TECHNICAL MEMORANDUM

DATE March 27, 2025 **Reference No.** CA0034529.1069-004-TM-Rev0

TO Pravina Singh
Public Services and Procurement Canada

FROM Jennifer Daley **EMAIL** jennifer.daley@wsp.com

2023 AND 2024 SURFACE WATER AND STORM WATER RESULTS FOR CONTAMINANTS OF EMERGING CONCERN

1.0 INTRODUCTION

As requested by Public Services and Procurement Canada (PSPC), on behalf of Transport Canada (TC) and Parks Canada Agency (PCA), WSP Canada Inc. (WSP) completed a surface water and storm sewer outfall sampling program (herein referred to as the "Sampling Program") within Kingston Inner Harbour (KIH; the Site) in November 2023, May 2024, and July 2024. One objective of the Sampling Program was to evaluate the presence of contaminants of emerging concern within KIH surface water and storm sewer outfalls, including bisphenol A (BPA), perfluoroalkyl and polyfluoroalkyl substances (PFAS), and polybrominated diphenyl ethers (PBDE).

Several contaminants of emerging concern have been identified over the past decade in urban environments that are increasingly being detected in water bodies, many of which are not routinely monitored or regulated. A sub-set of contaminants of emerging concern that could be of public interest include endocrine disrupters that may pose potential risk to aquatic receptors, such as BPA (an industrial chemical used to make certain plastics and resins), PFAS (human-made chemicals used as surfactants, lubricants and repellents for dirt, water, and grease), and PBDEs (flame retardants applied to many commercial products). Such sources would not originate from activities on the KIH water lots but are of interest prior to detailed design to confirm that current source controls are sufficient. Accordingly, it was recommended that measurements of contaminants of emerging concern be made in samples collected at storm sewer outflows and within KIH. Sampling during both dry outflow and wet outflow events was conducted to quantify contaminants of emerging concern representative of substances discharged under different weather conditions. This memo presents these results.

2.0 METHODS

2.1 Sampling Stations and Analysis

Surface water samples were collected and analysed for contaminants of emerging concern at three stations in KIH (i.e., within the TC-2A and TC-AB management units), two stations in the reference area (i.e., PC-N), and four stormwater outfalls into KIH (i.e., the Dufferin, Kingscourt, Cataraqui, and Anglin Bay outfalls). The sampling and analysis also included equipment blanks, field blanks, and three trip blanks for quality assurance and quality control (QA/QC) as discussed in Section 2.3.

A summary of the sampling stations analysed for contaminants of emerging concern is provided in Table 1. Sample locations are illustrated on Figure 1.

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Table 1: Summary of Sample Locations Analysed for Contaminants of Emerging Concern – Surface Water

Management Unit	Station ID	Latitude	Longitude	Fall 2023			Spring 2024			Summer 2024		
				PBDE	PFAS	BPA	PBDE	PFAS	BPA	PBDE	PFAS	BPA
KIH Surface Water												
Parks Canada North	PC-N-SW-001	44.25942	-76.47668	☑	☑	☑	☑	☑	☑	—	—	—
	PC-N-SW-003	44.25263	-76.47375	☑	☑	☑	☑	—	☑	—	—	—
Parks Canada Orchard Marsh	PCOM-SW-001	44.24827	-76.48087	—	—	—	☑	☑	☑	—	—	—
Transport Canada 2A	TC-2A-SW-001	44.24016	-76.48034	☑	☑	☑	—	☑	☑	—	—	—
Transport Canada Anglin Bay	TC-AB-SW-001	44.23591	-76.47799	☑	☑	☑	☑	☑	☑	—	—	—
Stormwater Discharge												
199/237 Douglas Fluhrer Park	Dufferin-SW-001	44.24004	-76.48132	☑	☑	☑	☑	☑	☑	☑	☑	☑
202 Kingscourt	Kingscourt-SW-001	44.24787	-76.48322	☑	☑	☑	☑	☑	☑	☑	☑	☑
200 Cataraqui Street	Cataraqui-SW-001	44.24232	-76.47999	—	—	—	—	—	—	☑	☑	☑
197 Anglin Bay	Anglin Bay-SW-001	44.23559	-76.48108	☑	☑	☑	☑	☑	☑	☑	☑	☑

Notes: PBDE = polybrominated diethyl ether; PFAS = perfluoroalkyl and polyfluoroalkyl substances; BPA = bisphenol A; — = not sampled.

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LEGEND

- MANAGEMENT UNIT
- FEDERAL WATER LOT BOUNDARY
- PARKS CANADA JURISDICTION
- TRANSPORT CANADA JURISDICTION
- DEPARTMENT OF NATIONAL DEFENCE JURISDICTION
- MUNICIPALLY OWNED WATERLOT
- BELLE ISLAND EXCLUSION ZONE
- PARKS CANADA APPROVED SAMPLING AREA
- SURFACE WATER SAMPLE LOCATION
- SUBMERGED STORM SEWER OUTFALL LOCATION
- STORM SEWER MANHOLE LOCATION
- STORM SEWER OUTFLOW LOCATION

FOR DISCUSSION PURPOSES ONLY

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CLIENT
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PROJECT
KINGSTON INNER HARBOUR
KINGSTON, ONTARIO

TITLE
SURFACE WATER SAMPLING LOCATIONS - CONTAMINANTS OF EMERGING CONCERN (2023 - 2024)

CONSULTANT
wsp

YYYY-MM-DD	2025-03-21
DESIGNED	CB
PREPARED	JP
REVIEWED	
APPROVED	

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PC-N was selected as the reference area (Golder 2016) because it exhibits similar physical, chemical, and biological characteristics to the KIH, and includes diffuse low-level anthropogenic influence but not significant point sources due to a lack of adjacent industry. The sampled locations in the reference area were also outside of the area influenced by the Third Crossing Project (the bridge being built over the Cataraqui River) and PCA's water chestnut removal program.

2.2 Sample Collection

The field sampling was conducted by two WSP staff using a boat for access to KIH and reference sampling areas and foot access with supervision by the City of Kingston for storm sewer sampling (where necessary). The field sampling was conducted based on the specific work instructions provided to the field team and the proposed analytical program that was approved by PSPC.

2.2.1 Harbour Surface Water Sampling

Surface water samples were collected using a horizontal Van Dorn sampler. Upon arrival at each sampling station, the boat was anchored by slowly lowering the anchor to the substrate to avoid generation of excess turbidity (how clear or cloudy water is; the more particles there are, the cloudier the water looks) which would otherwise produce artificial results in the water samples. The station was visually inspected to confirm that sediments remained undisturbed and that no turbidity was present in the targeted sampling area; visual turbidity was allowed to dissipate before any sampling was conducted.

Water quality samples were obtained by standard grab techniques using a Teflon-free discrete water sampler. Grab water samples were taken around 50 centimetres (cm) below water surface to limit potential for turbidity or sediment entrainment (where particles of sediment are picked up and carried away by water). At sample locations less than one metre (m) water depth, the sample was collected mid-water column while taking care to not disturb the bottom. A single grab sample satisfied requirements for most stations; however, stations with additional chemistry requirements needed two sample grabs to obtain the necessary water volume.

For parameters requiring field filtering (i.e., dissolved organic carbon), a 0.45 micrometre (µm) filter and syringe were used to fill sample containers in the field at the time of collection. As some bottles were pre-charged with preservatives (i.e., containers used for PBDE, total organic carbon), bottles were not rinsed prior to filling, and care was taken not to overfill. Surface water samples were kept cool with coolers and ice in the field and until they were received by laboratory.

The Van Dorn sampler and sampling equipment were rinsed with ambient KIH surface water three times to remove any clinging material and then washed with laboratory-grade detergent (i.e., Liquinox™ or equivalent) prior to sampling at each station.

2.2.2 Storm Sewer Outflow Sampling

At storm sewers with unsubmerged outfalls (i.e., Kingscourt and Dufferin), water samples were collected using a horizontal Van Dorn sampler. These outfalls were accessed on foot through public property and water samples were retrieved from the shoreline by lowering the Van Dorn from the concrete box culvert into the water column directly at the outfall. Avoidance of turbid waters was conducted similar to the surface water program.

For storm sewers with submerged outfalls (i.e., Anglin Bay and Cataraqui), water samples were collected using either a horizontal Van Dorn sampler or a telescopic pole sampler (an extendable pole with a 250-millilitre [mL] jar attached to the end). Access to these sampling locations required coordination with the City of Kingston to remove upgradient utility covers (e.g., manholes) and implement traffic control measures

Storm sewer sampling during Fall 2023 and Spring 2024 represented typical flow conditions rather than peak flow events. As such, sampling was conducted a minimum of 24 hours after a precipitation event (called a dry weather condition), as this is expected to represent water affected by widespread human activities. The dry weather events contribute only minor amounts of chemicals to the harbour because the discharge rates are small in comparison to flushing events (i.e., heavy rain, melting snow, or storms, which usually has lower concentrations of chemicals but much higher discharges of water).

In contrast to the dry weather events, storm sewer sampling during Summer 2024 occurred during an active precipitation event associated with the remnants of Hurricane Beryl, which brought 39.7 mm of total rainfall to Kingston on 10 July 2024 (Environment and Climate Change Canada [ECCC] 2024). This weather condition contrasted strongly with the other days in early July 2024, in which mainly dry conditions prevailed (i.e., clear with only scattered periods of light rain). Field sampling took place between 15:15 and 18:00, when moderate rainfall was observed. According to ECCC historical data from the Kingston Weather Station (372247.00 m E; 4897922.00 m N), the heaviest rainfall (30 mm) occurred earlier in the day between 07:00 and 14:00. During the sampling period (15:15–18:00), an estimated 5.3 mm of rain fell, averaging approximately 2.65 mm/hour, with an additional 4.4 mm recorded later between 19:00 and 21:00.

Water flowing out of the storm sewers toward the harbour was visually observed during wet weather events, but during dry weather events the water that was within the storm sewers was quiescent. There was no indication of net flow in either direction during these dry weather events.

2.2.3 PFAS Sampling Considerations

PFAS sampling was grouped together within the 2023 Fall, 2024 Spring and 2024 Summer Sampling Programs to ensure that specific procedures to avoid cross-contamination were followed. Protocols to avoid cross-contamination included the following (applied to WSP staff):

- Water resistant, waterproof coatings/treated fabric (e.g., Gore-Tex), or stain-treated clothing (e.g., coated Tyvek suits) was avoided to the extent practicable during the field program; however, survival suits were required due to program timing (i.e., water temperatures). As Mustang survival suits may contain trace amounts of PFAS, an equipment blank (a sample to check for contamination on the equipment used for sampling) was collected (as discussed in Section 2.3). Field clothing worn on-site was restricted to natural fibres (preferably cotton) and not those of synthetic origin. Field clothing was laundered with minimal use of soap, and no fabric softener or scented products. After they had been cleaned, the clothing was rinsed again with water only before drying (no fabric softeners used).

- Field crews avoided all paper, aluminium foil, coated papers, and coated textiles in packaging and used only cotton or hard plastic containers.
- Field crews avoided the consumption of fried foods or those prepared in Teflon coated surfaces such as frying pans.
- Food and snacks were not consumed in the sampling boat.
- When eating/drinking field crews removed gloves and outer wear.
- No smoking was permitted while sampling or during the field day.
- No field books containing coated paper were used during the sampling programs.
- PFAS-free gloves were used during sample collection.
- Pen or pencil were used to record all notes and sample labels (i.e., no markers).
- Field personnel did not use shampoos, conditioners, body gels, scents, cosmetics, or hand creams as part of their personal cleaning/showering routine on the day of a sampling event, as these products may contain surfactants and represent a potential source of PFAS.
- For washroom breaks, field personnel allowed for extra time for hand rinsing with water after the use of soap. Use of paper towels was avoided.
- All samples were collected in laboratory provided PFAS-free bottles.

  Prior to each PFAS sampling event, equipment was rinsed with a mixture of laboratory grade soap (i.e., Liquinox™) and laboratory provided PFAS-free water, then rinsed with acetone, and again rinsed three times with laboratory PFAS-free water.

2.3 Quality Assurance/Quality Control

To confirm sample integrity, detailed QA/QC measures were undertaken:

- Field equipment was calibrated at appropriate intervals.
- Samples were collected in such a way that the introduction of sediment material to the sample was minimized.
- Contact with contaminating materials/samples was minimized as much as possible.
- Sampling equipment was decontaminated prior to use at each station.
- Samples were placed in laboratory-supplied sampling containers appropriate for the analyses conducted in such a way that no material of interest was lost due to adsorption, degradation, or volatilization.
- Samples were packaged with chain-of-custody forms and shipping labels, then shipped to the laboratory within required laboratory holding times and shipping/storage conditions.
- Several QA/QC samples were collected throughout the Sampling Programs as summarized in Table 2. The following types of QA/QC samples were processed by WSP field staff to assess sampling variability and various sources of cross-contamination including:

- Two field blanks were submitted to the laboratory in Fall 2023 and Spring 2024, and one in Summer 2024. These field blanks were filled by staff in the field using laboratory-provided deionized water, which was carefully poured into laboratory-supplied sample jars. Field staff wore gloves during the collection process to minimize the risk of contamination. To maintain the integrity of the blanks, they were not processed through any sampling equipment. Once filled, the field blanks were immediately sealed and stored securely.
- One trip blank was provided by the laboratory in Fall 2023 and Spring 2024 for PBDEs and BPA, and Fall 2023, Spring 2024, and Summer 2024 for PFAS. The trip blanks came prepared by the laboratory in pre-filled, pre-labeled jars to assess any contamination that may occur during the transport and handling of samples. These trip blanks were brought into the field by staff during all sampling events, ensuring consistency during the field program. To maintain their integrity, the trip blanks remained sealed for the entirety of the field program and were not exposed to any environmental conditions or processing during the sampling activities. Once the field program concluded, the trip blanks were returned to the laboratory for analysis.
- Two equipment blanks were taken during Fall 2023 and Spring 2024, as well as an additional equipment blank sample from Summer 2024, to assess potential for PFAS cross-contamination on field equipment. Equipment blanks were collected from the Van Dorn water sampler and from a life jacket.
- Field duplicate samples to assess for sample and field variability were collected for all chemicals.

In addition to the above, other controls for the chemical analyses included:

- Sufficient water volumes were collected so that required detection limits were met.
- Laboratory QA/QC for samples included the analysis of laboratory control samples, method blanks, trip blanks, equipment blanks, laboratory duplicates, and spiked samples to assess precision and accuracy of analytical methods. Laboratory QA/QC reports were reviewed upon receipt to confirm the laboratory data quality objectives had been met and that the appropriate QA/QC information had been reported.

Table 2: Summary of QA/QC Samples

Station ID	Fall 2023			Spring 2024			Summer 2024		
	PBDE	PFAS	BPA	PBDE	PFAS	BPA	PBDE	PFAS	BPA
Surface Water									
FIELD-SW-001 (TCAB-SW-001)	☑	☑	☑	☑	☑	☑	—	—	—
DUP-SW-001 (TCAB-SW-001)	☑	☑	☑	☑	☑	☑	—	—	—
TRIP-SW-001	☑	☑	☑	☑	☑	☑	—	—	—
EQUIPMENT-SW-001 (Van Dorn water sampler)	—	☑	—	—	☑	—	—	—	—
EQUIPMENT-SW-002 (Mustang survival suits in Fall 2023, lifejacket in Spring 2024)	—	☑	—	—	☑	—	—	—	—

Station ID	Fall 2023			Spring 2024			Summer 2024		
	PBDE	PFAS	BPA	PBDE	PFAS	BPA	PBDE	PFAS	BPA
Storm Water									
FIELD-SW-002	☑	☑	☑	—	☑	☑	☑	☑	☑
DUP-SW-003 (Dufferin-SW-001)	—	☑	—	—	☑	—	☑	☑	☑
TRIP-SW-001	—	—	—	—	—	—	—	☑	—
EQUIPMENT-SW-001 (Van Dorn water sampler)	—	—	—	—	—	—	—	☑	—
EQUIPMENT-SW-002 (Lifejacket/raincoat)	—	☑	—	—	☑	—	—	—	—

Notes: PBDE = polybrominated diethyl ether; PFAS = perfluoroalkyl and polyfluoroalkyl substances; BPA = bisphenol A, — = no QA/QC sample collected; FIELD = field blank; DUP = field duplicate; EQUIPMENT = equipment blank.

2.4 Relative Percent Difference

Sampling precision is measured by calculating the relative percentage difference (RPD) for the duplicate samples. Standards for evaluating the repeatability of duplicate samples are described by the Canadian Council of Ministers of Environment (CCME 2016). The CCME suggests the use of 40% RPD for liquids as QA/QC acceptance criteria. Concentration results less than 5 times the reporting detection limit become increasingly imprecise; and therefore, RPDs were not calculated for concentrations less than 5 times the reporting detection limit. The RPD is calculated as follows:

$$RPD = \frac{|x_1 - x_2|}{avg(x_1 + x_2)} \times 100\%$$

3.0 APPLICABLE ENVIRONMENTAL QUALITY CRITERIA

For BPA, PBDE, and PFAS, there are no Canadian Council of Ministers of the Environment (CCME) or Ontario water quality criteria.

The Federal Environmental Quality Guidelines (FEQGs) were considered where there were no CCME or Ontario criteria available (Government of Canada 2024). FEQGs are recommended thresholds to support federal initiatives. They are set at a concentration that is protective of a low likelihood of direct adverse effects from the chemical on aquatic life, or in wildlife (birds and mammals) that consume aquatic life where chemicals may bioaccumulate. FEQGs for the protection of aquatic life are available for PBDE (Environment Canada 2013), PFAS (Environment Canada 2018), and BPA (Environment Canada 2017).

4.0 RESULTS

A summary of field measurements (e.g., in-situ water quality, water depth, weather) is provided in Attachment 1 for both the 2023 (Table 1-1) and 2024 (Tables 1-2 and 1-3) Sampling Programs.

The water levels in KIH during Fall 2023 ranged from 0.68 to 5.4 m, during Spring 2024 ranged from 0.35 to 5.47 m, and during Summer 2024 ranged from 0.46 to 1.0 m. The water levels in PC-N ranged from 0.72 to 1.3 across all sampling events.

The results from the water quality screening of analytical parameters are provided in Attachments 2 to 5 and summarized below for both 2023 and 2024 Sampling Programs.

4.1 Conventional Parameters

Analytical results for conventional parameters (i.e., pH, hardness, temperature, dissolved organic carbon, total organic carbon, and total suspended solids) are presented in Attachment 2, Table 2-1.

The total suspended solids levels across KIH samples were also highest during the Summer 2024 sampling (i.e., mean suspended solids across all management units of 18 mg/L) and lowest during the Spring 2024 sampling (i.e., mean suspended solids across all management units of 3 mg/L). For the reference area, total suspended solids were highest on average in Fall 2023, followed by Spring 2024, and the least in Summer 2024 (with all reference samples below laboratory detection limits in the summer). The Summer 2024 sampling occurred during a precipitation event that included 39.7 mm of rain the day of sampling (ECCC 2024). This event appears to have resulted in higher sediment disturbance and re-suspension of particulates given the shallow water conditions in KIH. The low total suspended solids level in the reference area is likely due to the deeper water depths.

4.2 PBDE

Analytical results for PBDE are presented in Attachment 3, Table 3-1. There were detected concentrations for several PBDE parameters; however, the concentrations were well below the available FEQGs. The lowest concentrations were found in PC-N in surface water and the Anglin Bay storm sewer outfall. The highest concentrations were found in PC-OM in surface water and in the Kingscourt storm sewer outfall.

The Summer 2024 sampling event had higher concentrations of PBDEs in KIH surface water relative to the Fall 2023 and Spring 2024 sampling events, likely because of the elevated turbidity (the sediment particles carry PBDEs that sorb tightly to solid materials and organic carbon).

4.3 PFAS

Analytical results for PFAS are presented in Attachment 4, Table 4-1. The concentrations in all samples were measured below detection limits.

4.4 BPA

Analytical results for BPA are presented in Attachment 5, Table 5-1. The concentrations in all samples were measured below detection limits.

4.5 Quality Assurance/Quality Control Results

- The 2023 and 2024 water quality data met the following QA/QC procedures:
- Chemical analyses on surface water samples were completed within the sample hold time requirements.
- Data reported by the laboratory were considered reliable according to the accredited laboratory QA/QC assessment.
- There was low variability and high precision between laboratory duplicates.

Samples were packed in laboratory provided bubble wrap and stored in provided coolers with bagged ice and ice packs; however, many variables can impact the ability of samples to cool between shipment and receival by the laboratory (e.g., sediment temperature, air temperature, insulation such as bubble wrap reducing effectiveness of ice). Federal guidelines for sample temperature at the laboratory are ≤10°C (CCME 2016). Although some samples were received by ALS at temperatures above 10°C, analytical studies from Bureau Veritas (2021) suggest that short term storage of samples above the 10°C threshold should not adversely affect the quality of the data. With consideration of sampling time and studied analytical variability in samples stored slightly above the federal temperature guidelines, The results from the 2023 and 2024 CEC water quality sampling program are considered acceptable.

Further discussion on field duplicate analysis, field blanks and trip blanks are provided below.

4.5.1 Field Duplicate Analysis

Field duplicate water samples were collected to provide an indication of variability in the surface water chemistry. The ability of the laboratory to provide the same result on replicate analyses was assessed through the laboratory's internal replicate analyses results. As discussed in Section 2.4, variability between the duplicates was assessed by calculating RPDs between the duplicate and parent sample constituent concentrations.

In accordance with the CCME Guidance Manual (CCME 2016), the data quality objectives (DQOs) for field duplicate samples were an RPD less than or equal to 40% for parameters measured in water.

The RPD results for field duplicate are presented in Attachment 6, Table 6-1. Results were limited to PBDE, because PFAS and BPA parameters were consistently below the reporting detection limit. Calculated RPDs were greater than 40% for the following parameters and samples:

- BDE 209 and hexabromobiphenyl at TC2A-SW-001 in Fall 2023
- BDE 15 and BDE 209 at Dufferin-SW-001 in Summer 2024

The analytical laboratory was contacted about these few elevated RPD values; they responded that there were no laboratory QC issues identified and instead attributed the high reporting detection limits to the difficulty in splitting water samples into separate bottles in a fully mixed manner. Because PBDEs are highly insoluble and heavily particulate bound, even small differences in the quantity or type of solids among bottles can exert large influence on total measured concentrations.

As the PBDE concentrations in the field duplicate samples were below the FEQGs, the variability did not affect the data interpretation.

4.5.2 Blanks

Field and trip blanks were measured below reporting detection limits for PFAS and BPA, and equipment blanks were measured below reporting detection limits for PFAS. Detected concentrations of PBDE parameters were found in the field blanks and the trip blanks, but detected concentrations were at least 100-fold lower than the available FEQGs.

The analytical method (EPA 1614) allows a passing Method Blank, if the levels of PBDE are below 4 ng/L (four parts per trillion). The concentrations of PBDE in blanks were less than 4 ng/L (20 to 400 times lower). Per laboratory description, this means that trace detected levels in these samples are not methodologically significant, since it is common to observe laboratory background (including false and/or variable background) at levels much higher than what was detected in the blanks..

Based on this review, the data are considered reliable and did not affect the data interpretation.

5.0 CLOSURE

We hope that the information provided here is sufficient and if you have any further questions, please don't hesitate to contact the undersigned.

WSP Canada Inc.

[redacted]

Attachments:

Attachment 1 – Water Quality Results: Field Measurements (Table 1-1: Fall 2023, Table 1-2: Spring 2024, Table 1-3: Summer 2024)
Attachment 2 – Water Quality Results: Conventional Parameters (Table 2-1)
Attachment 3 – Water Quality Results: Polybrominated Diphenyl Ethers (Table 3-1)
Attachment 4 – Water Quality Results: Per- and Polyfluoroalkyl Substances (Table 4-1)
Attachment 5 – Water Quality Results: Bisphenol A (Table 5-1)
Attachment 6 – QA/QC Results: Relative Percent Difference (Table 6-1)

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7.0 LIMITATIONS

This report is intended for the sole use of the Government of Canada and must be considered in its entirety. Any use of this document or the findings, conclusions, or recommendations provided in this report by any person other than Government of Canada is at the sole risk of such user.

WSP must be contacted should any questions arise as to the scope of this report or the context in which this study was performed. WSP will also not be responsible for the real or perceived decrease in a property value, its saleability or ability to gain financing through the reporting of factual information. With respect to regulatory compliance issues, please note that regulatory statutes and the interpretation of regulatory statute are subject to change over time.

The report was developed using data and information collecting during the field survey conducted by WSP and is based solely on the Site conditions encountered at the time of the field survey and subsequent sample analysis. The findings in this report are based on interpretation of data obtained. No assurance can be provided with respect to potential changed physical, biological, or chemical characteristics of the aquatic ecosystem beyond the Study Area.

In assessing the Site properties, WSP has relied in good faith on information provided by others. We accept no responsibility for any deficiency, misstatements, or inaccuracies contained in this report as a result of omissions, misinterpretations, or fraudulent acts of others. The services described in this report were performed in accordance with the general practices and procedures accepted in the consulting field.

ATTACHMENT 1

Water Quality Results: Field Measurements

Table 1-1: Field Measurements from Fall 2023 Sampling Event

Management Unit	Station ID	Sample Date[(a)]	Sample Type	Sampler Type	Latitude	Longitude	Air Temp (°C)	Wind Rate	Water Depth (m)	Water Temp (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	TDS (mg/L)	NTU	TSS (mg/L)	ORP
Surface Water																	
Parks Canada North	PCN-001	SW: 21-Nov-23 PFAS: 23-Nov-23	SW	Van Dorn	44.25942	-76.47668	-2	Light	0.72	0.1	263	13.1	8.5	0.17	18.1	48	146
Parks Canada North	PCN-003	SW: 21-Nov-23 PFAS: 23-Nov-23	SW	Van Dorn	44.25263	-76.47375	1	Light	0.72	1.9	264	11.7	8.3	0.17	25.7	68	165
Transport Canada 2A	TC2A-001	SW: 21-Nov-23 PFAS: 23-Nov-23	SW	Van Dorn	44.24016	-76.48034	-1	Light	0.68	2.1	280	12.6	8.5	0.18	1.7	48	154
Transport Canada Anglin Bay	TCAB-001	SW: 21-Nov-23 PFAS: 23-Nov-23	SW	Van Dorn	44.23591	-76.47799	-2	Light	5.4	6.1	264	11.6	8.1	0.18	3.6	13	97
Storm Water																	
199/237 Douglas Fluhrer Park (Dufferin)	Dufferin-001	24-Nov-23	SW	Van Dorn	44.24004	-76.48132	-4	Light	0.5	9.8	856	10.5	8.5	0.770	0	53	87
200- Cataraqui St.	Cataraqui-001	23-Nov-23	SW	Van Dorn	44.24232	-76.47996	6	Light	1.6	6.3	292	10.0	8.4	0.190	16	65	111
202-Kingscourt	Kingscourt-001	24-Nov-23	SW	Van Dorn	44.24787	-76.48322	-2	Light	0.1	11.9	846	9.9	8.1	0.550	8	54	-8
197-Anglin Bay	Anglin Bay- 001	23-Nov-23	SW	Pole Sampler	44.23559	-76.48108	7	Light	0.2	13.1	1293	9.1	8.1	0.830	0	47	166

Notes: SW = surface water; TSS = total suspended solids; ORP = oxidation-reduction potential; NTU = Nephelometric Turbidity Unit; TDS = total dissolved solids; Nov = November; PCN = Parks Canada North; PPOM = private property Orchard Marsh; WM = Woolen mill; TC = Transport Canada; TCOM = Transport Canada Orchard Marsh; TCAB = Transport Canada Anglin Bay; TCRC = Transport Canada Rowing Club; PCE = Parks Canada East; PCW = Parks Canada West; m = meters; µS/cm = microsiemens per centimeter; mg/L = milligrams per litre; °C = degrees Celsius; ID = identifier.

[(a)] PFAS samples were collected on a separate day than the general water chemistry due to cross-contamination protocols. All in-situ water quality is representative of when general water chemistry was collected (i.e., November 21)

Table 1-2: Field Measurements from Spring 2024 Sampling Event

Management Unit	Station ID	Sample Date[a]	Sample Time (24-hour)	Sampler Type	Latitude	Longitude	Air Temp (°C)	Wind Rate (km/h)	Water Depth (m)	Sample Depth (m)	Water Temp (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity (NTU)	TDS (ppt)	ORP (mV)
Surface Water																	
Parks Canada North	PCN-SW-001	21-May-24	12:21	Van Dorn/AquaTroll 600	44.259428	-76.476696	22	13	1.32	0.50	25.25	259.51	9.85	9.04	4.00	0.17	195.5
Parks Canada North	PCN-SW-003	21-May-24	14:39	Van Dorn/AquaTroll 600	44.252630	-76.473735	22	13	1.16	0.50	25.83	265.70	11.98	9.29	5.54	0.17	183.7
Parks Canada Orchard Marsh	PCOM-SW-001	22-May-24	16:02	Van Dorn/AquaTroll 600	44.248266	-76.480868	26	13	0.35	0.17	28.08	741.42	13.53	7.90	8.05	0.49	232.7
Transport Canada 2A	TC2A-SW-001	22-May-24	14:11	Van Dorn/AquaTroll 600	44.240176	-76.480354	23	13	1.25	0.50	25.7	290.38	10.78	9.06	5.21	0.19	169.8
Transport Canada Anglin Bay	TCAB-SW-001	21-May-24	15:38	Van Dorn/AquaTroll 600	44.235925	-76.478007	23	13	5.47	0.50	19.75	286.38	12.56	9.17	2.49	0.19	214.9
Storm Water																	
197-Anglin Bay	Anglin Bay-SW-001	22-May-24	8:30	Van Dorn/AquaTroll 600	44.235591	-76.481087	18	13	0.65	0.30	16.49	549.67	8.41	8.47	2.90	0.36	193.9
202-Kingscourt	Kingscourt-SW-001	22-May-24	10:28	Van Dorn/AquaTroll 600	44.247875	-76.483200	20	13	0.32	0.15	10.67	768.5	10.54	9.12	2.01	0.50	253.9
199/237 Douglas Fluhrer Park	Dufferin-SW-001	22-May-24	12:18	Van Dorn/AquaTroll 600	44.240049	-76.481322	21	13	0.75	0.30	14.64	741.29	9.97	9.32	3.24	0.49	167.5

Notes:
SW = surface water; TSS = total suspended solids; ORP = oxidation-reduction potential; NTU = Nephelometric turbidity units; TDS = total dissolved solids; PCN = Parks Canada north; PCOM = Parks Canada Orchard Marsh; PPOM = Private Property Orchard Marsh; WM = Woolen Mill; TC = Transport Canada; TCOM = Transport Canada Orchard Marsh; TCAB = Transport Canada Anglin Bay TCRC = Transport Canada Rowing Club; PCE = Parks Canada East; PCW = Parks Canada West; UC = unnamed creek; m = meters; µS/cm = microsiemens per centimeter; mg/L = milligrams per litre; mV = millivolts; ppt = parts per trillion; °C = degrees Celsius; ID = identifier; km/h = kilometers per hour.

[a] PFAS was taken on a separate day than other water chemistry due to strict sampling protocols to avoid cross contamination.

Table 1-3: Field Measurements from Summer 2024 Sampling Event

Management Unit	Station ID	Sample Date[(a)]	Sample Time (24-hour)	Sampler Type	Latitude	Longitude	Air Temp (°C)	Wind Rate (km/h)	Water Depth (m)	Sample Depth (m)	Water Temp (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity (NTU)	TDS (ppt)	ORP (mV)
Storm Water																	
197-Anglin Bay	Anglin Bay-SW-001	10-Jul-24	15:15	Van Dorn/AquaTroll 600	n/a	n/a	21	21	0.46	0.30	21.56	278.58	8.45	8.58	66.28	0.18	223.6
200- Cataraqui St.	Cataraqui-SW-001	10-Jul-24	15:50	Van Dorn/AquaTroll 600	n/a	n/a	21	21	1.00	0.50	22.92	69.46	8.17	9.05	83.18	0.05	178.6
202-Kingscourt	Kingscourt-SW-001	10-Jul-24	17:00	Van Dorn/AquaTroll 600	n/a	n/a	20	21	0.71	0.30	22.18	92.27	8.57	8.84	202.69	0.06	178.4
199/237 Douglas Fluhrer Park	Dufferin-SW-001	10-Jul-24	18:00	Van Dorn/AquaTroll 600	n/a	n/a	20	21	0.71	0.30	19.64	485.30	9.03	8.57	17.23	0.32	211.5

Notes: SW = surface water; PCN = Parks Canada North; PCOM = Parks Canada Orchard Marsh; PPOM = Private Property Orchard Marsh; WM = Woolen Mill; TC = Transport Canada; TCOM = Transport Canada Orchard Marsh; TCAB = Transport Canada Anglin Bay; TCRC = Transport Canada Rowing Club; PCE = Parks Canada East; PCW = Parks Canada West; UC = unnamed creek; m = meters; µS/cm = microsiemens per centimeter; mg/L = milligrams per litre; mV = millivolts; ppt = parts per thousand; °C = degrees Celsius; ID = identifier; km/h = kilometers per hour.

[(a)] PFAS was taken on a separate day than the general water chemistry due to strict sampling protocols.

ATTACHMENT 2

Water Quality Results: Conventional Parameters

Table 2-1 - Conventional Parameters

Sample Name						**PCN-SW-001**			**PCN-SW-002**			**PCN-SW-003**			**PCOM-SW-001**		**PCE-SW-001**		
Sample Date						2023-11-21	2024-05-21	2024-07-10	2023-11-21	2024-05-21	2024-07-10	2023-11-21	2024-05-21	2024-07-10	2024-05-22	2024-07-09	2023-11-20	2024-05-22	2024-07-09
Laboratory Certificate of Analysis						WT2338312	WT2412994	WT2419343	WT2338312	WT2413003	WT2419290	WT2338304	WT2413003	WT2419343	WT2413166	WT2419287	WT2338131	WT2413243	WT2419342
	CWQG [1]	**FEQG [2]**	**PWQO [3]**	**PCN [4]**	**Unit**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	-	°C	0.10	25.25	27.09	1.60	26.29	27.37	1.90	25.83	27.44	28.08	24.76	3.20	26.59	28.11
Hardness	-	-	-	135	mg/L	112.61	108.00	89.50	126.34	118.00	97.30	135.47	110.00	95.80	232.00	241.00	146.10	105.00	99.80
Conductivity	-	-	-	325	µS/cm	261.00	252.00	218.00	317.00	275.00	236.00	325.00	252.00	222.00	679.00	709.00	366.00	252.00	242.00
Total Suspended Solids	-	-	-	12.1	mg/L	12.10	< 3.0	< 3.0	< 3.0	< 3.0	< 3.1	9.10	4.80	< 3.0	7.60	13.50	23.00	4.80	< 3.0
Turbidity	-	-	-	13.8	NTU	10.80	1.75	2.12	2.13	2.40	2.24	13.80	4.27	1.98	6.06	10.80	20.00	3.42	2.00
Total Organic Carbon	-	-	-	8.28	mg/L	8.28	6.92	7.93	8.27	7.28	7.10	7.84	6.93	7.74	7.08	5.22	7.78	8.12	6.77
Dissolved Organic Carbon	-	-	-	8.53	mg/L	7.81	7.74	7.72	7.66	6.83	8.19	8.47	8.08	8.53	7.11	5.93	8.06	7.93	7.42
pH	6.5 - 9	-	6.5 - 8.5	8.57	pH units	8.12	8.27	8.30	8.19	8.22	8.24	8.04	8.57	8.39	8.20	7.89	8.17	8.30	8.95

Notes: < = concentration below the laboratory detection limits; - = chemical not analyzed or criteria not defined; µS/cm = microsiemens per centimetre; µg/L = microgram per litre; mg/L = milligram per litre; NTU = Nephelometric turbidity units.

[1] CCME (Canadian Council of Ministers of the Environment). 1999 and updates. CWQG (Canadian Water Quality Guidelines) for the Protection of Aquatic Life (freshwater, long-term).

[2] Envrionment Canada FEQG (Federal Environmental Quality Guidelines) for surface water and protection of aquatic life, as of January 2024.

[3] Ontario Ministry of Environment (MOE). 1999. Appendix A: PWQG (Provincial Water Quality Objectives) in Water Management: Policies, Guidelines, Provincial Water Quality Objectives.

[4] Maximum concentration measured in PCN (reference area)

Bold - indicates concentration exceeds CCME criteria or is outside pH range
Underlined - indicates concentration exceeds Ontario criteria or is outside pH range
Shaded - indicates concentration exceeds FEQG
Blue - Indicates concentration exceeds the maximum concentration in PCN

Table 2-1 - Conventional Parameters

					Sample Name	**DUP-SW-002**	**DUP-SW-002**	**PCW-SW-001**			**PPOM-SW-001**			**TC1-SW-001**			**TC2A-SW-001**		
					Sample Date	2023-11-20	2024-07-09	2023-11-20	2024-05-22	2024-07-09	2023-11-21	2024-05-20	2024-07-09	2023-11-21	2024-05-20	2024-07-09	2023-11-20	2024-05-22	2024-07-09
					Laboratory Certificate of Analysis	WT2338125	WT2419344	WT2338132	WT2413166	WT2419287	WT2338308	WT2412843	WT2419342	WT2338311	WT2412843	WT2419341	WT2338131	WT2413243	WT2419291
	CWQG [1]	**FEQG [2]**	**PWQO [3]**	**PCN [4]**	**Unit**	*PCE-SW-001*	*PCE-SW-001*	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	-	°C	3.20	28.11	4.00	27.54	27.67	0.90	27.20	28.59	2.10	22.98	27.79	2.10	25.70	28.19
Hardness	-	-	-	135	mg/L	145.12	101.00	196.25	123.00	92.80	174.24	156.00	140.00	124.63	107.00	99.90	131.88	105.00	97.50
Conductivity	-	-	-	325	µS/cm	371.00	241.00	600.00	309.00	258.00	433.00	432.00	384.00	291.00	249.00	249.00	360.00	273.00	250.00
Total Suspended Solids	-	-	-	12.1	mg/L	20.40	< 3.0	14.80	13.00	< 3.0	10.70	9.00	23.90	< 3.0	4.00	< 3.0	< 3.0	< 3.0	5.90
Turbidity	-	-	-	13.8	NTU	21.60	1.67	18.80	11.40	1.39	6.99	4.14	14.50	1.88	2.07	1.90	1.34	1.73	1.67
Total Organic Carbon	-	-	-	8.28	mg/L	7.80	7.05	6.13	7.45	7.05	7.20	8.60	8.74	6.72	7.92	6.66	5.96	7.39	6.52
Dissolved Organic Carbon	-	-	-	8.53	mg/L	8.96	7.50	6.35	7.92	7.50	7.28	7.00	8.70	6.78	7.19	7.72	5.58	7.33	7.31
pH	6.5 - 9	-	6.5 - 8.5	8.57	pH units	8.20	8.94	8.28	8.37	8.70	8.06	8.16	8.46	8.13	8.48	8.90	8.37	8.30	**9.16**

Notes: < = concentration below the laboratory detection limits; - = chemical not analyzed or criteria not defined; µS/cm = microsiemens per centimetre; µg/L = microgram per litre; mg/L = milligram per litre; NTU = Nephelometric turbidity units.

[1] CCME (Canadian Council of Ministers of the Environment). 1999 and updates. CWQG (Canadian Water Quality Guidelines) for the Protection of Aquatic Life (freshwater, long-term).

[2] Envrionment Canada FEQG (Federal Environmental Quality Guidelines) for surface water and protection of aquatic life, as of January 2024.

[3] Ontario Ministry of Environment (MOE). 1999. Appendix A: PWQG (Provincial Water Quality Objectives) in Water Management: Policies, Guidelines, Provincial Water Quality Objectives.

[4] Maximum concentration measured in PCN (reference area)

Bold - indicates concentration exceeds CCME criteria or is outside pH range
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Shaded - indicates concentration exceeds FEQG
Blue - Indicates concentration exceeds the maximum concentration in PCN

Table 2-1 - Conventional Parameters

Sample Name						**TC3A-SW-001**			**DUP-SW-001**	**TC4-SW-001**			**DUP-SW-002**	**TC5-SW-001**			**TCAB-SW-001**		
Sample Date						2023-11-22	2024-05-20	2024-07-08	2024-07-08	2023-11-22	2024-05-20	2024-07-08	2024-05-20	2023-11-22	2024-05-20	2024-07-08	2023-11-20	2024-05-21	2024-07-08
Laboratory Certificate of Analysis						WT2338480	WT2412845	WT2419068	WT2419072	WT2338484	WT2412838	WT2419072	WT2412838	WT2338484	WT2412838	WT2419070	WT2338132	WT2412979	WT2419070
	CWQG [1]	**FEQG [2]**	**PWQO [3]**	**PCN [4]**	**Unit**	-	-	-	*TC3A-SW-001*	-	-	-	*TC4-SW-001*	-	-	-	-	-	-
Temperature	-	-	-	-	°C	3.60	18.53	27.13	27.13	3.60	16.02	25.03	16.02	6.00	15.29	24.14	6.10	19.75	24.33
Hardness	-	-	-	135	mg/L	115.41	118.00	102.00	104.00	114.16	108.00	102.00	109.00	116.55	117.00	108.00	113.79	102.00	104.00
Conductivity	-	-	-	325	µS/cm	278.00	296.00	268.00	267.00	277.00	267.00	258.00	264.00	291.00	288.00	282.00	281.00	267.00	271.00
Total Suspended Solids	-	-	-	12.1	mg/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	3.70	< 3.0	< 3.0
Turbidity	-	-	-	13.8	NTU	1.10	1.47	1.53	1.26	1.59	0.97	1.49	1.02	0.64	0.46	1.17	1.42	1.03	1.06
Total Organic Carbon	-	-	-	8.28	mg/L	5.69	7.37	5.72	5.93	5.80	6.52	5.78	6.47	4.51	4.42	4.68	5.61	6.91	4.99
Dissolved Organic Carbon	-	-	-	8.53	mg/L	5.99	7.66	5.98	5.78	5.82	5.22	5.46	5.23	4.50	3.67	4.70	4.87	5.61	4.97
pH	6.5 - 9	-	6.5 - 8.5	8.57	pH units	7.28	8.43	8.07	8.49	7.67	8.54	8.53	8.55	7.87	8.26	8.33	8.21	8.42	7.71

Notes: < = concentration below the laboratory detection limits; - = chemical not analyzed or criteria not defined; µS/cm = microsiemens per centimetre; µg/L = microgram per litre; mg/L = milligram per litre; NTU = Nephelometric turbidity units.

[1] CCME (Canadian Council of Ministers of the Environment). 1999 and updates. CWQG (Canadian Water Quality Guidelines) for the Protection of Aquatic Life (freshwater, long-term).

[2] Envrionment Canada FEQG (Federal Environmental Quality Guidelines) for surface water and protection of aquatic life, as of January 2024.

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[4] Maximum concentration measured in PCN (reference area)

Bold - indicates concentration exceeds CCME criteria or is outside pH range
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Blue - Indicates concentration exceeds the maximum concentration in PCN

Table 2-1 - Conventional Parameters

					Sample Name	**DUP-SW-001**	**TCOM-SW-001**			**TCRC-SW-001**			**WM-SW-001**			**UC-SW-001**		**UC-SW-002**	
					Sample Date	2024-05-21	2023-11-21	2024-05-20	2024-07-09	2023-11-22	2024-05-20	2024-07-09	2023-11-21	2024-05-20	2024-07-09	2024-05-23	2024-07-11	2024-05-23	2024-07-11
					Laboratory Certificate of Analysis	WT2412996	WT2338308	WT2412843	WT2419288	WT2338480	WT2412845	WT2419291	WT2338311	WT2412845	WT2419341	WT2413281	WT2419567	WT2413281	WT2419558
	CWQG [1]	**FEQG [2]**	**PWQO [3]**	**PCN [4]**	**Unit**	*TCAB-SW-001*	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	-	°C	19.75	1.50	25.05	28.64	3.00	22.72	28.14	2.10	21.84	27.86	12.61	17.01	14.20	18.06
Hardness	-	-	-	135	mg/L	110.00	135.08	113.00	123.00	113.39	103.00	97.90	123.09	108.00	93.90	246.00	249.00	270.00	182.00
Conductivity	-	-	-	325	µS/cm	267.00	332.00	303.00	382.00	314.00	259.00	242.00	293.00	261.00	237.00	755.00	774.00	796.00	575.00
Total Suspended Solids	-	-	-	12.1	mg/L	< 3.0	22.50	< 3.0	< 3.0	8.80	3.40	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	9.30	< 3.0	20.10
Turbidity	-	-	-	13.8	NTU	0.99	14.80	2.50	0.80	6.44	1.52	1.43	1.56	1.49	1.30	2.07	10.80	4.29	19.80
Total Organic Carbon	-	-	-	8.28	mg/L	5.62	7.99	8.22	7.23	5.59	7.61	6.18	6.28	7.40	6.22	3.18	4.60	3.55	6.63
Dissolved Organic Carbon	-	-	-	8.53	mg/L	5.96	7.04	6.31	7.22	6.34	7.75	6.70	6.06	6.60	6.79	3.04	5.28	3.89	7.06
pH	6.5 - 9	-	6.5 - 8.5	8.57	pH units	8.49	8.09	8.31	8.48	8.07	8.60	8.71	8.07	8.45	8.92	8.23	8.25	8.15	8.06

Notes: < = concentration below the laboratory detection limits; - = chemical not analyzed or criteria not defined; µS/cm = microsiemens per centimetre; µg/L = microgram per litre; mg/L = milligram per litre; NTU = Nephelometric turbidity units.

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[4] Maximum concentration measured in PCN (reference area)

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Table 2-1 - Conventional Parameters

						Sample Name	DUP-SW-004	DUP-SW-004	UC-SW-003		Anglin Bay-SW-001			Cataraqui-SW-001			Dufferin-SW-001		
						Sample Date	2024-05-23	2024-07-11	2024-05-23	2024-07-11	2023-11-23	2024-05-22	2024-07-10	2023-11-23	2024-05-22	2024-07-10	2023-11-24	2024-05-22	2024-07-10
						Laboratory Certificate of Analysis	WT2413148	WT2419567	WT2413148	WT2419558	WT2338621	WT2413150	WT2419544	WT2338618	WT2413239	WT2419538	WT2338619	WT2413156	WT2419549
	CWQG [1]	**FEQG [2]**	**PWQO [3]**	**PCN [4]**	**Unit**	*UC-SW-002*	*UC-SW-002*	-	-	-	-	-	-	-	-	-	-	-	
Temperature	-	-	-	-	°C	14.20	18.06	17.53	18.15	13.10	16.49	21.56	6.30	12.09	22.92	9.80	14.64	19.64	
Hardness	-	-	-	135	mg/L	276.00	188.00	268.00	168.00	263.82	136.00	65.00	46.87	87.10	45.10	311.30	161.00	121.00	
Conductivity	-	-	-	325	µS/cm	787.00	575.00	802.00	537.00	1280.00	477.00	205.00	395.00	269.00	85.80	1140.00	473.00	472.00	
Total Suspended Solids	-	-	-	12.1	mg/L	3.30	21.70	3.50	11.90	< 3.0	< 3.0	32.00	5.70	6.40	39.20	< 3.0	3.20	11.40	
Turbidity	-	-	-	13.8	NTU	4.22	23.70	5.31	12.10	1.11	1.26	21.10	7.16	2.68	35.10	0.24	1.70	7.69	
Total Organic Carbon	-	-	-	8.28	mg/L	3.57	6.17	4.91	6.64	6.07	5.20	6.94	3.62	8.29	7.40	3.33	6.02	4.58	
Dissolved Organic Carbon	-	-	-	8.53	mg/L	4.27	6.46	5.17	7.56	2.84	5.37	6.64	3.60	7.69	6.75	3.47	7.17	5.42	
pH	6.5 - 9	-	6.5 - 8.5	8.57	pH units	8.42	8.06	8.15	8.08	8.16	8.18	8.00	7.65	8.13	7.85	8.31	8.22	7.96	

Notes: < = concentration below the laboratory detection limits; - = chemical not analyzed or criteria not defined; µS/cm = microsiemens per centimetre; µg/L = microgram per litre; mg/L = milligram per litre; NTU = Nephelometric turbidity units.

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Blue - Indicates concentration exceeds the maximum concentration in PCN

Table 2-1 - Conventional Parameters

					Sample Name	Kingscourt-SW-001			TRIP-SW-001		FIELD-SW-001			FIELD-SW-002		
					Sample Date	2023-11-24	2024-05-22	2024-07-10	2023-11-24	2024-05-22	2023-11-23	2024-05-21	2024-07-10	2023-11-24	2024-05-22	2024-07-11
					Laboratory Certificate of Analysis	WT2338619	WT2413163	WT2419541	WT2338782	WT2413161	WT2338620	WT2412991	WT2419290	WT2338623	WT2413150	WT2419555
	CWQG [1]	FEQG [2]	PWQO [3]	PCN [4]	Unit	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	-	°C	11.90	10.67	22.18	-	-	-	-	-	-	-	-
Hardness	-	-	-	135	mg/L	270.02	237.00	121.00	-	< 0.50	0.40	< 0.50	<0.50	0.39	< 0.50	<0.50
Conductivity	-	-	-	325	µS/cm	821.00	712.00	126.00	< 2.0	< 2.0	3.00	< 2.0	< 2.0	3.20	7.90	< 2.0
Total Suspended Solids	-	-	-	12.1	mg/L	< 3.0	< 3.0	228.00	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	155.00
Turbidity	-	-	-	13.8	NTU	0.74	0.34	101.00	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Organic Carbon	-	-	-	8.28	mg/L	3.37	2.87	6.29	< 0.50	< 0.50	0.77	< 0.50	< 0.50	0.76	116.00	< 0.50
Dissolved Organic Carbon	-	-	-	8.53	mg/L	3.13	3.00	6.97	< 0.50	< 0.50	< 0.50	118.00	< 0.50	< 0.50	124.00	0.55
pH	6.5 - 9	-	6.5 - 8.5	8.57	pH units	8.13	8.41	8.08	**5.61**	6.41	**5.28**	6.35	6.32	**5.57**	**5.01**	**5.98**

Notes: < = concentration below the laboratory detection limits; - = chemical not analyzed or criteria not defined; µS/cm = microsiemens per centimetre; µg/L = microgram per litre; mg/L = milligram per litre; NTU = Nephelometric turbidity units.

[1] CCME (Canadian Council of Ministers of the Environment). 1999 and updates. CWQG (Canadian Water Quality Guidelines) for the Protection of Aquatic Life (freshwater, long-term).

[2] Envrionment Canada FEQG (Federal Environmental Quality Guidelines) for surface water and protection of aquatic life, as of January 2024.

[3] Ontario Ministry of Environment (MOE). 1999. Appendix A: PWQG (Provincial Water Quality Objectives) in Water Management: Policies, Guidelines, Provincial Water Quality Objectives.

[4] Maximum concentration measured in PCN (reference area)

Bold - indicates concentration exceeds CCME criteria or is outside pH range
Underlined - indicates concentration exceeds Ontario criteria or is outside pH range
Shaded - indicates concentration exceeds FEQG
Blue - Indicates concentration exceeds the maximum concentration in PCN

ATTACHMENT 3

Water Quality Results: Polybrominated Diphenyl Ethers

Table 3-1 - Polybrominated Diphenyl Ethers (PBDEs) in Surface Water

		Sample Name	PCN-SW-001		PCN-SW-003		PCOM-SW-001	TC2A-SW-001	DUP-SW-001		TCAB-SW-001		ANGLIN BAY-SW-001		
		Sample Date	2023-11-21	2024-05-21	2023-11-21	2024-05-21	2024-05-22	2023-11-20	2023-11-20	2024-05-21	2023-11-20	2024-05-21	2023-11-23	2024-05-22	2024-07-10
		Laboratory Certificate of Analysis	L2753732	L2755885	L2753731	L2755887	L2755909	L2753712	L2753713	L2755886	L2753711	L2755883	L2753767	L2755905	L2756623
Parameter	**FEQG[1]**	**Unit**	-	-	-	-	-	-	*TC2A-SW-001*	*TCAB-SW-001*	-	-	-	-	-
Brominated Diphenyl Ether 10	-	pg/l	< 0.18	< 0.23	< 0.066	< 0.17	< 0.63	< 0.20	< 0.22	< 0.19	< 0.17	< 0.29	< 2.3	< 0.20	< 0.10
Brominated Diphenyl Ether 100	-	pg/l	1.2	1.64	0.63	1.88	9.32	2.72	2.26	1.46	0.62	1.5	27.7	3.06	33.5
Brominated Diphenyl Ether 105	-	pg/l	< 0.24	< 0.44	< 0.14	< 0.37	< 1.4	< 0.32	< 0.26	< 0.48	< 0.26	< 0.86	< 2.2	< 0.27	< 0.34
Brominated Diphenyl Ether 116	-	pg/l	< 0.39	< 0.61	< 0.23	< 0.52	< 2.0	< 0.51	< 0.42	< 0.67	< 0.41	< 1.2	< 2.9	< 0.37	< 0.46
Brominated Diphenyl Ether 118	-	pg/l	< 0.20	< 0.40	< 0.12	< 0.34	< 1.3	< 0.26	< 0.21	< 0.44	< 0.21	< 0.79	6	< 0.24	0.76
Brominated Diphenyl Ether 119/120	-	pg/l	< 0.17	< 0.35	< 0.10	< 0.29	< 1.1	< 0.23	< 0.19	< 0.38	< 0.18	< 0.68	3.3	< 0.21	< 0.31
Brominated Diphenyl Ether 12/13	-	pg/l	< 0.097	< 0.13	< 0.036	< 0.093	< 0.35	< 0.11	< 0.12	< 0.11	< 0.093	< 0.16	< 1.3	< 0.11	< 0.060
Brominated Diphenyl Ether 126	-	pg/l	< 0.10	< 0.20	< 0.059	< 0.17	< 0.65	< 0.13	< 0.11	< 0.23	< 0.11	< 0.44	2.61	< 0.13	< 0.20
Brominated Diphenyl Ether 128	-	pg/l	< 1.2	< 2.2	< 0.64	< 1.7	< 7.7	< 1.4	< 1.5	< 2.5	< 1.3	< 3.8	< 16	< 1.9	< 1.1
Brominated Diphenyl Ether 138/166	-	pg/l	< 1.0	< 1.8	< 0.56	< 1.4	< 6.2	< 1.3	< 1.3	< 2.0	< 1.2	< 3.1	< 13	< 1.5	< 0.95
Brominated Diphenyl Ether 140	-	pg/l	< 0.50	< 0.94	< 0.27	< 0.72	< 3.3	< 0.60	< 0.63	< 1.1	< 0.56	< 1.6	< 7.5	< 0.82	1.12
Brominated Diphenyl Ether 15	-	pg/l	< 0.081	< 0.11	0.071	0.337	0.35	0.229	0.177	< 0.092	0.093	< 0.14	< 1.1	< 0.095	0.4
Brominated Diphenyl Ether 153 [a]	120,000	pg/l	0.94	1.8	0.39	2.09	7.4	1.7	0.91	< 0.92	< 0.59	< 1.7	17.6	3.95	16.3
Brominated Diphenyl Ether 154	-	pg/l	0.77	1.77	0.26	1.29	5.1	1.3	0.78	< 0.51	0.51	1.5	19.7	1.98	14.8
Brominated Diphenyl Ether 155	-	pg/l	< 0.18	< 0.26	< 0.11	< 0.21	< 0.93	< 0.20	< 0.26	< 0.35	< 0.24	< 0.65	8.3	< 0.24	0.72
Brominated Diphenyl Ether 156	-	pg/l	< 1.4	< 2.5	< 0.78	< 1.9	< 8.6	< 1.7	< 1.8	< 2.8	< 1.6	< 4.3	< 19	< 2.2	< 1.3
Brominated Diphenyl Ether 17/25	-	pg/l	0.2	< 0.26	0.14	0.47	4.5	1.14	1.4	0.33	0.25	< 0.63	< 1.9	0.69	1.58
Brominated Diphenyl Ether 181	-	pg/l	< 0.79	< 0.84	< 0.50	< 0.81	< 3.1	< 1.3	1.4	< 0.84	< 1.4	< 2.2	< 6.2	< 0.70	< 0.77
Brominated Diphenyl Ether 183 [a]	17,000	pg/l	< 0.42	< 0.50	< 0.27	< 0.48	< 1.8	< 0.68	0.82	< 0.50	0.74	< 1.3	8.9	2.16	22.8
Brominated Diphenyl Ether 184	-	pg/l	< 0.27	< 0.32	< 0.17	< 0.31	< 1.2	< 0.44	< 0.42	< 0.32	< 0.47	< 0.83	< 2.9	< 0.27	1.63
Brominated Diphenyl Ether 190	-	pg/l	< 1.2	< 1.3	< 0.76	< 1.2	< 4.8	< 1.9	< 1.9	< 1.3	< 2.1	< 3.3	< 9.4	< 1.1	< 1.1
Brominated Diphenyl Ether 191	-	pg/l	< 0.66	< 0.78	< 0.42	< 0.75	< 2.9	< 1.1	< 1.0	< 0.78	< 1.2	< 2.0	< 6.7	< 0.65	< 0.79
Brominated Diphenyl Ether 196	-	pg/l	< 1.3	< 1.3	< 0.64	< 0.94	< 4.7	< 1.3	< 1.5	< 1.2	< 1.2	< 2.8	4.8	1.6	11.7
Brominated Diphenyl Ether 197	-	pg/l	< 1.1	< 1.1	0.75	< 0.77	4.2	< 1.1	1.5	< 1.0	< 1.0	< 2.3	6.5	< 0.76	13.5
Brominated Diphenyl Ether 203	-	pg/l	< 1.7	< 1.7	1	< 1.2	< 5.8	< 1.7	< 1.9	< 1.5	< 1.6	< 3.5	< 5.4	3.5	14.3
OctaBDE (194-205; calculated)	17,000 [b]	pg/l	4.1	4.1	2.39	2.91	14.7	4.1	4.9	3.7	3.8	8.6	16.7	5.86	39.5
Brominated Diphenyl Ether 206 [a]	-	pg/l	3.1	4.55	3.2	2.6	158	10	14.6	2.1	4.4	2.8	32.5	8.93	156
Brominated Diphenyl Ether 207	-	pg/l	3.1	4.51	2.7	4.49	27.9	7.6	7.9	0.85	3.8	< 1.3	32.1	6.87	105
Brominated Diphenyl Ether 208	-	pg/l	1.9	2.99	1.3	1.85	13.9	3.1	3	< 0.58	2.3	< 1.3	20.9	3.59	38
Brominated Diphenyl Ether 209 [a]	-	pg/l	75	46.9	49.8	75.5	6280	174	490	22.8	46	23.3	478	83.7	4950
Brominated Diphenyl Ether 28/33 [a]	46,000	pg/l	< 0.14	< 0.24	0.214	0.72	1.8	0.47	0.36	0.46	0.2	< 0.59	2.3	0.74	3.35
Brominated Diphenyl Ether 30	-	pg/l	< 0.16	< 0.28	< 0.10	< 0.23	< 1.4	< 0.37	< 0.20	< 0.35	< 0.23	< 0.69	< 2.1	< 0.33	< 0.20
Brominated Diphenyl Ether 32	-	pg/l	< 0.11	< 0.20	< 0.071	< 0.17	< 0.97	< 0.25	< 0.13	< 0.25	< 0.15	< 0.49	< 1.5	< 0.24	< 0.15
Brominated Diphenyl Ether 35	-	pg/l	< 0.098	< 0.17	< 0.062	< 0.14	1.1	< 0.22	< 0.12	< 0.21	< 0.13	< 0.41	< 1.3	< 0.20	0.4
Brominated Diphenyl Ether 37	-	pg/l	< 0.098	< 0.17	< 0.062	< 0.14	< 0.83	< 0.22	< 0.12	< 0.21	< 0.14	< 0.42	< 1.3	< 0.20	< 0.12
Brominated Diphenyl Ether 47 [a]	24,000	pg/l	3.84	7.36	2.65	8.07	38.9	10.6	8.58	9.16	2.98	9	112	14.7	129
Brominated Diphenyl Ether 49	-	pg/l	< 0.26	0.91	< 0.15	0.86	8.2	1.6	1.5	0.85	< 0.34	1.75	3.5	0.7	5.19
Brominated Diphenyl Ether 51	-	pg/l	< 0.17	< 0.21	< 0.095	< 0.18	< 1.0	0.36	0.32	< 0.25	< 0.22	< 0.45	< 0.99	< 0.20	0.56
Brominated Diphenyl Ether 66	-	pg/l	< 0.30	0.65	< 0.17	< 0.31	2	< 0.45	0.39	0.99	< 0.40	< 0.78	2.4	0.81	4.08
Brominated Diphenyl Ether 7	-	pg/l	0.22	0.63	0.316	0.78	0.88	0.27	< 0.20	0.56	0.2	0.83	< 2.1	0.56	< 0.10
Brominated Diphenyl Ether 71	-	pg/l	< 0.28	< 0.32	< 0.16	< 0.28	< 1.6	< 0.41	< 0.28	< 0.39	< 0.37	< 0.71	< 1.5	< 0.32	< 0.26
Brominated Diphenyl Ether 75	-	pg/l	< 0.20	< 0.24	< 0.11	< 0.21	< 1.2	< 0.30	< 0.20	< 0.30	< 0.26	< 0.53	< 1.2	< 0.24	< 0.15
Brominated Diphenyl Ether 77	-	pg/l	< 0.19	< 0.20	< 0.097	< 0.18	< 1.0	< 0.25	< 0.18	< 0.25	< 0.24	< 0.46	< 0.85	< 0.21	< 0.15
Brominated Diphenyl Ether 79	-	pg/l	< 0.17	< 0.20	< 0.095	< 0.18	< 0.98	< 0.25	< 0.17	< 0.24	< 0.22	< 0.44	< 0.95	< 0.20	0.3
Brominated Diphenyl Ether 8/11	-	pg/l	< 0.11	< 0.15	0.1	< 0.11	0.76	< 0.13	0.24	< 0.12	< 0.11	< 0.19	< 1.5	< 0.13	0.13
Brominated Diphenyl Ether 85	-	pg/l	0.33	0.38	0.15	0.7	2.1	0.67	0.43	< 0.38	< 0.20	0.98	5.9	0.68	5.16
Brominated Diphenyl Ether 99	4,000	pg/l	5.66	9.8	2.96	8.55	39.7	11.5	9.2	6.2	3.34	9.24	119	14.4	148
hexabromobiphenyl	-	pg/l	1.73	1.21	1.3	1.21	1.72	1.66	2.57	2.49	1.27	2.6	5.1	1.54	6.98
Pentabromoethylbenzene (PBEB)	-	pg/l	< 0.058	< 0.10	0.071	< 0.086	< 0.29	< 0.093	< 0.064	< 0.15	< 0.068	< 0.20	0.71	< 0.090	0.29

Notes: pg/l = picograms per litre; < = parameter was below laboratory equipment detection limit; **"-"** = chemical not analyzed or criteria not defined.

[1] Federal Environmental Quality Guideline (FEQG) for Water (Environment Canada 2013)

[a] FEQG for triBDE (tribromodiphenyl ether), tetraBDE (tetrabromodiphenyl ether), hexaBDE (hexabromodiphenyl ether), heptaBDE (heptabromodiphenyl ether), nonaBDE (nonabromodiphenyl ether) and decaBDE (decabromodiphenyl ether) are based on data for the congeners: BDE-28, BDE-47, BDE-153, BDE-183, BDE-206, and BDE-209, respectively unless otherwise noted.

[b] FEQG for octaBDE refers to isomers of octabromodiphenyl ether (PBDE congener numbers 194–205)

Blue Indicates concentration exceeds the maximum concentration in PCN

Table 3-1 - Polybrominated Diphenyl Ethers (PBDEs) in Surface Wat

		Sample Name	CATARAQUI-SW-001	DUFFERIN-SW-001			DUP-SW-003	KINGSCOURT-SW-001			TRIP-SW-001		FIELD-SW-001		FIELD-SW-002	
		Sample Date	2024-07-10	2023-11-24	2024-05-22	2024-07-10	2024-07-10	2023-11-24	2024-05-22	2024-07-10	2023-11-24	2024-05-22	2023-11-23	2024-05-21	2023-11-24	2024-07-10
		Laboratory Certificate of Analysis	L2756622	L2753765	L2755906	L2756625	L2756625	L2753765	L2755908	L2756624	L2753761	L2755907	L2753768	L2755884	L2753766	L2756622
Parameter	**FEQG[1]**	**Unit**	-	-	-	-	*Dufferin-SW-001*	-	-	-	-	-	-	-	-	-
Brominated Diphenyl Ether 10	-	pg/l	< 0.35	< 0.16	< 0.20	< 0.13	< 0.11	< 0.14	< 0.18	< 0.10	< 0.20	< 0.23	< 0.14	< 0.19	< 0.18	< 0.13
Brominated Diphenyl Ether 100	-	pg/l	73.6	5.89	5.54	8.22	8.76	1.77	3.2	325	0.48	0.54	0.61	0.68	0.56	0.37
Brominated Diphenyl Ether 105	-	pg/l	< 1.1	< 0.63	< 0.39	< 0.77	< 0.54	< 0.24	< 0.58	< 0.63	< 1.1	< 0.63	< 0.42	< 0.49	< 0.62	< 0.27
Brominated Diphenyl Ether 116	-	pg/l	< 1.4	< 1.0	< 0.55	< 1.0	< 0.74	< 0.38	< 0.81	< 0.85	< 1.7	< 0.88	< 0.67	< 0.68	< 1.0	< 0.37
Brominated Diphenyl Ether 118	-	pg/l	3.3	< 0.52	0.6	< 0.76	< 0.54	< 0.19	< 0.53	9.62	< 0.90	< 0.58	2.1	< 0.45	1.8	< 0.27
Brominated Diphenyl Ether 119/120	-	pg/l	< 0.95	< 0.45	< 0.31	< 0.69	< 0.49	< 0.17	< 0.46	6.5	< 0.78	< 0.50	4.28	2.34	< 0.44	< 0.24
Brominated Diphenyl Ether 12/13	-	pg/l	< 0.20	< 0.086	0.17	< 0.074	< 0.061	< 0.075	< 0.098	1.19	< 0.11	< 0.13	0.12	< 0.11	< 0.096	< 0.072
Brominated Diphenyl Ether 126	-	pg/l	< 0.66	< 0.28	< 0.18	< 0.44	< 0.30	< 0.10	< 0.28	1.2	< 0.45	< 0.30	< 0.22	< 0.25	< 0.28	< 0.17
Brominated Diphenyl Ether 128	-	pg/l	< 2.3	< 1.3	< 1.9	< 2.1	< 1.7	< 1.2	< 2.5	< 1.8	< 1.5	< 3.4	< 3.3	< 3.1	< 1.5	< 0.78
Brominated Diphenyl Ether 138/166	-	pg/l	8.5	< 1.1	< 1.5	< 1.9	< 1.5	< 1.1	< 2.0	21.6	< 1.4	< 2.8	< 2.9	< 2.5	< 1.3	< 0.70
Brominated Diphenyl Ether 140	-	pg/l	< 1.2	< 0.53	< 0.80	< 1.1	< 0.89	< 0.52	< 1.1	3.95	< 0.64	< 1.5	< 1.4	< 1.3	< 0.62	< 0.40
Brominated Diphenyl Ether 15	-	pg/l	0.51	0.365	0.214	0.3	0.47	0.17	< 0.084	3.57	< 0.092	< 0.11	< 0.065	< 0.091	< 0.081	< 0.061
Brominated Diphenyl Ether 153 [a]	120,000	pg/l	34	1.1	2.2	2.3	3.4	< 0.54	2.72	141	< 0.71	< 1.3	< 2.9	< 1.3	< 0.68	< 0.54
Brominated Diphenyl Ether 154	-	pg/l	32.9	1.9	2.2	3.6	3.2	0.71	1.6	123	0.7	1.08	0.52	1.39	0.56	< 0.18
Brominated Diphenyl Ether 155	-	pg/l	2.01	< 0.21	< 0.29	< 0.58	< 0.37	< 0.15	< 0.27	8.23	< 0.20	< 0.33	< 0.45	< 0.42	< 0.23	< 0.15
Brominated Diphenyl Ether 156	-	pg/l	< 2.8	< 1.5	< 2.1	< 2.5	< 2.0	< 1.5	< 2.8	< 2.1	< 1.9	< 3.8	< 4.0	< 3.5	< 1.8	< 0.92
Brominated Diphenyl Ether 17/25	-	pg/l	4	0.52	2.74	0.67	0.97	< 0.25	< 0.32	52.6	0.36	< 0.39	< 0.16	< 0.33	< 0.24	< 0.16
Brominated Diphenyl Ether 181	-	pg/l	< 2.0	< 1.2	< 0.77	< 1.0	< 1.0	< 1.1	< 1.1	4.3	< 1.2	< 1.1	< 4.5	< 1.3	< 1.4	< 0.59
Brominated Diphenyl Ether 183 [a]	17,000	pg/l	9.5	< 0.65	1.5	4.1	5.19	< 0.60	< 0.63	87.6	< 0.63	< 0.63	< 2.4	< 0.79	< 0.75	< 0.42
Brominated Diphenyl Ether 184	-	pg/l	< 0.95	< 0.42	< 0.29	< 0.48	< 0.48	< 0.39	< 0.40	4.6	< 0.40	< 0.41	< 1.5	< 0.51	< 0.49	< 0.28
Brominated Diphenyl Ether 190	-	pg/l	< 2.9	< 1.8	< 1.2	< 1.4	< 1.4	< 1.7	< 1.6	8.7	< 1.8	< 1.6	< 6.8	< 2.0	< 2.1	< 0.85
Brominated Diphenyl Ether 191	-	pg/l	< 2.0	< 1.0	< 0.71	< 1.0	< 1.0	< 0.94	< 0.99	6.5	< 0.98	< 0.99	< 3.8	< 1.2	< 1.2	< 0.60
Brominated Diphenyl Ether 196	-	pg/l	10.4	< 1.5	1.2	2.6	4.3	< 1.3	< 1.3	43.5	< 1.6	< 2.1	< 46	< 2.0	< 1.6	< 0.83
Brominated Diphenyl Ether 197	-	pg/l	12.2	< 1.3	1.46	2.6	3.4	< 1.1	< 1.0	56.7	< 1.4	< 1.7	< 38	< 1.7	< 1.3	< 0.73
Brominated Diphenyl Ether 203	-	pg/l	16.9	< 1.9	1.6	4.2	6.6	< 1.7	< 1.6	54.5	< 2.1	< 2.6	< 53	< 2.5	< 2.0	< 0.99
OctaBDE (194-205; calculated)	17,000 [b]	pg/l	39.5	4.7	4.26	9.4	14.3	4.1	3.9	154.7	5.1	6.4	137	6.2	4.9	2.55
Brominated Diphenyl Ether 206 [a]	-	pg/l	172	< 3.7	5.09	57	28	5.3	3.97	600	< 2.4	< 0.93	< 170	< 1.3	8.1	< 2.0
Brominated Diphenyl Ether 207	-	pg/l	100	< 3.3	4.63	30	25	< 2.9	3.99	492	< 2.1	< 0.70	< 160	< 1.0	6.2	< 1.8
Brominated Diphenyl Ether 208	-	pg/l	37	< 2.8	1.3	< 14	< 12	4.5	1.86	191	< 1.8	< 0.67	< 160	< 0.97	3.9	< 1.8
Brominated Diphenyl Ether 209 [a]	-	pg/l	3260	47	76.7	2330	400	48	55.5	14800	31	10.9	< 1100	19	48	< 21
Brominated Diphenyl Ether 28/33 [a]	46,000	pg/l	8.5	0.9	0.8	1.67	1.81	0.34	0.58	43.1	0.51	0.97	1.1	0.77	1.22	< 0.16
Brominated Diphenyl Ether 30	-	pg/l	< 0.84	< 0.24	< 0.20	< 0.14	< 0.14	< 0.28	< 0.36	< 0.68	< 0.22	< 0.43	< 0.18	< 0.36	< 0.27	< 0.17
Brominated Diphenyl Ether 32	-	pg/l	< 0.62	< 0.16	< 0.14	< 0.10	< 0.11	< 0.19	< 0.25	1.31	< 0.15	< 0.30	< 0.12	< 0.25	< 0.18	< 0.13
Brominated Diphenyl Ether 35	-	pg/l	1.1	0.18	< 0.12	0.26	< 0.085	< 0.16	< 0.21	7.6	0.17	< 0.25	0.4	< 0.21	0.35	< 0.10
Brominated Diphenyl Ether 37	-	pg/l	< 0.49	< 0.14	< 0.12	< 0.082	< 0.084	< 0.16	< 0.22	2.12	0.2	< 0.26	0.35	< 0.22	0.42	< 0.10
Brominated Diphenyl Ether 47 [a]	24,000	pg/l	253	40.2	25.5	35.1	34.7	12	15.7	1250	3.68	5.38	4.78	5.42	5.44	3.59
Brominated Diphenyl Ether 49	-	pg/l	14.1	< 0.41	4.54	1.8	2.01	0.39	1.4	112	1.62	2.56	3.15	2.74	2.85	< 0.12
Brominated Diphenyl Ether 51	-	pg/l	2.27	< 0.26	0.67	< 0.22	< 0.17	< 0.12	< 0.27	11.5	0.54	0.87	1.18	0.66	1.26	< 0.10
Brominated Diphenyl Ether 66	-	pg/l	11.9	1.19	1.3	1.57	1.7	0.38	< 0.48	43.3	1.13	1.63	2.09	2.03	2.24	< 0.14
Brominated Diphenyl Ether 7	-	pg/l	< 0.34	< 0.14	3.22	< 0.12	< 0.10	< 0.12	< 0.16	0.5	< 0.18	< 0.21	< 0.13	< 0.18	< 0.16	< 0.12
Brominated Diphenyl Ether 71	-	pg/l	< 0.53	< 0.44	< 0.39	< 0.34	< 0.27	< 0.20	< 0.43	9.4	1.3	1.7	2.86	2.03	2.64	< 0.16
Brominated Diphenyl Ether 75	-	pg/l	< 0.29	< 0.32	< 0.30	< 0.19	< 0.15	< 0.14	< 0.32	2.12	< 0.37	< 0.42	< 0.23	< 0.39	< 0.16	< 0.087
Brominated Diphenyl Ether 77	-	pg/l	< 0.30	< 0.29	< 0.26	< 0.19	< 0.15	< 0.13	< 0.29	0.9	< 0.32	< 0.37	< 0.21	< 0.34	< 0.14	< 0.083
Brominated Diphenyl Ether 79	-	pg/l	1.12	0.4	< 0.24	< 0.17	< 0.14	< 0.12	< 0.27	3.7	< 0.31	< 0.35	0.64	< 0.32	< 0.13	< 0.080
Brominated Diphenyl Ether 8/11	-	pg/l	< 0.24	< 0.099	0.53	< 0.087	< 0.072	< 0.086	< 0.11	5.67	< 0.13	< 0.15	< 0.089	< 0.12	< 0.11	< 0.085
Brominated Diphenyl Ether 85	-	pg/l	15.4	1.24	1.33	1.48	1.87	0.52	0.75	48	< 0.83	< 0.50	0.54	< 0.39	< 0.48	< 0.22
Brominated Diphenyl Ether 99	4,000	pg/l	360	25.5	24.2	35	36.3	9.31	14	1450	2.84	4.74	3.24	5.32	5.38	2.1
hexabromobiphenyl	-	pg/l	3.7	1.3	1.76	< 1.8	< 1.1	0.95	1.7	9.59	1.49	1.4	2	1.46	2.35	1.3
Pentabromoethylbenzene (PBEB)	-	pg/l	1.1	< 0.10	< 0.087	< 0.18	< 0.12	< 0.090	< 0.11	0.91	< 0.12	< 0.14	< 0.10	< 0.11	0.11	< 0.079

Notes: pg/l = picograms per litre; < = parameter was below laboratory equipment detection limit; "-" = chemical not analyzed or criteria not defined.

[1]Federal Environmental Quality Guideline (FEQG) for Water (Environment Canada 2013)

[a] FEQG for triBDE (tribromodiphenyl ether), tetraBDE (tetrabromodiphenyl ether), hexaBDE (hexabromodiphenyl ether), heptaBDE (heptabromodiphenyl ether), nonaBDE (nonabromodiphenyl ether) and decaBDE (decabromodiphenyl ether) are based on data for the congeners: BDE-28, BDE-47, BDE-153, BDE-183, BDE-206, and BDE-209, respectively unless otherwise noted.

[b] FEQG for octaBDE refers to isomers of octabromodiphenyl ether (PBDE congener numbers 194–205)

Blue Indicates concentration exceeds the maximum concentration in PCN

ATTACHMENT 4

Water Quality Results: Per- and Polyfluoroalkyl Substances

Table 4-1 - Per- and polyfluoroalkyl substances (PFAS) in Surface Water

Sample Name			PCN-SW-001		PCN-SW-003	Anglin Bay-SW-001			Cataraqui-SW-001	Dufferin-SW-001			DUP-SW-003			Kingscourt-SW-001			PCOM-SW-001
Sample Date			2023-11-23	2024-05-21	2023-11-23	2023-11-23	2024-05-22	2024-07-10	2024-07-10	2023-11-24	2024-07-10	2024-05-22	2023-11-24	2024-05-22	2024-07-10	2023-11-24	2024-05-22	2024-07-10	2024-05-22
Laboratory Certificate of Analysis			WT2338625	WT2412977	WT2338625	WT2338625	WT2413241	WT2419551	WT2419551	WT2338625	WT2419551	WT2413241	WT2338625	WT2413241	WT2419551	WT2338625	WT2413241	WT2419551	WT2413241
Parameter	**FEQG[1]**	**Unit**	-	-	-	-	-	-	-	-	-	-	*Dufferin-SW-001*			-	-	-	-
PFAS																			
Perfluoro-1-Octanesulfonate (PFOS)	6.8	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorobutanoic acid	-	µg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
Perfluorodecane Sulfonate	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorodecanoic Acid (PFDA)	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorododecanoic Acid (PFDoA)	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluoroheptane Sulfonate	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluoroheptanoic Acid (PFHpA)	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorohexane sulfonate (PFHXS)	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorohexanoic Acid (PFHxA)	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluoro-n-octanoic acid (PFOA)	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorononanoic Acid (PFNA)	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluoropentanoic Acid (PFPeA)	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorotetradecanoic Acid	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorotridecanoic Acid	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
methyl perfluorooctane sulfonamidoacetic acid, n- [MeFOSAA]	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
perfluoro-1-nonane sulfonic acid [PFNS]	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
N-Ethyl perfluorooctane sulfonamidoacetic acid	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluoropentansulfonic acid (PFPES)	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
4,8-Dioxa-3H-Perfluorononanoic acid	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluoroundecanoic acid	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorobutane Sulfonate (PFBS)	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
4:2 Fluorotelomer sulfonate	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
N-ethylperfluorooctanesulfonamidoethanol	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
methyl perfluorooctane sulfonamide, n- [MeFOSA]	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorooctane Sulfonamide (PFOSA)	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
N-methylperfluorooctanesulfonamidoethanol	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
N-ethylperfluorooctanesulfonamidoethanol	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
perfluoro(2-ethoxyethane)sulfonic acid [PFEESA]	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Hexafluoropropylene Oxide Dimer Acid [HFPO-DA]	-	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
nonafluoro-3,6-dioxaheptanoic acid [NFDHA]	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
fluorotelomer carboxylic acid, 3:3 [3:3 FTCA]	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
perfluoro-3-methoxypropanoic acid [PFMPA]	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorododecanesulfonic acid (PFDoS)	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
fluorotelomer carboxylic acid, 7:3 [7:3 FTCA]	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
perfluoro-4-methoxybutanoic acid [PFMBA]	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
fluorotelomer carboxylic acid, 5:3 [5:3 FTCA]	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PFAS, total (EPA 1633)	-	µg/L	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
Other																			
Perfluorobutane Sulfonate (PFBS)	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
6:2 Fluorotelomer sulfonate	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
8:2 Fluorotelomer sulfonate	-	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020

Notes: µg/l = micrograms per litre; < = parameter was below laboratory detection limit; **"-"** = chemical not analyzed or criteria not defined.

[1]Federal Environmental Quality Guideline (FEQG) for Water (Environment Canada 2018)

Table 4-1 - Per- and polyfluoroalkyl substances (PFAS) in Surface Water

			Sample Name	TC2A-SW-001		DUP-SW-001		TCAB-SW-001		EQUIPMENT-SW-001				EQUIPMENT-SW-002		FIELD-SW-001		FIELD-SW-002			TRIP-SW-001		
			Sample Date	2023-11-23	2024-05-22	2023-11-23	2024-05-21	2023-11-23	2024-05-21	2023-11-23	2024-05-22	2024-07-10	2023-11-23	2024-05-22	2023-11-23	2024-05-21	2023-11-24	2024-05-22	2024-07-10	2023-11-23	2024-05-21	2024-07-10
			Laboratory Certificate of Analysis	WT2338625	WT2413241	WT2338625	WT2412977	WT2338625	WT2412977	WT2338625	WT2413241	WT2419551	WT2338625	WT2413241	WT2338625	WT2412977	WT2338625	WT2413241	WT2419551	WT2338625	WT2412977	WT2419551
Parameter	**FEQG[1]**	**Unit**		-	-	*TC2A-SW-001*	*TCAB-SW-001*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PFAS																							
Perfluoro-1-Octanesulfonate (PFOS)	6.8	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorobutanoic acid	-	µg/L		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Perfluorodecane Sulfonate	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorodecanoic Acid (PFDA)	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorododecanoic Acid (PFDoA)	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluoroheptane Sulfonate	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluoroheptanoic Acid (PFHpA)	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorohexane sulfonate (PFHXS)	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorohexanoic Acid (PFHxA)	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluoro-n-octanoic acid (PFOA)	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorononanoic Acid (PFNA)	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluoropentanoic Acid (PFPeA)	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorotetradecanoic Acid	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorotridecanoic Acid	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
methyl perfluorooctane sulfonamidoacetic acid, n- [MeFOSAA]	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
perfluoro-1-nonane sulfonic acid [PFNS]	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
N-Ethyl perfluorooctane sulfonamidoacetic acid	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluoropentansulfonic acid (PFPES)	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
4,8-Dioxa-3H-Perfluorononanoic acid	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluoroundecanoic acid	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorobutane Sulfonate (PFBS)	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
4:2 Fluorotelomer sulfonate	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
N-ethylperfluorooctanesulfonamidoethanol	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
methyl perfluorooctane sulfonamide, n- [MeFOSA]	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorooctane Sulfonamide (PFOSA)	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
N-methylperfluorooctanesulfonamidoethanol	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
N-ethylperfluorooctanesulfonamidoethanol	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
perfluoro(2-ethoxyethane)sulfonic acid [PFEESA]	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Hexafluoropropylene Oxide Dimer Acid [HFPO-DA]	-	µg/L		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
nonafluoro-3,6-dioxaheptanoic acid [NFDHA]	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
fluorotelomer carboxylic acid, 3:3 [3:3 FTCA]	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
perfluoro-3-methoxypropanoic acid [PFMPA]	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Perfluorododecanesulfonic acid (PFDoS)	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
fluorotelomer carboxylic acid, 7:3 [7:3 FTCA]	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
perfluoro-4-methoxybutanoic acid [PFMBA]	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
fluorotelomer carboxylic acid, 5:3 [5:3 FTCA]	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PFAS, total (EPA 1633)	-	µg/L		< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
Other																							
Perfluorobutane Sulfonate (PFBS)	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
6:2 Fluorotelomer sulfonate	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
8:2 Fluorotelomer sulfonate	-	µg/L		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020

Notes: µg/l = micrograms per litre; < = parameter was below laboratory detection limit; **"-"** = chemical not analyzed or criteria not defined.
[1]Federal Environmental Quality Guideline (FEQG) for Water (Environment Canada 2018)

ATTACHMENT 5

Water Quality Results: Bisphenol A

Table 5-1 - Bisphenol A in Surface Water

Sample Name			**PCN-SW-001**		**PCN-SW-003**		**PCOM-SW-001**	**TC2A-SW-001**		**DUP-SW-001**		**TCAB-SW-001**		**Anglin Bay-SW-001**			**Cataraqui-SW-001**
Sample Date			2023-11-21	2024-05-21	2023-11-21	2024-05-21	2024-05-22	2023-11-20	2024-05-22	2023-11-20	2024-05-21	2023-11-20	2024-05-21	2023-11-23	2024-05-22	2024-07-10	2024-07-10
Laboratory Certificate of Analysis			WT2338312	WT2412994	WT2338304	WT2413003	WT2413166	WT2338131	WT2413243	WT2338125	WT2412996	WT2338132	WT2412979	WT2338621	WT2413150	WT2419544	WT2419566
Parameter	**FEQG[1]**	**Unit**	-	-	-	-	-	-	-	*TC2A-SW-001*	*TCAB-SW-001*	-	-	-	-	-	-
Bisphenol A	3.5	µg/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20

Sample Name			**Dufferin-SW-001**			**DUP-SW-003**	**Kingscourt-SW-001**			**TRIP-SW-001**		**FIELD-SW-001**		**FIELD-SW-002**		
Sample Date			2023-11-24	2024-05-22	2024-07-10	2024-07-10	2023-11-24	2024-05-22	2024-07-10	2023-11-24	2024-05-22	2023-11-23	2024-05-21	2023-11-24	2024-05-22	2024-07-10
Laboratory Certificate of Analysis			WT2338619	WT2413156	WT2419549	WT2419549	WT2338619	WT2413163	WT2419541	WT2338782	WT2413161	WT2338620	WT2412991	WT2338623	WT2413241	WT2419566
Parameter	**FEQG[1]**	**Unit**	-	-		*Dufferin-SW-001*	-	-		-	-	-	-	-	-	-
Bisphenol A	3.5	µg/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20

Notes: µg/l = micrograms per litre; < = paramete
[1]Federal Environmental Quality Guideline (FEQG

Notes: µg/l = micrograms per litre; < = parameter was below laboratory detection limit.
[1]Federal Environmental Quality Guideline (FEQG) for Water (Environment Canada 2018)

Table 5-1 - Bisphenol A in Surface Water

Sample Name			Dufferin-SW-001			DUP-SW-003	Kingscourt-SW-001			TRIP-SW-001		FIELD-SW-001		FIELD-SW-002		
Sample Date			2023-11-24	2024-05-22	2024-07-10	2024-07-10	2023-11-24	2024-05-22	2024-07-10	2023-11-24	2024-05-22	2023-11-23	2024-05-21	2023-11-24	2024-05-22	2024-07-10
Laboratory Certificate of Analysis			WT2338619	WT2413156	WT2419549	WT2419549	WT2338619	WT2413163	WT2419541	WT2338782	WT2413161	WT2338620	WT2412991	WT2338623	WT2413241	WT2419566
Parameter	**FEQG[1]**	**Unit**	-	-	-	*Dufferin-SW-001*	-	-	-	-	-	-	-	-	-	-
Bisphenol A	3.5	µg/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20

Notes: µg/l = micrograms per litre; < = paramete

[1]Federal Environmental Quality Guideline (FEQ

ATTACHMENT 6

QA/QC Results: Relative Percent Difference

Table 6-1 - RPD Results for Surface Water and Stormwater - PBDE

	Sample Name	TC2A-SW-001	DUP-SW-001	Relative Percent Difference	TCAB-SW-001	DUP-SW-001	Relative Percent Difference	DUFFERIN-SW-001	DUP-SW-003	Relative Percent Difference
	Sample Date	2023-11-20	2023-11-20		2024-05-21	2024-05-21		2024-07-10	2024-07-10	
	Laboratory Certificate of Analysis	L2753712	L2753713		L2755883	L2755886		L2756625	L2756625	
PBDEs	**Unit**									
Brominated Diphenyl Ether 10	pg/L	< 0.20	< 0.22	NC	< 0.29	< 0.19	NC	< 0.13	< 0.11	NC
Brominated Diphenyl Ether 100	pg/L	2.72	2.26	18%	1.5	1.46	3%	8.22	8.76	6%
Brominated Diphenyl Ether 105	pg/L	< 0.32	< 0.26	NC	< 0.86	< 0.48	NC	< 0.77	< 0.54	NC
Brominated Diphenyl Ether 116	pg/L	< 0.51	< 0.42	NC	< 1.2	< 0.67	NC	< 1.0	< 0.74	NC
Brominated Diphenyl Ether 118	pg/L	< 0.26	< 0.21	NC	< 0.79	< 0.44	NC	< 0.76	< 0.54	NC
Brominated Diphenyl Ether 119/120	pg/L	< 0.23	< 0.19	NC	< 0.68	< 0.38	NC	< 0.69	< 0.49	NC
Brominated Diphenyl Ether 12/13	pg/L	< 0.11	< 0.12	NC	< 0.16	< 0.11	NC	< 0.074	< 0.061	NC
Brominated Diphenyl Ether 126	pg/L	< 0.13	< 0.11	NC	< 0.44	< 0.23	NC	< 0.44	< 0.30	NC
Brominated Diphenyl Ether 128	pg/L	< 1.4	< 1.5	NC	< 3.8	< 2.5	NC	< 2.1	< 1.7	NC
Brominated Diphenyl Ether 138/166	pg/L	< 1.3	< 1.3	NC	< 3.1	< 2.0	NC	< 1.9	< 1.5	NC
Brominated Diphenyl Ether 140	pg/L	< 0.60	< 0.63	NC	< 1.6	< 1.1	NC	< 1.1	< 0.89	NC
Brominated Diphenyl Ether 15	pg/L	0.229	0.177	NA	< 0.14	< 0.092	NC	0.3	0.47	**44%**
Brominated Diphenyl Ether 153	pg/L	1.7	0.91	NA	< 1.7	< 0.92	NC	2.3	3.4	NA
Brominated Diphenyl Ether 154	pg/L	1.3	0.78	NA	1.5	< 0.51	NC	3.6	3.2	12%
Brominated Diphenyl Ether 155	pg/L	< 0.20	< 0.26	NC	< 0.65	< 0.35	NC	< 0.58	< 0.37	NC
Brominated Diphenyl Ether 156	pg/L	< 1.7	< 1.8	NC	< 4.3	< 2.8	NC	< 2.5	< 2.0	NC
Brominated Diphenyl Ether 17/25	pg/L	1.14	1.4	20%	< 0.63	0.33	NC	0.67	0.97	37%
Brominated Diphenyl Ether 181	pg/L	< 1.3	1.4	NC	< 2.2	< 0.84	NC	< 1.0	< 1.0	NC
Brominated Diphenyl Ether 183	pg/L	< 0.68	0.82	NC	< 1.3	< 0.50	NC	4.1	5.19	23%
Brominated Diphenyl Ether 184	pg/L	< 0.44	< 0.42	NC	< 0.83	< 0.32	NC	< 0.48	< 0.48	NC
Brominated Diphenyl Ether 190	pg/L	< 1.9	< 1.9	NC	< 3.3	< 1.3	NC	< 1.4	< 1.4	NC
Brominated Diphenyl Ether 191	pg/L	< 1.1	< 1.0	NC	< 2.0	< 0.78	NC	< 1.0	< 1.0	NC
Brominated Diphenyl Ether 196	pg/L	< 1.3	< 1.5	NC	< 2.8	< 1.2	NC	2.6	4.3	NA
Brominated Diphenyl Ether 197	pg/L	< 1.1	1.5	NC	< 2.3	< 1.0	NC	2.6	3.4	NA
Brominated Diphenyl Ether 203	pg/L	< 1.7	< 1.9	NC	< 3.5	< 1.5	NC	4.2	6.6	NA
Brominated Diphenyl Ether 206	pg/L	10	14.6	37%	2.8	2.1	NA	57	28	NA
Brominated Diphenyl Ether 207	pg/L	7.6	7.9	NA	< 1.3	0.85	NC	30	25	NA
Brominated Diphenyl Ether 208	pg/L	3.1	3	NA	< 1.3	< 0.58	NC	< 14	< 12	NC
Brominated Diphenyl Ether 209	pg/L	174	490	**95%**	23.3	22.8	2%	2330	400	**141%**
Brominated Diphenyl Ether 28/33	pg/L	0.47	0.36	NA	< 0.59	0.46	NC	1.67	1.81	8%
Brominated Diphenyl Ether 30	pg/L	< 0.37	< 0.20	NC	< 0.69	< 0.35	NC	< 0.14	< 0.14	NC
Brominated Diphenyl Ether 32	pg/L	< 0.25	< 0.13	NC	< 0.49	< 0.25	NC	< 0.10	< 0.11	NC
Brominated Diphenyl Ether 35	pg/L	< 0.22	< 0.12	NC	< 0.41	< 0.21	NC	0.26	< 0.085	NC
Brominated Diphenyl Ether 37	pg/L	< 0.22	< 0.12	NC	< 0.42	< 0.21	NC	< 0.082	< 0.084	NC
Brominated Diphenyl Ether 47	pg/L	10.6	8.58	21%	9	9.16	2%	35.1	34.7	1%
Brominated Diphenyl Ether 49	pg/L	1.6	1.5	6%	1.75	0.85	NA	1.8	2.01	11%
Brominated Diphenyl Ether 51	pg/L	0.36	0.32	NA	< 0.45	< 0.25	NC	< 0.22	< 0.17	NC
Brominated Diphenyl Ether 66	pg/L	< 0.45	0.39	NC	< 0.78	0.99	NC	1.57	1.7	8%
Brominated Diphenyl Ether 7	pg/L	0.27	< 0.20	NC	0.83	0.56	NA	< 0.12	< 0.10	NC
Brominated Diphenyl Ether 71	pg/L	< 0.41	< 0.28	NC	< 0.71	< 0.39	NC	< 0.34	< 0.27	NC
Brominated Diphenyl Ether 75	pg/L	< 0.30	< 0.20	NC	< 0.53	< 0.30	NC	< 0.19	< 0.15	NC
Brominated Diphenyl Ether 77	pg/L	< 0.25	< 0.18	NC	< 0.46	< 0.25	NC	< 0.19	< 0.15	NC
Brominated Diphenyl Ether 79	pg/L	< 0.25	< 0.17	NC	< 0.44	< 0.24	NC	< 0.17	< 0.14	NC
Brominated Diphenyl Ether 8/11	pg/L	< 0.13	0.24	NC	< 0.19	< 0.12	NC	< 0.087	< 0.072	NC
Brominated Diphenyl Ether 85	pg/L	0.67	0.43	NA	0.98	< 0.38	NC	1.48	1.87	NA
Brominated Diphenyl Ether 99	pg/L	11.5	9.2	22%	9.24	6.2	39%	35	36.3	4%
Hexabromobiphenyl	pg/L	1.66	2.57	**43%**	2.6	2.49	4%	< 1.8	< 1.1	NC

Notes: < = less than detection limit; NC = not calculated, concentrations are not detectable; NA = not applicable; pg/L = picogram per litre.

[(a)]Relative percent difference (RPD) = the difference between two values divided by the mean of the two values. RPD is calculated when the concentration is greater than five times the detection limit. If the concentration is less than five times the detection limit, the RPD calculation is not applicable.

Acceptable RPD for in surface water is less than or equal to 40%, per CCME (2016).

Bold & Shaded values indicate an exceedance of the acceptable RPD.