approximately 25 years.	No mitigation required.	No residual effects	Pre-construction ground water monitoring at the Mill Street South site occurred in 2012-2013. Monitoring of selected remediated sites will occur following remediation to verify EA predictions.	Measure uranium concentrations at remediated Mill Street and Alexander Street sites. Report measurements annually to verify modelling predictions.	No residual adverse effects.	Pre-construction ground water monitoring at the Mill Street South site occurred in 2012-2013. Monitoring of selected remediated sites will occur following remediation to verify EA predictions.
Groundwater Quality Volume of groundwater collected for treatment in the LTWMF groundwater drainage water collection system would decrease by approximately 30%; contaminant concentrations expected to decline over time.	Collected groundwater water will be treated to requirements set by the CNSC during licensing of the LTWMF.	No residual adverse effects.	WWTP construction was completed in 2016 – active commissioning commenced in the Fall of 2016.	Measure volume and concentrations of contaminants in LTWMF groundwater collection system annually to verify predictions.	Changes in drainage water quality and volume are expected to occur after remediation work commences. It should be noted that drainage water on site is treated prior to release to the environment.	Monitoring of LTWMF groundwater-drainage water collection system occurred in 2021. Increases in average metal concentrations (including arsenic and uranium) were observed in 2021 compared to 2020. The drainage water location WC-SW4-02 was unable to be

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						sampled in 2021as this location due to insufficient water. This location has been historically intermittent, and samples have not always been able to be collected. Monitoring of groundwater and drainage water will continue throughout the Construction and Development Phase.
Drainage water volume A 66 % reduction is predicted for the volume of drainage water to be collected in the groundwater/drainage water collection and treatment system, to 27,380 m^3/a after the cover is placed on the LTWMF. A reduction of 92,110 m^3/a to 116,280 m^3/a is predicted for the sum of groundwater and drainage water discharge, an overall volume reduction of 44 %.	No applicable.	No applicable.	Not applicable.	Measure volume of drainage water at the LTWMF annually to verify predictions.	Not applicable.	Monitoring of groundwater and drainage water will continue throughout the Construction and Development Phase.
Groundwater Flow It is predicted that the water table will be lower by 10 m, and that the groundwater mounding under the existing facility will dissipate. Groundwater discharge to Brand Creek is predicted to decrease by 2 %.	Not applicable.	Not applicable.	Not applicable.	Confirm lowering of water table. Confirm dissipation of mounding by monitoring water table beneath and adjacent to the LTWMF. Monitor stream flow and perform base flow	No residual adverse effects.	The average water levels in groundwater monitoring wells in 2021 are generally comparable to previous years. Monitoring will continue throughout the Construction and Development Phase. The volume of treated

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Groundwater discharge to the onsite drainage system is predicted to decrease by 30 %. The treated effluent volume to be discharged to Lake Ontario is predicted to decrease by 42 %.				separation to get groundwater discharge, to confirm 2 % decrease is not exceeded, and that there is a 30 % decrease in groundwater discharge to the onsite drainage system, and a 42 % decrease in the volume of treated effluent discharged to Lake Ontario. Monitor groundwater flow and direction to verify assessment assumption. Continue monitoring to increase understanding.		effluent discharged to Lake Ontario is monitored on a continuous basis. Monthly Effluent volumes discharged to Lake Ontario are provided in Section 4.1.6. The total effluent volume in 2021 was 125,000 m^3.
Groundwater Quality and Quantity No measurable changes of quality or quantity of groundwater and drainage water during LTWMF construction. Maximum breakthrough of Contaminants of Potential Concern (COPCs) through the LTWMF would be 1 % of PWQO and Ontario Drinking Water Standards (ODWS) criteria.	Not applicable.	Not applicable.	Not applicable.	Monitor quantity and quality of groundwater and drainage water intercepted during construction to confirm prediction of no measurable change.	No measurable change to groundwater quality was observed in 2021 sampling results. (Section 10.3.3.1).	Drainage water and groundwater was monitored in 2021 and will continue to be monitored throughout the Construction and Development Phase.
Design of LTWMF, including liners and covers Primary and secondary liner units would have maximum hydraulic conductivity of $1x10^{-7}$ cm/s. Cover would	Not applicable.	Not applicable.	Not applicable.	Monitor leakage through the primary liner using collection system installed between the primary and secondary liners to verify hydraulic conductivity of the liner units.	Not applicable until maintenance and monitoring.	Monitoring to occur in the Maintenance and Monitoring Phase.

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2021	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2021	Status of EA Commitments - 2021
have a maximum hydraulic conductivity of 10^{-8} cm/s. Volume (annual) of leachate generated within the LTWMF is predicted to be 150 m^3 based on the assumption of 1 mm/a leakage through the cover.				Monitor settlement of the LTWMF cover, to confirm the assumption that there will not be excessive settlements of the waste under the cover that would compromise the cover performance. Monitor rate of infiltration through the LTWMF cover to verify the hydraulic conductivity of the cover and confirm the assumed leakage rate through the cover system.		
Volumes of Excavated Wastes Volumes of excavated wastes to be stored in the LTWMF are predicted to be as follows: 620,000 m^3 of low-level radioactive waste (LLRW); 572,000 m^3 of material mixed with LLRW; 51,250 m3 of industrial waste; and 150,000 m3 of Cameco decommissioning and stored waste. Predictions of contaminant concentrations are found in Tables 9.2.2-1 and 9.2.1-2 of the EA Study Report.	Not applicable.	Not applicable.	Not applicable.	Verify the volume and concentrations of excavated waste prior to emplacement in the LTWMF, to confirm the source term volumes and contaminant concentrations used to predict long-term environmental effects.	On-site waste movement occurred from 2021 January 01 to 2021 December 31 (Section 12.1.2).	Volume of waste will be monitored as waste is placed in the cells of the PH LTWMF.

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Terrestrial Environment						
Preparation of the LTWMF site will result in temporary loss of vegetation of 3 % in Local Study Area and 11 % in Site Study Area, with permanent conversion of vegetation communities in 11 % of Local Study Area and 47 % of Site Study Area. Remediation of sites within Ward 1 will result in temporary loss of 7.6 % of vegetation within Local Study Area and 53 % in Site Study Area. Remediation of sites outside the Highland Drive Site Local Study Area will result in temporary loss of 34 % (18.3 ha) of vegetation.	Relocation of the LTWMF storm water management pond out of the wooded area into an area of Cultural Meadow vegetation. Development of new vegetation communities at the LTWMF site, rather than re-establishing pre-construction conditions. Development of a protection and rehabilitation plan for the fen and beach vegetation at the waterworks site. Implementation of erosion and sediment control structures around cleared sites. Application of dust suppression techniques. Rehabilitation of sites after completion of waste removal. Development of a site-specific landscape plan of each work site. Vegetation clearing should not take place in migratory bird habitat during the breeding season. In	No residual adverse effects.	CNL performed oversight on a regular basis to ensure compliance with the approved Environmental protection and management plans. CNL-approved dust suppressant was used when needed to aid in the dust management for the construction activities. The construction activities were completed outside the migratory bird breeding season. Site-specific rehabilitation and landscape plan will be created at the end of the construction and remediation activities.	Verify relocation of stormwater management pond. Verify development of protection and rehabilitation plans for the fen and beach vegetation at the Waterworks site. Verify implementation of erosion and sediment control structures; application of dust suppression techniques; and rehabilitation of sites. Verify extent and duration of temporary and permanent loss/change. Confirm that no vegetation clearing is occurring during breeding season. In exceptions, confirm that nest survey was conducted and reviewed. Review site-specific remediation plans to confirm incorporation of structural habitat qualities and variability.	No residual adverse effects.	Monitoring planned for active construction phase. CNL performed oversight on a regular basis to ensure compliance with the approved Environmental protection and management plans. More details of the compliance oversight are discussed in Section 2.3. A Dust Monitoring Program was carried out by an independent contractor (not the prime contractor or CNL) for the PH LTWMF activities to ensure that perceived organizational conflicts regarding dust monitoring results and work activities had been avoided. Continuous monitoring occurs during the work hours and results are reported on a 15-minute interval. Any exceedances as identified in *Dust Management and Requirements Plan* [4] are immediately reported to CNL and the prime contractor to initiate corrective action. CNL-approved dust suppressant was used when needed to aid in the dust

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	exceptions, when the breeding season cannot be avoided, an avian biologist will conduct a nest survey immediately prior (e.g., within 2 days) to starting any work potentially impacting migratory bird habitat, to identify and locate active nests of species covered by the Migratory Birds Convention Act. A mitigation plan would be developed to address any potential impacts on migratory birds or their active nests and forwarded for review to Environment Canada prior to implementation. Site-specific rehabilitation plans will incorporate features to re-establish structural habitat qualities and variability for sites (including at Sculthorpe Marsh, if its remediation is warranted).					management for the PH LTWMF construction activities. The PH LTWMF site clearing activities were completed from November-March which is outside the migratory bird breeding season for this area.
Terrestrial (Sculthorpe Marsh)	If remediation occurs (in the Marsh), a Protection and Restoration Plan would be developed to ensure no net loss of wetland function, and should include: No excavation into beach bar;		Not currently applicable, remediation is still being discussed with MPH. A Site Specific Risk Assessment will be conducted prior to any remediation activities.	Follow-up actions with respect to the Sculthorpe Marsh, including the requirement for its remediation, are the subjects of a separate report. Should remediation of Sculthorpe Marsh be	Not currently applicable, remediation is still being discussed with MPH. An MECP approved Site Specific Risk Assessment will be conducted prior to any remediation activities.	Remediation of Sculthorpe Marsh is still being discussed with MPH. A Site Specific Risk Assessment will be conducted prior to any remediation activities.

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	Protection of willow trees along public trails, from excavation or onsite movement of machinery; Erosion prevention, and; Accelerated soil stabilization and plant growth.			required, EA follow-up monitoring would comprise: Verify development of Protection and Restoration Plan that is acceptable to provincial and federal regulatory agencies. Verify no net loss of wetland functions.		
Human Health and Safety						
Workers, Non-Radiological Maximum dust exposures to non-radiological conventional contaminants - within established weighted average criteria (AAQC) for acute 8-hour exposures. For construction activities: annual accident rate of 2.0 to 3.0 Lost time Accidents, and 8.0 to 10.0 Total Recordable Accidents per 100 workers. This equates to 24.4 recordable accidents during construction and development, with 7.3 of the accidents resulting in lost time; 7.8 recordable accidents during site remediation work, with 2.3 of the accidents resulting in lost time.	(See *Atmospheric Environmental Component*). Personal protection equipment would be supplied to mitigate noise effects. All workers would be provided with and required to implement worker protection measures as set out by the Port Hope Site Health and Safety Plan. Implement a policy that all occupational illnesses and injuries are preventable and adopt an operational objective of zero occupational illnesses and injuries (For details, see the specific elements of this policy as listed under Mitigation Measures in Table 11.9.1 of the Screening Report).	No residual adverse effects.	CNL reviewed and approved contractor plan for Health and Safety for the PH LTWMF projects. Construction contractors will be required to adhere to federal and provincial legislation related to the protection of health and safety. Compliance oversights occurred during the PH LTWMF activities. A discussion of the compliance oversight is in Section 9. Implemented a Health and Safety Plan procedure and an Environmental Protection Plan protocol to address the	Monitor compliance with relevant federal legislation related to protection of health and safety. Monitor accident rate. Verify the development of an operational policy, and confirm the details conform to the elements proposed as mitigation measures. (Note that some follow-up elements in the Atmospheric Environment are also relevant in that they are fundamentally intended for the protection of worker health and safety).	No residual adverse effects. For construction activities there were three recordable accidents in 2021, none of which resulted in lost time.	Construction contractors will be required to adhere to federal and provincial legislation related to the protection of health and safety. Compliance oversight occurred during the PH LTWMF activities. A discussion of the compliance oversight is in Section 9. Incident rates are being monitored. (Section 9). Contractors conducting work on behalf of the PHAI submit health and safety plans, for CNL's review and acceptance, which are consistent with the requirements of the *PHAI OSH Plan* [9]. Noise monitoring was completed by CNL over four campaigns in 2021 around

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Noise levels would reach 88 to 96 dBA in construction areas.	Implement a Health and Safety Plan procedure and an Environmental Protection Plan protocol to address the demolition of buildings and the appropriate management of debris materials generated from these activities. Notify residents when activities are expected to result in a 6 dBA increase in noise. Establish an operational protocol that will maintain noise levels at the fenceline below 70 dBA. Prevent public access to areas where noise levels may exceed 70 dBA.		demolition of buildings and the appropriate management of debris materials generated from these activities. Residents were notified when activities were expected to result in a 6 dBA increase in noise. Noise levels at the fenceline of the Port Hope LTWMF did not exceed 70 dBA. Public access was restricted to the PH LTWMF site.			the PH LTWMF. It can be observed that there are some increases in 2021 but below the predicted range of 12 dBA and the *World Health Organization's Guideline for Community Noise* level of 70 dBA over a 24-hour period [5].
Members of the Public, Non-Radiological Air quality; Noise and Non radiological contaminants: See *Atmospheric Environment Component* for predicted effects; mitigation measures; residual effects after mitigation; and follow-up program features. General Health and Well-being. 22 % of people surveyed expect their level of satisfaction with the community to increase with	(See *Atmospheric Environmental Component)* Implement protocols for delivering information to and receiving concerns from, residents to address their concerns for health, sense of well-being, feelings of safety and security and of satisfaction with their community.	Increased stress and adverse effects to health and general well-being resulting from negative changes to people's feelings of health and sense of well-being, feelings of personal security, and feelings of satisfaction with their community.	In 2021, twenty-two Tier 1 complaints were received and resolved at the CNL level. Five Tier 2 complaints were received and two were resolved at the CNL level. The remaining three complaints are on hold until spring of 2022 to be re-assessed at that time. Public attitude survey was completed in 2018. Next public attitude survey was to take place in 2020, and 2021 but has been postponed due to health restrictions.	Monitor communications protocol. Survey members of the public to confirm level of satisfaction with the community.	Public attitude survey was completed in 2018. Next public attitude survey to take place in 2022.	Since 2002, the CNL has commissioned bi-annual public attitude surveys to monitor public awareness of the PHAI, identify issues and concerns, determine communication needs of the public, and provide data regarding public attitudes. (Section 1) discusses PHAI interactions within the community of Port Hope. The next scheduled public attitude survey will take place in 2022.

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2021	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2021	Status of EA Commitments - 2021
completion of the project; 14 %, to decrease.						
Workers, Radiological Workers excavating onsite wastes and placing on- and offsite wastes are expected to receive annual radiation doses between 1.6 and 2.7 mSv/a. Workers dewatering sediment during harbour cleanup are expected to receive doses up to 7.6 mSv/a.	(See *Atmospheric Environmental Component*) PHAI Radiation Protection Plan includes the ALARA principle. Other requirements of the plan include completion of Radiation Safety Assessments, use of Work Permits/Assessments and worker rotation in and out of positions where there is a risk of receiving a higher dose.	No residual adverse effects.	On-site remediation continued in 2021. Activity involved hauling of on-site Arsenic waste and some quantity of Marginally Contaminated Waste. Hauling of off-site waste to LTWMF began in 2018.	Monitor radiation doses to confirm accuracy of predictions. (Note that some follow-up elements in the Atmospheric Environment are also relevant in that they are fundamentally intended for the protection of worker health and safety).	For Port Hope Sites, individual annual doses ranged from 0.01 mSv to 0.38 mSv. The collective radiation dose was 11.63 person-mSv. The average annual dose was 0.02 mSv.	Upon comparison between the actual and predicted doses, the doses exposed to the workers were below the predicted levels. This has proven the mitigation measures were effectively executed.
Members of the Public, Radiological During remediation, Ward 1 adjacent residents: radiation dose of 0.074 mSv/a for adult on median diet, 0.16 mSv/a, for infant on upper bound diet. During construction and development, Ward 1 residents: 0.06 mSv/a for an adult, to 0.25 mSv/a, for an infant. Ward 2 residents: 0.12 mSv/a, for an adult on a median diet, to 0.25 mSv/a, for an infant on an upper bound diet.	(See *Atmospheric Environment Component*) No additional proposed mitigation.	No residual adverse effects.	Remediation activities continued in 2021.	Monitor radiation doses to confirm accuracy of predictions. (Note that some follow-up elements in the Atmospheric Environment are also relevant in that they are fundamentally intended for the protection of the health and safety of members of the public).	Fenceline gamma dose in 2021 contributed to less than 1 % of the annual dose limited for occupational exposures for members of the public of 1 mSv/a. Total dose to the public was assessed with the inclusion of radon exposure at the fenceline. A total effective dose was estimated to be 2 % for occupational exposures for members of the public.	The radiation dose to public was measured to be 0.02 mSv/a, which is 2 % of the annual dose limit for occupational exposures for members of the public of 1 mSv/a (1000 µSv/a).
Cumulative Effect (in the Biophysical Environment)						
Radiological Incremental annual average radon concentrations would	(See *Atmospheric Environment Component*).	No residual adverse effects.	Remediation activities continued in 2021.	Verify radon concentrations, radiological constituents of re suspended dust, at	Radon monitoring commenced at 4 locations around the PH LTWMF in	Assessment of average radon concentrations at 2 km will be performed on a quarterly

Predicted Environmental Effect	Mitigation Measure	Residual Environmental Effect (remaining after mitigation)	Status of Mitigation Measures – 2021	EA Follow-up Monitoring Requirement	Predicted Environmental Effect - 2021	Status of EA Commitments - 2021
be indistinguishable from background at a distance of 2 km; radiological constituents of re-suspended dust would not be measurable beyond approximately 1 km.				distance of 2 km and 1 km, respectively. (Note that this follow-up monitoring requirement is incorporated into the *Atmospheric Environment* follow-up program.)	2018. These locations were positioned at approximately 2 km distance from the LTWMF Controlled Area fenced boundary. The average radon concentration for 2021 across all locations was calculated to be 26.4 Bq/m^3. The highest noted radon concentration level was 37 Bq/m^3 which is below the environmental trigger level for radon 150 Bq/m^3.	basis to receive better statistics. In 2018 July, CNL deployed a dust fall jar monthly, following the MECP siting requirements, to measure the potential dust deposition at 1 km from the site. The location was approximately 1 km north of the PH LTWMF site. The dustfall jar was deployed until one year of data was collected, in which the EA prediction that radiological constituents of re-suspended dust will not be measurable beyond approximately 1 km from the Site was verified.