FINAL REPORT

WASTE MANAGEMENT OF CANADA CORPORATION

WATFORD, ONTARIO

TWIN CREEKS ENVIRONMENTAL CENTRE SITE: 2023 FOURTH QUARTER & ANNUAL MONITORING REPORT VOLUME 3 OF 5: POPLAR SYSTEM MONITORING PROGRAM

RWDI #2303459.01
February 28, 2024

SUBMITTED TO

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Ms. Angela McLachlan
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Re: Waste Management of Canada Corporation
2023 Fourth Quarter and Annual Monitoring Report
Twin Creeks Environmental Centre, Township of Warwick, County of Lambton, Ontario
Volume 3 of 5: Poplar System Monitoring Program

Dear Ms. McLachlan,

RWDI AIR Inc. is pleased to provide this 2023 Fourth Quarter and Annual Monitoring Report: Poplar System Monitoring Program, for the Twin Creeks Environmental Centre.

This report provides details of the monitoring completed in 2023 and an interpretation of the 2023 monitoring data, including our conclusions and recommendations. Relevant technical data are appended.

We trust that this report satisfies your requirements. If you have any questions or comments, please contact us.

Yours very truly,

RWDI

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Attach.

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1 INTRODUCTION

1.1 Environmental Centre Description and Background

The Twin Creeks Environmental Centre (Site) is a solid, non-hazardous waste landfill facility that contains an existing landfill (Existing Landfill) and an area approved expansion (Expansion Landfill). The Site is located on Part of Lots 19 and 20, Concession 3, South of Egremont Road (SER) and Part of Lots 20 to 22, Concession 4 SER, in the Township of Warwick, County of Lambton, Ontario. The Site occupies an area of 301 hectares (ha) with 101.8 ha permitted for landfilling. The approximate Site location is shown on **Figure 1**.

The Site is located within a dominantly clayey to silty aquitard that extends to a depth of between 23.4 and 30.8 metres (m) below the Site. Landfill waste at the Site is located in two (2) areas: 1) the Existing Landfill, and 2) the Expansion Landfill. The Existing Landfill is comprised of Cells 3 through 12, as well as the West Cell and South Cell. As of November 16, 2009, waste disposal activities commenced in the Expansion Landfill. The Expansion Landfill consists of Cell 1, Cell 2, Cell 4, and Cell 6A. The waste cell designations and other features of the Existing Landfill are shown in **Figure 2**.

The South Cell of the Existing Landfill consists of waste landfilled into trenches of various widths and depths excavated into the clayey soil. Three (3) finger drains that extend through the trenches provide gravity drainage to the perimeter maintenance holes for leachate collection. The remainder of the waste footprint contains waste trenches, as well as newer waste cells constructed with re-compacted clayey liners and, in some cells, waste underdrains.

Waste within the Expansion Landfill, to the west of the Existing Landfill, will extend to an average depth of 15 m below existing grade. Leachate is managed with a liner system that directs leachate toward dedicated leachate pumping stations. The liner system consists of a primary drainage layer below the waste to collect leachate, an underlying recompacted clayey liner (primary liner), then a secondary drainage layer for leak detection and contingency use, which is all underlain by a thick natural barrier of clayey soil (secondary liner).

Surface water flow at the Site is ephemeral, with flow that typically occurs after snowmelt or prolonged periods of precipitation. Runoff from most of the east half of the Existing Landfill flows to Sedimentation Pond 1 (SP1), while runoff from the northern portion of Cell 11, and the west half of the Existing Landfill from north of approximately the Cell 8/6 boundary, flows to Sedimentation Pond 4 (SP4). Runoff from most of Cell 6 and the remaining west half, to approximately the middle of the South Cell of the Existing Landfill is directed to Sedimentation Pond 2 (SP2). Runoff from the southern portion of the South Cell flows to sedimentation Pond 1 (SP1). Sedimentation Pond 3 (SP3) captures runoff from the northwest quadrant of the Expansion Landfill and therefore, runoff from the Poplar System would not flow through SP3.

Leachate generated at the Site is managed by: 1) on-Site disposal with phytoremediation using poplar trees; and 2) by transport off-Site for treatment and disposal. The Poplar System, in its expanded form of 9.3 ha, became operational on September 27, 2017. In 2023, leachate was managed for on-Site disposal from May 2 to October 12 during the irrigation season (May 1 to October 15, 2023).

Leachate phytoremediation at the Site can occur in the area noted below, which is shown in **Figure 2**.

1.2 Purpose and Scope

The purpose of the Poplar System Monitoring Program is outlined below.

- To evaluate the effectiveness of the Poplar System for the phytoremediation of leachate.
- To assess potential effects to surface water, soil, and air quality as a result of operating the Poplar System.
- To evaluate the Poplar System Monitoring Program and to recommend improvements, where required.

The Poplar System Monitoring Program involves a data collection component, a comprehensive analysis and interpretation component, as well as a reporting component. The monitoring components completed in 2023 are reflective of the period during which the Poplar System was operational.

1.3 Poplar System Regulatory Framework

The Poplar System is operated in conformance with the regulatory approvals noted below. Copies of the relevant ECAs and their amendments are provided in **Appendix A.**

- Amended Environmental Compliance Approval (ECA) No. A032203, dated December 16, 2023. It is noted that during the 2023 calendar year, WM was required to conform to the Amended ECA dated December 19, 2020, then as amended on February 4, 2023, and then as further amended on December 16, 2023 (Waste ECA).
- Amended ECA for Industrial Sewage Works No. 2403-BE6LZ4, dated August 21, 2019 (Sewage ECA).
- Permit-To-Take-Water (PTTW) No. 4682-BLJRYJ, dated November 8, 2021 for the removal of surface water from four (4) Sedimentation Ponds and the dewatering of the Secondary Drainage Layer (SDL) for the Expansion Landfill.
- MECP Letter entitled "Request for Modification to Surface Water Monitoring/Assessment Process at Twin Creeks Landfill, dated February 27, 2014" (2014 MECP Letter).

Operation and monitoring of the Poplar System was completed during 2023 in accordance with conditions of the Waste ECA that relate to monitoring (Condition 8.7) and reporting requirements (Conditions 15.4 to 15.7), as well as the relevant monitoring requirements of the Sewage ECA and the PTTW.

Throughout 2023, quarterly monitoring reports were submitted to relevant stakeholders within 60 days following the last day of the previous quarter in accordance with Condition 15.4 of the Waste ECA. Volume 3 of the 2023 Fourth Quarter and Annual Monitoring Report (2023 Annual Report) satisfies the reporting requirements for both the fourth quarter (Q4) of 2023 (October 1 to December 31) and 2023 Poplar System monitoring period.

1.4 Poplar System Design and Operation

The details of the expanded Poplar System at the Site are provided within Items 63 through 65 in Schedule 'A' of the Waste ECA. The Poplar System was initially operated as a pilot study from 2003 through 2007, at which time it became approved as an operational leachate phytoremediation system in 2008.

In 2010, an application was submitted to the MECP for an increase in the area of the Poplar System over the waste footprint of the Existing Landfill. The application was approved in 2011 and the Poplar System area and monitoring program were revised. The approved leachate application area is about 9.3 ha in area, as shown in **Figure 2**.

The Poplar System, in its expanded form, became operational on September 27, 2017. The expanded Poplar System consists of four (4) zones, with each zone consisting of 40 to 50 rows of trees, planted in an east-west directional pattern, as shown in **Figure 3**. Trees in each row are separated by a spacing of approximately 0.6 m and rows are approximately 3 m apart. Each row is approximately 186 m in length. The expanded Poplar System includes similar infection-resistant poplar tree hybrids to the original Poplar System, as well as the planting of willow trees.

Leachate to be applied to the Poplar System is transferred from the Equalization Tank, which receives leachate from both the Existing and Expansion Landfills, as well as condensate from the landfill gas extraction system, and directly from the leachate maintenance holes of the Existing Landfill, to a holding tank system [two 50 cubic metre (m^3) tanks and two 100 m^3 tanks)] located near the southwest corner of Zone 1. Leachate is pumped into this holding tank system for storage and gravity drains to a pumping station for transfer to the Poplar System. The leachate is then pumped through the network of distribution piping for drip irrigation.

For strong strength leachate, such as collected from MH18, it may require mixing with surface water, potable water, or weaker strength leachate (e.g., monofill cell leachate) such that quality of the irrigation liquid satisfies the relevant concentration strength target for the poplar trees. The liquid for mixing with the leachate is typically obtained from the municipal water supply system (from an on-Site fire hydrant near Sedimentation Pond 1 (SP1)), temporary water storage area(s), surface water sumps, or weaker strength leachate (i.e. from monofill Cells 8, 10, and 12), or other locations as operations permit.

1.5 Precipitation Data

A summary of precipitation data for the 30-Year Normals (1961-1990, 1971-2000, 1981-2010, and 1991-2020) and the 1995 through 2023 annual climatic data for the area around the Site is provided in **Table B- 1**, **Appendix B**. The 30-year normal and data to 1996 were collected at the Strathroy Climatological Station. Data from 1997 onward were collected from the Strathroy-Mullifarry Climatological Station, which is the nearest Environment Canada climatological station to the Site.

The 2023 climatic data for the local Strathroy-Mullifarry Climatological Station are presented in **Table B-2**, **Appendix B**. Precipitation data from the on-Site climatological station from January 1 to December 31, 2023, are also provided in **Table B-3**, **Appendix B**. A total of approximately 906.2 millimetres (mm) of precipitation was recorded from the on-Site climatological station during 2023, while the Strathroy-Mullifarry Climatological Station recorded approximately 1,140.4 mm of precipitation in 2023.

Relative to the 30-Year Normal (1991-2020), 2023 was wetter than normal as recorded at the climatological station. The 2002 to 2023 on-Site precipitation data from January 1 to December 31 indicated that the yearly precipitation received at the Site was consistently less than the regional total. For example, the precipitation recorded from the on-Site climatological station in 2023 was approximately 20.5 % less than what was measured

at the Strathroy-Mullifarry Climatological Station. This pattern of annually less precipitation recorded at the Site than recorded regionally, has typically been observed since on-Site precipitation monitoring began in 2003 (2003 was first full year of monitoring).

Based on the available historical data from the Environment Canada climatological stations, there is typically a water deficit (evapotranspiration exceeds precipitation) from May through September. Therefore, there is a low potential for overland flow and an increase in infiltration rates during this period, which is beneficial for the operation of a Poplar System. For the period from October through April, typically there is a water surplus (precipitation exceeds evapotranspiration) results in a greater potential for overland flow and a decrease in infiltration rates.

2 MONITORING METHODS

The Poplar System Monitoring Program completed for the monitoring period from January 1 to December 31, 2023, is outlined in **Tables 1** and **2**.

The monitoring components completed in 2023 are reflective of the period during which the Poplar System was operational. For the monitoring components completed, the monitoring methodology followed the protocols outlined for the Poplar System, which are provided in **Appendix C**.

Throughout 2023, the routine quarterly surface water monitoring component of the Poplar System Monitoring Program was completed for precipitation events in conjunction with the routine quarterly surface water monitoring of the Compliance Monitoring Program for the Site. Precipitation event monitoring is completed once per calendar quarter in response to greater than 10 mm of precipitation in a 24-hour period. The surface water storm event monitoring (≥ 25 mm in 24 hours) was required to be completed during the operation of the Poplar System in 2023, which was between May 2 and October 12.

A quality assurance and quality control (QA/QC) program was followed for each of the monitoring tasks completed in 2023, where required. QA/QC findings are discussed in **Section 0**.

2.1 Irrigation Application

In 2023, irrigation liquid was applied to the poplar trees intermittently for a total of 77 days from May 2 to October 12. Per the Waste ECA, the last approved day to apply irrigation liquid to the Poplar System is October 15. The volume of irrigation liquid applied was monitored daily by a flow meter. The volumes of irrigation liquid applied are discussed in **Section 4.1**.

The irrigation liquid applied to the Poplar System during 2023 was approximately 100% leachate by concentration (based on the target leachate concentrations) and 100% leachate by volume. Monthly samples of the irrigation liquid applied during the 2023 irrigation season were collected from the holding tank as required.

The collected samples were submitted to Bureau Veritas Inc. of Mississauga, Ontario (Bureau Veritas) for analysis of the required parameters. Bureau Veritas is a Canadian Association for Laboratory Accreditation (CALA) certified environmental laboratory. Irrigation quality findings are discussed in **Section 4.2**.

2.2 Liquid Measurements

Leachate levels were measured at the required leachate monitoring wells and maintenance holes as part of the Site operations on May 1 and November 1, 2023, with findings presented in **Section 5.1**.

2.3 Soil Monitoring

During the fall of 2023 on September 12, a soil sample was collected within each zone of the Poplar System from a depth between ground surface and 0.6 m to 0.9 m below ground surface (mBGS). The collected samples were submitted to Bureau Veritas for analysis.

During 2023, soil electrical conductivity (EC) was measured weekly in the Poplar System during system operation, per Condition 8.7 of the Waste ECA. The EC measurements were taken at five (5) locations in the Poplar System. At each location and for each event, EC measurements were taken along a poplar tree row near a drip emitter, as well as between poplar tree rows. At each measurement location, EC measurements were taken at depths of 25 and 150 mm below ground surface.

Soil monitoring findings are discussed in **Section 5.2**.

2.4 Leaf Tissue Sampling

Leaf tissue samples were collected on September 19, 2023. The protocol for leaf tissue sample collection involved the accumulation of at least 200 grams (g) of leaf tissue from various trees.

Within each zone of the Poplar System, one (1) composite sample was prepared from the upper canopy (top of tree) and one (1) composite sample was prepared from the lower canopy (base of tree). Samples were submitted to Bureau Veritas for analysis.

Leaf tissue monitoring findings are discussed in **Section 5.3**.

2.5 Stem Core Testing

To assess leachate constituent concentration accumulation within the tree trunk tissue, stem core samples are collected annually during operation of the Poplar System. In 2023, stem core sample collection was completed on September 19. Stem core samples were collected from one (1) location within each zone of the Poplar System. As stem core removal may kill a small diameter tree, the samples were obtained from the trees removed to investigate root depth penetration. Samples were collected from a location equivalent to about 1.5 m above the ground surface (mAGS). Samples were submitted to Bureau Veritas for analysis.

Stem core monitoring findings are discussed in **Section 5.4**.

2.6 Root Tissue Testing

To compare leachate constituent concentration accumulation within the poplar tree leaf tissue, stem, and roots, root tissue samples are collected annually. In 2023, root tissue sample collection was completed on September 19. Root tissue samples were collected from one (1) location within each zone of the Poplar System. The root tissue samples were collected from the trees removed to investigate root depth penetration. Samples were submitted to Bureau Veritas for analysis.

Root tissue monitoring findings are discussed in **Section 0**.

2.7 Visual Assessment

A visual assessment of the Poplar System was completed on September 27, 2023. The assessment considered the following characteristics.

- Tree diameter & height
- Crown density
- Leaf size and discolouration
- Insect infestation
- Depth of root penetration
- Crown dieback
- Abnormally shaped leaves
- Length of new tree branch extension roots
- Tree mortality
- Foliage transparency
- Deformed growth

As part of the visual assessment, one (1) tree from each zone of the Poplar System was cut down, roots were excavated, and soil was removed to expose the roots. The depth of the taproot and brace roots for the tree excavated were measured and recorded. The visual assessment also included an inspection of the brace roots of the trees for evidence of animal damage.

Consistent with the assessment protocols, a visual assessment was completed for select trees within each zone of the Poplar System. The trees are staked and flagged for follow-up inspections in consecutive years. Visual assessment findings for the trees are presented in **Section 5.6**.

2.8 Daily Inspections

Daily inspections were completed during operation of the irrigation system for evidence of ponded water and/or leachate seeps in the land application area. Tree undergrowth and olfactory ambient air odour assessments were completed at the time of the inspections. Inspection records are maintained on file by RWDI.

2.9 Surface Water Sampling

The 2023 surface water monitoring program for the Poplar System included: 1) routine quarterly precipitation events (> 10 mm in 24 hours) as part of the Compliance Monitoring Program; and 2) storm events (> 25 mm in 24 hours) to be completed twice during system operation. The surface water monitoring stations for the Poplar System include SS14A, SS14B, and SS15A, which are shown in **Figure 2**.

With the activation of the expanded Poplar System in 2017, the locations of monitoring stations SS14A and SS14B, were relocated to account for the larger irrigation area of the expanded Poplar System. Historical monitoring positions for these monitoring stations are discussed in the 2018 Annual Poplar System Report. SS14A is in a location within the east ditch upstream of the expanded Poplar System. SS14B is in a location within the west ditch adjacent to Zone 3 of the Poplar System. Monitoring station SS15A, which was created in September 2009, is located downstream of the Poplar System within the perimeter ditch, prior to discharge into SP1. The current surface water monitoring station locations for the Poplar System are shown in **Figure 2**.

A summary of the surface water monitoring stations, which formed part of the 2023 Poplar System Monitoring Program, is presented below.

Monitoring Station Designation	Monitoring Station Description
SS14A (former SS14)	On-Site flow within East Ditch of the Existing Landfill, upstream of the Poplar System.
SS14B (former SS15)	On-Site flow within West Ditch of the Existing Landfill, adjacent to Zone 3 of the Poplar System.
SS15A	South Ditch of the Existing Landfill and inlet point to Sedimentation Pond 1, downstream of Poplar System.

Surface water monitoring dates are presented in the summary below with the associated precipitation totals, as recorded from the on-Site climatological station.

Surface Water Monitoring Date	Stations Sampled	Previous Five Days of Precipitation (mm)	Task Description
February 10, 2023	SS14A, SS14B, SS15A	0.2, 0, 0, 7.2, 10.8	**First Quarter:** 10.8 mm precipitation event monitoring. Irrigation system was not active until May 2.
April 4, 2023	SS14A, SS14B, SS15A	5.6, 43.8, 10.8, 0, 29.6	**Second Quarter:** 29.6 mm precipitation event monitoring. Irrigation system was not active until May 2.
July 3, 2023	SS14B, SS15A	0.4, 5.0, 0, 3.8, 20.4	**Third Quarter:** 20.4 mm precipitation event monitoring. Irrigation system was active until October 12. SS14A did not have flow conditions for sampling.
July 7, 2023	SS14A, SS14B, SS15A	20.4, 0.2, 0, 0, 29.0	**Third Quarter:** 29.0 mm precipitation event monitoring (SS14A) and storm event monitoring. Irrigation system was active until October 12.

Surface Water Monitoring Date	Stations Sampled	Previous Five Days of Precipitation (mm)	Task Description
July 13, 2023	SS14A, SS14B, SS15A	6.4, 0.4, 0, 7.8, 30.4	**Third Quarter:** 30.4 mm storm event monitoring. Irrigation system was active until October 12.
November 2, 2023	SS14A, SS14B, SS15A	1.8, 4.8, 0.2, 0.4, 14.0	**Fourth Quarter:** 14.0 mm precipitation event monitoring. Irrigation system was active until October 12.

For the above-noted monitoring events, when flowing surface water conditions were observed, surface water samples were collected directly from the watercourse with an unpreserved laboratory prepared sample bottle. Where required, this water was transferred to sample bottles that contained preservatives. No field filtering was required or completed.

During the irrigation season in 2023, storm event monitoring was completed on two (2) occasions, in accordance with the Waste ECA. The events were completed on July 7 and July 13, 2023, in response to > 25 mm of precipitation in 24 hours. It is noted that storm event monitoring was completed throughout the permitted irrigation season (i.e., following what was ultimately the last day of irrigation on October 12, 2023).

It is noted that based on historical observations, there are commonly precipitation events generating greater than 10 mm of precipitation in a 24-hour period that do not generate flowing conditions at a given sampling station during the drier months from late spring to early fall.

The 2023 surface water findings for the Poplar System Monitoring Program are discussed in **Section 5.7**. The 2023 surface water findings for the Compliance Monitoring Program are presented under separate cover in the *2023 Compliance Monitoring and Operations Program Report, Twin Creeks Environmental Centre Site, Volumes 1 to 2* (RWDI AIR Inc., 2023).

2.10 Field QA/QC Sampling

The field sampling QA/QC program is presented in the following summary. It is noted that vegetation samples, by nature of their matrix, cannot have a field duplicate created.

Media	Monitoring Event	Original Sample ID	Field-Prepared Duplicate Sample ID
Soil	September 12, 2023	S4	SODUP
Surface Water	February 10, 2023	SS15A	PSSWDUP
	April 4, 2023	SS15A	PSSWDUP
	July 3, 2023	SS15A	PSSWDUP
	July 7, 2023	SS15A	PS-STORMDUP
	July 13, 2023	SS15A	PS-STORMDUP
	November 2, 2023	SS14B	PSSWDUP

3 QUALITY ASSURANCE AND QUALITY CONTROL EVALUATION

The QA/QC program for the monitoring completed in 2023 included field-prepared duplicate samples, comparisons with field-determined analytical results, laboratory-prepared duplicates, matrix spikes, duplicates, percent recoveries of analyses, and data review.

The laboratory analyzed several control samples to verify that the analytical equipment was functioning properly and reporting results accurately at the time of analysis for the samples collected at the Site. The control samples had an expected target value, which was compared against pre-determined data quality objectives. For the laboratory control samples, the results were within acceptable laboratory data quality criteria.

For the field-prepared duplicate samples, the analytical results for the required parameters of analysis, completed as detailed in **Section 2.10,** were evaluated for the relative percent difference (RPD) of parameter concentrations using the United States Environmental Protection Agency (USEPA) National Functional Guidelines (US EPA 542-R-20-006 and US EPA 540-R-005) as a general QA/QC RPD screening mechanism. The RPD screening mechanism is such that for concentrations greater than five (5) times the laboratory reportable detection limit (RDL), a concentration difference of less than or equal to 20% is deemed acceptable. For concentrations less than or equal to five (5) times the RDL, a concentration difference of equal to or less than the RDL is deemed acceptable. Where an exceedance of the general QA/QC RPD screening mechanism is identified, the results for the required parameters of analysis are evaluated against the applicable performance standards for sample duplicates noted in Tables 5.1 to 5.15 of the *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*, as prepared by the Ministry of the Environment, Conservation, and Parks (MECP), dated March 8, 2004, and amended to February 19, 2021. For the results found to be outside of the tolerance of each QA/QC evaluation, a laboratory data quality review (DQR) of the results is completed by the laboratory to verify that the concentrations are accurate as presented and are within acceptable laboratory data quality criteria.

Laboratory analytical results for soil and surface water are provided in **Appendix G** and **Appendix E**, respectively.

3.1 Soil QA/QC

For the 2023 soil sampling event, a QA/QC evaluation was completed for the analytical results of the original sample and its respective field-prepared duplicate sample, as outlined in **Section 2.10**. The results of the original and duplicate sample satisfied the criteria of the QA/QC evaluation, with exceptions presented below.

Date	Sample Designation (Original / Duplicate)	Parameter	QA/QC Evaluation
September 12, 2023	S4 / SODUP	Nitrogen	RPD > 20%
		Calculated Total Kjeldahl Nitrogen	RPD > 20%
		Chloride	RPD > 20%
		Sulphate	RPD > 20%
		Acid Extractable Titanium	RPD > 20%
		Available Potassium	RPD > 20%
		Soluble Potassium	RPD > 20%

A laboratory DQR of the above-noted QA/QC exceptions was completed and the results were verified by the lab to be accurate as presented. Therefore, although a QA/QC exception was identified, the relevant original sample results were deemed to be representative of conditions at the time of sampling. As such, the original sample results were included into the database for interpretive purposes.

3.2 Surface Water QA/QC

For the 2023 surface water monitoring events, QA/QC evaluations were completed for the analytical results of the original samples and their respective field-prepared duplicate samples, as outlined in **Section 2.10**. The results of the original and duplicate samples satisfied the criteria of the QA/QC evaluations, with the exceptions presented below.

Date	Sample Designation (Original / Duplicate)	Parameter	QA/QC Evaluation
February 10, 2023	SS15A / PSSWDUP	Total Ammonia	Difference > RDL
July 3, 2023	SS15A / PSSWDUP	Total Iron	RPD > 20%
July 13, 2023	SS15A / PS-STORMDUP	Dissolved Chloride	RPD > 20%

A laboratory DQR of each of the above-noted QA/QC exceptions was completed and the results were verified by the lab to be accurate as presented. Therefore, although a QA/QC exception was identified, the relevant original sample results were deemed to be representative of conditions at the time of sampling. As such, the original sample results were included into the database for interpretive purposes.

In summary, acceptable QA/QC data for the field-prepared duplicate samples, laboratory duplicates, and percent recovery of analysis indicated that the detected constituent concentrations were accurate and reflected actual conditions at the time of sample collection.

4 SYSTEM IRRIGATION AND OPERATIONS

4.1 Irrigation Quantity

In 2023, irrigation liquid was applied to the poplar trees intermittently for a total of 77 days between May 2 and October 12. Irrigation details are provided in **Appendix D**. **Table D-1** presents a summary of the monthly and annual irrigation liquid volumes for the Poplar System. **Table D-2** presents a summary of application rates. **Table D-3** presents as summary of the annual volume of leachate managed on-Site by the Poplar System and transported off-Site for disposal.

The irrigation liquid applied to the Poplar System during 2023 (a total of 8,658.85 m^3) was approximately 100% leachate by concentration (based on the target leachate concentrations) and 100% leachate by volume.

A portion of leachate collected from the landfill leachate management system was transported off-Site for disposal at the Chatham Water Pollution Control Plant. In 2023, a total of 61,765,490 m^3 of leachate was removed from the Site for off-site treatment and disposal. Therefore, the total volume of leachate extracted for treatment

(applied to the Poplar System and removed for offsite treatment) during 2023 was 70,424,339 m^3. Since activation of the initial Poplar System (2003 to 2014 for the initial system and 2017 to 2023 for the expanded system), 60,828.21 m^3 of leachate has been managed by phytoremediation at the Site.

The 2023 total annual irrigation rate (applied leachate and water) was approximately 81.2 millimetres per square metre (mm/m^2) for the 9.3 ha Poplar System. The application rate is less than the available annual irrigation potential of 476 mm/m^2, as detailed in the *Expansion of Poplar Cap Irrigation System for Existing Waste Disposal Area* report, as prepared by GENIVAR Consultants LP and dated January 2010. The available annual irrigation potential of 476 mm/m^2 is based on a predicted irrigation period of 105 to 120 days, which accounts for days with precipitation. Therefore, on average, the available daily irrigation potential is 4 mm/m^2 to 4.5 mm/m^2. As irrigation liquid was applied to the poplar trees intermittently for a total of 77 days in 2023, the average daily irrigation rate was approximately 1.1 mm/m^2. The total volume of liquid (including irrigation liquid and precipitation) applied to the Poplar System in 2023 was approximately 590.4 mm/m^2.

The application of leachate was greater in 2023 than in 2022, which was attributed to the increased days of operation in 2023 (77 days) compared to 2022 (70 days).

4.2 Irrigation Quality

Irrigation liquid monitoring for quality in consideration of application rates to the Poplar System (specifically the operational loading to the poplar trees) is completed monthly during the irrigation season. As irrigation liquid was applied during the irrigation period from May 2 to October 12, 2023, monthly samples of the irrigation liquid were collected from the holding tank from May to October. The analytical results for the irrigation liquid samples are presented in **Tables E-1** to **E-3**, **Appendix E**. The Laboratory Certificates of Analysis for the 2023 samples are provided in **Table E-4**, **Appendix E**.

The 2023 analytical results for the irrigation liquid were compared to the target leachate concentrations for irrigation loading to the poplar trees. In 2023, most parameter concentrations within the irrigation liquid satisfied the 100% leachate target concentrations, with two (2) exceptions noted in **Table E-1** and **E-2, Appendix E** and as discussed herein. One of the parameters for each the June and October 2023 samples were determined to have exceeded the 100% leachate target concentrations. The June 2023 exceedance was exclusively a nutrient-related constituent (ammonia). The October 2023 exceedance was electrical conductivity (EC). Where parameters were found to be greater than their respective 100% target leachate concentration, they were verified to be within their respective historical range, with the exception of the October 2023 EC value, which was a historical high. As the poplar trees did not indicate any level of health stress in 2023, the aforementioned analytical results did not appear to pose a concern to the poplar trees.

For comparative purposes, the 2023 irrigation liquid analytical results were also compared to guidelines for metals and general parameters in irrigation water from the Canadian Council of Ministers of the Environment (CCME, 2004) (CCME Guideline). In addition, the results were also assessed against values for chloride irrigation of salt tolerant poplar trees (Shanon et al., 1998). The CCME Guideline criteria are presented in **Table 4** and **Table E-1**, **Appendix E**. It is noted that the CCME Guideline criteria are for vegetable crops do not represent upper toxicity limits for the poplar trees, however, they can be utilized as a guide for assessing chemical loading to the poplars. The analytical results which were found to be greater than their respective CCME Guideline criterion are highlighted in **Table E-1, Appendix E.** In general, the irrigation liquid's quality satisfied the CCME Irrigation Water

Guidelines with the exception of boron (May through August, and the October samples). However, as discussed herein, there was not any evidence of tree stress, such as but not limited to, deformed growth or leave discolouration, that indicated the boron concentrations detrimentally affected tree health.

For the organic parameters tested, there is only a 100% leachate target concentration for the total BTEX compounds (benzene, toluene, ethylbenzene, and xylenes). The concentrations of total BTEX detected in 2023 were less than the respective 100% leachate target concentration. There was not any evidence of tree stress, such as but not limited to, deformed growth or leave discolouration, that indicated the BTEX concentrations detrimentally affected tree health. The organic analytical results are presented in **Tables E-2** and **E-3**, **Appendix E.**

4.3 Operational Information

During 2023, the Poplar System did not operate during precipitation events or if soil conditions were excessively wet. Per Condition 8.7.c. of the Waste ECA, the Poplar System was deactivated a minimum of one (1) hour prior to precipitation events forecast in excess of 12.5 millimetres per hour (mm/hr).

The undergrowth of the Poplar System was controlled to reduce the activity of vermin that could damage the trees and drip irrigation lines. During the inspections completed for the land application area in 2023, vegetative undergrowth consisted primarily of grass and sparse weeds. Weed control is normally completed during the growing season by herbicide spraying under the direction of the St. Clair Region Conservation Authority (SCRCA). Records of application rates and chemicals used are maintained on file with SCRCA.

As discussed, the Poplar System in its expanded form of 9.3 ha became operational on September 27, 2017. Per the Waste ECA, the irrigation season for the Poplar System is permitted to run from May 1 to October 15. In 2023, the expanded Poplar System was operated during the irrigation season between May 2 and October 12, 2023.

5 MONITORING RESULTS

5.1 Liquid Levels

Leachate level monitoring points in and around the Poplar System historically included MH16, MH17, MH18, OW22A-10, and OW53-10. As the expanded Poplar System was constructed over more cells of the Existing Landfill, additional monitoring points were included for the assessment of leachate liquid levels. The monitoring points include monitoring well OW51A, maintenance holes MH3SA, MH3SB, MH3SC, MH3SD, MH3SE, MH3SF, MH4A, and MH4B, as well as the West Central Fill Area (Sump).

In consultation with the Landfill Engineer and Hydrogeologist Reviewers of the Technical Review Team (TRT), WM had agreed post-2016 to augment the existing leachate level monitoring program for the Site with the installation of additional leachate level monitoring wells within select waste cells of the Existing Landfill. The supplemental leachate level monitoring locations (LW1 to LW6) were installed within the Existing Landfill in 2017, at the locations shown in **Figure 2**. These monitoring wells are to be monitored for levels semi-annually together with

the already established semi-annual spring and fall monitoring events for the Site to provide further insight toward leachate patterns within select waste cells of the Existing Landfill. The supplemental leachate monitoring wells installed in and around the Poplar System include LW4 (Cell 4), as well as LW5 and LW6 (South Cell).

Leachate levels for the leachate monitoring wells and maintenance holes were measured on May 1 and November 1, 2023. The 2023 and historical leachate elevations for the aforementioned monitoring points are presented in **Table F-1** and shown in **Figures F-1** to **F-5**, **Appendix F**.

For the leachate monitoring points located at/near the top of cap surface in the vicinity of the Poplar System, a summary of the leachate level depth below the top of cap surface during 2023 is provided below.

Application Area	Approximate Cap Surface Elevation (mASL)	Range of Depth Below Cap Surface (m)
South Cell	243.9	5.09 to 5.38
Cell 3S	249.0	4.52 to 5.68
Cell 3	249.8	12.08 to 12.81
Cell 4	245.1	4.83 to 4.94
West Cell	248.8	3.35 to 4.72

Notes: 1) "m" denotes metres. "mASL" denotes metres above sea level.
2) Detailed leachate elevations are provided in **Appendix F**.
3) Approximate Cap Surface Elevation is based on the approximate cap surface elevation at each relevant monitoring point within its respective application area that exists on top of the landfill.

Based on the leachate levels measured historically and in 2023, the generalized pattern of decreasing leachate elevations from spring to fall within each cell below the cap surface within the footprint of the Poplar System indicates that the application of irrigation liquid is consumed by the trees and is therefore, not causing leachate mounding within the waste.

One (1) exception to the generalized pattern was noted in the western portion of Cell 3S (MH3SC and MH3SD), where leachate elevations slightly increased from May 2023 to November 2023. It is noted that the pump in MH3SC frequently cycles on and off in a given day, and therefore the timing of leachate level measurement can affect the overall leachate volume interpretations from this manhole. Therefore, conclusions drawn from the leachate levels from this manhole should be interpreted with caution.

During 2023, the leachate elevations within select maintenance holes were generally drawn down throughout the majority of application period and fluctuated significantly as a result of leachate extraction for irrigation to the Poplar System. With respect to draw down as a result of leachate extraction, the leachate elevations in leachate monitoring wells LW1 to LW6 did not definitively correlate to the elevations in their counterpart maintenance hole (within the same waste cell). This observation indicates that leachate within the waste mound that may not be directed to, or captured by, the leachate underdrain collection system (i.e. perched, low hydraulic conductivity, or some other cause) is therefore, not having an effect to the groundwater system (i.e. potentiometric pressures). This effect is observed in waste cells that are both positioned under and not under the Poplar System, indicating that the operation of the Poplar System is not the cause of this leachate elevation differential effect.

There was no observable negative affect observed to the sideslope of the Existing Landfill, such as leachate seeps, soil staining, stress vegetation, soil slumping or erosion, as a result of this leachate elevation differential. At this time, the exact cause of the leachate differential is unknown, but it is not causing a detrimental effect to the operation of the Poplar System, excluding limiting leachate volume availability, and is not causing visible stress to the landfill cap and as such does not represent an immediate concern. Ongoing leachate level monitoring will enable an evaluation if this leachate differential is a long-term (i.e. over 5 years) situation or has the potential to represent a concern (i.e. increasing trends with time, or stress to the landfill cap, etc.).

5.2 Soil Monitoring

5.2.1 Soil Quality

The laboratory analytical results for the soil samples collected on September 12, 2023, are presented in **Table G-1**, **Appendix G**. The Laboratory Certificates of Analysis for the 2023 samples are provided in **Table G-3**, **Appendix G**.

Soil sampling was completed in September 2023 to evaluate select metals and other inorganic constituent concentrations in comparison to the MOE *Guidelines for the Utilization of Biosolids and Other Wastes on Agricultural Land*, dated March 1996.

The results for the select metals and other inorganic constituents were reasonable and showed results generally consistent with the heterogeneity of soils, with variable results between Zones 1 through 4, with some exceptions. The concentrations for most parameters were similar with some increasing and some decreasing in 2023 compared to the concentrations in 2022. Similar to historical data, slightly elevated Nickel concentrations were noted for the sample collected from Zone 3 in 2023. Also, similar to 2022, a slightly elevated boron concentration was noted for the sample collected from Zone 4. A medium-level sodium adsorption ratio (SAR) was noted for the sample collected from Zone 1, and high-level SARs were noted for the samples collected from Zones 3 and 4 in 2023. This attributable to elevated sodium concentration levels, in comparison to historical ranges. The noted sodium concentrations as well as the nickel and boron concentrations have not had a detrimental effect to tree health based on visual assessment, as outlined herein.

5.2.2 Soil Electrical Conductivity

During 2023, soil EC was measured weekly in the Poplar System during system operation per Condition 8.7 of the Waste ECA. The soil EC measurements are presented in **Table G-2**, **Appendix G**. To evaluate the EC results, the geometric mean of the measurements for each event were taken for: 1) the measurements taken along a poplar tree row near a drip emitter (location A); and 2) the measurements taken centrally between poplar tree rows (location B). A plot of the geometric mean of the EC results for the expanded Poplar System is provided in **Figure G-1**, **Appendix G**. The EC results were generally greater at location A than at location B.

Similar to past years, in 2023 the geometric mean of the initial EC results at the beginning of the irrigation season (on May 2nd) was notably less than the geometric mean from the end of the 2022 season, as presented in **Figure G-1, Appendix G.** This decrease is indicative of natural soil flushing occurring repeatedly during off-season precipitation and snow-melt events.

Overall, based on the EC results in 2023, the application of irrigation liquid increases the EC of the shallow soil in the Poplar System. Generally, following the irrigation season, the EC results exhibit a decreasing trend into the spring of the subsequent irrigation season. This indicates that the EC results are primarily only elevated during active irrigation and that the application of irrigation liquid is not attributing to a build-up of EC in the shallow soil of the Poplar System over time. As the poplar trees did not exhibit any indication of health stress in 2023, the soil EC results did not appear to pose a concern to the poplar trees.

5.3 Leaf Tissue Sampling

Leaf tissue samples were collected on September 19, 2023. The laboratory analytical results for the leaf tissue samples are presented in **Tables H-1** and **H-2**, **Appendix H**. Indicator values are provided for guidance in evaluating acceptable tissue quality. These indicator values were established in 2002 during consultation with the MOE and considered a Manitoba Soil Fertility Guide as a guidance document for phytoremediation. The Laboratory Certificates of Analysis for the 2023 samples are provided in **Table H-5**, **Appendix H**.

In 2023, the leaf tissue results showed similar concentration loading in the upper and lower portions of the tree canopy, with the exception of boron, which generally showed higher concentrations in the upper canopy. Also in 2023, concentrations of zinc observed within the upper canopy of Zones 3 and 4 were noted to be elevated in comparison to historical values. The concentrations for most parameters were similar with some increasing and some decreasing in 2023 compared to the concentrations in 2022. As the poplar trees did not exhibit any indication of health stress in 2023, the relevant concentrations within leaf tissue samples did not appear to pose a concern to the poplar trees.

To evaluate the leaf tissue quality and potential environmental effects as a result of dispersal as windblown material, the relevant constituent concentrations were compared to the Ontario Compost Quality Standards, as prepared by the MOE and last revised July 25, 2012. Of the tested parameters, the leaf tissue analytical results satisfied their respective composting guidelines, which indicates that the leaves were suitable to be used as compost and/or were acceptable to be left to naturally decay as there were no anticipated detrimental effects to local soil and water resources.

5.4 Stem Core Testing

In 2023, stem core sample collection was completed on September 19. The laboratory analytical results for the stem core samples are presented in **Table H-3**, **Appendix H**. The Laboratory Certificates of Analysis for the 2023 samples are provided in **Table H-5**, **Appendix H**.

The concentrations for most parameters tested for the stem core samples were similar with some increasing, and others decreasing in 2023 compared to the concentrations in 2022. As the poplar trees did not exhibit any indication of health stress in 2023, the concentrations within the stem core samples did not appear to pose a concern to the poplar trees.

5.5 Root Tissue Testing

In 2023, root tissue sample collection was completed on September 19. The laboratory analytical results for the root tissue samples are presented in **Table H-4**, **Appendix H**. The Laboratory Certificates of Analysis for the 2023 samples are provided in **Table H-5**, **Appendix H**.

The concentrations for most parameters tested for the root tissue samples were similar with some increasing and some decreasing in 2023 compared to the concentrations in 2022. It should be noted that more irrigation liquid was applied to the Poplar System during the 2023 season than in 2022. As the poplar trees did not exhibit any indication of health stress in 2023, the concentrations within the root tissue samples did not appear to pose a concern to the poplar trees.

5.6 Visual Assessment

The findings from the visual assessment of select Poplar System trees are presented in **Table I-1**, **Appendix I**. A visual assessment of the Poplar System was completed on September 27, 2023. A summary of the 2023 and historical inspection findings is presented in **Table I-2**, **Appendix I**.

Overall, the tree plot condition within each zone of the Poplar System showed favourable conditions in 2023. The inspection results for the tree and leaf visual assessment were reasonable for six (6) year old trees, with tree heights/diameters and leaf dimensions associatively sized. The trees and leaves appeared healthy in 2023 with no apparent visual disease or toxicity symptoms. For the rows assessed, the average overall tree mortality (37 %) in 2023 was up from 2022 (18 %). These deceased trees will be replaced with new trees during the next scheduled poplar tree planting at the Site (Spring 2024).

Zone One (1) and Zone Two (2), which are comprised of the least developed trees and the slower development of the trees within these zones is mostly attributed to the topographic gradient which causes higher runoff rates, and subsequently less opportunity for irrigation liquid infiltration as well as uptake by the trees. Zone three (3) and Zone four (4), which are comprised of the most developed trees, may start to be experiencing tree growth competition as the trees will compete with each other for more for sunlight, water, air, and nutrients as they grow.

Replacement of irrigation drip lines with solid lines occurred periodically throughout the irrigation season, in order to better manage the application of the irrigation liquid. Ongoing inspections and irrigation system maintenance for system improvements overtime should continue to improve the effectiveness of the system to irrigate greater volumes of leachate each year.

Between 2022 and 2023, the average diameters of the poplar trees inspected showed an increase, which is reflective of the difference in tree diameter measurement technique once the trees are five (5) years old. Prior to year five, the diameter measuring point is to be taken at the bottom third interval of the tree. From year five (5) and older, the diameter is to be measured at approximately chest height (1.3 m). Given the average historical heights presented in **Table I-2, Appendix I,** measurements would have been taken at a height of 0.9 m or lower on each poplar tree up until the 2022 monitoring season. As the poplar trees are now six (6) years old, this was

the second year in which field technicians measured tree diameter at approximately 1.3 m above ground level, which reflects the slight increase in average diameter as presented in **Table I-2, Appendix I**. As the trees generally did not display any signs of stress, the findings will be assessed in more detail in the future for trends as more data is collected in this manner.

Undergrowth and ponding inspections, as well as odour monitoring, are completed monthly during operation of the Poplar System. The undergrowth was generally confined between the tree rows and was groomed on a regular basis by WM. Periodic surface water ponding within the Poplar System area was observed during the permitted irrigation season in 2023. No irrigation liquid application occurred in areas with ponded water, as introduced in **Section 4.1** Notable odours emanating as a result of the operation of the Poplar System were not detected during the daily inspections.

5.7 Surface Water Sampling

The 2023 surface water monitoring program for the Poplar System was completed for monitoring stations SS14A, SS14B, and SS15A. The current surface water monitoring station locations for the Poplar System are shown in **Figure 2**.

Quarterly precipitation event (≥ 10 mm in 24 hours) monitoring was completed in 2023 in February, April, July, and November. Storm event (> 25 mm in 24 hours) monitoring was completed on two (2) occasions during the permitted irrigation season (May 1 to October 15) in 2023. The monitoring for storm events was completed on July 7 and 13, 2023.

Surface water field analytical results are provided in **Table J-1**, **Appendix J**. During the 2023 monitoring events, the surface water temperatures varied between 2.4°C and 32.5°C, which reflected the ambient air temperature during sampling. Field pH, EC, turbidity, and dissolved oxygen values fluctuated with no notable anomalies.

Surface water laboratory analytical results for the monitoring stations around the Poplar System are presented in **Table J-2**, **Appendix J**. **Figures J-1** to **J-4** provide concentration vs. time plots for chloride, boron, nitrate, and total ammonia as these parameters are useful leachate indicators and typically occur at detectable concentrations within the surface water. Laboratory Certificates of Analysis for the 2023 surface water samples are provided in **Table J-3**, **Appendix J**.

5.7.1 Precipitation Event Surface Water Monitoring

In 2023, surface water samples were collected at each of the required monitoring stations as part of the routine monitoring following a precipitation event. The specific monitoring dates for each precipitation monitoring event in 2023 are discussed in **Section 0** and are presented in **Table J-1**, **Appendix J**.

Generally, the analytical concentrations within the surface water fluctuated at the internal assessment monitoring stations found in the on-Site ditch around the Poplar System. For the 2023 routine precipitation monitoring events, most parameter concentrations were similar between monitoring stations SS14A, SS14B, and the downstream monitoring station SS15A.

As apparent in **Figures J-1** to **J-4**, during 2023 the indicator concentrations (i.e., chloride, boron, nitrate, and total ammonia) fluctuated at the surface water monitoring stations SS14A, SS14B, and SS15A, but were generally within their respective historical ranges. At SS15A, new historical highs were observed for nitrate during the Q3 precipitation monitoring event and boron during the Q4 precipitation monitoring event. However, for the nitrate concentrations, they are not a concern as they were down near historical lows by Q4. Further monitoring of SS15A in 2024 will determine if the concentration of boron in Q4 of 2023 is an isolated occurrence. In 2023, elevated, but fluctuating concentrations of chloride and boron continued to be detected at SS14B and SS15A with no discernable trend. Concentrations of total ammonia at SS14B and SS15A, and concentrations of chloride, boron, nitrate, and total ammonia at SS14A were generally near historical lows throughout 2023.

In summary, concentrations of chloride, boron, nitrate, and total ammonia have shown to be generally fluctuating with no trend of note (e.g. increasing or decreasing) at SS14B and SS15A, and generally near historical lows at SS14A.

It is noted that these parameter concentrations appear to be present in the surface water at the relevant locations in part, due to temporary effects of construction and excavation/hauling activities that occurred throughout the year (e.g., effects of erosion from the roadways within the catchment areas of the relevant ditches). This is evidenced by the fact that elevated turbidity values were noted primarily at SS14B and SS15A in comparison to as detected at SS14A. As such, the elevated parameter concentrations are not directly attributed to the operation of the Poplar System, but rather possibly to localized erosional effects from earthworks construction activities. It is noted that the water sources at SS14A and SS15A flow into Sedimentation Pond 1, which based on monitoring, was effective at treating the water to acceptable quality for discharge from the pond.

In addition to the observed water quality patterns described above, other factors were used to evaluate the effectiveness of the Poplar System during operation to treat leachate without unacceptable effects to the natural environment, which include irrigation application control and inspections for stresses in the system. The 2023 irrigation loading by volume (81.2 mm/m^2) to the Poplar System was less than 25% of the target irrigation volume of 476 mm/m^2. There was no observation of irrigation liquid leaving the irrigation system to the surface water drainage ditches. Irrigation liquid was not applied within 1 hour prior to storm events that may be greater than 12.5 mm/hour per Condition 8.7c. of the Waste ECA, or when the field was too wet in consideration of Condition 8.7d of the Waste ECA. In fact, the 2023 irrigation application practices were more conservative than outlined in the Waste ECA. Additionally, there is no evidence of leachate seeps, stressed vegetation, soil staining/erosion or other visual signature of a potential unacceptable leachate effect to the Poplar System (i.e. no stressed trees). Of note, each year WM continues to implement efforts to maintain/increase the ability of the Poplar System to treat irrigation liquid. In recent years, efforts have consisted of replacing deceased trees with new trees each spring (based on visual assessments in September), adding additional topsoil to areas of the Poplar System, altering the intensity of irrigation on a day-to-day basis based on weather and field conditions, etc. WM plans to continue to implement efforts to evaluate operational efficiencies in an effort to increase the ability of the Poplar System to treat irrigation liquid to the system's full irrigation potential. New trees are scheduled to be planted in the Spring of 2024 to replace trees that were observed to be deceased during the September 2023 visual assessment.

In consideration of the aforementioned discussion, it is not entirely known why the surface water at internal assessment monitoring stations SS14B and SS15A showed the noted elevated chemical concentrations, however, the concentrations are not directly attributed to the operation of the Poplar System during 2023. As further

downstream internal assessment monitoring station SP1, as well as downstream compliance assessment monitoring station SS1 had acceptable surface water quality, the noted chemical results at SS14B and SS15A do not represent an immediate concern. The water quality at SS14B and SS15A will need to be evaluated for a continuance of these concentrations or if an emerging trend of concern occurs.

As highlighted in **Table J-2**, **Appendix J,** select concentrations of the additional parameters tested for were greater than their respective Ontario Provincial Water Quality Objectives (PWQO) at the monitoring stations during each monitoring event in 2023. These parameters, in addition to the indicator parameters discussed above, which were found to be greater than their respective PWQO objectives were verified to be within their respective historical ranges (excluding as noted above for SS15A), and therefore do not represent an immediate concern. The evaluation of the effectiveness of the Poplar System to not cause an unacceptable impact to surface water is based on the water quality observed at downstream internal assessment monitoring stations SP1, as well as at further downstream monitoring station SS1, which was observed throughout 2023.

It is noted that surface water sampling protocols for the Poplar System do not include field filtering for dissolved metals and therefore, the resultant metals concentrations reported for surface water are for total metals, which include concentrations that are present within and/or adsorbed to the suspended soil particles.

Of the tested constituents, no organic compounds were detected at the surface water monitoring stations during the quarterly routine precipitation monitoring events in 2023.

5.7.2 Storm Event Surface Water Monitoring

In 2023, surface water samples were collected as part of monitoring following storm events. The monitoring for storm events was completed on July 7 and 13, 2023. For the July 7 and 13, 2023 storm events, samples were collected at each of the required monitoring stations.

It is noted that storm event monitoring was completed throughout the permitted irrigation season (i.e., following what was ultimately the last day of irrigation on October 12, 2023).

As shown in **Table J-2**, select concentrations of the tested parameters were greater than their respective PWQO at the monitoring stations during the monitored storm events in 2023. These parameters are presented in the following summary.

Monitoring Station	July 7, 2023	July 13, 2023
SS14A (Upstream of Poplar System, East Ditch)	Iron, Aluminum, Phosphorus	Iron, Aluminum, Cobalt, Phosphorus
SS14B (Adjacent to Zone 3, West Ditch)	Boron, Iron, Aluminum, Phosphorus	Boron, Iron, Aluminum, Cobalt, Copper, Phosphorus
SS15A (Downstream, Inlet ditch to SP1)	Boron, Iron, Aluminum, Cobalt, Copper, Phosphorus	Boron, Chromium, Iron, Nickel, Zinc, Aluminum, Cobalt, Copper, Lead, Phosphorus, Vanadium

The storm event parameter concentrations that were greater than their respective PWQO in 2023 were within their respective historical range. For the July 7 and 13, 2023 storm events, the parameters that were detected at concentrations greater than their respective PWQO were mainly detected adjacent to (at SS14B) and downstream (at SS15A) of the Poplar System with few parameters being detected upstream (at SS14A) of the Poplar System.

Similar to what was noted in **Section 5.7.1,** throughout 2023, elevated concentrations of boron continued to be detected at SS14B and SS15A during some of the precipitation storm events whereas concentrations generally maintained around their historical lows at SS14A. During the July 7, 2023, storm monitoring event, a new historical high for nitrate was detected at monitoring station SS15A. However, this concentration is not a concern as similar to historical events, the concentration was an isolated occurrence as the nitrate concentration at SS15A was well within the historical range for the second storm event on July 13, 2023, and the 2023 Q4 routine monitoring event. Also, the other PLIL parameters were not elevated, nor showing an increasing trend of concern.

As discussed above, these parameter concentrations appear to be present in the surface water at the relevant locations in part, due to temporary effects of Cell 6 construction and excavation/hauling activities that occurred throughout the year (e.g., effects of erosion from the roadways within the catchment areas of the relevant ditches). This Is evidenced by the fact that elevated turbidity values were noted primarily at SS14B and party at SS15A in comparison to those detected at SS14A. Overall, for the July 7 and 13, 2022 storm events, the parameter concentrations that were greater than their respective PWQO are not directly attributed to the operation of the Poplar System but rather to localized erosional effects from earthworks construction activities. It is noted that these water sources flow into Sedimentation Pond 1, which based on water quality monitoring, was effective at treating water quality to acceptable quality for discharge from the pond and as further verified downstream at surface water monitoring station SS1 for discharge off-site.

Of the tested constituents, volatile and semi-volatile organic compounds were not detected at the surface water monitoring stations during the storm monitoring events in 2023.

Overall, the 2023 surface water monitoring results for the Poplar System monitoring stations indicated that runoff from the Poplar System did not negatively affect downstream water quality. It is noted that the Poplar System surface water stations are not compliance stations and, as such, are not required to be assessed against the relevant surface water trigger concentrations derived from the Landfill Environmental Monitoring Program, as prepared by Jagger Hims Limited and dated December 2007.

6 2024 POPLAR SYSTEM MONITORING PROGRAM

The 2024 Poplar System Monitoring Program should be completed as outlined in **Tables 5** and **6**, and according to the field protocols provided in **Appendix C**.

7 CONCLUSIONS

The following conclusions are provided in consideration of the findings for the 2023 Poplar System Monitoring Program.

- In 2023, irrigation liquid was applied to the poplar trees intermittently for a total of 77 days from May 2 to October 12. The Poplar System was operated in conformance with Condition 8.7 of the Waste ECA.
- The irrigation liquid applied to the Poplar System in 2023 contained approximately 100% leachate by concentration and 100% leachate by volume. A total of approximately 8,658.85 m^3 of leachate was applied to the Poplar System in 2023.
- The 2023 total irrigation rate was approximately 81.2 mm/m^2 for the Poplar System, of which was less than 25% of the available annual irrigation potential of 476 mm/m^2 detailed in the *Expansion of Poplar Cap Irrigation System for Existing Waste Disposal Area* report, as prepared by GENIVAR Consultants LP and January 2010.
- The leachate elevations within select maintenance holes were generally drawn down and fluctuated significantly throughout the duration of the application period as a result of leachate extraction for irrigation to the Poplar System. The leachate elevations in the leachate monitoring wells typically did not show correlation to their counterpart maintenance hole within each respective cell. This observation indicates that leachate within the waste mound that may not be directed to or captured by the leachate underdrain collection system (i.e. perched, low hydraulic conductivity, or some other cause) is therefore, not having an effect to the groundwater system (i.e. potentiometric pressures). This effect is observed in waste cells that are both positioned under and not under the Poplar System, indicating that the operation of the Poplar System is not the cause of this leachate elevation differential effect.
- Based on the soil samples collected for the Poplar System, soil quality was not adversely affected by the application of irrigation liquid in 2023.
- Based on the EC results in 2023, the application of irrigation liquid increases the EC of the shallow soil in the Poplar System.
- Overall, the tree plot condition within each zone of the Poplar System showed favourable conditions in 2023. The trees and leaves appeared healthy in 2023 with no apparent visual disease or toxicity symptoms. Therefore, no detrimental effects to tree health or growth vigour were observed during 2023 as a result of the application of irrigation liquid.
- Leaf tissue quality satisfied available compost guidelines.
- Notable odours emanating as a result of the operation of the Poplar System were not detected in 2023.
- For the surface water monitoring events completed in 2023, the parameter concentrations within the surface water at the monitoring stations for the Poplar System fluctuated but were generally within their respective historical ranges with two (2) exceptions.
- Overall, the Poplar System provides an effective system for the on-Site management of landfill leachate with no distinctive detrimental effects to soil, air, or surface water quality, and no notable detrimental effects to the poplar trees. Select areas of focus, including surface water quality evaluations at SS14A, SS14B, and SS15A, as well as leachate level monitoring should continue such that the Poplar System is managed in an environmentally effective manner.

8 CLOSURE

We trust that this 2023 Fourth Quarter and Annual Monitoring Report, Volume 3 of 5, for the Poplar System at the Twin Creeks Environmental Centre is satisfactory for your requirements. Should there be any questions or comments, please do not hesitate to contact us.

Sincerely,

RWDI

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9 STATEMENT OF QUALIFICATIONS AND LIMITATIONS

This Report has been prepared for a specific purpose and use, as outlined within the Report. The scope of the undertaking was initially provided in a proposal submitted by RWDI AIR, Inc. (RWDI) to Waste Management of Canada Corporation. The proposal (subject to any documented scope changes requested by Waste Management of Canada Corporation) constitutes an agreement between RWDI and Waste Management of Canada Corporation.

RWDI relied in part, upon the data, information, specifications and documentation (Data) provided by Waste Management of Canada Corporation as well as third parties. It is assumed by RWDI that the Data provided are complete and accurate. RWDI was not retained to, nor has it conducted any independent verification of the accuracy, completeness or suitability of the Data. As such, RWDI assumes no liability for losses, damages, or claims of any nature arising from inaccurate, incomplete or unsuitable Data provided on this project. Waste Management of Canada Corporation by receipt of this Report agrees to indemnify and hold harmless RWDI with respect thereto.

It is important that the reader of this Report, recognize that subsurface, environmental and/or geotechnical conditions may vary geographically and temporally. This is a natural phenomenon, which is not fully accommodated in the limited testing conducted by RWDI. In addition, the analysis of the collected data, by necessity, incorporates simplifying assumptions of site conditions and analytical solutions that assume uniformity in site conditions. The opinions, conclusions, and recommendations contained within the Report therefore represent RWDI's professional judgment in-light of these limitations.

This Report is to be considered confidential and is for the sole use of Waste Management of Canada Corporation. As such, the Report shall not be relied upon by third parties, except where agreed in writing between RWDI and Waste Management of Canada Corporation; where required by law; or where used for governmental review. RWDI accepts no responsibility, and denies any liability whatsoever, to parties other than Waste Management of Canada Corporation who may obtain access to the Report, for any injury, loss, or damage suffered by such parties arising from their use of, reliance upon, decisions or actions based on the Report or any of its contents, except to the extent where those parties have obtained prior written consent of RWDI to use and rely upon the Report and its contents. Any damages arising from improper use of the Report or parts thereof shall be borne by the party making such use.

This statement of Qualifications and Limitations is attached to, and forms part of the Report and any use of the Report are subject to the terms thereof.

TABLES

Table 1
Poplar System Monitoring Program - 2023
Twin Creeks Environmental Centre - Poplar System

Task	Monitoring Location	Parameters	Frequency	Monitoring Dates	Comments
Visual Assessment	Poplar System	Tree diameter, tree height, tree mortality, crown dieback, foliage transparency, crown density, leaf size, discolouration of leaves, abnormally shaped leaves, length of new tree branch extension shoots, deformed growth, insect infestation.	Annually - September	27-Sep-23	
Root Depth	Poplar System	Depth of root penetration.	Annually - September	27-Sep-23	
Inspections	Poplar System	Brace roots for animal damage etc.	Annually - September	27-Sep-23	
Undergrowth	Poplar System	Type and condition	Monthly - During Irrigation	15-May-23, 20-Jun-23, 19-Jul-23, 14-Aug-23, 22-Sep-23, 4-Oct-23	
Ponding and Runoff	Poplar System	Ponding and runoff of irrigation water	Monthly - During Irrigation	15-May-23, 20-Jun-23, 19-Jul-23, 14-Aug-23, 22-Sep-23, 4-Oct-23	
Soil Conductivity	Poplar System	Soil Conductivity	Weekly - During Irrigation		Five (5) locations, two (2) stations at each location, and depths of 25 and 150 mm. Stations are at drip emitter (A) and between irrigation lines (B).
Soil Sampling	Poplar System	Nitrate (N), Ammonium and Ammonia, TKN, Phosphorus**, Calcium*, Magnesium*, Sodium*, Potassium*, TOC, Sulphate, Chloride, Boron, Total Metals.	Annually - September	12-Sep-23	Four (4) composite soil samples per location (S1 to S4) from a sample interval from grade to a depth of between 0.6 m (minimum) and 0.9 m (maximum).
Leachate Irrigation	Poplar System Leachate Holding Tank	General Chemistry, VOCs, Heavy Metals	Monthly - During Irrigation	24-May-23, 14-Jun-23, 19-Jul-23, 9-Aug-23, 6-Sep-23, 11-Oct-23	
Odour	Poplar System	Subjective Olfactory Assessment	Monthly - During Irrigation	24-May-23, 14-Jun-23, 19-Jul-23, 9-Aug-23, 6-Sep-23, 11-Oct-23	
Leaf Tissue Analysis	Poplar System	Total Nitrogen, Phosphorus, Potassium, Boron, Copper, Iron, Manganese, Zinc and Chloride.	Annually - September	19-Sep-23	Eight (8) samples. Four (4) composite of the lower canopy and four (4) composite of the upper canopy.
Stem Core and Root Tissue	Poplar System	Full Metal Scan, Chloride	Annually - September	19-Sep-23	Four (4) composites for the Poplar System.
Leachate Levels	Poplar System		May and November	1-May-23, 1-Nov-23	MH16,MH17,MH18,OW22A-10, OW51A-15, OW53-10, MH3SA, MH3SB, MH3SC, MH3SD, MH3SE, MH3SF, MH4A, MH4B, Sump
Surface Water Monitoring	Poplar System at SS14A, SS14B, and SS15A	SW-P, BTEX	In conjunction with EMP monitoring.	10-Feb-23 (Routine monitoring for Q1 precipitation events) 4-Apr-23 (Routine monitoring for Q2 precipitation events) 3-Jul-23 (Routine monitoring for Q3 precipitation events) 7-Jul-23 (Routine monitoring for Q3 precipitation events) 2-Nov-23 (Routine monitoring for Q4 precipitation events)	
Storm Event Surface Water Monitoring	Poplar System at SS14A, SS14B, and SS15A	Nitrate, Nitrite, TKN, Ammonia (total), Phosphorus, Heavy Metals, BTEX, Chloride, pH, Dissolved Oxygen.	Two (2) events during irrigation and after storm events.	7-Jul-23 (Storm event monitoring for Q3 precipitation event) 13-Jul-23 (Storm event monitoring for Q3 precipitation event)	Irrigation system active from May 2 to October 12, 2023

Notes:

1) Poplar System - Located on a 9.3 ha portion of the Central and South Cell.
2) Monitoring locations are shown in Figure 2.
3) General Chemistry indicates: pH, conductivity, chloride, sulphate, alkalinity, calcium, magnesium, potassium, sodium, nitrate, nitrogen, TKN, ammonia, and total phosphorus.
4) VOCs indicates a scan for volatiles and semi-volatiles per GC/MS.
5) Total Metals denotes: Al, As, Ba, Be, Bi, B, Cd, Cr, Co, Pb, Mo, Ni, P, Se, Ag, Sr, Ti, Sn, V, and Zn.
6) Full Metal Scan denotes: Al, As, Ba, Be, Bi, B, Ca, Cd, Cr, Co, Cu, K, Pb, Mg, Mo, Na, Ni, P, Se, Ag, Sr, Sn, V, and Zn.
7) SW-P denotes: chloride, ammonia (un-ionized), sulphate, phenols, nitrate, alkalinity, TOC, B, Ni, Cr, Zn, Ca, Mg, K, Na, and Fe; as well as Field Parameters: pH, conductivity, temperature, turbidity, and dissolved oxygen.
8) BTEX indicates: benzene, toluene, ethylbenzene, and xylenes (total).
9) TPH indicates total petroleum hydrocarbons for gas/diesel and heavy oils.
10) '*' indicates NH_4 Acetate Extractable.
11) '**' indicates $NaHCO_3$ Extractable.

Table 2
Poplar System Monitoring Schedule - 2023
Twin Creeks Environmental Centre - Poplar System

Task	Monitoring Location	Frequency	2023											
			January	February	March	April	May	June	July	August	September	October	November	December
Monitoring Network Installation			**Maintenance**											
Visual Assessment	Poplar System	September												
Root Depth	Poplar System	September												
Inspections	Poplar System	September												
Undergrowth	Poplar System	Monthly - During Irrigation												
Ponding	Poplar System	Monthly - During Irrigation												
Soil Conductivity	Poplar System	Weekly - During Irrigation												
Soil Sampling	Poplar System	September												
Leachate Toxicity	Poplar System Leachate Holding Tank	Monthly - During Irrigation												
Odour	Poplar System	Monthly - During Irrigation												
Leaf Tissue Analysis	Poplar System	September												
Stem Core and Root Tissue	Poplar System	September												
Leachate Levels	Poplar System	May and November												
Surface Water Monitoring	Poplar System at SS14A, SS14B, and SS15A	In conjunction with EMP monitoring	First Quarter			Second Quarter			Third Quarter			Fourth Quarter		
Storm Event Surface Water Monitoring	Poplar System at SS14A, SS14B, and SS15A	Two (2) events during irrigation and after storm events					Two events							

Table 3
Poplar System Inspection Record - 2-Year Summary
Twin Creeks Environmental Centre - Poplar System

Task	Monitoring Parameters	ZONE 1		ZONE 2		ZONE 3		ZONE 4	
		Sep-22	Sep-23	Sep-22	Sep-23	Sep-22	Sep-23	Sep-22	Sep-23
Visual Assessment	*TREE DIAMETER (cm)*	5.0	7.1	5.5	8.4	7.2	8.3	8.0	8.1
	TREE HEIGHT (m)	4.6	5.2	4.8	7.5	6.2	7.8	6.8	8.2
	TREE MORTALITY (%) [3]	8	32	15	33	24	45	25	36
	CROWN DENSITY (%)	75	82	87	81	78	78	82	87
	LEAF SIZE (cm) *(length/width)*	6.6 / 6.3	7.7 / 7.5	6.9 / 6.5	7.8 / 7.6	6.0 / 5.8	7.9 / 8.5	6.9 / 6.5	8.2 / 7.9
	DISCOLOURATION OF LEAVES (%)	83	83	56	86	53	11	75	75
	LENGTH OF NEW TREE BRANCH EXTENSION SHOOTS (cm)	11.3	8.2	11.7	9.3	9.6	9.1	6.5	5.9
	INSECT INFESTATION (%)	4.4	2.5	6.9	2.5	2.5	2.5	2.5	2.5
	DEPTH OF ROOT PENETRATION (m)*	0.78	0.82	0.56	0.76	0.65	0.81	1.60	1.68

Notes:

1) Expanded Poplar System initiated in 2017.
2) Blank denotes data not available.
3) The tree mortality is based on the number of trees which died from the previous year.

Table 4
Irrigation Water - Poplar System Target Leachate Concentrations
Twin Creeks Environmental Centre - Poplar System

Parameter	LMP (Pre-2000)	Target Concentrations[9] Zones 1 to 4 - 100% Leachate	CCME Guidelines
Alkalinity	9,150	9,150	-
Conductivity (mS/cm)	10,616	10,616	-
Sodium	921	921	-
Potassium	238	238	-
Magnesium	347	347	-
Chloride	1241	1241	700 to 14,000*
Iron	2.9 - 25	2.9 - 25	20.0
Manganese	0.24	0.24	10.0
Ammonia (total)	554	554	-
TKN	2,948	2948	-
Boron	25.3	25.3	6.0
Chromium	0.12	0.12	0.1
Copper	0.43	0.43	5.0
Lead	<0.02-0.33	<0.02-0.33	2.0
Molybdenum	<0.02-1.82	<0.02-1.82	0.05
Nickel	<0.02-29.3	<0.02-29.3	2.0
Total Phosphorus	2.37	2.37	-
Zinc	0.043	0.043	5.0
Phenols	0.160	0.16	-
Total BTEX (µg/L)	127	127	-

Notes:

1) All data are mg/L unless otherwise specified.
2) LMP denotes geometric mean leachate quality from Leachate Management Plan, July 2001.
3) Target Concentrations derived from LMP and "Expansion of Poplar Cap Irrigation System for Existing Waste Disposal Area" report by GENIVAR Consultants LP dated January 2010.
4) CCME Guidelines denotes maximum concentration for negative effects to vegetation for irrigation water per Canadian Water Quality Guidelines (2004).
5) *' denotes concentration estimated based on poplar tree tolerance and vegetable crops. of > 710 mg/L (CCME, 2004), and salty water irrigation at 400 to 14,000 mg/L (Shanon et al, 1998).
6) '-' denotes no LMP and/or CCME Guideline.
7) Target Concentrations denotes leachate strength appropriate for 'Year 1' trees.
8) Target Concentrations denotes leachate strength appropriate for 'Year 2' trees.
9) Target Concentrations denotes leachate strength appropriate for 'Year 3' trees and beyond.

Table 5
Poplar System Monitoring Program - 2024
Twin Creeks Environmental Centre - Poplar System

Task	Monitoring Location	Parameters	Frequency	Comments
Visual Assessment	Poplar System	Tree diameter, tree height, tree mortality, crown dieback, foliage transparency, crown density, leaf size, discolouration of leaves, abnormally shaped leaves, length of new tree branch extension shoots, deformed growth, insect infestation.	Annually - September	
Root Depth	Poplar System	Depth of root penetration	Annually - September	
Inspections	Poplar System	Brace roots for animal damage etc.	Annually - September	
Undergrowth	Poplar System	Type and condition	Monthly - During Irrigation	
Ponding and Runoff	Poplar System	Ponding and runoff of irrigation water	Monthly - During Irrigation	
Soil Conductivity	Poplar System	Soil Conductivity	Weekly - During Irrigation	Five (5) locations, two (2) stations at each location, and depths of 25 and 150 mm. Stations are at drip emitter (A) and between irrigation lines (B).
Soil Sampling	Poplar System	Nitrate (N), Ammonium and Ammonia, TKN, Phosphorus**, Calcium*, Magnesium*, Sodium*, Potassium*, TOC, Sulphate, Chloride, Boron, Total Metals.	Annually - September	Four (4) composite soil samples per location (S1 to S4) from a sample interval from grade to a depth of between 0.6 m (minimum) and 0.9 m (maximum).
Leachate Irrigation	Poplar System Leachate Holding Tank	General Chemistry, VOCs, Heavy Metals	Monthly - During Irrigation	
Odour	Poplar System	Subjective Olfactory Assessment	Monthly - During Irrigation	
Leaf Tissue Analysis	Poplar System	Total Nitrogen, Phosphorus, Potassium, Boron, Copper, Iron, Manganese, Zinc and Chloride.	Annually - September	Eight (8) samples. Four (4) composite of the lower canopy and four (4) composite of the upper canopy.
Stem Core and Root Tissue	Poplar System	Full Metal Scan, Chloride	Annually - September	Four (4) composites for the Poplar System.
Leachate Levels	Poplar System		May and November	MH16,MH17,MH18,OW22A-10, OW51A-15, OW53-10, MH3SA, MH3SB, MH3SC, MH3SD, MH3SE, MH3SF, MH4A, MH4B, Sump
Surface Water Monitoring	Poplar System at SS14A, SS14B, and SS15A	SW-P, BTEX	In conjunction with EMP monitoring.	
Storm Event Surface Water Monitoring	Poplar System at SS14A, SS14B, and SS15A	Nitrate, Nitrite, TKN, Ammonia (total), Phosphorus, Heavy Metals, BTEX, Chloride, pH, Dissolved Oxygen.	Two (2) events during irrigation and after st orm events.	

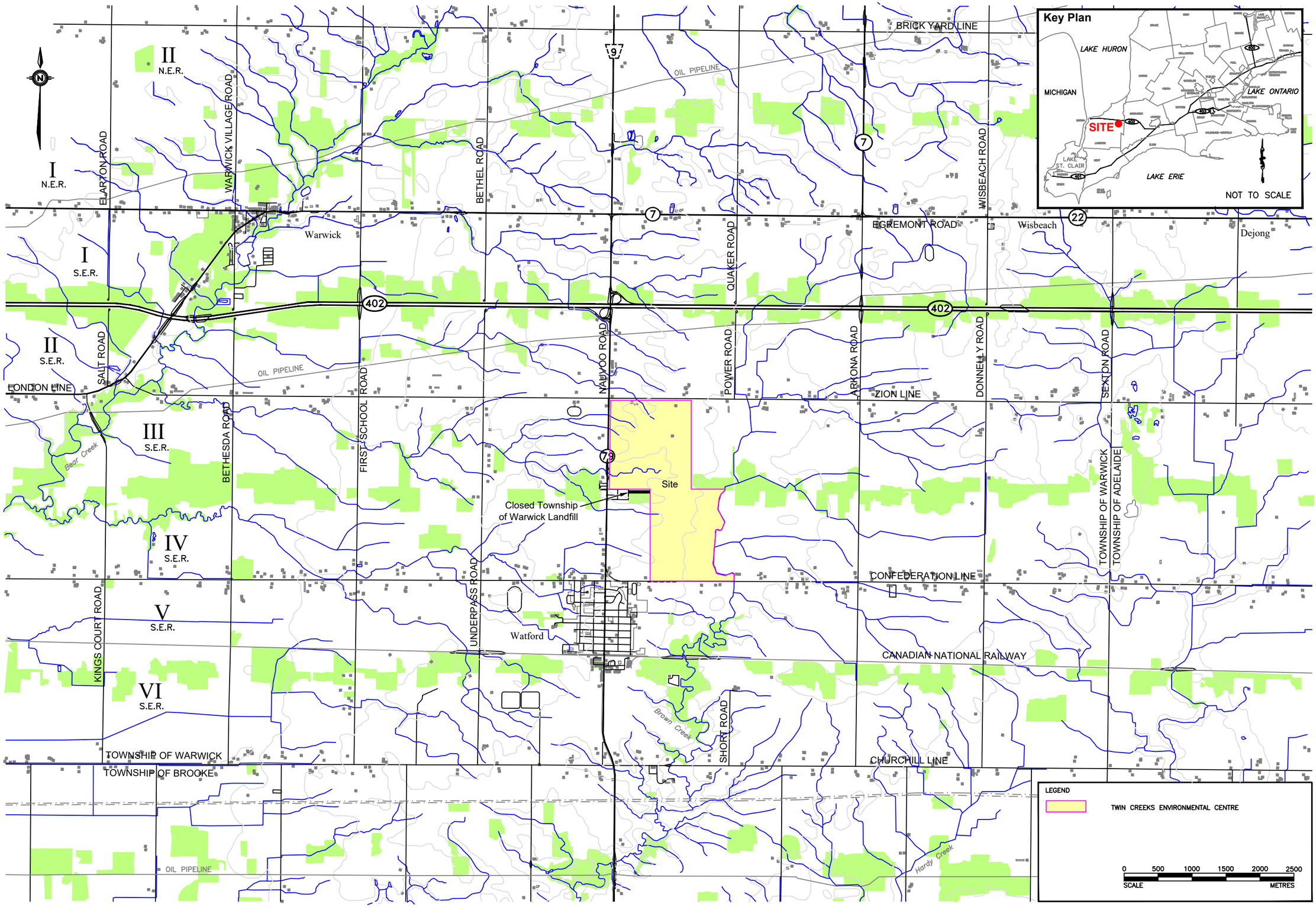
Notes:

1) Poplar System - Located on a 9.3 ha portion of the Central and South Cell.
2) Monitoring locations are shown in Figure 2.
3) General Chemistry indicates: pH, conductivity, chloride, sulphate, alkalinity, calcium, magnesium, potassium, sodium, nitrate, nitrogen, TKN, ammonia, and total phosphorus.
4) VOCs indicates a scan for volatiles and semi-volatiles per GC/MS.
5) Total Metals denotes: Al, As, Ba, Be, Bi, B, Cd, Cr, Co, Pb, Mo, Ni, P, Se, Ag, Sr, Ti, Sn, V, and Zn.
6) Full Metal Scan denotes: Al, As, Ba, Be, Bi, B, Ca, Cd, Cr, Co, Cu, K, Pb, Mg, Mo, Na, Ni, P, Se, Ag, Sr, Sn, V, and Zn.
7) SW-P denotes: chloride, ammonia (un-ionized), sulphate, phenols, nitrate, alkalinity, TOC, B, Ni, Cr, Zn, Ca, Mg, K, Na, and Fe; as well as Field Parameters: pH, conductivity, temperature, turbidity, and dissolved oxygen.
8) BTEX indicates: benzene, toluene, ethylbenzene, and xylenes (total).
9) TPH indicates total petroleum hydrocarbons for gas/diesel and heavy oils.
10) '*' indicates NH_4 Acetate Extractable.
11) '**' indicates $NaHCO_3$ Extractable.

Table 6
Poplar System Monitoring Schedule - 2024
Twin Creeks Environmental Centre - Poplar System

Task	Monitoring Location	Frequency	2024											
			January	February	March	April	May	June	July	August	September	October	November	December
Monitoring Network Installation			**Maintenance**											
Visual Assessment	Poplar System	September												
Root Depth	Poplar System	September												
Inspections	Poplar System	September												
Undergrowth	Poplar System	Monthly - During Irrigation												
Ponding	Poplar System	Monthly - During Irrigation												
Soil Conductivity	Poplar System	Weekly - During Irrigation												
Soil Sampling	Poplar System	September												
Leachate Toxicity	Poplar System Leachate Holding Tank	Monthly - During Irrigation												
Odour	Poplar System	Monthly - During Irrigation												
Leaf Tissue Analysis	Poplar System	September												
Stem Core and Root Tissue	Poplar System	September												
Leachate Levels	Poplar System	May and November												
Surface Water Monitoring	Poplar System at SS14A, SS14B, and SS15A	In conjunction with EMP monitoring	First Quarter			Second Quarter			Third Quarter			Fourth Quarter		
Storm Event Surface Water Monitoring	Poplar System at SS14A, SS14B, and SS15A	Two (2) events during irrigation and after storm events					Two events							

FIGURES



MAP SOURCE:
FIGURE PROVIDED BY GENIVAR INC., FIGURE 1, FILE REF NO. 111-53111-00-F1-LM PS2012, DATED FEBRUARY 2013.

SITE LOCATION MAP
2023 POPLAR SYSTEM

TWIN CREEKS ENVIRONMENTAL CENTRE
TOWNSHIP OF WARWICK, ONTARIO

DWN BY: EW
CHK BY: JCL
DATE: JANUARY 2024
SCALE: 1:50,000

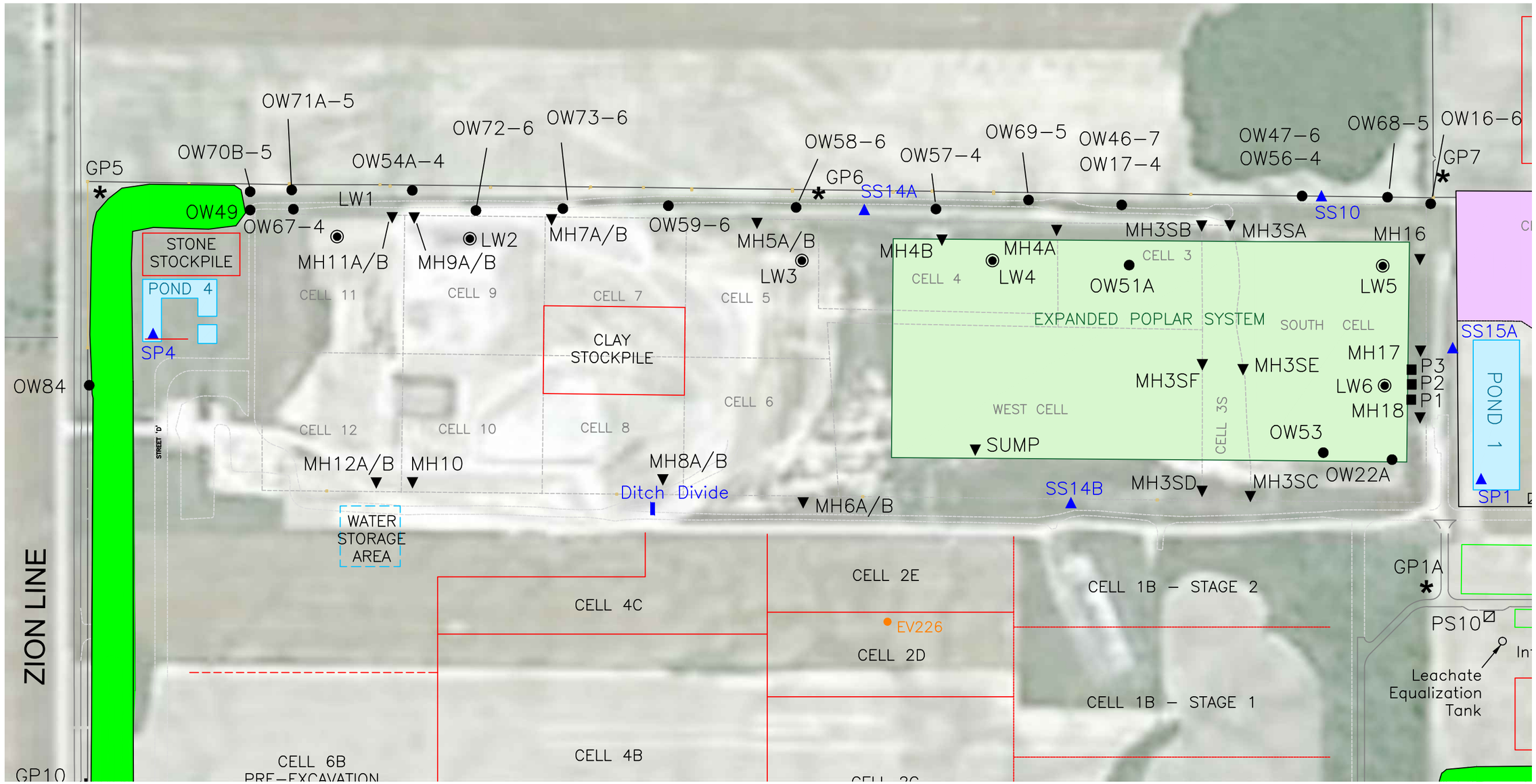
WASTE MANAGEMENT OF CANADA CORP.

PROJECT NO. 2303459

FIGURE 1

WASTE MANAGEMENT

I:\2303459\04Deliverables\41WasteManagement\Phase 1000\Q4\2023 Q4 Annual Poplar System Report\03Figures\Working files\20221117 RWDI 2202861 FIG Waste TCEC PoplarAnnualReportF1SiteLoc.dwg



LEGEND

- LANDFILL EXPANSION WASTE FOOTPRINT
- PROPOSED BERMS / INFRUSTRUCTURE (APPROXIMATE)
- EXISTING BERMS / INFRASTRUCTURE (APPROXIMATE)
- SEDIMENTATION POND
- ⊠ PS11 — PUMPING STATION LOCATION & DESIGNATION
- ● OW58 — ACTIVE MONITORING WELL LOCATION & DESIGNATION
- ▲ SS1 — SURFACE WATER MONITORING LOCATION & DESIGNATION
- ✱ GP1 — ACTIVE GAS PROBE LOCATION & DESIGNATION
- ■ P1 — PEIZOMETER LOCATION & DESIGNATION
- ◉ LW1 — LEACHATE MONITORING WELL LOCATION & DESIGNATION
- ● EV226 — EARLY VERTICAL GAS WELL (EVGW)
- ▼ MH5A/B — MAINTENANCE HOLE LOCATION & DESIGNATION

NOTE:
1. TOPOGRAPHIC FEATURES SHOWN ON THIS PLAN ARE BASED ON DECEMBER 2011 SITE CONDITIONS.
2. SOURCE FIGURE PROVIDED BY GENIVAR INC., FIGURE 2, FILE REF NO. 111-53111-00-F2-SP 12CM Q4, DATED FEBRUARY 2013.

0 50 100m

RM

WASTE MANAGEMENT

MONITORING NETWORK
2023 POPLAR SYSTEM

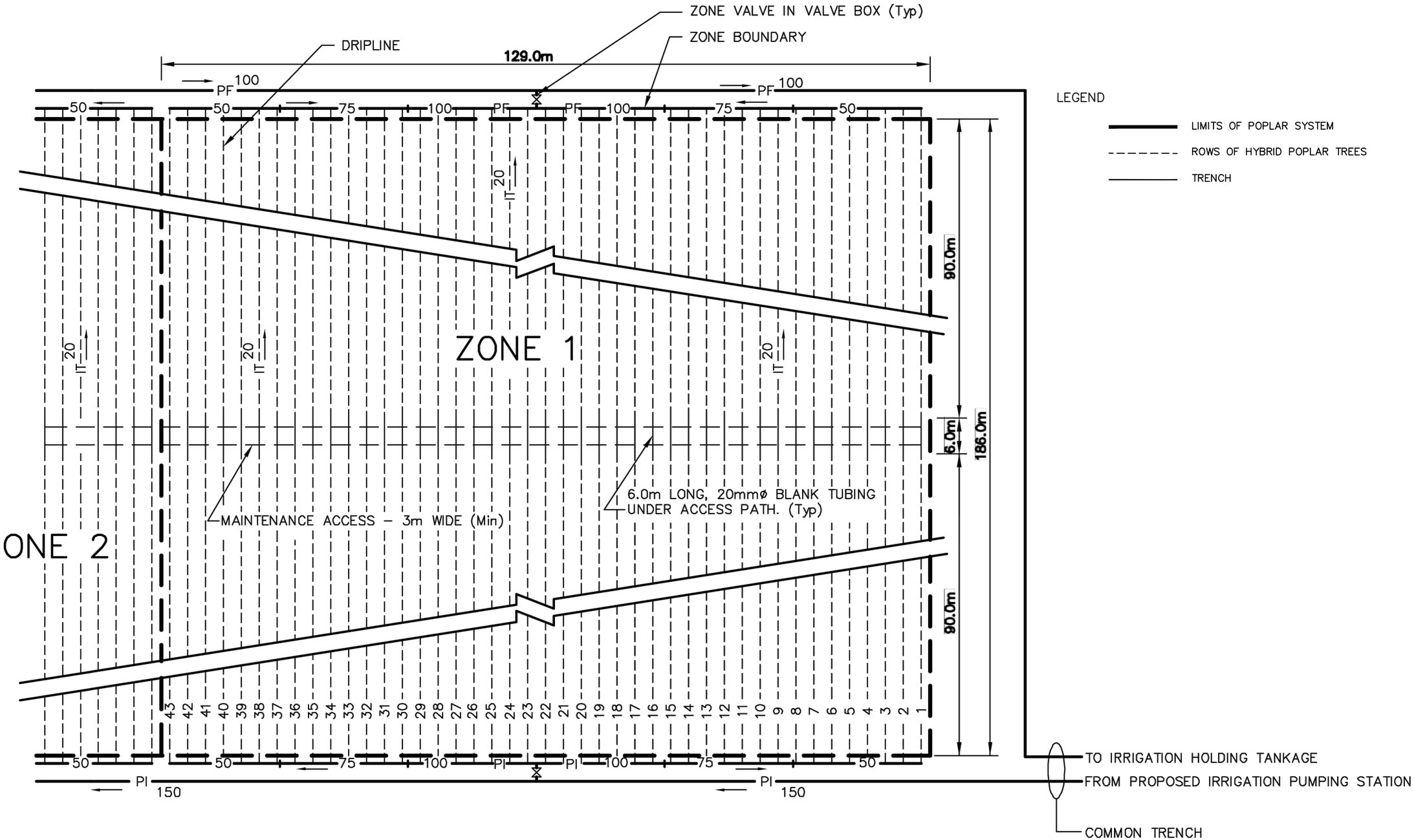
TWIN CREEKS ENVIRONMENTAL CENTRE
TOWNSHIP OF WARWICK, ONTARIO

DWN BY: EW
CHK BY: JCL
DATE: JANUARY 2024
SCALE: 1:4,000

WASTE MANAGEMENT OF CANADA CORP.

PROJECT NO. 2303459

FIGURE 2



MAP SOURCE:
FIGURE PROVIDED BY GENIVAR INC., FIGURE P100, FILE REF NO. 1731813 – P100, DATED JANUARY 20, 2010.

RWDI

WASTE MANAGEMENT

TYPICAL ZONE LAYOUT
2023 POPLAR SYSTEM
TWIN CREEKS ENVIRONMENTAL CENTRE
TOWNSHIP OF WARWICK, ONTARIO

DWN BY: EW
CHK BY: JCL
DATE: January 2024
SCALE: 1:650
WASTE MANAGEMENT OF CANADA CORP.
PROJECT NO. **2303459**

FIGURE
3

APPENDIX A:

Approval Documentation

APPENDIX A1:

Amended Environmental Compliance Approval [No. A032203], dated December 19, 2020

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A032203
Issue Date: December 19, 2020

Waste Management of Canada Corporation
117 Wentworth Court
Brampton, Ontario
L6T 5L4

Site Location: Twin Creeks Environmental Centre
5768 Nauvoo Rd Watford
Warwick Township, County of Lambton
N0M 2S0

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

the use and operation of a 101.8 hectare waste disposal site (landfill) within a total site area of 301 hectares.

For the purpose of this environmental compliance approval, the following definitions apply:

"Agricultural Waste" for the purposes of this ECA, is defined as municipal yard waste, wood chips, food waste and minimal amounts of solid manure which would only be accepted or used for the purpose of seeding or operating an active aerobic compost pile and does not include liquid manure;

"AQMP" means an Air Quality Monitoring Program;

"Construction Phase" is defined as the period of time from the start of construction of Phase 1 of the expanded landfill to the date of first receipt of waste in Phase 1;

"Contaminating Lifespan" refers to the period of time, after closure until the site finally produces contaminants at concentrations below levels which have unacceptable health or environmental effects;

"Crown" means Her Majesty the Queen in the Right of Ontario;

"Director" means any Ministry employee appointed in writing by the Minister pursuant to section 5 of the EPA as a Director for the purposes of Part V of the EPA;

“District Manager ” refers to the District Manager in the Ministry of the Environment, Conservation and Parks Sarnia District Office;

“District Office ” refers to the Ministry of the Environment, Conservation and Parks Sarnia District Office;

“EA” refers to the document titled “Warwick Landfill Expansion Environmental Assessment” , dated September 2005, which includes Discussion Papers 1 though 9 included in the Appendices A to F of the Environmental Assessment. EA also includes responses from the Owner dated:

1. March 10, 2006 “Waste Unit’s Final Comments Dated March 8, 2006”
2. February 14, 2006 “Leachate Recirculation”
3. February 14, 2006 “Response to February 1, 2006 Correspondence”
4. January 13, 2006 “Waste Management Response to Comments received from Warwick Landfill Expansion EA” including attachments entitled:

    i. Response to the Township of Warwick;
    ii. Response to Thomson Rogers;
    iii. Table of responses to various agencies, public and First Nations Submissions;
    iv. Landfill Gas Assessment, Warwick Landfill Baseline Conditions Report prepared by RWDI dated January 12, 2006
    v. Memo dated March 10, 2006
    vi. June 12, 2006 “Response to May 1, 2006 Ministry Review ”;

“EAA” refers to the Ontario Environmental Assessment Act, R.S.O. 1990, c.E.18, as amended;

"**Environmental Compliance Approval" or "ECA" or "Approval"** means this entire provisional Environmental Compliance Approval document, issued in accordance with Section 20.2 of the EPA , and includes any schedules to it, the application and the supporting documentation listed in schedule "A";

“Environmental Inspector” refers to the individual employed by the Ministry of the Environment, Conservation and Parks to inspect the Site;

"EPA " means Environmental Protection Act , R.S.O. 1990, c.E.19, as amended;

“EPB” refers to the Environmental Permissions Branch of the Ministry of the Environment, Conservation and Parks;

"**Hydraulic Trap"** indicates a situation where hydraulic gradients from the surrounding soil are inward toward the landfill waste and associated leachate collection system;

"**Mini-Transfer Area**" means the mini-transfer public convenience drop-off area as described and identified in the June 2009 Development & Operations Report that is identified in Item 59 of Schedule "A" and whose location is identified as "Expansion Mini-Transfer" in figure MT2 that is contained in the 2009 Development & Operations Report;

“MECP” or “**Ministry**” refers to the Ontario Ministry of the Environment, Conservation and Parks;

"Operation Phase" is defined as the period of time from the date that Phase 1 of the expanded landfill area first receives waste until the landfill site reaches final capacity;

"Operator " has the same meaning as "operator" as defined in s.25 of the EPA;

"Owner " means Waste Management of Canada Corporation and its successors and assigns;

"O. Reg. 101/94" means Ontario Regulation 101/94 as amended;

"OWRA" means the Ontario Water Resources Act, R.S.O. 1990, c. O.40, as amended;

"**PA** " means the Pesticides Act , R.S.O. 1990, c.P.11, as amended;

"Preparation Report" refers to a report documenting that the subsequent stage of the landfill has been constructed in accordance with the approved design plans and specifications;

"Poplar System" is the irrigation area located on top of the cap of the Existing Site (old landfill) that is used for the phytoremediation of leachate that is generated at the Site per Items 63 through 65 of Schedule "A" and Figure 2 of Item 16 on Schedule "A";

"Poplar Plantation" is the irrigation area located on native soil to the south of the Site that is used for the phytoremediation of irrigation liquid that satisfies the Effluent Limit criteria per the OWRA Section Approval for the Site, Item 39 of Schedule "A", and Appendix N11 of Item 30 on Schedule "A";

"Provincial Officer" means any person designated in writing by the Minister as a provincial officer pursuant to section 5 of the OWRA or section 5 of the EPA or section 17 of PA;

"**PWQO**" refers to the Provincial Water Quality Objectives;

"**Recyclable Waste**" means waste that are glass, plastic, aluminium or steel cans, gypsum wallboard, newspapers, cardboard and/or other materials for which there is a secured market;

"Regional Director" refers to the Director of the Ministry of the Environment's Southwestern Regional Office;

"Regulation 232 " or "Reg. 232" or "O. Reg. 232/98" means Ontario Regulation 232/98 (Landfilling Sites) made under the EPA, as amended;

"Regulation 347 " or "Reg. 347 " or "O. Reg. 347" means Regulation 347, R.R.O. 1990, made under the EPA, as amended;

"Site" refers to the Twin Creeks Landfill Site and lands owned by the Owner described as:

> Firstly, Part of Lots 19 and 20, Concession 3, S.E.R.,and Part of Lot 20, 21 and 22, Concession 4, S.E.R. and Part of the Road Allowance between Lots 21 and 22, Concession 4, S.E.R., shown as Parts 1,

2 and 3 on Plan 25R-9125 and Part 2 on Plan 25R-1903, Save and Except Part 1 on Plan 25R-6184, Township of Warwick, County of Lambton; and

Secondly, Part of Lot 20, Concession 3 S.E.R., shown as Part 1 on Plan 25R-6184, Township of Warwick, County of Lambton;

"Traditional agricultural crop production" means standard crop production, nursery and horticultural crops, agro-forestry, conservation uses but not greenhouses or any accessory agricultural buildings and structures;

"Undertaking" refers to the proposed undertaking as described in the Warwick Landfill Expansion Environmental Assessment;

"WIFN" refers to Walpole Island First Nation; and

"WPLC" refers to the Warwick Public Liaison Committee.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1.0 GENERAL

Compliance

1.1 This Approval revokes all previous Approvals and Notices of Amendment issued under Part V of the Environmental Protection Act for this Site. The approval given herein, including the terms and conditions set out, replaces all previously issued Approvals and related terms and conditions under Part V of the Act for this Site.

1.2 The Owner and Operator shall ensure compliance with all the conditions of this Approval and shall ensure that any person authorized to carry out work on or operate any aspect of the Site is notified of this Approval and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

1.3 Any person authorized to carry out work on or operate any aspect of the Site shall comply with the conditions of this Approval.

In Accordance

1.4 Except as otherwise provided by this Approval, the Site shall be designed, developed, built, operated and maintained in accordance with the documentation listed in the attached Schedule "A".

1.5 (a) Construction and installation of aspects described in Schedule "A" must be completed within 5

years of the later of:

1. the date this Approval is issued; or
2. if there is a hearing or other litigation in respect of the issuance of this Approval, the date that this hearing or litigation is disposed of, including all appeals.

(b) Notwithstanding Condition 1(5)(a), ongoing constructed aspects that are pertinent to the Major Works identified in Conditions 4.1 to 4.7 including the landfill liner, landfill capping, landfill gas management infrastructure, leachate collection and recirculation infrastructure shall be constructed in accordance with the documentation in the attached Schedule "A" that pertain to the final design of the Site.

(c) This Approval ceases to apply in respect of the aspects of the Site that have not been constructed or installed before the later of the dates identified in Conditions 1(5)(a).

Interpretation

1.6 Where there is a conflict between a provision of any document listed in Schedule "A" in this Approval, and the conditions of this Approval, the conditions in this Approval shall take precedence.

1.7 Where there is a conflict between the application and a provision in any document listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and the Ministry approved the amendment.

1.8 Where there is a conflict between any two documents listed in Schedule "A", the document bearing the most recent date shall take precedence.

1.9 The conditions of this Approval are severable. If any condition of this Approval, or the application of any condition of this Approval to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this Approval shall not be affected thereby.

Other Legal Obligations

1.10 The issuance of, and compliance with, this Approval does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; and

(b) limit in any way the authority of the Ministry to require certain steps be taken or to require the Owner and Operator to furnish any further information related to compliance with this Approval.

(c) The Owner shall ensure that:

(i) all equipment discharging to atmosphere are approved under Section 9 of the ECA where applicable; and

(ii) all effluent is discharged in accordance with the OWRA where applicable.

Adverse Effect

1.11 The Owner and Operator shall take steps to minimize and ameliorate any adverse effect on the natural

environment or impairment of water quality resulting from the present, past and historical operations at the Site. Such steps may include accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

1.12 Despite an Owner, Operator, or any other person fulfilling any obligations imposed by this Approval, the person remains responsible for any contravention of any other condition of this Approval or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect to the natural environment or impairment of water quality.

1.13 At no time shall the Owner or Operator allow the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

Change of Ownership

1.14 The Owner shall notify the Director, in writing, and forward a copy of the notification to the District Manager, within 30 days of the occurrence of any changes in the following information:
(a) the ownership of the Site;
(b) the Operator of the Site;
(c) the address of the Owner or Operator; and
(d) the partners, where the Owner or Operator is or at any time becomes a partnership and a copy of the most recent declaration filed under the Business Names Act, R. S. O. 1990, c. B.17, shall be included in the notification.

1.15 No portion of this Site shall be transferred or encumbered prior to or after closing of the Site unless the Director is notified in advance and sufficient financial assurance is deposited with the Ministry to ensure that these conditions will be carried out.

1.16 In the event of any change in ownership of the Site, other than change to a successor municipality, the Owner shall notify the successor of and provide the successor with a copy of this Approval, and the Owner shall provide a copy of the notification to the District Manager and the Director.

Registration on Title Requirement

1.17 Prior to dealing with the property in any way, the Owner shall provide a copy of this Approval and any amendments, to any person who acquires an interest in the property as a result of the dealing.

1.18 (a) If not already completed, within ninety (90) calendar days from the date of issuance of this Approval, the Owner shall submit to the Director a completed Certificate of Requirement which shall include:
(i) a plan of survey prepared, signed and sealed by an Ontario Land Surveyor, which shows the area of the Site where waste has been and is to be deposited at the Site;
(ii) proof of ownership of the Site;
(iii) a letter signed by a member of the Law Society of Upper Canada or other qualified legal practitioner acceptable to the Director, verifying the legal description provided in the Certificate of Requirement;
(iv) the legal abstract of the property; and

(v) any supporting documents including a registerable description of the Site.

(b) If not already completed, within fifteen (15) calendar days of receiving a Certificate of Requirement authorized by the Director, the Owner shall:
    (i) register the Certificate of Requirement in the appropriate Land Registry Office on the title to the property; and
    (ii) submit to the Director and the District Manager, written verification that the Certificate of Requirement has been registered on title.

Registration on Title Requirement - Contaminant Attenuation Zone (CAZ)

1.19 If not already completed, or if required at any time, within thirty (30) calendar days from the date of establishing a contaminant attenuation zone (CAZ) (overburden and/or bedrock aquifers) in either fee simple or by way of a groundwater easement, the Owner shall submit to the Director a completed Certificate of Requirement which shall include:

(a) If rights are obtained in fee simple, the Owner shall provide:
    (i) documentation evidencing ownership of the CAZ obtained in compliance with Regulation 232, as amended;
    (ii) a completed Certificate of Requirement and supporting documents containing a registerable description of the CAZ; and
    (iii) a letter signed by a member of the Law Society of Upper Canada; or other qualified legal practitioner acceptable to the Director, verifying the legal description of the CAZ.
(b) within fifteen (15) calendar days of receiving a Certificate of Requirement signed or authorized by the Director,the Owner shall:
    (i) register the Certificate of Requirement in the appropriate Land Registry Office on the title to the property; and
    (ii) submit to the Director and the District Manager, a written verification that the Certificate of Requirement has been registered on title.
(c) If rights are obtained by way of a groundwater easement, the Applicant shall:
    (i) provide a copy of the agreement for the easement;
    (ii) provide a plan of survey signed and sealed by an Ontario Land Surveyor for the CAZ; and
    (iii) submit proof of registration on title of the groundwater easement to the Director and District Manager;
(d) The Owner shall not amend, or remove, or consent to the removal of the easement or CAZ from title without the prior written consent of the Director.

Certificate of Withdrawal of Requirement

1.20 If the Applicant wants to withdraw the Certificate of Requirement, the Applicant shall:

(a) submit to the Director, a request for a Certificate of Withdrawal of Requirement; and its supporting documents, outlining the reasons for the Withdrawal of the Requirement.
(b) submit to the Director:
    (i) a plan of survey of the area where waste was deposited signed and sealed by an Ontario Land Surveyor and for the Site or CAZ;

(ii) the legal abstract of the Site or CAZ – or area where waste was deposited;
(iii) completed Certificate of Withdrawal of Requirement containing a registerable description of the Site or CAZ or area where waste was deposited; and
(iv) a letter signed by a member of the Law Society of Upper Canada or other qualified legal practitioner acceptable to the Director verifying the legal description of the Certificate of Withdrawal of Requirement.

(c) within fifteen (15) calendar days of receiving a Certificate of Withdrawal of Requirement authorized by the Director, the Applicant shall:
(i) register the Certificate of Withdrawal of Requirement in the appropriate Land Registry Office on the title to the Site or CAZ or area where waste was deposited; and
(ii) submit to the Director and District Manager a copy of the registered document together with a copy of the PIN Abstract confirming the registration.

Inspections by the Ministry

1.21 No person shall hinder or obstruct a Provincial Officer from carrying out any and all inspections authorized by the OWRA, the EPA, the PA, the SDWA or the NMA, of any place to which this Approval relates, and without limiting the foregoing:
(a) to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this Approval are kept;
(b) to have access to, inspect, and copy any records required to be kept by the conditions of this Approval;
(c) to inspect the Site, related equipment and appurtenances;
(d) to inspect the practices, procedures, or operations required by the conditions of this Approval; and
(e) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this Approval or the EPA, the OWRA, the PA, the SDWA or the NMA.

Information and Record Retention

1.22 (a) Except as authorized in writing by the Director, all records required by this Approval shall be retained at the Site for a minimum of two (2) years from their date of creation.
(b) The Owner shall retain all documentation listed in Schedule "A" for as long as this Approval is valid.
(c) All information and logs required in Condition 9.1 shall be kept at the Site until they are included in the Annual Report.
(d) The Owner shall retain employee training records as long as the employee is working at the Site.
(e) The Owner shall make all of the above documents available for inspection upon request of Ministry staff.

1.23 The receipt of any information by the Ministry or the failure of the Ministry to prosecute any person or to require any person to take any action under this Approval or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:
(a) an approval, waiver, or justification by the Ministry of any act or omission of any person that contravenes any term or condition of this Approval or any statute, regulation or other legal requirement; and
(b) acceptance by the Ministry of the information's completeness or accuracy.

1.24 The Owner shall ensure that a copy of this Approval, in its entirety and including all its Notices of Amendment, and documentation listed in Item #1 of Schedule "A", are retained at the Site or the Owner's office at all times.

1.25 Any information related to this Approval and contained in Ministry files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, RSO 1990, CF-31.

2.0 FINANCIAL ASSURANCE

2.1 a. The Financial Assurance shall be submitted as required to the Director, Financial Assurance as defined in Section 131 of the Environmental Protection Act. The Financial Assurance shall be in a form acceptable to the Director and shall provide sufficient funds for the analysis, closure, ongoing and long-term monitoring and reporting, post-closure maintenance and care of the Site.

1. On the following dates, the Owner shall ensure the maximum amount of financial assurance has been submitted to the Director in a form acceptable to the Director as follows:

Payment Date	**Amount**
By March 31, 2021	$32,459,985.00
By March 31, 2022	$35,256,829.00
By March 31, 2023	$37,164,501.00
By March 31, 2024	$39,434,722.00

b. Commencing on March 31, 2024 and on a four year basis thereafter, the Owner shall provide to the Director a re-evaluation of the amount of the Financial Assurance to facilitate the actions required under Condition 2.1.a. The re-evaluation shall include an assessment based on any new information relating to the environmental conditions of the Site and shall include the costs of additional monitoring and/or implementation of alternative measures required by the Director upon review of the annual reports. The Financial Assurance must be submitted to the Director within thirty (30) days of written acceptance of the re-evaluation by the Director;

c. Commencing on March 31, 2021, the Owner shall prepare and maintain at the Site an updated re-evaluation of the amount of Financial Assurance required to implement the actions required under Condition 2.1.a for each of the intervening years in which a re-evaluation is not required to be submitted to the Director under Condition 2.1.b. The re-evaluation shall be made available to the Ministry, upon request; and

d. The amount of Financial Assurance is subject to review at any time by the Director and may be amended at his/her discretion. If any Financial Assurance is scheduled to expire or notice is received, indicating Financial Assurance will not be renewed, and satisfactory methods have not been made to replace the Financial Assurance at least sixty (60) days before the Financial Assurance terminates, the Owner shall forthwith replace the Financial Assurance with cash.

3.0 WARWICK PUBLIC LIAISON COMMITTEE and FIRST NATIONS

WPLC

3.1 The Owner shall continue and maintain the WPLC. The WPLC shall serve as a focal point for dissemination, review and exchange of information and monitoring results relevant to the operation of the undertaking. In addition, the purpose of the WPLC will be to provide community review of the development, operation (current and proposed) and ongoing monitoring, closure and post-closure care related to the landfill Site.

3.2 The general mandate of the WPLC shall include:

a. Review operations and provide regular input to the Owner with respect to all matters pertaining to landfill Site operation, including issues pertaining to ongoing operations, monitoring, the need for contingency plans or remedial measures, response to community complaints, the need for changes to the ECA , post-closure monitoring and maintenance, and development of the proposed end use for the landfill Site;
b. Review operational and monitoring reports;
c. Consider and make recommendations to the Owner regarding outside consulting advice in respect of the landfill Site;
d. Facilitate ongoing dialogue between the Owner, the Environmental Inspector and the community, including residents and businesses in the immediate vicinity of the landfill Site;
e. Provide reports regularly to the community on the activities of the WPLC, the landfill operations and landfill related issues and seek public input on these activities and issues;
f. Monitor the Owner's complaint response program and make recommendations to the Owner with respect to this program; and
g. Provide recommendations to the Owner with respect to unresolved complaints.

3.3 The WPLC shall not exercise any supervisory, regulatory, approval, legal or other decision making role with respect to the operations (current and proposed) at the Site.

3.4 The Owner shall provide for the administrative costs of operating the WPLC, including the cost of meeting places and clerical services.

3.5 The WPLC shall operate under a Terms of Reference of the committee. Suggestions to revise the WPLC Terms of Reference may be made at any meeting that a quorum is present. No changes to the Terms of Reference can be made until the committee members mutually agree to changes. Any changes shall be provided to the Ministry for information purposes.

3.6 The Community members shall be appointed by the WPLC. The community member positions are intended to be available to individuals that are not members of groups already represented on the WPLC and have an interest in the operation of the landfill. The WPLC shall encourage individuals who reside in close proximity to the landfill to participate. A community member is defined as a taxpayer and/or resident of Warwick Township.

3.7 The function of the Ministry member will be to provide advice, information and input to other

members as required.

3.8 The WPLC shall determine the appropriate meeting frequency and review it on an annual basis.

3.9 Minutes and agendas of meetings shall be printed and distributed as per the mailing list on a timely basis.

3.10 The WPLC shall have reasonable access to the Site and its landfill related facilities for the purpose of carrying out its objective and mandate and the Owner's consultants' reports relating to Site operations shall be provided to the WPLC.

3.11 The Owner shall provide the WPLC with access to the Owner's consultants as required and consultants reports in accordance with protocols agreed to between the Owner and the WPLC.

3.12 Unless disclosure would be contrary to the Freedom of Information and Protection of Privacy Act ,the WPLC, the Township of Warwick and Walpole Island First Nation are to be provided all formal submissions and correspondence related to the site operations by the Owner at the same time as these items are submitted to the Ministry, the Township of Warwick Council or any other body.

3.13 The Owner shall allow access to the landfill site during normal operating hours, to enable any individual member of the WPLC and member of the public recommended by local representatives on the WPLC, to observe operations. An individual member of the WPLC must contact the operator to arrange for a Site pass, be accompanied by an operators representative at all times and follow all safety procedures.

3.14 All recommendations made to the Owner with respect to ongoing landfill operations, monitoring and the implementation of contingency measures shall be discussed at joint meetings between representatives of the Owner and the WPLC. The purpose of these meetings will be to arrive at an agreement between the Owner and WPLC with respect to implementation of the recommendations.

3.15 The Owner will disclose all monitoring results to the WPLC and deliver to the WPLC all documents and information (except as may be privileged) relevant to the operation of the landfill.

First Nation and Township of Warwick Consultation

3.16 During the process of submission of an application to amend any approvals for the Site, the Owner shall

a. discuss with WIFN and the Township of Warwick (Township) the proposed application prior to submission of the WIFN application to the Director;
b. provide the same documents to WIFN and Township that are provided to the Director in respect of the amendments; and
c. provide the Director, either prior to or at the same time of application submission, with a statement how WIFN and Township comments were considered by the Owner.

4.0 CONSTRUCTION, INSTALLATION and PLANNING

Major Works

4.1 For the purposes of this ECA the following are Major Works :

a. gas management system;
b. leachate collection system; and
c. liner

4.2 a. A final detailed design shall be prepared for each Major Work to be constructed at the Site consistent with the conceptual design of the Site as presented in the Supporting Documentation, specifically Items 66, 67, and 68 of Schedule "A".

b. Geonet may substitute a component of the 0.3 metres of granular in the secondary drainage layer in accordance with Items 54 to 57 inclusive on Schedule "A". The Owner shall ensure that the Quality Assurance/Quality Control procedure detailed in Item 57 of Schedule "A" is followed during installation of the geonet material.

4.3 The final detailed design of each Major Work shall include the following:

a. design drawings and specifications;
b. a detailed quality assurance / quality control (QA/QC) program for construction of the major work, including necessary precautions to avoid disturbance to the underlying soils; and
c. details on the monitoring, maintenance, repair and replacement of the engineered components of the major work, if any.

4.4 Any design optimization or modification that is inconsistent with the conceptual design shall be clearly identified, along with an explanation of the reasons for the change.

4.5 The final detailed design of each Major Work shall be submitted to the Director and copied to the District Manager.

4.6 Each major work shall be constructed in accordance with the approved final detailed design and the QA/QC procedures shall be implemented as proposed by the Owner. Any significant variances from the conceptual design for the Site as detailed in Items 66, 67 and 68 of Schedule "A" shall be subject to approval by the Director.

4.7 As-built drawings for all Major Works shall be retained on Site and made available to Ministry staff for inspection.

Subsequent Stages

4.8 At least six (6) months prior to the anticipated completion of landfilling in each stage of the Site , a final detailed design for the subsequent stage shall be submitted to the Director. Any significant variances from the conceptual design for the Site as detailed in Items 66, 67 and 68 of Schedule "A"

shall be subject to approval by the Director.

4.9 No person shall deposit any waste at the subsequent stage until a written Preparation Report in accordance with O. Reg. 232/98, Section 19 has been submitted to the Director and District Manager documenting that:

a. all construction;
b. QA/QC activities;
c. Site conditions; and,
d. all details of the construction of the Site;

are in accordance with the approved design plans and specifications.

4.10 Approval to proceed with landfilling or construction of each subsequent stage shall be dependent on groundwater, air quality and surface water monitoring results acceptable to the Director . If monitoring results are not acceptable to the Director then remedial action must be taken and completed before landfilling may proceed in the subsequent stage.

Geotechnical Engineer

4.11 A qualified professional geotechnical engineer shall inspect the excavation and construction underlying the Site and provide a report addressing whether the construction proceeded in accordance with approved detailed design plans, specifications and QA/QC procedures. The report shall be included in the Preparation Reports for each stage of the landfill.

Environmental Inspector

4.12 In accordance with conditions 18 and 19 of the EA approval dated January 15, 2007 known as Item 1 on Schedule "A", the Owner shall provide funding to the Ministry for the provision of an Environmental Inspector to inspect the Site, at any reasonable time on such terms and conditions, as deemed appropriate by the District Manager of the District Office and outlined in a written agreement with the Owner. Within the agreement, the Owner shall commit to providing, as a minimum, the following:

a. Adequate office facilities, communication equipment, and means of transportation for the Environmental Inspector; and,
b. Reimbursement to the MECP semi-annually for the costs and associated expenses of the Environmental Inspector.

4.13 The Owner shall provide funding for an Environmental Inspector on Site based on the following:

a. Construction Phase/Operations Phase- Full-time, on-Site inspector with the inspector being on Site a full day each day for five (5) days per calendar week for the first two years of the operation phase.

4.14 a. Every two (2) years commencing on **February 1, 2012**, the Owner shall prepare and submit a

report to the District Manager detailing the status and need for a Environmental Inspector based on discussions with the Township of Warwick, WIFN and the WPLC regarding the inspection frequency for the Environmental Inspector. The inspection frequency of the Environmental Inspector shall remain as per the requirements outlined in Condition 4.13 during the operation phase until a decision is made by the District Manager on the appropriate inspection frequency.

b. Notwithstanding Conditions 4.12 to 4.14 (1) and 15.3, inclusive, the Environmental Inspector's duties may, in consultation with the Owner, be increased, reduced, suspended or terminated on such terms and conditions as deemed appropriate by the District Manager and, for greater certainty, the District Manager may require an Environmental Inspector to be on-Site for up to seven days per week in cases of apparent significant non-compliance with the conditions of the EA approval or any approval issued for the Site under the EPA until such non-compliance is resolved.

5.0 OTHER WORKS

Berm Construction

5.1 All berm slopes associated with this approval shall be no greater than 3:1.

Diversion Area

5.2 The diversion area will be located to the east of the treated leachate storage lagoons.

Cell 12

5.3 a. Cell 12 will be used as a monofil of contaminated soils until redeveloped and incorporated into the Expansion Site in accordance with Items 66 through 68 of Schedule "A".

b. The management of the Cell 12 monofill shall be in accordance with the procedures and practices consistent with other previous monofill operations at the Site.

Landscape

5.4 The Owner shall ensure the landscape plan is carried out in accordance with Item 72 and 80 of Schedule "A", as amended from time to time.

6.0 GENERAL OPERATIONS

Proper Operation

6.1 The Site shall be properly operated and maintained at all times. All waste shall be managed and disposed of in accordance with the EPA , Regulation 347 , Regulation 232 , and the requirements of this ECA. At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

6.2 The Owner shall ensure that the MECP's Guideline B-7, Reasonable Use Concept, is applied at the Site boundaries.

6.3 a. Landfilling operations shall be conducted in accordance with Items 66 through 71 of Schedule "A" attached to this ECA.

b. The Owner shall ensure the operations and procedures manual for the the Site includes discussions on the following items.:

a. Health and safety;
b. Operation and maintenance of the Site;
c. Waste disposal area and development;
d. Nuisance management;
e. Leachate management;
f. Landfill gas management;
g. Surface water/Storm water management;
h. Inspections and monitoring;
i. Contingency plans and emergency procedures;
j. Complaints; and,
k. Reporting and record keeping.

c. The operations and procedures manual shall be:

a. retained at the Site;
b. reviewed on an annual basis and updated by the Owner as required; and
c. be available for inspection by Ministry staff.

Waste Type

6.4 Only the following types of waste shall be accepted at the Site :

a. municipal, industrial, commercial and institutional solid non-hazardous waste generated within the Province of Ontario, including non-hazardous contaminated soil.

Capacity

6.5 The Owner shall only accept and deposit waste at the Site as long as there is available capacity as defined by the final contours for the Site approved by this ECA . The approval permits disposal of waste at the Site to fill an air space of **26,508,000 cubic metres** (including waste, daily and interim cover material). This capacity includes the capacity of the existing and expansion landfill areas.

Yearly Waste Limit

6.6 a. The Owner can receive up to a maximum of **1,400,000 tonnes per year** of waste including contaminated soil for disposal at the Site.

b. The amount of tire shred that may be received to process is **7,160 tonnes/year**.

c. Up to a maximum of **100 tonnes per day** of solid non-hazardous waste, white goods and metals, recyclable waste, wood waste, and leaf and yard waste that are deposited by the public using small vehicles at the Mini-Transfer Area of the Site may be transferred from the Site by a waste hauler or waste haulers that has an ECA to another waste disposal site.

Service Area

6.7 Only waste that is generated in the Province of Ontario shall be accepted at the Site **.**

Landfilling of Sludge

6.8 A thickness of at least 2 metres of compacted waste and cover material shall be maintained between any landfilled sludge (solid non-hazardous as per Reg. 347) and the granular leachate collection layer.

Asbestos Waste

6.9 Any waste that is considered asbestos waste shall be handled in accordance with Section 17 of O. Reg. 347 as amended from time to time.

6.10 A suitable sized excavation for the asbestos waste shall be made by the Owner in a location away from the active landfilling face.

6.11 All asbestos waste shall be inspected to ensure that the asbestos waste is properly bagged or contained and free from puncture, tears or leaks.

6.12 The asbestos waste shall be placed in the excavation to avoid damage to the containers and to prevent dust and spillage.

6.13 Upon completion of the unloading and deposition of the asbestos in the excavation, at least 125 centimetres of cover or waste material shall be placed over the asbestos.

6.14 All asbestos waste shall be deposited to a level no higher that 1.25 metres below the general elevation of the disposal area to ensure that daily cover material removal in the future does not encounter the asbestos waste.

Waste Limits

6.15 No waste, including daily cover, intermediate cover or final cover layer, shall be landfilled outside the limits of the base and final cover contours presented in Items 66 through 71 of Schedule "A"**(**the Development and Operations Plan) attached to this ECA .

Site Use

6.16 The area inside the fencing indicated in Appendix N18 of Item 30 of Schedule "A" shall be used for waste disposal purposes only. The remainder of the Site outside the fenced area shall be used for traditional agricultural crop production only.

Waste Inspection

6.17 All loads of waste must be properly inspected by trained Site personnel prior to disposal at the Site and waste vehicles must be diverted to appropriate areas for waste disposal.

Waste Deposit

6.18 The Owner shall deposit waste in a manner that minimizes exposure area at the landfill working face and waste shall be compacted before cover is applied.

Burning Waste Prohibited

6.19 Burning of waste at the Site is prohibited.

Signage

6.20 A sign shall be maintained at the main entrance/exit to the Site on which is legibly displayed the following information:

a. the name of the Site and Owner ;
b. the number of the ECA;
c. the name of the Operator;
d. the normal hours of operation;
e. the allowable and prohibited waste types;
f. a warning against unauthorized access;
g. the telephone number to which complaints may be directed;
h. a twenty-four (24) hour emergency telephone number (if different from above); and
i. a warning against dumping outside the Site .

6.21 The Owner shall install and maintain signs to direct vehicles to working face and recycling areas.

6.22 The Owner shall maintain signs at recycling depot informing users what materials are acceptable and directing users to appropriate storage area.

Hours of Operation

6.23 Waste shall only be accepted at the Site during the following time periods:

a. 7 AM to 7 PM - Monday to Saturday.

6.24 On-site equipment used for daily Site preparation and closing activities shall only be used during

a. 6 AM to 8 PM - Monday to Saturday.

6.25 With prior written approval of the District Manager, the time periods may be extended to accommodate seasonal or unusual quantities of waste or such factors as determined to be reasonable to the District Manager.

6.26 The Owner may provide limited hours of operation provided that the hours are posted at the landfill gate and that suitable notice is provided to the public of any change in operating hours.

6.27 Upon reasonable notice to the District Manager, contingency actions may take place outside normal hours of operation. Emergency response may occur at any time as required.

Site Security

6.28 During non-operating hours, the Site entrance and exit gates shall be locked and the Site shall be secured against access by unauthorized persons

Fencing

6.29 The entire area as shown in Figure 12 in Item 66 of Schedule "A" shall be fenced by the Owner with a 6 foot high wire woven highway-type paige fence.

Site Access

6.30 Access to and exit from the Site for the transportation of waste shall under normal circumstances be permitted from County Road 79.

Access Roads

6.31 a. On-Site roads shall be provided and maintained in a manner that vehicles hauling waste to and on the Site may travel readily and safely on any operating day. During winter months, when the Site is in operation, roads must be maintained to ensure safe access to the landfill working face.

b. Access roads must be clear of mud, ice and debris which may create hazardous conditions.

Vermin, Dust, Litter, Odour, Noise, Traffic

6.32 The Site shall be operated and maintained such that vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.

Scavenging

6.33 The Owner shall ensure that there is no scavenging as defined in O. Reg. 347 at the Site.

Dust

6.34 The Owner shall control fugitive dust emissions from on Site sources including but not limited to on-Site roads, stockpiled cover material and, closed landfill area prior to seeding especially during times of dry weather conditions. If necessary, major sources of dust shall be treated with water and/or dust suppression materials to minimize the overall dust emissions from the Site.

6.35 Dust shall be managed as per the Best Management Practices Plan (Dust) prepared by RWDI listed as Item 83 in Schedule "A".

Litter Control

6.36 The Owner shall take all practical steps to prevent escape of litter from the Site. All loose, windblown litter shall be collected and disposed of at the landfill working face.

6.37 Litter pickup will occur at least weekly on the Owner's property during all weather conditions.

6.38 The Owner will respond to litter complaints within one (1) day of the complaint being received.

6.39 Litter shall be managed in accordance with the Best Management Practices plan prepared by RWDI listed as Item 25 on Schedule "A".

Odour

6.40 Odour shall be managed in accordance with the Best Management Practices Plan (Odour) prepared by RWDI listed as Item 84 in Schedule "A".

Noise

6.41 The Owner shall comply with noise criteria in MECP Guideline entitled “Noise Guidelines for Landfill Sites" dated October 1998 as amended from time to time and the Site shall comply with the limits set in Publication NPC205. Bird bangers may be used at the Site for gull control provided that they produce reference impulsive sound not exceeding 125 dBAI at 5 metres from the bird banger.

6.42 Noise monitoring at the Site shall be undertaken by the Owner as per the document entitled "Environmental Noise Monitoring Program for the Warwick Landfill", dated June 15, 2007 prepared by Aercoustics Engineering Limited listed as Item 73 on Schedule "A".

Alteration of Best Management Plans for Odour, Dust and Litter

6.43 The Owner shall use the Best Management Plans (BMP's) for dust, odour and litter at the Sitein accordance with the applicable Conditions approved by this ECA. The Owner may submit changes in writing to the Director for approval to amend the BMP(s). At the same time any changes to the BMP's are submitted to the Director, the Owner shall provide the proposed changes to the BMP's to the Township of Warwick, WPLC and WIFN.

Surface Water

6.44 The Owner shall take all appropriate measures to minimize surface water from coming in contact with waste. Temporary berms and ditches shall be constructed around active waste disposal areas to prevent extraneous surface water from coming in contact with the active working face.

6.45 The Owner shall not discharge surface water to receiving water bodies without an approval under the EPA.

6.46 If surface water ponding occurs in any surface water ditches having a drainage slope less than 0.5%, the Owner shall regrade the ditches.

Application of Cover Material

6.47 Cover material shall be applied as follows:

a. Daily Cover - At the end of each working day, the entire working face shall be covered with a minimum thickness of 150 mm of soil cover or an approved alternative cover material;

b. Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 mm of soil cover or an approved alternative cover material shall be placed;

c. Final Cover - In areas where landfilling has been completed to final contours, a minimum 1.85 metre thick layer of final cover soil shall be placed. Fill areas shall be progressively completed and rehabilitated as landfill development reaches final contours; and

d. Topsoil - In areas where landfilling has been completed to final contours and where final cover has been placed, a minimum 0.15 metres thick layer of topsoil shall be placed.

Cover Materials Allowed

6.48 The following materials, in the corresponding thickness, may be used as an alternative to soil as a daily and intermediate cover:

a. Contaminated soil that satisfies the Schedule IV Toxicity Characteristic Leaching Procedure (TCLP) criteria as outlined in O. Reg. 347 as amended from time to time;
b. Wood chips (daily);
c. Automobile Shredder Residue (ASR) (daily); or
d. Tarps (daily)

6.49 The use of any other alternative materials as daily or intermediate cover material is subject to approval by the Director.

6.50 Use of alternative daily or intermediate cover materials shall be discontinued within two (2) working days of receipt of written notification from the District Manager, stating that the use of the alternative daily or intermediate cover materials at the Site has proven to be environmentally unsuitable.

Automobile Shredder Residue as Daily Cover

6.51 a. Automobile Shredder Residue (ASR) may be used as a daily cover at the Site on an on-going basis from the issuance of this Approval.

b. The Owner shall cease the use of ASR if written notification is received from the District Manager indicating that there are environmental concerns due to the use of ASR as daily cover based on the testing of the ASR required by Condition 6.52.

c. The Owner may re-commence the use of ASR upon the Owner submitting an action plan that is acceptable to the District Manager that can address the environmental concerns which were raised due to the the use of ASR as daily cover.

6.52 Automobile Shredder Residue samples of the daily cover material are to be taken on semi-annual basis (Spring and Fall) and submitted for analysis of O. Reg. 347 Schedule IV Inorganics, VOC's, and PAH's. Automobile Shredder Residue is to conform with the specifications of a non-hazardous waste under O. Reg. 347 as amended from time to time. Semi-Annually testing results are to be submitted to the District Manager upon receipt. The frequency of O. Reg. 347 testing of the daily cover material can be reduced subject to approval of the District Manager.

Contaminated Soil as Daily or Intermediate Cover

6.53 Contaminated soil equal to or below 10% of the TCLP value and/or 0.4 mg/L benzene may be landfilled in Cells 8, 10 and/or 12.

6.54 If confirmatory testing of the contaminated soil to be landfilled in Cells 8, 10 and/or 12 indicates an exceedance of 10% of the TCLP value and/or 0.4 mg/L of benzene, but satisfies the TCLP criteria as in O.Reg. 347, the soil may be used as daily and/or intermediate cover, and or landfilled as waste.

6.55 If the contaminated soil received at the Site does not meet the TCLP value, the contaminated soil shall be classified as a hazardous waste and shall be disposed of at a site that is approved to receive and dispose of hazardous waste.

6.56 Contaminated soil that satisfies the TCLP criteria may be used as daily and/or intermediate cover in the Expansion Site of the landfill. Contaminated soils may not be used on outside slopes which drain into the surface water system.

6.57 Contaminated soil used for daily and/or intermediate cover shall be sampled on a quarterly basis and submitted for analysis of O.Reg. 347 Schedule IV Inorganics, VOCs, PAHs and PCBs. Quarterly testing results shall be included in the annual report. The frequency of O. Reg. 347 testing of the cover material may be reduced subject to agreement of the District Manager.

6.58 Contaminated soil for use as daily cover and/or intermediate cover shall be stockpiled in areas of the

Site that have a leachate collection system installed below.

6.59 Surface water run off from the contaminated soils stockpile which exceeds the Provincial Water Quality Objectives shall not be discharged through the surface water management system.

6.60 The Owner must ensure that measures are in place for the on Site treatment and disposal of any contaminated run off from the contaminated soils stockpile.

6.61 Prior to receipt at the Site, each source of contaminated soils which are to be used as daily or intermediate cover shall be tested to determine if the soils meet the criteria in this ECA and a copy of the test results shall be kept in the daily records for the Site as required.

7.0 SITE OPERATIONS

Landfill Reclamation

7.1 The Owner shall restrict stockpiling of contaminated soil from Cells 8, 10 and 12 to sections of the landfill footprint that have a liner and leachate collection system.

Waste Processing and Composting

7.2 Waste Processing and composting is allowed at the location outlined in Item 49 on Schedule "A" subject to the following conditions:

a. Prior to the commencement of any waste processing or composting operations at the Site, the Owner shall ensure that air (Section 9 EPA) and noise approvals are obtained;
b. Prior to the start of composting operations at the Site, the Owner shall submit to the District Manager a contingency plan for any odour problems that may occur;
c. The total combined amount of waste that may be received at the Site for processing and composting shall not exceed **36,000 tonnes per year** and the maximum daily amount to be received at the Site shall not exceed **700 tonnes per day**;
d. The amount of waste that may be received at the Site for composting shall not exceed **7,500 tonnes per yea**r;
e. Material acceptable for processing and composting at the site shall include leaf, yard, agricultural waste, concrete, asphalt, wood and tires;
f. The bins for diversion shall be emptied on an as needed basis to prevent odours and operational problems. The Ministry may at any time instruct that a bin be emptied;
g. The Owner shall ensure that waste processing and composting is undertaken in a safe manner, and that all waste is properly handled, processed and contained so as not to pose any threat to the general public and site personnel;
h. All noise generating processing activities in the waste diversion area including concrete/asphalt/crushing, wood chipping and tire shredding shall only occur between 07:00 to 19:00; and
i. Any runoff that comes into contact with waste in the waste processing/composting area shall be managed in such a fashion to ensure compliance with Condition 8.5 of this ECA.

7.3 The Owner shall ensure that composting at the Site is undertaken in accordance with O.Reg 101/94 as amended from time to time and the Ministry document entitled "Interim Guidelines for the Production and Use of Aerobic Compost in Ontario " dated November 2004 as amended from time to time and the following requirements:

a. Only leaf and yard waste, Agricultural Waste as defined in Item 3 in Schedule "A" and wood (not including painted or treated wood or laminated wood) may be accepted at the compost area.
b. Leaf and yard waste is defined as waste consisting of natural Christmas trees and other plant materials but not tree limbs or other woody materials in excess of seven (7) centimetres in diameter.
c. The composting site shall only receive material for composting from May 1st to November 1st each year.
d. Leaf and yard waste, Agricultural Waste and wood may not be stored for more than four (4) days before it is composted.
e. During composting, the Owner shall provide the composting mass with adequate ventilation to ensure that aerobic conditions are maintained.
f. Cured compost must be analyzed for the parameters listed in Table 1 of O.Reg. 101/94 and shall not be removed from the Site unless it has been sampled and analyzed.
g. Cured compost is defined as meeting the specifications in Sections 7.2 to 7.5 inclusive of the Interim Guidelines for the Production and Use of Aerobic Compost in Ontario" dated November 2004 as amended from time to time and can be used on an unrestricted basis.
h. Compost is designated a waste if the compost contains a substance listed in Table 1 of O. Reg. 101/94 that has a concentration greater than the concentration listed in Column 2.
i. Controlled compost is defined as compost that is designated a waste under the previous condition but has concentrations less than the concentrations listed in Column 3 of Table 1 in O. Reg. 101/94.
j. Controlled compost may not be removed from the site except for direct shipment to the intended user.
k. Material from the composting process that fails to meet the "Interim Guidelines for the Production and Use of Aerobic Compost in Ontario" dated November 2004 shall be deemed to be a waste under O. Reg. 347 and shall be disposed of accordingly.
l. The person to whom controlled compost is shipped shall be given a copy of the chemical analysis of the compost and a notice that states that the compost is controlled compost and that sets out the terms and conditions of the compost's exemption from Part V of the EPA. A copy of this notice shall be kept on file at the Site.
m. The District Manager may at any time and at his absolute discretion instruct that any or all of the waste materials from the composting or processing operations or the processed waste from the composting or processing operations to be either landfilled or directed to be utilized for specific uses and in specific locations.

7.4 Record keeping for the composting operation shall be kept as follows:

a. Records about each composting mass shall be kept including temperatures of the mass, when the temperatures were measured, when the mass was turned, information about the

curing process and details about significant problems that occurred during composting or curing. This information shall be kept at the Site for at least three years after the mass was cured;

b. Records shall be kept of the analyses of compost. Any laboratory records shall be kept as part of the record. A record of an analysis shall be kept for at least three years after the analysis is performed; and

c. A record shall be kept of the name, address and telephone number of each person to whom controlled compost is shipped. The record shall be kept for at least ten (10) years after the shipment.

Tire Shred

7.5 The management and placement of tire shreds at the Site shall be in accordance with the Fire Protection and Prevention Act as follows:

a. No individual tire shred pile shall be more than 3 metres in height and 100 square metres in area. Six (6) metres of space shall be provided between all piles. Fifteen (15) metres is to be provided from property lines and thirty (30) metres shall be provided from tree lines;
b. A buffer of 4.5 metres is to be provided for grass or weeds from the edge of the tire pile to the edge of the pad.
c. A firebreak of 22 metres shall be provided between the two areas of 16 piles each.

7.6 If the total stockpiled tire shreds exceeds **300 cubic metres**, the storage period shall not exceed 90 (ninety) days.

7.7 The total amount of tire shreds stored on Site shall be recorded in a log book and made available to the Ministry for inspection.

Backup Power

7.8 The Owner shall maintain adequate backup power at the Site in order to ensure scale facility and landfill gas blower on site continue to operate and are not damaged due to an extended power outage. A power supply connection at each leachate collection pumping station shall be maintained by the Owner that will permit a portable generator to be connected during a power outage.

Landfill Gas

7.9 All buildings are to be free of any landfill gas accumulation. The Owner shall provide adequate ventilation systems to relieve landfill gas accumulations in buildings if necessary.

Landfill Gas Management

7.10 The Owner shall, manage landfill gas in accordance with Items 66 through 68, Items 75 through 77, and Item 81 of Schedule "A" and based on the landfill gas management system constructed under the

authority of the EPA Approval issued which may be amended or replaced from time to time.

Cleaning of Leachate Collection System

7.11 The leachate collection system piping for each stage of the landfill shall be inspected annually for the first five years after waste placement and then as often as future inspections indicate to be necessary. Additionally, leachate collection pipes must be cleaned whenever an inspection indicates that cleaning is necessary.

7.12 In areas where leachate collection pipe slopes are less than 0.5%, the leachate collection pipes shall be inspected semi-annually for the first three (3) years after waste placement and then as often as future inspections indicate to be necessary. Additionally, leachate collection pipes must be cleaned whenever an inspection indicates that cleaning is necessary. After the three (3) year period, inspection and cleaning of the leachate collection pipes shall be in accordance with the previous condition.

Leachate Collection System

7.13 All leachate collection pipes for Cell 12 shall be sloped at a minimum of 0.5%.

7.14 The Owner shall install 250 mm diameter perforated leachate collection pipes with perforations located at the 10:30, 4:30, 1:30 and 7:30 positions.

7.15 The stone for the leachate collection system shall have the following specifications:

a. D85 shall be greater than 37 mm where D85 is described as the stone diameter such that, when measured by weight, 85% of the stones in the layer have a smaller diameter;
b. D10 shall be greater than 19 mm where D10 is the stone diameter such that, when measured by weight, 10% of the stones in the layer have a smaller diameter;
c. D60/D10 shall be less than 2; and,
d. One per cent (1%) of the stones may pass a #200 sieve.

7.16 A minimum of 50 mm of stone shall be placed below the leachate collection pipes and a minimum of 250 mm of stone shall be placed above any leachate collection pipes.

7.17 The Owner shall ensure that the leachate collection system is constructed under the supervision of a qualified consultant.

Hydraulic Trap

7.18 The Owner shall ensure that a hydraulic trap is developed and maintained beneath the Expansion Area and shall ensure that a maximum leachate head of 300 mm on the landfill liner is not exceeded.

8.0 LEACHATE MANAGEMENT

Leachate Recirculation

8.1 Prior to implementing the leachate recirculation program , a report on the moisture content of the incoming waste and the actual field capacity of the waste in situ shall be submitted to the Director.

8.2 The Director may at any time, terminate leachate recirculation at the Site if, in the Ministry's opinion, adverse effects on the environment are observed.

8.3 Before starting leachate recirculation, the Owner shall provide to the Director a monitoring program to ascertain the effectiveness of the leachate recirculation process.

8.4 Leachate recirculation shall not occur in any above grade locations until final cover has been installed on exterior side slopes.

Leachate Management Plan

8.5 The Owner's leachate management plan shall not include any direct discharge of leachate or treated leachate from the Site, even as a contingency option, to surface waters, including Bear Creek. The Owner shall not discharge leachate or treated leachate to surface waters, including Bear Creek from the Site.

Leachate Treatment Plant

8.6 (1) (a) Within a minimum of three (3) years prior to closure of the landfill Site, the Owner shall ensure that a leachate treatment system is installed and operational at the Site.

(b) Leachate from the Site not sent to the operational drip irrigation area(s) approved under Condition 8.7 shall be disposed of off-Site at a location approved by the District Manager until the leachate treatment system required by Condition 8.6 (1)(a) is approved and operational.

(c) Any waste from the leachate treatment system that is to be disposed of in the landfill must be classified as a solid non-hazardous waste.

(d) The Owner shall implement all items within the document entitled Leachate Management Framework, listed as Item 86 in Schedule "A". These items include new and existing leachate monitor locations (wells, mini piezometers, and sump), leachate monitoring, leachate level reporting, Leachate Management Plan by March 31, 2020 and updated every 3 years, and the Leachate Treatment Facility Study to be completed at least 7 years prior to closure of the landfill.

(2) As part of the financial assurance calculation in Section 2.0, the Owner shall provide to the Director for approval, a detailed financial assurance plan including the cost of leachate transportation and disposal for the landfill site during the period preceding the initiation of the leachate treatment system. In addition, the Owner shall provide to the Director for approval a financial assurance plan detailing the capital cost of the on-Site leachate treatment system.

Phytoremediation of Leachate - Existing and Proposed Poplar Plantations

8.7 On-Site phytoremediation may occur at the Poplar System and Poplar Plantation in accordance with the following conditions:

a. The Owner shall ensure that there is a 100 metre grassed buffer at all times from the Poplar Plantation to the Kersey drain.

b. Irrigation of leachate onto the either the Poplar Plantation or the Poplar System shall not occur in the following instances:

i. Between the dates of October 16 to April 30
ii. On frozen or snow covered ground conditions;
iii. Under conditions that will cause ponded water or runoff;
iv. Conditions where surface water ponding within the area is occurring;
v. Where no poplar trees are currently planted;
vi. In areas within a drip irrigation area where trees have been harvested more than a frequency greater than every other tree;
vii. In areas within a drip irrigation area that has been fully harvested clear of trees and the trees have not started to coppice.

c. If weather forecasts indicate a rainfall storm greater than 12.5 mm/hour will occur, the Owner shall within 1 hour before the storm, shut off all irrigation of the poplar forest.

d. Irrigation zones shall be individually assessed by the Owner for suitability of irrigation after rainfall events greater than 12.5 mm.

e. Records shall be kept for the Poplar System and Poplar Plantation areas as follows:

i. quantities and dates of application of pesticides and herbicides;
ii. inspection notes regarding tree growth rates and health;
iii. inspection notes regarding condition and growth of underlying vegetative landfill cover (ie grass);
iv. observed pooling and/or runoff of irrigated liquid;
v. observations of any odours; and,
vi. weather conditions records as may be obtained from the nearest Environment Canada Weather Office which may include daily high and low temperatures, wind velocity and direction, and precipitation quantities.

f. Irrigation onto either the Poplar System or the Poplar Plantation shall be as follows:

i. Detailed records shall be kept of the quantities of irrigation liquid that are applied, including the dates of application onto either drip irrigation area;
ii. Operations in a given drip irrigation area must immediately stop if contamination problems in surface water or groundwater, which are attributable to the operation of the noted drip irrigation area, are found to be occurring. Recommencement of operations may proceed only upon further written notification of the District Manager;
iii. Operations of a given drip irrigation area must be discontinued immediately if

operation of the noted drip irrigation area causes surface runoff from the footprint area or if operations cause surface ponding within the drip irrigation area; operations cannot be restarted during that application day and can only be restarted after surface ponding has evaporated or infiltrated or conditions causing the runoff or ponding have been rectified;

iv. If there are any stoppages of operations under the requirements of items ii) or iii) above, then the District Manager shall be notified immediately; and,

v. If odours attributable to one of the drip irrigation areas become a problem at the site, then the District Manager shall be so informed in writing and the operation of the noted drip irrigation area shall be stopped pending further instructions from the District Manager;

g. (1) Monitoring of the drip irrigation Poplar System and the Poplar Plantation shall be in accordance with Items 63 through 65 of Schedule "A".

(2) Monitoring frequencies and analyses for the following items shall be as follows:

i. Daily inspections for ponded water or saturated soil during irrigation;
ii. Monthly testing of irrigation liquid quality during the irrigation season;
iii. Soil samples should be taken annually from grade to a depth of 0.6 m minimum and 0.9 m maximum;
iv. Annual soil analyses shall be conducted annually per Section 3.1 of Item 63 of Schedule "A", in addition to pH, electrical conductivity, cation exchange capacity, and sodium absorption ratio
v. Leaf Tissue analyses once per year in the fall; and
vi. Crop inspection once per year in the fall.

h. Reporting on the drip irrigation areas shall be part of the annual monitoring report for the Site and shall include but not be limited to the following:

i. results and an analysis of the results of the monitoring programs for the drip irrigation areas:
ii. assessment of the results of the vegetation as related to the stated objectives for the Poplar System and Poplar Plantation facilities construction and operations;
iii. assessment of the need to change the monitoring program for the drip irrigation areas and a recommendation of the required changes;
iv. tabulation and assessment of the volumes of leachate produced by the landfill, and those volumes which may be applied to the existing drip irrigation areas;
v. a report on operational problems identified during the operation of the drip irrigation areas and a discussion of each problem and details of what was done to rectify each problem;
vi. a Site plan which shows the location of the areas planted with both trees and grass cover and the vegetation used on those areas;
vii. an assessment of the monitoring results pertaining to the use of trees as vegetation on the final cover

i. The Director retains the right to request that the Owner conduct additional studies, suspend operations or require the Owner to provide additional methods to handle leachate at the Site in addition to or as a replacement to the drip irrigation areas.

j. If the Director requests removal of the drip irrigation areas, the Owner shall:

i. remove the irrigation equipment and the trees from the noted drip irrigation area. For the Poplar System, removal of trees shall include removal of tree stumps and most roots, excavate the trench to the maximum depth of root depth penetration on each tree row, and then replace, remould and recompact the excavated material;

ii. the landfill cover shall be restored to the same condition as it was in prior to commencement of the Poplar System and a blend of suitable grasses shall be seeded as necessary; and,

iii. within 6 months of completion of the noted drip irrigation area closure activities, submit to the Director a report outlining the work that has been completed.

k. Electrical conductivity of the shallow soil (maximum depth of 0.15 m) beneath the drip irrigation areas shall be monitored on a weekly basis during irrigation.

l. If salt levels are building up in the soil or additional irrigation with leachate is found to be detrimental to the health of the poplars, the leachate application rate shall be reduced or terminated.

Wood Waste and Leaf Litter

m. Any wood waste or leaf litter that is produced in the Poplar System or Poplar Plantation shall managed in accordance with Item 63 of Schedule "A".

Other Items

n. (1) Drip irrigation rates for the Poplar Plantation shall be no greater that the rate specified in the EPA approval for the Site.

(2) Drip irrigation rates for the Poplar System shall be no greater than the rates noted in Item 63 of Schedule "A".

o. No drip irrigation shall occur within fifty (50) metres of any surface watercourse or drain.

p. (1) Leachate to be used for drip irrigation on the Poplar Plantation shall not exceed the treated leachate effluent criteria specified in the EPAapproval for applicable industrial sewage works for the Site.

(2) Leachate to be used for drip irrigation on the Poplar System shall not exceed the

treated leachate effluent criteria specified in the Item 63 through 65 in Schedule "A".

q. The use of the Poplar Plantation to manage irrigation leachate will not be permitted without first providing the District Manger with at least two (2) months written notice of the anticipated irrigation liquid application date. The use of surface water to encourage tree growth will be permitted and will not be considered as irrigation liquid.

r. Monitoring and the associated reporting for the Poplar Plantation will commence at least two (2) months prior to irrigation liquid application and continue until two (2) years after cessation of irrigation liquid application to the Poplar Plantation.

Leachate Storage Tanks

s. The leachate storage tanks shall be inspected by a licenced plumber on an annual basis

t. The leachate storage tanks shall be cleaned and sediment removed at least once every two (2) years.

9.0 INSPECTIONS AND RECORDS

Inspections

9.1 The Owner shall inspect the Site monthly for the following items but not limited to these items:

a. Erosion rills;
b. General settlement areas or depressions;
c. Shear and tension cracks;
d. Condition of surface water drainage works;
e. Erosion and sedimentation in surface water drainage system;
f. Presence of any ponded water;
h. Adequacy of cover material;
i. Evidence of vegetative stress, distressed poplars or side slope plantings;
j. Condition of groundwater monitoring wells and gas wells;
k. Presence of insects, vermin, rodents and scavenging animals;
l. Condition of fence surrounding the Site; and
m. General Site appearance.

9.2 The Owner shall inspect the Site weekly for presence of leachate seeps.

Daily Inspections and Log Book

9.3 An inspection of the entire Site and all equipment on the Site shall be conducted each day the Site is in operation to ensure that the site is being operated in compliance with this ECA . Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the Site if needed.

9.4 A record of the inspections shall be kept in a daily log book or a dedicated electronic file that includes:

i. the name and signature of person that conducted the inspection;
ii. the date and time of the inspection;
iii. the list of any deficiencies discovered;
iv. the recommendations for remedial action; and
v. the date, time and description of actions taken.

9.5 A record shall be kept in a daily log book of all refusal of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

Monthly Records

9.6 Monthly Site inspection records in the form of a written log or a dedicated electronic file shall include but not be limited to the following:

a. the type, geographic source, date and time of arrival, hauler, and quantity (tonnes) of all waste received at the Site;
b. the area of the Site in which waste disposal operations are taking place;
c. a calculation of the total quantity (tonnes) of waste received at the Site during each operating day and each operating week;
d. Results of any test done to determine the acceptability of waste at the Site;
e. A reference for each load of solid non-hazardous industrial waste received, to the client and type of solid non-hazardous industrial waste;
f. the amount of any leachate removed, or treated and discharged from the Site;
g. a record of litter collection activities and the application of any dust suppressants;
h. a record of the daily inspections;
i. a description of any out-of-service period of any control, treatment, disposal or monitoring facilities, the reasons for the loss of service, and action taken to restore and maintain service;
j. type and amount of daily, intermediate and final cover used;
k. maintenance and repairs performed on equipment employed at the Site;
l. complaints received and actions taken to resolve them;
m. emergency situations and actions taken to resolve them; and
n. any other information required by the District Manager.

9.7 The Owner shall maintain on record at the Site for each client disposing of solid non-hazardous waste at the Site, a description of each type of solid non-hazardous waste received from the client and documentation to demonstrate that the Owner has taken reasonable care to ensure that waste classified as either hazardous or liquid industrial waste under O. Reg. 347 as amended from time to time, is not disposed of at the Site.

Record Retention

9.8 Except as authorized in writing by the Director, all records required by this ECA shall be retained at

the Site for a minimum of two (2) years from their date of creation.

9.9 The Owner shall retain all documentation listed in Schedule "A" for as long as this ECA is valid.

9.10 All monthly Site inspection records are to be kept at the Site until they are included in the Annual Report.

9.11 The Owner shall retain employee training records as long as the employee is working at the Site.

9.12 The Owner shall make all of the above documents available for inspection upon request of Ministry staff.

9.13 The Owner shall retain, either on-Site or in another location and notify the District Manager of this location, copies of the annual reports referred to in the preceding condition and any associated documentation of compliance monitoring activities and shall continue to do so for a period of at least two (2) years after the closure of the Site.

10.0 TRAINING

Employees and Training

10.1 A training plan for all employees that operate any aspect of the Site shall be developed and implemented by the Operator . Only trained employees shall operate any aspect of the Site or carry out any activity required under this ECA . Employees must provide proof of training to the Ministry upon request. For the purpose of this ECA "trained" means knowledgeable either through instruction or practice in:

a. the relevant waste management legislation including EPA, O. Reg. 347 and O. Reg. 232/98 , regulations and guidelines;
b. major environmental and occupational health and safety concerns pertaining to the waste to be handled;
c. the proper handling of wastes;
d. the management procedures including the use and operation of equipment for the processes and wastes to be handled;
e. the emergency response procedures;
f. the specific written procedures for the control of nuisance conditions;
g. the terms, conditions and operating requirements of this ECA and
h. proper inspection, receiving and recording procedures and the activities to be undertaken during and after a load rejection.

11.0 COMPLAINTS PROCEDURES

11.1 If at any time, the Owner receives complaints regarding the operation of the Site , the Owner shall respond to these complaints according to the following procedure:

a. The Owner shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information, the time and date of the complaint, specific details of operations that were occurring, any changers from normal operations, types of waste loads (including source) and other on Site activities;
b. The Owner, upon notification of the complaint, shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and
c. The Owner shall complete and retain on-Site a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents.

11.2 The Owner shall designate a person to receive any complaints and to respond with a written notice of action as soon as possible. The Owner shall post the Site complaints procedure at the Site entrance. All complaints and the Owner's actions taken to remedy the complaints must be summarized in the Annual Report.

11.3 All complaints received by the Owner are to be reported within twenty-four (24) hours of receipt to the District Manager, the Township of Warwick, the Environmental Inspector and WIFN. Complaints shall be reported to the WPLC at the next WPLC meeting.

12.0 EMERGENCY SITUATIONS

12.1 In the event of a fire or discharge of a contaminant to the environment, Site staff shall contact the MECP Spills Action Centre (1-800-268-6060) and the District Office of the MECP forthwith.

12.2 The Owner shall submit to the District Manager a written report within three (3) days of the spill or incident, outlining the nature of the incident, remedial measures taken and measures taken to prevent future occurrences at the Site.

12.3 The Owner shall ensure that adequate fire fighting and contingency spill clean up equipment is available in accordance with Item 66 of Schedule "A" and that emergency response personnel are familiar with its use and location.

13.0 MONITORING

Groundwater Monitors

13.1 The Owner shall ensure all groundwater monitoring wells are properly capped, locked and protected from damage.

13.2 In areas where landfilling is to proceed around monitoring wells, the wells must be decommissioned in accordance with O. Reg. 903 as amended from time to time and then replaced when waste placement and capping is completed.

13.3 Any groundwater monitoring wells included in the monitoring program shall be assessed, repaired, replaced or decommissioned as required.

13.4 The Owner shall repair or replace any monitoring well which is destroyed or in any way made inoperable for sampling such that no more than one sampling event is missed.

13.5 All monitoring wells that are no longer required as part of the groundwater monitoring program shall be decommissioned in accordance with good standard practice that will prevent contamination through the abandoned well and in accordance with O. Reg. 903. A report on the decommissioning shall be provided in the annual monitoring report for the period during which the well was decommissioned.

Monitoring Program

13.6 Monitoring programs shall be carried out for groundwater, surface water, landfill gas in accordance with the Environmental Monitoring Plan, as amended from time to time listed as Item 39 and Appendix H of Item 68 of Schedule "A".

13.7 The Owner shall ensure that Biochemical Oxygen Demand, Total Suspended Solids, Total coliform, Fecal coliform and E. Coli are added to the parameter list to be sampled for surface water station SS19.

13.8 Air Quality, Dust, Hydrocarbon, and Volatile Organic Carbon monitoring shall be undertaken in accordance with Item 85 in Schedule "A".

13.9 Air quality monitoring shall be in accordance with the canister method (USEPA TO-14/15) .

13.10 Noise monitoring shall be undertaken by the Owner at the Site in accordance with Item 28 on Schedule "A" including any noise monitoring in response to noise complaints.

13.11 No alterations to the groundwater, air quality, noise or surface water monitoring programs shall be implemented prior to receiving written approval from the District Manager. The Owner shall give all requests to the Township of Warwick, the WPLC and WIFN at the same time or prior to the time that such request is made to the District Manager.

14.0 CONTINGENCY PLANS AND TRIGGER MECHANISMS

Hydraulic Containment

14.1 If the leachate level elevation in any of the pumping stations wells listed below rise above their respective trigger level, the Owner shall take additional groundwater levels within four (4) weeks as detailed in Figure 2 of Item 39 and Appendix H of Item 68 of Schedule "A".

Monitoring location Trigger Leachate Elevation (mASL)

PS1 232.7
PS3 232.6
PS5 232.8
PS7 233.4

The assessment process for leachate levels is detailed in Figure 2 of Appendix H of Item 68 on Schedule “A”.

Groundwater Quality

14.2 The trigger concentration for groundwater quality shall be 80% of the Guideline B-7 values for parameters that have an Ontario Drinking Water Quality Standards value.

14.3 Groundwater chemical concentrations must be assessed with the trigger concentrations within six (6) weeks of sample collection.

14.4 The assessment process for groundwater quality is detailed in Figure 3 of Item 39 and Appendix H of of Item 68 of Schedule “A”.

Surface Water Quality

14.5 The trigger mechanisms for surface water quality shall be one of the following:

a. Where off Site surface water quality satisfies the Ministry’s PWQO, the respective PWQO shall be used as a trigger concentration; or

b. Where the background surface water quality naturally exceeds the PWQO, the background concentration should be considered in evaluating and updating the trigger concentration.

14.6 Surface water quality results will be assessed in accordance with the requirements established under the Industrial Sewage Works component of the EPAapproval for the Site.

14.7 The assessment process for surface water quality is detailed in Figure 4 of Appendix H of Item 68 in Schedule “A “.

Landfill Gas

14.8 If landfill gas concentrations exceed 10% LEL, the Owner shall undertake additional monitoring, assess the source and pathway of methane to determine if the elevated concentrations are landfill related.

14.9 If the elevated concentrations are landfill related, the Owner shall undertake contingency measures.

General Contingency Measures

14.10 In the event a result of a monitoring test exceeds the trigger mechanisms detailed above, the Owner shall:

a. notify the District Manager, the WPLC, WIFN and the Township of Warwick of any trigger level exceedances within twenty four (24) hours of receipt of the results;
b. conduct an investigation into the cause of the adverse result and submit a report to the District Manager that includes an assessment of whether contingency measures need to be carried out;
c. if contingency measures are needed, submit detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures, and a schedule as to when these measures will be implemented, to the Director and notify District Manager ; and
d. implement the required contingency measures upon approval by the Director .

15.0 REPORTING

Semi Annual Volume Determination

15.1 The Owner shall undertake semi-annual air space surveys of the bottom and top waste contours to determine the estimated air space used for waste disposal in the prior six months. The air space survey shall include daily cover material and shall take into account settlement. The first air space survey shall be undertaken by no later than February 2012 with an air space survey being completed semi-annually after the completion of the first air space survey, until landfill Site closure.

15.2 Wastes which the Owner has been ordered to dispose of at the Site by any ministry, department or agency of the federal or Provincial Crown shall be excluded from the air space survey calculations.

15.3 Each air space survey shall be conducted by an Ontario Land Surveyor or other qualified consultant and such air space survey shall be provided to the District Manager. The Owner shall keep a copy of each air space survey on-Site and make them available to MECP personnel upon request.

Quarterly Monitoring Reports

15.4 The Owner shall submit quarterly monitoring reports to the Township of Warwick, WIFN, District Manager and the WPLC within sixty (60) days of the end of the calendar quarterly reporting period starting **September 30, 2012**.

15.5 Each report will include the following:

a. a summary of monitoring activities and results;
b. a summary of any exceedences and related operator responses;
c. any complaints received and operator response;
d. a summary of mitigation activities for noise, dust, litter, air quality or other taken during the quarter in accordance with the Best Management Practices;
e. any proposed improvements to monitoring or operating procedures; and

f. any implemented improvements to monitoring or operating procedures that have been identified to address or reduce impacts.

Annual Report

15.6 A written report on the development, operation and monitoring of the Site , shall be completed annually (the "Annual Report"). The Annual Report shall be submitted to the Regional Director , the District Manager, the Township of Warwick, WIFN, and the WPLC, by **March 31st** of each year, and shall cover the 12 month period preceding December 31st.

15.7 The Annual Report shall include the following:

a. the results and an interpretive analysis of the results of all leachate, groundwater, surface water and landfill gas monitoring, including an assessment of the need to amend the monitoring programs;
b. an assessment of the operation and performance of all engineered facilities, the need to amend the design or operation of the Site , and the adequacy of and need to implement the contingency plans;
c. an assessment of the effectiveness of the Poplar Plantation and the Poplar System for leachate;
d. an assessment of the effectiveness of the on Site leachate treatment facility;
e. Site plans showing the existing contours of the Site;
f. areas of landfilling operation during the reporting period;
g. areas of intended operation during the next reporting period;
h. areas of excavation during the reporting period;
i. the progress of final cover, vegetative cover, and any intermediate cover application;
j. previously existing site facilities;
k. facilities installed during the reporting period;
l. Site preparations and facilities planned for installation during the next reporting period;
m. calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the Site during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;
n. a calculation of the remaining capacity of the Site, an estimate of the remaining Site life and a comparison of actual capacity used to approved Site capacity;
o. a summary of the quantity of any leachate or pre-treated leachate removed from the Site or leachate treated and discharged from the Site;
p. a summary of the weekly, maximum daily and total annual quantity (tonnes) of waste received at the Site;
q. a summary of any complaints received and the responses made;
r. a discussion of any operational problems encountered at the Site and corrective action taken;
s. an update summary of the amount of financial assurance which has been provided to the Director;
t. a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903;
u. any other information with respect to the site which the District Manager or Regional

Director may require from time to time;

v. a statement of compliance with all conditions of this ECA and other relevant Ministry requirements, guidelines and regulations;
w. summary of inspections undertaken at the Site;
x. a summary of recycling, processing and composting efforts undertaken including the amount of recyclable received, amount of processed material and composted material each year;
y. any changes in operations, equipment or procedures employed at the Site; and
z. recommendations regarding any proposed changes in operations of the Site.

16.0 SITE CLOSURE

Closure Plan

16.1 At least two (2) years prior to closure or when 90% of the site capacity is reached, whichever comes first, the Owner shall submit to the Director for approval, with copies to the District Manager, the Township of Warwick, WIFN and the WPLC, a detailed Site closure plan pertaining to the termination of landfilling operations at this Site , post-closure inspection, maintenance and monitoring, and end use. The plan shall include the following:

a. a plan showing Site appearance after closure;
b. a description of the proposed end use of the Site ;
c. a description of the procedures for closure of the Site, including:

    i.) advance notification of the public of the landfill closure;
    ii) posting of a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
    iii) completion, inspection and maintenance of the final cover and landscaping;
    iv) site security;
    v) removal of unnecessary landfill-related structures, buildings and facilities; and
    vi) final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;

d. a schedule indicating the time-period for implementing sub-conditions i) to vi) above.
e. descriptions of the procedures for post-closure care of the Site, including:

    i.) operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
    ii) record keeping and reporting; and
    iii) complaint contact and response procedures;

f. an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas;
g. an updated estimate of the contaminating life span of the Site , based on the results of the monitoring programs to date; and

h. an update of the cost estimates for financial assurance and the amount which has been provided to the Director to date.

16.2 The Site shall be closed in accordance with the closure plan as approved by the Director.

End Use

16.3 The Owner shall consult with affected stakeholders on the proposed end uses as committed to in Item 35 of Schedule "A" prior to the submission of its closure report under the EPA. The proposed end use activities should be consistent with the types of activities consulted upon during the EA.

Closure of the Site

16.4 Upon closure of the Site, the following features will be inspected, recorded on a quarterly basis and maintained as required on a seasonal basis :

a. evidence of settlement;
b. possible leachate seeps and springs;
c. cover soil integrity;
d. vegetative cover;
e. surface water drainage works;
f. erosion and sediment in surface water drainage system; and
g. groundwater monitoring wells.

16.5 A vegetative cover consisting of vegetation that is suited to local conditions and that is capable with minimal care of providing vigorous, plentiful cover no later than its 3rd growing season shall be established over all completed areas to control erosion and maximize evaportranspiration. The Owner shall complete planting as soon as possible after reaching final contours.

16.6 If weather conditions do not allow timely placement of final and vegetative cover, silt curtains shall be employed to minimize silt loadings to surface water bodies.

SCHEDULE "A"

1. Document entitled "Environmental Assessment Act Section 9 Notice of Approval to Proceed with the Undertaking" , Re: An Environmental Assessment for Warwick Landfill Expansion, Waste Management of Canada Corporation, EA File Number: EA-02-08-02-03, dated January 15, 2007.

2. Application for a Provisional Certificate of Approval for the Warwick Landfill, dated March 27, 2006.

3. Document entitled "Development and Operations Plans Warwick Landfill Expansion Volume 1 of 2" dated March 2006 prepared by Henderson, Paddon and Associates Limited.

4. Document entitled "Development and Operations Plans Warwick Landfill Expansion Volume 2 of 2" dated March 2006 prepared by Henderson, Paddon and Associates Limited.

5. Document entitled "Assessment of Geotechnical Design Requirements New Landfill Facility Warwick, Ontario" prepared by Alston Associates Inc., dated July 31, 2006.

6. Document entitled "2006 Poplar System Monitoring Report Warwick Landfill Site Township of Warwick Ontario" prepared by Jagger Hims Limited, dated January 2007.

7. Document entitled "Warwick Landfill Expansion Contaminating Lifespan Review" prepared by Jagger Hims Limited, dated March 2006.

8. Drawing No. 105716-111 entitled " Proposed Final Contours and Stormwater Management Plan" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

9. Drawing No. 105716-112 entitled " Landfill Bottom Contours (Top of Primary Gravel)" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

10. Drawing No. 105716-113 entitled "Landfill Perimeter Sections" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

11. Drawing No. 105716-114 entitled " Landfill Perimeter Sections" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

12. Drawing No. 105716-115 entitled "Leachate Collection Sump Details" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

13. Drawing No. 105716-116 entitled "Proposed Primary Leachate Collection System" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

14. Drawing No. 105716-117 entitled "Proposed Secondary Leachate Collection System" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

15. Drawing No. 105716-118 entitled "Landfill Sections" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

16. Drawing No. 105716-119 entitled “Landfill Perimeter Sections” prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

17. Drawing No. 105716-120 entitled “ Landfill Perimeter Sections” prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

18. Drawing No. 105716-125 entitled “Details and Sections” prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

19. Letter dated April 16, 2007 from Frank Ford, Henderson Paddon and Associated Limited to Wilf Ruland, Citizens Environmental Consulting.

20. Letter dated May 2, 2007 from Frank Ford, Henderson Paddon and Associated Limited to Wilf Ruland, Citizens Environmental Consulting.

21. Letter dated June 1, 2007 from Greg Washuta, P. Eng., M. Eng., Senior Waste Engineer, Ministry of the Environment to Reid Cleland, Waste Management of Canada Corporation.

22. Drawing No. 106716-127A entitled "Plough Furrow Surface Water Distribution Warwick Landfill" prepared by Henderson Paddon and Associates Limited, dated March 21, 2007.

23. Drawing No. 106716-F215 entitled "Proposed Mini-Transfer Area" prepared by Henderson Paddon and Associates Limited, dated March 29, 2007.

24. Report entitled "Best Management Practices Plan (Dust) Warwick Landfill Watford, Ontario " prepared by RWDI Air Inc., dated December 11, 2007.

25. Report entitled "Best Management Practices Plan (Litter) Warwick Landfill Watford, Ontario " prepared by RWDI Air Inc., dated December 11, 2007.

26. Report entitled "Best Management Practices Plan (Odour) Warwick Landfill Watford, Ontario " prepared by RWDI Air Inc., dated December 11**,** 2007.

27. Document entitled "Appendix F Air Quality Monitoring Plan and Letter", prepared by RWDI, dated November 29, 2007.

28. Document entitled "Environmental Noise Monitoring Program for the Warwick Landfill" , prepared by Aercoustics Engineering Limited, dated November 21, 2007.

29. Document entitled "Proposed Expansion of WM Warwick Landfill Predicted Noise Impact" , prepared by Aercoustics Engineering Limited, dated June 15, 2007.

30. Document entitled "Application for Approval of ECA of Approval A032203 Warwick Township County of Lambton MOE. Reference No. 0539-6N7TRY Part 1 of 2" , dated July 13, 2007, prepared by Henderson Paddon and Associates Limited.

31. Document entitled "Application for Approval of ECA of Approval A032203 Warwick Township County of Lambton MOE. Reference No. 0539-6N7TRY Part 2 of 2- Financial Assurances" , dated August 22, 2007, prepared by Henderson Paddon and Associates Limited.

32. Letter dated July 27, 2007 from Dan Toner, Assistant Director, Laboratory Services Branch to Tesfaye Gebrezghi, Supervisor- Waste Unit, MOE.

33. Table 6.1 entitled "Phasing-Analysis for Leachate Quantities WM- Warwick Landfill Expansion" prepared by Henderson Paddon and Associates Ltd., dated August 17, 2007.

34. Letter dated August 20, 2007 from John DeYoe, RWDI to Frank Ford, Henderson Paddon and Associates Limited.

35. Discussion Paper 9 entitled "Impact Management Plan" and all Appendices dated October 2005 prepared by Waste Management of Canada Corporation.

36. Letter Report and attachments dated May 10, 2001 from Frank C. Ford of Henderson, Paddon Environmental to Mark Turner, Environmental Assessment and Approvals Branch.

37. Development and Operations Report - Canadian Waste Services Inc. - Warwick Landfill, Warwick Township - Revised, dated October 1997, prepared by Henderson Paddon Environmental Inc.

38. Consolidated Report Leachate Management Plan - Canadian Waste Services Inc. - Warwick Landfill - Warwick Township dated July 2001 prepared by Henderson Paddon Environmental Inc.

39. Environmental Monitoring Plan - Warwick Landfill - Township of Warwick, Ontario dated December 2007, prepared by Jagger Hims Limited.

40. Letter dated October 11, 2007 from Brad Bergeron, RWDI to Greg Washuta, Senior Waste Engineer, Ministry of the Environment.

41. Report entitled "Stormwater Management Plan Poplar Irrigation Area Warwick Landfill Expansion Watford, Ontario" dated December 2007, prepared by Henderson Paddon Environmental Inc.

42. Letter dated November 21, 2007 from Kevin Smith, Aercoustics Engineering Limited to Wayne Jenken, Waste Management of Canada Corporation.

43. E-mail and attachments dated February 12, 2008 from Brad Bergeron, RWDI Air Inc. to Greg Washuta, Senior Waste Engineer, EAAB, MOE.

44. E-mail and attachments dated January 29, 2008 from Brad Bergeron RWDI Air Inc. to Greg Washuta, Senior Waste Engineer, EAAB, MOE.

45. Letter dated March 3, 2008 from Wayne Jenken, Landfill Engineer, WMCC to Ian Parrott, Manager, ECA of Approval Review Section, EAAB, MOE.

46. Letter dated June 13, 2008 from Frank Ford, Senior Environmental Engineer, Henderson Paddon and Associates Limited to Greg Washuta, P. Eng., Senior Waste Engineer, Waste Unit, EAAB, MOE.

47. Application for a Provisional Certificate of Approval for a Waste Disposal Site for the Twin Creeks Landfill Site, signed and dated December 11, 2008.

48. Letter dated December 11, 2008 from Reid Cleland, District Landfill Manager, WMCC to Doris Dumais, Approvals Director, EAAB, MOE.

49. Report entitled "Cell 12 Project and Changes Affecting The Warwick Landfill Expansion" and attached appendices, created by Henderson Paddon & Associates Limited, dated August 2008.

50. Application for a Provisional Certificate of Approval for a Waste Disposal Site for the Twin Creeks Landfill Site, dated August 11, 2008.

51. Letter dated December 18, 2008 from Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE to Reid Cleland, District Landfill Manager, WMCC.

52. Letter dated December 18, 2008 from Wayne Jenken, Landfill Engineer, WMCC to Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE.

53. Letter dated December 18, 2008 from Jason Balsdon and Brent Langille, Jagger Hims Limited to Wayne Jenken, Landfill Engineer, WMCC.

54. Application for a Provisional Certificate of Approval for a Waste Disposal Site for Waste Management of Canada Corporation's Twin Creeks Landfill Site, signed and dated January 16, 2009.

55. Report and Appendix A entitled "Waste Management of Canada Corporation Twin Creeks Landfill Use of Geonet for Secondary Drainage Layer" prepared by Henderson Paddon and Associates, dated January 2009.

56 Letter dated March 18, 2009 from Greg Washuta Senior Waste Engineer, Waste Unit, EAAB, MOE to Reid Cleland, Landfill Manager, WMCC.

57. Letter report and appendices A, B and C dated April 9, 2009 from Jeff Armstrong, Genivar Consultants LP to Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE.

58. Application for a Waste Disposal Site Certificate of Approval dated April 28, 2009 and signed by Reid Cleland, District Manager, Waste Management of Canada Corporation.

59. Report produced by Genivar Consultants LP entitled "Development & Operations Report for a Waste Transfer Station Application" dated June 2009.

60. November 24, 2009 e-mail from Jeff Armstrong of Genivar Consultants LP to Jim Chisholm, Senior Review Engineer with the Ministry of Environment indicating that the application is for an existing mini

transfer area but flexibility is being applied for to direct the waste collected at this area to alternate waste disposal sites.

61. November 24, 2009 e-mail from Jim Chisholm, Senior Review Engineer with the Ministry of Environment to Jeff Armstrong, Genivar Consultants LP, requesting information about how the Mini-Transfer Area already located at the landfill is covered by the existing Certificate of Approval and the December 21, 2009 e-mail response from Jeff Armstrong to Jim Chisholm to his November 24, 2009 e-mail, outlining that the Mini-Transfer Area is covered by the 1997 Design and Operation Report that is identified in Item 37 and attached page 7-4 of the report in which Section 7.8 dealt with the Mini-Transfer Area.

62. January 24, 2011, 12:11PM, e-mail from Wayne Jenken, Area Landfill Engineer, Waste Management of Canada Corporation to Jim Chisholm, Senior Review Engineer with the Ministry of Environment indicating that the original Mini Transfer Area moved to the new location on November 2009 and that the old location for the Mini Transfer Area has been removed. The e-mail also made suggested changes to a draft of the Notice.

63. Document entitled "Twin Creeks Landfill - Expansion of Poplar Cap Irrigation System for Existing Waste Disposal Area January 2010" prepared for Waste Management of Canada Corporation by Genivar Consultants LP dated January 2010.

64. Letter dated November 2, 2010 addressed to Mr. Reid Cleland, Waste Management of Canada Corporation from Mr. Greg Washuta, Ministry of the Environment providing comments and requesting additional information on MOE Reference File No. 1486-829MCN.

65. Document entitled "Twin Creeks Landfill, Watford, ON 091-13089-00 (91730R) - Application for Approval for Expansion of Poplar Plantation (South Fill Area) - Response to MOE Comments Letter dated November 2, 2010" prepared for Waste Management of Canada Corporation by Genivar Consultants LP dated December 2, 2010.

66. Report entitled "Development and Operations Plan - Warwick Landfill Expansion - Volume 1 of 3" prepared for WMCC by Henderson Paddon & Associates dated March 2008.

67. Report entitled "Development and Operations Plan - Warwick Landfill Expansion - Volume 2 of 3" prepared for WMCC by Henderson Paddon & Associates dated March 2008.

68. Report entitled "Development and Operations Plan - Warwick Landfill Expansion - Monitoring Plans - Volume 3 of 3" prepared for WMCC by Henderson Paddon & Associates dated March 2008.

69. Letter dated May 6, 2009 addressed to Mr. Reid Cleland, WMCC from Mr. Greg Washuta, Ministry of the Environment providing ministry review comments on the Development and Operations Plan

70. Letter dated August 19, 2009 addressed to Mr. Reid Cleland, WMCC from Mr. Greg Washuta, Ministry of the Environment providing comments from the Township of Warwick, Walpole Island First Nation and the Warwick Public Liaison Committee on the Development and Operations Plan

71. Letter dated November 12, 2009 addressed to Mr. Greg Washuta, Ministry of the Environment from Mr. Wayne Jenken, WMCC.

72. Drawing set entitled "Twin Creeks Landfill - Landscaping and Signage Detail Construction Drawings" prepared by Schollen & Company Inc. and dated July 4, 2008. The drawing set consists of the following:

    i. Cover page entitled "Twin Creeks Landfill - Landscaping and Signage Detail Construction Drawings" prepared by Schollen & Company Inc. and dated July 4, 2008;
    ii. Drawing No. L-1 entitled "Landscape Plan - Screening Berm";
    iii. Drawing No. L-1A entitled " Lanscape Detail at Intersections - Screening Berm"
    iv. Drawing No. L-2 entitled "Landscape Plan - Screening Berm";
    v. Drawing No. L-3 entitled "Landscape Plan - Screening Berm & Area F";
    vi. Drawing No. L-4 entitled "Landscape Plan - Screening Berm";
    vii. Drawing No. L-5 entitled "Landscape Plan - Screening Berm and Area G (North)";
    vii. Drawing No. L-6 entitled "Landscape Plan - Screen Planting Area G (South)";
    viii. Drawing No. L-7 entitled "Landscape Plan - Screen Planting and Creek Area A and Area B";
    ix. Drawing No. L-8 entitled "Landscape Plan - Screen Planting Areas C, D and E";
    x. Drawing No. L-9 entitled "Landscape Plan - Restoration Planting Area H";
    xi. Drawing No. LD-1 entitled "Landscape Detail Plan ";
    xii. Drawing No. LD-2 entitled "Landscape Notes and Master Plant List"; and
    xiii. Drawing No. LD-3 entitled "Signage Details";

73. Application for a Certificate of Approval for a Waste Disposal Site dated April 6, 2011 submitted by Waste Management of Canada Corporation for Provisional Certificate of Approval No. A032203 requesting approval for use of an alternative daily cover material and amended Best Management Practices for Odour.. The supporting documentation for the application included the following:

    i. Cover letter dated April 7, 2011 addressed to Mr. Tes Gebrezghi, Ministry of the Environment from Mr. Reid Cleland, Waste Management of Canada Corporation;
    ii. Report entitled "Best Management Practices Plan (Odour) Warwick Landfill" prepared for Waste Management of Canada Corporation by RWDI Air Inc. (Project No. 1100800) dated April 7, 2011;
    iii. Letter dated March 24, 2011 addressed to Mr. Wayne Jenken, Waste Management of Canada Corporation from Mr. Peter Pickfield, Garrod Pickfield; and
    iv. Email dated March 22, 2011 at 3:32 p.m. sent to Mr. Peter Pickfield, Garrod Pickfield from Mr. Wayne Jenken.

74. Letter dated October 4, 2011 addressed to Mr. Tesfaye Gebrezghi, Ministry of the Environment from Mr. Reid Cleland, Waste Management of Canada requesting an amendment to Condition 167 (a). The supporting documentation attached to the letter included the following:

    a. Application for a Certificate of Approval for a Waste Disposal Site dated October 4, 2011;
    b. Provisional Certificate of Approval A032203 Notice No. 7 dated June 1, 2011;
    c. Letter from Wayne Jenken, WMCC to Don Bruder, Township of Warwick dated February

23, 2011;

d. Letter from Wayne Jenken, WMCC to Don Bruder, Township of Warwick dated May 26, 2011;
e. Letter from Peter Pickfield, Garrod Pickfield LLP to Reid Cleland, WMCC dated September 14, 2011;
f. Letter from Wayne Jenken, WMCC to Dean Jacobs, Walpole Island First Nations dated July 14, 2011;
g. Email from Kent Hunter, Neegan Burnside to Wayne Jenken dated September 19, 2011 at 3:54 p.m.;
g. Email from Wayne Jenken, WMCC to Kent Hunter, Neegan Burnside dated September 20, 2011 at 1:52 p.m.;
h. Email from Kent Hunter, Neegan Burnside to Wayne Jenken dated September 27, 2011 at 10:23 a.m.;
i. WPLC meeting minutes dated September 15, 2011; and
j. WPLC meeting minutes dated April 7, 2011.

75. Letter dated May 22, 2012 addressed to Ms. Agatha Garcia Wright, Director, Ministry of the Environment from Mr. Wayne Jenken, Waste Management of Canada Corporation requesting amendment to Condition No. 7.10 (Landfill Gas Management). The letter included the following supporting documentation:

i. Letter report entitled "Early Vertical Gas Well Collection System" dated May 2012 and addressed to Mr. Reid Cleland, Waste Management of Canada Corporation from Mr. Frank Ford, GENIVAR Inc.;
ii. Drawings No. 102 and G111 - Landfill Gas Collection System;
iii. Landfill Gas Headers, Gas Building with Blowers and Landfill Gas Flaring System Design Drawings and Design and Operations Plan for Modifications;
iv. Description of Phase 1 of the Gas Collection System;
v. Revised Section 4.7 of the Design and Operations Plan;
vi. Application to Amend Environmental Compliance Approval No. A032203 and supporting documents;
vii. Consultation Summary and Records with Stakeholders; and
viii. Design Drawings for Amended Landfill Gas Management System.

76. Letter dated July 26, 2012 addressed to Mr. Reid Cleland, Waste Management of Canada Corporation from Mr. Dale Gable, Ministry of the Environment requesting additional information on the location of the proposed gas extraction wells.

77. Letter dated August 9, 2012 addressed to Mr. Dale Gable, Ministry of the Environment from Mr. Frank Ford, GENIVAR Inc. providing details on the location of the gas wells.

78. Letter Report dated May 9, 2012 addressed to Ms. Agatha Garcia Wright, Director, Ministry of the Environment form Mr. Wayne Jenken, Waste Management of Canada requesting Conditions 6.48 to 6.61 be amended. The letter report included the following Sections:

i. Environmental Compliance Approval application signed by Reid Cleland, WMCC and

dated May 9, 2012;
ii. Proof of legal name and zoning;
iii. Record of consultation with Township of Warwick;
iv. Record of consultation with Walpole First Island First Nation; and
v. Record of consultation with WPLC.

79. Letter report dated September 26, 2012 addressed to Ms. Agatha Garcia-Wright. Director, Environmental Approvals Branch, Ministry of the Environment from Mr. Philip Janisse and Mr. Brent Langille, RWDI Inc. requesting the time frame for the use of ASR be extended and the sampling frequency for the ASR be reduced.

80. Letter dated October 15, 2012 and supporting drawings addresses to Ms. Agatha Garcia-Wright. Director, Environmental Approvals Branch, Ministry of the Environment from Mr. Wayne Jenken, Waste Management of Canada Corporation detailing the proposed changes to the landscape plan for the Site. The supporting drawings include the following drawing prepared by Schollen and Company Inc (Contract No. 27007) dated June 2012:

i. Cover page entitled "Twin Creeks Landfill Expansion - Landscape and Details Drawings" dated June 29, 2012
ii. Drawing No. L-1 entitled "Landscape Plan - Screening Berm";
iii. Drawing L-1A entitled "Landscape Detail at Intersections - Screening Berms";
iv. Drawing L-2 entitled "Landscape Plan - Screening Berm";
v. Drawing L-3 entitled "Landscape Plan - Screening Berm and Area F";
vi. Drawing L-4 entitled "Landscape Plan - Screening Berm";
vii. Drawing L-5 entitled "Landscape Plan - Screening Berm and Area G";
viii. Drawing L-6 entitled "Landscape Plan - Area G Planting Area";
ix. Drawing L-7 entitled "Landscape Plan - Area A and Area B Screen Planting and Creek";
x. Drawing L-8 entitled "Landscape Plan - Area C, D and E Screen Planting";
xi. Drawing L-9 entitled "Landscape Plan - Area H Restoration Planting";
xii. Drawing LD-1 entitled "Landscape Detail Plan";
xiii. Drawing LD-2 entitled "Landscape Notes and Master Plant List";
xiv. Drawing LD-3 entitled "Signage Details";
xv. Drawing LD-4 entitled "Details"; and
xvi. Drawing LD-5 entitled "Details".

81. Letter dated November 13, 2013 addressed to Agatha Garcia-Wright, Director, Ministry of the Environment from Wayne Jenken, Waste Management of Canada Corporation requesting amendment to Condition 8.6 (a). The following supporting documentation was attached to the memorandum.

i. Amended Environmental Compliance Approval Number A032203 issued December 13, 2011
ii. Amended Environmental Compliance Approval Number A032203 Notice No. 1 issued February 29, 2012
iii. Application to Amend Environmental Compliance Approval No. A032203 with Signature of Reid Cleland in Section 1.4
iv. Record of Consultations with Stakeholders

82. Application package dated May 4, 2016 and received on May 16, 2016 including all subsequently submitted supporting documentation and drawings, including the amendment to the D&O plan and associated drawings.

83. Report titled "Twin Creeks Landfill Site: Best Management Practices Plan (Dust) - Version 7" prepared by RWDI Air Inc., dated May 19, 2017.

84. Report titled "Twin Creeks Landfill Site: Best Management Practices Plan (Odour) - Version 8" prepared by RWDI Air Inc., dated May 19, 2017.

85. Report titled "Twin Creeks Landfill Site: Ambient Air Quality Monitoring Plan (Revision #3)" prepared by RWDI Air Inc., dated May 18, 2017.

86. "WM Twin Creeks Landfill Site, Leachate Management Framework" prepared by HDR, dated November 29, 2017.

87. Application for a an amendment to ECA No. A032203 to provide detailed design for the construction of Cell 4 in response to Condition 4.8. Signed by Reid Cleland and dated October 16, 2018. The supporting documentation for the application included the drawing set titled "Waste Management of Canada Corporation, Twin Creeks Landfill Expansion, Warwick Township, Landfill Base Preparation Cell 4." Prepared by WSP Group, October, 2018. The drawing set consists of the following:

    i. Drawing No. 106716P-400 - "Title Sheet";
    ii. Drawing No. 106716P-401 - "March 2018 Existing Conditions Plan;
    iii. Drawing No. 106716P-402 - "Cell 4 - Bottom of Excavation - West";
    iv. Drawing No. 106716P-403 - "Cell 4 - Bottom of Excavation - East";
    v. Drawing No. 106716P-404 - "Cell 4 - Top of Primary Clay Liner - West";
    vi. Drawing No. 106716P-405 - "Cell 4 - Top of Primary Clay Liner - East";
    vii. Drawing No. 106716P-406 - "Cell 4 - Temporary Clay Seal - West";
    vii. Drawing No. 106716P-407 - "Cell 4 - Temporary Clay Seal - East";
    viii. Drawing No. 106716P-408 - "Cell 4 - Section and Details";
    ix. Drawing No. 106716P-409 - "Cell 4 - Section and Details";
    x. Drawing No. 106716P-410 - "Cell 4 - Section and Details";
    xi. Drawing No. 106716P-411 - "Cell 4 - Pumping Station PS5/PS6 Plans and Sections";
    xii. Drawing No. 106716P-412 - "Cell 4 - Pumping Station PS5/PS6 Plans and Sections";
    xiii. Drawing No. 106716P-413 - "Cell 4 - Sections and Details"; and
    xiv Drawing No. 106716P-414 - "Cell 4 - Sections and Details".

The reasons for the imposition of these terms and conditions are as follows:

Conditions 1.1, 1.2, 1.3, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.14, 1.15, 1.23, and 1.24 are to clarify the legal rights and responsibilities of the Owner and Operator under this Approval.

Conditions 1.4 and 1.5 are to ensure that the Site is designed, operated, monitored and maintained in accordance

with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.

Condition 1.12 is to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes.

Condition 1.14 is to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this Approval.

Conditions 1.15 and 1.16 are to ensure that the successor is aware of its legal responsibilities.

Conditions 1.17, 1.18, 1.19, and 1.20 clarify that the Part II.1 Director is an individual with authority pursuant to Section 197 of the Environmental Protection Act to require registration on title and provide any person with an interest in property before dealing with the property in any way to give a copy of the Approval to any person who will acquire an interest in the property as a result of the dealing.

Condition 1.21 is to ensure that appropriate Ministry staff has ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Approval. This Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the Act, the OWRA, the PA, the NMA and the SDWA.

Condition 1.25 clarifies what information may be subject to the Freedom of Information Act.

Condition 2.1 is to require Financial Assurance for this company to ensure that sufficient funds are available to the Ministry to clean up the Site in the event that the Owner is unable or unwilling to do so.

Conditions 3.1 to 3.15 inclusive are necessary in order to establish a forum for the exchange of information and public dialogue on activities to be carried out at the landfill site. Open communication with the public and local authorities is important in helping to maintain high standards for site operation and environmental protection.

Condition 3.16 has been included in order to ensure that consultation with First Nations is undertaken during the submission of any application to amend any approval required by the Ministry.

Conditions 4.1 to 4.6 inclusive, 4.8, and 4.9 is to ensure that the Site is designed, constructed and operated in an environmentally acceptable manner, based on the conceptual design and operations for the Site.

Condition 4.7 is to ensure the availability of as-built drawings for inspection and information purposes.

Condition 4.10 has been specifically included to allow for optimization of design for subsequent stages based on operating experience and monitoring results and to ensure that any necessary remedial action is undertaken before landfilling may proceed in the next stage.

Condition 4.11 has been included to ensure that the site has been constructed in accordance with the approved design plans, specifications and QA/QC procedures and to ensure that there is not an adverse impact on the environment.

Condition 4.12 is to ensure that there is a person, reporting directly to the Ministry, with associated costs reimbursed by the Owner, who is responsible for inspecting the Site, based on the requirements in this ECA of Approval to ensure that the Site is operated in an environmentally acceptable manner.

Conditions 4.13, 4.14, 15.1, 15.2 and 15.3 is to specify the amount of days the environmental inspector is required to be on site based on the conditions in this approval and in accordance with the previously approved EA for the site.

Condition 5.1 is to ensure safe side slopes of the berm.

The reason for Condition 5.2 is to approve the diversion area based on the information submitted. This is ensure the protection of the environment and the public.

Condition 5.3 is to approve the use of Cell 12 for contaminated soil.

Condition 5.4 is to ensure the Owner carries out the landscape plan based on the submitted information.

Conditions 6.1 and 6.18 are included in order to ensure that waste disposal at the site is undertaken in accordance with applicable Ministry of the Environment regulations and guidelines. Compliance with these regulations and guidelines will ensure that the site does not cause and adverse effect on the environment.

Conditions 6.4 and 6.7 is to specify the approved areas from which waste may be accepted at the Site and the types and amounts of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.

Condition 6.5 is to specify restrictions on the extent of landfilling at this Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity of the site. Approval to landfill beyond these limits would require an application with supporting documentation submitted to the Director.

Condition 6.6 specifies the maximum amount of waste that may be received at the site based on the previously approved Environmental Assessment for the site.

Condition 6.8 has been inserted to minimize the potential for clogging of the drainage layer and to minimize temperature effects on the leachate collection system. Failure to maintain the specified minimum thickness of waste and cover material may result in a decrease in the service life of the drainage layer.

Conditions 6.9 to 6.14 inclusive have been included in order to ensure asbestos waste is handled and disposed of in accordance with O. Reg. 347 as amended from time to time. Proper handling and disposal of asbestos waste ensures that the asbestos waste does not cause an adverse impact on the environment and also does not affect human health.

Condition 6.16 is needed to make certain that uses at the site are for waste disposal purposes only and not any other uses which may cause an adverse impact on the environment and human health.

Condition 6.17 is necessary in order to ensure that all waste loads are inspected and waste that is disposed of at the site is in accordance with the terms and conditions in this ECA of Approval.

Condition 6.19 is to ensure that open burning of municipal waste is not permitted because of concerns with air emissions, smoke and other nuisance affects, and the potential fire hazard.

Conditions 6.20 through 6.22 inclusive are to ensure that users of the Site are fully aware of important information and restrictions related to Site operations under this ECA of Approval.

Conditions 6.23 to 6.27 inclusive are to specify the normal hours of operation for the landfill Site and a mechanism for amendment of the hours of operation.

Conditions 6.28 to 6.30 inclusive are to specify site access to/from the Site and to ensure the controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.

Condition 6.31 is needed in order to make certain that the waste received at the site is in accordance with the ECA and O. Reg. 347.

Condition 6.32 has been included is to ensure that access roads are clear and do not pose a safety hazard to the general public.

Condition 6.33 is for the protection of public health and safety and minimization of the potential for damage to environmental control, monitoring and other works at the landfill Site. Scavenging is the uncontrolled removal of material from waste at a landfill site.

Conditions 6.34 to 6.40 inclusive are to ensure that the Site is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.

Condition 6.41 is to ensure that noise from or related to the operation of the landfill is kept to within Ministry limits and does not result in a hazard or nuisance to any person.

Condition 6.42 is included to ensure that noise monitoring is undertaken in accordance with the noise monitoring program prepared and to ensure that an independent acoustic audit is completed in accordance with the Ministry's requirements.

Condition 6.43 is to clarify when the Best Management Plans can be amended and the mechanism for amending the Best Management Plans.

Condition 6.44 is to ensure that appropriate measures are taken in order to prevent surface water from contacting waste so as not to cause an adverse effect on the environment.

Conditions 6.45 and 7.18 is to specify other approvals required for works and activities related to the operation of this Site as a landfill.

Condition 6.46 has been included is in order to prevent ponding in on site ditches and any adverse impact on the environment and human health.

Condition 6.47 is to ensure that landfilling operations are conducted in an environmentally acceptable manner. Daily and intermediate cover is used to control potential nuisance effects, to facilitate vehicle access on the site, and to ensure an acceptable site appearance is maintained. The proper closure of a landfill site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the site.

Condition 6.48 to 6.61 inclusive is to specify the approval requirements for use of alternative cover material at the Site.

Condition 7.1 is necessary so that runoff from contaminated soils does not create and adverse impact on the environment.

Conditions 7.2 and 7.3 are included in order to ensure that the composting and processing operations at the site are conducted in a fashion in accordance with Ministry's regulations, guidelines and so as not to pose a threat to human health or the environment.

Conditions 7.4, 9.3, 9.4, 9.5, 9.6 and 9.7 are to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this ECA of Approval, the EPA and its regulations.

Conditions 7.5 and 7.6 inclusive have been included are to ensure tire shred storage in accordance with the Fire Protection and Prevention Act and to protect the natural environment.

Condition 7.7 is to ensure that backup power is available so that all facilities remain operational during a power disruption thus preventing any adverse impacts on the environment.

Condition 7.8 has been inserted in order to ensure that concentrations of landfill gas do not pose a hazard to human health or the environment.

Condition 7.9 is to ensure that landfill gas is built and managed in accordance with the Ministry's requirement and regulation.

Condition 7.10 is needed in order to ensure that an adequate landfill gas management system is installed at the site in order to protect human health and the environment.

Conditions 7.11 and 7.12 are to minimize the potential for clogging of leachate collection pipes and to ensure effective operation of the leachate collection system components for as long as they are required. Failure to clean out these components on a regular basis may result in a decrease in their service lives. Regular cleaning of the leachate collection pipes is especially important during stages of landfilling when the level of both organic and inorganic constituents in the leachate is high and, consequently, the potential for clogging due to encrustation is greatest. As the landfill reaches the more stable methane producing stage, pipe cleaning may be required less frequently.

Condition 7.13 has been added to ensure adequate flow of leachate in the leachate collection pipes.

Conditions 7.14 to 7.17 are to ensure that the leachate collection system is designed and built in accordance with Regulations and the ministry's requirements.

Condition 7.18 is included is in order to prevent off site migration of leachate which may cause an adverse effect on the environment.

Conditions 8.1 to 8.4 inclusive are needed to ensure leachate recirculation is undertaken in accordance with the ministry's requirements and leachate recirculation does not pose an adverse impact on the environment.

Condition 8.5 is in accordance with EA condition 22 and protects the natural environment from any impacts due to discharge of raw or treated leachate to adjacent creeks.

Condition 8.6 is to ensure that a fully functional leachate treatment system is in place on site prior to waste placement.

Condition 8.7 clarifies the responsibilities of the owner, the requirements of the ministry, the authority of the Ministry and protects the natural environment and human health.

Conditions 9.1 and 9.2 are needed to ensure regular inspections of the site are conducted in order to protect the natural environment.

Conditions 9.8 to 9.12 inclusive is to ensure that accurate waste records are maintained to ensure compliance with the conditions in this ECA of Approval (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the EPA and its regulations.

Conditions 9.13, 15.4, 15.5 and 15.6 are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.

Condition 10.1 is to ensure that the Site is supervised and operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.

Conditions 11.1, 11.2 amd 11.3 is to establish a forum for the exchange of information and public dialogue on activities carried out at the landfill Site. Open communication with the public and local authorities is important in helping to maintain high standards for site operation and environmental protection.

Conditions 12.1 and 12.2 are to ensure that the Ministry is informed of any spills or fires at the Site and to provide public health and safety and environmental protection.

Condition 12.3 is contained in the ECA to guarantee that appropriate measures are taken by the County to prevent future occurrences of spills or fires at the site and to protect public health and safety and the environment.

Conditions 13.1 to 13.5 inclusive are to ensure protection of the natural environment and the integrity of the groundwater monitoring network.

Conditions 13.6 through 13.11 inclusive are to demonstrate that the landfill site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.

Conditions 14.1 through 14.10 inclusive are to ensure that the Owner follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site. A remedial action / contingency plan is necessary to ensure protection of the natural environment. A leachate contingency plan is a specific requirement of Reg. 232.

Conditions 16.1 and 16.2 are to ensure that final closure of the Site is completed in an aesthetically pleasing manner and to ensure the long-term protection of the natural environment.

Condition 16.3 ensures proper public consultation about the end use of the Site is undertaken and that the end use activities are consistent with those identified during the EA process.

Conditions 16.4 to 16.6 ensure that certain activities are undertaken upon closure of the site in order to ensure that the closed site does not affect the natural environment.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A032203 issued on December 13, 2011

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*****
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 19th day of December, 2020

Mohsen Keyvani, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

CF/
c: District Manager, MECP Sarnia
Brent J. Langille, RWDI

APPENDIX A2:

Amended Certificate of Approval [Industrial Sewage Works] No. 3506-7M5PU3, dated July 9, 2009

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDED CERTIFICATE OF APPROVAL
INDUSTRIAL SEWAGE WORKS
NUMBER 3506-7M5PU3
Issue Date: July 9, 2009

Waste Management of Canada Corporation (WM)
5045 South Service Rd, Suite 300
Burlington, Ontario L6L 5Y7

Site Location: Twin Creeks Landfill Site
8039 Zion Line
Warwick Township, County of Lambton, Ontario N0M 2S0
● Firstly, Part of Lot 19 & 20, Concession 3, S.E.R., and Part of Lots 20, 21 & 22, Concession 4, S.E.R., and Part of the Road Allowance between Lots 21 and 22, Concession 4, S.E.R., shown as Parts 1,2, and 3 on Plan 25R-9125 and Part 2 on Plan 25R-1903, Save and Except Part 1 on Plan 25R-6184.
● Secondly, Part of Lot 20, Concession 3 S.E.R, shown as Part 1 on Plan 25R-6184.

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

Establishment of a leachate collection, treatment, and disposal facility and a stormwater management facility to service the Twin Creeks Landfill Site located in the Township of Warwick, County of Lambton, consisting of the following:

STORMWATER MANAGEMENT FACILITY

Establishment of a stormwater management facility to service a 146.5 ha drainage area of the Twin Creeks Landfill Site Expansion within the 300 ha area of the Twin Creeks Landfill Site consisting of the following:

Stormwater Management Pond - SWM Pond #1:
a stormwater management facility (**SWM Pond #1**) to service a total drainage area of 33.7 ha consisting of the eastern part of the existing landfill site and future excess soil stockpile area, designed to provide quantity and quality control by attenuating peak stormwater flows from storm events up to 1:100 year return frequency including regional storm (Hazel) at or below pre-development levels, consisting of the following:

- one (1) approximately 1,300 m long perimeter trapezoidal ditch along the toe of the eastern side of the closed landfill having a 0.6 m wide bottom and 2H:1V side slopes, discharging collected stormwater to an extended detention wet pond described below;

- one (1) ditch along the south and west side of the leachate storage lagoon collecting runoff from the excess soil stockpile area, discharging collected stormwater to a forebay described below;

- one (1) forebay with approximate dimensions of 19 m long X 16 m wide bottom, and 4H:1V side slopes, discharging to an extended detention wet pond described below;

- one (1) extended detention wet pond with approximate dimensions of 294.0 m long bottom, 23.5 m wide bottom and 4H:1V side slopes, equipped with a permanent vertical baffle with a minimum elevation of 238.7 m ASL, providing a total storage capacity of 21,429 m³ consisting of a permanent pool storage volume of 3,651 m³ with an average depth of 0.5 m, and an extended storage volume of 17,778 m³ with an extended storage depth of 1.91 m, equipped with an outlet structure described below;

- an outlet structure consisting of two (2) 1500 mm diameter concrete manholes discharging through two (2) 750 mm diameter outlet pipes, each pipe equipped with a 1200 mm X 1200 mm concrete valve chamber and a sluice gate valve, to a perimeter ditch flowing towards a roadside ditch along County Road 79;

- one (1) 8.0 m wide emergency overflow structure with weir elevation of 239.55 m ASL discharging to a perimeter ditch flowing towards County Road 79 roadside ditch; and

- including all controls and appurtenances.

Stormwater Management Pond - SWM Pond #2:
a stormwater management facility (**SWM Pond #2**) to service a total drainage area of 67.9 ha consisting of southwestern part of the expanded landfill site, designed to provide quantity and quality control by attenuating peak stormwater flows from storm events up to 1:100 year return frequency including regional storm (Hazel) at or below pre-development levels, consisting of the following:

- two (2) approximately 400 m and 1500 m long perimeter ditches along the southern part of the landfill having a minimum depth of 1.0 m, and 3H:1V & 4H:1V side slopes discharging collected stormwater through two (2) culverts, 3000 mm X 1200 mm concrete box and 1390 X 970 mm CSPA, to a forebay described below;

- one (1) forebay with approximate dimensions of 47 m long X 30 m wide bottom and 4H:1V and 3H:1V side slopes, discharging to an extended detention wet pond described below;

- one (1) extended detention wet pond with approximate dimensions of 391.0 m long X 44.0 m wide bottom and 4H:1V and 3H:1V side slopes, providing a total storage capacity of 48,954 m³ consisting of a permanent pool storage volume of 10,856 m³ with a average depth of 0.60 m, and an extended storage volume of 38,098 m³ with an extended storage depth of 1.75 m, equipped with an outlet structure described below;

- an outlet structure consisting of one (1)1800 mm diameter and one (1) 2400 mm diameter concrete

manholes discharging through a 1050 mm and a 1200 mm diameter outlet pipes, each pipe equipped with a 2000 mm X 2000 mm concrete valve chamber and a sluice gate valve, to a roadside ditch along County Road 79;

- one (1) 18 m wide emergency overflow structure with weir elevation of 234.05 m ASL discharging to a roadside ditch along County Road 79; and

- including all controls and appurtenances.

Stormwater Management Pond - SWM Pond #3:
a stormwater management facility (**SWM Pond #3**) to service a total drainage area of 30.5 ha consisting of northwestern part of the expanded landfill site, designed to provide quantity and quality control by attenuating peak stormwater flows from storm events up to 1:00 year return frequency including regional storm (Hazel) at or below pre-development levels, consisting of the following:

- one (1) approximately 650 m long perimeter ditch along the northern part of the expanded landfill and one (1) approximately 500 m long perimeter ditch along the western part of the expanded landfill, each having a minimum of 1.0 m depth and 3H:1V & 4H:1V side slopes, discharging collected stormwater through a 3000 mm X 1200 mm concrete box culvert to a forebay described below;

- one (1) forebay with approximate dimensions of 33 m long X 25 m wide bottom and 4H:1V side slopes, discharging to an extended detention wet pond described below;

- one (1) extended detention wet pond with approximate dimensions of 255.0 m long, 36.0 m wide bottom and 3H:1V and 4H:1V side slopes, providing a total storage capacity of 24,996 m^3 consisting of a permanent pool storage volume of 4,843 m^3 with an average depth of 0.50 m, and an extended storage volume of 20,053 m^3 with an extended storage depth of 1.67 m, equipped with an outlet structure described below;

- an outlet structure consisting of three (3)1200 mm diameter concrete manholes discharging through two (2) 600 mm diameter and one (1) 450 mm diameter outlet pipes, each pipe equipped with 1200 mm X 1200 mm box concrete valve chamber and a sluice gate valve, to a roadside ditch along County Road 79;

- one (1) 9 m wide emergency overflow structure with a weir elevation of 238.00 m ASL discharging to a roadside ditch along County Road 79; and

- including all controls and appurtenances.

Stormwater Management Pond - SWM Pond #4:
a stormwater management facility (**SWM Pond #4**) to service a total drainage area of 14.4 ha consisting of the north eastern part of the expanded landfill site and norther part of the existing landfill site, designed to provide quantity and quality control by attenuating peak stormwater flows from storm events up to 1:100 year return frequency including regional storm (Hazel) at or below pre-development levels, consisting of the following:

- four (4) perimeter ditches collecting runoff from the northern side of the expanded landfill and from the northwestern portion of the existing landfill, having a minimum of 1.0 m depth and 3H:1V & 4H:1V side slopes, discharging collected stormwater through two (2) inlet structures to a forebay described below;

- one (1) forebay with approximate dimensions of 16 m long X 16 m wide bottom and 4H:1V side slopes, discharging to an extended detention wet pond described below;

- one (1) extended detention wet pond with approximate dimensions of 165.0 m long bottom, 20.0 m wide bottom and 3H:1V and 4H:1V side slopes, providing a total storage capacity of 8,328 m^3 consisting of a permanent pool storage volume of 1,812 m^3 with an average depth of 0.50 m, and an extended storage volume of 6,516 m^3 with an extended storage depth of 1.32 m, equipped with an outlet structure described below;

- an outlet structure consisting of one (1)1800 mm diameter concrete manhole discharging through one (1)1050 mm diameter outlet pipe equipped with 2000 mm X 2000 mm concrete valve chamber and a sluice gate valve to a perimeter ditch along Zion Line to a roadside ditch along Zion Line;

- one (1) 8 m wide emergency overflow structure with a weir elevation of 242.00 m ASL discharging to a road side ditch along Zion Line; and

- including all controls and appurtenances.

all in accordance with the Application for Approval of Industrial Sewage Works dated July 21, 2006 submitted by Waste Management of Canada Corporation, design specifications and drawings prepared by Henderson Paddon and Associates Limited, Owen Sound, Ontario and the following documents:

1. "Development and Operations Plans - Warwick Landfill Expansion - Volumes 1 and 2" dated March 2006, prepared by Henderson Paddon and Associates Limited, Owen Sound, Ontario.

2. Letter from Mr. J. Pullen, Waste Management of Canada Corporation, dated August 1, 2006 written in response to an additional information request letter from Stefanos Habtom, P.Eng., MOE dated July 17, 2006.

3. Letter and attachments from Mr. J. Pullen, Waste Management of Canada Corporation, dated December 14, 2006 written in response to an additional information request letter from Stefanos Habtom, P.Eng., MOE dated November 7, 2006.

LEACHATE TREATMENT AND DISPOSAL FACILITY

Establishment of a leachate collection, treatment, and disposal facility with a *Rated Capacity* of 300 m^3 /day to service Phases 1 to 4 and **with a plan to upgrade the facility** to a *Rated Capacity* 400 m^3/day to service Phases 5 to 9 and during closure and post closure period of the Twin Creeks Landfill Site expansion, consisting of the following:

Raw Leachate Pumping Stations

- four (4) 7.3 L/sec capacity primary raw leachate pumps and four (4) 3.5 L/sec secondary leachate pumps together with their associated forcemains discharging to the equalization tank described below.

Equalization Tank

- one (1) 2,300 m³ capacity steel and glass lined tank enclosed with a clay berm containment area, receiving raw leachate from the landfill leachate collection system, equipped with three (3) 9.6 L/sec capacity variable frequency drive (VFD) recirculation pumps during Phases 1 to 4 and a total of three (3) 9.6 L/sec capacity VFD raw leachate pumps (two duty, one standby) during Phases 5 to 9, all pumping leachate to the leachate treatment system described below; and

- two (2) 27.7 L/sec capacity VFD raw leachate pumps (one duty, one standby) to be used in combination to fill the Sequencing Batch Reactor (SBR) reactors at a faster rate.

Chemical Feed System

- one (1) 1.0 m³ capacity phosphoric acid solution storage tank equipped with two (2) 32.0 L/hr capacity metering pumps (one duty for each SBR reactor with with interconnecting piping for redundancy) dosing phosphoric acid into the SBR reactors as required;

- one (1) 1.0 m³ capacity flocculant storage tank equipped with two (2) 363 L/hr capacity metering pumps (one duty for each SBR reactor with with interconnecting piping for redundancy) dosing flocculant upstream of the SBR reactors as required;

- one (1) 1.0 m³ capacity anti-foam agent storage tank equipped with two (2) 32.0 L/hr capacity metering pumps (one duty for each SBR reactor with with interconnecting piping for redundancy) dosing anti-foam agent upstream of the SBR reactors as required;

- one (1) 10.0 m³ capacity methanol storage tank equipped with a spill containment structure and two (2) 144 L/hr capacity metering pumps (one duty for each SBR reactor with with interconnecting piping for redundancy) dosing methanol upstream of the SBR reactors as required; and

- one (1) 88 m³ capacity in-ground high strength carbon waste storage tank equipped with two (2) 288 L/hr capacity metering pumps (one duty for each SBR reactor with with interconnecting piping for redundancy) dosing high strength carbon waste upstream of the SBR reactors as required.

Sequencing Batch Reactor (SBR)

- a sequencing batch reactor consisting of two (2) reactors each with approximate dimensions of 6.4 m long x 16.2 m wide x 5.5 m SWD providing active reactor volume of 572 m³, each tank equipped with a jet aeration header and one 227 L/sec capacity dry pit jet pumps and a decanter system capable of decanting 69.4 L/sec; and

- three (3) 50 hp positive displacement air blowers each with VFD control and with a capacity of 462 L/sec at 65.5 kPa supplying the air required for SBR aeration.

Effluent and Sludge Pumps

- two (2) effluent transfer pumps (one duty for each SBR reactor with with interconnecting piping for redundancy) each with 69.4 L/sec capacity transferring effluent from the SBR units to an effluent holding tank described below; and

- two (2) activated sludge wasting pumps (one duty for each reactor) each with 22 L/sec capacity transferring activated wasted sludge to aerated sludge tanks described below.

Effluent and Sludge Holding Tanks

- one (1) 400 m^3 storage capacity effluent holding tank with approximate dimensions of 9.75 m long x 8.5 m wide x 5.5 m SWD equipped with coarse bubble diffusers, discharging to a reverse osmosis membrane filtration system described below;

- two (2) aerated sludge tanks operating in either parallel or series mode, each with approximate dimensions of 11.8 m long x 3 m wide x 5.5 m SWD providing a storage capacity of 200 m^3 equipped with coarse bubble diffusers, two (2) supernatant pumps returning supernatant to the SBR units described above, and two (2) sludge pumps discharging settled sludge to a sludge dewatering press described below; and

- three (3) 141 L/sec at 65.5 kPa capacity 20 hp positive displacement air blowers with VFD control providing air required for the effluent tank and sludge holding tanks.

Reverse Osmosis Membrane Filtration System

- one (1) 15.0 m^3 capacity treated effluent storage tank equipped with one (1) 8.3 L/sec pump discharging to a cartridge sand filtration unit described below;

- one (1) 7,000 L capacity sulphuric acid storage tank for pH adjustment of effluent at the effluent storage tank described above;

- two (2) dual redundant 3.47 L/sec capacity cartridge sand filtration unit discharging to a reverse osmosis membrane filtration system described below;

- one (1) three-staged reverse osmosis membrane filtration system with an overall treatment capacity of 3.47 L/sec consisting of three (3) filtration units, equipped with a 32 piece ST-RO membrane modules, a 20 piece ST-RO membranes modules, a 15 piece ST-NF membrane modules and the following pumps:

    1. four (4) high pressure plunger pumps with capacity of 1.8 L/s each (1st and 2nd stage RO);
    2. five (5) multistage centrifugal booster pumps with under water motor with capacity of 2.8 L/s each (1st and 2nd stage RO);
    3. one (1) multi stage vertical centrifugal pump (cleaning pump) with the capacity of 3.47 L/s;
    4. one (1) high pressure plunger pump with the capacity of 1.06 L/s (3rd stage NF);
    5. three (3) multistage centrifugal booster pumps with under water motor with the capacity of 2.8 L/s each (3rd stage NF); and

6. one (1) multi stage vertical centrifugal pump (cleaning pump) with the capacity of 1,06 L/s.

all discharging final permeate to a treated effluent storage pond described below and final concentrate to a concentrate storage tank described below;

Standby Power

- two (2) independent electric power sources from Hydro One to the landfill site;

- contingency plans, including off-site disposal of leachate, shall be in place to address issues associated with the leachate treatment system arising out of extended power outages from the dual source Hydro One power line;

Treated Effluent Storage Ponds

- one (1) 2,200 m³ capacity clay lined pond **(Inlet cell)** equipped with a floating aerator and one (1) pumping station manhole with one (1) 30 m³/hr capacity submersible pump;

- one (1) 53,900 m³ capacity clay lined pond **(Cell 1)** equipped with one (1) interconnecting manhole with a gate valve; and

- one (1) 28,400 m³ capacity clay lined pond **(Cell 2)** providing storage for treated effluent from the membrane filtration system, equipped with one (1) interconnecting manhole with a gate valve, a pumping station **(Pumping Station 11)** equipped with one (1) 56.9 L/sec 40 hp VFD submersible pump to be used for truck loading purposes, one (1) 7.3 L/sec capacity 5 hp submersible effluent return pump, and two (2) 45.7 L/sec capacity 50 hp VFD submersible irrigation pumps (one duty, one standby) discharging to a poplar tree land irrigation area described below;

Concentrate Evaporator and Dryer

- one (1) 102 m³ concentrate storage tank with approximate dimensions of 4.4 m long x 4.8 m wide and 5.5 m SWD equipped with one (1) 9.5 L/sec capacity pumps for off-site disposal, also used for off-site disposal slurry, and one (1) 0.63 L/sec capacity pumps for transferring concentrate to an evaporator treatment system described below;

- one (1) 0.63 L/sec capacity mechanical vapor compression evaporator equipped with electric heating element and heat exchangers to remove moisture from concentrate and produce a slurry discharging to a slurry holding tank described below;

- one (1) 102.0 m³ capacity slurry holding tank with approximate dimensions of 4.4 m long x 4.8 m wide and 5.5 m SWD equipped with one (1) 1.57 L/sec capacity slurry pump discharging to a slurry dryer described below; and

- one (1) 0.035 L/sec capacity slurry dryer with approximate dimensions of 4.7 m long x 2.1 m wide x 1.5 m high discharging to a salt cake disposal bin (water vapour will be evaporated through the slurry dryer exhaust).

Treated Effluent On-Site Disposal

Upon substantial completion of the Works, treated leachate effluent will be disposed as follows:

- one (1) 21.7 ha poplar tree irrigation land established to handle (during Phases 1 to 4) an average of 909 m^3/day of treated leachate effluent during suitable irrigation days between the period extending from May 1st to October 15th, consisting of six (6) 3.62 ha treated effluent drip-irrigation zones using approximately 250 m long drip-irrigation tubing installed in each zone;

- one (1) 6.62 ha poplar tree irrigation land established to handle (during Phases 5 to 9) an additional 278 m^3/day (bringing the total to 1,187 m^3/day) of treated leachate effluent during suitable irrigation days between the period extending from May 1st to October 15th, consisting of two (2) 3.31 ha treated effluent drip-irrigation zones using approximately 250 m long drip-irrigation tubing installed in each zone;

- a stormwater management system to control the quality of stormwater runoff from the poplar tree irrigation land to Kersey Drain (Brown Creek), consisting of one (1) west furrow approximately 710 m long and 200 mm deep and one (1) east furrow approximately 510 m long and 200 mm deep, running parallel to each other with a grassed area in between, each equipped with a 200 mm high berm for distributing stormwater runoff across the entire length of the furrow, discharging by sheet flow to Kersey Drain; and

- including all controls and associated appurtenances.

Raw/Diluted Leachate Effluent Disposal

- one (1) existing 3.33 ha poplar tree irrigation system identified as the South Fill Area (SFA) Poplar System, of approximately 150 m length for each poplar row. Leachate is applied through pressure drip-irrigation tubing at a rate not to exceed 476 mm/m^2, or 149,000 L/day, during the growing season. The system is subject to conditions as specified in the *EPA* Section 27 approval for the site.

- a system of maintenance holes, collector system and leachate sump accross the existing site to transfer leachate to the leachate holding tanks via two methods: 1) down-hole leachate pumps transfer leachate through portable piping units directly to the leachate holding tanks; and 2) the use of a tanker truck, which tranfers the leachate via gravity drainage into the leachate holding tanks.

all in accordance with the Application for Approval of Industrial Sewage Works submitted by Waste Management of Canada Corporation, conceptual design specification and drawings prepared by Conestoga-Rovers & Associates, Waterloo, Ontario and the following documents:

1. "Technical Design Brief On-Site Leachate Treatment Facility - Warwick Landfill Site Expansion - Waste Management of Canada Corporation, Watford, Ontario" dated August 2007, prepared by Conestoga-Rovers & Associates, Waterloo, Ontario.
2. "Development and Operations Plans - Warwick Landfill Expansion - Volumes 1 and 2", prepared by Henderson Paddon and Associates Limited, Owen Sound, Ontario.
3. Additional information provided by Conestoga-Rovers dated September 20, 2007 in response to items #1 and #2 of MOE letter dated September 18, 2007 regarding proposed leachate treatment facility.
4. Additional information provided by Henderson Paddon & Associates Limited dated September 19,

2007 in response to item #3 of MOE letter dated September 18, 2007 regarding the proposed effluent storage ponds.

5. Additional information provided by Jagger Hims Limited dated September 25, 2007 in response to items #4, #5, and #6 of MOE letter dated September 18, 2007 regarding the operation and monitoring of the proposed poplar tree irrigation area.
6. "Stormwater Management Plan, Poplar Irrigation Area, Warwick Landfill Expansion, Watford Ontario" dated December 2007, prepared by Henderson Paddon & Associates Limited, Owen Sound, Ontario.
7. "Environmental Monitoring Plan, Warwick Landfill Expansion, Township of Warwick, Ontario" dated December 2007, prepared by Jagger Hims Limited, Newmarket, Ontario.
8. "Stormwater Management Plan Poplar Irrigation Area, Warwick Landfill Expansion, Watford Ontario" dated December 2007, prepared by Henderson Paddon & Associates Limited, Owen Sound, Ontario.
9. "Application for Approval of Industrial Sewage Works submitted by Waste Management of Canada Corporation for site name change from Warwick Landfill Site to Twin Creeks Landfill Site" dated July 10, 2008.
10. Application for Approval of Industrial Sewage Works submitted by Waste Management of Canada Corporation for update of leachate STP components" dated October 27, 2008, and supporting documents.
11. Appendix Q of the Development & Operations Report - Warwick Landfill Expansion, Volume 1 of 3, prepared by Henderson Paddon & Associates Ltd., dated March 2008.
12. Letter from Jagger Hims Limited of Windsor, ON to Reid Cleland of Waste Management of Canada Corporation, dated December 12, 2008, in response to comments provided by Edgardo Tovilla of the MOE on letter dated December 11, 2008.
13. Letters from Wayne Jenken of Waste Management of Canada Corporation to Edgardo Tovilla of the MOE, dated December 15, 2008, with comments to draft CofA.
14. Documents titled "Groundwater Contingency and Remedial Action Plan" and "Surface Water, Contingency Remedial Action Plan, Warwick Landfill Site", prepared by Jagger Hims Limited, dated April 2008 and contained in Appendix N.26 and 27 respectively, in the Operations and Maintenance Manual, Warwick Landfill Expansion, WM, May 2008.
15. Letter from Peter C. Pickfield of Garrod Pickfield LLP Lawyers on behalf of the Township of Warwick to Edgardo Tovilla of the MOE, dated June 26, 2009, in response to request for comments on the WM application for approval.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"*Act* " means the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended;

"*Average Daily Flow* " means the cumulative total sewage flow to the sewage works during a calendar year divided by the number of days during which sewage was flowing to the sewage works that year;

"*BOD5* " (also known as $TBOD_5$) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demand;

"*CBOD5* " means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measured in an unfiltered sample;

"*Certificate* " means this entire certificate of approval document, issued in accordance with Section 53 of the *Act* , and includes any schedules;

"*Daily Concentration* " means the concentration of a contaminant in the effluent discharged over any single day, as measured by a composite or grab sample, whichever is required;

"*Director* " means any *Ministry* employee appointed by the Minister pursuant to section 5 of the *Act* ;

"*EPA* " means any *Environmental Protection Act,* R.S.O. 1990, c.E.19, as amended from time to time;

"*District Manager* " means the District Manager of the Sarnia District Office of the Ministry;

"*Ministry* " means the Ontario Ministry of the Environment;

"*Monthly Average Concentration* " means the arithmetic mean of all *Daily Concentrations* of a contaminant in the effluent sampled or measured, or both, during a calendar month;

"*Owner* " means Waste Management of Canada Corporation and includes its successors and assignees;

"Proposed Works " means the sewage works described in the *Owner* 's application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate* ;

"*Rated Capacity* " means the *Average Daily Flow* for which the *Works* are approved to handle;

"Substantial Completion" has the same meaning as *"substantial performance* " in the Construction Lien Act;

"*Township* " refers to the Township of Warwick;

"*Works* " means the sewage works described in the *Owner* 's application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate* and includes both *Previous Works* and *Proposed Works* ;

"*WIFN* " refers to Walpole Island First Nation; and

"*WPLC* "refers to the Warwick Public Liaison Committee.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

PART I - GENERAL

1. GENERAL PROVISIONS

(1) The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

(3) Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

(4) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

(5) The requirements of this *Certificate* are severable. If any requirement of this *Certificate*, or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this certificate shall not be affected thereby.

2. CHANGE OF OWNER

(1) The *Owner* shall notify the *District Manager* and the *Director*, in writing, of any of the following changes within 30 days of the change occurring:

(a) change of *Owner*;

(b) change of address of the *Owner*;

(c) change of partners where the *Owner* is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, R.S.O. 1990, c.B17 shall be included in the notification to the *District Manager*;

(d) change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations

Information Act, R.S.O. 1990, c. C39 shall be included in the notification to the *District Manager* ;

(2) In the event of any change in ownership of the *Works* , other than a change to a successor municipality, the *Owner* shall notify in writing the succeeding owner of the existence of this *Certificate* , and a copy of such notice shall be forwarded to the *District Manager* and the *Director* .

PART II - STORMWATER MANAGEMENT FACILITY

3. UPON THE SUBSTANTIAL COMPLETION OF THE WORKS

(1) Upon the *Substantial Completion* of the *Proposed Works* , the Owner shall prepare a statement, certified by a Professional Engineer, that the works are constructed in accordance with this *Certificate* , and upon request, shall make the written statement available for inspection by Ministry personnel.

(2) Within one (1) year of the *Substantial Completion* of the *Proposed Works* , a set of as-built drawings showing the works "as constructed" shall be prepared. These drawings shall be kept up to date through revisions undertaken from time to time and a copy shall be retained at the *Works* for the operational life of the *Works* .

4. OPERATIONS MANUAL

(1) The *Owner* shall prepare an operations manual prior to the commencement of operation of the *Works* , that includes, but not necessarily limited to, the following information:

(a) operating procedures for routine operation of the works;

(b) inspection programs, including frequency of inspection, for the works and the methods or tests employed to detect when maintenance is necessary;

(c) repair and maintenance programs, including the frequency of repair and maintenance for the works;

(d) contingency plans and procedures for dealing with potential spill, bypasses and any other abnormal situations and for notifying the *District Manager* ; and

(e) complaint procedures for receiving and responding to public complaints.

(2) The *Owner* shall maintain the operations manual up to date through revisions undertaken from time to time and retain a copy at the location of the sewage works. Upon request, the *Owner* shall make the manual available for inspection and copying by *Ministry* personnel.

(3) The *Owner* shall notify and provide the *Township, WPLC* and WIFN with a copy of the

proposed operations manual required under Condition 4(1).

5. MONITORING AND RECORDING

The *Owner* shall carry out the following monitoring program:

(1) All samples and measurements taken for the purposes of this *Certificate* shall be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

(2) The *Owner* shall collect grab samples of stormwater from the pond outlets at **SWM Pond #1 (SP1), SWM Pond #2 (SP2), SWM Pond #3 (SP3)**, and **SWM Pond #4 (SP4)** and **Poplar Irrigation Area sampling locations SS17A, SS17B, SS18A** and **SS18B** at least **at a quarterly frequency*** [NOTE] and analyse for the parameters listed in Table 1 below:

Table 1 - Stormwater Monitoring
Sampling Locations: SWM Pond Outlets - SP1, SP2, SP3, SP4.
Irrigation Area - SS17A, SS17B, SS18A and **SS18B.**

Parameter	Parameter	Parameter	Field -Parameter
Alkalinity	Magnesium	Toluene	Conductivity
Total Ammonia Nitrogen	Potassium	Ethylbenzene	Dissolved Oxygen
Un-ionized Ammonia	Sodium	Xylene	pH (Field)
Chloride	Arsenic	Vinyl Chloride	Temperature
Conductivity (Lab)	Barium	1,2,4-Trichlorobenzene	Turbidity
Nitrate Nitrogen	Boron	1,2-Dichlorobenzene	
Nitrite Nitrogen	Cadmium	1,3-Dichlorobenzene	
TKN	Chromium (Total)	1,4-Dichlorobenzene	
pH (Lab)	Copper	Hexachlorobenzene	
Total Phosphorus	Iron	Diethylphthalate	
Total Suspended Solids	Lead	Dimethylphthalate	
Total Dissolved Solids	Mercury	Di-n-butyl phthalate	
Sulphate	Nickel	Phenol	
BOD5	Zinc	Benzo(a)pyrene	
Chemical Oxygen Demand	Benzene	2,4,6-Trichlorophenol	
Phenols	1,4-Dichlorobenzene	2,4-Trichlorophenol	
Calcium	Dichloromethane	Pentachlorophenol	

*** Note:** Samples shall be collected within twenty four hours after a rainfall event (more than 10 mm rainfall in 24 hour period) resulting in a stormwater discharge from each SWM Pond or Poplar Tree Irrigation Area at a minimum interval of one (1) month between consecutive sampling events.

(3) The methods and protocols for sampling, analysis, and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

(a) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (August 1994), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions; and
(b) the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition) as amended from time to time by more recently published editions.

(4) The measurement frequencies specified in Condition 5 (2) in respect to any parameter are minimum requirements which may, after 24 months of monitoring in accordance with this Condition, be modified by the *District Manager* in writing from time to time.

(5) The *Owner* shall provide to the *Township* , *WPLC* , and *WIFN* a copy of all requests to be submitted to the *District Manager* for any changes to the monitoring program specified in Condition 5 (2) at the same time or prior to the time such request is made to the *District Manager*.

(6) The *Owner* shall provide to the *District Manager* as part of the next quartely report after issuance of this Certificate a detailed calendar for the proposed completion schedule of the stormwater management works. Updated calendars will be submitted to the *District Manager* on quartely basis as construction progresses until the completion of the stormwater management works. This process will provide a reasonable construction schedule that accounts for construction delays due to weather and other unforseen delays.

6. OPERATION AND MAINTENANCE.

(1) The *Owner* shall apply the "Stormwater Contingency and Remedial Action Plan" as included in Appendix N.27 of the Operations and Maintenance Manual, Warwick Landfill Expansion, WM, May 2008.

(2) Within one (1) year of the commencement of operation of the *Works* (**SWM Ponds and Poplar Tree Irrigation Area)**, the *Owner* shall prepare an annual report establishing revised trigger levels for allowing stormwater discharges from the *Works* (**SWM Pond and Poplar Tree Irrigation Area**). The revised trigger levels shall be established for the trigger parameters outlined in Table 2 under Condition 6 (4) based on 75 percentile of the annual surface water monitoring results from surface water sampling location **SS10** upstream of the landfill.

(3) The *Owner* shall operate the *Works* (**SWM Ponds**) with the outlet sluice gate valve in a **Normally Open Position** during normal operation period.

(4) The *Owner* shall compare monitoring results obtained under Condition 5 (2) for the trigger parameters listed in Table 2 with their respective trigger levels listed in Table 2 to identify any potential leachate impact to stormwater.

Table 2	
Trigger Parameter	**Trigger Level** (mg/L)
Ammonia (unionized)	0.020*
Boron	0.20*
Chloride	210*
Chromium (Total)	0.0089*
Nickel	0.025*
Phenols	0.001*
Zinc	0.020*

Note: * The above shown trigger levels are based on PWQO and will be used until adequate monitoring data is collected from Sampling Location SS10 to calculate the corresponding 75 percentile of background surface water concentration levels. Annually, a trigger level for a parameter listed above will be replaced by the corresponding 75 percentile of background surface water concentration where background surface water concentrations collected upstream of the landfill (Sampling Location SS10) exceed the PWQO or the trigger value set for chloride.

(5) In the event that a monitoring result for any parameter that is listed in Table 2 for any of the **SWM Ponds** exceeds its trigger level, the *Owner* shall conduct sampling of the contents of the affected **SWM Pond** within one (1) week to confirm the exceedence of the trigger level for that parameter and identify potential source of contamination. Upon confirmation of the exceedence of any trigger level for any parameter that is listed in Table 2, the *Owner* shall close the outlet sluice gate valve of the affected *Works* (**SWM Pond**) and implement an approved "Stormwater Contingency and Remedial Action Plan".

(6) The *Owner* shall dispose of the contents of an affected *Work* (**SWM Pond)** which failed to meet the quality requirements outlined in Condition 6 (5) in accordance with an approved "Stormwater Contingency and Remedial Action Plan".

(7) In the event that a monitoring result for any parameter that is listed in Table 2 for the **Poplar Tree Irrigation Area** exceeds its trigger level, the *Owner* shall conduct sampling of the stormwater runoff from the affected part of **Poplar Tree Irrigation Area** as soon as possible to confirm the exceedence of the trigger level for that parameter and identify potential source of contamination. Upon confirmation of the exceedence of any trigger level for any parameter that is listed in Table 2, the *Owner* shall implement an approved "Stormwater Contingency and Remedial Action Plan".

(8) The *Owner* shall inspect the *Works* **(SWM Ponds)** at least once a year and, if necessary, clean and maintain the Works to prevent the excessive build-up of sediments and/or vegetation.

(9) The *Owner* shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken, and shall keep the logbook at the site or *Owner* 's operational head quarter for inspection by the *Ministry* . The logbook shall include the following:

(a) the name of the Works (SWM Pond #1, SWM Pond #2, SWM Pond #3, and SWM Pond #4);
(b) the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed; and
(c) the occurrence date of each spill within the catchment area of a given SWM Pond, including follow-up actions / remedial measures undertaken.

(10) The *Owner* shall notify and provide the *Township, WPLC* and *WIFN* with a copy of the proposed "Stormwater Contingency and Remedial Action Plan" required under Condition 6 (1).

7. RECORD KEEPING

The *Owner* shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the operation and maintenance and monitoring activities required by this *Certificate* .

PART III - LEACHATE TREATMENT FACILITY

8. EFFLUENT LIMITS

(1) The *Owner* shall design and construct the *Proposed Works* and operate and maintain the *Works* such that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent discharged from the **Treated Effluent Storage Pond** (Cell 2) to the poplar plant irrigation area.

Table 3 - Effluent Limits
Sampling Location: **Discharge Point from Treated Effluent Storage Pond**

Effluent Parameter	**Average Monthly Concentration** (milligrams per litre unless otherwise indicated)
Column 1	Column 2
Total Ammonia Nitrogen	68.7
Total Phosphorus	0.72
Phenols	0.2
Chlorides	247
Copper	0.014
Iron	27.0
pH of the effluent maintained between 6.0 to 9.5, inclusive, at all times	

(2) For the purposes of determining compliance with and enforcing subsection (1):

(a) The *Average Monthly Concentration* of a parameter named in Column 1 of subsection (1) shall not exceed the corresponding maximum concentration set out in Column 2 of subsection (1);

(b) The pH of the effluent shall be maintained within the limits outlined in subsection (1), at all times.

(3) The effluent limit set out in subsection (2) shall apply upon the commencement of operation of the proposed poplar forest irrigation area.

9. OPERATION AND MAINTENANCE

(1) The *Owner* shall exercise due diligence in ensuring that, at all times, the *Works* and the related equipment and appurtenances used to achieve compliance with this *Certificate* are properly operated and maintained. Proper operation and maintenance shall include effective performance, adequate funding, adequate operator staffing and training, including training in all procedures and other requirements of this *Certificate* and the *Act* and regulations, adequate laboratory facilities, process controls and alarms and the use of process chemicals and other substances in the *Works* .

(2) The *Owner* shall prepare an operations manual prior to the commencement of operation of the *Proposed Work* , that includes, but not necessarily limited to, the following information:

(a) operating procedures for routine operation of the *Works* ;

(b) inspection programs, including frequency of inspection, for the *Works* and the methods or tests employed to detect when maintenance is necessary;

(c) repair and maintenance programs, including the frequency of repair and maintenance for the *Works* ;

(d) procedures for the inspection and calibration of monitoring equipment;

(e) a spill prevention control and countermeasures plan, consisting of contingency plans and procedures for dealing with equipment breakdowns, potential spills and any other abnormal situations, including notification of the *District Manager* ; and

(f) procedures for receiving, responding and recording public complaints, including recording any follow-up actions taken.

(3) The *Owner* shall maintain the operations manual current and retain a copy at the location of the *Works* for the operational life of the *Works* . Upon request, the *Owner* shall make the manual available to *Ministry* staff.

(4) The *Owner* shall notify and provide the *Township, WPLC* and *WIFN* with a copy of the proposed operations manual required under Condition 9(2).

10. MONITORING AND RECORDING

The *Owner* shall, upon commencement of operation of the *Works* , carry out the following monitoring program:

(1) All samples and measurements taken for the purposes of this *Certificate* are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

(2) For the purposes of this condition, the following definitions apply:

(a) Daily means once each day;

(b) Weekly means once each week;

(c) Monthly means once every month;

(d) Semi-annually means once every six months.

(3) Samples shall be collected at the following sampling points, at the frequency specified, by means of the specified sample type and analysed for each parameter listed and all results recorded:

Table 4 - Leachate Monitoring
Sampling Location: **Equalization Tank**

Parameters	Sample Type	Frequency
BOD5	Grab	Quarterly
Dissolved Organic Carbon (DOC)	Grab	Quarterly
Total Phosphorus	Grab	Quarterly
Total Kjeldahl Nitrogen	Grab	Quarterly
BTEX	Grab	Quarterly
pH	Grab	Quarterly
VOCs Note 1	Grab	Semi-Annually
Semi-VOCs Note 2	Grab	Semi-Annually
Metals Note 3	Grab	Semi-Annually
General Chemistry Note 4	Grab	Semi-Annually

Table 5 - Leachate Treatment Plant Effluent Monitoring Sampling Location: **Discharge to Treated Effluent Storage Pond**		
Parameters	**Sample Type**	**Frequency**
CBOD5	Grab	Weekly
Dissolved Organic Carbon (DOC)	Grab	Weekly
Total Ammonia Nitrogen	Grab	Weekly
Chloride	Grab	Weekly
BTEX	Grab	Weekly
pH	Grab	Weekly
VOCs[Note 1]	Grab	Monthly
Semi-VOCs [Note 2]	Grab	Monthly
Metals [Note 3]	Grab	Monthly
General Chemistry [Note 4]	Grab	Monthly
PCB	Grab	Semi-Annually
Organochlorides	Grab	Semi-Annually

Table 6 - Treated Effluent Storage Pond Effluent Monitoring Sampling Location: **Discharge to Poplar Plant Irrigation Area**		
Parameters	**Sample Type**	**Frequency**
CBOD5	Grab	Weekly
Dissolved Organic Carbon (DOC)	Grab	Weekly
Total Ammonia Nitrogen	Grab	Weekly
Chloride	Grab	Weekly
BTEX	Grab	Weekly
pH	Grab	Weekly
VOCs[Note 1]	Grab	Monthly
Semi-VOCs [Note 2]	Grab	Monthly
Metals [Note 3]	Grab	Monthly
General Chemistry [Note 4]	Grab	Monthly

Note 1: VOCs: Benzene, 1,4-Dichlorobenzene, Dichloromethane, Toluene, Ethylbenzene, Xylenes, and Vinyl Chloride.

Note 2: Semi-VOCs: 1,2,4-Trichlorobenzene, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, Hexachlorobenzene, Diethylphthalate, Dimethylphthalate, Di-n-butyl phthalate, Phenol, Benzo(a)pyrene, 2,4,6- Trichlorophenol, 2,4-Dichlorophenol, Pentachlorophenol.

Note 3: Metals: Arsenic, Barium, Boron, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Mercury, Nickel, Zinc.

Note 4: G. Chemistry: Alkalinity, Calcium, Chloride, Conductivity, COD, Nitrate, Nitrite, Magnesium, pH, Potassium, Sodium, Sulphate, Total Dissolved Solids, TKN, Temperature, Turbidity, Total Phosphorus, TSS, Phenols, Dissolved Oxygen.

(4) The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

(a) the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only), as amended from time to time by more recently published editions;

(b) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (January 1999), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions; and

(c) the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition), as amended from time to time by more recently published editions;

(5) The measurement frequencies specified in Condition 10 (3) in respect to any parameter are minimum requirements which may, after 24 months of monitoring in accordance with this Condition, be modified by the *District Manager* in writing from time to time.

(6) The *Owner* shall provide to the *Township* , *WPLC* , and *WIFN* a copy of all requests to be submitted to the *District Manager* for any changes to the monitoring program specified in Condition 10 (3) at the same time or prior to the time such request is made to the *District Manager*.

(7) The *Owner* shall install and maintain (a) continuous flow measuring device(s), to measure the flowrate of the effluent from the *Works* with an accuracy to within plus or minus 15 per cent (+/- 15%) of the actual flowrate for the entire design range of the flow measuring device, and record the flowrate at a daily frequency.

(8) The *Owner* shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this *Certificate* .

(9) The *Owner* shall visually inspect the existing and proposed drip-irrigation pipeline systems at least once per week during operation period to look for leaking and/or failed (broken) lines that would otherwise produce runoff. The inspection should be supported by a log book documenting routine inspection and notes on repair as required.

11. GROUNDWATER MONITORING - POPLAR TREE LAND IRRIGATION AREA

(1) The Owner shall establish at least four (4) groundwater monitoring wells designated as OW16, OW40, OW60 and OW79 (for Effluent Storage Ponds), OW61 and OW62 (for Poplar Forest Irrigation Area).

(2) The Owner shall collect grab samples during May and November from the sampling locations outlined in subsection (1) at the frequency indicated in Table 7 and analyze for the parameters listed in Table 7 below.

Table 7 - Groundwater Monitoring
Sampling Location: **OW40, OW60 and OW79 - at Annual Frequency**
Sampling Location: **OW16, OW61, and OW62 - at Semi-Annual Frequency**

Parameters	Parameters	Field Parameters
Alkalinity	Boron	pH
Conductivity	Cadmium	Conductivity
Chloride	Lead	Turbidity
pH	Iron	
Dissolved Organic Carbon	Barium	
Total Dissolved Solids	Benzene	
Total Ammonia	1,4-Dichlorobenzene	
Total Kjeldahl Nitrogen	Dichloromethane	
Sulphate	Ethylbenzene	
Nitrate	Vinyl Chloride	
Calcium	Toluene	
Potassium	Xylenes	
Sodium		
Magnesium		

(3) Notwithstanding subsection (2), the *Owner* shall collect at least one groundwater sample from each of the locations in subsection (1) prior to the initial land application event and have these samples analysed for the same parameters as outlined in subsection (2).

(4) The methods and protocols for sampling, analysis and recording shall conform to that outlined in Condition 10(4).

(5) The measurement frequencies specified in Condition 11 (2) in respect to any parameter are minimum requirements which may, after 24 months of monitoring in accordance with this Condition, be modified by the *District Manager* in writing from time to time.

(6) The *Owner* shall provide to the *Township* , *WPLC* , and *WIFN* a copy of all requests to be submitted to the *District Manager* for any changes to the monitoring program specified in Condition 11 (2) at the same time or prior to the time such request is made to the *District*

Manager.

12. OPERATION - POPLAR TREE LAND IRRIGATION

(1) The *Owner* shall apply the "Groundwater Contingency and Remedial Action Plan" for any potential groundwater impact caused by Effluent Storage Ponds and the Poplar Forest Irrigation Area, as included in Appendix N.26 of the Operations and Maintenance Manual, Warwick Landfill Expansion, WM, May 2008.

(2) The *Owner* shall compare monitoring results obtained under Condition 11 (2) for the trigger parameters listed in Table 8 with their respective trigger levels listed in Table 8 to identify any potential leachate impact to groundwater.

Table 8

Trigger Parameter	**Trigger Level** (mg/L)		
	Active Aquitard	Interstadial Silt and Sand	Interface Aquifer
Chloride	106	116	134
Nitrate	2.3	2.3	2.3
Boron	1.1	2.1	2.6
Cadmium	0.001	0.001	0.001
Lead	0.002	0.002	0.002
Benzene	0.001	0.001	0.001
1,4-Dichlorobenzene	0.001	0.001	0.001
Dichloromethane	0.01	0.01	0.01
Vinyl Chloride	0.0004	0.0004	0.0004

(3) In the event that a monitoring result for any parameter that is listed in Table 8 exceeds its trigger level, the *Owner* shall re-sample within one (1) month to confirm the exceedence of the trigger level for that parameter. Upon confirmation of the exceedence of any trigger level for any parameter that is listed in Table 8, the *Owner* shall conduct a second round re-sampling within six (6) months to re-confirm the exceedence of the trigger level for the parameter of concern.

(4) In the event that the presence of the parameter(s) of concern is (are) not confirmed after the second round of sampling conducted under Condition 12 (3), then, normal groundwater monitoring shall be resumed.

(5) In the event that the presence of the parameter(s) of concern is confirmed after the second round of sampling conduced under Condition 12 (3), then, it shall constitute as a confirmation of leachate impact to groundwater and the *Owner* shall immediately implement the "Groundwater Contingency and Remedial Action Plan" approved under Condition 12 (1).

(6) The *Owner* shall notify the *District Manager* orally, as soon as possible, and in writing within seven days of the confirmation of leachate impact to groundwater including an assessment of the relative severity and extent of leachate impact and proposed remedial actions.

(7) The Owner shall record and report a summary of all trigger exceedence incidents and all remedial action measures taken under Condition 12 (5) in the Annual Report prepared under Condition 14.

(8) The *Owner* shall dispose of **only** treated leachate effluent that meets the effluent limits requirements outlined under Condition 8 (1) for treatment and disposal by drip-irrigation on the approved poplar tree land area during the period between May 1st and October 15th.

(9) The Owner shall not allow under any circumstance (including as emergency contingency plan) any direct discharge of leachate or treated leachate effluent from the *Works* to any receiving surface water including Bear Creek;
.

(10) The *Owner* shall record the total volume of treated leachate effluent drip-irrigated on the poplar tree land irrigation area on a daily basis.

(11) The *Owner* shall ensure that treated leachate effluent is disposed of via drip-irrigation in the designated six (6) poplar tree drip-irrigation zones initially, and ultimately on eight (8) poplar tree drip-irrigation zones on a planned rotation basis.

(12) The *Owner* shall visually inspect drip-irrigation operations at least twice each day during operation period to ensure that no surface ponding or surface run-off is taking place.

(13) The *Owner* shall retain records of inspections and drip-irrigation operation data collected under subsections (10), (11) and (12) and make them available for inspection *Ministry* staff upon request.

(14) No drip irrigation is to take place:

a) on frozen or snow covered ground conditions;
b) with the occurrence of surface ponding in any area subjected to drip irrigation;
c) within 100 m of any surface watercourse or drain; and
d) at an average daily application rate greater than 4.8 mm;

(15) The *Owner* shall notify and provide the *Township, WPLC* and *WIFN* with a copy of the proposed "Groundwater Contingency and Remedial Action Plan" required under Condition 12(1).

PART IV - GENERAL

13. REPORTING

(1) One week prior to the start up of the operation of the *Proposed Work* , the *Owner* shall notify the *District Manager* (in writing) of the pending start up date.

(2) In addition to the obligations under Part X of the Environmental Protection Act, the *Owner* shall, within 10 working days of the occurrence of any reportable spill as defined in Ontario Regulation 675/98, bypass or loss of any product, by-product, intermediate product, oil, solvent, waste material or any other polluting substance into the environment, submit a full written report of the occurrence to the *District Manager* describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.

(3) The *Owner* shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to *Ministry* staff.

(4) The *Owner* shall prepare and submit to the *District Manager* a performance report on an annual basis before March 31st . The first such report shall cover the first annual period following the commencement of operation of the *Works* and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:

(a) a summary and interpretation of all monitoring data and a comparison to the effluent objectives outlined in Condition 8, including an overview of the success and adequacy of the *Works* ;

(b) a summary and interpretation of all monitoring data and a comparison to the trigger levels outlined in Condition 6, including an overview of the success and adequacy of the *Works* ;

(c) a description of any operating problems encountered and corrective actions taken;

(d) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the *Works* ;

(e) a summary of any effluent quality assurance or control measures undertaken in the reporting period;

(f) a summary of the calibration and maintenance carried out on all effluent monitoring equipment;

(g) a tabulation of the amount of dry salt cake generated in the reporting period, an

outline of anticipated amount of dry salt cake to be generated in the next reporting period and a summary of the locations to where the cake was disposed;

(h) a summary of any complaints received during the reporting period and any steps taken to address the complaints; and

(i) any other information the *District Manager* requires from time to time.

(5) The *Owner* shall provide one (1) copy of all reports and plans required by Condition 13 (4) of this *Certificate* to the *Township, WPLC* and *WIFN* in a timely manner.

(6) During the process of submission of an application to amend this Certificate, the *Owner* shall

(a) discuss with *WIFN* and the *WPLC* the proposed application prior to submission of the application to the *Director* ;

(b) provide the same documents to *WIFN* that is provided to the *Director* in respect of the amendment; and

(c) provide the *Director* with a statement how WIFN's comments were considered by the *Owner* before it submitted the application to the *Ministry* .

14. REVOCATION

This Certificate of Approval revokes and replaces Certificate of Approval No. 3-0218-98-006 issued on May 8, 1998, upon commencement of operation of the Works approved by this Certificate.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the works are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. Condition 2 is included to ensure that the *Ministry* records are kept accurate and current with respect to the approved works and to ensure that subsequent owners of the *Works* are made aware of the *Certificate* and continue to operate the *Works* in compliance with it.

3. Condition 3 is included to ensure that the *Works* are constructed in accordance with the approval and that record drawings of the *Works* "as constructed" are maintained for future references.

4. Conditions 4, 6, 9 and 12 are included to require that the *Works* be properly operated,

maintained, funded, staffed and equipped such that the environment is protected and injury to any person or deterioration, loss and damage to property is prevented. As well, the inclusion of a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the owner and made available to the *Ministry* . Such a manual is an integral part of the operation of the *Works* . Its compilation and use should assist the *Owner* in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for *Ministry* staff when reviewing the *Owner'* s operation of the work.

5. Conditions 5, 10 and 11 are included to require the owner to demonstrate on a continual basis that the quality and quantity of the effluent from the approved *Works* is consistent with the effluent limits specified in the certificate and that the approved *Works* does not cause any impairment to the receiving watercourse and/or the groundwater.

6. Condition 7 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the *Works* .

7. Condition 8 is imposed to ensure that the effluent irrigated from the *Works* to the poplar irrigation area meets the *Ministry* 's effluent quality requirements thus minimizing environmental impact on groundwater and receiving surface water.

8. Condition 13 is included to provide a performance record for future references to ensure that the *Ministry* is made aware of problems as they arise and to provide a compliance record for all the terms and conditions outlined in this *Certificate* so that the *Ministry* can work with the *Owner* in resolving any problems in a timely manner.

9. Condition 14 is included to ensure that Certificate of Approval No. 3-0218-98-006, which was issued for the site to operate as a municipal sewage works - stormwater management works is revoked and replaced by this Certificate issued appropriately to operate as an industrial sewage works.

This Certificate of Approval revokes and replaces Certificate(s) of Approval No. 2209-7HURTP issued on August 28, 2008.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act , R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required , and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 9th day of July, 2009

Mansoor Mahmood, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

ET/
c: District Manager, MOE Sarnia District Office
Andrew Lugowski, Conestoga-Rovers & Associates Limited

APPENDIX A3:

Amendment to ECA No. 3506-7M5PU3 – Notice No. 1, dated February 20, 2013

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 3506-7M5PU3
Notice No. 1
Issue Date: February 20, 2013

Waste Management of Canada Corporation (WM)
8039 Zion Line R.R. #4
Watford, Ontario
N0M 2S0

Site Location: Twin Creeks Landfill Site
8039 Zion Line
Warwick Township, County of Lambton, Ontario N0M 2S0
- Firstly, Part of Lot 19 & 20, Concession 3, S.E.R., and Part of Lots 20, 21 & 22, Concession 4, S.E.R., and Part of the Road Allowance between Lots 21 and 22, Concession 4, S.E.R., shown as Parts 1,2, and 3 on Plan 25R-9125 and Part 2 on Plan 25R-1903, Save and Except Part 1 on Plan 25R-6184.
- Secondly, Part of Lot 20, Concession 3 S.E.R, shown as Part 1 on Plan 25R-6184.

You are hereby notified that I have amended Approval No. 3506-7M5PU3 issued on July 9, 2009 for a leachate collection, treatment, and disposal facility and a stormwater management facility to service the Twin Creeks Landfill Site located in the Township of Warwick, County of Lambton*, as follows:*

Part I - Additional Sewage Works

The said *Approval* is hereby amended to include the approval of the following additional sewage *Works:*

Stormwater Management Pond - SWM Pond #2:
Modifications to the outlet from the existing SWM Pond #2 to resolve leakage problems at the sluice gate valve. The following items represent the existing Pond 2 structures updated with the proposed works.

- one (1) extended detention wet pond with approximate dimensions of 413 m long X 44.0 m wide bottom and 4H:1V and 3H:1V side slopes, providing a total storage capacity of 51,725 m³ consisting of a permanent pool storage volume of 11,427 m³ with a average depth of 0.60 m, and an extended storage volume of 40,298 m³ with an extended storage depth of 1.75 m, equipped with an outlet structure described below;

- a new outlet structure to replace the existing one consisting of one (1)1800 mm diameter and one (1) 2400 mm diameter concrete manholes discharging through a 1050 mm and a 1200 mm diameter outlet pipes, each pipe equipped with a 2000 mm X 2000 mm concrete valve chamber, to a roadside ditch

along County Road 79.

All other controls, electrical equipment, instrumentation, piping, pumps, valves and appurtenances essential for the proper operation of the aforementioned sewage *Works* .

Part II - Definitions

The following definitions on the said Approval are modified to include the following additional conditions:

"Poplar System" is the irrigation area of 9.3 hectares located on top of the cap of the Existing Site (old landfill) that is used for the phytoremediation of leachate that is generated at the *Site.*

"Poplar Plantation" is the irrigation area located on native soil to the south of the *Site* that is used for the phytoremediation of irrigation liquid that satisfies the Effluent Limit criteria.

With the above definitions any reference in the Approval to "Poplar Tree Irrigation Area" is now changed to *Poplar Plantation.*

Part III - Documentation

The said *Approval* is hereby amended to include the following additional supporting documents:

1. Application for Approval of Sewage Works dated December 6, 2011 submitted by Waste Management of Canada Corporation, design specifications and drawings prepared by GENIVAR of Owen Sound, ON.

2. Development & Operations Report Warwick Landfill Expansion, Volumes 1, 2 and 3, prepared by Henderson Paddon & Associates Limited, dated March 2008.

3. Letter from Brent J. Langille of RWDI Air Inc. to Edgar Tovilla of the MOE, dated July 17, 2012.

4. Amendment to the application for sewage works Approval No. 3506-7M5PU3, dated August 28, 2011, Revision 2, dated November 19, 2012.

The reason(s) for this amendment to the Approval is (are) as follows:

The purpose of this amendment is to approve sewage works designed to repair and modify the existing SWM Pond #2 and realignment of some of its existing berms and drainage ditches. These modifications include the pond enlargement and rebuild the outlet at a new location, having the ultimate location of pond discharge to remain unchanged draining off-site along County Road 79 (Nauvoo Road)

This Notice shall constitute part of the approval issued under Approval No. 3506-7M5PU3 dated July 9, 2009.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon

me, the Environmental Review Tribunal and in accordance with Section 47 of the Environmental Bill of Rights, 1993, S.O. 1993, c. 28 (Environmental Bill of Rights), the Environmental Commissioner, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Environmental Commissioner
1075 Bay Street, Suite 605
Toronto, Ontario
M5S 2B1

AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca**

This instrument is subject to Section 38 of the Environmental Bill of Rights, 1993, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek leave to appeal within 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry at www.ebr.gov.on.ca , you can determine when the leave to appeal period ends.

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 20th day of February, 2013

Mansoor Mahmood, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

ET/
c: District Manager, MOE Sarnia District Office
Peter Brodzikowski, P.Eng., GENIVAR Inc.

APPENDIX A4:

Amended ECA [Industrial Sewage Works] No. 3506-7M5PU3, dated August 21, 2019

Ontario

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 2403-BE6LZ4
Issue Date: August 21, 2019

Waste Management of Canada Corporation
117 Wentworth Court
Brampton, Ontario
L6T 5L4

Site Location: Twin Creeks Environmental Centre
5768 Nauvoo Road, Watford
Township of Warwick , County of Lambton

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

Usage and operation of a leachate collection, treatment, and disposal facility and a stormwater management facility to service the Twin Creeks Landfill Site located in the Township of Warwick, County of Lambton, consisting of the following:

Proposed Works (previously approved by ECA number 3506-7M5PU3)

LEACHATE TREATMENT AND DISPOSAL FACILITY

use and operation of a leachate collection, treatment, and disposal facility with a *Rated Capacity* of 400 m^3/day to service Phases 1 to 9 and during closure and post closure period of the Twin Creeks Landfill Site expansion, consisting of the following:

Raw Leachate Pumping Stations

- two (2) primary leachate pumps (one for each PS5 and PS7) and each rated at 7.3 L/sec, together with their associated forcemains discharging to the equalization tank described below.

Secondary Drainage Layer Pumping Stations

- two (2) secondary drainage layer pumps (one for each PS6 and PS8) each rated at 3.5 L/sec, together with their associated forcemains discharging to the equalization tank described below.

Equalization Tank

- Three (3) additional variable frequency drive (VFD) recirculation pumps each rated at approximately 9.6 L/sec proposed to be pumping leachate to the leachate treatment system;

- two (2) VFD raw leachate pumps (one duty, one standby) each rated at 27.7 L/sec, to be used in combination to fill the Sequencing Batch Reactor (SBR) reactors at a faster rate.

Chemical Feed System

- one (1) 1.0 m^3 capacity phosphoric acid solution storage tank equipped with two (2) metering pumps (one duty for each SBR reactor with interconnecting piping for redundancy) each rated at 32.0 L/hr, dosing phosphoric acid into the SBR reactors as required;

- one (1) 1.0 m^3 capacity flocculant storage tank equipped with two (2) metering pumps (one duty for each SBR reactor with interconnecting piping for redundancy) each rated at 363 L/hr, dosing flocculant upstream of the SBR reactors as required;

- one (1) 1.0 m^3 capacity anti-foam agent storage tank equipped with two (2) metering pumps (one duty for each SBR reactor with interconnecting piping for redundancy) each rated at 32.0 L/hr, dosing anti-foam agent upstream of the SBR reactors as required;

- one (1) 10.0 m^3 capacity methanol storage tank equipped with a spill containment structure and two (2) metering pumps (one duty for each SBR reactor with interconnecting piping for redundancy) each rated at 144 L/hr, dosing methanol upstream of the SBR reactors as required; and

- one (1) 88 m^3 capacity in-ground high strength carbon waste storage tank equipped with two (2) metering pumps (one duty for each SBR reactor with interconnecting piping for redundancy) each rated at 288 L/hr, dosing high strength carbon waste upstream of the SBR reactors as required.

Sequencing Batch Reactor (SBR)

- a sequencing batch reactor system consisting of two (2) reactors each with approximate dimensions of 6.4 m long x 16.2 m wide x 5.5 m SWD providing active reactor volume of 572 m^3, each tank equipped with a jet aeration header and one (1) dry pit jet pump rated at 227 L/sec and a decanter system capable of decanting 69.4 L/sec; and

- three (3) 50 hp positive displacement air blowers each with VFD control and rated at of 462 L/sec at 65.5 kPa supplying the air required for SBR aeration.

Effluent and Sludge Pumps

- two (2) effluent transfer pumps (one duty for each SBR reactor with interconnecting piping for redundancy) each rated at 69.4 L/sec, transferring effluent from the SBR units to an effluent holding tank, as described below; and

- two (2) activated sludge wasting pumps (one duty for each reactor) each rated at 22 L/sec, transferring activated wasted sludge to aerated sludge tanks, as described below.

Effluent and Sludge Holding Tanks

- one (1) 400 m^3 storage capacity effluent holding tank with approximate dimensions of 9.75 m long x 8.5 m wide x 5.5 m SWD equipped with coarse bubble diffusers, discharging to a reverse osmosis membrane filtration system, as described below;

- two (2) aerated sludge tanks operating in either parallel or series mode, each with approximate dimensions of 11.8 m long x 3 m wide x 5.5 m SWD providing a storage capacity of 200 m^3 equipped with coarse bubble diffusers, two (2) supernatant pumps returning supernatant to the SBR units described above, and two (2) sludge pumps discharging settled sludge to a sludge dewatering press, as described below; and

- three (3) positive displacement air blowers each rated at 141 L/sec and at 65.5 kPa with VFD control providing air required for the effluent tank and sludge holding tanks.

Reverse Osmosis Membrane Filtration System

- one (1) treated effluent storage tank with a capacity of 15.0 m^3, equipped with one (1) pump rated at 8.3 L/sec discharging to a cartridge sand filtration unit, as described below;

- one (1) sulphuric acid storage tank with a capacity of 7,000 L for pH adjustment of effluent at the effluent storage tank, as described above;

- two (2) dual redundant 3.47 L/sec capacity cartridge sand filtration unit discharging to a reverse osmosis membrane filtration system described below;

- one (1) three-staged reverse osmosis membrane filtration system with an overall treatment capacity of 3.47 L/sec consisting of three (3) filtration units, equipped with a 32-piece ST-RO membrane modules, a 20-piece ST-RO membranes modules, a 15 piece ST-NF membrane modules and the following pumps:

    a. four (4) high pressure plunger pumps each rated at1.8 L/s (1st and 2nd stage RO);
    b. five (5) multistage centrifugal booster pumps with under water motor each rated at.8 L/s (1st and 2nd stage RO);
    c. one (1) multi stage vertical centrifugal pump (cleaning pump) rated at 3.47 L/s;
    d. one (1) high pressure plunger pump with a capacity of 1.06 L/s (3rd stage NF);
    e. three (3) multistage centrifugal booster pumps with under water motor rated at 2.8 L/s each (3rd

stage NF); and

f. one (1) multi stage vertical centrifugal pump (cleaning pump) rated at 1,06 L/s.

all discharging final permeate to a treated effluent storage pond described below and final concentrate to a concentrate storage tank described below;

Treated Effluent Storage Ponds

- one (1) clay lined pond **(Inlet cell)** with a capacity of 2,200 m^3, equipped with a floating aerator and one (1) pumping station manhole with a submersible pump rated at 30 m^3/hr;

- one (1) clay lined pond **(Cell 1)** with a capacity of 53,900 m^3 equipped with one (1) interconnecting manhole with a gate valve; and

- one (1) clay lined pond **(Cell 2)** with a capacity of 28,400 m^3, providing storage for treated effluent from the membrane filtration system, equipped with one (1) interconnecting manhole with a gate valve, a pumping station **(Pumping Station 11)** equipped with one (1) VFD submersible pump rated at 56.9 L/sec to be used for truck loading purposes, one (1) submersible effluent return pump rated at 7.3 L/sec , and two (2) VFD submersible irrigation pumps each rated at 45.7 L/sec (one duty, one standby) discharging to a poplar tree land irrigation area described below;

Concentrate Evaporator and Dryer

- one (1) concentrate storage tank with approximate dimensions of 4.4 m long x 4.8 m wide and 5.5 m SWD (total capacity of 102 m^3), equipped with a submersible pump for off-site disposal rated at 9.5 L/sec, also used for off-site disposal slurry, and a pump for transferring concentrate to an evaporator treatment system, as described below, rated at 0.63 L/sec;

- one (1) mechanical vapor compression evaporator rated at 0.63 L/sec, equipped with electric heating element and heat exchangers to remove moisture from concentrate and produce a slurry discharging to a slurry holding tank described below;

- one (1) slurry holding tank with approximate dimensions of 4.4 m long x 4.8 m wide and 5.5 m SWD (total capacity of 102.0 m^3) equipped with one (1) slurry pump rated at 1.57 L/sec, discharging to a slurry dryer described below; and

- one (1) slurry dryer rated at 0.035 L/sec with approximate dimensions of 4.7 m long x 2.1 m wide x 1.5 m high discharging to a salt cake disposal bin (water vapour will be evaporated through the slurry dryer exhaust).

Treated Effluent On-Site Disposal

Upgrades to the disposal system of the treated leachate effluent, as follows:

- two (2) 3.31 ha treated effluent drip-irrigation zones using approximately 250 m long drip-irrigation tubing installed in each zone;

Previous Works:

STORMWATER MANAGEMENT FACILITY

a stormwater management facility to service a 146.5 ha drainage area of the Twin Creeks Landfill Site Expansion within the 300 ha area of the Twin Creeks Landfill Site consisting of the following:

Stormwater Management Pond - SWM Pond #1

a stormwater management facility (**SWM Pond #1**) to service a total drainage area of 33.7 ha consisting of the eastern part of the existing landfill site and future excess soil stockpile area, designed to provide quantity and quality control by attenuating peak stormwater flows from storm events up to 1:100 year return frequency including regional storm (Hazel) at or below pre-development levels, consisting of the following:

- one (1) approximately 1,300 m long perimeter trapezoidal ditch along the toe of the eastern side of the closed landfill having a 0.6 m wide bottom and 2H:1V side slopes, discharging collected stormwater to an extended detention wet pond described below;

- one (1) ditch along the south and west side of the leachate storage lagoon collecting runoff from the excess soil stockpile area, discharging collected stormwater to a forebay described below;

- one (1) forebay with approximate dimensions of 19 m long x 16 m wide bottom, and 4H:1V side slopes, discharging to an extended detention wet pond described below;

- one (1) extended detention wet pond with approximate dimensions of 294.0 m long bottom, 23.5 m wide bottom and 4H:1V side slopes, equipped with a permanent vertical baffle with a minimum elevation of 238.7 m ASL, providing a total storage capacity of 21,429 m^3 consisting of a permanent pool storage volume of 3,651 m^3 with an average depth of 0.5 m, and an extended storage volume of 17,778 m^3 with an extended storage depth of 1.91 m, equipped with an outlet structure described below;

- an outlet structure consisting of two (2) 1500 mm diameter concrete manholes discharging through two (2) 750 mm diameter outlet pipes, each pipe equipped with a 1200 mm x 1200 mm concrete valve chamber and a sluice gate valve, to a perimeter ditch flowing towards a roadside ditch along County Road 79; and

- one (1) 8.0 m wide emergency overflow structure with weir elevation of 239.55 m ASL discharging to a perimeter ditch flowing towards County Road 79 roadside ditch.

Stormwater Management Pond - SWM Pond #2

a stormwater management facility (**SWM Pond #2**) to service a total drainage area of 67.9 ha consisting of southwestern part of the expanded landfill site, designed to provide quantity and quality control by attenuating peak stormwater flows from storm events up to 1:100 year return frequency including regional storm (Hazel) at or below pre-development levels, consisting of the following:

- two (2) approximately 400 m and 1500 m long perimeter ditches along the southern part of the landfill having a minimum depth of 1.0 m, and 3H:1V & 4H:1V side slopes discharging collected stormwater through two (2) culverts, 3000 mm X 1200 mm concrete box and 1390 x 970 mm CSPA, to a forebay described below;

- one (1) forebay with approximate dimensions of 47 m long x 30 m wide bottom and 4H:1V and 3H:1V side slopes, discharging to an extended detention wet pond described below;

- one (1) extended detention wet pond with approximate dimensions of 413.0 m long x 44.0 m wide bottom and 4H:1V and 3H:1V side slopes, providing a total storage capacity of 51,725 m^3 consisting of a permanent pool storage volume of 11,427 m^3 with a average depth of 0.60 m, and an extended storage volume of 38,098 m^3 with an extended storage depth of 1.75 m, equipped with an outlet structure described below;

- an outlet structure consisting of one (1)1800 mm diameter and one (1) 2400 mm diameter concrete manholes discharging through a 1,050 mm and a 1,200 mm diameter outlet pipes, each pipe equipped with a 2000 mm x 2000 mm concrete valve chamber and a sluice gate valve, to a roadside ditch along County Road 79; and

- one (1) 18 m wide emergency overflow structure with weir elevation of 234.05 m ASL discharging to a roadside ditch along County Road 79.

Stormwater Management Pond - SWM Pond #3

a stormwater management facility (**SWM Pond #3**) to service a total drainage area of 30.5 ha consisting of northwestern part of the expanded landfill site, designed to provide quantity and quality control by attenuating peak stormwater flows from storm events up to 1:00 year return frequency including regional storm (Hazel) at or below pre-development levels, consisting of the following:

- one (1) approximately 650 m long perimeter ditch along the northern part of the expanded landfill and one (1) approximately 500 m long perimeter ditch along the western part of the expanded landfill, each having a minimum of 1.0 m depth and 3H:1V & 4H:1V side slopes, discharging collected stormwater through a 3000 mm x 1200 mm concrete box culvert to a forebay described below;

- one (1) forebay with approximate dimensions of 33 m long x 25 m wide bottom and 4H:1V side slopes, discharging to an extended detention wet pond described below;

- one (1) extended detention wet pond with approximate dimensions of 255.0 m long, 36.0 m wide bottom and 3H:1V and 4H:1V side slopes, providing a total storage capacity of 24,996 m^3 consisting of a permanent pool storage volume of 4,843 m^3 with an average depth of 0.50 m, and an extended storage volume of 20,053 m^3 with an extended storage depth of 1.67 m, equipped with an outlet structure described below;

- an outlet structure consisting of three (3)1200 mm diameter concrete manholes discharging through two (2) 600 mm diameter and one (1) 450 mm diameter outlet pipes, each pipe equipped with 1200 mm x 1200 mm box concrete valve chamber and a sluice gate valve, to a roadside ditch along County Road 79; and

- one (1) 9 m wide emergency overflow structure with a weir elevation of 238.00 m ASL discharging to a roadside ditch along County Road 79.

Stormwater Management Pond - SWM Pond #4

a stormwater management facility (**SWM Pond #4**) to service a total drainage area of 14.4 ha consisting of the north eastern part of the expanded landfill site and norther part of the existing landfill site, designed to provide quantity and quality control by attenuating peak stormwater flows from storm events up to 1:100 year return frequency including regional storm (Hazel) at or below pre-development levels, consisting of the following:

- four (4) perimeter ditches collecting runoff from the northern side of the expanded landfill and from the northwestern portion of the existing landfill, having a minimum of 1.0 m depth and 3H:1V & 4H:1V side slopes, discharging collected stormwater through two (2) inlet structures to a forebay described below;

- one (1) forebay with approximate dimensions of 16 m long x 16 m wide bottom and 4H:1V side slopes, discharging to an extended detention wet pond described below;

- one (1) extended detention wet pond with approximate dimensions of 165.0 m long bottom, 20.0 m wide bottom and 3H:1V and 4H:1V side slopes, providing a total storage capacity of 8,328 m^3 consisting of a permanent pool storage volume of 1,812 m^3 with an average depth of 0.50 m, and an extended storage volume of 6,516 m^3 with an extended storage depth of 1.32 m, equipped with an outlet structure described below;

- an outlet structure consisting of one (1)1800 mm diameter concrete manhole discharging through one (1)1050 mm diameter outlet pipe equipped with 2000 mm X 2000 mm concrete valve chamber and a sluice gate valve to a perimeter ditch along Zion Line to a roadside ditch along Zion Line;

- one (1) 8 m wide emergency overflow structure with a weir elevation of 242.00 m ASL discharging to a road side ditch along Zion Line; and

all other controls, electrical equipment, instrumentation, piping, valves and appurtenances essential for the proper operation of the aforementioned sewage Works;

all in accordance with the following submitted supporting documents listed in Schedule A.

LEACHATE TREATMENT AND DISPOSAL FACILITY

use and operation of a leachate collection, treatment, and disposal facility with a *Rated Capacity* of 400 m^3/day to service Phases 1 to 9 and during closure and post closure period of the Twin Creeks Landfill Site expansion, consisting of the following:

Raw Leachate Pumping Stations

- two (2) primary raw leachate pumps (one for each PS1 and PS3) each rated at 7.3 L/sec, together with their associated forcemains discharging to the equalization tank described below.

Secondary Drainage Layer Pumping Stations

- two (2) secondary drainage layer pumps (one for each PS2 and PS4) each rated at 3.5 L/sec, together with their associated forcemains discharging to the equalization tank described below.

Equalization Tank

- one (1) 2,300 m^3 capacity steel and glass lined tank enclosed with a clay berm containment area, receiving raw leachate from the landfill leachate collection system, equipped with three (3) variable frequency drive (VFD) recirculation pumps (two duty and one standby) each rated at 9.6 L/sec, all pumping leachate to the leachate treatment system, as described below; and

Treated Effluent On-Site Disposal (Poplar Plantation)

Upon substantial completion of the Works, treated leachate effluent will be disposed as follows:

- one (1) 28.32 ha poplar tree irrigation land established to handle an average of 1,187 m^3/day of treated leachate effluent during suitable irrigation days between the period extending from May 1st to October 15th, consisting of six (6) 3.62 ha treated effluent drip-irrigation zones using approximately 250 m long drip-irrigation tubing installed in each zone;

- a stormwater management system to control the quality of stormwater runoff from the poplar tree irrigation land to Kersey Drain (Brown Creek), consisting of one (1) west furrow approximately 710 m long x 200 mm deep and one (1) east furrow approximately 510 m long x 200 mm deep, running parallel to each other with a grassed area in between, each equipped with a 200 mm high berm for distributing stormwater runoff across the entire length of the furrow, discharging by sheet flow to Kersey Drain; and

Raw/Diluted Leachate Effluent Disposal (Poplar System)

- one (1) existing 9.3 ha poplar tree irrigation system identified as the Poplar System, of approximately 150 m length for each poplar row. Leachate is applied through pressure drip-irrigation tubing at a rate not to exceed 476 mm/m², or 44,000 L/day, during the growing season. The system is subject to conditions as specified in the *EPA* Section 27 approval for the site. Revised to a 9.3 ha area with a rate of 476 mm/m^2 or 44,000 m^3/year.

    - a system of maintenance holes, collector system and leachate sump across the existing site to transfer leachate to the leachate holding tanks via two methods: 1) down-hole leachate pumps transfer leachate through piping units directly to the leachate holding tanks and the Equalization Tank; and 2) the use of a tanker truck, which transfers the leachate via gravity drainage into the leachate holding tanks or maintenance holes of the leachate conveyance system.

all other controls, electrical equipment, instrumentation, piping, pumps, valves and appurtenances essential for the proper operation of the aforementioned sewage Works;

all in accordance with the following submitted supporting documents listed in Schedule A.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Approval" means this entire document and any schedules attached to it, and the application;

2. "District Manager" means the District Manager of the Sarnia District Office of the Ministry;

3. "Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;

4. "EPA" means the *Environmental Protection Act* , R.S.O. 1990, c.E.19, as amended;

5. "Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;

6. "Owner" means Waste Management of Canada Corporation and its successors and assignees;

7. "OWRA" means the *Ontario Water Resources Act* , R.S.O. 1990, c. O.40, as amended;

8. "Poplar System" is the irrigation area of 9.3 hectares located on top of the cap of the Existing Site (old landfill) that is used for the phytoremediation of leachate that is generated at the Site.

9. "Poplar Plantation" is the irrigation area located on native soil to the south of the Site that is used for the phytoremediation of irrigation liquid that satisfies the Effluent Limit criteria.

10. "Previous Works" means those portions of the sewage works previously constructed and approved under an Approval;

11. "Proposed Works" means the sewage works described in the Owner's application, this Approval, to the extent approved by this Approval;

12. "Township" means the Township of Warwick;

13. "Works" means the sewage works described in the Owner's application, and this Approval, and includes both Proposed Works and Previous Works;

14. "WIFN" refers to Walpole Island First Nation; and

15. "WPLC" refers to the Warwick Public Liaison Committee.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

PART I - GENERAL

1. GENERAL CONDITION

1. The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

2. Except as otherwise provided by these conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Approval, and the application for approval of the Works.

3. Where there is a conflict between a provision of any document in the schedule referred to in this Approval and the conditions of this Approval, the Conditions in this Approval shall take precedence, and where there is a conflict between the documents in the schedule, the document bearing the most recent date shall prevail.

4. Where there is a conflict between the documents listed in the Schedule A, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

5. The Conditions of this Approval are severable. If any Condition of this Approval, or the application

of any requirement of this Approval to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this Approval shall not be affected thereby.

2. CHANGE OF OWNER

1. The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within thirty (30) days of the change occurring:

    a. change of Owner or operating authority, or both;

    b. change of address of Owner or operating authority or address of new Owner or operating authority;

    c. change of partners where the Owner or operating authority is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Partnerships Registration Act;*

    d. change of name of the corporation where the Owner or operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (Form 1, 2 or 3 of O. Reg. 189, R.R.O. 1980, as amended from time to time), filed under the *Corporations Information Act* , shall be included in the notification to the District Manager;

2. In the event of any change in ownership of the Works, the Owner shall notify in writing the succeeding owner of the existence of this Approval, and a copy of such notice shall be forwarded to the District Manager.

3. The Owner shall ensure that all communications made pursuant to this condition will refer to this Approval's number.

PART II - STORMWATER MANAGEMENT FACILITY

3. OPERATIONS MANUAL

1. The Owner shall maintain the operations manual up to date through revisions undertaken from time to time and retain a copy at the location of the sewage works. Upon request, the Owner shall make the manual available for inspection and copying by Ministry personnel.

4. EFFLUENT MONITORING AND RECORDING

1. The Owner shall carry out a monitoring program and all samples and measurements taken for the purposes of this Approval are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

2. Samples shall be collected and analyzed at the sampling point(s), at the sampling frequencies and using the sample type specified for each parameter listed in the effluent monitoring table included in **Schedule B**:

3. The methods and protocols for sampling, analysis, toxicity testing, and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

    a. the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (January 1999), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions;

    b. the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition) as amended from time to time by more recently published editions; and

    c. in respect of any parameters not mentioned in (a) - (b), the written approval of the District Manager, which approval shall be obtained prior to sampling.

4. The temperature and pH of the effluent from the Works shall be determined in the field at the time of sampling for total ammonia. The concentration of un-ionized ammonia shall be calculated using the total ammonia concentration, pH and temperature using the methodology stipulated in "Ontario's Provincial Water Quality Objectives" dated July 1994, as amended, for ammonia (un-ionized).

5. The measurement frequencies specified in Condition 4 (2) in respect to any parameter are minimum requirements which ma, after 24 months of monitoring in accordance with this Condition, be modified by the District Manager in writing from time to time.

6. The Owner shall provide to the Township, WPLC, WIFN a copy of all requests to be submitted to the District Manager for any changes to the monitoring program specified in Condition 4 (5) at the same time or prior to the time such request is made to the District Manager.

5. OPERATION AND MAINTENANCE

1. The Owner shall apply the "Stormwater Contingency and Remedial Action Plan as included in Appendix N.27 of the Operations and Maintenance manual, Warwick Landfill Expansion, WM, May 2008.

2. The Owner shall operate the Works (**SWM Ponds**) with the outlet sluice gate valve in a **Normally Open Position** during normal operation period.

3. The Owner shall compare monitoring results obtained under Condition 4 (2) for the trigger parameters listed in Table 2 in **Schedule B** with respective trigger levels listed in Table 2 in **Schedule B** to identify any potential leachate impact to stormwater.

4. In the event that a monitoring result for any parameter that is listed in Table 2 of **Schedule B** for any of **SWM Ponds** exceeds its trigger level, the Owner shall conduct sampling of the contents of the affected **SWM Pond** within one (1) week to confirm the exceedance of the trigger level for that parameter and identify potential source of contamination. Upon confirmation of the exceedence of the exceedance of any trigger level for any parameter that is listed in Table 2 of **Schedule B**, the Owner shall close the outlet sluice gate valve of the affected Works **(SWM Pond)** and implement an approved "Stormwater Contingency and Remedial Action Plan".

5. The Owner shall dispose of the contents of an affected Work **(SWM Pond)** which failed to meet the quality requirements outlined in Condition 5 (5) in accordance with an approved "Stormwater Contingency and Remedial Action Plan".

6. In the event that a monitoring result for any parameter that is listed in Table 2 for the **Poplar Plantation** exceeds its trigger level, the Owner shall conduct sampling of the stormwater runoff from the affected part of the **Poplar Plantation** as soon as possible to confirm the exceedence of the trigger level for that parameter and identify potential source of contamination. Upon confirmation of the exceedence of any trigger level for any parameter that is listed in Table 2, the Owner shall implement an approved "Stormwater Contingency and Remedial Action Plan".

7. The Owner shall inspect the Works **(SWM Ponds)** at least once a year and, if necessary, clean and maintain the Works to prevent the excessive build-up of sediments and/or vegetation.

8. The Owner shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken, and shall keep the logbook at the site or Owner's operational head quarter for inspection by the Ministry. The logbook shall include the following:

    a. the name of the Works (SWM Pond #1, SWM Pond #2, SWM Pond #3, and SWM Pond #4);

    b. the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed; and

    c. the occurrence date of each spill within the catchment area of a given SWM Pond, including follow-up action/ remedial measures undertaken.

6. RECORD KEEPING

1. The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the operation and maintenance and monitoring activities required by this Approval.

PART III - LEACHATE TREATMENT FACILITY

7. EFFLUENT LIMITS

1. The Owner shall design, construct and operate the Works such that the concentrations of the materials listed as effluent parameters in the effluent limits table in **Schedule B** are not exceeded in the effluent from the **Treated Effluent Storage Pond** (Cell 2).

2. For the purposes of determining compliance with and enforcing subsection (1):

    a. The Average Monthly Concentration of a parameter named in Column 1 of Table 3 in **Schedule B** shall not exceed the corresponding maximum concentration set out in Column 2 of Table 3 in **Schedule B;**

    b. non-compliance with respect to pH is deemed to have occurred when any single measurement is outside of the indicated range.

8. OPERATION AND MAINTENANCE

1. The Owner shall exercise due diligence in ensuring that, at all times, the Works and the related equipment and appurtenances used to achieve compliance with this Approval are properly operated and maintained. Proper operation and maintenance shall include effective performance, adequate funding, adequate operator staffing and training, including training procedures and other requirements of this Approval and OWRA and regulations, adequate laboratory facilities, process controls and alarms and the use of process chemicals and other substances in the Works.

2. The Owner shall main the operations manual current and retain a copy at the location of the Works for the operational life of the Works. Upon request, the Owner shall make the manual available to Ministry staff.

9. EFFLUENT MONITORING AND RECORDING

The Owner shall carry out a monitoring program:

1. all samples and measurements taken for the purposes of this Approval are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

2. For the purpose of this condition, the following definitions apply:

    a. Daily means once each day;

    b. Weekly means once each week;

    c. Monthly means once every month; and

d. Semi-annually means once every six months.

3. Samples shall be collected and analyzed at the sampling point(s), at the sampling frequencies and using the sample type specified for each parameter listed in the effluent monitoring table included in **Schedule B**:

4. The methods and protocols for sampling, analysis, toxicity testing, and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

    a. the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)", as amended from time to time by more recently published editions;

    b. the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (January 1999), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions;

    c. the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition) as amended from time to time by more recently published editions; and

    d. in respect of any parameters not mentioned in (a) - (c), the written approval of the District Manager, which approval shall be obtained prior to sampling.

5. The measurement frequencies specified in **Schedule B** in respect to any parameter are minimum requirements which may, after 24 months of monitoring in accordance with this Condition, be modified by the District Manager in writing from time to time.

6. The Owner shall provide to the Township, WPLC and WIFN a copy of all requests to be submitted to the District Manager for any changes to the monitoring program specified in **Schedule B** at the same time or prior to the time such request is made to the District Manager.

7. A continuous flow measuring device(s) shall be installed and maintained to measure the flowrate of the effluent from the sewage works, with an accuracy to within plus or minus fifteen (15) per cent of the actual flowrate for the entire design range of the flow measuring device and the Owner shall measure, record and calculate the flowrate for each effluent stream on each day of sampling.

8. The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this Approval.

9. The Owner shall visually inspect the drip-irrigation pipeline systems at least once per week during operation period to look for leaking and/or failed (broken) lines that would otherwise produce run-off. The inspection should be supported by a log book documenting routine inspection and notes on repair as required.

10. GROUNDWATER MONITORING - POPLAR PLANTATION LAND IRRIGATION AREA

1. The Owner shall collect grab samples during May and November from the sampling location outlined in Table 7 of **Schedule B** and analyze for the parameters listed in Table 7 of **Schedule B.**

2. The methods and protocols for sampling, analysis and recording shall conform to that outlined in Condition 9 (4).

3. The measurement frequencies specified in Condition 10 (2) in respect to any parameter are minimum frequencies which may, after 24 months of monitoring in accordance with this Condition, be modified by the District Manager, in writing from time to time.

4. The Owner shall provide to the Township, WPLC, and WIFN a copy of all requests to be submitted to the District Manager for any changes to the monitoring program specified in Condition 10 (2) at the same time or prior to the time such request is made to the District Manager.

11. OPERATION - POPLAR PLANTATION LAND IRRIGATION

1. The Owner shall apply the "Groundwater Contingency and Remedial Action Plan" for any potential groundwater impact caused by Effluent Storage Ponds and the Poplar Forest Irrigation Area, as included in Appendix N.26 of the Operation and Maintenance Manual, Warwick Landfill Expansion, WM, May 2008.

2. The Owner shall compare monitoring results obtained under condition 10 (2) for the trigger parameter listed in Table 8 of **Schedule B** with their respective trigger levels listed in Table 8 of **Schedule B** to identify any potential leachate impact to groundwater.

3. In the event that a monitoring result for any parameter that is listed in Table 8 of **Schedule B** exceeds its trigger level, the Owner shall re-sample within one (1) month to confirm the exceedence of the trigger level for that parameter. Upon confirmation of the exceedence of any trigger level for any parameter that is listed in Table 8 of **Schedule B**, the Owner shall conduct a second round re-sampling within six (6) months to re-confirm the exceedence of the trigger level for the parameter of concern.

4. In the event that the presence of the parameter(s) of concern is (are) not confirmed after the second round of sampling conducted under Condition 11 (3), then, normal groundwater monitoring shall be resumed.

5. In the event that the presence of the parameter(s) of concern is confirmed after the second round of sampling conduced under Condition 11 (3), then, it shall constitute as a confirmation of leachate impact to groundwater and the *Owner* shall immediately implement the "Groundwater Contingency and Remedial Action Plan" approved under Condition 11 (1).

6. The Owner shall notify the District Manager orally, as soon as possible, and in writing within seven days of the confirmation of leachate impact to groundwater including an assessment of the relative severity and extent of leachate impact and proposed remedial actions.

7. The Owner shall record and report a summary of all trigger exceedence incidents and all remedial action measures taken under Condition 11 (5) in the Annual Report prepared under Condition 13.

8. The Owner shall dispose of **only** treated leachate effluent that meets the effluent limits requirements outlined under Condition 7 (1) for treatment and disposal by drip-irrigation on the approved poplar tree land area during the period between May 1st and October 15th of each calendar year.

9. The Owner shall not allow under any circumstance (including as emergency contingency plan) any direct discharge of leachate or treated leachate effluent from the Works to any receiving surface water including Bear Creek;

10. The Owner shall record the total volume of treated leachate effluent drip-irrigated on the poplar tree land irrigation area on a daily basis.

11. The Owner shall ensure that treated leachate effluent is disposed of via drip-irrigation in the designated six (6) poplar tree drip-irrigation zones initially, and ultimately on eight (8) poplar tree drip-irrigation zones on a planned rotation basis.

12. The Owner shall visually inspect drip-irrigation operations at least twice each day during operation period to ensure that no surface ponding or surface run-off is taking place.

13. The *Owner* shall retain records of inspections and drip-irrigation operation data collected under subsections (10), (11) and (12) and make them available for inspection Ministry staff upon request.

14. No drip irrigation is to take place:

    a. on frozen or snow covered ground conditions;

    b. with the occurrence of surface ponding in any area subjected to drip irrigation;

    c. within 100 m of any surface watercourse or drain; and

    d. at an average daily application rate greater than 4.8 mm;

15. The Owner shall notify and provide the Township, WPLC and WIFN with a copy of the proposed "Groundwater Contingency and Remedial Action Plan" required under Condition 11 (1).

PART IV - GENERAL

12. REPORTING

1. In addition to the obligations under Part X of the EPA, the Owner shall, within ten (10) working days of the occurrence of any reportable spill as defined in Ontario Regulation 675/98, bypass or loss of any product, by-product, intermediate product, oil, solvent, waste material or any other polluting substance into the environment, submit a full written report of the occurrence to the District Manager describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.

2. The Owner shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to Ministry staff.

3. The Owner shall prepare and submit a performance report to the District Manager on an annual basis within before March 31 of each calendar year. The reports shall contain, but shall not be limited to, the following information:

    a. a summary and interpretation of all monitoring data and a comparison to the effluent objectives outlined in Condition 7, including an overview of the success and adequacy of the Works;

    b. a summary and interpretation of all monitoring data and a comparison to the trigger limits outlined in Condition 5, including an overview of the success and adequacy of the Works;

    c. a description of any operating problems encountered and corrective actions taken;

    d. a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the sewage works;

    e. a summary of any effluent quality assurance or control measures undertaken in the reporting period;

    f. a summary of the calibration and maintenance carried out on all effluent monitoring equipment;

    g. a tabulation of dry salt cake generated in the reporting period, an outline of anticipated amount of dry salt cake to be generated in the next reporting period and a summary of the locations to where the cake was disposed;

    h. a summary of any complaints received during the reporting period and any steps taken to address the complaints; and

    i. any other information the District Manager requires from time to time.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the works are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. Condition 2 is included to ensure that the Ministry records are kept accurate and current with respect to the approved works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

3. Conditions 3, 5, 8 and 11 are included to require that the Works be properly operated, maintained, funded, staffed and equipped such that the environment is protected and injury to any person or deterioration, loss and damage to property is prevented. As well, the inclusion of a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the owner and made available to the Ministry. Such a manual is an integral part of the operation of the Works. Its compilation and use should assist the *Owner* in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions.The manual will also act as a benchmark for *Ministry* staff when reviewing the Owner′ s operation of the work.

4. Conditions 4, 9 and 10 are included to require the owner to demonstrate on a continual basis that the quality and quantity of the effluent from the approved Works is consistent with the effluent limits specified in the certificate and that the approved Works does not cause any impairment to the receiving watercourse and/or the groundwater.

5. Condition 6 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the Works.

6. Condition 7 is imposed to ensure that the effluent irrigated from the Works to the poplar irrigation area meets the Ministry's effluent quality requirements thus minimizing environmental impact on groundwater and receiving surface water.

7. Condition 12 is included to provide a performance record for future references to ensure that the *Ministry* is made aware of problems as they arise and to provide a compliance record for all the terms and conditions outlined in this Approval so that the Ministry can work with the Owner in resolving any problems in a timely manner.

Schedule A

1. Application for Environmental Compliance Approval submitted by Reid Cleland, Director of Operations- Eastern Canada Landfills of Waste Management of Canada Corporation received on March 5, 2019 and all supporting documentation and information submitted during the review process.

Schedule B

Table 1 - Stormwater Monitoring Sampling Locations: SWM Pond Outlets - SP1, SP2, SP3, SP4. Irrigation Area - SS17A, SS17B, SS18A and **SS18B.**			
Parameter	**Parameter**	**Parameter**	**Field -Parameter**
Alkalinity	Magnesium	Toluene	Conductivity
Total Ammonia Nitrogen	Potassium	Ethylbenzene	Dissolved Oxygen
Un-ionized Ammonia	Sodium	Xylene	pH (Field)
Chloride	Arsenic	Vinyl Chloride	Temperature
Conductivity (Lab)	Barium	1,2,4-Trichlorobenzene	Turbidity
Nitrate Nitrogen	Boron	1,2-Dichlorobenzene	
Nitrite Nitrogen	Cadmium	1,3-Dichlorobenzene	
TKN	Chromium (Total)	1,4-Dichlorobenzene	
pH (Lab)	Copper	Hexachlorobenzene	
Total Phosphorus	Iron	Diethylphthalate	
Total Suspended Solids	Lead	Dimethylphthalate	
Total Dissolved Solids	Mercury	Di-n-butyl phthalate	
Sulphate	Nickel	Phenol	
BOD5	Zinc	Benzo(a)pyrene	
Chemical Oxygen Demand	Benzene	2,4,6-Trichlorophenol	
Phenols	1,4-Dichlorobenzene	2,4-Trichlorophenol	
Calcium	Dichloromethane	Pentachlorophenol	

Note: Samples shall be collected within twenty four hours after a rainfall event (more than 10 mm rainfall in 24 hour period) resulting in a stormwater discharge from each SWM Pond or Poplar Plantation Irrigation Area at a minimum interval of one (1) month between consecutive sampling events.

Table 2	
Trigger Parameter	**Trigger Level [SS10 & SS16 - 90th percentile]** (mg/L)
Ammonia (unionized)	0.020
Boron	0.20
Boron (SP1 only)	0.39
Chloride	210
Chromium (Total)	0.024
Nickel	0.027
Phenols	0.001
Zinc	0.06

Note: Annually, a trigger level for a parameter listed above will be replaced by the corresponding 90th percentile of background surface water concentration where background surface water concentrations collected upstream of the landfill (Sampling Locations SS10 and SS16).

Table 3 - Effluent Limits Sampling Location: **Discharge Point from Treated Effluent Storage Pond**	
Effluent Parameter	**Average Monthly Concentration** (milligrams per litre unless otherwise indicated)
Column 1	Column 2
Total Ammonia Nitrogen	68.7
Total Phosphorus	0.72
Phenols	0.2
Chlorides	247
Copper	0.014
Iron	27.0
pH of the effluent maintained between 6.0 to 9.5, inclusive, at all times	

Table 4 - Leachate Monitoring Sampling Location: **Equalization Tank**		
Parameters	**Sample Type**	**Frequency**
BOD5	Grab	Quarterly
Dissolved Organic Carbon (DOC)	Grab	Quarterly
Total Phosphorus	Grab	Quarterly
Total Kjeldahl Nitrogen	Grab	Quarterly
BTEX	Grab	Quarterly
pH	Grab	Quarterly
VOCs [Note 1]	Grab	Semi-Annually
Semi-VOCs [Note 2]	Grab	Semi-Annually
Metals [Note 3]	Grab	Semi-Annually
General Chemistry [Note 4]	Grab	Semi-Annually

Table 5 - Leachate Treatment Plant Effluent Monitoring Sampling Location: **Discharge to Treated Effluent Storage Pond**		
Parameters	**Sample Type**	**Frequency**
CBOD5	Grab	Weekly
Dissolved Organic Carbon (DOC)	Grab	Weekly
Total Ammonia Nitrogen	Grab	Weekly
Chloride	Grab	Weekly
BTEX	Grab	Weekly
pH	Grab	Weekly
VOCs [Note 1]	Grab	Monthly
Semi-VOCs [Note 2]	Grab	Monthly
Metals [Note 3]	Grab	Monthly
General Chemistry [Note 4]	Grab	Monthly
PCB	Grab	Semi-Annually
Organochlorides	Grab	Semi-Annually

Table 6 - Treated Effluent Storage Pond Effluent Monitoring Sampling Location: **Discharge to Poplar Plant Irrigation Area**		
Parameters	**Sample Type**	**Frequency**
CBOD5	Grab	Weekly
Dissolved Organic Carbon (DOC)	Grab	Weekly
Total Ammonia Nitrogen	Grab	Weekly
Chloride	Grab	Weekly
BTEX	Grab	Weekly
pH	Grab	Weekly
VOCs[Note 1]	Grab	Monthly
Semi-VOCs [Note 2]	Grab	Monthly
Metals [Note 3]	Grab	Monthly
General Chemistry [Note 4]	Grab	Monthly

Note 1: VOCs: Benzene, 1,4-Dichlorobenzene, Dichloromethane, Toluene, Ethylbenzene, Xylenes, and Vinyl Chloride.

Note 2: Semi-VOCs: 1,2,4-Trichlorobenzene, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, Hexachlorobenzene, Diethylphthalate, Dimethylphthalate, Di-n-butyl phthalate, Phenol, Benzo(a)pyrene, 2,4,6- Trichlorophenol, 2,4-Dichlorophenol, Pentachlorophenol.

Note 3: Metals: Arsenic, Barium, Boron, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Mercury, Nickel, Zinc.

Note 4: G. Chemistry: Alkalinity, Calcium, Chloride, Conductivity, COD, Nitrate, Nitrite, Magnesium, pH, Potassium, Sodium, Sulphate, Total Dissolved Solids, TKN, Temperature, Turbidity, Total Phosphorus, TSS, Phenols, Dissolved Oxygen.

Table 7 - Groundwater Monitoring Sampling Location: **OW40, OW60 and OW79 - at Annual Frequency** Sampling Location: **OW16, OW61, and OW62 - at Semi-Annual Frequency**		
Parameters	**Parameters**	**Field Parameters**
Alkalinity	Boron	pH
Conductivity	Cadmium	Conductivity
Chloride	Lead	Turbidity
pH	Iron	
Dissolved Organic Carbon	Barium	
Total Dissolved Solids	Benzene	
Total Ammonia	1,4-Dichlorobenzene	
Total Kjeldahl Nitrogen	Dichloromethane	
Sulphate	Ethylbenzene	
Nitrate	Vinyl Chloride	
Calcium	Toluene	
Potassium	Xylenes	
Sodium		
Magnesium		

Table 8 - Trigger Limits for Poplar Plantation Land Irrigation			
Trigger Parameter	**Trigger Level** (mg/L)		
	Active Aquitard	Interstadial Silt and Sand	Interface Aquifer
Chloride	106	116	134
Nitrate	2.3	2.3	2.3
Boron	1.1	2.1	2.6
Cadmium	0.001	0.001	0.001
Lead	0.002	0.002	0.002
Benzene	0.001	0.001	0.001
1,4-Dichlorobenzene	0.001	0.001	0.001
Dichloromethane	0.01	0.01	0.01
Vinyl Chloride	0.0004	0.0004	0.0004

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 3506-7M5PU3 issued on July 9, 2009

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*****
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 21st day of August, 2019

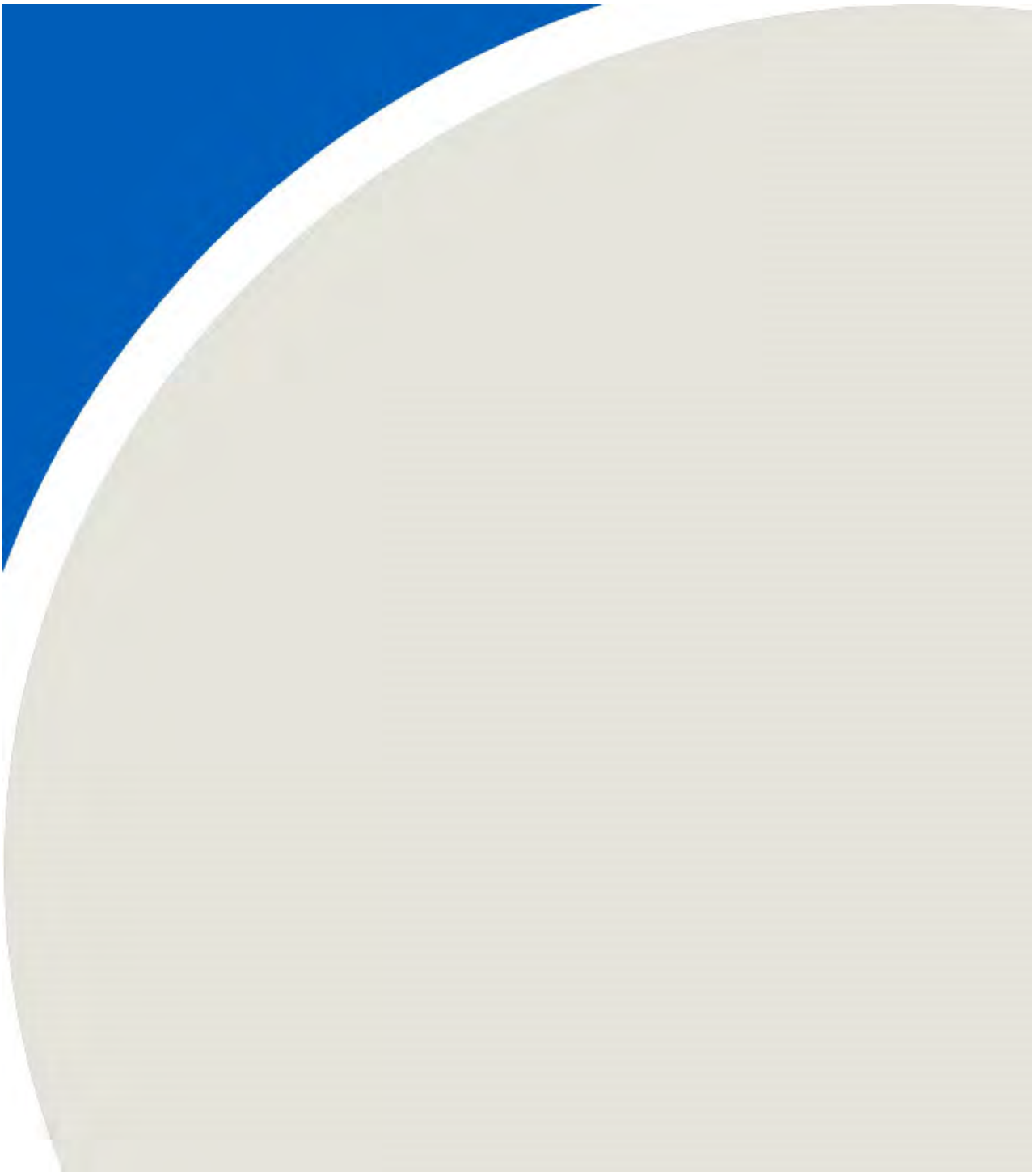
Youssouf Kalogo, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

SO/

c: District Manager, MECP Sarnia District Office
Larry Fedec, HDR Corporation

APPENDIX A5:

Amended ECA [Air] No. 9488-AMPH4Y, dated July 6, 2017



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Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 9488-AMPH4Y
Issue Date: July 6, 2017

Waste Management of Canada Corporation
117 Wentworth Court
Brampton, Ontario
L6T 5L4

Site Location: Twin Creeks Landfill Site
8039 Zion Line
Warwick Township, County of Lambton
N0M 2S0

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act , R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

Three (3) enclosed flare systems, each having a maximum inlet capacity of 2.08 cubic metres per second of landfill gas, exhausting into the air at a maximum volumetric flow rate of 61.3 cubic metres per second through individual stacks, each having an exit diameter of 3.7 metres, extending 15.2 metres above grade; used to:

- incinerate the landfill gas from a landfill gas collection system;

control the off-gases from the enclosed building housing the leachate treatment facility; and

maintain a negative pressure on the leachate collection system on an as-needed basis;

one (1) enclosed flare system having a maximum inlet capacity of 0.94 cubic metres per second of landfill gas, exhausting into the air at a maximum volumetric flow rate of 25.8 cubic metres per second through a stack having an exit diameter of 3.2 metres, extending 12.2 metres above grade; used to:

- incinerate the landfill gas from a landfill gas collection system;

control the off-gases from the enclosed building housing the leachate treatment facility; and

maintain a negative pressure on the leachate collection system on an as-needed basis;

One (1) diesel fuel fired emergency generator rated at 1,000 kilowatts that will be used to provide back-up power for the landfill gas plant; exhausting into the air at a maximum volumetric flow rate of 3.56 cubic metres per second; having an exit diameter of 0.25 metre, extending 3.6 metres above grade;

One (1) diesel fuel fired generator rated at 50 kilowatts that will be used to provide regular power to the leachate pumping system; exhausting into the air at a maximum volumetric flow rate of 0.24 cubic metres per second; having an exit diameter of 0.10 metre, extending 3.6 metres above grade;

One (1) diesel fuel fired emergency generator rated at 250 kilowatts that will be used to provide

back-up power for the office buildings; exhausting into the air at a maximum volumetric flow rate of 0.97 cubic metres per second; having an exit diameter of 0.15 metre, extending 3.6 metres above grade;

Two (2) passive exhaust louvres serving two (2) sequencing batch reactors (SBR) and two (2) aeration tanks; exhausting into the air individually at a maximum volumetric flow rate of 1.96 cubic metres per second; each having an exit dimension of 1.22 x 1.22 metres, extending 2.13 metres above grade;

One (1) process exhaust fan serving the reverse osmosis system area; exhausting into the air at a maximum volumetric flow rate of 1.71 cubic metres per second; having an exit dimension of 0.45 x 0.45 metres, extending 4.0 metres above grade;

One (1) exhaust fan serving slurry dryer; exhausting into the air at a maximum volumetric flow rate of 0.24 cubic metres per second; having an exit diameter of 0.3 metre, extending 5.0 metres above grade;

all in accordance with the Application for an Approval, dated February 15, 2017 and signed by Reid Cleland of the *Company* and all information and documentation associated with the application including ESDM Report prepared by RWDI AIR Inc. dated February 15, 2017 and signed by Brad Bergeron; and email updates provided by Brad Bergeron of RWDI AIR Inc. on May 10, 18, 24 and 26, 2017.

For the purpose of this environmental compliance approval, the following definitions apply:

1. *"Acoustic Audit"* means an investigative procedure consisting of measurements of all noise emissions due to the operation of the *Facility,* assessed in comparison to the performance limits for the *Facility* regarding noise emissions, completed in accordance with the procedures set in *Publication NPC-103* and reported in accordance with *Publication NPC-233.*
2. *"Acoustic Audit Report"* means a report presenting the results of an *Acoustic Audit*, prepared in accordance with *Publication NPC-233.*
3. *"Acoustical Consultant"* means a person currently active in the field of environmental acoustics and noise/vibration control, who is familiar with Ministry noise guidelines and procedures and has a combination of formal university education, training and experience necessary to assess noise emissions from a *Facility.*
4. *"CEM System"* means the continuous monitoring and recording system, one for each of the flare system, used to optimize the operation of the flare systems, as described in this *Approval,* including Schedule "A", to the extent approved by this *Approval.*
5. *"Approval"* means this Environmental Compliance *Approval,* including the application and supporting documentation listed above.
6. *"Company"* means Waste Management of Canada Corporation that is responsible for the construction or operation of the *Facility* and includes any successors and assigns.
7. *"Director"* means a person appointed for the purpose of section 20.3 of the *EPA* by the Minister pursuant to section 5 of the *EPA.*
8. *"District Manager"* means the District Manager of the appropriate local district office of the Ministry, where the *Facility* is geographically located.
9. *"EPA"* means the Environmental Protection Act, R.S.O. 1990, c.E.19, as amended.
10. *"Equipment"* means the equipment described in the *Company's* application, this *Approval* and in

the supporting documentation submitted with the application, to the extent approved by this *Approval.*

11. *"Facility"* means the entire operation located on the property where the *Equipment* is located.
12. *"Independent Acoustical Consultant"* means an *Acoustical Consultant* not representing the *Company,* and not involved in the noise impact assessment or the design/implementation of noise control measures for the Facility/Equipment. The *Independent Acoustical Consultant* shall not be retained by the consultant involved in the noise impact assessment or the design/implementation of noise control measures for the *Facility/Equipment.*
13. *"Manager"* means the Manager, Technology Standards Section, Standards Development Branch of the Ministry, or any other person who represents and carries out the duties of the Manager, as those duties relate to the conditions of this *Approval.*
14. *"Manual"* means a document or a set of documents that provide written instructions to staff of the *Company.*
15. *"Pre-Test Information"* means the information outlined in Section 1. of the *Source Testing Code.*
16. *"Publication NPC-103"* means Publication NPC-103 of the Model Municipal Noise Control By-Law, Final Report, August, 1978, as amended.
17. *"Publication NPC-205"* means the Ministry Publication NPC-205, "Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)", October, 1995, as amended.
18. *"Publication NPC-233"* means Publication NPC-233, Information to be Submitted for *Approval* of Stationary Sources of Sound, October 1995, as amended.
19. *"Sensitive Receptor"* means any location where routine or normal activities occurring at reasonably expected times would experience adverse effect(s) from odour discharges from the *Facility,* including one or a combination of:
    1. private residences or public facilities where people sleep (e.g. single and multi-unit dwellings, nursing homes, hospitals, trailer parks, camping grounds, etc.),
    2. institutional facilities (e.g.: schools, places of worship, community centres, day care centres, recreational centres, etc.),
    3. outdoor public recreational areas (e.g.: trailer parks, play grounds, picnic areas, etc.), and
    4. other outdoor public areas where there are continuous human activities (e.g.: commercial plazas and office buildings).
20. *"Schedules"* means the following schedules attached to the *Approval* and forming part of the *Approval* namely:
    - Schedule A - Continuous Monitoring and Recording System for Temperature
    - Schedule B - Source Testing Requirement
    - Schedule C - Procedures for Calculation of 10-minute Average Concentration of Odour.
21. *"Site"* means the Twin Creeks Landfill Site and lands owned by the *Company* described as:

    8039 Zion Line, R.R. #4, Watford
    Lots 19 and 20, Concession 3 and Lots 20 and 21, Concession 4, SER, Reference Plan 25R-9125
    Township of Warwick, County Of Lambton, Ontario
    N0M 2S0.
22. *"Source Testing"* means sampling and testing to measure emissions resulting from operating the *Equipment* under process conditions which yield the worst case emissions within the approved operating range of the *Facility* and satisfies paragraph 1 of subsection 11(1) of O. Reg. 419/05.

23. *"Source Testing Code"* means the Ontario *Source Testing Code,* dated June 2010, prepared by the Ministry, as amended.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. **NOTIFICATION**
    1. The *Company* shall notify the *District Manager* in writing at least one (1) month prior to the expected date of installation of the second, third and fourth enclosed flare system in the *Facility.*
2. **PERFORMANCE**
    1. The *Company* shall, at all times, ensure that the noise emissions from the *Facility* comply with the limits set in Ministry *Publication NPC-205.*
    2. The *Company* shall restrict the testing of the two (2) emergency diesel generators (1,000 kilowatts and 250 kilowatts) to a maximum of 30 minutes per hour each during the daytime period between 07:00 and 19:00 hours.
    3. The *Company* shall operate all four enclosed flare systems in such a manner that a minimum temperature, as recorded by the *CEM System,* shall be 875 degrees Celsius at a point representing a minimum retention time of 0.7 second, at all times when the landfill gas incineration is in progress.
3. **OPERATION AND MAINTENANCE**
    1. The *Company* shall ensure that the *Equipment,* including the *CEM System,* is properly operated and maintained at all times. The *Company* shall:
    2. prepare, not later than three (3) months after the date of this *Approval,* a *Manual* outlining the operating procedures and a maintenance program for the *Equipment.* These operating procedures and the maintenance program in the *Manual* shall be updated as necessary. The *Manual* shall include, as a minimum, the following:
    3. routine operating and maintenance procedures in accordance with good engineering practices and as recommended by the *Equipment* and the *CEM System* suppliers;
    4. the calibration procedures of the *CEM System;*
    5. emergency procedures and procedures to prevent upset conditions;
    6. the operator training which is to be provided by qualified and experienced individuals, for example, staff associated with the *Equipment* and the *CEM System* suppliers or personnel with equivalent qualification;
    7. the procedures for optimizing the operation of the *Equipment* to minimize emissions from the *Equipment;*
    8. the periodic, at a minimum weekly, inspection of the *Equipment* which is to be conducted by individuals trained with the *Equipment;* and timetables for work to be carried out;
    9. procedures for any record keeping activities relating to operation and maintenance of the *Equipment,* including but not limited to the quantity and quality of the landfill gas collected and fed to the *Equipment* for incineration;
    10. procedures to record process upsets/upset conditions and the remedial actions taken to respond to the upsets;

11. all appropriate measures to minimize noise, dust and odorous emissions from all potential sources;
12. the procedures for recording and responding to complaints regarding the operation of the *Equipment;*
13. implement the procedures of the *Manual.*

4. **ACOUSTIC AUDIT**
   1. The *Company* shall carry out *Acoustic Audit* measurements on the actual noise emissions due to the operation of the *Facility.* The:
      a. shall carry out *Acoustic Audit* measurements in accordance with the procedures in *Publication NPC-103;*
      b. shall submit an *Acoustic Audit* Report on the results of the *Acoustic Audit,* prepared by an *Independent Acoustical Consultant,* in accordance with the requirements of *Publication NPC-233,* to the *District Manager* and the *Director* not later than three (3) months after the commencement of operation of each of the proposed three (3) flare systems in the *Facility.*
   2. The *Director:*
      a. may not accept the results of the *Acoustic Audit* if the requirements of *Publication NPC-233* were not followed;
      b. may require the *Company* to repeat the *Acoustic Audit* if the results of the *Acoustic Audit* are found unacceptable to the *Director.*

5. **RECORD RETENTION**
   1. The *Company* shall retain, for a minimum of two (2) years from the date of their creation, all records and information related to or resulting from the recording activities required by this *Approval,* and make these records available for review by staff of the Ministry upon request. The *Company* shall retain:
   2. all records on the maintenance, repair and inspection of the *Equipment* and the *CEM System;*
   3. all records produced by the *CEM System;*
   4. all records on the quality and quantity of landfill gas collected and fed to the *Equipment;*
   5. all records on the ambient air monitoring;
   6. all records generated in the *Acoustic Audit* measurements;
   7. all records of process upsets/upset conditions and remedial actions taken to respond to the upsets;
   8. all records of any environmental complaints; including:
   9. a description, time and date of each incident to which the complaint relates,
   10. wind direction at the time of the incident to which the complaint relates, and
   11. a description of the measures taken to address the cause of the incident to which the complaint relates and to prevent a similar occurrence in the future.

6. **NOTIFICATION OF COMPLAINTS**
   1. The *Company* shall notify the *District Manager,* in writing, of each environmental complaint within two (2) business days of the complaint. The notification shall include:
   2. this *Approval* number;
   3. a description of the nature of the complaint;
   4. the time and date of the incident to which the complaint relates;
   5. a description of the measures taken to address the cause of the incident to which the complaint relates and to prevent a similar occurrence in the future.

7. **CONSULTATION**
   1. During the process of submission of an application to amend any *Approval* for the *Site,* the *Company* shall:
   2. discuss with Walpole Island First Nation (WIFN), Township of Warwick and Warwick Public

Liaison Committee (WPLC) the proposed application prior to submission of the application to the *Director;*

3. provide the same documents to WIFN, Township of Warwick and WPLC that are provided to the *Director* in respect of the amendment; and
4. provide the *Director* with a statement indicating how WIFN, Township of Warwick and WPLC's comments were considered by the *Company* before it submitted the application to the Ministry.

8. **SOURCE TESTING**
   1. The *Company* shall monitor the emissions from the operation of the *Facility* as follows:
      a. The *Company* shall perform Source Testing for the sources and contaminants outlined in Schedule B.
      b. The *Company* shall submit, within the three (3) months following the date of this *Approval,* to the Manager a test protocol, including the *Pre-Test Information* for the Source Testing required by the *Source Testing Code.*
      c. The *Company* shall finalize the test protocol in consultation with the Manager.
      d. The *Company* shall not commence the Source Testing until the Manager has accepted the test protocol.
      e. The *Company* shall notify the *District Manager* and the Manager in writing of the location, date and time of any impending Source Testing required by this *Approval,* at least fifteen (15) business days prior to the Source Testing or as approved by the Manager.
      f. The *Company* shall complete the Source Testing within three (3) months after the commencement of the leachate treatment facility. The source testing will be repeated within 90 days of the start of each new phase as outlined in Table 6.1 of the Design and Operations Plan for the *Site.*

9. **REPORT ON SOURCE TESTING**
   1. The *Company* shall submit a report on the Source Testing to the *District Manager* and the *Manager,* as stated in the test protocol, but no later than two (2) months after completing the *Source Testing.* The report shall be in the format described in the *Source Testing Code,* and shall also include:
      a. an executive summary including the results from the *Source Testing;*
      b. records of all operating conditions including any upset conditions during the *Source Testing;* and
      c. the results of dispersion calculations using the maximum emission rate for odour for the *Equipment,* indicating the maximum concentration of the odour, 10 minute-average, calculated in accordance with the procedures outlined in Schedule C, at the nearby Sensitive Receptors and the yearly frequency of exceedance of 1 odour unit at the Sensitive Receptors.

10. **REFUSAL OF SOURCE TESTING**
    1. The *Director* may not accept the results of the *Source Testing* if:
       a. the *Source Testing Code* or the requirements of the Manager were not followed; or
       b. the *Company* did not notify the *District Manager* and the Manager of the *Source Testing;* or
       c. the *Company* failed to provide a complete report on the *Source Testing.*
    2. If the *Director* does not accept the results of the *Source Testing,* the *Director* may require re-testing.

SCHEDULE "A"

PARAMETER: Temperature

LOCATION:
The sample point for the continuous temperature monitoring and recording system shall be shall be

installed in the combustion chamber of each flare where the minimum retention time of the combustion gases at a minimum temperature of 875 degrees Celsius for at least 0.7 second is achieved.

PERFORMANCE:

The Continuous Temperature Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETER SPECIFICATION

1. Type: shielded "K" type thermocouple or equivalent
2. Accuracy: + 1.5 percent of the minimum gas temperature
3. Response Time (95%): 60 sec. (max)
4. Operating Range (Full Scale): 1.5 times approval limit
5. Standard Tolerance: ±2.2 ºC or ±0.75%
6. Resolution: 0.1 ºC
7. Calibration: Per manufacturer's recommendations

RECORDER:

The recorder must be capable of registering continuously the measurement of the monitor without a significant loss of accuracy and with a time resolution of 5 minutes or better.

RELIABILITY:

The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent, thereafter when the enclosed flare systems are in operation.

SCHEDULE "B"

Source Testing Requirement

Source ID	Description	Test Parameters
L3	Exhaust serving sequencing a batch reactor (SBR) and an aeration tank	Odour, hydrogen sulfide, total Mercaptans and a complete scan for volatile organic compounds
L4	Exhaust serving sequencing a batch reactor (SBR) and an aeration tank	Odour, hydrogen sulfide, total Mercaptans and a complete scan for volatile organic compounds
EF-2	Exhaust serving reverse osmosis system area	Odour, hydrogen sulfide, total Mercaptans and a complete scan for volatile organic compounds
SD-1	Exhaust serving slurry dryer	Odour, hydrogen sulfide, total Mercaptans and a complete scan for volatile organic compounds

SCHEDULE "C"

Procedures for the Calculation of 10-minute Average Concentration of Odour

1. The one-hour average concentration of odour at the Point of Impingement and at the most impacted *Sensitive Receptor* can be calculated using the Procedure described as follows:
    1. Calculate one-hour average concentration of odour at the Point of Impingement and at the most impacted *Sensitive Receptor,* employing the AERMOD atmospheric dispersion model employing at least five (5) years of hourly local meteorological data and provide results as individual one- hour odour concentrations;

2. Convert each of the one-hour average concentrations predicted over the five (5) years of hourly local meteorological data to a 10-minute average concentration using the One-hour Average to 10-Minute Average Conversion described below;
3. Present the 10-Minute Average concentrations predicted to occur over a five (5) year period at the Point of Impingement and at the most impacted *Sensitive Receptor* in a histogram. The maximum 10-minute average concentration of odour at the *Sensitive Receptor* will be considered to be the maximum odour concentration at the most impacted *Sensitive Receptor* that occurs and is represented in the histogram; and

2. For AERMOD, use the following formula to convert one-hour average Point of Impingement concentration to 10-minute average Point of Impingement concentration:

The reasons for the imposition of these terms and conditions are as follows:

1. Condition No. 1 is included to assist the Ministry with the inspection of the *Facility* so that the environmental impact and subsequent compliance with the *EPA,* the regulations and this *Approval* can be verified.
2. Condition Nos. 2.1 and 2.3 are included to provide the minimum performance requirements considered necessary to prevent an adverse effect resulting from the operation of the *Facility.*
3. Condition No. 2.2 is included to ensure that the operation of the two (2) emergency diesel generators, excluding emergency situations, is not extended beyond the specified hours to prevent an adverse effect resulting from the operation of the Equipment.
4. Condition No. 3 is included to emphasize that the *Equipment* including the *CEM System* must be maintained and operated according to a procedure that will result in compliance with the *EPA,* the regulations and this *Approval*.
5. Condition No. 4 is included to require the Company to gather accurate information and submit an Acoustic Audit Report in accordance with procedures set in the Ministry's noise guidelines, so that the environmental impact and subsequent compliance with this Approval can be verified.
6. Condition No. 5 is included to require the *Company* to keep records and to provide information to staff of the Ministry so that compliance with the *EPA,* the regulations and this *Approval* can be verified.
7. Condition No. 6 is included to require the *Company* to notify staff of the Ministry so as to assist the Ministry with the review of the *Facility's* compliance.
8. Condition No. 7 is included in order to ensure that consultation with Walpole Island First Nation (WIFN), Township of Warwick and Warwick Public Liaison Committee (WPLC) is undertaken during the submission of any application to amend any *Approval* required by the Ministry.
9. Condition Nos. 8 to 10 are included to require the *Company* to gather accurate information so that the environmental impact and subsequent compliance with the *EPA,* the regulations and this *Approval* can be verified.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 4365-7VXJ5G issued on November 10, 2009.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me, the Environmental Review Tribunal and in accordance with Section 47 of the Environmental Bill of Rights, 1993, S.O. 1993, c. 28 (Environmental Bill of Rights), the Environmental Commissioner,

within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Environmental Commissioner
1075 Bay Street, Suite 605
Toronto, Ontario
M5S 2B1

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or** www.ert.gov.on.ca

This instrument is subject to Section 38 of the Environmental Bill of Rights, 1993, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek leave to appeal within 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry at www.ebr.gov.on.ca*, you can determine when the leave to appeal period ends.*

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 6th day of July, 2017

Rudolf Wan, P.Eng.

Director
appointed for the purposes of Part II.1 of
the *Environmental Protection Act*

BS/
c: District Manager, MOECC Sarnia
Brad Bergeron, RWDI AIR Inc.

APPENDIX A6:

Amended Permit to Take Water [Surface Water] No. 4430-8PLMKV, dated January 17, 2012

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDED PERMIT TO TAKE WATER
Surface Water
NUMBER 4430-8PLMKV

Pursuant to Section 34 of the Ontario Water Resources Act, R.S.O. 1990 this Permit To Take Water is hereby issued to:

Waste Management of Canada Corporation
8039 Zion Line
Watford, Ontario, N0M 2S0
Canada

For the water taking from: Twin Creeks Landfill-
Stormwater Sedimentation Ponds (Ponds 1,2,3,4),
Secondary Drainage Layer (SDL),
Pumping Stations (PS2, PS4, PS6, PS8)

Located at: 8039 Zion Line
Warwick, County of Lambton

For the purposes of this Permit, and the terms and conditions specified below, the following definitions apply:

DEFINITIONS

(a) "Director" means any person appointed in writing as a Director pursuant to section 5 of the OWRA for the purposes of section 34, OWRA.

(b) "Provincial Officer" means any person designated in writing by the Minister as a Provincial Officer pursuant to section 5 of the OWRA.

(c) "Ministry" means Ontario Ministry of the Environment.

(d) "District Office" means the Sarnia District Office.

(e) "Permit" means this Permit to Take Water No. 4430-8PLMKV including its Schedules, if any, issued in accordance with Section 34 of the OWRA.

(f) "Permit Holder" means Waste Management of Canada Corporation.

(g) "OWRA " means the *Ontario Water Resources Act,* R.S.O. 1990, c. O. 40, as amended.

You are hereby notified that this Permit is issued subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. Compliance with Permit

1.1 Except where modified by this Permit, the water taking shall be in accordance with the application for this Permit To Take Water, dated October 25, 2011 and signed by Reid Cleland, and all Schedules included in this Permit.

1.2 The Permit Holder shall ensure that any person authorized by the Permit Holder to take water under this Permit is provided with a copy of this Permit and shall take all reasonable measures to ensure that any such person complies with the conditions of this Permit.

1.3 Any person authorized by the Permit Holder to take water under this Permit shall comply with the conditions of this Permit.

1.4 This Permit is not transferable to another person.

1.5 This Permit provides the Permit Holder with permission to take water in accordance with the conditions of this Permit, up to the date of the expiry of this Permit. This Permit does not constitute a legal right, vested or otherwise, to a water allocation, and the issuance of this Permit does not guarantee that, upon its expiry, it will be renewed.

1.6 The Permit Holder shall keep this Permit available at all times at or near the site of the taking, and shall produce this Permit immediately for inspection by a Provincial Officer upon his or her request.

1.7 The Permit Holder shall report any changes of address to the Director within thirty days of any such change. The Permit Holder shall report any change of ownership of the property for which this Permit is issued within thirty days of any such change. A change in ownership in the property shall cause this Permit to be cancelled.

2. General Conditions and Interpretation

2.1 Inspections

The Permit Holder must forthwith, upon presentation of credentials, permit a Provincial Officer to carry out any and all inspections authorized by the OWRA, the *Environmental Protection Act* , R.S.O. 1990, the *Pesticides Act* , R.S.O. 1990, or the *Safe Drinking Water Act,* S. O. 2002.

2.2 Other Approvals

The issuance of, and compliance with this Permit, does not:

(a) relieve the Permit Holder or any other person from any obligation to comply with any other

applicable legal requirements, including the provisions of the *Ontario Water Resources Act* , and the *Environmental Protection Act* , and any regulations made thereunder; or

(b) limit in any way any authority of the Ministry, a Director, or a Provincial Officer, including the authority to require certain steps be taken or to require the Permit Holder to furnish any further information related to this Permit.

2.3 Information

The receipt of any information by the Ministry, the failure of the Ministry to take any action or require any person to take any action in relation to the information, or the failure of a Provincial Officer to prosecute any person in relation to the information, shall not be construed as:

(a) an approval, waiver or justification by the Ministry of any act or omission of any person that contravenes this Permit or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

2.4 Rights of Action

The issuance of, and compliance with this Permit shall not be construed as precluding or limiting any legal claims or rights of action that any person, including the Crown in right of Ontario or any agency thereof, has or may have against the Permit Holder, its officers, employees, agents, and contractors.

2.5 Severability

The requirements of this Permit are severable. If any requirements of this Permit, or the application of any requirements of this Permit to any circumstance, is held invalid or unenforceable, the application of such requirements to other circumstances and the remainder of this Permit shall not be affected thereby.

2.6 Conflicts

Where there is a conflict between a provision of any submitted document referred to in this Permit, including its Schedules, and the conditions of this Permit, the conditions in this Permit shall take precedence.

3. Water Takings Authorized by This Permit

3.1 **Expiry**

This Permit expires on **April 15, 2020.** No water shall be taken under authority of this Permit after the expiry date.

3.2 Amounts of Taking Permitted

The Permit Holder shall only take water from the source, during the periods and at the rates and amounts of taking specified in Table A. Water takings are authorized only for the purposes specified in Table A.

Table A

	Source Name / Description:	Source: Type:	Taking Specific Purpose:	Taking Major Category:	Max. Taken per Minute (litres):	Max. Num. of Hrs Taken per Day:	Max. Taken per Day (litres):	Max. Num. of Days Taken per Year:	Zone/ Easting/ Northing:
1	Pond 1	Pond Online	Other - Industrial	Industrial	2,400	10	82,700	105	17 429230 4757320
2	Pond 2	Pond Online	Other - Industrial	Industrial	2,400	10	246,700	105	17 428370 4757850
3	Pond 3	Pond Online	Other - Industrial	Industrial	2,400	10	110,100	105	17 428380 4758670
4	Pond 4	Pond Online	Other - Industrial	Industrial	2,400	10	41,200	105	17 429390 4758620
5	SDL	Well Dug	Other - Dewatering	Dewatering	4,921	24	7,085,520	215	17 428500 4758400
6	PS2	Well Dug	Other - Dewatering	Dewatering	1,325	24	1,907,640	365	17 428500 4758400
7	PS4	Well Dug	Other - Dewatering	Dewatering	1,325	24	1,907,640	365	17 428500 4758400
8	PS6	Well Dug	Other - Dewatering	Dewatering	1,325	24	1,907,640	365	17 428500 4758400
9	PS8	Well Dug	Other - Dewatering	Dewatering	1,325	24	1,907,640	365	17 428500 4758400
						Total Taking:	15,196,780		

4. Monitoring

4.1 The Permit Holder shall, on each day water is taken under the authorization of this Permit, record the date, the volume of water taken on that date and the rate at which it was taken. The daily volume of water taken shall be measured by a flow meter or calculated in accordance with the method described in the application for this Permit or as otherwise accepted by the Director. A separate record shall be maintained for each source. The Permit Holder shall keep all records required by this condition current and available at or near the site of the taking and shall produce the records immediately for inspection by a Provincial Officer upon his or her request. The Permit Holder, unless otherwise required by the Director, shall submit, on or before March 31st in every year, the daily water taking data collected and recorded for the previous year to the ministry's Water Taking Reporting System.

5. Impacts of the Water Taking

5.1 Notification

The Permit Holder shall immediately notify the local District Office of any complaint arising from the taking of water authorized under this Permit and shall report any action which has been taken or is proposed with regard to such complaint. The Permit Holder shall immediately notify the local District Office if the taking of water is observed to have any significant impact on the surrounding waters. After hours, calls shall be directed to the Ministry's Spills Action Centre at 1-800-268-6060.

5.2 For Surface-Water Takings

The taking of water (including the taking of water into storage and the subsequent or simultaneous withdrawal from storage) shall be carried out in such a manner that streamflow is not stopped and is not reduced to a rate that will cause interference with downstream uses of water or with the natural functions of the stream.

5.3 The Permit Holder must ensure that if water is discharged directly to a watercourse, the discharge water shall be controlled in such a way as to avoid erosion and sedimentation in the receiving watercourse.

6. Director May Amend Permit

The Director may amend this Permit by letter requiring the Permit Holder to suspend or reduce the taking to an amount or threshold specified by the Director in the letter. The suspension or reduction in taking shall be effective immediately and may be revoked at any time upon notification by the Director. This condition does not affect your right to appeal the suspension or reduction in taking to the Environmental Review Tribunal under the *Ontario Water Resources Act* , Section 100 (4).

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is included to ensure that the conditions in this Permit are complied with and can be enforced.

2. Condition 2 is included to clarify the legal interpretation of aspects of this Permit.

3. Conditions 3 through 6 are included to protect the quality of the natural environment so as to safeguard the ecosystem and human health and foster efficient use and conservation of waters. These conditions allow for the beneficial use of waters while ensuring the fair sharing, conservation and sustainable use of the waters of Ontario. The conditions also specify the water takings that are authorized by this Permit and the scope of this Permit.

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, you may by written notice served upon me, the Environmental Review Tribunal and the Environmental Commissioner, **Environmental Bill of Rights**, R.S.O. 1993, Chapter 28, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 101 of the Ontario Water Resources Act, as amended provides that the Notice requiring a hearing shall state:*

1. The portions of the Permit or each term or condition in the Permit in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

In addition to these legal requirements, the Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Permit to Take Water number;
6. The date of the Permit to Take Water;
7. The name of the Director;
8. The municipality within which the works are located;

This notice must be served upon:

The Secretary
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto ON
M5G 1E5
Fax: (416) 314-4506

AND

The Environmental Commissioner
1075 Bay Street
6th Floor, Suite 605
Toronto, Ontario M5S 2W5

AND

The Director, Section 34
Ministry of the Environment
733 Exeter Rd
London ON N6E 1L3
Fax: (519)873-5020

Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal:

by telephone at (416) 314-4600 ***by fax at (416) 314-4506*** ***by e-mail at www.ert.gov.on.ca***

*This instrument is subject to Section 38 of the **Environmental Bill of Rights** that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek to appeal for 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry, you can determine when the leave to appeal period ends.*

This Permit cancels and replaces Permit Number 7433-849HTE, issued on 2010/04/16.

Dated at London this 17th day of January, 2012.

Dan Dobrin
Director, Section 34
Ontario Water Resources Act , R.S.O. 1990

Schedule A

This Schedule "A" forms part of Permit To Take Water 4430-8PLMKV, dated January 17, 2012.

Ministry of the Environment
Southwestern Region
Technical Support Section
Water Resources
733 Exeter Rd
London ON N6E 1L3
Fax: (519)873-5020
Tel: 519-873-5000

Ministère de l'Environnement
Direction régionale du Sud-Ouest
Bureau du Directeur Adjoint
733 Exeter Rd
London ON N6E 1L3
Télécopieur: (519)873-5020
Tél:519-873-5000

Ontario

January 17, 2012

Reid Cleland
Waste Management of Canada Corporation
8039 Zion Line
Watford, ON N0M 2S0

Dear Mr. Cleland,

RE: Permit to Take Water 4430-8PLMKV
Amendment to Permit to Take Water No. 7433-849HTE
Twin Creeks Landfill Site
Warwick, County of Lambton
Reference Number 3142-8N8JE9

Please find attached a Permit to Take Water which authorizes the withdrawal of water in accordance with the application for this Permit to Take Water, dated October 25, 2011 and signed by Reid Cleland.

This Permit to Take Water expires on **April 15, 2020**. Authorized rates and volumes of water taking are given in Table A.

Take notice that in issuing this Permit, terms and conditions pertaining to the taking of water and to the results of the taking have been imposed. The terms and conditions have been designed to allow for the development of water resources, while providing reasonable protection to existing water uses and users.

Please ensure that prior to discharging any secondary drainage layer (SDL) water taken under the authority of this Permit to stormwater ditches, you refer to Section 4.5 of your Development and Operations Plan, dated March, 2008, which requires that samples of the SDL liquid be analyzed for the primary and secondary leachate indicator parameters (PLIL-SW and SLIL-SW), as defined in the Environmental Monitoring Plan.

Ontario Regulation 387/04 (Water Taking) requires all water takers to report daily water taking amounts to the Water Taking Reporting System (WTRS) electronic database: http://www.ene.gov.on.ca/envision/water/pttw.htm. Daily water taking must be reported on a calendar year basis. If no water is taken, then a "no taking" report must be entered. Please consult the Regulation and Section 4 of this Permit for monitoring requirements.

If you have questions about reporting requirements, please call the WTRS Help Desk at 416-235-6322 (toll free: 1-877-344-2011) or by email, WTRSHelpdesk@ontario.ca. It is preferred that you submit your

data directly and electronically to the WTRS. Where this is impracticable, please use the Water Taking Submission Form (included as Appendix C of the *Technical Bulletin: Permit To Take Water (PTTW) - Monitoring and Reporting of Water Takings*), which can be downloaded from the above web site, and fax your completed forms to 416-235-6549 or mail them to: Water User Reporting Section, 125 Resources Rd. Toronto, ON M9P 3V6.

Yours truly,

Dan Dobrin
Supervisor, Water Resources
Southwestern Region

File Storage Number: SILAWAZI.220

APPENDIX A7:

Amended Permit to Take Water [Surface Water] No. 4682-BLJRYJ, dated November 8, 2021

PERMIT TO TAKE WATER
Ground Water
NUMBER 4682-BLJRYJ

Pursuant to Section 34.1 of the Ontario Water Resources Act, R.S.O. 1990 this Permit To Take Water is hereby issued to:

Waste Management of Canada Corporation
5768 Nauvoo Rd
Warwick, Ontario, N0M 2S0
Canada

For the water taking from: PS2, PS4, PS6, PS8, SDL, Pond 1, Pond 2, Pond 3, Pond 4.

Located at: Lot 19 and 20, Concession 3, Geographic Township of Warwick
Warwick, County of Lambton

For the purposes of this Permit, and the terms and conditions specified below, the following definitions apply:

DEFINITIONS

(a) "Director" means any person appointed in writing as a Director pursuant to section 5 of the OWRA for the purposes of section 34.1, OWRA.

(b) "Provincial Officer" means any person designated in writing by the Minister as a Provincial Officer pursuant to section 5 of the OWRA.

(c) "Ministry" means Ontario Ministry of the Environment, Conservation and Parks.

(d) "District Office" means the Sarnia District Office.

(e) "Permit" means this Permit to Take Water No. 4682-BLJRYJ including its Schedules, if any, issued in accordance with Section 34.1 of the OWRA.

(f) "Permit Holder" means Waste Management of Canada Corporation.

(g) "OWRA " means the *Ontario Water Resources Act,* R.S.O. 1990, c. O. 40, as amended.

You are hereby notified that this Permit is issued subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. Compliance with Permit

1.1 Except where modified by this Permit, the water taking shall be in accordance with the application for this Permit To Take Water, dated December 19, 2019 and signed by Phil Janisse, and all Schedules included in this Permit.

1.2 The Permit Holder shall ensure that any person authorized by the Permit Holder to take water under this Permit is provided with a copy of this Permit and shall take all reasonable measures to ensure that any such person complies with the conditions of this Permit.

1.3 Any person authorized by the Permit Holder to take water under this Permit shall comply with the conditions of this Permit.

1.4 This Permit is not transferable to another person.

1.5 This Permit provides the Permit Holder with permission to take water in accordance with the conditions of this Permit, up to the date of the expiry of this Permit. This Permit does not constitute a legal right, vested or otherwise, to a water allocation, and the issuance of this Permit does not guarantee that, upon its expiry, it will be renewed.

1.6 The Permit Holder shall keep this Permit available at all times at or near the site of the taking, and shall produce this Permit immediately for inspection by a Provincial Officer upon his or her request.

1.7 The Permit Holder shall report any changes of address to the Director within thirty days of any such change. The Permit Holder shall report any change of ownership of the property for which this Permit is issued within thirty days of any such change. A change in ownership in the property shall cause this Permit to be cancelled.

2. General Conditions and Interpretation

2.1 Inspections
The Permit Holder must forthwith, upon presentation of credentials, permit a Provincial Officer to carry out any and all inspections authorized by the OWRA, the *Environmental Protection Act*, R.S.O. 1990, the *Pesticides Act*, R.S.O. 1990, or the *Safe Drinking Water Act,* S. O. 2002.

2.2 Other Approvals
The issuance of, and compliance with this Permit, does not:

(a) relieve the Permit Holder or any other person from any obligation to comply with any other applicable legal requirements, including the provisions of the *Ontario Water Resources Act*, and

the *Environmental Protection Act* , and any regulations made thereunder; or

(b) limit in any way any authority of the Ministry, a Director, or a Provincial Officer, including the authority to require certain steps be taken or to require the Permit Holder to furnish any further information related to this Permit.

2.3 Information

The receipt of any information by the Ministry, the failure of the Ministry to take any action or require any person to take any action in relation to the information, or the failure of a Provincial Officer to prosecute any person in relation to the information, shall not be construed as:

(a) an approval, waiver or justification by the Ministry of any act or omission of any person that contravenes this Permit or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

2.4 Rights of Action

The issuance of, and compliance with this Permit shall not be construed as precluding or limiting any legal claims or rights of action that any person, including the Crown in right of Ontario or any agency thereof, has or may have against the Permit Holder, its officers, employees, agents, and contractors.

2.5 Severability

The requirements of this Permit are severable. If any requirements of this Permit, or the application of any requirements of this Permit to any circumstance, is held invalid or unenforceable, the application of such requirements to other circumstances and the remainder of this Permit shall not be affected thereby.

2.6 Conflicts

Where there is a conflict between a provision of any submitted document referred to in this Permit, including its Schedules, and the conditions of this Permit, the conditions in this Permit shall take precedence.

3. Water Takings Authorized by This Permit

3.1 **Expiry**

This Permit expires on **October 31, 2031**. No water shall be taken under authority of this Permit after the expiry date.

3.2 Amounts of Taking Permitted

The Permit Holder shall only take water from the source, during the periods and at the rates and amounts of taking specified in Table A. Water takings are authorized only for the purposes specified in Table A.

Table A

	Source Name / Description:	Source: Type:	Taking Specific Purpose:	Taking Major Category:	Max. Taken per Minute (litres):	Max. Num. of Hrs Taken per Day:	Max. Taken per Day (litres):	Max. Num. of Days Taken per Year:	Zone/ Easting/ Northing:
1	PS2	Well Dug	Construction	Dewatering Construction	1,325	24	1,907,640	365	17 428500 4757900
2	PS4	Well Dug	Construction	Dewatering Construction	1,325	24	1,907,640	365	17 428505 4758130
3	PS6	Well Dug	Construction	Dewatering Construction	1,325	24	1,907,640	365	17 428505 4758490
4	PS8	Well Dug	Construction	Dewatering Construction	1,325	24	1,907,640	365	17 428500 4758800
5	SDL	Well Dug	Construction	Dewatering Construction	4,921	24	7,085,520	365	17 428500 4758900
6	pond 01	Pond Online	Other - Industrial	Industrial	4,921	24	7,085,520	365	17 429230 4757320
7	pond 02	Pond Online	Other - Industrial	Industrial	4,921	24	7,085,520	365	17 428370 4757850
8	pond 03	Pond Online	Other - Industrial	Industrial	4,921	24	7,085,520	365	17 428380 4758670
9	pond 04	Pond Online	Other - Industrial	Industrial	4,921	24	7,085,520	365	17 429390 4758620
						Total Taking:	42,068,160		

4. Monitoring

4.1 Under section 9 of O. Reg. 387/04, and as authorized by subsection 34(6) of the Ontario Water Resources Act, the Permit Holder shall, on each day water is taken under the authorization of this Permit, record the date, the volume of water taken on that date and the rate at which it was taken. The daily volume of water taken shall be measured by a flow meter or calculated in accordance with the method described in the application for this Permit, or as otherwise accepted by the Director. A separate record shall be maintained for each source. The Permit Holder shall keep all records required by this condition current and available at or near the site of the taking and shall produce the records immediately for inspection by a Provincial Officer upon his or her request. The Permit Holder, unless otherwise required by the Director, shall submit, on or before March 31st in every year, the records required by this condition to the ministry's Water Taking Reporting System.

4.2 Within 180 days of the issuance of this Permit, the Permit Holder shall submit to the

District Manager, a Plan (the "Plan") to investigate the potential impacts of the Water Taking. The Plan shall include two components:

a. An Ecological Study which includes an inventory of the ecosystem in the immediate vicinity of the Gilliand-Geerts Drain between Nauvoo Road and Underpass Road, and an assessment of potential impacts of the water taking on that ecosystem; and
b. A survey of downstream riparian property owners along the Gilliand-Geerts Drain between Nauvoo Road and Underpass Road to determine the extent of any surface water uses by those property owners and assess any impacts of the water taking on those uses.

The Plan shall include timelines for completing the outlined work. Upon acceptance of the Plan by the District Manager, the Permit Holder shall complete the action items outlined with the Plan within the prescribed timelines.

5. Impacts of the Water Taking

5.1 Notification

The Permit Holder shall immediately notify the local District Office of any complaint arising from the taking of water authorized under this Permit and shall report any action which has been taken or is proposed with regard to such complaint. The Permit Holder shall immediately notify the local District Office if the taking of water is observed to have any significant impact on the surrounding waters. After hours, calls shall be directed to the Ministry's Spills Action Centre at 1-800-268-6060.

5.2 For Groundwater Takings

If the taking of water is observed to cause any negative impact to other water supplies obtained from any adequate sources that were in use prior to initial issuance of a Permit for this water taking, the Permit Holder shall take such action necessary to make available to those affected, a supply of water equivalent in quantity and quality to their normal takings, or shall compensate such persons for their reasonable costs of so doing, or shall reduce the rate and amount of taking to prevent or alleviate the observed negative impact. Pending permanent restoration of the affected supplies, the Permit Holder shall provide, to those affected, temporary water supplies adequate to meet their normal requirements, or shall compensate such persons for their reasonable costs of doing so.

If permanent interference is caused by the water taking, the Permit Holder shall restore the water supplies of those permanently affected.

6. Director May Amend Permit

The Director may amend this Permit by letter requiring the Permit Holder to suspend or reduce the taking to an amount or threshold specified by the Director in the letter. The suspension or reduction in taking shall be effective immediately and may be revoked at any time upon notification by the Director. This condition does not affect your right to appeal the suspension or reduction in taking to the Environmental Review Tribunal under the *Ontario Water*

Resources Act , Section 100 (4).

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is included to ensure that the conditions in this Permit are complied with and can be enforced.

2. Condition 2 is included to clarify the legal interpretation of aspects of this Permit.

3. Conditions 3 through 6 are included to protect the quality of the natural environment so as to safeguard the ecosystem and human health and foster efficient use and conservation of waters. These conditions allow for the beneficial use of waters while ensuring the fair sharing, conservation and sustainable use of the waters of Ontario. The conditions also specify the water takings that are authorized by this Permit and the scope of this Permit.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, you may by written notice served upon me, the Environmental Review Tribunal and the Minister of the Environment, Conservation and Parks, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Minister of the Environment, Conservation and Parks will place notice of your appeal on the Environmental Registry. Section 101 of the Ontario Water Resources Act, as amended provides that the Notice requiring a hearing shall state:

1. The portions of the Permit or each term or condition in the Permit in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

In addition to these legal requirements, the Notice should also include:

a. The name of the appellant;
b. The address of the appellant;
c. The Permit to Take Water number;
d. The date of the Permit to Take Water;
e. The name of the Director;
f. The municipality within which the works are located;

This notice must be served upon:

The Secretary
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto ON
M5G 1E5
Fax: (416) 326-5370
Email:
ERTTribunalsecretary@ontario.ca

AND

The Minister of the Environment,
Conservation and Parks
777 Bay Street, 5th Floor
Toronto, Ontario
M7J 2J3

AND

The Director, Section 34.1,
Ministry of the Environment,
Conservation and Parks
733 Exeter Rd
London ON N6E 1L3
Fax: (519) 873-5020

Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal:

by Telephone at	by Fax at	by e-mail at
(416) 212-6349	(416) 326-5370	www.ert.gov.on.ca
Toll Free 1(866) 448-2248	Toll Free 1(844) 213-3474	

This instrument is subject to Section 38 of the ***Environmental Bill of Rights*** *that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek to appeal for 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry, you can determine when the leave to appeal period ends.*

This Permit cancels and replaces Permit Number 4430-8PLMKV, issued on 2012/01/17.

Dated at London this 8th day of November, 2021.

Jason Lehouillier

Jason Lehouillier
Director, Section 34.1
Ontario Water Resources Act , R.S.O. 1990

Schedule A

This Schedule “A” forms part of Permit To Take Water 4682-BLJRYJ, dated November 8, 2021.

APPENDIX A8:

Amended ECA No. A032203, dated February 4, 2023

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A032203
Issue Date: February 4, 2023

Waste Management of Canada Corporation
117 Wentworth Court
Brampton, Ontario
L6T 5L4

Site Location: Twin Creeks Environmental Centre
5768 Nauvoo Rd Watford
Warwick Township, County of Lambton
N0M 2S0

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

the use and operation of a 101.8 hectare waste disposal site (landfill) within a total site area of 301 hectares.

For the purpose of this environmental compliance approval, the following definitions apply:

"Agricultural Waste" for the purposes of this ECA, is defined as municipal yard waste, wood chips, food waste and minimal amounts of solid manure which would only be accepted or used for the purpose of seeding or operating an active aerobic compost pile and does not include liquid manure;

"AQMP " means an Air Quality Monitoring Program;

"Construction Phase " is defined as the period of time from the start of construction of Phase 1 of the expanded landfill to the date of first receipt of waste in Phase 1;

"Contaminating Lifespan" refers to the period of time, after closure until the site finally produces contaminants at concentrations below levels which have unacceptable health or environmental effects;

"Crown " means Her Majesty the Queen in the Right of Ontario;

"Director " means any Ministry employee appointed in writing by the Minister pursuant to section 5 of the EPA as a Director for the purposes of Part II.1 of the EPA;

“District Manager ” means the District Manager in the Ministry of the Environment, Conservation and Parks Sarnia District Office;

“District Office ” means the Ministry of the Environment, Conservation and Parks Sarnia District Office;

“EA” refers to the document titled “Warwick Landfill Expansion Environmental Assessment” , dated September 2005, which includes Discussion Papers 1 though 9 included in the Appendices A to F of the Environmental Assessment. EA also includes responses from the Owner dated:

1. March 10, 2006 “Waste Unit’s Final Comments Dated March 8, 2006”
2. February 14, 2006 “Leachate Recirculation”
3. February 14, 2006 “Response to February 1, 2006 Correspondence”
4. January 13, 2006 “Waste Management Response to Comments received from Warwick Landfill Expansion EA” including attachments entitled:

    i. Response to the Township of Warwick;
    ii. Response to Thomson Rogers;
    iii. Table of responses to various agencies, public and First Nations Submissions;
    iv. Landfill Gas Assessment, Warwick Landfill Baseline Conditions Report prepared by RWDI dated January 12, 2006;
    v. Memo dated March 10, 2006;
    vi. June 12, 2006 “Response to May 1, 2006 Ministry Review ”;

“EAA” refers to the Ontario Environmental Assessment Act, R.S.O. 1990, c.E.18, as amended;

"Environmental Compliance Approval" or "ECA" or "Approval" means this entire provisional Environmental Compliance Approval document, issued in accordance with Section 20.2 of the EPA , and includes any schedules to it, the application and the supporting documentation listed in schedule "A";

“Environmental Inspector” refers to the individual employed by the Ministry of the Environment, Conservation and Parks to inspect the Site;

"EPA " means Environmental Protection Act , R.S.O. 1990, c.E.19, as amended;

“EPB” refers to the Environmental Permissions Branch of the Ministry of the Environment, Conservation and Parks;

"Hydraulic Trap" indicates a situation where hydraulic gradients from the surrounding soil are inward toward the landfill waste and associated leachate collection system;

"Mini-Transfer Area" means the mini-transfer public convenience drop-off area as described and identified in the June 2009 Development & Operations Report that is identified in Item 59 of Schedule "A" and whose location is identified as "Expansion Mini-Transfer" in figure MT2 that is contained in the 2009 Development & Operations Report;

“MECP” or “Ministry” refers to the Ontario Ministry of the Environment, Conservation and Parks;

"Operation Phase" is defined as the period of time from the date that Phase 1 of the expanded landfill area first receives waste until the landfill site reaches final capacity;

“Operator ” has the same meaning as “operator” as defined in s.25 of the EPA;

“Owner ” means Waste Management of Canada Corporation and its successors and assigns;

"O. Reg. 101/94" means Ontario Regulation 101/94 as amended;

"OWRA" means the Ontario Water Resources Act, R.S.O. 1990, c. O.40, as amended;

“PA ” means the Pesticides Act , R.S.O. 1990, c.P.11, as amended;

"Preparation Report" refers to a report documenting that the subsequent stage of the landfill has been constructed in accordance with the approved design plans and specifications;

“Poplar System” is the irrigation area located on top of the cap of the Existing Site (old landfill) that is used for the phytoremediation of leachate that is generated at the Site per Items 63 through 65 of Schedule “A” and Figure 2 of Item 16 on Schedule "A";

“Poplar Plantation” is the irrigation area located on native soil to the south of the Site that is used for the phytoremediation of irrigation liquid that satisfies the Effluent Limit criteria per the OWRA Section Approval for the Site, Item 39 of Schedule “A”, and Appendix N11 of Item 30 on Schedule "A";

"Provincial Officer" means any person designated in writing by the Minister as a provincial officer pursuant to section 5 of the OWRA or section 5 of the EPA or section 17 of PA;

"PWQO" refers to the Provincial Water Quality Objectives;

"Recyclable Waste" means waste that are glass, plastic, aluminium or steel cans, gypsum wallboard, newspapers, cardboard and/or other materials for which there is a secured market;

“Regional Director” refers to the Director of the Ministry of the Environment’s Southwestern Regional Office;

"Regulation 232 " or "Reg. 232" or "O. Reg. 232/98" means Ontario Regulation 232/98 (Landfilling Sites) made under the EPA, as amended;

"Regulation 347 " or "Reg. 347 " or "O. Reg. 347" means Regulation 347, R.R.O. 1990, made under the EPA, as amended;

“Site” refers to the Twin Creeks Landfill Site and lands owned by the Owner described as:

> Firstly, Part of Lots 19 and 20, Concession 3, S.E.R.,and Part of Lot 20, 21 and 22, Concession 4, S.E.R. and Part of the Road Allowance between Lots 21 and 22, Concession 4, S.E.R., shown as Parts 1,

2 and 3 on Plan 25R-9125 and Part 2 on Plan 25R-1903, Save and Except Part 1 on Plan 25R-6184, Township of Warwick, County of Lambton; and

Secondly, Part of Lot 20, Concession 3 S.E.R., shown as Part 1 on Plan 25R-6184, Township of Warwick, County of Lambton;

"Traditional agricultural crop production" means standard crop production, nursery and horticultural crops, agro-forestry, conservation uses but not greenhouses or any accessory agricultural buildings and structures;

"Undertaking" refers to the proposed undertaking as described in the Warwick Landfill Expansion Environmental Assessment;

"WIFN" refers to Walpole Island First Nation; and

"WPLC" refers to the Warwick Public Liaison Committee.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1.0 GENERAL

Compliance

1.1 This Approval revokes all previous Approvals and Notices of Amendment issued under Part V of the Environmental Protection Act for this Site. The approval given herein, including the terms and conditions set out, replaces all previously issued Approvals and related terms and conditions under Part V of the Act for this Site.

1.2 The Owner and Operator shall ensure compliance with all the conditions of this Approval and shall ensure that any person authorized to carry out work on or operate any aspect of the Site is notified of this Approval and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

1.3 Any person authorized to carry out work on or operate any aspect of the Site shall comply with the conditions of this Approval.

In Accordance

1.4 Except as otherwise provided by this Approval, the Site shall be designed, developed, built, operated and maintained in accordance with the documentation listed in the attached Schedule "A".

1.5 (a) Construction and installation of aspects described in Schedule "A" must be completed within 5 years of the later of:

1. the date this Approval is issued; or
2. if there is a hearing or other litigation in respect of the issuance of this Approval, the date that this hearing or litigation is disposed of, including all appeals.

(b) Notwithstanding Condition 1.5(a), ongoing constructed aspects that are pertinent to the Major Works identified in Conditions 4.1 to 4.7 including the landfill liner, landfill capping, landfill gas management infrastructure, leachate collection and recirculation infrastructure shall be constructed in accordance with the documentation in the attached Schedule "A" that pertain to the final design of the Site.

(c) This Approval ceases to apply in respect of the aspects of the Site that have not been constructed or installed before the later of the dates identified in Conditions 1.5(a).

Interpretation

1.6 Where there is a conflict between a provision of any document listed in Schedule "A" in this Approval, and the conditions of this Approval, the conditions in this Approval shall take precedence.

1.7 Where there is a conflict between the application and a provision in any document listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and the Ministry approved the amendment.

1.8 Where there is a conflict between any two documents listed in Schedule "A", the document bearing the most recent date shall take precedence.

1.9 The conditions of this Approval are severable. If any condition of this Approval, or the application of any condition of this Approval to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this Approval shall not be affected thereby.

Other Legal Obligations

1.10 The issuance of, and compliance with, this Approval does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; and

(b) limit in any way the authority of the Ministry to require certain steps be taken or to require the Owner and Operator to furnish any further information related to compliance with this Approval.

(c) The Owner shall ensure that:

(i) all equipment discharging to atmosphere are approved under Section 9 of the ECA where applicable; and

(ii) all effluent is discharged in accordance with the OWRA where applicable.

Adverse Effect

1.11 The Owner and Operator shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of water quality resulting from the present, past and historical operations at

the Site. Such steps may include accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

1.12 Despite an Owner, Operator, or any other person fulfilling any obligations imposed by this Approval, the person remains responsible for any contravention of any other condition of this Approval or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect to the natural environment or impairment of water quality.

1.13 At no time shall the Owner or Operator allow the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

Change of Ownership

1.14 The Owner shall notify the Director, in writing, and forward a copy of the notification to the District Manager, within 30 days of the occurrence of any changes in the following information:
(a) the ownership of the Site;
(b) the Operator of the Site;
(c) the address of the Owner or Operator; and
(d) the partners, where the Owner or Operator is or at any time becomes a partnership and a copy of the most recent declaration filed under the Business Names Act, R. S. O. 1990, c. B.17, shall be included in the notification.

1.15 No portion of this Site shall be transferred or encumbered prior to or after closing of the Site unless the Director is notified in advance and sufficient financial assurance is deposited with the Ministry to ensure that these conditions will be carried out.

1.16 In the event of any change in ownership of the Site, other than change to a successor municipality, the Owner shall notify the successor of and provide the successor with a copy of this Approval, and the Owner shall provide a copy of the notification to the District Manager and the Director.

Registration on Title Requirement

1.17 Prior to dealing with the property in any way, the Owner shall provide a copy of this Approval and any amendments, to any person who acquires an interest in the property as a result of the dealing.

1.18 (a) If not already completed, within ninety (90) calendar days from the date of issuance of this Approval, the Owner shall submit to the Director a completed Certificate of Requirement which shall include:
(i) a plan of survey prepared, signed and sealed by an Ontario Land Surveyor, which shows the area of the Site where waste has been and is to be deposited at the Site;
(ii) proof of ownership of the Site;
(iii) a letter signed by a member of the Law Society of Upper Canada or other qualified legal practitioner acceptable to the Director, verifying the legal description provided in the Certificate of Requirement;
(iv) the legal abstract of the property; and
(v) any supporting documents including a registerable description of the Site.

(b) If not already completed, within fifteen (15) calendar days of receiving a Certificate of Requirement authorized by the Director, the Owner shall:
    (i) register the Certificate of Requirement in the appropriate Land Registry Office on the title to the property; and
    (ii) submit to the Director and the District Manager, written verification that the Certificate of Requirement has been registered on title.

Registration on Title Requirement - Contaminant Attenuation Zone (CAZ)

1.19 If not already completed, or if required at any time, within thirty (30) calendar days from the date of establishing a contaminant attenuation zone (CAZ) (overburden and/or bedrock aquifers) in either fee simple or by way of a groundwater easement, the Owner shall submit to the Director a completed Certificate of Requirement which shall include:

(a) If rights are obtained in fee simple, the Owner shall provide:
    (i) documentation evidencing ownership of the CAZ obtained in compliance with Regulation 232, as amended;
    (ii) a completed Certificate of Requirement and supporting documents containing a registerable description of the CAZ; and
    (iii) a letter signed by a member of the Law Society of Upper Canada; or other qualified legal practitioner acceptable to the Director, verifying the legal description of the CAZ.
(b) within fifteen (15) calendar days of receiving a Certificate of Requirement signed or authorized by the Director,the Owner shall:
    (i) register the Certificate of Requirement in the appropriate Land Registry Office on the title to the property; and
    (ii) submit to the Director and the District Manager, a written verification that the Certificate of Requirement has been registered on title.
(c) If rights are obtained by way of a groundwater easement, the Applicant shall:
    (i) provide a copy of the agreement for the easement;
    (ii) provide a plan of survey signed and sealed by an Ontario Land Surveyor for the CAZ; and
    (iii) submit proof of registration on title of the groundwater easement to the Director and District Manager;
(d) The Owner shall not amend, or remove, or consent to the removal of the easement or CAZ from title without the prior written consent of the Director.

Certificate of Withdrawal of Requirement

1.20 If the Applicant wants to withdraw the Certificate of Requirement, the Applicant shall:

(a) submit to the Director, a request for a Certificate of Withdrawal of Requirement; and its supporting documents, outlining the reasons for the Withdrawal of the Requirement.
(b) submit to the Director:
    (i) a plan of survey of the area where waste was deposited signed and sealed by an Ontario Land Surveyor and for the Site or CAZ;
    (ii) the legal abstract of the Site or CAZ – or area where waste was deposited;

(iii) completed Certificate of Withdrawal of Requirement containing a registerable description of the Site or CAZ or area where waste was deposited; and
(iv) a letter signed by a member of the Law Society of Upper Canada or other qualified legal practitioner acceptable to the Director verifying the legal description of the Certificate of Withdrawal of Requirement.

(c) within fifteen (15) calendar days of receiving a Certificate of Withdrawal of Requirement authorized by the Director, the Applicant shall:
(i) register the Certificate of Withdrawal of Requirement in the appropriate Land Registry Office on the title to the Site or CAZ or area where waste was deposited; and
(ii) submit to the Director and District Manager a copy of the registered document together with a copy of the PIN Abstract confirming the registration.

Inspections by the Ministry

1.21 No person shall hinder or obstruct a Provincial Officer from carrying out any and all inspections authorized by the OWRA, the EPA, the PA, the SDWA or the NMA, of any place to which this Approval relates, and without limiting the foregoing:
(a) to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this Approval are kept;
(b) to have access to, inspect, and copy any records required to be kept by the conditions of this Approval;
(c) to inspect the Site, related equipment and appurtenances;
(d) to inspect the practices, procedures, or operations required by the conditions of this Approval; and
(e) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this Approval or the EPA, the OWRA, the PA, the SDWA or the NMA.

Information and Record Retention

1.22 (a) Except as authorized in writing by the Director, all records required by this Approval shall be retained at the Site for a minimum of two (2) years from their date of creation.
(b) The Owner shall retain all documentation listed in Schedule "A" for as long as this Approval is valid.
(c) All information and logs required in Condition 9.1 shall be kept at the Site until they are included in the Annual Report.
(d) The Owner shall retain employee training records as long as the employee is working at the Site.
(e) The Owner shall make all of the above documents available for inspection upon request of Ministry staff.

1.23 The receipt of any information by the Ministry or the failure of the Ministry to prosecute any person or to require any person to take any action under this Approval or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:
(a) an approval, waiver, or justification by the Ministry of any act or omission of any person that contravenes any term or condition of this Approval or any statute, regulation or other legal requirement; and
(b) acceptance by the Ministry of the information's completeness or accuracy.

1.24 The Owner shall ensure that a copy of this Approval, in its entirety and including all its Notices of Amendment, and documentation listed in Item #1 of Schedule "A", are retained at the Site or the Owner's office at all times.

1.25 Any information related to this Approval and contained in Ministry files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, RSO 1990, CF-31.

2.0 FINANCIAL ASSURANCE

2.1 a. The Financial Assurance shall be submitted as required to the Director, Financial Assurance as defined in Section 131 of the Environmental Protection Act. The Financial Assurance shall be in a form acceptable to the Director and shall provide sufficient funds for the analysis, closure, ongoing and long-term monitoring and reporting, post-closure maintenance and care of the Site.

1. On the following dates, the Owner shall ensure the maximum amount of financial assurance has been submitted to the Director in a form acceptable to the Director as follows:

Payment Date	**Amount**
By March 31, 2021	$32,459,985.00
By March 31, 2022	$35,256,829.00
By March 31, 2023	$37,164,501.00
By March 31, 2024	$39,434,722.00

b. Commencing on March 31, 2024 and on a four year basis thereafter, the Owner shall provide to the Director a re-evaluation of the amount of the Financial Assurance to facilitate the actions required under Condition 2.1.a. The re-evaluation shall include an assessment based on any new information relating to the environmental conditions of the Site and shall include the costs of additional monitoring and/or implementation of alternative measures required by the Director upon review of the annual reports. The Financial Assurance must be submitted to the Director within thirty (30) days of written acceptance of the re-evaluation by the Director;

c. Commencing on March 31, 2021, the Owner shall prepare and maintain at the Site an updated re-evaluation of the amount of Financial Assurance required to implement the actions required under Condition 2.1.a for each of the intervening years in which a re-evaluation is not required to be submitted to the Director under Condition 2.1.b. The re-evaluation shall be made available to the Ministry, upon request; and

d. The amount of Financial Assurance is subject to review at any time by the Director and may be amended at his/her discretion. If any Financial Assurance is scheduled to expire or notice is received, indicating Financial Assurance will not be renewed, and satisfactory methods have not been made to replace the Financial Assurance at least sixty (60) days before the Financial Assurance terminates, the Owner shall forthwith replace the Financial Assurance with cash.

3.0 WARWICK PUBLIC LIAISON COMMITTEE and FIRST NATIONS

WPLC

3.1 The Owner shall continue and maintain the WPLC. The WPLC shall serve as a focal point for dissemination, review and exchange of information and monitoring results relevant to the operation of the undertaking. In addition, the purpose of the WPLC will be to provide community review of the development, operation (current and proposed) and ongoing monitoring, closure and post-closure care related to the landfill Site.

3.2 The general mandate of the WPLC shall include:

a. Review operations and provide regular input to the Owner with respect to all matters pertaining to landfill Site operation, including issues pertaining to ongoing operations, monitoring, the need for contingency plans or remedial measures, response to community complaints, the need for changes to the ECA , post-closure monitoring and maintenance, and development of the proposed end use for the landfill Site;
b. Review operational and monitoring reports;
c. Consider and make recommendations to the Owner regarding outside consulting advice in respect of the landfill Site;
d. Facilitate ongoing dialogue between the Owner, the Environmental Inspector and the community, including residents and businesses in the immediate vicinity of the landfill Site;
e. Provide reports regularly to the community on the activities of the WPLC, the landfill operations and landfill related issues and seek public input on these activities and issues;
f. Monitor the Owner's complaint response program and make recommendations to the Owner with respect to this program; and
g. Provide recommendations to the Owner with respect to unresolved complaints.

3.3 The WPLC shall not exercise any supervisory, regulatory, approval, legal or other decision making role with respect to the operations (current and proposed) at the Site.

3.4 The Owner shall provide for the administrative costs of operating the WPLC, including the cost of meeting places and clerical services.

3.5 The WPLC shall operate under a Terms of Reference of the committee. Suggestions to revise the WPLC Terms of Reference may be made at any meeting that a quorum is present. No changes to the Terms of Reference can be made until the committee members mutually agree to changes. Any changes shall be provided to the Ministry for information purposes.

3.6 The Community members shall be appointed by the WPLC. The community member positions are intended to be available to individuals that are not members of groups already represented on the WPLC and have an interest in the operation of the landfill. The WPLC shall encourage individuals who reside in close proximity to the landfill to participate. A community member is defined as a taxpayer and/or resident of Warwick Township.

3.7 The function of the Ministry member will be to provide advice, information and input to other members as required.

3.8 The WPLC shall determine the appropriate meeting frequency and review it on an annual basis.

3.9 Minutes and agendas of meetings shall be printed and distributed as per the mailing list on a timely basis.

3.10 The WPLC shall have reasonable access to the Site and its landfill related facilities for the purpose of carrying out its objective and mandate and the Owner's consultants' reports relating to Site operations shall be provided to the WPLC.

3.11 The Owner shall provide the WPLC with access to the Owner's consultants as required and consultants reports in accordance with protocols agreed to between the Owner and the WPLC.

3.12 Unless disclosure would be contrary to the Freedom of Information and Protection of Privacy Act ,the WPLC, the Township of Warwick and Walpole Island First Nation are to be provided all formal submissions and correspondence related to the site operations by the Owner at the same time as these items are submitted to the Ministry, the Township of Warwick Council or any other body.

3.13 The Owner shall allow access to the landfill site during normal operating hours, to enable any individual member of the WPLC and member of the public recommended by local representatives on the WPLC, to observe operations. An individual member of the WPLC must contact the operator to arrange for a Site pass, be accompanied by an operators representative at all times and follow all safety procedures.

3.14 All recommendations made to the Owner with respect to ongoing landfill operations, monitoring and the implementation of contingency measures shall be discussed at joint meetings between representatives of the Owner and the WPLC. The purpose of these meetings will be to arrive at an agreement between the Owner and WPLC with respect to implementation of the recommendations.

3.15 The Owner will disclose all monitoring results to the WPLC and deliver to the WPLC all documents and information (except as may be privileged) relevant to the operation of the landfill.

First Nation and Township of Warwick Consultation

3.16 During the process of submission of an application to amend any approvals for the Site, the Owner shall:

a. discuss with WIFN and the Township of Warwick (Township) the proposed application prior to submission of the WIFN application to the Director;
b. provide the same documents to WIFN and Township that are provided to the Director in respect of the amendments; and
c. provide the Director, either prior to or at the same time of application submission, with a statement how WIFN and Township comments were considered by the Owner.

4.0 CONSTRUCTION, INSTALLATION and PLANNING

Major Works

4.1 For the purposes of this ECA the following are Major Works:

a. gas management system;
b. leachate collection system; and
c. liner.

4.2 a. A final detailed design shall be prepared for each Major Work to be constructed at the Site consistent with the conceptual design of the Site as presented in the Supporting Documentation, specifically Items 66, 67, and 68 of Schedule "A".

b. Geonet may substitute a component of the 0.3 metres of granular in the secondary drainage layer in accordance with Items 54 to 57 inclusive on Schedule "A". The Owner shall ensure that the Quality Assurance/Quality Control procedure detailed in Item 57 of Schedule "A" is followed during installation of the geonet material.

4.3 The final detailed design of each Major Work shall include the following:

a. design drawings and specifications;
b. a detailed quality assurance / quality control (QA/QC) program for construction of the major work, including necessary precautions to avoid disturbance to the underlying soils; and
c. details on the monitoring, maintenance, repair and replacement of the engineered components of the major work, if any.

4.4 Any design optimization or modification that is inconsistent with the conceptual design shall be clearly identified, along with an explanation of the reasons for the change.

4.5 The final detailed design of each Major Work shall be submitted to the Director and copied to the District Manager.

4.6 Each major work shall be constructed in accordance with the approved final detailed design and the QA/QC procedures shall be implemented as proposed by the Owner. Any significant variances from the conceptual design for the Site as detailed in Items 66, 67 and 68 of Schedule "A" shall be subject to approval by the Director.

4.7 As-built drawings for all Major Works shall be retained on Site and made available to Ministry staff for inspection.

Subsequent Stages

4.8 At least six (6) months prior to the anticipated completion of landfilling in each stage of the Site , a final detailed design for the subsequent stage shall be submitted to the Director. Any significant variances from the conceptual design for the Site as detailed in Items 66, 67 and 68 of Schedule "A"

shall be subject to approval by the Director.

4.9 No person shall deposit any waste at the subsequent stage until a written Preparation Report in accordance with O. Reg. 232/98, Section 19 has been submitted to the Director and District Manager documenting that:

a. all construction;
b. QA/QC activities;
c. Site conditions; and,
d. all details of the construction of the Site;

are in accordance with the approved design plans and specifications.

4.10 Approval to proceed with landfilling or construction of each subsequent stage shall be dependent on groundwater, air quality and surface water monitoring results acceptable to the Director. If monitoring results are not acceptable to the Director then remedial action must be taken and completed before landfilling may proceed in the subsequent stage.

Geotechnical Engineer

4.11 A qualified professional geotechnical engineer shall inspect the excavation and construction underlying the Site and provide a report addressing whether the construction proceeded in accordance with approved detailed design plans, specifications and QA/QC procedures. The report shall be included in the Preparation Reports for each stage of the landfill.

Environmental Inspector

4.12 In accordance with conditions 18 and 19 of the EA approval dated January 15, 2007 known as Item 1 on Schedule "A", the Owner shall provide funding to the Ministry for the provision of an Environmental Inspector to inspect the Site, at any reasonable time on such terms and conditions, as deemed appropriate by the District Manager of the District Office and outlined in a written agreement with the Owner. Within the agreement, the Owner shall commit to providing, as a minimum, the following:

a. Adequate office facilities, communication equipment, and means of transportation for the Environmental Inspector; and,
b. Reimbursement to the MECP semi-annually for the costs and associated expenses of the Environmental Inspector.

4.13 The Owner shall provide funding for an Environmental Inspector on Site based on the following:

a. Construction Phase/Operations Phase- Full-time, on-Site inspector with the inspector being on Site a full day each day for five (5) days per calendar week for the first two years of the operation phase.

4.14 a. Every two (2) years commencing on February 1, 2012, the Owner shall prepare and submit a

report to the District Manager detailing the status and need for a Environmental Inspector based on discussions with the Township of Warwick, WIFN and the WPLC regarding the inspection frequency for the Environmental Inspector. The inspection frequency of the Environmental Inspector shall remain as per the requirements outlined in Condition 4.13 during the operation phase until a decision is made by the District Manager on the appropriate inspection frequency.

b. Notwithstanding Conditions 4.12 to 4.14 (1) and 15.3, inclusive, the Environmental Inspector's duties may, in consultation with the Owner, be increased, reduced, suspended or terminated on such terms and conditions as deemed appropriate by the District Manager and, for greater certainty, the District Manager may require an Environmental Inspector to be on-Site for up to seven days per week in cases of apparent significant non-compliance with the conditions of the EA approval or any approval issued for the Site under the EPA until such non-compliance is resolved.

5.0 OTHER WORKS

Berm Construction

5.1 All berm slopes associated with this approval shall be no greater than 3:1.

Diversion Area

5.2 The diversion area will be located to the east of the treated leachate storage lagoons.

Cell 12

5.3 a. Cell 12 will be used as a monofil of contaminated soils until redeveloped and incorporated into the Expansion Site in accordance with Items 66 through 68 of Schedule "A".

b. The management of the Cell 12 monofill shall be in accordance with the procedures and practices consistent with other previous monofill operations at the Site.

Landscape

5.4 The Owner shall ensure the landscape plan is carried out in accordance with Item 72 and 80 of Schedule "A", as amended from time to time.

6.0 GENERAL OPERATIONS

Proper Operation

6.1 The Site shall be properly operated and maintained at all times. All waste shall be managed and disposed of in accordance with the EPA , Regulation 347 , Regulation 232 , and the requirements of this ECA. At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

6.2 The Owner shall ensure that the MECP's Guideline B-7, Reasonable Use Concept, is applied at the Site boundaries.

6.3 a. Landfilling operations shall be conducted in accordance with Items 66 through 71 of Schedule "A" attached to this ECA.

b. The Owner shall ensure the operations and procedures manual for the the Site includes discussions on the following items:

a. Health and safety;
b. Operation and maintenance of the Site;
c. Waste disposal area and development;
d. Nuisance management;
e. Leachate management;
f. Landfill gas management;
g. Surface water/Storm water management;
h. Inspections and monitoring;
i. Contingency plans and emergency procedures;
j. Complaints; and,
k. Reporting and record keeping.

c. The operations and procedures manual shall be:

a. retained at the Site;
b. reviewed on an annual basis and updated by the Owner as required; and
c. be available for inspection by Ministry staff.

Waste Type

6.4 Only the following types of waste shall be accepted at the Site:

a. municipal, industrial, commercial and institutional solid non-hazardous waste generated within the Province of Ontario, including non-hazardous contaminated soil.

Capacity

6.5 The Owner shall only accept and deposit waste at the Site as long as there is available capacity as defined by the final contours for the Site approved by this ECA . The approval permits disposal of waste at the Site to fill an air space of 26,508,000 cubic metres (including waste, daily and interim cover material). This capacity includes the capacity of the existing and expansion landfill areas.

Yearly Waste Limit

6.6 a. The Owner can receive up to a maximum of 1,400,000 tonnes per year of waste including contaminated soil for disposal at the Site.

b. The amount of tire shred that may be received to process is 7,160 tonnes/year.

c. Up to a maximum of 100 tonnes per day of solid non-hazardous waste, white goods and metals, recyclable waste, wood waste, and leaf and yard waste that are deposited by the public using small vehicles at the Mini-Transfer Area of the Site may be transferred from the Site by a waste hauler or waste haulers that has an ECA to another waste disposal site.

Service Area

6.7 Only waste that is generated in the Province of Ontario shall be accepted at the Site**.**

Landfilling of Sludge

6.8 A thickness of at least 2 metres of compacted waste and cover material shall be maintained between any landfilled sludge (solid non-hazardous as per Reg. 347) and the granular leachate collection layer.

Asbestos Waste

6.9 Any waste that is considered asbestos waste shall be handled in accordance with Section 17 of O. Reg. 347 as amended from time to time.

6.10 A suitable sized excavation for the asbestos waste shall be made by the Owner in a location away from the active landfilling face.

6.11 All asbestos waste shall be inspected to ensure that the asbestos waste is properly bagged or contained and free from puncture, tears or leaks.

6.12 The asbestos waste shall be placed in the excavation to avoid damage to the containers and to prevent dust and spillage.

6.13 Upon completion of the unloading and deposition of the asbestos in the excavation, at least 125 centimetres of cover or waste material shall be placed over the asbestos.

6.14 All asbestos waste shall be deposited to a level no higher that 1.25 metres below the general elevation of the disposal area to ensure that daily cover material removal in the future does not encounter the asbestos waste.

Waste Limits

6.15 No waste, including daily cover, intermediate cover or final cover layer, shall be landfilled outside the limits of the base and final cover contours presented in Items 66 through 71 of Schedule "A"**(**the Development and Operations Plan) attached to this ECA .

Site Use

6.16 The area inside the fencing indicated in Appendix N18 of Item 30 of Schedule "A" shall be used for waste disposal purposes only. The remainder of the Site outside the fenced area shall be used for traditional agricultural crop production only.

Waste Inspection

6.17 All loads of waste must be properly inspected by trained Site personnel prior to disposal at the Site and waste vehicles must be diverted to appropriate areas for waste disposal.

Waste Deposit

6.18 The Owner shall deposit waste in a manner that minimizes exposure area at the landfill working face and waste shall be compacted before cover is applied.

Burning Waste Prohibited

6.19 Burning of waste at the Site is prohibited.

Signage

6.20 A sign shall be maintained at the main entrance/exit to the Site on which is legibly displayed the following information:

a. the name of the Site and Owner;
b. the number of the ECA;
c. the name of the Operator;
d. the normal hours of operation;
e. the allowable and prohibited waste types;
f. a warning against unauthorized access;
g. the telephone number to which complaints may be directed;
h. a twenty-four (24) hour emergency telephone number (if different from above); and
i. a warning against dumping outside the Site.

6.21 The Owner shall install and maintain signs to direct vehicles to working face and recycling areas.

6.22 The Owner shall maintain signs at recycling depot informing users what materials are acceptable and directing users to appropriate storage area.

Hours of Operation

6.23 Waste shall only be accepted at the Site during the following time periods:

a. 7 AM to 7 PM - Monday to Saturday.

6.24 On-site equipment used for daily Site preparation and closing activities shall only be used during:

a. 6 AM to 8 PM - Monday to Saturday.

6.25 With prior written approval of the District Manager, the time periods may be extended to accommodate seasonal or unusual quantities of waste or such factors as determined to be reasonable to the District Manager.

6.26 The Owner may provide limited hours of operation provided that the hours are posted at the landfill gate and that suitable notice is provided to the public of any change in operating hours.

6.27 Upon reasonable notice to the District Manager, contingency actions may take place outside normal hours of operation. Emergency response may occur at any time as required.

Site Security

6.28 During non-operating hours, the Site entrance and exit gates shall be locked and the Site shall be secured against access by unauthorized persons.

Fencing

6.29 The entire area as shown in Figure 12 in Item 66 of Schedule "A" shall be fenced by the Owner with a 6 foot high wire woven highway-type paige fence.

Site Access

6.30 Access to and exit from the Site for the transportation of waste shall under normal circumstances be permitted from County Road 79.

Access Roads

6.31 a. On-Site roads shall be provided and maintained in a manner that vehicles hauling waste to and on the Site may travel readily and safely on any operating day. During winter months, when the Site is in operation, roads must be maintained to ensure safe access to the landfill working face.

b. Access roads must be clear of mud, ice and debris which may create hazardous conditions.

Vermin, Dust, Litter, Odour, Noise, Traffic

6.32 The Site shall be operated and maintained such that vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.

Scavenging

6.33 The Owner shall ensure that there is no scavenging as defined in O. Reg. 347 at the Site.

Dust

6.34 The Owner shall control fugitive dust emissions from on Site sources including but not limited to on-Site roads, stockpiled cover material and, closed landfill area prior to seeding especially during times of dry weather conditions. If necessary, major sources of dust shall be treated with water and/or dust suppression materials to minimize the overall dust emissions from the Site.

6.35 Dust shall be managed as per the Best Management Practices Plan (Dust) prepared by RWDI listed as Item 83 in Schedule "A".

Litter Control

6.36 The Owner shall take all practical steps to prevent escape of litter from the Site. All loose, windblown litter shall be collected and disposed of at the landfill working face.

6.37 Litter pickup will occur at least weekly on the Owner's property during all weather conditions.

6.38 The Owner will respond to litter complaints within one (1) business day of the complaint being received.

6.39 Litter shall be managed in accordance with the Best Management Practices plan prepared by RWDI listed as Item 25 on Schedule "A".

Odour

6.40 Odour shall be managed in accordance with the Best Management Practices Plan (Odour) prepared by RWDI listed as Item 84 in Schedule "A".

Noise

6.41 The Owner shall comply with noise criteria in MECP Guideline entitled “Noise Guidelines for Landfill Sites" dated October 1998 as amended from time to time and the Site shall comply with the limits set in Publication NPC205. Bird bangers may be used at the Site for gull control provided that they produce reference impulsive sound not exceeding 125 dBAI at 5 metres from the bird banger.

6.42 Noise monitoring at the Site shall be undertaken by the Owner as per the document entitled "Environmental Noise Monitoring Program for the Warwick Landfill", dated June 15, 2007 prepared by Aercoustics Engineering Limited listed as Item 73 on Schedule "A".

Alteration of Best Management Plans for Odour, Dust and Litter

6.43 The Owner shall use the Best Management Plans (BMP's) for dust, odour and litter at the Sitein accordance with the applicable Conditions approved by this ECA. The Owner may submit changes in writing to the Director for approval to amend the BMP(s). At the same time any changes to the BMP's are submitted to the Director, the Owner shall provide the proposed changes to the BMP's to the Township of Warwick, WPLC and WIFN.

Surface Water

6.44 The Owner shall take all appropriate measures to minimize surface water from coming in contact with waste. Temporary berms and ditches shall be constructed around active waste disposal areas to prevent extraneous surface water from coming in contact with the active working face.

6.45 The Owner shall not discharge surface water to receiving water bodies without an approval under the EPA.

6.46 If surface water ponding occurs in any surface water ditches having a drainage slope less than 0.5%, the Owner shall regrade the ditches.

Application of Cover Material

6.47 Cover material shall be applied as follows:

a. Daily Cover - At the end of each working day, the entire working face shall be covered with a minimum thickness of 150 mm of soil cover or an approved alternative cover material;

b. Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 mm of soil cover or an approved alternative cover material shall be placed;

c. Final Cover - In areas where landfilling has been completed to final contours, a minimum 1.85 metre thick layer of final cover soil shall be placed. Fill areas shall be progressively completed and rehabilitated as landfill development reaches final contours; and

d. Topsoil - In areas where landfilling has been completed to final contours and where final cover has been placed, a minimum 0.15 metres thick layer of topsoil shall be placed.

Cover Materials Allowed

6.48 The following materials, in the corresponding thickness, may be used as an alternative to soil as a daily and intermediate cover:

a. Contaminated soil that satisfies the Schedule IV Toxicity Characteristic Leaching Procedure (TCLP) criteria as outlined in O. Reg. 347 as amended from time to time;
b. Wood chips (daily);
c. Automobile Shredder Residue (ASR) (daily); or
d. Tarps (daily).

6.49 The use of any other alternative materials as daily or intermediate cover material is subject to approval by the Director.

6.50 Use of alternative daily or intermediate cover materials shall be discontinued within two (2) working days of receipt of written notification from the District Manager, stating that the use of the alternative

daily or intermediate cover materials at the Site has proven to be environmentally unsuitable.

Automobile Shredder Residue as Daily Cover

6.51 a. Automobile Shredder Residue (ASR) may be used as a daily cover at the Site on an on-going basis from the issuance of this Approval.

b. The Owner shall cease the use of ASR if written notification is received from the District Manager indicating that there are environmental concerns due to the use of ASR as daily cover based on the testing of the ASR required by Condition 6.52.

c. The Owner may re-commence the use of ASR upon the Owner submitting an action plan that is acceptable to the District Manager that can address the environmental concerns which were raised due to the the use of ASR as daily cover.

6.52 Automobile Shredder Residue samples of the daily cover material are to be taken on semi-annual basis (Spring and Fall) and submitted for analysis of O. Reg. 347 Schedule IV Inorganics, VOC's, and PAH's. Automobile Shredder Residue is to conform with the specifications of a non-hazardous waste under O. Reg. 347 as amended from time to time. Semi-Annually testing results are to be submitted to the District Manager upon receipt. The frequency of O. Reg. 347 testing of the daily cover material can be reduced subject to approval of the District Manager.

Contaminated Soil as Daily or Intermediate Cover

6.53 Contaminated soil equal to or below 10% of the TCLP value and/or 0.4 mg/L benzene may be landfilled in Cells 8, 10 and/or 12.

6.54 If confirmatory testing of the contaminated soil to be landfilled in Cells 8, 10 and/or 12 indicates an exceedance of 10% of the TCLP value and/or 0.4 mg/L of benzene, but satisfies the TCLP criteria as in O.Reg. 347, the soil may be used as daily and/or intermediate cover, and or landfilled as waste.

6.55 If the contaminated soil received at the Site does not meet the TCLP value, the contaminated soil shall be classified as a hazardous waste and shall be disposed of at a site that is approved to receive and dispose of hazardous waste.

6.56 Contaminated soil that satisfies the TCLP criteria may be used as daily and/or intermediate cover in the Expansion Site of the landfill. Contaminated soils may not be used on outside slopes which drain into the surface water system.

6.57 Contaminated soil used for daily and/or intermediate cover shall be sampled on a quarterly basis and submitted for analysis of O.Reg. 347 Schedule IV Inorganics, VOCs, PAHs and PCBs. Quarterly testing results shall be included in the annual report. The frequency of O. Reg. 347 testing of the cover material may be reduced subject to agreement of the District Manager.

6.58 Contaminated soil for use as daily cover and/or intermediate cover shall be stockpiled in areas of the Site that have a leachate collection system installed below.

6.59 Surface water run off from the contaminated soils stockpile which exceeds the Provincial Water Quality Objectives shall not be discharged through the surface water management system.

6.60 The Owner must ensure that measures are in place for the on Site treatment and disposal of any contaminated run off from the contaminated soils stockpile.

6.61 Prior to receipt at the Site, each source of contaminated soils which are to be used as daily or intermediate cover shall be tested to determine if the soils meet the criteria in this ECA and a copy of the test results shall be kept in the daily records for the Site as required.

7.0 SITE OPERATIONS

Landfill Reclamation

7.1 The Owner shall restrict stockpiling of contaminated soil from Cells 8, 10 and 12 to sections of the landfill footprint that have a liner and leachate collection system.

Waste Processing and Composting

7.2 Waste Processing and composting is allowed at the location outlined in Item 49 on Schedule "A" subject to the following conditions:

a. Prior to the commencement of any waste processing or composting operations at the Site, the Owner shall ensure that air (Section 9 EPA) and noise approvals are obtained;
b. Prior to the start of composting operations at the Site, the Owner shall submit to the District Manager a contingency plan for any odour problems that may occur;
c. The total combined amount of waste that may be received at the Site for processing and composting shall not exceed 36,000 tonnes per year and the maximum daily amount to be received at the Site shall not exceed 700 tonnes per day;
d. The amount of waste that may be received at the Site for composting shall not exceed 7,500 tonnes per year;
e. Material acceptable for processing and composting at the site shall include leaf, yard, agricultural waste, concrete, asphalt, wood and tires;
f. The bins for diversion shall be emptied on an as needed basis to prevent odours and operational problems. The Ministry may at any time instruct that a bin be emptied;
g. The Owner shall ensure that waste processing and composting is undertaken in a safe manner, and that all waste is properly handled, processed and contained so as not to pose any threat to the general public and site personnel;
h. All noise generating processing activities in the waste diversion area including concrete/asphalt/crushing, wood chipping and tire shredding shall only occur between 07:00 to 19:00; and
i. Any runoff that comes into contact with waste in the waste processing/composting area

shall be managed in such a fashion to ensure compliance with Condition 8.5 of this ECA.

7.3 The Owner shall ensure that composting at the Site is undertaken in accordance with O.Reg 101/94 as amended from time to time and the Ministry document entitled "Interim Guidelines for the Production and Use of Aerobic Compost in Ontario " dated November 2004 as amended from time to time and the following requirements:

a. Only leaf and yard waste, Agricultural Waste as defined in Item 3 in Schedule "A" and wood (not including painted or treated wood or laminated wood) may be accepted at the compost area.
b. Leaf and yard waste is defined as waste consisting of natural Christmas trees and other plant materials but not tree limbs or other woody materials in excess of seven (7) centimetres in diameter.
c. The composting site shall only receive material for composting from May 1st to November 1st each year.
d. Leaf and yard waste, Agricultural Waste and wood may not be stored for more than four (4) days before it is composted.
e. During composting, the Owner shall provide the composting mass with adequate ventilation to ensure that aerobic conditions are maintained.
f. Cured compost must be analyzed for the parameters listed in Table 1 of O.Reg. 101/94 and shall not be removed from the Site unless it has been sampled and analyzed.
g. Cured compost is defined as meeting the specifications in Sections 7.2 to 7.5 inclusive of the Interim Guidelines for the Production and Use of Aerobic Compost in Ontario" dated November 2004 as amended from time to time and can be used on an unrestricted basis.
h. Compost is designated a waste if the compost contains a substance listed in Table 1 of O. Reg. 101/94 that has a concentration greater than the concentration listed in Column 2.
i. Controlled compost is defined as compost that is designated a waste under the previous condition but has concentrations less than the concentrations listed in Column 3 of Table 1 in O. Reg. 101/94.
j. Controlled compost may not be removed from the site except for direct shipment to the intended user.
k. Material from the composting process that fails to meet the "Interim Guidelines for the Production and Use of Aerobic Compost in Ontario" dated November 2004 shall be deemed to be a waste under O. Reg. 347 and shall be disposed of accordingly.
l. The person to whom controlled compost is shipped shall be given a copy of the chemical analysis of the compost and a notice that states that the compost is controlled compost and that sets out the terms and conditions of the compost's exemption from Part V of the EPA. A copy of this notice shall be kept on file at the Site.
m. The District Manager may at any time and at his absolute discretion instruct that any or all of the waste materials from the composting or processing operations or the processed waste from the composting or processing operations to be either landfilled or directed to be utilized for specific uses and in specific locations.

7.4 Record keeping for the composting operation shall be kept as follows:

a. Records about each composting mass shall be kept including temperatures of the mass,

when the temperatures were measured, when the mass was turned, information about the curing process and details about significant problems that occurred during composting or curing. This information shall be kept at the Site for at least three years after the mass was cured;

b. Records shall be kept of the analyses of compost. Any laboratory records shall be kept as part of the record. A record of an analysis shall be kept for at least three years after the analysis is performed; and

c. A record shall be kept of the name, address and telephone number of each person to whom controlled compost is shipped. The record shall be kept for at least ten (10) years after the shipment.

Tire Shred

7.5 The management and placement of tire shreds at the Site shall be in accordance with the Fire Protection and Prevention Act as follows:

a. No individual tire shred pile shall be more than 3 metres in height and 100 square metres in area. Six (6) metres of space shall be provided between all piles. Fifteen (15) metres is to be provided from property lines and thirty (30) metres shall be provided from tree lines;
b. A buffer of 4.5 metres is to be provided for grass or weeds from the edge of the tire pile to the edge of the pad.
c. A firebreak of 22 metres shall be provided between the two areas of 16 piles each.

7.6 If the total stockpiled tire shreds exceeds 300 cubic metres, the storage period shall not exceed 90 (ninety) days.

7.7 The total amount of tire shreds stored on Site shall be recorded in a log book and made available to the Ministry for inspection.

Backup Power

7.8 The Owner shall maintain adequate backup power at the Site in order to ensure scale facility and landfill gas blower on site continue to operate and are not damaged due to an extended power outage. A power supply connection at each leachate collection pumping station shall be maintained by the Owner that will permit a portable generator to be connected during a power outage.

Landfill Gas

7.9 All buildings are to be free of any landfill gas accumulation. The Owner shall provide adequate ventilation systems to relieve landfill gas accumulations in buildings if necessary.

Landfill Gas Management

7.10 The Owner shall, manage landfill gas in accordance with Items 66 through 68, Items 75 through 77,

and Item 81 of Schedule "A" and based on the landfill gas management system constructed under the authority of the EPA Approval issued which may be amended or replaced from time to time.

Cleaning of Leachate Collection System

7.11 The leachate collection system piping for each stage of the landfill shall be inspected annually for the first five years after waste placement and then as often as future inspections indicate to be necessary. Additionally, leachate collection pipes must be cleaned whenever an inspection indicates that cleaning is necessary.

7.12 In areas where leachate collection pipe slopes are less than 0.5%, the leachate collection pipes shall be inspected semi-annually for the first three (3) years after waste placement and then as often as future inspections indicate to be necessary. Additionally, leachate collection pipes must be cleaned whenever an inspection indicates that cleaning is necessary. After the three (3) year period, inspection and cleaning of the leachate collection pipes shall be in accordance with the previous condition.

Leachate Collection System

7.13 All leachate collection pipes for Cell 12 shall be sloped at a minimum of 0.5%.

7.14 The Owner shall install 250 mm diameter perforated leachate collection pipes with perforations located at the 10:30, 4:30, 1:30 and 7:30 positions.

7.15 The stone for the leachate collection system shall have the following specifications:

a. D85 shall be greater than 37 mm where D85 is described as the stone diameter such that, when measured by weight, 85% of the stones in the layer have a smaller diameter;
b. D10 shall be greater than 19 mm where D10 is the stone diameter such that, when measured by weight, 10% of the stones in the layer have a smaller diameter;
c. D60/D10 shall be less than 2; and,
d. One per cent (1%) of the stones may pass a #200 sieve.

7.16 A minimum of 50 mm of stone shall be placed below the leachate collection pipes and a minimum of 250 mm of stone shall be placed above any leachate collection pipes.

7.17 The Owner shall ensure that the leachate collection system is constructed under the supervision of a qualified consultant.

Hydraulic Trap

7.18 The Owner shall ensure that a hydraulic trap is developed and maintained beneath the Expansion Area and shall ensure that a maximum leachate head of 300 mm on the landfill liner is not exceeded.

8.0 LEACHATE MANAGEMENT

Leachate Recirculation

8.1 Prior to implementing the leachate recirculation program , a report on the moisture content of the incoming waste and the actual field capacity of the waste in situ shall be submitted to the Director.

8.2 The Director may at any time, terminate leachate recirculation at the Site if, in the Ministry's opinion, adverse effects on the environment are observed.

8.3 Before starting leachate recirculation, the Owner shall provide to the Director a monitoring program to ascertain the effectiveness of the leachate recirculation process.

8.4 Leachate recirculation shall not occur in any above grade locations until final cover has been installed on exterior side slopes.

Leachate Management Plan

8.5 The Owner’s leachate management plan shall not include any direct discharge of leachate or treated leachate from the Site, even as a contingency option, to surface waters, including Bear Creek. The Owner shall not discharge leachate or treated leachate to surface waters, including Bear Creek from the Site.

Leachate Treatment Plant

8.6 (1) (a) Within a minimum of three (3) years prior to closure of the landfill Site, the Owner shall ensure that a leachate treatment system is installed and operational at the Site.

(b) Leachate from the Site not sent to the operational drip irrigation area(s) approved under Condition 8.7 shall be disposed of off-Site at a location approved by the District Manager until the leachate treatment system required by Condition 8.6 (1)(a) is approved and operational.

(c) Any waste from the leachate treatment system that is to be disposed of in the landfill must be classified as a solid non-hazardous waste.

(d) The Owner shall implement all items within the document entitled Leachate Management Framework, listed as Item 86 in Schedule "A". These items include new and existing leachate monitor locations (wells, mini piezometers, and sump), leachate monitoring, leachate level reporting, Leachate Management Plan by March 31, 2020 and updated every 3 years, and the Leachate Treatment Facility Study to be completed at least 7 years prior to closure of the landfill.

(2) As part of the financial assurance calculation in Section 2.0, the Owner shall provide to the Director for approval, a detailed financial assurance plan including the cost of leachate transportation and disposal for the landfill site during the period preceding the initiation of the leachate treatment system. In addition, the Owner shall provide to the Director for approval a financial assurance plan detailing the capital cost of the on-Site leachate treatment system.

Phytoremediation of Leachate - Existing and Proposed Poplar Plantations

8.7 On-Site phytoremediation may occur at the Poplar System and Poplar Plantation in accordance with the following conditions:

a. The Owner shall ensure that there is a 100 metre grassed buffer at all times from the Poplar Plantation to the Kersey drain.
b. Irrigation of leachate onto the either the Poplar Plantation or the Poplar System shall not occur in the following instances:

i. Between the dates of October 16 to April 30;
ii. On frozen or snow covered ground conditions;
iii. Under conditions that will cause ponded water or runoff;
iv. Conditions where surface water ponding within the area is occurring;
v. Where no poplar trees are currently planted;
vi. In areas within a drip irrigation area where trees have been harvested more than a frequency greater than every other tree;
vii. In areas within a drip irrigation area that has been fully harvested clear of trees and the trees have not started to coppice.

c. If weather forecasts indicate a rainfall storm greater than 12.5 mm/hour will occur, the Owner shall within 1 hour before the storm, shut off all irrigation of the poplar forest.
d. Irrigation zones shall be individually assessed by the Owner for suitability of irrigation after rainfall events greater than 12.5 mm.
e. Records shall be kept for the Poplar System and Poplar Plantation areas as follows:

i. quantities and dates of application of pesticides and herbicides;
ii. inspection notes regarding tree growth rates and health;
iii. inspection notes regarding condition and growth of underlying vegetative landfill cover (ie grass);
iv. observed pooling and/or runoff of irrigated liquid;
v. observations of any odours; and,
vi. weather conditions records as may be obtained from the nearest Environment Canada Weather Office which may include daily high and low temperatures, wind velocity and direction, and precipitation quantities.

f. Irrigation onto either the Poplar System or the Poplar Plantation shall be as follows:

i. Detailed records shall be kept of the quantities of irrigation liquid that are applied, including the dates of application onto either drip irrigation area;
ii. Operations in a given drip irrigation area must immediately stop if contamination problems in surface water or groundwater, which are attributable to the operation of the noted drip irrigation area, are found to be occurring. Recommencement of operations may proceed only upon further written notification of the District Manager;

iii. Operations of a given drip irrigation area must be discontinued immediately if operation of the noted drip irrigation area causes surface runoff from the footprint area or if operations cause surface ponding within the drip irrigation area; operations cannot be restarted during that application day and can only be restarted after surface ponding has evaporated or infiltrated or conditions causing the runoff or ponding have been rectified;

iv. If there are any stoppages of operations under the requirements of items ii) or iii) above, then the District Manager shall be notified immediately; and,

v. If odours attributable to one of the drip irrigation areas become a problem at the site, then the District Manager shall be so informed in writing and the operation of the noted drip irrigation area shall be stopped pending further instructions from the District Manager;

g. (1) Monitoring of the drip irrigation Poplar System and the Poplar Plantation shall be in accordance with Items 63 through 65 of Schedule "A".

(2) Monitoring frequencies and analyses for the following items shall be as follows:

i. Daily inspections for ponded water or saturated soil during irrigation;
ii. Monthly testing of irrigation liquid quality during the irrigation season;
iii. Soil samples should be taken annually from grade to a depth of 0.6 m minimum and 0.9 m maximum;
iv. Annual soil analyses shall be conducted annually per Section 3.1 of Item 63 of Schedule "A", in addition to pH, electrical conductivity, cation exchange capacity, and sodium absorption ratio;
v. Leaf Tissue analyses once per year in the fall; and
vi. Crop inspection once per year in the fall.

h. Reporting on the drip irrigation areas shall be part of the annual monitoring report for the Site and shall include but not be limited to the following:

i. results and an analysis of the results of the monitoring programs for the drip irrigation areas:
ii. assessment of the results of the vegetation as related to the stated objectives for the Poplar System and Poplar Plantation facilities construction and operations;
iii. assessment of the need to change the monitoring program for the drip irrigation areas and a recommendation of the required changes;
iv. tabulation and assessment of the volumes of leachate produced by the landfill, and those volumes which may be applied to the existing drip irrigation areas;
v. a report on operational problems identified during the operation of the drip irrigation areas and a discussion of each problem and details of what was done to rectify each problem;
vi. a Site plan which shows the location of the areas planted with both trees and grass cover and the vegetation used on those areas;
vii. an assessment of the monitoring results pertaining to the use of trees as

vegetation on the final cover.

i. The Director retains the right to request that the Owner conduct additional studies, suspend operations or require the Owner to provide additional methods to handle leachate at the Site in addition to or as a replacement to the drip irrigation areas.

j. If the Director requests removal of the drip irrigation areas, the Owner shall:

i. remove the irrigation equipment and the trees from the noted drip irrigation area. For the Poplar System, removal of trees shall include removal of tree stumps and most roots, excavate the trench to the maximum depth of root depth penetration on each tree row, and then replace, remould and recompact the excavated material;

ii. the landfill cover shall be restored to the same condition as it was in prior to commencement of the Poplar System and a blend of suitable grasses shall be seeded as necessary; and,

iii. within 6 months of completion of the noted drip irrigation area closure activities, submit to the Director a report outlining the work that has been completed.

k. Electrical conductivity of the shallow soil (maximum depth of 0.15 m) beneath the drip irrigation areas shall be monitored on a weekly basis during irrigation.

l. If salt levels are building up in the soil or additional irrigation with leachate is found to be detrimental to the health of the poplars, the leachate application rate shall be reduced or terminated.

Wood Waste and Leaf Litter

m. Any wood waste or leaf litter that is produced in the Poplar System or Poplar Plantation shall managed in accordance with Item 63 of Schedule "A".

Other Items

n. (1) Drip irrigation rates for the Poplar Plantation shall be no greater that the rate specified in the EPA approval for the Site.

(2) Drip irrigation rates for the Poplar System shall be no greater than the rates noted in Item 63 of Schedule "A".

o. No drip irrigation shall occur within fifty (50) metres of any surface watercourse or drain.

p. (1) Leachate to be used for drip irrigation on the Poplar Plantation shall not exceed the treated leachate effluent criteria specified in the EPAapproval for applicable industrial sewage works for the Site.

(2) Leachate to be used for drip irrigation on the Poplar System shall not exceed the treated leachate effluent criteria specified in the Item 63 through 65 in Schedule "A".

q. The use of the Poplar Plantation to manage irrigation leachate will not be permitted without first providing the District Manger with at least two (2) months written notice of the anticipated irrigation liquid application date. The use of surface water to encourage tree growth will be permitted and will not be considered as irrigation liquid.

r. Monitoring and the associated reporting for the Poplar Plantation will commence at least two (2) months prior to irrigation liquid application and continue until two (2) years after cessation of irrigation liquid application to the Poplar Plantation.

Leachate Storage Tanks

s. The leachate storage tanks shall be inspected by a licenced plumber on an annual basis.

t. The leachate storage tanks shall be cleaned and sediment removed at least once every two (2) years.

9.0 INSPECTIONS AND RECORDS

Inspections

9.1 The Owner shall inspect the Site monthly for the following items but not limited to these items:

a. Erosion rills;
b. General settlement areas or depressions;
c. Shear and tension cracks;
d. Condition of surface water drainage works;
e. Erosion and sedimentation in surface water drainage system;
f. Presence of any ponded water;
h. Adequacy of cover material;
i. Evidence of vegetative stress, distressed poplars or side slope plantings;
j. Condition of groundwater monitoring wells and gas wells;
k. Presence of insects, vermin, rodents and scavenging animals;
l. Condition of fence surrounding the Site; and
m. General Site appearance.

9.2 The Owner shall inspect the Site weekly for presence of leachate seeps.

Daily Inspections and Log Book

9.3 An inspection of the entire Site and all equipment on the Site shall be conducted each day the Site is in operation to ensure that the site is being operated in compliance with this ECA . Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the Site if needed.

9.4 A record of the inspections shall be kept in a daily log book or a dedicated electronic file that includes:

i. the name and signature of person that conducted the inspection;
ii. the date and time of the inspection;
iii. the list of any deficiencies discovered;
iv. the recommendations for remedial action; and
v. the date, time and description of actions taken.

9.5 A record shall be kept in a daily log book of all refusal of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

Monthly Records

9.6 Monthly Site inspection records in the form of a written log or a dedicated electronic file shall include but not be limited to the following:

a. the type, geographic source, date and time of arrival, hauler, and quantity (tonnes) of all waste received at the Site;
b. the area of the Site in which waste disposal operations are taking place;
c. a calculation of the total quantity (tonnes) of waste received at the Site during each operating day and each operating week;
d. Results of any test done to determine the acceptability of waste at the Site;
e. A reference for each load of solid non-hazardous industrial waste received, to the client and type of solid non-hazardous industrial waste;
f. the amount of any leachate removed, or treated and discharged from the Site;
g. a record of litter collection activities and the application of any dust suppressants;
h. a record of the daily inspections;
i. a description of any out-of-service period of any control, treatment, disposal or monitoring facilities, the reasons for the loss of service, and action taken to restore and maintain service;
j. type and amount of daily, intermediate and final cover used;
k. maintenance and repairs performed on equipment employed at the Site;
l. complaints received and actions taken to resolve them;
m. emergency situations and actions taken to resolve them; and
n. any other information required by the District Manager.

9.7 The Owner shall maintain on record at the Site for each client disposing of solid non-hazardous waste at the Site, a description of each type of solid non-hazardous waste received from the client and documentation to demonstrate that the Owner has taken reasonable care to ensure that waste classified as either hazardous or liquid industrial waste under O. Reg. 347 as amended from time to time, is not disposed of at the Site.

Record Retention

9.8 Except as authorized in writing by the Director, all records required by this ECA shall be retained at

the Site for a minimum of two (2) years from their date of creation.

9.9 The Owner shall retain all documentation listed in Schedule "A" for as long as this ECA is valid.

9.10 All monthly Site inspection records are to be kept at the Site until they are included in the Annual Report.

9.11 The Owner shall retain employee training records as long as the employee is working at the Site.

9.12 The Owner shall make all of the above documents available for inspection upon request of Ministry staff.

9.13 The Owner shall retain, either on-Site or in another location and notify the District Manager of this location, copies of the annual reports referred to in the preceding condition and any associated documentation of compliance monitoring activities and shall continue to do so for a period of at least two (2) years after the closure of the Site.

10.0 TRAINING

Employees and Training

10.1 A training plan for all employees that operate any aspect of the Site shall be developed and implemented by the Operator . Only trained employees shall operate any aspect of the Site or carry out any activity required under this ECA . Employees must provide proof of training to the Ministry upon request. For the purpose of this ECA "trained" means knowledgeable either through instruction or practice in:

a. the relevant waste management legislation including EPA, O. Reg. 347 and O. Reg. 232/98 , regulations and guidelines;
b. major environmental and occupational health and safety concerns pertaining to the waste to be handled;
c. the proper handling of wastes;
d. the management procedures including the use and operation of equipment for the processes and wastes to be handled;
e. the emergency response procedures;
f. the specific written procedures for the control of nuisance conditions;
g. the terms, conditions and operating requirements of this ECA; and
h. proper inspection, receiving and recording procedures and the activities to be undertaken during and after a load rejection.

11.0 COMPLAINTS PROCEDURES

11.1 If at any time, the Owner receives complaints regarding the operation of the Site , the Owner shall respond to these complaints according to the following procedure:

a. The Owner shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information, the time and date of the complaint, specific details of operations that were occurring, any changers from normal operations, types of waste loads (including source) and other on Site activities;
b. The Owner, upon notification of the complaint, shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and
c. The Owner shall complete and retain on-Site a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents.

11.2 The Owner shall designate a person to receive any complaints and to respond with a written notice of action as soon as possible. The Owner shall post the Site complaints procedure at the Site entrance. All complaints and the Owner's actions taken to remedy the complaints must be summarized in the Annual Report.

11.3 The Company shall notify the District Manager, Township of Warwick and WIFN, in writing, of each environmental complaint within two (2) business days of the complaint. The notification shall include:

1. this Approval number;

2. a description of the nature of the complaint;

3. the time and date of the incident to which the complaint relates.

11.4 The Company shall report all environmental complaints to the WPLC at the next WPLC meeting.

12.0 EMERGENCY SITUATIONS

12.1 In the event of a fire or discharge of a contaminant to the environment, Site staff shall contact the MECP Spills Action Centre (1-800-268-6060) and the District Office of the MECP forthwith.

12.2 The Owner shall submit to the District Manager a written report within three (3) days of the spill or incident, outlining the nature of the incident, remedial measures taken and measures taken to prevent future occurrences at the Site.

12.3 The Owner shall ensure that adequate fire fighting and contingency spill clean up equipment is available in accordance with Item 66 of Schedule "A" and that emergency response personnel are familiar with its use and location.

13.0 MONITORING

Groundwater Monitors

13.1 The Owner shall ensure all groundwater monitoring wells are properly capped, locked and protected from damage.

13.2 In areas where landfilling is to proceed around monitoring wells, the wells must be decommissioned in accordance with O. Reg. 903 as amended from time to time and then replaced when waste placement and capping is completed.

13.3 Any groundwater monitoring wells included in the monitoring program shall be assessed, repaired, replaced or decommissioned as required.

13.4 The Owner shall repair or replace any monitoring well which is destroyed or in any way made inoperable for sampling such that no more than one sampling event is missed.

13.5 All monitoring wells that are no longer required as part of the groundwater monitoring program shall be decommissioned in accordance with good standard practice that will prevent contamination through the abandoned well and in accordance with O. Reg. 903. A report on the decommissioning shall be provided in the annual monitoring report for the period during which the well was decommissioned.

Monitoring Program

13.6 Monitoring programs shall be carried out for groundwater, surface water, landfill gas in accordance with the Environmental Monitoring Plan, as amended from time to time listed as Item 39 and Appendix H of Item 68 of Schedule "A".

13.7 The Owner shall ensure that Biochemical Oxygen Demand, Total Suspended Solids, Total coliform, Fecal coliform and E. Coli are added to the parameter list to be sampled for surface water station SS19.

13.8 Air Quality, Dust, Hydrocarbon, and Volatile Organic Carbon monitoring shall be undertaken in accordance with Item 85 in Schedule "A".

13.9 Air quality monitoring shall be in accordance with the canister method (USEPA TO-14/15) .

13.10 Noise monitoring shall be undertaken by the Owner at the Site in accordance with Item 28 on Schedule "A" including any noise monitoring in response to noise complaints.

13.11 No alterations to the groundwater, air quality, noise or surface water monitoring programs shall be implemented prior to receiving written approval from the District Manager. The Owner shall give all requests to the Township of Warwick, the WPLC and WIFN at the same time or prior to the time that such request is made to the District Manager.

14.0 CONTINGENCY PLANS AND TRIGGER MECHANISMS

Hydraulic Containment

14.1 If the leachate level elevation in any of the pumping stations wells listed below rise above their respective trigger level, the Owner shall take additional groundwater levels within four (4) weeks as detailed in Figure 2 of Item 39 and Appendix H of Item 68 of Schedule "A".

Monitoring location Trigger Leachate Elevation (mASL)

PS1 232.7
PS3 232.6
PS5 232.8
PS7 233.4

The assessment process for leachate levels is detailed in Figure 2 of Appendix H of Item 68 on Schedule “A”.

Groundwater Quality

14.2 The trigger concentration for groundwater quality shall be 80% of the Guideline B-7 values for parameters that have an Ontario Drinking Water Quality Standards value.

14.3 Groundwater chemical concentrations must be assessed with the trigger concentrations within six (6) weeks of sample collection.

14.4 The assessment process for groundwater quality is detailed in Figure 3 of Item 39 and Appendix H of of Item 68 of Schedule “A”.

Surface Water Quality

14.5 The trigger mechanisms for surface water quality shall be one of the following:

a. Where off Site surface water quality satisfies the Ministry’s PWQO, the respective PWQO shall be used as a trigger concentration; or

b. Where the background surface water quality naturally exceeds the PWQO, the background concentration should be considered in evaluating and updating the trigger concentration.

14.6 Surface water quality results will be assessed in accordance with the requirements established under the Industrial Sewage Works component of the EPA approval for the Site.

14.7 The assessment process for surface water quality is detailed in Figure 4 of Appendix H of Item 68 in Schedule “A “.

Landfill Gas

14.8 If landfill gas concentrations exceed 10% LEL, the Owner shall undertake additional monitoring, assess the source and pathway of methane to determine if the elevated concentrations are landfill

related.

14.9 If the elevated concentrations are landfill related, the Owner shall undertake contingency measures.

General Contingency Measures

14.10 In the event a result of a monitoring test exceeds the trigger mechanisms detailed above, the Owner shall:

a. notify the District Manager, the WPLC, WIFN and the Township of Warwick of any trigger level exceedances within twenty four (24) hours of receipt of the results;
b. conduct an investigation into the cause of the adverse result and submit a report to the District Manager that includes an assessment of whether contingency measures need to be carried out;
c. if contingency measures are needed, submit detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures, and a schedule as to when these measures will be implemented, to the Director and notify District Manager; and
d. implement the required contingency measures upon approval by the Director.

15.0 REPORTING

Semi Annual Volume Determination

15.1 The Owner shall undertake semi-annual air space surveys of the bottom and top waste contours to determine the estimated air space used for waste disposal in the prior six months. The air space survey shall include daily cover material and shall take into account settlement. The first air space survey shall be undertaken by no later than February 2012 with an air space survey being completed semi-annually after the completion of the first air space survey, until landfill Site closure.

15.2 Wastes which the Owner has been ordered to dispose of at the Site by any ministry, department or agency of the federal or Provincial Crown shall be excluded from the air space survey calculations.

15.3 Each air space survey shall be conducted by an Ontario Land Surveyor or other qualified consultant and such air space survey shall be provided to the District Manager. The Owner shall keep a copy of each air space survey on-Site and make them available to MECP personnel upon request.

Quarterly Monitoring Reports

15.4 The Owner shall submit quarterly monitoring reports to the Township of Warwick, WIFN, District Manager and the WPLC within sixty (60) days of the end of the calendar quarterly reporting period starting September 30, 2012.

15.5 Each report will include the following:

a. a summary of monitoring activities and results;
b. a summary of any exceedences and related operator responses;
c. any complaints received and operator response;
d. a summary of mitigation activities for noise, dust, litter, air quality or other taken during the quarter in accordance with the Best Management Practices;
e. any proposed improvements to monitoring or operating procedures; and
f. any implemented improvements to monitoring or operating procedures that have been identified to address or reduce impacts.

Annual Report

15.6 A written report on the development, operation and monitoring of the Site , shall be completed annually (the "Annual Report"). The Annual Report shall be submitted to the Regional Director , the District Manager, the Township of Warwick, WIFN, and the WPLC, by March 31st of each year, and shall cover the 12 month period preceding December 31st.

15.7 The Annual Report shall include the following:

a. the results and an interpretive analysis of the results of all leachate, groundwater, surface water and landfill gas monitoring, including an assessment of the need to amend the monitoring programs;
b. an assessment of the operation and performance of all engineered facilities, the need to amend the design or operation of the Site, and the adequacy of and need to implement the contingency plans;
c. an assessment of the effectiveness of the Poplar Plantation and the Poplar System for leachate;
d. an assessment of the effectiveness of the on Site leachate treatment facility;
e. Site plans showing the existing contours of the Site;
f. areas of landfilling operation during the reporting period;
g. areas of intended operation during the next reporting period;
h. areas of excavation during the reporting period;
i. the progress of final cover, vegetative cover, and any intermediate cover application;
j. previously existing site facilities;
k. facilities installed during the reporting period;
l. Site preparations and facilities planned for installation during the next reporting period;
m. calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the Site during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;
n. a calculation of the remaining capacity of the Site, an estimate of the remaining Site life and a comparison of actual capacity used to approved Site capacity;
o. a summary of the quantity of any leachate or pre-treated leachate removed from the Site or leachate treated and discharged from the Site;
p. a summary of the weekly, maximum daily and total annual quantity (tonnes) of waste received at the Site;
q. a summary of any complaints received and the responses made;
r. a discussion of any operational problems encountered at the Site and corrective action

taken;

s. an update summary of the amount of financial assurance which has been provided to the Director;
t. a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903;
u. any other information with respect to the site which the District Manager or Regional Director may require from time to time;
v. a statement of compliance with all conditions of this ECA and other relevant Ministry requirements, guidelines and regulations;
w. summary of inspections undertaken at the Site;
x. a summary of recycling, processing and composting efforts undertaken including the amount of recyclable received, amount of processed material and composted material each year;
y. any changes in operations, equipment or procedures employed at the Site; and
z. recommendations regarding any proposed changes in operations of the Site.

16.0 SITE CLOSURE

Closure Plan

16.1 At least two (2) years prior to closure or when 90% of the site capacity is reached, whichever comes first, the Owner shall submit to the Director for approval, with copies to the District Manager, the Township of Warwick, WIFN and the WPLC, a detailed Site closure plan pertaining to the termination of landfilling operations at this Site , post-closure inspection, maintenance and monitoring, and end use. The plan shall include the following:

a. a plan showing Site appearance after closure;
b. a description of the proposed end use of the Site;
c. a description of the procedures for closure of the Site, including:

i.) advance notification of the public of the landfill closure;
ii) posting of a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
iii) completion, inspection and maintenance of the final cover and landscaping;
iv) site security;
v) removal of unnecessary landfill-related structures, buildings and facilities; and
vi) final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;

d. a schedule indicating the time-period for implementing sub-conditions i) to vi) above.
e. descriptions of the procedures for post-closure care of the Site, including:

i.) operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
ii) record keeping and reporting; and

iii) complaint contact and response procedures;

f. an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas;
g. an updated estimate of the contaminating life span of the Site , based on the results of the monitoring programs to date; and
h. an update of the cost estimates for financial assurance and the amount which has been provided to the Director to date.

16.2 The Site shall be closed in accordance with the closure plan as approved by the Director.

End Use

16.3 The Owner shall consult with affected stakeholders on the proposed end uses as committed to in Item 35 of Schedule "A" prior to the submission of its closure report under the EPA. The proposed end use activities should be consistent with the types of activities consulted upon during the EA.

Closure of the Site

16.4 Upon closure of the Site, the following features will be inspected, recorded on a quarterly basis and maintained as required on a seasonal basis:

a. evidence of settlement;
b. possible leachate seeps and springs;
c. cover soil integrity;
d. vegetative cover;
e. surface water drainage works;
f. erosion and sediment in surface water drainage system; and
g. groundwater monitoring wells.

16.5 A vegetative cover consisting of vegetation that is suited to local conditions and that is capable with minimal care of providing vigorous, plentiful cover no later than its 3rd growing season shall be established over all completed areas to control erosion and maximize evaportranspiration. The Owner shall complete planting as soon as possible after reaching final contours.

16.6 If weather conditions do not allow timely placement of final and vegetative cover, silt curtains shall be employed to minimize silt loadings to surface water bodies.

SCHEDULE "A"

1. Document entitled "Environmental Assessment Act Section 9 Notice of Approval to Proceed with the Undertaking" , Re: An Environmental Assessment for Warwick Landfill Expansion, Waste Management of Canada Corporation, EA File Number: EA-02-08-02-03, dated January 15, 2007.

2. Application for a Provisional Certificate of Approval for the Warwick Landfill, dated March 27, 2006.

3. Document entitled "Development and Operations Plans Warwick Landfill Expansion Volume 1 of 2" dated March 2006 prepared by Henderson, Paddon and Associates Limited.

4. Document entitled "Development and Operations Plans Warwick Landfill Expansion Volume 2 of 2" dated March 2006 prepared by Henderson, Paddon and Associates Limited.

5. Document entitled "Assessment of Geotechnical Design Requirements New Landfill Facility Warwick, Ontario" prepared by Alston Associates Inc., dated July 31, 2006.

6. Document entitled "2006 Poplar System Monitoring Report Warwick Landfill Site Township of Warwick Ontario" prepared by Jagger Hims Limited, dated January 2007.

7. Document entitled "Warwick Landfill Expansion Contaminating Lifespan Review" prepared by Jagger Hims Limited, dated March 2006.

8. Drawing No. 105716-111 entitled " Proposed Final Contours and Stormwater Management Plan" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

9. Drawing No. 105716-112 entitled " Landfill Bottom Contours (Top of Primary Gravel)" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

10. Drawing No. 105716-113 entitled "Landfill Perimeter Sections" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

11. Drawing No. 105716-114 entitled " Landfill Perimeter Sections" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

12. Drawing No. 105716-115 entitled "Leachate Collection Sump Details" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

13. Drawing No. 105716-116 entitled "Proposed Primary Leachate Collection System" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

14. Drawing No. 105716-117 entitled "Proposed Secondary Leachate Collection System" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

15. Drawing No. 105716-118 entitled "Landfill Sections" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

16. Drawing No. 105716-119 entitled “Landfill Perimeter Sections” prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

17. Drawing No. 105716-120 entitled “ Landfill Perimeter Sections” prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

18. Drawing No. 105716-125 entitled “Details and Sections” prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

19. Letter dated April 16, 2007 from Frank Ford, Henderson Paddon and Associated Limited to Wilf Ruland, Citizens Environmental Consulting.

20. Letter dated May 2, 2007 from Frank Ford, Henderson Paddon and Associated Limited to Wilf Ruland, Citizens Environmental Consulting.

21. Letter dated June 1, 2007 from Greg Washuta, P. Eng., M. Eng., Senior Waste Engineer, Ministry of the Environment to Reid Cleland, Waste Management of Canada Corporation.

22. Drawing No. 106716-127A entitled "Plough Furrow Surface Water Distribution Warwick Landfill" prepared by Henderson Paddon and Associates Limited, dated March 21, 2007.

23. Drawing No. 106716-F215 entitled "Proposed Mini-Transfer Area" prepared by Henderson Paddon and Associates Limited, dated March 29, 2007.

24. Report entitled "Best Management Practices Plan (Dust) Warwick Landfill Watford, Ontario " prepared by RWDI Air Inc., dated December 11, 2007.

25. Report entitled "Best Management Practices Plan (Litter) Warwick Landfill Watford, Ontario " prepared by RWDI Air Inc., dated December 11, 2007.

26. Report entitled "Best Management Practices Plan (Odour) Warwick Landfill Watford, Ontario " prepared by RWDI Air Inc., dated December 11**,** 2007.

27. Document entitled "Appendix F Air Quality Monitoring Plan and Letter", prepared by RWDI, dated November 29, 2007.

28. Document entitled "Environmental Noise Monitoring Program for the Warwick Landfill" , prepared by Aercoustics Engineering Limited, dated November 21, 2007.

29. Document entitled "Proposed Expansion of WM Warwick Landfill Predicted Noise Impact" , prepared by Aercoustics Engineering Limited, dated June 15, 2007.

30. Document entitled "Application for Approval of ECA of Approval A032203 Warwick Township County of Lambton MOE. Reference No. 0539-6N7TRY Part 1 of 2" , dated July 13, 2007, prepared by Henderson Paddon and Associates Limited.

31. Document entitled "Application for Approval of ECA of Approval A032203 Warwick Township County of Lambton MOE. Reference No. 0539-6N7TRY Part 2 of 2- Financial Assurances" , dated August 22, 2007, prepared by Henderson Paddon and Associates Limited.

32. Letter dated July 27, 2007 from Dan Toner, Assistant Director, Laboratory Services Branch to Tesfaye Gebrezghi, Supervisor- Waste Unit, MOE.

33. Table 6.1 entitled "Phasing-Analysis for Leachate Quantities WM- Warwick Landfill Expansion" prepared by Henderson Paddon and Associates Ltd., dated August 17, 2007.

34. Letter dated August 20, 2007 from John DeYoe, RWDI to Frank Ford, Henderson Paddon and Associates Limited.

35. Discussion Paper 9 entitled "Impact Management Plan" and all Appendices dated October 2005 prepared by Waste Management of Canada Corporation.

36. Letter Report and attachments dated May 10, 2001 from Frank C. Ford of Henderson, Paddon Environmental to Mark Turner, Environmental Assessment and Approvals Branch.

37. Development and Operations Report - Canadian Waste Services Inc. - Warwick Landfill, Warwick Township - Revised, dated October 1997, prepared by Henderson Paddon Environmental Inc.

38. Consolidated Report Leachate Management Plan - Canadian Waste Services Inc. - Warwick Landfill - Warwick Township dated July 2001 prepared by Henderson Paddon Environmental Inc.

39. Environmental Monitoring Plan - Warwick Landfill - Township of Warwick, Ontario dated December 2007, prepared by Jagger Hims Limited.

40. Letter dated October 11, 2007 from Brad Bergeron, RWDI to Greg Washuta, Senior Waste Engineer, Ministry of the Environment.

41. Report entitled "Stormwater Management Plan Poplar Irrigation Area Warwick Landfill Expansion Watford, Ontario" dated December 2007, prepared by Henderson Paddon Environmental Inc.

42. Letter dated November 21, 2007 from Kevin Smith, Aercoustics Engineering Limited to Wayne Jenken, Waste Management of Canada Corporation.

43. E-mail and attachments dated February 12, 2008 from Brad Bergeron, RWDI Air Inc. to Greg Washuta, Senior Waste Engineer, EAAB, MOE.

44. E-mail and attachments dated January 29, 2008 from Brad Bergeron RWDI Air Inc. to Greg Washuta, Senior Waste Engineer, EAAB, MOE.

45. Letter dated March 3, 2008 from Wayne Jenken, Landfill Engineer, WMCC to Ian Parrott, Manager, ECA of Approval Review Section, EAAB, MOE.

46. Letter dated June 13, 2008 from Frank Ford, Senior Environmental Engineer, Henderson Paddon and Associates Limited to Greg Washuta, P. Eng., Senior Waste Engineer, Waste Unit, EAAB, MOE.

47. Application for a Provisional Certificate of Approval for a Waste Disposal Site for the Twin Creeks Landfill Site, signed and dated December 11, 2008.

48. Letter dated December 11, 2008 from Reid Cleland, District Landfill Manager, WMCC to Doris Dumais, Approvals Director, EAAB, MOE.

49. Report entitled "Cell 12 Project and Changes Affecting The Warwick Landfill Expansion" and attached appendices, created by Henderson Paddon & Associates Limited, dated August 2008.

50. Application for a Provisional Certificate of Approval for a Waste Disposal Site for the Twin Creeks Landfill Site, dated August 11, 2008.

51. Letter dated December 18, 2008 from Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE to Reid Cleland, District Landfill Manager, WMCC.

52. Letter dated December 18, 2008 from Wayne Jenken, Landfill Engineer, WMCC to Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE.

53. Letter dated December 18, 2008 from Jason Balsdon and Brent Langille, Jagger Hims Limited to Wayne Jenken, Landfill Engineer, WMCC.

54. Application for a Provisional Certificate of Approval for a Waste Disposal Site for Waste Management of Canada Corporation's Twin Creeks Landfill Site, signed and dated January 16, 2009.

55. Report and Appendix A entitled "Waste Management of Canada Corporation Twin Creeks Landfill Use of Geonet for Secondary Drainage Layer" prepared by Henderson Paddon and Associates, dated January 2009.

56 Letter dated March 18, 2009 from Greg Washuta Senior Waste Engineer, Waste Unit, EAAB, MOE to Reid Cleland, Landfill Manager, WMCC.

57. Letter report and appendices A, B and C dated April 9, 2009 from Jeff Armstrong, Genivar Consultants LP to Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE.

58. Application for a Waste Disposal Site Certificate of Approval dated April 28, 2009 and signed by Reid Cleland, District Manager, Waste Management of Canada Corporation.

59. Report produced by Genivar Consultants LP entitled "Development & Operations Report for a Waste Transfer Station Application" dated June 2009.

60. November 24, 2009 e-mail from Jeff Armstrong of Genivar Consultants LP to Jim Chisholm, Senior Review Engineer with the Ministry of Environment indicating that the application is for an existing mini

transfer area but flexibility is being applied for to direct the waste collected at this area to alternate waste disposal sites.

61. November 24, 2009 e-mail from Jim Chisholm, Senior Review Engineer with the Ministry of Environment to Jeff Armstrong, Genivar Consultants LP, requesting information about how the Mini-Transfer Area already located at the landfill is covered by the existing Certificate of Approval and the December 21, 2009 e-mail response from Jeff Armstrong to Jim Chisholm to his November 24, 2009 e-mail, outlining that the Mini-Transfer Area is covered by the 1997 Design and Operation Report that is identified in Item 37 and attached page 7-4 of the report in which Section 7.8 dealt with the Mini-Transfer Area.

62. January 24, 2011, 12:11PM, e-mail from Wayne Jenken, Area Landfill Engineer, Waste Management of Canada Corporation to Jim Chisholm, Senior Review Engineer with the Ministry of Environment indicating that the original Mini Transfer Area moved to the new location on November 2009 and that the old location for the Mini Transfer Area has been removed. The e-mail also made suggested changes to a draft of the Notice.

63. Document entitled "Twin Creeks Landfill - Expansion of Poplar Cap Irrigation System for Existing Waste Disposal Area January 2010" prepared for Waste Management of Canada Corporation by Genivar Consultants LP dated January 2010.

64. Letter dated November 2, 2010 addressed to Mr. Reid Cleland, Waste Management of Canada Corporation from Mr. Greg Washuta, Ministry of the Environment providing comments and requesting additional information on MOE Reference File No. 1486-829MCN.

65. Document entitled "Twin Creeks Landfill, Watford, ON 091-13089-00 (91730R) - Application for Approval for Expansion of Poplar Plantation (South Fill Area) - Response to MOE Comments Letter dated November 2, 2010" prepared for Waste Management of Canada Corporation by Genivar Consultants LP dated December 2, 2010.

66. Report entitled "Development and Operations Plan - Warwick Landfill Expansion - Volume 1 of 3" prepared for WMCC by Henderson Paddon & Associates dated March 2008.

67. Report entitled "Development and Operations Plan - Warwick Landfill Expansion - Volume 2 of 3" prepared for WMCC by Henderson Paddon & Associates dated March 2008.

68. Report entitled "Development and Operations Plan - Warwick Landfill Expansion - Monitoring Plans - Volume 3 of 3" prepared for WMCC by Henderson Paddon & Associates dated March 2008.

69. Letter dated May 6, 2009 addressed to Mr. Reid Cleland, WMCC from Mr. Greg Washuta, Ministry of the Environment providing ministry review comments on the Development and Operations Plan

70. Letter dated August 19, 2009 addressed to Mr. Reid Cleland, WMCC from Mr. Greg Washuta, Ministry of the Environment providing comments from the Township of Warwick, Walpole Island First Nation and the Warwick Public Liaison Committee on the Development and Operations Plan

71. Letter dated November 12, 2009 addressed to Mr. Greg Washuta, Ministry of the Environment from Mr. Wayne Jenken, WMCC.

72. Drawing set entitled "Twin Creeks Landfill - Landscaping and Signage Detail Construction Drawings" prepared by Schollen & Company Inc. and dated July 4, 2008. The drawing set consists of the following:

    i. Cover page entitled "Twin Creeks Landfill - Landscaping and Signage Detail Construction Drawings" prepared by Schollen & Company Inc. and dated July 4, 2008;
    ii. Drawing No. L-1 entitled "Landscape Plan - Screening Berm";
    iii. Drawing No. L-1A entitled " Lanscape Detail at Intersections - Screening Berm"
    iv. Drawing No. L-2 entitled "Landscape Plan - Screening Berm";
    v. Drawing No. L-3 entitled "Landscape Plan - Screening Berm & Area F";
    vi. Drawing No. L-4 entitled "Landscape Plan - Screening Berm";
    vii. Drawing No. L-5 entitled "Landscape Plan - Screening Berm and Area G (North)";
    vii. Drawing No. L-6 entitled "Landscape Plan - Screen Planting Area G (South)";
    viii. Drawing No. L-7 entitled "Landscape Plan - Screen Planting and Creek Area A and Area B";
    ix. Drawing No. L-8 entitled "Landscape Plan - Screen Planting Areas C, D and E";
    x. Drawing No. L-9 entitled "Landscape Plan - Restoration Planting Area H";
    xi. Drawing No. LD-1 entitled "Landscape Detail Plan ";
    xii. Drawing No. LD-2 entitled "Landscape Notes and Master Plant List"; and
    xiii. Drawing No. LD-3 entitled "Signage Details";

73. Application for a Certificate of Approval for a Waste Disposal Site dated April 6, 2011 submitted by Waste Management of Canada Corporation for Provisional Certificate of Approval No. A032203 requesting approval for use of an alternative daily cover material and amended Best Management Practices for Odour.. The supporting documentation for the application included the following:

    i. Cover letter dated April 7, 2011 addressed to Mr. Tes Gebrezghi, Ministry of the Environment from Mr. Reid Cleland, Waste Management of Canada Corporation;
    ii. Report entitled "Best Management Practices Plan (Odour) Warwick Landfill" prepared for Waste Management of Canada Corporation by RWDI Air Inc. (Project No. 1100800) dated April 7, 2011;
    iii. Letter dated March 24, 2011 addressed to Mr. Wayne Jenken, Waste Management of Canada Corporation from Mr. Peter Pickfield, Garrod Pickfield; and
    iv. Email dated March 22, 2011 at 3:32 p.m. sent to Mr. Peter Pickfield, Garrod Pickfield from Mr. Wayne Jenken.

74. Letter dated October 4, 2011 addressed to Mr. Tesfaye Gebrezghi, Ministry of the Environment from Mr. Reid Cleland, Waste Management of Canada requesting an amendment to Condition 167 (a). The supporting documentation attached to the letter included the following:

    a. Application for a Certificate of Approval for a Waste Disposal Site dated October 4, 2011;
    b. Provisional Certificate of Approval A032203 Notice No. 7 dated June 1, 2011;
    c. Letter from Wayne Jenken, WMCC to Don Bruder, Township of Warwick dated February

23, 2011;

d. Letter from Wayne Jenken, WMCC to Don Bruder, Township of Warwick dated May 26, 2011;
e. Letter from Peter Pickfield, Garrod Pickfield LLP to Reid Cleland, WMCC dated September 14, 2011;
f. Letter from Wayne Jenken, WMCC to Dean Jacobs, Walpole Island First Nations dated July 14, 2011;
g. Email from Kent Hunter, Neegan Burnside to Wayne Jenken dated September 19, 2011 at 3:54 p.m.;
g. Email from Wayne Jenken, WMCC to Kent Hunter, Neegan Burnside dated September 20, 2011 at 1:52 p.m.;
h. Email from Kent Hunter, Neegan Burnside to Wayne Jenken dated September 27, 2011 at 10:23 a.m.;
i. WPLC meeting minutes dated September 15, 2011; and
j. WPLC meeting minutes dated April 7, 2011.

75. Letter dated May 22, 2012 addressed to Ms. Agatha Garcia Wright, Director, Ministry of the Environment from Mr. Wayne Jenken, Waste Management of Canada Corporation requesting amendment to Condition No. 7.10 (Landfill Gas Management). The letter included the following supporting documentation:

i. Letter report entitled "Early Vertical Gas Well Collection System" dated May 2012 and addressed to Mr. Reid Cleland, Waste Management of Canada Corporation from Mr. Frank Ford, GENIVAR Inc.;
ii. Drawings No. 102 and G111 - Landfill Gas Collection System;
iii. Landfill Gas Headers, Gas Building with Blowers and Landfill Gas Flaring System Design Drawings and Design and Operations Plan for Modifications;
iv. Description of Phase 1 of the Gas Collection System;
v. Revised Section 4.7 of the Design and Operations Plan;
vi. Application to Amend Environmental Compliance Approval No. A032203 and supporting documents;
vii. Consultation Summary and Records with Stakeholders; and
viii. Design Drawings for Amended Landfill Gas Management System.

76. Letter dated July 26, 2012 addressed to Mr. Reid Cleland, Waste Management of Canada Corporation from Mr. Dale Gable, Ministry of the Environment requesting additional information on the location of the proposed gas extraction wells.

77. Letter dated August 9, 2012 addressed to Mr. Dale Gable, Ministry of the Environment from Mr. Frank Ford, GENIVAR Inc. providing details on the location of the gas wells.

78. Letter Report dated May 9, 2012 addressed to Ms. Agatha Garcia Wright, Director, Ministry of the Environment form Mr. Wayne Jenken, Waste Management of Canada requesting Conditions 6.48 to 6.61 be amended. The letter report included the following Sections:

i. Environmental Compliance Approval application signed by Reid Cleland, WMCC and

dated May 9, 2012;
ii. Proof of legal name and zoning;
iii. Record of consultation with Township of Warwick;
iv. Record of consultation with Walpole First Island First Nation; and
v. Record of consultation with WPLC.

79. Letter report dated September 26, 2012 addressed to Ms. Agatha Garcia-Wright. Director, Environmental Approvals Branch, Ministry of the Environment from Mr. Philip Janisse and Mr. Brent Langille, RWDI Inc. requesting the time frame for the use of ASR be extended and the sampling frequency for the ASR be reduced.

80. Letter dated October 15, 2012 and supporting drawings addresses to Ms. Agatha Garcia-Wright. Director, Environmental Approvals Branch, Ministry of the Environment from Mr. Wayne Jenken, Waste Management of Canada Corporation detailing the proposed changes to the landscape plan for the Site. The supporting drawings include the following drawing prepared by Schollen and Company Inc (Contract No. 27007) dated June 2012:

i. Cover page entitled "Twin Creeks Landfill Expansion - Landscape and Details Drawings" dated June 29, 2012
ii. Drawing No. L-1 entitled "Landscape Plan - Screening Berm";
iii. Drawing L-1A entitled "Landscape Detail at Intersections - Screening Berms";
iv. Drawing L-2 entitled "Landscape Plan - Screening Berm";
v. Drawing L-3 entitled "Landscape Plan - Screening Berm and Area F";
vi. Drawing L-4 entitled "Landscape Plan - Screening Berm";
vii. Drawing L-5 entitled "Landscape Plan - Screening Berm and Area G";
viii. Drawing L-6 entitled "Landscape Plan - Area G Planting Area";
ix. Drawing L-7 entitled "Landscape Plan - Area A and Area B Screen Planting and Creek";
x. Drawing L-8 entitled "Landscape Plan - Area C, D and E Screen Planting";
xi. Drawing L-9 entitled "Landscape Plan - Area H Restoration Planting";
xii. Drawing LD-1 entitled "Landscape Detail Plan";
xiii. Drawing LD-2 entitled "Landscape Notes and Master Plant List";
xiv. Drawing LD-3 entitled "Signage Details";
xv. Drawing LD-4 entitled "Details"; and
xvi. Drawing LD-5 entitled "Details".

81. Letter dated November 13, 2013 addressed to Agatha Garcia-Wright, Director, Ministry of the Environment from Wayne Jenken, Waste Management of Canada Corporation requesting amendment to Condition 8.6 (a). The following supporting documentation was attached to the memorandum.

i. Amended Environmental Compliance Approval Number A032203 issued December 13, 2011
ii. Amended Environmental Compliance Approval Number A032203 Notice No. 1 issued February 29, 2012
iii. Application to Amend Environmental Compliance Approval No. A032203 with Signature of Reid Cleland in Section 1.4
iv. Record of Consultations with Stakeholders

82. Application package dated May 4, 2016 and received on May 16, 2016 including all subsequently submitted supporting documentation and drawings, including the amendment to the D&O plan and associated drawings.

83. Report titled "Twin Creeks Landfill Site: Best Management Practices Plan (Dust) - Version 7" prepared by RWDI Air Inc., dated May 19, 2017.

84. Report titled "Twin Creeks Landfill Site: Best Management Practices Plan (Odour) - Version 8" prepared by RWDI Air Inc., dated May 19, 2017.

85. Report titled "Twin Creeks Landfill Site: Ambient Air Quality Monitoring Plan (Revision #3)" prepared by RWDI Air Inc., dated May 18, 2017.

86. "WM Twin Creeks Landfill Site, Leachate Management Framework" prepared by HDR, dated November 29, 2017.

87. Application for a an amendment to ECA No. A032203 to provide detailed design for the construction of Cell 4 in response to Condition 4.8. Signed by Reid Cleland and dated October 16, 2018. The supporting documentation for the application included the drawing set titled "Waste Management of Canada Corporation, Twin Creeks Landfill Expansion, Warwick Township, Landfill Base Preparation Cell 4." Prepared by WSP Group, October, 2018. The drawing set consists of the following:

    i. Drawing No. 106716P-400 - "Title Sheet";
    ii. Drawing No. 106716P-401 - "March 2018 Existing Conditions Plan;
    iii. Drawing No. 106716P-402 - "Cell 4 - Bottom of Excavation - West";
    iv. Drawing No. 106716P-403 - "Cell 4 - Bottom of Excavation - East";
    v. Drawing No. 106716P-404 - "Cell 4 - Top of Primary Clay Liner - West";
    vi. Drawing No. 106716P-405 - "Cell 4 - Top of Primary Clay Liner - East";
    vii. Drawing No. 106716P-406 - "Cell 4 - Temporary Clay Seal - West";
    vii. Drawing No. 106716P-407 - "Cell 4 - Temporary Clay Seal - East";
    viii. Drawing No. 106716P-408 - "Cell 4 - Section and Details";
    ix. Drawing No. 106716P-409 - "Cell 4 - Section and Details";
    x. Drawing No. 106716P-410 - "Cell 4 - Section and Details";
    xi. Drawing No. 106716P-411 - "Cell 4 - Pumping Station PS5/PS6 Plans and Sections";
    xii. Drawing No. 106716P-412 - "Cell 4 - Pumping Station PS5/PS6 Plans and Sections";
    xiii. Drawing No. 106716P-413 - "Cell 4 - Sections and Details"; and
    xiv Drawing No. 106716P-414 - "Cell 4 - Sections and Details".

The reasons for the imposition of these terms and conditions are as follows:

Conditions 1.1, 1.2, 1.3, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.14, 1.15, 1.23, and 1.24 are to clarify the legal rights and responsibilities of the Owner and Operator under this Approval.

Conditions 1.4 and 1.5 are to ensure that the Site is designed, operated, monitored and maintained in accordance

with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.

Condition 1.12 is to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes.

Condition 1.14 is to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this Approval.

Conditions 1.15 and 1.16 are to ensure that the successor is aware of its legal responsibilities.

Conditions 1.17, 1.18, 1.19, and 1.20 clarify that the Part II.1 Director is an individual with authority pursuant to Section 197 of the Environmental Protection Act to require registration on title and provide any person with an interest in property before dealing with the property in any way to give a copy of the Approval to any person who will acquire an interest in the property as a result of the dealing.

Condition 1.21 is to ensure that appropriate Ministry staff has ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Approval. This Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the Act, the OWRA, the PA, the NMA and the SDWA.

Condition 1.25 clarifies what information may be subject to the Freedom of Information Act.

Condition 2.1 is to require Financial Assurance for this company to ensure that sufficient funds are available to the Ministry to clean up the Site in the event that the Owner is unable or unwilling to do so.

Conditions 3.1 to 3.15 inclusive are necessary in order to establish a forum for the exchange of information and public dialogue on activities to be carried out at the landfill site. Open communication with the public and local authorities is important in helping to maintain high standards for site operation and environmental protection.

Condition 3.16 has been included in order to ensure that consultation with First Nations is undertaken during the submission of any application to amend any approval required by the Ministry.

Conditions 4.1 to 4.6 inclusive, 4.8, and 4.9 is to ensure that the Site is designed, constructed and operated in an environmentally acceptable manner, based on the conceptual design and operations for the Site.

Condition 4.7 is to ensure the availability of as-built drawings for inspection and information purposes.

Condition 4.10 has been specifically included to allow for optimization of design for subsequent stages based on operating experience and monitoring results and to ensure that any necessary remedial action is undertaken before landfilling may proceed in the next stage.

Condition 4.11 has been included to ensure that the site has been constructed in accordance with the approved design plans, specifications and QA/QC procedures and to ensure that there is not an adverse impact on the environment.

Condition 4.12 is to ensure that there is a person, reporting directly to the Ministry, with associated costs reimbursed by the Owner, who is responsible for inspecting the Site, based on the requirements in this ECA of Approval to ensure that the Site is operated in an environmentally acceptable manner.

Conditions 4.13, 4.14, 15.1, 15.2 and 15.3 is to specify the amount of days the environmental inspector is required to be on site based on the conditions in this approval and in accordance with the previously approved EA for the site.

Condition 5.1 is to ensure safe side slopes of the berm.

The reason for Condition 5.2 is to approve the diversion area based on the information submitted. This is ensure the protection of the environment and the public.

Condition 5.3 is to approve the use of Cell 12 for contaminated soil.

Condition 5.4 is to ensure the Owner carries out the landscape plan based on the submitted information.

Conditions 6.1 and 6.18 are included in order to ensure that waste disposal at the site is undertaken in accordance with applicable Ministry of the Environment regulations and guidelines. Compliance with these regulations and guidelines will ensure that the site does not cause and adverse effect on the environment.

Conditions 6.4 and 6.7 is to specify the approved areas from which waste may be accepted at the Site and the types and amounts of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.

Condition 6.5 is to specify restrictions on the extent of landfilling at this Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity of the site. Approval to landfill beyond these limits would require an application with supporting documentation submitted to the Director.

Condition 6.6 specifies the maximum amount of waste that may be received at the site based on the previously approved Environmental Assessment for the site.

Condition 6.8 has been inserted to minimize the potential for clogging of the drainage layer and to minimize temperature effects on the leachate collection system. Failure to maintain the specified minimum thickness of waste and cover material may result in a decrease in the service life of the drainage layer.

Conditions 6.9 to 6.14 inclusive have been included in order to ensure asbestos waste is handled and disposed of in accordance with O. Reg. 347 as amended from time to time. Proper handling and disposal of asbestos waste ensures that the asbestos waste does not cause an adverse impact on the environment and also does not affect human health.

Condition 6.16 is needed to make certain that uses at the site are for waste disposal purposes only and not any other uses which may cause an adverse impact on the environment and human health.

Condition 6.17 is necessary in order to ensure that all waste loads are inspected and waste that is disposed of at the site is in accordance with the terms and conditions in this ECA of Approval.

Condition 6.19 is to ensure that open burning of municipal waste is not permitted because of concerns with air emissions, smoke and other nuisance affects, and the potential fire hazard.

Conditions 6.20 through 6.22 inclusive are to ensure that users of the Site are fully aware of important information and restrictions related to Site operations under this ECA of Approval.

Conditions 6.23 to 6.27 inclusive are to specify the normal hours of operation for the landfill Site and a mechanism for amendment of the hours of operation.

Conditions 6.28 to 6.30 inclusive are to specify site access to/from the Site and to ensure the controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.

Condition 6.31 is needed in order to make certain that the waste received at the site is in accordance with the ECA and O. Reg. 347.

Condition 6.32 has been included is to ensure that access roads are clear and do not pose a safety hazard to the general public.

Condition 6.33 is for the protection of public health and safety and minimization of the potential for damage to environmental control, monitoring and other works at the landfill Site. Scavenging is the uncontrolled removal of material from waste at a landfill site.

Conditions 6.34 to 6.40 inclusive are to ensure that the Site is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.

Condition 6.41 is to ensure that noise from or related to the operation of the landfill is kept to within Ministry limits and does not result in a hazard or nuisance to any person.

Condition 6.42 is included to ensure that noise monitoring is undertaken in accordance with the noise monitoring program prepared and to ensure that an independent acoustic audit is completed in accordance with the Ministry's requirements.

Condition 6.43 is to clarify when the Best Management Plans can be amended and the mechanism for amending the Best Management Plans.

Condition 6.44 is to ensure that appropriate measures are taken in order to prevent surface water from contacting waste so as not to cause an adverse effect on the environment.

Conditions 6.45 and 7.18 is to specify other approvals required for works and activities related to the operation of this Site as a landfill.

Condition 6.46 has been included is in order to prevent ponding in on site ditches and any adverse impact on the environment and human health.

Condition 6.47 is to ensure that landfilling operations are conducted in an environmentally acceptable manner. Daily and intermediate cover is used to control potential nuisance effects, to facilitate vehicle access on the site, and to ensure an acceptable site appearance is maintained. The proper closure of a landfill site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the site.

Condition 6.48 to 6.61 inclusive is to specify the approval requirements for use of alternative cover material at the Site.

Condition 7.1 is necessary so that runoff from contaminated soils does not create and adverse impact on the environment.

Conditions 7.2 and 7.3 are included in order to ensure that the composting and processing operations at the site are conducted in a fashion in accordance with Ministry's regulations, guidelines and so as not to pose a threat to human health or the environment.

Conditions 7.4, 9.3, 9.4, 9.5, 9.6 and 9.7 are to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this ECA of Approval, the EPA and its regulations.

Conditions 7.5 and 7.6 inclusive have been included are to ensure tire shred storage in accordance with the Fire Protection and Prevention Act and to protect the natural environment.

Condition 7.7 is to ensure that backup power is available so that all facilities remain operational during a power disruption thus preventing any adverse impacts on the environment.

Condition 7.8 has been inserted in order to ensure that concentrations of landfill gas do not pose a hazard to human health or the environment.

Condition 7.9 is to ensure that landfill gas is built and managed in accordance with the Ministry's requirement and regulation.

Condition 7.10 is needed in order to ensure that an adequate landfill gas management system is installed at the site in order to protect human health and the environment.

Conditions 7.11 and 7.12 are to minimize the potential for clogging of leachate collection pipes and to ensure effective operation of the leachate collection system components for as long as they are required. Failure to clean out these components on a regular basis may result in a decrease in their service lives. Regular cleaning of the leachate collection pipes is especially important during stages of landfilling when the level of both organic and inorganic constituents in the leachate is high and, consequently, the potential for clogging due to encrustation is greatest. As the landfill reaches the more stable methane producing stage, pipe cleaning may be required less frequently.

Condition 7.13 has been added to ensure adequate flow of leachate in the leachate collection pipes.

Conditions 7.14 to 7.17 are to ensure that the leachate collection system is designed and built in accordance with Regulations and the ministry's requirements.

Condition 7.18 is included is in order to prevent off site migration of leachate which may cause an adverse effect on the environment.

Conditions 8.1 to 8.4 inclusive are needed to ensure leachate recirculation is undertaken in accordance with the ministry's requirements and leachate recirculation does not pose an adverse impact on the environment.

Condition 8.5 is in accordance with EA condition 22 and protects the natural environment from any impacts due to discharge of raw or treated leachate to adjacent creeks.

Condition 8.6 is to ensure that a fully functional leachate treatment system is in place on site prior to waste placement.

Condition 8.7 clarifies the responsibilities of the owner, the requirements of the ministry, the authority of the Ministry and protects the natural environment and human health.

Conditions 9.1 and 9.2 are needed to ensure regular inspections of the site are conducted in order to protect the natural environment.

Conditions 9.8 to 9.12 inclusive is to ensure that accurate waste records are maintained to ensure compliance with the conditions in this ECA of Approval (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the EPA and its regulations.

Conditions 9.13, 15.4, 15.5 and 15.6 are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.

Condition 10.1 is to ensure that the Site is supervised and operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.

Conditions 11.1, 11.2, 11.3 and 11.4 is to establish a forum for the exchange of information and public dialogue on activities carried out at the landfill Site. Open communication with the public and local authorities is important in helping to maintain high standards for site operation and environmental protection.

Conditions 12.1 and 12.2 are to ensure that the Ministry is informed of any spills or fires at the Site and to provide public health and safety and environmental protection.

Condition 12.3 is contained in the ECA to guarantee that appropriate measures are taken by the County to prevent future occurrences of spills or fires at the site and to protect public health and safety and the environment.

Conditions 13.1 to 13.5 inclusive are to ensure protection of the natural environment and the integrity of the groundwater monitoring network.

Conditions 13.6 through 13.11 inclusive are to demonstrate that the landfill site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.

Conditions 14.1 through 14.10 inclusive are to ensure that the Owner follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site. A remedial action / contingency plan is necessary to ensure protection of the natural environment. A leachate contingency plan is a specific requirement of Reg. 232.

Conditions 16.1 and 16.2 are to ensure that final closure of the Site is completed in an aesthetically pleasing manner and to ensure the long-term protection of the natural environment.

Condition 16.3 ensures proper public consultation about the end use of the Site is undertaken and that the end use activities are consistent with those identified during the EA process.

Conditions 16.4 to 16.6 ensure that certain activities are undertaken upon closure of the site in order to ensure that the closed site does not affect the natural environment.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A032203 issued on December 19, 2020

In accordance with Section 139 of the *Environmental Protection Act,* you may by written notice served upon me and the Ontario Land Tribunal within 15 days after receipt of this notice, require a hearing by the Tribunal. Section 142 of the *Environmental Protection Act* provides that the notice requiring the hearing ("the Notice") shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the *Environmental Protection Act,* a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

Registrar* Ontario Land Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario M5G 1E5 OLT.Registrar@ontario.ca	and	The Director appointed for the purposes of Part II.1 of the *Environmental Protection Act* Ministry of the Environment, Conservation and Parks 135 St. Clair Avenue West, 1st Floor Toronto, Ontario M4V 1P5

*** Further information on the Ontario Land Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349 or 1 (866) 448-2248, or www.oltt.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the *Environmental Protection Act.*

DATED AT TORONTO this 4th day of February, 2023

Mohsen Keyvani, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

SN/

c: District Manager, MECP Sarnia
field alert

APPENDIX A9:

Amended ECA [Air] No. 4155-BMCLZ8, dated March 3, 2020

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 4155-BMCLZ8
Issue Date: March 3, 2020

Waste Management of Canada Corporation
117 Wentworth Court
Brampton, Ontario
L6T 5L4

Site Location: Twin Creeks Environmental Centre
5768 Nauvoo Rd (Watford)
Warwick Township, County of Lambton

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act , R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

- Three (3) enclosed flare systems, each having a maximum inlet capacity of 2.08 cubic metres per second of landfill gas, exhausting into the air at a maximum volumetric flow rate of 61.3 cubic metres per second through individual stacks, each having an exit diameter of 3.7 metres, extending 15.2 metres above grade; used to:
  - incinerate the landfill gas from a landfill gas collection system;
- control the off-gases from the enclosed building housing the leachate treatment facility; and
- maintain a negative pressure on the leachate collection system on an as-needed basis;
- one (1) enclosed flare system having a maximum inlet capacity of 0.94 cubic metres per second of landfill gas, exhausting into the air at a maximum volumetric flow rate of 25.8 cubic metres per second through a stack having an exit diameter of 3.2 metres, extending 12.2 metres above grade; used to:
  - incinerate the landfill gas from a landfill gas collection system;
- control the off-gases from the enclosed building housing the leachate treatment facility; and
- maintain a negative pressure on the leachate collection system on an as-needed basis;
- One (1) diesel fuel fired emergency generator rated at 1,000 kilowatts that will be used to provide back-up power for the landfill gas plant; exhausting into the air at a maximum volumetric flow rate of 3.56 cubic metres per second; having an exit diameter of 0.25 metre, extending 3.6 metres above grade;

- One (1) diesel fuel fired generator rated at 50 kilowatts that will be used to provide regular power to the leachate pumping system; exhausting into the air at a maximum volumetric flow rate of 0.24 cubic metres per second; having an exit diameter of 0.10 metre, extending 3.6 metres above grade;
- One (1) diesel fuel fired emergency generator rated at 250 kilowatts that will be used to provide back-up power for the office buildings; exhausting into the air at a maximum volumetric flow rate of 0.97 cubic metres per second; having an exit diameter of 0.15 metre, extending 3.6 metres above grade;
- Two (2) passive exhaust louvres serving two (2) sequencing batch reactors (SBR) and two (2) aeration tanks; exhausting into the air individually at a maximum volumetric flow rate of 1.96 cubic metres per second; each having an exit dimension of 1.22 x 1.22 metres, extending 2.13 metres above grade;
- One (1) process exhaust fan serving the reverse osmosis system area; exhausting into the air at a maximum volumetric flow rate of 1.71 cubic metres per second; having an exit dimension of 0.45 x 0.45 metres, extending 4.0 metres above grade;
- One (1) exhaust fan serving slurry dryer; exhausting into the air at a maximum volumetric flow rate of 0.24 cubic metres per second; having an exit diameter of 0.3 metre, extending 5.0 metres above grade;

all in accordance with the Application for an Approvals, dated February 27, 2019 and February 15, 2017, both signed by Reid Cleland of the *Company* and all information and documentation associated with the application including ESDM Report prepared by RWDI AIR Inc. dated February 15, 2017 and signed by Brad Bergeron; and email updates provided by Brad Bergeron of RWDI AIR Inc. on May 10, 18, 24 and 26, 2017.

For the purpose of this environmental compliance approval, the following definitions apply:

1. *"Acoustic Audit"* means an investigative procedure consisting of measurements of all noise emissions due to the operation of the *Facility,* assessed in comparison to the performance limits for the *Facility* regarding noise emissions, completed in accordance with the procedures set in *Publication NPC-103* and reported in accordance with *Publication NPC-233.*
2. *"Acoustic Audit Report"* means a report presenting the results of an *Acoustic Audit* , prepared in accordance with *Publication NPC-233.*
3. *"Acoustical Consultant"* means a person currently active in the field of environmental acoustics and noise/vibration control, who is familiar with Ministry

noise guidelines and procedures and has a combination of formal university education, training and experience necessary to assess noise emissions from a *Facility.*

4. *"CEM System"* means the continuous monitoring and recording system, one for each of the flare system, used to optimize the operation of the flare systems, as described in this *Approval,* including Schedule "A", to the extent approved by this *Approval.*
5. *"Approval"* means this Environmental Compliance *Approval,* including the application and supporting documentation listed above.
6. *"Company"* means Waste Management of Canada Corporation that is responsible for the construction or operation of the *Facility* and includes any successors and assigns.
7. *"Director"* means a person appointed for the purpose of section 20.3 of the *EPA* by the Minister pursuant to section 5 of the *EPA.*
8. *"District Manager"* means the District Manager of the appropriate local district office of the Ministry, where the *Facility* is geographically located.
9. *"EPA"* means the Environmental Protection Act, R.S.O. 1990, c.E.19, as amended.
10. *"Equipment"* means the equipment described in the *Company's* application, this *Approval* and in the supporting documentation submitted with the application, to the extent approved by this *Approval.*
11. *"Facility"* means the entire operation located on the property where the *Equipment* is located.
12. *"Independent Acoustical Consultant"* means an *Acoustical Consultant* not representing the *Company,* and not involved in the noise impact assessment or the design/implementation of noise control measures for the Facility/Equipment. The *Independent Acoustical Consultant* shall not be retained by the consultant involved in the noise impact assessment or the design/implementation of noise control measures for the *Facility/Equipment.*
13. *"Manager"* means the Manager, Technology Standards Section, Standards Development Branch of the Ministry, or any other person who represents and carries out the duties of the Manager, as those duties relate to the conditions of this *Approval.*
14. *"Manual"* means a document or a set of documents that provide written instructions to staff of the *Company.*
15. *"Pre-Test Information"* means the information outlined in Section 1. of the *Source Testing Code.*

16. *"Publication NPC-103"* means Publication NPC-103 of the Model Municipal Noise Control By-Law, Final Report, August, 1978, as amended.
17. *"Publication NPC-205"* means the Ministry Publication NPC-205, "Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)", October, 1995, as amended.
18. *"Publication NPC-233"* means Publication NPC-233, Information to be Submitted for *Approval* of Stationary Sources of Sound, October 1995, as amended.
19. *"Sensitive Receptor"* means any location where routine or normal activities occurring at reasonably expected times would experience adverse effect(s) from odour discharges from the *Facility,* including one or a combination of:
    1. private residences or public facilities where people sleep (e.g. single and multi-unit dwellings, nursing homes, hospitals, trailer parks, camping grounds, etc.),
    2. institutional facilities (e.g.: schools, places of worship, community centres, day care centres, recreational centres, etc.),
    3. outdoor public recreational areas (e.g.: trailer parks, play grounds, picnic areas, etc.), and
    4. other outdoor public areas where there are continuous human activities (e.g.: commercial plazas and office buildings).
20. *"Schedules"* means the following schedules attached to the *Approval* and forming part of the *Approval* namely:
    - Schedule A - Continuous Monitoring and Recording System for Temperature
    - Schedule B - Source Testing Requirement
    - Schedule C - Procedures for Calculation of 10-minute Average Concentration of Odour.
21. *"Site"* means the Twin Creeks Landfill Site and lands owned by the *Company* described as:
    8039 Zion Line, R.R. #4, Watford
    Lots 19 and 20, Concession 3 and Lots 20 and 21, Concession 4, SER, Reference Plan
    25R-9125
    Township of Warwick, County Of Lambton, Ontario
    N0M 2S0.
22. *"Source Testing"* means sampling and testing to measure emissions resulting from operating the *Equipment* under process conditions which yield the worst case emissions within the approved operating range of the *Facility* and satisfies paragraph 1 of subsection 11(1) of O. Reg. 419/05.

23. *"Source Testing Code"* means the Ontario *Source Testing Code,* dated June 2010, prepared by the Ministry, as amended.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. **NOTIFICATION**
    1. The *Company* shall notify the *District Manager* in writing at least one (1) month prior to the expected date of installation of the second, third and fourth enclosed flare system in the *Facility.*

2. **PERFORMANCE**
    1. The *Company* shall, at all times, ensure that the noise emissions from the *Facility* comply with the limits set in Ministry *Publication NPC-205.*
    2. The *Company* shall restrict the testing of the two (2) emergency diesel generators (1,000 kilowatts and 250 kilowatts) to a maximum of 30 minutes per hour each during the daytime period between 07:00 and 19:00 hours.
    3. The *Company* shall operate all four enclosed flare systems in such a manner that a minimum temperature, as recorded by the *CEM System,* shall be 875 degrees Celsius at a point representing a minimum retention time of 0.7 second, at all times when the landfill gas incineration is in progress.

3. **OPERATION AND MAINTENANCE**
    1. The *Company* shall ensure that the *Equipment,* including the *CEM System,* is properly operated and maintained at all times. The *Company* shall:
    2. prepare, not later than three (3) months after the date of this *Approval,* a *Manual* outlining the operating procedures and a maintenance program for the *Equipment.* These operating procedures and the maintenance program in the *Manual* shall be updated as necessary. The *Manual* shall include, as a minimum, the following:
    3. routine operating and maintenance procedures in accordance with good engineering practices and as recommended by the *Equipment* and the *CEM System* suppliers;
    4. the calibration procedures of the *CEM System;*
    5. emergency procedures and procedures to prevent upset conditions;
    6. the operator training which is to be provided by qualified and experienced

individuals, for example, staff associated with the *Equipment* and the *CEM System* suppliers or personnel with equivalent qualification;

7. the procedures for optimizing the operation of the *Equipment* to minimize emissions from the *Equipment;*
8. the periodic, at a minimum weekly, inspection of the *Equipment* which is to be conducted by individuals trained with the *Equipment;* and timetables for work to be carried out;
9. procedures for any record keeping activities relating to operation and maintenance of the *Equipment,* including but not limited to the quantity and quality of the landfill gas collected and fed to the *Equipment* for incineration;
10. procedures to record process upsets/upset conditions and the remedial actions taken to respond to the upsets;
11. all appropriate measures to minimize noise, dust and odorous emissions from all potential sources;
12. the procedures for recording and responding to complaints regarding the operation of the *Equipment;*
13. implement the procedures of the *Manual.*

4. **ACOUSTIC AUDIT**

5. 1. The *Company* shall carry out *Acoustic Audit* measurements on the actual noise emissions due to the operation of the *Facility.* The:

2. a. shall carry out *Acoustic Audit* measurements in accordance with the procedures in *Publication NPC-103;*

   b.

   c. shall submit an *Acoustic Audit* Report on the results of the *Acoustic Audit,* prepared by an *Independent Acoustical Consultant,* in accordance with the requirements of *Publication NPC-233,* to the *District Manager* and the *Director* not later than three (3) months after the commencement of operation of each of the proposed three (3) flare systems in the *Facility.*

3.

4. The *Director:*

5. a. may not accept the results of the *Acoustic Audit* if the requirements of *Publication NPC-233* were not followed;

   b.

   c. may require the *Company* to repeat the *Acoustic Audit* if the results of

the *Acoustic Audit* are found unacceptable to the *Director.*

6. **RECORD RETENTION**
    1. The *Company* shall retain, for a minimum of two (2) years from the date of their creation, all records and information related to or resulting from the recording activities required by this *Approval,* and make these records available for review by staff of the Ministry upon request. The *Company* shall retain:
    2. all records on the maintenance, repair and inspection of the *Equipment* and the *CEM System;*
    3. all records produced by the *CEM System;*
    4. all records on the quality and quantity of landfill gas collected and fed to the *Equipment;*
    5. all records on the ambient air monitoring;
    6. all records generated in the *Acoustic Audit* measurements;
    7. all records of process upsets/upset conditions and remedial actions taken to respond to the upsets;
    8. all records of any environmental complaints; including:
    9. a description, time and date of each incident to which the complaint relates,
    10. wind direction at the time of the incident to which the complaint relates, and
    11. a description of the measures taken to address the cause of the incident to which the complaint relates and to prevent a similar occurrence in the future.

7. **NOTIFICATION OF COMPLAINTS**
    1. The *Company* shall notify the *District Manager,* in writing, of each environmental complaint within two (2) business days of the complaint. The notification shall include:
    2. this *Approval* number;
    3. a description of the nature of the complaint;
    4. the time and date of the incident to which the complaint relates;
    5. a description of the measures taken to address the cause of the incident to which the complaint relates and to prevent a similar occurrence in the future.

8. **CONSULTATION**
    1. During the process of submission of an application to amend any *Approval* for the *Site,* the *Company* shall:
    2. discuss with Walpole Island First Nation (WIFN), Township of Warwick and

Warwick Public Liaison Committee (WPLC) the proposed application prior to submission of the application to the *Director;*

3. provide the same documents to WIFN, Township of Warwick and WPLC that are provided to the *Director* in respect of the amendment; and
4. provide the *Director* with a statement indicating how WIFN, Township of Warwick and WPLC's comments were considered by the *Company* before it submitted the application to the Ministry.

9. **SOURCE TESTING**
    1. The *Company* shall monitor the emissions from the operation of the *Facility* as follows:
        a. The *Company* shall perform Source Testing for the sources and contaminants outlined in Schedule B.
        b. The *Company* shall submit, within the three (3) months following the date of this *Approval,* to the Manager a test protocol, including the *Pre-Test Information* for the Source Testing required by the *Source Testing Code.*
        c. The *Company* shall finalize the test protocol in consultation with the Manager.
        d. The *Company* shall not commence the Source Testing until the Manager has accepted the test protocol.
        e. The *Company* shall notify the *District Manager* and the Manager in writing of the location, date and time of any impending Source Testing required by this *Approval,* at least fifteen (15) business days prior to the Source Testing or as approved by the Manager.
        f. The *Company* shall complete the Source Testing within three (3) months after the commencement of the leachate treatment facility. The source testing will be repeated within 90 days of the start of each new phase as outlined in Table 6.1 of the Design and Operations Plan for the *Site.*

10. **REPORT ON SOURCE TESTING**
    1. The *Company* shall submit a report on the Source Testing to the *District Manager* and the *Manager,* as stated in the test protocol, but no later than two (2) months after completing the *Source Testing.* The report shall be in the format described in the *Source Testing Code,* and shall also include:
        a. an executive summary including the results from the *Source Testing;*
        b. records of all operating conditions including any upset conditions during the *Source Testing;* and

c. the results of dispersion calculations using the maximum emission rate for odour for the *Equipment,* indicating the maximum concentration of the odour, 10 minute-average, calculated in accordance with the procedures outlined in Schedule C, at the nearby Sensitive Receptors and the yearly frequency of exceedance of 1 odour unit at the Sensitive Receptors.

11. **REFUSAL OF SOURCE TESTING**
    1. The *Director* may not accept the results of the *Source Testing* if:
        a. the *Source Testing Code* or the requirements of the Manager were not followed; or
        b. the *Company* did not notify the *District Manager* and the Manager of the *Source Testing;* or
        c. the *Company* failed to provide a complete report on the *Source Testing.*
    2. If the *Director* does not accept the results of the *Source Testing,* the *Director* may require re-testing.

SCHEDULE "A"

PARAMETER: Temperature

LOCATION:

The sample point for the continuous temperature monitoring and recording system shall be shall be installed in the combustion chamber of each flare where the minimum retention time of the combustion gases at a minimum temperature of 875 degrees Celsius for at least 0.7 second is achieved.

PERFORMANCE:

The Continuous Temperature Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETER SPECIFICATION

1. Type: shielded "K" type thermocouple or equivalent
2. Accuracy: + 1.5 percent of the minimum gas temperature
3. Response Time (95%): 60 sec. (max)
4. Operating Range (Full Scale): 1.5 times approval limit
5. Standard Tolerance: ±2.2 ºC or ±0.75%
6. Resolution: 0.1 ºC
7. Calibration: Per manufacturer’s recommendations

RECORDER:

The recorder must be capable of registering continuously the measurement of the monitor without a significant loss of accuracy and with a time resolution of 5 minutes or better.

RELIABILITY:

The monitor shall be operated and maintained so that accurate data is obtained during

a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent, thereafter when the enclosed flare systems are in operation.

SCHEDULE "B"
Source Testing Requirement

Source ID	Description	Test Parameters
L3	Exhaust serving sequencing a batch reactor (SBR) and an aeration tank	Odour, hydrogen sulfide, total Mercaptans and a complete scan for volatile organic compounds
L4	Exhaust serving sequencing a batch reactor (SBR) and an aeration tank	Odour, hydrogen sulfide, total Mercaptans and a complete scan for volatile organic compounds
EF-2	Exhaust serving reverse osmosis system area	Odour, hydrogen sulfide, total Mercaptans and a complete scan for volatile organic compounds
SD-1	Exhaust serving slurry dryer	Odour, hydrogen sulfide, total Mercaptans and a complete scan for volatile organic compounds

SCHEDULE "C"
Procedures for the Calculation of 10-minute Average Concentration of Odour

1. The one-hour average concentration of odour at the Point of Impingement and at the most impacted *Sensitive Receptor* can be calculated using the Procedure described as follows:
    1. Calculate one-hour average concentration of odour at the Point of Impingement and at the most impacted *Sensitive Receptor,* employing the AERMOD atmospheric dispersion model employing at least five (5) years of hourly local meteorological data and provide results as individual one- hour odour concentrations;
    2. Convert each of the one-hour average concentrations predicted over the five (5) years of hourly local meteorological data to a 10-minute average concentration using the One-hour Average to 10-Minute Average Conversion described below;
    3. Present the 10-Minute Average concentrations predicted to occur over a five (5) year period at the Point of Impingement and at the most impacted *Sensitive Receptor* in a histogram. The maximum 10-minute average concentration of odour at the *Sensitive Receptor* will be considered to be the maximum odour concentration at the most impacted *Sensitive Receptor* that occurs and is represented in the histogram; and
2. For AERMOD, use the following formula to convert one-hour average Point of Impingement concentration to 10-minute average Point of Impingement concentration:

$$X_{10min} = X_{60min} * 1.65$$

where X_{10min} = 10-minute average concentration

X_{60min} = one-hour average concentration

The reasons for the imposition of these terms and conditions are as follows:

1. Condition No. 1 is included to assist the Ministry with the inspection of the *Facility* so that the environmental impact and subsequent compliance with the *EPA,* the regulations and this *Approval* can be verified.
2. Condition Nos. 2.1 and 2.3 are included to provide the minimum performance requirements considered necessary to prevent an adverse effect resulting from the operation of the *Facility.*
3. Condition No. 2.2 is included to ensure that the operation of the two (2) emergency diesel generators, excluding emergency situations, is not extended beyond the specified hours to prevent an adverse effect resulting from the operation of the Equipment.
4. Condition No. 3 is included to emphasize that the *Equipment* including the *CEM System* must be maintained and operated according to a procedure that will result in compliance with the *EPA,* the regulations and this *Approval*.
5. Condition No. 4 is included to require the Company to gather accurate information and submit an Acoustic Audit Report in accordance with procedures set in the Ministry's noise guidelines, so that the environmental impact and subsequent compliance with this Approval can be verified.
6. Condition No. 5 is included to require the *Company* to keep records and to provide information to staff of the Ministry so that compliance with the *EPA,* the regulations and this *Approval* can be verified.
7. Condition No. 6 is included to require the *Company* to notify staff of the Ministry so as to assist the Ministry with the review of the *Facility's* compliance.
8. Condition No. 7 is included in order to ensure that consultation with Walpole Island First Nation (WIFN), Township of Warwick and Warwick Public Liaison Committee (WPLC) is undertaken during the submission of any application to amend any *Approval* required by the Ministry.
9. Condition Nos. 8 to 10 are included to require the *Company* to gather accurate information so that the environmental impact and subsequent compliance with the *EPA,* the regulations and this *Approval* can be verified.

Upon issuance of the environmental compliance approval, I hereby revoke

Approval No(s). 9488-AMPH4Y issued on July 6, 2017.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or** www.ert.gov.on.ca

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 3rd day of March,

2020

Jeffrey McKerrall, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

BS/
c: District Manager, MECP Sarnia
Larry Fedec, HDR Corporation

APPENDIX A10:

Amended ECA [Air] No. 6318-CX4NFX, dated December 13, 2023

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 6318-CX4NFX
Issue Date: December 13, 2023

Waste Management of Canada Corporation
5768 Nauvoo Road
Warwick, Ontario
N0M 2S0

Site Location: Twin Creeks Environmental Centre
5768 Nauvoo Road Watford
Warwick Township, County of Lambton
N0M 2S0

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

- Two (2) enclosed flares (FLARE5, FLARE6), flaring either landfill gas or off-spec renewable natural gas (RNG), each having a maximum inlet capacity of:

  - 1.89 cubic metres per second of landfill gas, exhausting to the atmosphere at an approximate volumetric flowrate of 41.7 cubic metres per second, or

  - 0.94 cubic metres per second of off-spec RNG, exhausting to the atmosphere at an approximate volumetric flowrate of 37.2 cubic metres per second,

  exhausting to the atmosphere through individual stacks, each having an exit diameter of 3.7 metres, extending 15.2 metres above grade;

- One (1) pre-treatment thermal oxidizer (RNG_TO1), with a maximum thermal input of 2.44 million kilojoules per hour and a maximum inlet capacity of 0.33 cubic metres per second of off-spec RNG gas, exhausting to the atmosphere at an approximate volumetric flowrate of 2.5 cubic metres per second, through a stack, having an exit diameter of 1.2 metres, extending 15.2 metres above grade;

- One (1) main thermal oxidizer (RNG_TO2), with a maximum thermal input of 20.57 million kilojoules per hour and a maximum inlet capacity of 2.31 cubic metres per second of off-spec RNG gas, exhausting to the atmosphere at an approximate volumetric flowrate of 18 cubic metres per second, through a stack, having an exit diameter of 2.9 metres, extending 15.2 metres above grade;

- One (1) amine reboiler, having a maximum thermal input of 8,904,706 kilojoules per hour, exhausting to the atmosphere through a stack having an exit diameter of 0.4 metres, extending 4.9 metres above grade;

- Three (3) enclosed flares (FLARE1, FLARE2, FLARE3), each having a maximum inlet capacity of 2.08 cubic metres per second of landfill gas, exhausting into the air at a maximum volumetric flow rate of 61.3 cubic metres per second through individual stacks, each having an exit diameter of 3.7 metres, extending 15.2 metres above grade; used to:

    - incinerate the landfill gas from a landfill gas collection system;

    - control the off-gases from the enclosed building housing the leachate treatment facility; and

    - maintain a negative pressure on the leachate collection system on an as-needed basis;

- One (1) enclosed flare (FLARE4) having a maximum inlet capacity of 0.94 cubic metres per second of landfill gas, exhausting into the air at a maximum volumetric flow rate of 25.8 cubic metres per second through a stack having an exit diameter of 3.2 metres, extending 12.2 metres above grade; used to:

    - incinerate the landfill gas from a landfill gas collection system;

    - control the off-gases from the enclosed building housing the leachate treatment facility; and

    - maintain a negative pressure on the leachate collection system on an as-needed basis;

- One (1) diesel fuel fired generator (GEN2) rated at 50 kilowatts that will be used to provide regular power to the leachate pumping system; exhausting into the air at a maximum volumetric flow rate of 0.24 cubic metres per second; having an exit diameter of 0.10 metre, extending 3.6 metres above grade;

- One (1) diesel fuel fired emergency generator (GEN3) rated at 250 kilowatts that will be used to provide back-up power for the office buildings; exhausting into the air at a maximum volumetric flow rate of 0.97 cubic metres per second; having an exit diameter of 0.15 metre, extending 3.6 metres above grade;

- One (1) leachate treatment facility with a maximum capacity of 300 cubic metres per day of raw leachate consisting of:

- Two (2) passive exhaust louvres (L3, L4) serving two (2) sequencing batch reactors (SBR) and two (2) aeration tanks; exhausting into the air individually at a maximum volumetric flow rate of 1.96 cubic metres per second; each having an exit dimension of 1.22 x 1.22 metres, extending 2.13 metres above grade;

- One (1) process exhaust fan (EF-2) serving the reverse osmosis system area; exhausting into the air at a maximum volumetric flow rate of 1.71 cubic metres per second; having an exit dimension of 0.45 x 0.45 metres, extending 4.0 metres above grade;

- One (1) exhaust fan (SD-1) serving slurry dryer; exhausting into the air at a maximum volumetric flow rate of 0.24 cubic metres per second; having an exit diameter of 0.3 metre, extending 5.0 metres above grade;

- Two (2) RNG plant condensate tanks equipped with carbon drum filters;

- One (1) leachate treatment facility laboratory;

- Maintenance welding;

all in accordance with the Environmental Compliance Approval Application submitted by Waste Management of Canada Corporation, dated May 8, 2023 and signed by Wayne Jenken, Landfill Engineering Manager; and the supporting information, including the Emission Summary and Dispersion Modelling Report, submitted by RWDI AIR Inc., dated May 6, 2023 and signed by Brad Bergeron; additional information provided by Sarah Pellatt in a memo dated October 17, 2023; and the Primary Noise Screening Method Form prepared by RWDI AIR Inc., dated January 27, 2023 and signed by Daniel Kremer.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Approval" means this Environmental Compliance Approval, including the application and supporting documentation listed above;

2. "Best Management Practices Plan" means the document titled "Twin Creeks Landfill Site: Best Management Practices Plan (Dust) - Version 5", dated April 3, 2017 and prepared by RWDI AIR Inc.;

3. "Carbon Drum Filters" means the carbon drum filters controlling emissions from the two RNG plant condensate tanks, described in the Company's application, this Approval and in the supporting documentation submitted with the application, to the extent approved by this Approval;

4. "Company" means Waste Management of Canada Corporation that is responsible for the construction or operation of the Facility and includes any successors and assigns in accordance with section 19 of the EPA;

5. "Director" means a person appointed for the purpose of section 20.3 of the EPA by the Minister pursuant to section 5 of the EPA;

6. "District Manager" means the District Manager of the appropriate local district office of the Ministry, where the Facility is geographically located;

7. "Enclosed Flares" means FLARE1, FLARE2, FLARE3 and FLARE4, described in the Company's application, this Approval and in the supporting documentation submitted with the application, to the extent approved by this Approval;

8. "EPA" means the *Environmental Protection Act,* R.S.O. 1990, c.E.19;

9. "Equipment" means the equipment and processes described in the Company's application, this Approval and in the supporting documentation submitted with the application, to the extent approved by this Approval;

10. "ESDM Report" means the Emission Summary and Dispersion Modelling Report which was prepared in accordance with section 26 of O. Reg. 419/05 and the Procedure Document by Brad Bergeron, RWDI AIR Inc. and dated May 6, 2023, submitted in support of the application, and includes any changes to the report made up to the date of issuance of this Approval;

11. "Exhausted" means the capacity of the activated carbon to adsorb emissions is reached and the Carbon Drum Filters are no longer able to effectively reduce emissions;

12. "Facility" means the entire operation located on the property where the Equipment is located;

13. "Manager" means the Manager, Technology Standards Section, Technical Assessment and Standards Development Branch, or any other person who represents and carries out the duties of the Manager, Technology Standards Section, Technical Assessment and Standards Development Branch, as those duties relate to the conditions of this Approval;

14. "Manual" means a document or a set of documents that provide written instructions to staff of the Company;

15. "Ministry" means the ministry of the government of Ontario responsible for the EPA and includes all officials, employees or other persons acting on its behalf;

16. "O. Reg. 419/05" means Ontario Regulation 419/05: Air Pollution – Local Air Quality, made under the EPA;

17. "Odour Best Management Practices Plan" means the document titled "Twin Creeks Landfill: Best Management Practices Plan (Odour) - Version 9", dated November 17, 2023 and prepared by RWDI AIR Inc.;

18. "Organic Matter" means organic matter having carbon content expressed as equivalent methane;

19. "Point of Impingement" has the same meaning as in section 2 of O. Reg. 419/05;

20. "Pre-Test Plan" means a plan for the Source Testing including the information required in Section 5 of the Source Testing Code;

21. "Procedure Document" means Ministry guidance document titled "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated March 2018, as amended;

22. "Publication NPC-300" means the Ministry Publication NPC-300, “Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning, Publication NPC-300”, August 2013, as amended;

23. "RNG Plant Enclosed Flares" means FLARE5 and FLARE6, described in the Company's application, this Approval and in the supporting documentation submitted with the application, to the extent approved by this Approval;

24. "Sensitive Receptor" means any location where routine or normal activities occurring at reasonably expected times would experience adverse effect(s) from odour discharges from the Facility, including one or a combination of:

    a. private residences or public facilities where people sleep (e.g.: single and multi-unit dwellings, nursing homes, hospitals, trailer parks, camping grounds, etc.),

    b. institutional facilities (e.g.: schools, churches, community centres, day care centres, recreational centres, etc.),

    c. outdoor public recreational areas (e.g.: trailer parks, play grounds, picnic areas, etc.), and

    d. other outdoor public areas where there are continuous human activities (e.g.: commercial plazas and office buildings);

25. "Source Testing" means site-specific sampling and testing to measure emissions resulting from operating the Targeted Sources under operating conditions that will derive an emission rate that, for the relevant averaging period of the contaminant, is at least as high as the maximum emission rate that the source of contaminant is reasonably capable of, or a rate approved by the Manager within the approved operating range of Targeted Sources which satisfies paragraph 1 of subsection 11(1) of O. Reg. 419/05;

26. "Source Testing Code" means the Ontario Source Testing Code, dated June 2010, prepared by the Ministry, as amended;

27. "Targeted Sources" means the sources listed in Schedule B;

28. "Test Contaminants" means the contaminants listed in Schedule B; and

29. "Thermal Oxidizers" means RNG_TO1 and RNG_TO2, described in the Company's application, this Approval and in the supporting documentation submitted with the application, to the extent approved by this Approval.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. OPERATION AND MAINTENANCE

1. The Company shall ensure that the Equipment is properly operated and maintained at all times. The Company shall:

   a. prepare, not later than three (3) months after the date of this Approval, and update, as necessary, a Manual outlining the operating procedures and a maintenance program for the Equipment, including:

      i. routine operating and maintenance procedures in accordance with good engineering practices and as recommended by the Equipment suppliers;

      ii. emergency procedures, including spill clean-up procedures;

      iii. procedures for any record keeping activities relating to operation and maintenance of the Equipment; and

      iv. all appropriate measures to minimize noise, dust and odorous emissions from all potential sources;

   b. implement the recommendations of the Manual.

2. The Company shall ensure that the activated carbon in the Carbon Drum Filters is replaced before it is Exhausted.

2. THERMAL OXIDIZERS

1. The Company shall operate each of the Thermal Oxidizers in such a manner that:

   a. The combustion chamber shall be preheated to a minimum of 815 degrees Celsius prior to introducing the emissions for destruction.

   b. The temperature in the combustion chamber, is maintained at a minimum of 815 degrees Celsius at all times, when the Thermal Oxidizer is in operation.

c. The residence time of the combustion gases in the combustion chamber of RTO_TO1 shall not be less than 5 seconds at a temperature of 815 degrees Celsius minimum.

d. The residence time of the combustion gases in the combustion chamber of RTO_TO2 shall not be less than 4 seconds at a temperature of 815 degrees Celsius minimum.

e. The concentration of Organic Matter in the flue gas of the Thermal Oxidizer,being an average of ten measurements taken at approximately one minute intervals, shall not be greater than 100 parts per million by volume, measured on an undiluted basis.

2. The Company shall install, conduct and maintain a program to continuously monitor temperature in the combustion chamber of each of the Thermal Oxidizers. The continuous monitoring system shall be equipped with continuous recording devices and shall comply with the requirements outlined in Schedule A.

3. FLARES

1. The Company shall operate each of the Enclosed Flares in such a manner that:

   a. The temperature in the combustion chamber, is maintained at a minimum of 875 degrees Celsius at all times, when the Enclosed Flare is in operation; and

   b. The residence time of the combustion gases in the combustion chamber of the Enclosed Flare shall not be less than 0.7 seconds at a temperature of 875 degrees Celsius.

2. The Company shall continuously monitor the temperature in the combustion chamber of the Enclosed Flare. The temperature monitor and recorder shall shall comply with the requirements outlined in Schedule A.

3. The Company shall operate each of the RNG Plant Enclosed Flares in such a manner that:

   a. The temperature in the combustion chamber, is maintained at a minimum of 871 degrees Celsius at all times, when the RNG Plant Enclosed Flare is in operation; and

   b. The residence time of the combustion gases in the combustion chamber of the RNG Plant Enclosed Flare shall not be less than 0.7 seconds at a temperature of 871 degrees Celsius.

4. The Company shall continuously monitor the temperature in the combustion chamber of the RNG PLant Enclosed Flare. The temperature monitor and recorder shall shall comply with the requirements outlined in Schedule A.

4. SOURCE TESTING

1. The Company shall perform Source Testing in accordance with the procedures in Schedule C to

determine the rates of emissions of the Test Contaminants from the Targeted Sources.

5. FUGITIVE DUST CONTROL

1. The Company shall implement the Best Management Practices Plan for the control of fugitive dust emissions resulting from the operation of the Facility. The Company shall update the Best Management Practices Plan as necessary or at the direction of the District Manager.

6. ODOUR

1. The Company shall implement the Odour Best Management Practices Plan for the control of odour emissions resulting from the operation of the Facility. The Company shall update the Odour Best Management Practices Plan as necessary or at the direction of the District Manager.

7. RECORD RETENTION

1. The Company shall retain, for a minimum of two (2) years from the date of their creation, all records and information related to or resulting from the recording activities required by this Approval, and make these records available for review by staff of the Ministry upon request. The Company shall retain:

    a. all records on the maintenance, repair and inspection of the Equipment;

    b. all records produced by the temperature monitors required in Condition 2 and Condition 3;

    c. all records of any environmental complaints, including:

        i. a description, time and date of each incident to which the complaint relates;

        ii. wind direction at the time of the incident to which the complaint relates; and

        iii. a description of the measures taken to address the cause of the incident to which the complaint relates and to prevent a similar occurrence in the future.

8. NOTIFICATION OF COMPLAINTS

1. The Company shall notify the District Manager, in writing, of each environmental complaint within two (2) business days of the complaint. The notification shall include:

    a. this Approval number;

    b. a description of the nature of the complaint;

    c. the time and date of the incident to which the complaint relates; and

d. a description of the measures taken to address the cause of the incident to which the complaint relates and to prevent a similar occurrence in the future.

9. CONSULTATION

1. During the process of submission of an application to amend any Approval for the Site, the Company shall:

   a. discuss with Walpole Island First Nation (WIFN), Township of Warwick and Warwick Public Liaison Committee (WPLC) the proposed application prior to submission of the application to the Director;

   b. provide the same documents to WIFN, Township of Warwick and WPLC that are provided to the Director in respect of the amendment; and

   c. provide the Director with a statement indicating how WIFN, Township of Warwick and WPLC's comments were considered by the Company before it submitted the application to the Ministry.

10. NOISE

1. The Company shall, at all times, ensure that the noise emissions from the Facility comply with the limits set out in Ministry Publication NPC-300.

SCHEDULE A

Continuous Temperature Monitoring and Recording System Requirements

PARAMETER: Temperature

LOCATION:

The sample point for the continuous temperature monitoring and recording system shall be located at a location where the measurements are representative of the minimum temperature of the gases leaving the combustion chamber of the Thermal Oxidizer, Enclosed Flare or RNG Plant Enclosed Flare.

PERFORMANCE:

The continuous temperature monitoring and recording system shall meet the following minimum performance specifications for the following parameters:

Type:	shielded "K" type thermocouple, or equivalent
Accuracy:	±1.5 percent of the minimum gas temperature

DATA RECORDER:

The data recorder must be capable of registering continuously the measurement of the monitoring system without a significant loss of accuracy and with a time resolution of five (5) minutes or better.

RELIABILITY:

The monitoring system shall be operated and maintained so that accurate data is obtained during a minimum of 95 percent of the time for each calendar quarter.

SCHEDULE B

Targeted Sources and Test Contaminants for Source Testing:

Source ID	Description	Test Contaminants
L3	Exhaust serving sequencing a batch reactor (SBR) and an aeration tank	Odour, hydrogen sulfide, total Mercaptans and a complete scan for volatile organic compounds
L4	Exhaust serving sequencing a batch reactor (SBR) and an aeration tank	Odour, hydrogen sulfide, total Mercaptans and a complete scan for volatile organic compounds
EF-2	Exhaust serving reverse osmosis system area	Odour, hydrogen sulfide, total Mercaptans and a complete scan for volatile organic compounds
SD-1	Exhaust serving slurry dryer	Odour, hydrogen sulfide, total Mercaptans and a complete scan for volatile organic compounds

SCHEDULE C

Source Testing Procedures

1. The Company shall submit, not later than three (3) months after commencement of operation of the Targeted Sources, to the Manager a Pre-Test Plan for the Source Testing required under this Approval.

2. The Company shall finalize the Pre-Test Plan in consultation with the Manager.

3. The Company shall not commence the Source Testing required under this Approval until the Manager has accepted the Pre-Test Plan.

4. The Company shall complete the Source Testing, no later than three (3) months after the Manager has approved the Pre-Test Plan or a date agreed upon in consultation with the District Manager.

5. The Company shall notify the Manager, the District Manager and the Director in writing of the location, date and time of any impending Source Testing required by this Approval, at least fifteen (15) days prior to the Source Testing.

6. The Company shall submit a report (electronic format) on the Source Testing to the Manager, the District Manager and the Director not later than three (3) months after completing the Source Testing. The report shall be in the format described in the Source Testing Code, and shall also include, but not be limited to:

    a. an executive summary;

    b. an identification of the applicable North American Industry Classification System code (NAICS) for the Facility;

    c. records of weather conditions such as ambient temperature and relative humidity, wind speed and direction, and any environmental complaints if received, at the time of the Source Testing;

    d. records of operating conditions at the time of Source Testing, including but not limited to the quantity of raw leachate processed through the leachate treatment facility;

    e. results of Source Testing, including the emission rate, emission concentration of odour from the Targeted Sources;

    f. the results of dispersion calculations, taking into account all other odour sources not tested in the Source Testing, indicating the maximum 10-minute average concentration of odour at the Point of Impingement and at the most impacted Sensitive Receptor computed in accordance with Schedule D.

    g. a tabular comparison of emission rates based on Source Testing results to relevant estimates described in the ESDM Report

7. The Director may not accept the results of the Source Testing if:
    1. the Source Testing Code or the requirement of the Manager were not followed;
    2. the Company did not notify the Manager, the District Manager and Director of the Source Testing; or
    3. the Company failed to provide a complete report on the Source Testing.

8. If the Director does not accept the result of the Source Testing, the Director may require re-testing. If re-testing is required, the Pre-Test Plan strategies need to be revised and submitted to the Manager for approval. The actions taken to minimize the possibility of the Source Testing results not being accepted by the Director must be noted in the revision.

9. The Company shall update their ESDM Report in accordance with Section 26 of O. Reg. 419/05 and the Procedure Document with the results from the Source Testing if any of the calculated emission factors or calculated emission rates are higher than the predicted rates in the ESDM report, not later than three (3) months after the submission of the Source Testing report and make these records available for review by staff of the Ministry upon request.

SCHEDULE D

Procedure to Calculate and Record the 10-minute Average Concentration of Odour

1. Calculate and record one-hour average concentration of odour at the Point of Impingement and at the most impacted Sensitive Receptor, employing the AERMOD atmospheric dispersion model or any other model acceptable to the Director, that employs at least five (5) years of hourly local meteorological data and that can provide results reported as individual one-hour average odour concentrations;

2. Convert and record each of the one-hour average concentrations predicted over the five (5) years of hourly local meteorological data at the Point of Impingement and at the most impacted Sensitive Receptor to 10-minute average concentrations using the One-hour Average to 10-Minute Average Conversion described below; and

3. Record and present the 10-minute average concentrations predicted to occur over a five (5) year period at the Point of Impingement and at the most impacted Sensitive Receptor in a histogram. The histogram shall identify all predicted 10-minute average odour concentration occurrences in terms of frequency, identifying the number of occurrences over the entire range of predicted odour concentration in increments of not more than 1/10 of one odour unit. The maximum 10-minute average concentration of odour at the Sensitive Receptor will be considered to be the maximum odour concentration at the most impacted Sensitive Receptor that occurs and is represented in the histogram, disregarding outlying data points on the histogram as agreed to by the Director.

4. Use the following formula to convert and record one-hour average concentrations at the Point of Impingement and at the most impacted Sensitive Receptor to 10-minute average concentrations:

$$X_{10min} = X_{60min} * 1.65$$

where X_{10min} = 10-minute average concentration

X_{60min} = one-hour average concentration

(Equation: X Subscript 10min Baseline equals X Subscript 60min Baseline times 1.65, where X Subscript 10min Baseline equals 10-minute average concentration and X Subscript 60min Baseline equals one-hour average concentration.)

The reasons for the imposition of these terms and conditions are as follows:

1. Condition No. 1 is included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the EPA, the Regulations and this Approval.

2. Conditions No. 2 and 3 are included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the EPA, the Regulations and this Approval and to gather accurate information so that compliance with the operating requirements of this Approval can be verified.

3. Condition No. 4 is included to require the Company to gather accurate information so that compliance with the operating requirements of this Approval can be verified.

4. Conditions No. 5 and 6 are included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the EPA, the Regulations and this Approval.

5. Condition No. 7 is included to require the Company to keep records and to provide information to staff of the Ministry so that compliance with the EPA, the Regulations and this Approval can be verified.

6. Condition No. 8 is included to require the Company to notify staff of the Ministry so as to assist the Ministry with the review of the site's compliance.

7. Condition No. 9 is included in order to ensure that consultation with Walpole Island First Nation (WIFN), Township of Warwick and Warwick Public Liaison Committee (WPLC) is undertaken during the submission of any application to amend any Approval required by the Ministry.

8. Condition No. 10 is included to provide the minimum performance requirements considered necessary to prevent an adverse effect resulting from the operation of the Facility.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 4155-BMCLZ8 issued on March 3, 2020

In accordance with Section 139 of the *Environmental Protection Act,* you may by written notice served upon me, the Ontario Land Tribunal and in accordance with Section 47 of the *Environmental Bill of Rights,* 1993, the Minister of the Environment, Conservation and Parks, within 15 days after receipt of this notice, require a hearing by the Tribunal. The Minister of the Environment, Conservation and Parks will place notice of your appeal on the Environmental Registry. Section 142 of the *Environmental Protection Act* provides that the notice requiring the hearing ("the Notice") shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the *Environmental Protection Act,* a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

Registrar* Ontario Land Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario M5G 1E5 OLT.Registrar@ontario.ca	and	The Minister of the Environment, Conservation and Parks 777 Bay Street, 5th Floor Toronto, Ontario M7A 2J3	and	The Director appointed for the purposes of Part II.1 of the *Environmental Protection Act* Ministry of the Environment, Conservation and Parks 135 St. Clair Avenue West, 1st Floor Toronto, Ontario M4V 1P5

*** Further information on the Ontario Land Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349 or 1 (866) 448-2248, or www.olt.gov.on.ca**

This instrument is subject to Section 38 of the *Environmental Bill of Rights,* 1993, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek leave to appeal within 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry at https://ero.ontario.ca/, you can determine when the leave to appeal period ends.

The above noted activity is approved under s.20.3 of Part II.1 of the *Environmental Protection Act.*

DATED AT TORONTO this 13th day of December, 2023

Nancy E Orpana, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

KS/
c: District Manager, MECP Sarnia
Brad Bergeron, RWDI Air

APPENDIX A11:

Amended ECA No. A032203, dated December 16, 2023

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A032203
Issue Date: December 16, 2023

Waste Management of Canada Corporation
5768 Nauvoo Rd
Warwick, Ontario
N0M 2S0

Site Location: Twin Creeks Environmental Centre
5768 Nauvoo Rd Watford
Warwick Township, County of Lambton
N0M 2S0

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

the use and operation of a 101.8 hectare waste disposal site (landfill) within a total site area of 301 hectares.

For the purpose of this environmental compliance approval, the following definitions apply:

"Agricultural Waste" for the purposes of this ECA, is defined as municipal yard waste, wood chips, food waste and minimal amounts of solid manure which would only be accepted or used for the purpose of seeding or operating an active aerobic compost pile and does not include liquid manure;

"AQMP " means an Air Quality Monitoring Program;

"Construction Phase " is defined as the period of time from the start of construction of Phase 1 of the expanded landfill to the date of first receipt of waste in Phase 1;

"Contaminating Lifespan" refers to the period of time, after closure until the site finally produces contaminants at concentrations below levels which have unacceptable health or environmental effects;

"Crown " means Her Majesty the Queen in the Right of Ontario;

"Director " means any Ministry employee appointed in writing by the Minister pursuant to section 5 of the EPA as a Director for the purposes of Part II.1 of the EPA;

“District Manager ” means the District Manager in the Ministry of the Environment, Conservation and Parks Sarnia District Office;

“District Office ” means the Ministry of the Environment, Conservation and Parks Sarnia District Office;

“EA” refers to the document titled “Warwick Landfill Expansion Environmental Assessment” , dated September 2005, which includes Discussion Papers 1 though 9 included in the Appendices A to F of the Environmental Assessment. EA also includes responses from the Owner dated:

1. March 10, 2006 “Waste Unit’s Final Comments Dated March 8, 2006”
2. February 14, 2006 “Leachate Recirculation”
3. February 14, 2006 “Response to February 1, 2006 Correspondence”
4. January 13, 2006 “Waste Management Response to Comments received from Warwick Landfill Expansion EA” including attachments entitled:

    i. Response to the Township of Warwick;
    ii. Response to Thomson Rogers;
    iii. Table of responses to various agencies, public and First Nations Submissions;
    iv. Landfill Gas Assessment, Warwick Landfill Baseline Conditions Report prepared by RWDI dated January 12, 2006;
    v. Memo dated March 10, 2006;
    vi. June 12, 2006 “Response to May 1, 2006 Ministry Review ”;

“EAA” refers to the Ontario Environmental Assessment Act, R.S.O. 1990, c.E.18, as amended;

"Environmental Compliance Approval" or "ECA" or "Approval" means this entire provisional Environmental Compliance Approval document, issued in accordance with Section 20.2 of the EPA , and includes any schedules to it, the application and the supporting documentation listed in schedule "A";

“Environmental Inspector” refers to the individual employed by the Ministry of the Environment, Conservation and Parks to inspect the Site;

"EPA " means Environmental Protection Act , R.S.O. 1990, c.E.19, as amended;

“EPB” refers to the Environmental Permissions Branch of the Ministry of the Environment, Conservation and Parks;

"Hydraulic Trap" indicates a situation where hydraulic gradients from the surrounding soil are inward toward the landfill waste and associated leachate collection system;

"Mini-Transfer Area" means the mini-transfer public convenience drop-off area as described and identified in the June 2009 Development & Operations Report that is identified in Item 59 of Schedule "A" and whose location is identified as "Expansion Mini-Transfer" in figure MT2 that is contained in the 2009 Development & Operations Report;

“MECP” or “Ministry” refers to the Ontario Ministry of the Environment, Conservation and Parks;

"Operation Phase" is defined as the period of time from the date that Phase 1 of the expanded landfill area first receives waste until the landfill site reaches final capacity;

“Operator ” has the same meaning as “operator” as defined in s.25 of the EPA;

“Owner ” means Waste Management of Canada Corporation and its successors and assigns;

"O. Reg. 101/94" means Ontario Regulation 101/94 as amended;

"OWRA" means the Ontario Water Resources Act, R.S.O. 1990, c. O.40, as amended;

“PA ” means the Pesticides Act , R.S.O. 1990, c.P.11, as amended;

"Preparation Report" refers to a report documenting that the subsequent stage of the landfill has been constructed in accordance with the approved design plans and specifications;

“Poplar System” is the irrigation area located on top of the cap of the Existing Site (old landfill) that is used for the phytoremediation of leachate that is generated at the Site per Items 63 through 65 of Schedule “A” and Figure 2 of Item 16 on Schedule "A";

“Poplar Plantation” is the irrigation area located on native soil to the south of the Site that is used for the phytoremediation of irrigation liquid that satisfies the Effluent Limit criteria per the OWRA Section Approval for the Site, Item 39 of Schedule “A”, and Appendix N11 of Item 30 on Schedule "A";

"Provincial Officer" means any person designated in writing by the Minister as a provincial officer pursuant to section 5 of the OWRA or section 5 of the EPA or section 17 of PA;

"PWQO" refers to the Provincial Water Quality Objectives;

"Recyclable Waste" means waste that are glass, plastic, aluminium or steel cans, gypsum wallboard, newspapers, cardboard and/or other materials for which there is a secured market;

“Regional Director” refers to the Director of the Ministry of the Environment’s Southwestern Regional Office;

"Regulation 232 " or "Reg. 232" or "O. Reg. 232/98" means Ontario Regulation 232/98 (Landfilling Sites) made under the EPA, as amended;

"Regulation 347 " or "Reg. 347 " or "O. Reg. 347" means Regulation 347, R.R.O. 1990, made under the EPA, as amended;

“Site” refers to the Twin Creeks Landfill Site and lands owned by the Owner described as:

Firstly, Part of Lots 19 and 20, Concession 3, S.E.R.,and Part of Lot 20, 21 and 22, Concession 4, S.E.R. and Part of the Road Allowance between Lots 21 and 22, Concession 4, S.E.R., shown as Parts 1, 2 and 3 on Plan 25R-9125 and Part 2 on Plan 25R-1903, Save and Except Part 1 on Plan 25R-6184, Township of Warwick, County of Lambton; and

Secondly, Part of Lot 20, Concession 3 S.E.R., shown as Part 1 on Plan 25R-6184, Township of Warwick, County of Lambton;

"Traditional agricultural crop production" means standard crop production, nursery and horticultural crops, agro-forestry, conservation uses but not greenhouses or any accessory agricultural buildings and structures;

“Undertaking” refers to the proposed undertaking as described in the Warwick Landfill Expansion Environmental Assessment;

“WIFN” refers to Walpole Island First Nation; and

“WPLC” refers to the Warwick Public Liaison Committee.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1.0 GENERAL

Compliance

1.1 This Approval revokes all previous Approvals and Notices of Amendment issued under Part V of the Environmental Protection Act for this Site. The approval given herein, including the terms and conditions set out, replaces all previously issued Approvals and related terms and conditions under Part V of the Act for this Site.

1.2 The Owner and Operator shall ensure compliance with all the conditions of this Approval and shall ensure that any person authorized to carry out work on or operate any aspect of the Site is notified of this Approval and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

1.3 Any person authorized to carry out work on or operate any aspect of the Site shall comply with the conditions of this Approval.

In Accordance

1.4 Except as otherwise provided by this Approval, the Site shall be designed, developed, built, operated and maintained in accordance with the documentation listed in the attached Schedule “A”.

1.5 (a) Construction and installation of aspects described in Schedule "A" must be completed within 5 years of the later of:

1. the date this Approval is issued; or
2. if there is a hearing or other litigation in respect of the issuance of this Approval, the date that this hearing or litigation is disposed of, including all appeals.

(b) Notwithstanding Condition 1.5(a), ongoing constructed aspects that are pertinent to the Major Works identified in Conditions 4.1 to 4.7 including the landfill liner, landfill capping, landfill gas management infrastructure, leachate collection and recirculation infrastructure shall be constructed in accordance with the documentation in the attached Schedule "A" that pertain to the final design of the Site.

(c) This Approval ceases to apply in respect of the aspects of the Site that have not been constructed or installed before the later of the dates identified in Conditions 1.5(a).

Interpretation

1.6 Where there is a conflict between a provision of any document listed in Schedule "A" in this Approval, and the conditions of this Approval, the conditions in this Approval shall take precedence.

1.7 Where there is a conflict between the application and a provision in any document listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and the Ministry approved the amendment.

1.8 Where there is a conflict between any two documents listed in Schedule "A", the document bearing the most recent date shall take precedence.

1.9 The conditions of this Approval are severable. If any condition of this Approval, or the application of any condition of this Approval to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this Approval shall not be affected thereby.

Other Legal Obligations

1.10 The issuance of, and compliance with, this Approval does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; and

(b) limit in any way the authority of the Ministry to require certain steps be taken or to require the Owner and Operator to furnish any further information related to compliance with this Approval.

(c) The Owner shall ensure that:
  (i) all equipment discharging to atmosphere are approved under Section 9 of the ECA where applicable; and
  (ii) all effluent is discharged in accordance with the OWRA where applicable.

Adverse Effect

1.11 The Owner and Operator shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of water quality resulting from the present, past and historical operations at the Site. Such steps may include accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

1.12 Despite an Owner, Operator, or any other person fulfilling any obligations imposed by this Approval, the person remains responsible for any contravention of any other condition of this Approval or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect to the natural environment or impairment of water quality.

1.13 At no time shall the Owner or Operator allow the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

Change of Ownership

1.14 The Owner shall notify the Director, in writing, and forward a copy of the notification to the District Manager, within 30 days of the occurrence of any changes in the following information:
(a) the ownership of the Site;
(b) the Operator of the Site;
(c) the address of the Owner or Operator; and
(d) the partners, where the Owner or Operator is or at any time becomes a partnership and a copy of the most recent declaration filed under the Business Names Act, R. S. O. 1990, c. B.17, shall be included in the notification.

1.15 No portion of this Site shall be transferred or encumbered prior to or after closing of the Site unless the Director is notified in advance and sufficient financial assurance is deposited with the Ministry to ensure that these conditions will be carried out.

1.16 In the event of any change in ownership of the Site, other than change to a successor municipality, the Owner shall notify the successor of and provide the successor with a copy of this Approval, and the Owner shall provide a copy of the notification to the District Manager and the Director.

Registration on Title Requirement

1.17 Prior to dealing with the property in any way, the Owner shall provide a copy of this Approval and any amendments, to any person who acquires an interest in the property as a result of the dealing.

1.18 (a) If not already completed, within ninety (90) calendar days from the date of issuance of this

Approval, the Owner shall submit to the Director a completed Certificate of Requirement which shall include:

(i) a plan of survey prepared, signed and sealed by an Ontario Land Surveyor, which shows the area of the Site where waste has been and is to be deposited at the Site;
(ii) proof of ownership of the Site;
(iii) a letter signed by a member of the Law Society of Upper Canada or other qualified legal practitioner acceptable to the Director, verifying the legal description provided in the Certificate of Requirement;
(iv) the legal abstract of the property; and
(v) any supporting documents including a registerable description of the Site.

(b) If not already completed, within fifteen (15) calendar days of receiving a Certificate of Requirement authorized by the Director, the Owner shall:
(i) register the Certificate of Requirement in the appropriate Land Registry Office on the title to the property; and
(ii) submit to the Director and the District Manager, written verification that the Certificate of Requirement has been registered on title.

Registration on Title Requirement - Contaminant Attenuation Zone (CAZ)

1.19 If not already completed, or if required at any time, within thirty (30) calendar days from the date of establishing a contaminant attenuation zone (CAZ) (overburden and/or bedrock aquifers) in either fee simple or by way of a groundwater easement, the Owner shall submit to the Director a completed Certificate of Requirement which shall include:

(a) If rights are obtained in fee simple, the Owner shall provide:
(i) documentation evidencing ownership of the CAZ obtained in compliance with Regulation 232, as amended;
(ii) a completed Certificate of Requirement and supporting documents containing a registerable description of the CAZ; and
(iii) a letter signed by a member of the Law Society of Upper Canada; or other qualified legal practitioner acceptable to the Director, verifying the legal description of the CAZ.
(b) within fifteen (15) calendar days of receiving a Certificate of Requirement signed or authorized by the Director,the Owner shall:
(i) register the Certificate of Requirement in the appropriate Land Registry Office on the title to the property; and
(ii) submit to the Director and the District Manager, a written verification that the Certificate of Requirement has been registered on title.
(c) If rights are obtained by way of a groundwater easement, the Applicant shall:
(i) provide a copy of the agreement for the easement;
(ii) provide a plan of survey signed and sealed by an Ontario Land Surveyor for the CAZ; and
(iii) submit proof of registration on title of the groundwater easement to the Director and District Manager;
(d) The Owner shall not amend, or remove, or consent to the removal of the easement or CAZ from title without the prior written consent of the Director.

Certificate of Withdrawal of Requirement

1.20 If the Applicant wants to withdraw the Certificate of Requirement, the Applicant shall:

(a) submit to the Director, a request for a Certificate of Withdrawal of Requirement; and its supporting documents, outlining the reasons for the Withdrawal of the Requirement.
(b) submit to the Director:
    (i) a plan of survey of the area where waste was deposited signed and sealed by an Ontario Land Surveyor and for the Site or CAZ;
    (ii) the legal abstract of the Site or CAZ – or area where waste was deposited;
    (iii) completed Certificate of Withdrawal of Requirement containing a registerable description of the Site or CAZ or area where waste was deposited; and
    (iv) a letter signed by a member of the Law Society of Upper Canada or other qualified legal practitioner acceptable to the Director verifying the legal description of the Certificate of Withdrawal of Requirement.
(c) within fifteen (15) calendar days of receiving a Certificate of Withdrawal of Requirement authorized by the Director, the Applicant shall:
    (i) register the Certificate of Withdrawal of Requirement in the appropriate Land Registry Office on the title to the Site or CAZ or area where waste was deposited; and
    (ii) submit to the Director and District Manager a copy of the registered document together with a copy of the PIN Abstract confirming the registration.

Inspections by the Ministry

1.21 No person shall hinder or obstruct a Provincial Officer from carrying out any and all inspections authorized by the OWRA, the EPA, the PA, the SDWA or the NMA, of any place to which this Approval relates, and without limiting the foregoing:
(a) to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this Approval are kept;
(b) to have access to, inspect, and copy any records required to be kept by the conditions of this Approval;
(c) to inspect the Site, related equipment and appurtenances;
(d) to inspect the practices, procedures, or operations required by the conditions of this Approval; and
(e) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this Approval or the EPA, the OWRA, the PA, the SDWA or the NMA.

Information and Record Retention

1.22 (a) Except as authorized in writing by the Director, all records required by this Approval shall be retained at the Site for a minimum of two (2) years from their date of creation.
(b) The Owner shall retain all documentation listed in Schedule "A" for as long as this Approval is valid.
(c) All information and logs required in Condition 9.1 shall be kept at the Site until they are included in the Annual Report.

(d) The Owner shall retain employee training records as long as the employee is working at the Site.
(e) The Owner shall make all of the above documents available for inspection upon request of Ministry staff.

1.23 The receipt of any information by the Ministry or the failure of the Ministry to prosecute any person or to require any person to take any action under this Approval or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:
(a) an approval, waiver, or justification by the Ministry of any act or omission of any person that contravenes any term or condition of this Approval or any statute, regulation or other legal requirement; and
(b) acceptance by the Ministry of the information's completeness or accuracy.

1.24 The Owner shall ensure that a copy of this Approval, in its entirety and including all its Notices of Amendment, and documentation listed in Item #1 of Schedule "A", are retained at the Site or the Owner's office at all times.

1.25 Any information related to this Approval and contained in Ministry files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, RSO 1990, CF-31.

2.0 FINANCIAL ASSURANCE

2.1 a. The Financial Assurance shall be submitted as required to the Director, Financial Assurance as defined in Section 131 of the Environmental Protection Act. The Financial Assurance shall be in a form acceptable to the Director and shall provide sufficient funds for the analysis, closure, ongoing and long-term monitoring and reporting, post-closure maintenance and care of the Site.

1. On the following dates, the Owner shall ensure the maximum amount of financial assurance has been submitted to the Director in a form acceptable to the Director as follows:

Payment Date	**Amount**
By March 31, 2021	$32,459,985.00
By March 31, 2022	$35,256,829.00
By March 31, 2023	$37,164,501.00
By March 31, 2024	$39,434,722.00

b. Commencing on March 31, 2024 and on a four year basis thereafter, the Owner shall provide to the Director a re-evaluation of the amount of the Financial Assurance to facilitate the actions required under Condition 2.1.a. The re-evaluation shall include an assessment based on any new information relating to the environmental conditions of the Site and shall include the costs of additional monitoring and/or implementation of alternative measures required by the Director upon review of the annual reports. The Financial Assurance must be submitted to the Director within thirty (30) days of written acceptance of the re-evaluation by the Director; and

c. The amount of Financial Assurance is subject to review at any time by the Director and may be amended at his/her discretion. If any Financial Assurance is scheduled to expire or notice is

received, indicating Financial Assurance will not be renewed, and satisfactory methods have not been made to replace the Financial Assurance at least sixty (60) days before the Financial Assurance terminates, the Owner shall forthwith replace the Financial Assurance with cash.

3.0 WARWICK PUBLIC LIAISON COMMITTEE and FIRST NATIONS

WPLC

3.1 The Owner shall continue and maintain the WPLC. The WPLC shall serve as a focal point for dissemination, review and exchange of information and monitoring results relevant to the operation of the undertaking. In addition, the purpose of the WPLC will be to provide community review of the development, operation (current and proposed) and ongoing monitoring, closure and post-closure care related to the landfill Site.

3.2 The general mandate of the WPLC shall include:

a. Review operations and provide regular input to the Owner with respect to all matters pertaining to landfill Site operation, including issues pertaining to ongoing operations, monitoring, the need for contingency plans or remedial measures, response to community complaints, the need for changes to the ECA , post-closure monitoring and maintenance, and development of the proposed end use for the landfill Site;
b. Review operational and monitoring reports;
c. Consider and make recommendations to the Owner regarding outside consulting advice in respect of the landfill Site;
d. Facilitate ongoing dialogue between the Owner, the Environmental Inspector and the community, including residents and businesses in the immediate vicinity of the landfill Site;
e. Provide reports regularly to the community on the activities of the WPLC, the landfill operations and landfill related issues and seek public input on these activities and issues;
f. Monitor the Owner's complaint response program and make recommendations to the Owner with respect to this program; and
g. Provide recommendations to the Owner with respect to unresolved complaints.

3.3 The WPLC shall not exercise any supervisory, regulatory, approval, legal or other decision making role with respect to the operations (current and proposed) at the Site.

3.4 The Owner shall provide for the administrative costs of operating the WPLC, including the cost of meeting places and clerical services.

3.5 The WPLC shall operate under a Terms of Reference of the committee. Suggestions to revise the WPLC Terms of Reference may be made at any meeting that a quorum is present. No changes to the Terms of Reference can be made until the committee members mutually agree to changes. Any changes shall be provided to the Ministry for information purposes.

3.6 The Community members shall be appointed by the WPLC. The community member positions are intended to be available to individuals that are not members of groups already represented on the

WPLC and have an interest in the operation of the landfill. The WPLC shall encourage individuals who reside in close proximity to the landfill to participate. A community member is defined as a taxpayer and/or resident of Warwick Township.

3.7 The function of the Ministry member will be to provide advice, information and input to other members as required.

3.8 The WPLC shall determine the appropriate meeting frequency and review it on an annual basis.

3.9 Minutes and agendas of meetings shall be printed and distributed as per the mailing list on a timely basis.

3.10 The WPLC shall have reasonable access to the Site and its landfill related facilities for the purpose of carrying out its objective and mandate and the Owner's consultants' reports relating to Site operations shall be provided to the WPLC.

3.11 The Owner shall provide the WPLC with access to the Owner's consultants as required and consultants reports in accordance with protocols agreed to between the Owner and the WPLC.

3.12 Unless disclosure would be contrary to the Freedom of Information and Protection of Privacy Act ,the WPLC, the Township of Warwick and Walpole Island First Nation are to be provided all formal submissions and correspondence related to the site operations by the Owner at the same time as these items are submitted to the Ministry, the Township of Warwick Council or any other body.

3.13 The Owner shall allow access to the landfill site during normal operating hours, to enable any individual member of the WPLC and member of the public recommended by local representatives on the WPLC, to observe operations. An individual member of the WPLC must contact the operator to arrange for a Site pass, be accompanied by an operators representative at all times and follow all safety procedures.

3.14 All recommendations made to the Owner with respect to ongoing landfill operations, monitoring and the implementation of contingency measures shall be discussed at joint meetings between representatives of the Owner and the WPLC. The purpose of these meetings will be to arrive at an agreement between the Owner and WPLC with respect to implementation of the recommendations.

3.15 The Owner will disclose all monitoring results to the WPLC and deliver to the WPLC all documents and information (except as may be privileged) relevant to the operation of the landfill.

First Nation and Township of Warwick Consultation

3.16 During the process of submission of an application to amend any approvals for the Site, the Owner shall:

a. discuss with WIFN and the Township of Warwick (Township) the proposed application prior to submission of the WIFN application to the Director;

b. provide the same documents to WIFN and Township that are provided to the Director in respect of the amendments; and
c. provide the Director, either prior to or at the same time of application submission, with a statement how WIFN and Township comments were considered by the Owner.

4.0 CONSTRUCTION, INSTALLATION and PLANNING

Major Works

4.1 For the purposes of this ECA the following are Major Works:

a. gas management system;
b. leachate collection system; and
c. liner.

4.2 a. A final detailed design shall be prepared for each Major Work to be constructed at the Site consistent with the conceptual design of the Site as presented in the Supporting Documentation, specifically Items 66, 67, and 68 of Schedule "A".

b. Geonet may substitute a component of the 0.3 metres of granular in the secondary drainage layer in accordance with Items 54 to 57 inclusive on Schedule "A". The Owner shall ensure that the Quality Assurance/Quality Control procedure detailed in Item 57 of Schedule "A" is followed during installation of the geonet material.

4.3 The final detailed design of each Major Work shall include the following:

a. design drawings and specifications;
b. a detailed quality assurance / quality control (QA/QC) program for construction of the major work, including necessary precautions to avoid disturbance to the underlying soils; and
c. details on the monitoring, maintenance, repair and replacement of the engineered components of the major work, if any.

4.4 Any design optimization or modification that is inconsistent with the conceptual design shall be clearly identified, along with an explanation of the reasons for the change.

4.5 The final detailed design of each Major Work shall be submitted to the Director and copied to the District Manager.

4.6 Each major work shall be constructed in accordance with the approved final detailed design and the QA/QC procedures shall be implemented as proposed by the Owner. Any significant variances from the conceptual design for the Site as detailed in Items 66, 67 and 68 of Schedule "A" shall be subject to approval by the Director.

4.7 As-built drawings for all Major Works shall be retained on Site and made available to Ministry staff for inspection.

Subsequent Stages

4.8 At least six (6) months prior to the anticipated completion of landfilling in each stage of the Site , a final detailed design for the subsequent stage shall be submitted to the Director. Any significant variances from the conceptual design for the Site as detailed in Items 66, 67 and 68 of Schedule "A" shall be subject to approval by the Director.

4.9 No person shall deposit any waste at the subsequent stage until a written Preparation Report in accordance with O. Reg. 232/98, Section 19 has been submitted to the Director and District Manager documenting that:

a. all construction;
b. QA/QC activities;
c. Site conditions; and,
d. all details of the construction of the Site;

are in accordance with the approved design plans and specifications.

4.10 Approval to proceed with landfilling or construction of each subsequent stage shall be dependent on groundwater, air quality and surface water monitoring results acceptable to the Director. If monitoring results are not acceptable to the Director then remedial action must be taken and completed before landfilling may proceed in the subsequent stage.

Geotechnical Engineer

4.11 A qualified professional geotechnical engineer shall inspect the excavation and construction underlying the Site and provide a report addressing whether the construction proceeded in accordance with approved detailed design plans, specifications and QA/QC procedures. The report shall be included in the Preparation Reports for each stage of the landfill.

Environmental Inspector

4.12 In accordance with conditions 18 and 19 of the EA approval dated January 15, 2007 known as Item 1 on Schedule “A”, the Owner shall provide funding to the Ministry for the provision of an Environmental Inspector to inspect the Site, at any reasonable time on such terms and conditions, as deemed appropriate by the District Manager of the District Office and outlined in a written agreement with the Owner. Within the agreement, the Owner shall commit to providing, as a minimum, the following:

a. Adequate office facilities, communication equipment, and means of transportation for the Environmental Inspector; and,
b. Reimbursement to the MECP semi-annually for the costs and associated expenses of the

Environmental Inspector.

4.13 The Owner shall provide funding for an Environmental Inspector on Site based on the following:

a. Construction Phase/Operations Phase- Full-time, on-Site inspector with the inspector being on Site a full day each day for five (5) days per calendar week for the first two years of the operation phase.

4.14 a. Every two (2) years commencing on February 1, 2012, the Owner shall prepare and submit a report to the District Manager detailing the status and need for a Environmental Inspector based on discussions with the Township of Warwick, WIFN and the WPLC regarding the inspection frequency for the Environmental Inspector. The inspection frequency of the Environmental Inspector shall remain as per the requirements outlined in Condition 4.13 during the operation phase until a decision is made by the District Manager on the appropriate inspection frequency.

b. Notwithstanding Conditions 4.12 to 4.14 (1) and 15.3, inclusive, the Environmental Inspector's duties may, in consultation with the Owner, be increased, reduced, suspended or terminated on such terms and conditions as deemed appropriate by the District Manager and, for greater certainty, the District Manager may require an Environmental Inspector to be on-Site for up to seven days per week in cases of apparent significant non-compliance with the conditions of the EA approval or any approval issued for the Site under the EPA until such non-compliance is resolved.

5.0 OTHER WORKS

Berm Construction

5.1 All berm slopes associated with this approval shall be no greater than 3:1.

Diversion Area

5.2 The diversion area will be located to the east of the treated leachate storage lagoons.

Cell 12

5.3 a. Cell 12 will be used as a monofil of contaminated soils until redeveloped and incorporated into the Expansion Site in accordance with Items 66 through 68 of Schedule "A".

b. The management of the Cell 12 monofill shall be in accordance with the procedures and practices consistent with other previous monofill operations at the Site.

Landscape

5.4 The Owner shall ensure the landscape plan is carried out in accordance with Item 72 and 80 of Schedule "A", as amended from time to time.

6.0 GENERAL OPERATIONS

Proper Operation

6.1 The Site shall be properly operated and maintained at all times. All waste shall be managed and disposed of in accordance with the EPA , Regulation 347 , Regulation 232 , and the requirements of this ECA. At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

6.2 The Owner shall ensure that the MECP's Guideline B-7, Reasonable Use Concept, is applied at the Site boundaries.

6.3 a. Landfilling operations shall be conducted in accordance with Items 66 through 71 of Schedule "A" attached to this ECA.

b. The Owner shall ensure the operations and procedures manual for the the Site includes discussions on the following items:

a. Health and safety;
b. Operation and maintenance of the Site;
c. Waste disposal area and development;
d. Nuisance management;
e. Leachate management;
f. Landfill gas management;
g. Surface water/Storm water management;
h. Inspections and monitoring;
i. Contingency plans and emergency procedures;
j. Complaints; and,
k. Reporting and record keeping.

c. The operations and procedures manual shall be:

a. retained at the Site;
b. reviewed on an annual basis and updated by the Owner as required; and
c. be available for inspection by Ministry staff.

Waste Type

6.4 Only the following types of waste shall be accepted at the Site:

a. municipal, industrial, commercial and institutional solid non-hazardous waste generated within the Province of Ontario, including non-hazardous contaminated soil.

Capacity

6.5 The Owner shall only accept and deposit waste at the Site as long as there is available capacity as defined by the final contours for the Site approved by this ECA . The approval permits disposal of waste at the Site to fill an air space of 26,508,000 cubic metres (including waste, daily and interim cover material). This capacity includes the capacity of the existing and expansion landfill areas.

Yearly Waste Limit

6.6 a. The Owner can receive up to a maximum of 1,400,000 tonnes per year of waste including contaminated soil for disposal at the Site.

b. The amount of tire shred that may be received to process is 7,160 tonnes/year.

c. Up to a maximum of 100 tonnes per day of solid non-hazardous waste, white goods and metals, recyclable waste, wood waste, and leaf and yard waste that are deposited by the public using small vehicles at the Mini-Transfer Area of the Site may be transferred from the Site by a waste hauler or waste haulers that has an ECA to another waste disposal site.

Service Area

6.7 Only waste that is generated in the Province of Ontario shall be accepted at the Site.

Landfilling of Sludge

6.8 A thickness of at least 2 metres of compacted waste and cover material shall be maintained between any landfilled sludge (solid non-hazardous as per Reg. 347) and the granular leachate collection layer.

Asbestos Waste

6.9 Any waste that is considered asbestos waste shall be handled in accordance with Section 17 of O. Reg. 347 as amended from time to time.

6.10 A suitable sized excavation for the asbestos waste shall be made by the Owner in a location away from the active landfilling face.

6.11 All asbestos waste shall be inspected to ensure that the asbestos waste is properly bagged or contained and free from puncture, tears or leaks.

6.12 The asbestos waste shall be placed in the excavation to avoid damage to the containers and to prevent dust and spillage.

6.13 Upon completion of the unloading and deposition of the asbestos in the excavation, at least 125 centimetres of cover or waste material shall be placed over the asbestos.

6.14 All asbestos waste shall be deposited to a level no higher that 1.25 metres below the general elevation of the disposal area to ensure that daily cover material removal in the future does not encounter the asbestos waste.

Waste Limits

6.15 No waste, including daily cover, intermediate cover or final cover layer, shall be landfilled outside the limits of the base and final cover contours presented in Items 66 through 71 of Schedule "A"**(**the Development and Operations Plan) attached to this ECA .

Site Use

6.16 The area inside the fencing indicated in Appendix N18 of Item 30 of Schedule "A" shall be used for waste disposal purposes only. The remainder of the Site outside the fenced area shall be used for traditional agricultural crop production only.

Waste Inspection

6.17 All loads of waste must be properly inspected by trained Site personnel prior to disposal at the Site and waste vehicles must be diverted to appropriate areas for waste disposal.

Waste Deposit

6.18 The Owner shall deposit waste in a manner that minimizes exposure area at the landfill working face and waste shall be compacted before cover is applied.

Burning Waste Prohibited

6.19 Burning of waste at the Site is prohibited.

Signage

6.20 A sign shall be maintained at the main entrance/exit to the Site on which is legibly displayed the following information:

a. the name of the Site and Owner;
b. the number of the ECA;
c. the name of the Operator;
d. the normal hours of operation;
e. the allowable and prohibited waste types;
f. a warning against unauthorized access;
g. the telephone number to which complaints may be directed;
h. a twenty-four (24) hour emergency telephone number (if different from above); and
i. a warning against dumping outside the Site.

6.21 The Owner shall install and maintain signs to direct vehicles to working face and recycling areas.

6.22 The Owner shall maintain signs at recycling depot informing users what materials are acceptable and directing users to appropriate storage area.

Hours of Operation

6.23 Waste shall only be accepted at the Site during the following time periods:

a. 7 AM to 7 PM - Monday to Saturday.

6.24 On-site equipment used for daily Site preparation and closing activities shall only be used during:

a. 6 AM to 8 PM - Monday to Saturday.

6.25 With prior written approval of the District Manager, the time periods may be extended to accommodate seasonal or unusual quantities of waste or such factors as determined to be reasonable to the District Manager.

6.26 The Owner may provide limited hours of operation provided that the hours are posted at the landfill gate and that suitable notice is provided to the public of any change in operating hours.

6.27 Upon reasonable notice to the District Manager, contingency actions may take place outside normal hours of operation. Emergency response may occur at any time as required.

Site Security

6.28 During non-operating hours, the Site entrance and exit gates shall be locked and the Site shall be secured against access by unauthorized persons.

Fencing

6.29 The entire area as shown in Figure 12 in Item 66 of Schedule "A" shall be fenced by the Owner with a 6 foot high wire woven highway-type paige fence.

Site Access

6.30 Access to and exit from the Site for the transportation of waste shall under normal circumstances be permitted from County Road 79.

Access Roads

6.31 a. On-Site roads shall be provided and maintained in a manner that vehicles hauling waste to and on the Site may travel readily and safely on any operating day. During winter months, when the Site is in operation, roads must be maintained to ensure safe access to the landfill working face.

b. Access roads must be clear of mud, ice and debris which may create hazardous conditions.

Vermin, Dust, Litter, Odour, Noise, Traffic

6.32 The Site shall be operated and maintained such that vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.

Scavenging

6.33 The Owner shall ensure that there is no scavenging as defined in O. Reg. 347 at the Site.

Dust

6.34 The Owner shall control fugitive dust emissions from on Site sources including but not limited to on-Site roads, stockpiled cover material and, closed landfill area prior to seeding especially during times of dry weather conditions. If necessary, major sources of dust shall be treated with water and/or dust suppression materials to minimize the overall dust emissions from the Site.

6.35 Dust shall be managed as per the Best Management Practices Plan (Dust) prepared by RWDI listed as Item 83 in Schedule "A".

Litter Control

6.36 The Owner shall take all practical steps to prevent escape of litter from the Site. All loose, windblown litter shall be collected and disposed of at the landfill working face.

6.37 Litter pickup will occur at least weekly on the Owner's property during all weather conditions.

6.38 The Owner will respond to litter complaints within one (1) business day of the complaint being received.

6.39 Litter shall be managed in accordance with the Best Management Practices plan prepared by RWDI listed as Item 25 on Schedule "A".

Odour

6.40 Odour shall be managed in accordance with the Best Management Practices Plan (Odour) prepared by RWDI listed as Item 84 in Schedule "A".

Noise

6.41 The Owner shall comply with noise criteria in MECP Guideline entitled “Noise Guidelines for Landfill Sites" dated October 1998 as amended from time to time and the Site shall comply with the limits set in Publication NPC205. Bird bangers may be used at the Site for gull control provided that they produce

reference impulsive sound not exceeding 125 dBAI at 5 metres from the bird banger.

6.42 Noise monitoring at the Site shall be undertaken by the Owner as per the document entitled "Environmental Noise Monitoring Program for the Warwick Landfill", dated June 15, 2007 prepared by Aercoustics Engineering Limited listed as Item 73 on Schedule "A".

Alteration of Best Management Plans for Odour, Dust and Litter

6.43 The Owner shall use the Best Management Plans (BMP's) for dust, odour and litter at the Site in accordance with the applicable Conditions approved by this ECA. The Owner may submit changes in writing to the Director for approval to amend the BMP(s). At the same time any changes to the BMP's are submitted to the Director, the Owner shall provide the proposed changes to the BMP's to the Township of Warwick, WPLC and WIFN.

Surface Water

6.44 The Owner shall take all appropriate measures to minimize surface water from coming in contact with waste. Temporary berms and ditches shall be constructed around active waste disposal areas to prevent extraneous surface water from coming in contact with the active working face.

6.45 The Owner shall not discharge surface water to receiving water bodies without an approval under the EPA.

6.46 If surface water ponding occurs in any surface water ditches having a drainage slope less than 0.5%, the Owner shall regrade the ditches.

Application of Cover Material

6.47 Cover material shall be applied as follows:

a. Daily Cover - At the end of each working day, the entire working face shall be covered with a minimum thickness of 150 mm of soil cover or an approved alternative cover material;

b. Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 mm of soil cover or an approved alternative cover material shall be placed;

c. Final Cover - In areas where landfilling has been completed to final contours, a minimum 1.85 metre thick layer of final cover soil shall be placed. Fill areas shall be progressively completed and rehabilitated as landfill development reaches final contours; and

d. Topsoil - In areas where landfilling has been completed to final contours and where final cover has been placed, a minimum 0.15 metres thick layer of topsoil shall be placed.

Cover Materials Allowed

6.48 The following materials, in the corresponding thickness, may be used as an alternative to soil as a daily and intermediate cover:

a. Contaminated soil that satisfies the Schedule IV Toxicity Characteristic Leaching Procedure (TCLP) criteria as outlined in O. Reg. 347 as amended from time to time;
b. Wood chips (daily);
c. Automobile Shredder Residue (ASR) (daily); or
d. Tarps (daily).

6.49 The use of any other alternative materials as daily or intermediate cover material is subject to approval by the Director.

6.50 Use of alternative daily or intermediate cover materials shall be discontinued within two (2) working days of receipt of written notification from the District Manager, stating that the use of the alternative daily or intermediate cover materials at the Site has proven to be environmentally unsuitable.

Automobile Shredder Residue as Daily Cover

6.51 a. Automobile Shredder Residue (ASR) may be used as a daily cover at the Site on an on-going basis from the issuance of this Approval.

b. The Owner shall cease the use of ASR if written notification is received from the District Manager indicating that there are environmental concerns due to the use of ASR as daily cover based on the testing of the ASR required by Condition 6.52.

c. The Owner may re-commence the use of ASR upon the Owner submitting an action plan that is acceptable to the District Manager that can address the environmental concerns which were raised due to the the use of ASR as daily cover.

6.52 Automobile Shredder Residue samples of the daily cover material are to be taken on semi-annual basis (Spring and Fall) and submitted for analysis of O. Reg. 347 Schedule IV Inorganics, VOC's, and PAH's. Automobile Shredder Residue is to conform with the specifications of a non-hazardous waste under O. Reg. 347 as amended from time to time. Semi-Annually testing results are to be submitted to the District Manager upon receipt. The frequency of O. Reg. 347 testing of the daily cover material can be reduced subject to approval of the District Manager.

Contaminated Soil as Daily or Intermediate Cover

6.53 Contaminated soil equal to or below 10% of the TCLP value and/or 0.4 mg/L benzene may be landfilled in Cells 8, 10 and/or 12.

6.54 If confirmatory testing of the contaminated soil to be landfilled in Cells 8, 10 and/or 12 indicates an

exceedance of 10% of the TCLP value and/or 0.4 mg/L of benzene, but satisfies the TCLP criteria as in O.Reg. 347, the soil may be used as daily and/or intermediate cover, and or landfilled as waste.

6.55 If the contaminated soil received at the Site does not meet the TCLP value, the contaminated soil shall be classified as a hazardous waste and shall be disposed of at a site that is approved to receive and dispose of hazardous waste.

6.56 Contaminated soil that satisfies the TCLP criteria may be used as daily and/or intermediate cover in the Expansion Site of the landfill. Contaminated soils may not be used on outside slopes which drain into the surface water system.

6.57 Contaminated soil used for daily and/or intermediate cover shall be sampled on a quarterly basis and submitted for analysis of O.Reg. 347 Schedule IV Inorganics, VOCs, PAHs and PCBs. Quarterly testing results shall be included in the annual report. The frequency of O. Reg. 347 testing of the cover material may be reduced subject to agreement of the District Manager.

6.58 Contaminated soil for use as daily cover and/or intermediate cover shall be stockpiled in areas of the Site that have a leachate collection system installed below.

6.59 Surface water run off from the contaminated soils stockpile which exceeds the Provincial Water Quality Objectives shall not be discharged through the surface water management system.

6.60 The Owner must ensure that measures are in place for the on Site treatment and disposal of any contaminated run off from the contaminated soils stockpile.

6.61 Prior to receipt at the Site, each source of contaminated soils which are to be used as daily or intermediate cover shall be tested to determine if the soils meet the criteria in this ECA and a copy of the test results shall be kept in the daily records for the Site as required.

7.0 SITE OPERATIONS

Landfill Reclamation

7.1 The Owner shall restrict stockpiling of contaminated soil from Cells 8, 10 and 12 to sections of the landfill footprint that have a liner and leachate collection system.

Waste Processing and Composting

7.2 Waste Processing and composting is allowed at the location outlined in Item 49 on Schedule "A" subject to the following conditions:

a. Prior to the commencement of any waste processing or composting operations at the Site, the Owner shall ensure that air (Section 9 EPA) and noise approvals are obtained;
b. Prior to the start of composting operations at the Site, the Owner shall submit to the District

Manager a contingency plan for any odour problems that may occur;

c. The total combined amount of waste that may be received at the Site for processing and composting shall not exceed 36,000 tonnes per year and the maximum daily amount to be received at the Site shall not exceed 700 tonnes per day;
d. The amount of waste that may be received at the Site for composting shall not exceed 7,500 tonnes per year;
e. Material acceptable for processing and composting at the site shall include leaf, yard, agricultural waste, concrete, asphalt, wood and tires;
f. The bins for diversion shall be emptied on an as needed basis to prevent odours and operational problems. The Ministry may at any time instruct that a bin be emptied;
g. The Owner shall ensure that waste processing and composting is undertaken in a safe manner, and that all waste is properly handled, processed and contained so as not to pose any threat to the general public and site personnel;
h. All noise generating processing activities in the waste diversion area including concrete/asphalt/crushing, wood chipping and tire shredding shall only occur between 07:00 to 19:00; and
i. Any runoff that comes into contact with waste in the waste processing/composting area shall be managed in such a fashion to ensure compliance with Condition 8.5 of this ECA.

7.3 The Owner shall ensure that composting at the Site is undertaken in accordance with O.Reg 101/94 as amended from time to time and the Ministry document entitled "Interim Guidelines for the Production and Use of Aerobic Compost in Ontario " dated November 2004 as amended from time to time and the following requirements:

a. Only leaf and yard waste, Agricultural Waste as defined in Item 3 in Schedule "A" and wood (not including painted or treated wood or laminated wood) may be accepted at the compost area.
b. Leaf and yard waste is defined as waste consisting of natural Christmas trees and other plant materials but not tree limbs or other woody materials in excess of seven (7) centimetres in diameter.
c. The composting site shall only receive material for composting from May 1st to November 1st each year.
d. Leaf and yard waste, Agricultural Waste and wood may not be stored for more than four (4) days before it is composted.
e. During composting, the Owner shall provide the composting mass with adequate ventilation to ensure that aerobic conditions are maintained.
f. Cured compost must be analyzed for the parameters listed in Table 1 of O.Reg. 101/94 and shall not be removed from the Site unless it has been sampled and analyzed.
g. Cured compost is defined as meeting the specifications in Sections 7.2 to 7.5 inclusive of the Interim Guidelines for the Production and Use of Aerobic Compost in Ontario" dated November 2004 as amended from time to time and can be used on an unrestricted basis.
h. Compost is designated a waste if the compost contains a substance listed in Table 1 of O. Reg. 101/94 that has a concentration greater than the concentration listed in Column 2.
i. Controlled compost is defined as compost that is designated a waste under the previous condition but has concentrations less than the concentrations listed in Column 3 of Table 1

in O. Reg. 101/94.

j. Controlled compost may not be removed from the site except for direct shipment to the intended user.

k. Material from the composting process that fails to meet the "Interim Guidelines for the Production and Use of Aerobic Compost in Ontario" dated November 2004 shall be deemed to be a waste under O. Reg. 347 and shall be disposed of accordingly.

l. The person to whom controlled compost is shipped shall be given a copy of the chemical analysis of the compost and a notice that states that the compost is controlled compost and that sets out the terms and conditions of the compost's exemption from Part V of the EPA. A copy of this notice shall be kept on file at the Site.

m. The District Manager may at any time and at his absolute discretion instruct that any or all of the waste materials from the composting or processing operations or the processed waste from the composting or processing operations to be either landfilled or directed to be utilized for specific uses and in specific locations.

7.4 Record keeping for the composting operation shall be kept as follows:

a. Records about each composting mass shall be kept including temperatures of the mass, when the temperatures were measured, when the mass was turned, information about the curing process and details about significant problems that occurred during composting or curing. This information shall be kept at the Site for at least three years after the mass was cured;

b. Records shall be kept of the analyses of compost. Any laboratory records shall be kept as part of the record. A record of an analysis shall be kept for at least three years after the analysis is performed; and

c. A record shall be kept of the name, address and telephone number of each person to whom controlled compost is shipped. The record shall be kept for at least ten (10) years after the shipment.

Tire Shred

7.5 The management and placement of tire shreds at the Site shall be in accordance with the Fire Protection and Prevention Act as follows:

a. No individual tire shred pile shall be more than 3 metres in height and 100 square metres in area. Six (6) metres of space shall be provided between all piles. Fifteen (15) metres is to be provided from property lines and thirty (30) metres shall be provided from tree lines;

b. A buffer of 4.5 metres is to be provided for grass or weeds from the edge of the tire pile to the edge of the pad.

c. A firebreak of 22 metres shall be provided between the two areas of 16 piles each.

7.6 If the total stockpiled tire shreds exceeds 300 cubic metres, the storage period shall not exceed 90 (ninety) days.

7.7 The total amount of tire shreds stored on Site shall be recorded in a log book and made available to the Ministry for inspection.

Backup Power

7.8 The Owner shall maintain adequate backup power at the Site in order to ensure scale facility and landfill gas blower on site continue to operate and are not damaged due to an extended power outage. A power supply connection at each leachate collection pumping station shall be maintained by the Owner that will permit a portable generator to be connected during a power outage.

Landfill Gas

7.9 All buildings are to be free of any landfill gas accumulation. The Owner shall provide adequate ventilation systems to relieve landfill gas accumulations in buildings if necessary.

Landfill Gas Management

7.10 The Owner shall, manage landfill gas in accordance with Items 66 through 68, Items 75 through 77, and Item 81 of Schedule "A" and based on the landfill gas management system constructed under the authority of the EPA Approval issued which may be amended or replaced from time to time.

Cleaning of Leachate Collection System

7.11 The leachate collection system piping for each stage of the landfill shall be inspected annually for the first five years after waste placement and then as often as future inspections indicate to be necessary. Additionally, leachate collection pipes must be cleaned whenever an inspection indicates that cleaning is necessary.

7.12 In areas where leachate collection pipe slopes are less than 0.5%, the leachate collection pipes shall be inspected semi-annually for the first three (3) years after waste placement and then as often as future inspections indicate to be necessary. Additionally, leachate collection pipes must be cleaned whenever an inspection indicates that cleaning is necessary. After the three (3) year period, inspection and cleaning of the leachate collection pipes shall be in accordance with the previous condition.

Leachate Collection System

7.13 All leachate collection pipes for Cell 12 shall be sloped at a minimum of 0.5%.

7.14 The Owner shall install 250 mm diameter perforated leachate collection pipes with perforations located at the 10:30, 4:30, 1:30 and 7:30 positions.

7.15 The stone for the leachate collection system shall have the following specifications:

a. D85 shall be greater than 37 mm where D85 is described as the stone diameter such that,

when measured by weight, 85% of the stones in the layer have a smaller diameter;

b. D10 shall be greater than 19 mm where D10 is the stone diameter such that, when measured by weight, 10% of the stones in the layer have a smaller diameter;
c. D60/D10 shall be less than 2; and,
d. One per cent (1%) of the stones may pass a #200 sieve.

7.16 A minimum of 50 mm of stone shall be placed below the leachate collection pipes and a minimum of 250 mm of stone shall be placed above any leachate collection pipes.

7.17 The Owner shall ensure that the leachate collection system is constructed under the supervision of a qualified consultant.

Hydraulic Trap

7.18 The Owner shall ensure that a hydraulic trap is developed and maintained beneath the Expansion Area and shall ensure that a maximum leachate head of 300 mm on the landfill liner is not exceeded.

Renewable Natural Gas (RNG) Facility

7.19 The Renewable Natural Gas Facility shall be constructed and operated in accordance with Items 88 to 89 in Schedule A.

7.20 The Owner shall ensure that the flares of the RNG facility have adequate capacity to handle all the landfill gas collected, and the blowers shall be able to draw a vacuum of no less than 100 inches of water column.

7.21 The Owner shall ensure that the capacity of the landfill gas blower/flare facility and the RNG facility be assessed each time of the gas collection system expansion. The owner shall upgrade the landfill gas blower/flare facility or the RNG facility, if necessary, to ensure there is adequate capacity to handle the expected maximum landfill gas flow.

7.22 Prior to the operation of the RNG facility, the Owner shall ensure that the following documents are updated and training provided to employees involved in the RNG operation:

a. the Best Management Practices Plan for odour in accordance with Item 90 of Schedule A;
b. the Operation and Maintenance Manual for the RNG facility.

7.23 The Owner shall maintain daily operational record of the RNG facility at the site, and ensure the following information for the RNG facility are included in the annual report:

a. the total amount of landfill gas processed at the RNG facility;
b. the total amount of processed renewable natural gas sent to the off-site network;
c. the total amount of off-specification landfill gas that was flared;
d. a summary of the RNG facility operational disruptions and the response;
e. a summary of adverse effects such as odour, spills, fire emergency, etc., and the remediation

implemented; and

f. an assessment of the adequacy of the RNG facility treatment capacity and the need for system upgrade.

8.0 LEACHATE MANAGEMENT

Leachate Recirculation

8.1 Prior to implementing the leachate recirculation program , a report on the moisture content of the incoming waste and the actual field capacity of the waste in situ shall be submitted to the Director.

8.2 The Director may at any time, terminate leachate recirculation at the Site if, in the Ministry's opinion, adverse effects on the environment are observed.

8.3 Before starting leachate recirculation, the Owner shall provide to the Director a monitoring program to ascertain the effectiveness of the leachate recirculation process.

8.4 Leachate recirculation shall not occur in any above grade locations until final cover has been installed on exterior side slopes.

Leachate Management Plan

8.5 The Owner’s leachate management plan shall not include any direct discharge of leachate or treated leachate from the Site, even as a contingency option, to surface waters, including Bear Creek. The Owner shall not discharge leachate or treated leachate to surface waters, including Bear Creek from the Site.

Leachate Treatment Plant

8.6 (1) (a) Within a minimum of three (3) years prior to closure of the landfill Site, the Owner shall ensure that a leachate treatment system is installed and operational at the Site.

(b) Leachate from the Site not sent to the operational drip irrigation area(s) approved under Condition 8.7 shall be disposed of off-Site at a location approved by the District Manager until the leachate treatment system required by Condition 8.6 (1)(a) is approved and operational.

(c) Any waste from the leachate treatment system that is to be disposed of in the landfill must be classified as a solid non-hazardous waste.

(d) The Owner shall implement all items within the document entitled Leachate Management Framework, listed as Item 86 in Schedule "A". These items include new and existing leachate monitor locations (wells, mini piezometers, and sump), leachate monitoring, leachate level reporting, Leachate Management Plan by March 31, 2020 and updated

every 3 years, and the Leachate Treatment Facility Study to be completed at least 7 years prior to closure of the landfill.

(2) As part of the financial assurance calculation in Section 2.0, the Owner shall provide to the Director for approval, a detailed financial assurance plan including the cost of leachate transportation and disposal for the landfill site during the period preceding the initiation of the leachate treatment system. In addition, the Owner shall provide to the Director for approval a financial assurance plan detailing the capital cost of the on-Site leachate treatment system.

Phytoremediation of Leachate - Existing and Proposed Poplar Plantations

8.7 On-Site phytoremediation may occur at the Poplar System and Poplar Plantation in accordance with the following conditions:

a. The Owner shall ensure that there is a 100 metre grassed buffer at all times from the Poplar Plantation to the Kersey drain.
b. Irrigation of leachate onto the either the Poplar Plantation or the Poplar System shall not occur in the following instances:

i. Between the dates of October 16 to April 30;
ii. On frozen or snow covered ground conditions;
iii. Under conditions that will cause ponded water or runoff;
iv. Conditions where surface water ponding within the area is occurring;
v. Where no poplar trees are currently planted;
vi. In areas within a drip irrigation area where trees have been harvested more than a frequency greater than every other tree;
vii. In areas within a drip irrigation area that has been fully harvested clear of trees and the trees have not started to coppice.

c. If weather forecasts indicate a rainfall storm greater than 12.5 mm/hour will occur, the Owner shall within 1 hour before the storm, shut off all irrigation of the poplar forest.
d. Irrigation zones shall be individually assessed by the Owner for suitability of irrigation after rainfall events greater than 12.5 mm.
e. Records shall be kept for the Poplar System and Poplar Plantation areas as follows:

i. quantities and dates of application of pesticides and herbicides;
ii. inspection notes regarding tree growth rates and health;
iii. inspection notes regarding condition and growth of underlying vegetative landfill cover (ie grass);
iv. observed pooling and/or runoff of irrigated liquid;
v. observations of any odours; and,
vi. weather conditions records as may be obtained from the nearest Environment Canada Weather Office which may include daily high and low temperatures, wind velocity and direction, and precipitation quantities.

f. Irrigation onto either the Poplar System or the Poplar Plantation shall be as follows:

i. Detailed records shall be kept of the quantities of irrigation liquid that are applied, including the dates of application onto either drip irrigation area;
ii. Operations in a given drip irrigation area must immediately stop if contamination problems in surface water or groundwater, which are attributable to the operation of the noted drip irrigation area, are found to be occurring. Recommencement of operations may proceed only upon further written notification of the District Manager;
iii. Operations of a given drip irrigation area must be discontinued immediately if operation of the noted drip irrigation area causes surface runoff from the footprint area or if operations cause surface ponding within the drip irrigation area; operations cannot be restarted during that application day and can only be restarted after surface ponding has evaporated or infiltrated or conditions causing the runoff or ponding have been rectified;
iv. If there are any stoppages of operations under the requirements of items ii) or iii) above, then the District Manager shall be notified immediately; and,
v. If odours attributable to one of the drip irrigation areas become a problem at the site, then the District Manager shall be so informed in writing and the operation of the noted drip irrigation area shall be stopped pending further instructions from the District Manager;

g. (1) Monitoring of the drip irrigation Poplar System and the Poplar Plantation shall be in accordance with Items 63 through 65 of Schedule “A”.

(2) Monitoring frequencies and analyses for the following items shall be as follows:

i. Daily inspections for ponded water or saturated soil during irrigation;
ii. Monthly testing of irrigation liquid quality during the irrigation season;
iii. Soil samples should be taken annually from grade to a depth of 0.6 m minimum and 0.9 m maximum;
iv. Annual soil analyses shall be conducted annually per Section 3.1 of Item 63 of Schedule "A", in addition to pH, electrical conductivity, cation exchange capacity, and sodium absorption ratio;
v. Leaf Tissue analyses once per year in the fall; and
vi. Crop inspection once per year in the fall.

h. Reporting on the drip irrigation areas shall be part of the annual monitoring report for the Site and shall include but not be limited to the following:

i. results and an analysis of the results of the monitoring programs for the drip irrigation areas:
ii. assessment of the results of the vegetation as related to the stated objectives for the Poplar System and Poplar Plantation facilities construction and operations;

iii. assessment of the need to change the monitoring program for the drip irrigation areas and a recommendation of the required changes;
iv. tabulation and assessment of the volumes of leachate produced by the landfill, and those volumes which may be applied to the existing drip irrigation areas;
v. a report on operational problems identified during the operation of the drip irrigation areas and a discussion of each problem and details of what was done to rectify each problem;
vi. a Site plan which shows the location of the areas planted with both trees and grass cover and the vegetation used on those areas;
vii. an assessment of the monitoring results pertaining to the use of trees as vegetation on the final cover.

i. The Director retains the right to request that the Owner conduct additional studies, suspend operations or require the Owner to provide additional methods to handle leachate at the Site in addition to or as a replacement to the drip irrigation areas.

j. If the Director requests removal of the drip irrigation areas, the Owner shall:

i. remove the irrigation equipment and the trees from the noted drip irrigation area. For the Poplar System, removal of trees shall include removal of tree stumps and most roots, excavate the trench to the maximum depth of root depth penetration on each tree row, and then replace, remould and recompact the excavated material;
ii. the landfill cover shall be restored to the same condition as it was in prior to commencement of the Poplar System and a blend of suitable grasses shall be seeded as necessary; and,
iii. within 6 months of completion of the noted drip irrigation area closure activities, submit to the Director a report outlining the work that has been completed.

k. Electrical conductivity of the shallow soil (maximum depth of 0.15 m) beneath the drip irrigation areas shall be monitored on a weekly basis during irrigation.

l. If salt levels are building up in the soil or additional irrigation with leachate is found to be detrimental to the health of the poplars, the leachate application rate shall be reduced or terminated.

Wood Waste and Leaf Litter

m. Any wood waste or leaf litter that is produced in the Poplar System or Poplar Plantation shall managed in accordance with Item 63 of Schedule "A".

Other Items

n. (1) Drip irrigation rates for the Poplar Plantation shall be no greater that the rate specified

in the EPA approval for the Site.

(2) Drip irrigation rates for the Poplar System shall be no greater than the rates noted in Item 63 of Schedule "A".

o. No drip irrigation shall occur within fifty (50) metres of any surface watercourse or drain.

p. (1) Leachate to be used for drip irrigation on the Poplar Plantation shall not exceed the treated leachate effluent criteria specified in the EPAapproval for applicable industrial sewage works for the Site.

(2) Leachate to be used for drip irrigation on the Poplar System shall not exceed the treated leachate effluent criteria specified in the Item 63 through 65 in Schedule "A".

q. The use of the Poplar Plantation to manage irrigation leachate will not be permitted without first providing the District Manger with at least two (2) months written notice of the anticipated irrigation liquid application date. The use of surface water to encourage tree growth will be permitted and will not be considered as irrigation liquid.

r. Monitoring and the associated reporting for the Poplar Plantation will commence at least two (2) months prior to irrigation liquid application and continue until two (2) years after cessation of irrigation liquid application to the Poplar Plantation.

Leachate Storage Tanks

s. The leachate storage tanks shall be inspected by a licenced plumber on an annual basis.

t. The leachate storage tanks shall be cleaned and sediment removed at least once every two (2) years.

9.0 INSPECTIONS AND RECORDS

Inspections

9.1 The Owner shall inspect the Site monthly for the following items but not limited to these items:

a. Erosion rills;
b. General settlement areas or depressions;
c. Shear and tension cracks;
d. Condition of surface water drainage works;
e. Erosion and sedimentation in surface water drainage system;
f. Presence of any ponded water;
h. Adequacy of cover material;
i. Evidence of vegetative stress, distressed poplars or side slope plantings;
j. Condition of groundwater monitoring wells and gas wells;

k. Presence of insects, vermin, rodents and scavenging animals;
l. Condition of fence surrounding the Site; and
m. General Site appearance.

9.2 The Owner shall inspect the Site weekly for presence of leachate seeps.

Daily Inspections and Log Book

9.3 An inspection of the entire Site and all equipment on the Site shall be conducted each day the Site is in operation to ensure that the site is being operated in compliance with this ECA . Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the Site if needed.

9.4 A record of the inspections shall be kept in a daily log book or a dedicated electronic file that includes:

i. the name and signature of person that conducted the inspection;
ii. the date and time of the inspection;
iii. the list of any deficiencies discovered;
iv. the recommendations for remedial action; and
v. the date, time and description of actions taken.

9.5 A record shall be kept in a daily log book of all refusal of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

Monthly Records

9.6 Monthly Site inspection records in the form of a written log or a dedicated electronic file shall include but not be limited to the following:

a. the type, geographic source, date and time of arrival, hauler, and quantity (tonnes) of all waste received at the Site;
b. the area of the Site in which waste disposal operations are taking place;
c. a calculation of the total quantity (tonnes) of waste received at the Site during each operating day and each operating week;
d. Results of any test done to determine the acceptability of waste at the Site;
e. A reference for each load of solid non-hazardous industrial waste received, to the client and type of solid non-hazardous industrial waste;
f. the amount of any leachate removed, or treated and discharged from the Site;
g. a record of litter collection activities and the application of any dust suppressants;
h. a record of the daily inspections;
i. a description of any out-of-service period of any control, treatment, disposal or monitoring facilities, the reasons for the loss of service, and action taken to restore and maintain service;
j. type and amount of daily, intermediate and final cover used;
k. maintenance and repairs performed on equipment employed at the Site;

l. complaints received and actions taken to resolve them;
m. emergency situations and actions taken to resolve them; and
n. any other information required by the District Manager.

9.7 The Owner shall maintain on record at the Site for each client disposing of solid non-hazardous waste at the Site, a description of each type of solid non-hazardous waste received from the client and documentation to demonstrate that the Owner has taken reasonable care to ensure that waste classified as either hazardous or liquid industrial waste under O. Reg. 347 as amended from time to time, is not disposed of at the Site.

Record Retention

9.8 Except as authorized in writing by the Director, all records required by this ECA shall be retained at the Site for a minimum of two (2) years from their date of creation.

9.9 The Owner shall retain all documentation listed in Schedule "A" for as long as this ECA is valid.

9.10 All monthly Site inspection records are to be kept at the Site until they are included in the Annual Report.

9.11 The Owner shall retain employee training records as long as the employee is working at the Site.

9.12 The Owner shall make all of the above documents available for inspection upon request of Ministry staff.

9.13 The Owner shall retain, either on-Site or in another location and notify the District Manager of this location, copies of the annual reports referred to in the preceding condition and any associated documentation of compliance monitoring activities and shall continue to do so for a period of at least two (2) years after the closure of the Site.

10.0 TRAINING

Employees and Training

10.1 A training plan for all employees that operate any aspect of the Site shall be developed and implemented by the Operator . Only trained employees shall operate any aspect of the Site or carry out any activity required under this ECA . Employees must provide proof of training to the Ministry upon request. For the purpose of this ECA "trained" means knowledgeable either through instruction or practice in:

a. the relevant waste management legislation including EPA, O. Reg. 347 and O. Reg. 232/98 , regulations and guidelines;
b. major environmental and occupational health and safety concerns pertaining to the waste to be handled;

c. the proper handling of wastes;
d. the management procedures including the use and operation of equipment for the processes and wastes to be handled;
e. the emergency response procedures;
f. the specific written procedures for the control of nuisance conditions;
g. the terms, conditions and operating requirements of this ECA; and
h. proper inspection, receiving and recording procedures and the activities to be undertaken during and after a load rejection.

11.0 COMPLAINTS PROCEDURES

11.1 If at any time, the Owner receives complaints regarding the operation of the Site , the Owner shall respond to these complaints according to the following procedure:

a. The Owner shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information, the time and date of the complaint, specific details of operations that were occurring, any changers from normal operations, types of waste loads (including source) and other on Site activities;
b. The Owner, upon notification of the complaint, shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and
c. The Owner shall complete and retain on-Site a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents.

11.2 The Owner shall designate a person to receive any complaints and to respond with a written notice of action as soon as possible. The Owner shall post the Site complaints procedure at the Site entrance. All complaints and the Owner's actions taken to remedy the complaints must be summarized in the Annual Report.

11.3 The Company shall notify the District Manager, Township of Warwick and WIFN, in writing, of each environmental complaint within two (2) business days of the complaint. The notification shall include:

1. this Approval number;

2. a description of the nature of the complaint;

3. the time and date of the incident to which the complaint relates.

11.4 The Company shall report all environmental complaints to the WPLC at the next WPLC meeting.

12.0 EMERGENCY SITUATIONS

12.1 In the event of a fire or discharge of a contaminant to the environment, Site staff shall contact the MECP Spills Action Centre (1-800-268-6060) and the District Office of the MECP forthwith.

12.2 The Owner shall submit to the District Manager a written report within three (3) days of the spill or incident, outlining the nature of the incident, remedial measures taken and measures taken to prevent future occurrences at the Site.

12.3 The Owner shall ensure that adequate fire fighting and contingency spill clean up equipment is available in accordance with Item 66 of Schedule "A" and that emergency response personnel are familiar with its use and location.

13.0 MONITORING

Groundwater Monitors

13.1 The Owner shall ensure all groundwater monitoring wells are properly capped, locked and protected from damage.

13.2 In areas where landfilling is to proceed around monitoring wells, the wells must be decommissioned in accordance with O. Reg. 903 as amended from time to time and then replaced when waste placement and capping is completed.

13.3 Any groundwater monitoring wells included in the monitoring program shall be assessed, repaired, replaced or decommissioned as required.

13.4 The Owner shall repair or replace any monitoring well which is destroyed or in any way made inoperable for sampling such that no more than one sampling event is missed.

13.5 All monitoring wells that are no longer required as part of the groundwater monitoring program shall be decommissioned in accordance with good standard practice that will prevent contamination through the abandoned well and in accordance with O. Reg. 903. A report on the decommissioning shall be provided in the annual monitoring report for the period during which the well was decommissioned.

Monitoring Program

13.6 Monitoring programs shall be carried out for groundwater, surface water, landfill gas in accordance with the Environmental Monitoring Plan, as amended from time to time listed as Item 39 and Appendix H of Item 68 of Schedule "A". Surface water will also be evaluated as per Item 91 of Schedule "A".

13.7 The Owner shall ensure that Biochemical Oxygen Demand, Total Suspended Solids, Total coliform, Fecal coliform and E. Coli are added to the parameter list to be sampled for surface water station SS19.

13.8 Air Quality, Dust, Hydrocarbon, and Volatile Organic Carbon monitoring shall be undertaken in accordance with Item 85 in Schedule "A".

13.9 Air quality monitoring shall be in accordance with the canister method (USEPA TO-14/15) .

13.10 Noise monitoring shall be undertaken by the Owner at the Site in accordance with Item 28 on Schedule "A" including any noise monitoring in response to noise complaints.

13.11 No alterations to the groundwater, air quality, noise or surface water monitoring programs shall be implemented prior to receiving written approval from the District Manager. The Owner shall give all requests to the Township of Warwick, the WPLC and WIFN at the same time or prior to the time that such request is made to the District Manager.

14.0 CONTINGENCY PLANS AND TRIGGER MECHANISMS

Hydraulic Containment

14.1 If the leachate level elevation in any of the pumping stations wells listed below rise above their respective trigger level, the Owner shall take additional groundwater levels within four (4) weeks as detailed in Figure 2 of Item 39 and Appendix H of Item 68 of Schedule "A".

Monitoring location	Trigger Leachate Elevation (mASL)
PS1	232.7
PS3	232.6
PS5	232.8
PS7	233.4

The assessment process for leachate levels is detailed in Figure 2 of Appendix H of Item 68 on Schedule “A”.

Groundwater Quality

14.2 The trigger concentration for groundwater quality shall be 80% of the Guideline B-7 values for parameters that have an Ontario Drinking Water Quality Standards value.

14.3 Groundwater chemical concentrations must be assessed with the trigger concentrations within six (6) weeks of sample collection.

14.4 The assessment process for groundwater quality is detailed in Figure 3 of Item 39 and Appendix H of of Item 68 of Schedule “A”.

Surface Water Quality

14.5 The trigger mechanisms for surface water quality shall be one of the following:

a. Where off Site surface water quality satisfies the Ministry's PWQO, the respective PWQO shall be used as a trigger concentration; or

b. Where the background surface water quality naturally exceeds the PWQO, the background concentration should be considered in evaluating and updating the trigger concentration.

14.6 Surface water quality results will be assessed in accordance with the requirements established under the Industrial Sewage Works component of the EPA approval for the Site.

14.7 The assessment process for surface water quality is detailed in Figure 4 of Appendix H of Item 68 in Schedule "A ".

Landfill Gas

14.8 If landfill gas concentrations exceed 10% LEL, the Owner shall undertake additional monitoring, assess the source and pathway of methane to determine if the elevated concentrations are landfill related.

14.9 If the elevated concentrations are landfill related, the Owner shall undertake contingency measures.

General Contingency Measures

14.10 In the event a result of a monitoring test exceeds the trigger mechanisms detailed above, the Owner shall:

a. notify the District Manager, the WPLC, WIFN and the Township of Warwick of any trigger level exceedances within twenty four (24) hours of receipt of the results;
b. conduct an investigation into the cause of the adverse result and submit a report to the District Manager that includes an assessment of whether contingency measures need to be carried out;
c. if contingency measures are needed, submit detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures, and a schedule as to when these measures will be implemented, to the Director and notify District Manager; and
d. implement the required contingency measures upon approval by the Director.

15.0 REPORTING

Semi Annual Volume Determination

15.1 The Owner shall undertake semi-annual air space surveys of the bottom and top waste contours to determine the estimated air space used for waste disposal in the prior six months. The air space survey shall include daily cover material and shall take into account settlement. The first air space survey shall be undertaken by no later than February 2012 with an air space survey being completed semi-annually

after the completion of the first air space survey, until landfill Site closure.

15.2 Wastes which the Owner has been ordered to dispose of at the Site by any ministry, department or agency of the federal or Provincial Crown shall be excluded from the air space survey calculations.

15.3 Each air space survey shall be conducted by an Ontario Land Surveyor or other qualified consultant and such air space survey shall be provided to the District Manager. The Owner shall keep a copy of each air space survey on-Site and make them available to MECP personnel upon request.

Quarterly Monitoring Reports

15.4 The Owner shall submit quarterly monitoring reports to the Township of Warwick, WIFN, District Manager and the WPLC within sixty (60) days of the end of the calendar quarterly reporting period starting September 30, 2012.

15.5 Each report will include the following:

a. a summary of monitoring activities and results;
b. a summary of any exceedences and related operator responses;
c. any complaints received and operator response;
d. a summary of mitigation activities for noise, dust, litter, air quality or other taken during the quarter in accordance with the Best Management Practices;
e. any proposed improvements to monitoring or operating procedures; and
f. any implemented improvements to monitoring or operating procedures that have been identified to address or reduce impacts.

Annual Report

15.6 A written report on the development, operation and monitoring of the Site , shall be completed annually (the "Annual Report"). The Annual Report shall be submitted to the Regional Director , the District Manager, the Township of Warwick, WIFN, and the WPLC, by March 31st of each year, and shall cover the 12 month period preceding December 31st.

15.7 The Annual Report shall include the following:

a. the results and an interpretive analysis of the results of all leachate, groundwater, surface water and landfill gas monitoring, including an assessment of the need to amend the monitoring programs;
b. an assessment of the operation and performance of all engineered facilities, the need to amend the design or operation of the Site, and the adequacy of and need to implement the contingency plans;
c. an assessment of the effectiveness of the Poplar Plantation and the Poplar System for leachate;
d. an assessment of the effectiveness of the on Site leachate treatment facility;
e. Site plans showing the existing contours of the Site;

f. areas of landfilling operation during the reporting period;
g. areas of intended operation during the next reporting period;
h. areas of excavation during the reporting period;
i. the progress of final cover, vegetative cover, and any intermediate cover application;
j. previously existing site facilities;
k. facilities installed during the reporting period;
l. Site preparations and facilities planned for installation during the next reporting period;
m. calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the Site during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;
n. a calculation of the remaining capacity of the Site, an estimate of the remaining Site life and a comparison of actual capacity used to approved Site capacity;
o. a summary of the quantity of any leachate or pre-treated leachate removed from the Site or leachate treated and discharged from the Site;
p. a summary of the weekly, maximum daily and total annual quantity (tonnes) of waste received at the Site;
q. a summary of any complaints received and the responses made;
r. a discussion of any operational problems encountered at the Site and corrective action taken;
s. an update summary of the amount of financial assurance which has been provided to the Director;
t. a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903;
u. any other information with respect to the site which the District Manager or Regional Director may require from time to time;
v. a statement of compliance with all conditions of this ECA and other relevant Ministry requirements, guidelines and regulations;
w. summary of inspections undertaken at the Site;
x. a summary of recycling, processing and composting efforts undertaken including the amount of recyclable received, amount of processed material and composted material each year;
y. any changes in operations, equipment or procedures employed at the Site; and
z. recommendations regarding any proposed changes in operations of the Site.

16.0 SITE CLOSURE

Closure Plan

16.1 At least two (2) years prior to closure or when 90% of the site capacity is reached, whichever comes first, the Owner shall submit to the Director for approval, with copies to the District Manager, the Township of Warwick, WIFN and the WPLC, a detailed Site closure plan pertaining to the termination of landfilling operations at this Site , post-closure inspection, maintenance and monitoring, and end use. The plan shall include the following:

a. a plan showing Site appearance after closure;
b. a description of the proposed end use of the Site;
c. a description of the procedures for closure of the Site, including:

    i.) advance notification of the public of the landfill closure;
    ii) posting of a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
    iii) completion, inspection and maintenance of the final cover and landscaping;
    iv) site security;
    v) removal of unnecessary landfill-related structures, buildings and facilities; and
    vi) final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;

d. a schedule indicating the time-period for implementing sub-conditions i) to vi) above.
e. descriptions of the procedures for post-closure care of the Site, including:

    i.) operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
    ii) record keeping and reporting; and
    iii) complaint contact and response procedures;

f. an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas;
g. an updated estimate of the contaminating life span of the Site , based on the results of the monitoring programs to date; and
h. an update of the cost estimates for financial assurance and the amount which has been provided to the Director to date.

16.2 The Site shall be closed in accordance with the closure plan as approved by the Director.

End Use

16.3 The Owner shall consult with affected stakeholders on the proposed end uses as committed to in Item 35 of Schedule "A" prior to the submission of its closure report under the EPA. The proposed end use activities should be consistent with the types of activities consulted upon during the EA.

Closure of the Site

16.4 Upon closure of the Site, the following features will be inspected, recorded on a quarterly basis and maintained as required on a seasonal basis:

a. evidence of settlement;
b. possible leachate seeps and springs;
c. cover soil integrity;
d. vegetative cover;

e. surface water drainage works;
f. erosion and sediment in surface water drainage system; and
g. groundwater monitoring wells.

16.5 A vegetative cover consisting of vegetation that is suited to local conditions and that is capable with minimal care of providing vigorous, plentiful cover no later than its 3rd growing season shall be established over all completed areas to control erosion and maximize evaportranspiration. The Owner shall complete planting as soon as possible after reaching final contours.

16.6 If weather conditions do not allow timely placement of final and vegetative cover, silt curtains shall be employed to minimize silt loadings to surface water bodies.

SCHEDULE "A"

1. Document entitled "Environmental Assessment Act Section 9 Notice of Approval to Proceed with the Undertaking" , Re: An Environmental Assessment for Warwick Landfill Expansion, Waste Management of Canada Corporation, EA File Number: EA-02-08-02-03, dated January 15, 2007.

2. Application for a Provisional Certificate of Approval for the Warwick Landfill, dated March 27, 2006.

3. Document entitled "Development and Operations Plans Warwick Landfill Expansion Volume 1 of 2" dated March 2006 prepared by Henderson, Paddon and Associates Limited.

4. Document entitled "Development and Operations Plans Warwick Landfill Expansion Volume 2 of 2" dated March 2006 prepared by Henderson, Paddon and Associates Limited.

5. Document entitled "Assessment of Geotechnical Design Requirements New Landfill Facility Warwick, Ontario" prepared by Alston Associates Inc., dated July 31, 2006.

6. Document entitled "2006 Poplar System Monitoring Report Warwick Landfill Site Township of Warwick Ontario" prepared by Jagger Hims Limited, dated January 2007.

7. Document entitled "Warwick Landfill Expansion Contaminating Lifespan Review" prepared by Jagger Hims Limited, dated March 2006.

8. Drawing No. 105716-111 entitled " Proposed Final Contours and Stormwater Management Plan" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

9. Drawing No. 105716-112 entitled " Landfill Bottom Contours (Top of Primary Gravel)" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

10. Drawing No. 105716-113 entitled "Landfill Perimeter Sections" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

11. Drawing No. 105716-114 entitled " Landfill Perimeter Sections" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

12. Drawing No. 105716-115 entitled "Leachate Collection Sump Details" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

13. Drawing No. 105716-116 entitled "Proposed Primary Leachate Collection System" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

14. Drawing No. 105716-117 entitled "Proposed Secondary Leachate Collection System" prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

15. Drawing No. 105716-118 entitled "Landfill Sections" prepared by Henderson Paddon and Associates

Limited, dated February 24, 2006.

16. Drawing No. 105716-119 entitled “Landfill Perimeter Sections” prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

17. Drawing No. 105716-120 entitled “ Landfill Perimeter Sections” prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

18. Drawing No. 105716-125 entitled “Details and Sections” prepared by Henderson Paddon and Associates Limited, dated February 24, 2006.

19. Letter dated April 16, 2007 from Frank Ford, Henderson Paddon and Associated Limited to Wilf Ruland, Citizens Environmental Consulting.

20. Letter dated May 2, 2007 from Frank Ford, Henderson Paddon and Associated Limited to Wilf Ruland, Citizens Environmental Consulting.

21. Letter dated June 1, 2007 from Greg Washuta, P. Eng., M. Eng., Senior Waste Engineer, Ministry of the Environment to Reid Cleland, Waste Management of Canada Corporation.

22. Drawing No. 106716-127A entitled "Plough Furrow Surface Water Distribution Warwick Landfill" prepared by Henderson Paddon and Associates Limited, dated March 21, 2007.

23. Drawing No. 106716-F215 entitled "Proposed Mini-Transfer Area" prepared by Henderson Paddon and Associates Limited, dated March 29, 2007.

24. Report entitled "Best Management Practices Plan (Dust) Warwick Landfill Watford, Ontario " prepared by RWDI Air Inc., dated December 11, 2007.

25. Report entitled "Best Management Practices Plan (Litter) Warwick Landfill Watford, Ontario " prepared by RWDI Air Inc., dated December 11, 2007.

26. Report entitled "Best Management Practices Plan (Odour) Warwick Landfill Watford, Ontario " prepared by RWDI Air Inc., dated December 11**,** 2007.

27. Document entitled "Appendix F Air Quality Monitoring Plan and Letter", prepared by RWDI, dated November 29, 2007.

28. Document entitled "Environmental Noise Monitoring Program for the Warwick Landfill" , prepared by Aercoustics Engineering Limited, dated November 21, 2007.

29. Document entitled "Proposed Expansion of WM Warwick Landfill Predicted Noise Impact" , prepared by Aercoustics Engineering Limited, dated June 15, 2007.

30. Document entitled "Application for Approval of ECA of Approval A032203 Warwick Township

County of Lambton MOE. Reference No. 0539-6N7TRY Part 1 of 2" , dated July 13, 2007, prepared by Henderson Paddon and Associates Limited.

31. Document entitled "Application for Approval of ECA of Approval A032203 Warwick Township County of Lambton MOE. Reference No. 0539-6N7TRY Part 2 of 2- Financial Assurances" , dated August 22, 2007, prepared by Henderson Paddon and Associates Limited.

32. Letter dated July 27, 2007 from Dan Toner, Assistant Director, Laboratory Services Branch to Tesfaye Gebrezghi, Supervisor- Waste Unit, MOE.

33. Table 6.1 entitled "Phasing-Analysis for Leachate Quantities WM- Warwick Landfill Expansion" prepared by Henderson Paddon and Associates Ltd., dated August 17, 2007.

34. Letter dated August 20, 2007 from John DeYoe, RWDI to Frank Ford, Henderson Paddon and Associates Limited.

35. Discussion Paper 9 entitled "Impact Management Plan" and all Appendices dated October 2005 prepared by Waste Management of Canada Corporation.

36. Letter Report and attachments dated May 10, 2001 from Frank C. Ford of Henderson, Paddon Environmental to Mark Turner, Environmental Assessment and Approvals Branch.

37. Development and Operations Report - Canadian Waste Services Inc. - Warwick Landfill, Warwick Township - Revised, dated October 1997, prepared by Henderson Paddon Environmental Inc.

38. Consolidated Report Leachate Management Plan - Canadian Waste Services Inc. - Warwick Landfill - Warwick Township dated July 2001 prepared by Henderson Paddon Environmental Inc.

39. Environmental Monitoring Plan - Warwick Landfill - Township of Warwick, Ontario dated December 2007, prepared by Jagger Hims Limited.

40. Letter dated October 11, 2007 from Brad Bergeron, RWDI to Greg Washuta, Senior Waste Engineer, Ministry of the Environment.

41. Report entitled "Stormwater Management Plan Poplar Irrigation Area Warwick Landfill Expansion Watford, Ontario" dated December 2007, prepared by Henderson Paddon Environmental Inc.

42. Letter dated November 21, 2007 from Kevin Smith, Aercoustics Engineering Limited to Wayne Jenken, Waste Management of Canada Corporation.

43. E-mail and attachments dated February 12, 2008 from Brad Bergeron, RWDI Air Inc. to Greg Washuta, Senior Waste Engineer, EAAB, MOE.

44. E-mail and attachments dated January 29, 2008 from Brad Bergeron RWDI Air Inc. to Greg Washuta, Senior Waste Engineer, EAAB, MOE.

45. Letter dated March 3, 2008 from Wayne Jenken, Landfill Engineer, WMCC to Ian Parrott, Manager, ECA of Approval Review Section, EAAB, MOE.

46. Letter dated June 13, 2008 from Frank Ford, Senior Environmental Engineer, Henderson Paddon and Associates Limited to Greg Washuta, P. Eng., Senior Waste Engineer, Waste Unit, EAAB, MOE.

47. Application for a Provisional Certificate of Approval for a Waste Disposal Site for the Twin Creeks Landfill Site, signed and dated December 11, 2008.

48. Letter dated December 11, 2008 from Reid Cleland, District Landfill Manager, WMCC to Doris Dumais, Approvals Director, EAAB, MOE.

49. Report entitled "Cell 12 Project and Changes Affecting The Warwick Landfill Expansion" and attached appendices, created by Henderson Paddon & Associates Limited, dated August 2008.

50. Application for a Provisional Certificate of Approval for a Waste Disposal Site for the Twin Creeks Landfill Site, dated August 11, 2008.

51. Letter dated December 18, 2008 from Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE to Reid Cleland, District Landfill Manager, WMCC.

52. Letter dated December 18, 2008 from Wayne Jenken, Landfill Engineer, WMCC to Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE.

53. Letter dated December 18, 2008 from Jason Balsdon and Brent Langille, Jagger Hims Limited to Wayne Jenken, Landfill Engineer, WMCC.

54. Application for a Provisional Certificate of Approval for a Waste Disposal Site for Waste Management of Canada Corporation's Twin Creeks Landfill Site, signed and dated January 16, 2009.

55. Report and Appendix A entitled "Waste Management of Canada Corporation Twin Creeks Landfill Use of Geonet for Secondary Drainage Layer" prepared by Henderson Paddon and Associates, dated January 2009.

56 Letter dated March 18, 2009 from Greg Washuta Senior Waste Engineer, Waste Unit, EAAB, MOE to Reid Cleland, Landfill Manager, WMCC.

57. Letter report and appendices A, B and C dated April 9, 2009 from Jeff Armstrong, Genivar Consultants LP to Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE.

58. Application for a Waste Disposal Site Certificate of Approval dated April 28, 2009 and signed by Reid Cleland, District Manager, Waste Management of Canada Corporation.

59. Report produced by Genivar Consultants LP entitled "Development & Operations Report for a Waste

Transfer Station Application" dated June 2009.

60. November 24, 2009 e-mail from Jeff Armstrong of Genivar Consultants LP to Jim Chisholm, Senior Review Engineer with the Ministry of Environment indicating that the application is for an existing mini transfer area but flexibility is being applied for to direct the waste collected at this area to alternate waste disposal sites.

61. November 24, 2009 e-mail from Jim Chisholm, Senior Review Engineer with the Ministry of Environment to Jeff Armstrong, Genivar Consultants LP, requesting information about how the Mini-Transfer Area already located at the landfill is covered by the existing Certificate of Approval and the December 21, 2009 e-mail response from Jeff Armstrong to Jim Chisholm to his November 24, 2009 e-mail, outlining that the Mini-Transfer Area is covered by the 1997 Design and Operation Report that is identified in Item 37 and attached page 7-4 of the report in which Section 7.8 dealt with the Mini-Transfer Area.

62. January 24, 2011, 12:11PM, e-mail from Wayne Jenken, Area Landfill Engineer, Waste Management of Canada Corporation to Jim Chisholm, Senior Review Engineer with the Ministry of Environment indicating that the original Mini Transfer Area moved to the new location on November 2009 and that the old location for the Mini Transfer Area has been removed. The e-mail also made suggested changes to a draft of the Notice.

63. Document entitled "Twin Creeks Landfill - Expansion of Poplar Cap Irrigation System for Existing Waste Disposal Area January 2010" prepared for Waste Management of Canada Corporation by Genivar Consultants LP dated January 2010.

64. Letter dated November 2, 2010 addressed to Mr. Reid Cleland, Waste Management of Canada Corporation from Mr. Greg Washuta, Ministry of the Environment providing comments and requesting additional information on MOE Reference File No. 1486-829MCN.

65. Document entitled "Twin Creeks Landfill, Watford, ON 091-13089-00 (91730R) - Application for Approval for Expansion of Poplar Plantation (South Fill Area) - Response to MOE Comments Letter dated November 2, 2010" prepared for Waste Management of Canada Corporation by Genivar Consultants LP dated December 2, 2010.

66. Report entitled "Development and Operations Plan - Warwick Landfill Expansion - Volume 1 of 3" prepared for WMCC by Henderson Paddon & Associates dated March 2008.

67. Report entitled "Development and Operations Plan - Warwick Landfill Expansion - Volume 2 of 3" prepared for WMCC by Henderson Paddon & Associates dated March 2008.

68. Report entitled "Development and Operations Plan - Warwick Landfill Expansion - Monitoring Plans - Volume 3 of 3" prepared for WMCC by Henderson Paddon & Associates dated March 2008.

69. Letter dated May 6, 2009 addressed to Mr. Reid Cleland, WMCC from Mr. Greg Washuta, Ministry of the Environment providing ministry review comments on the Development and Operations Plan

70. Letter dated August 19, 2009 addressed to Mr. Reid Cleland, WMCC from Mr. Greg Washuta, Ministry of the Environment providing comments from the Township of Warwick, Walpole Island First Nation and the Warwick Public Liaison Committee on the Development and Operations Plan

71. Letter dated November 12, 2009 addressed to Mr. Greg Washuta, Ministry of the Environment from Mr. Wayne Jenken, WMCC.

72. Drawing set entitled "Twin Creeks Landfill - Landscaping and Signage Detail Construction Drawings" prepared by Schollen & Company Inc. and dated July 4, 2008. The drawing set consists of the following:

    i. Cover page entitled "Twin Creeks Landfill - Landscaping and Signage Detail Construction Drawings" prepared by Schollen & Company Inc. and dated July 4, 2008;
    ii. Drawing No. L-1 entitled "Landscape Plan - Screening Berm";
    iii. Drawing No. L-1A entitled " Lanscape Detail at Intersections - Screening Berm"
    iv. Drawing No. L-2 entitled "Landscape Plan - Screening Berm";
    v. Drawing No. L-3 entitled "Landscape Plan - Screening Berm & Area F";
    vi. Drawing No. L-4 entitled "Landscape Plan - Screening Berm";
    vii. Drawing No. L-5 entitled "Landscape Plan - Screening Berm and Area G (North)";
    vii. Drawing No. L-6 entitled "Landscape Plan - Screen Planting Area G (South)";
    viii. Drawing No. L-7 entitled "Landscape Plan - Screen Planting and Creek Area A and Area B";
    ix. Drawing No. L-8 entitled "Landscape Plan - Screen Planting Areas C, D and E";
    x. Drawing No. L-9 entitled "Landscape Plan - Restoration Planting Area H";
    xi. Drawing No. LD-1 entitled "Landscape Detail Plan ";
    xii. Drawing No. LD-2 entitled "Landscape Notes and Master Plant List"; and
    xiii. Drawing No. LD-3 entitled "Signage Details";

73. Application for a Certificate of Approval for a Waste Disposal Site dated April 6, 2011 submitted by Waste Management of Canada Corporation for Provisional Certificate of Approval No. A032203 requesting approval for use of an alternative daily cover material and amended Best Management Practices for Odour.. The supporting documentation for the application included the following:

    i. Cover letter dated April 7, 2011 addressed to Mr. Tes Gebrezghi, Ministry of the Environment from Mr. Reid Cleland, Waste Management of Canada Corporation;
    ii. Report entitled "Best Management Practices Plan (Odour) Warwick Landfill" prepared for Waste Management of Canada Corporation by RWDI Air Inc. (Project No. 1100800) dated April 7, 2011;
    iii. Letter dated March 24, 2011 addressed to Mr. Wayne Jenken, Waste Management of Canada Corporation from Mr. Peter Pickfield, Garrod Pickfield; and
    iv. Email dated March 22, 2011 at 3:32 p.m. sent to Mr. Peter Pickfield, Garrod Pickfield from Mr. Wayne Jenken.

74. Letter dated October 4, 2011 addressed to Mr. Tesfaye Gebrezghi, Ministry of the Environment from

Mr. Reid Cleland, Waste Management of Canada requesting an amendment to Condition 167 (a). The supporting documentation attached to the letter included the following:

a. Application for a Certificate of Approval for a Waste Disposal Site dated October 4, 2011;
b. Provisional Certificate of Approval A032203 Notice No. 7 dated June 1, 2011;
c. Letter from Wayne Jenken, WMCC to Don Bruder, Township of Warwick dated February 23, 2011;
d. Letter from Wayne Jenken, WMCC to Don Bruder, Township of Warwick dated May 26, 2011;
e. Letter from Peter Pickfield, Garrod Pickfield LLP to Reid Cleland, WMCC dated September 14, 2011;
f. Letter from Wayne Jenken, WMCC to Dean Jacobs, Walpole Island First Nations dated July 14, 2011;
g. Email from Kent Hunter, Neegan Burnside to Wayne Jenken dated September 19, 2011 at 3:54 p.m.;
g. Email from Wayne Jenken, WMCC to Kent Hunter, Neegan Burnside dated September 20, 2011 at 1:52 p.m.;
h. Email from Kent Hunter, Neegan Burnside to Wayne Jenken dated September 27, 2011 at 10:23 a.m.;
i. WPLC meeting minutes dated September 15, 2011; and
j. WPLC meeting minutes dated April 7, 2011.

75. Letter dated May 22, 2012 addressed to Ms. Agatha Garcia Wright, Director, Ministry of the Environment from Mr. Wayne Jenken, Waste Management of Canada Corporation requesting amendment to Condition No. 7.10 (Landfill Gas Management). The letter included the following supporting documentation:

i. Letter report entitled "Early Vertical Gas Well Collection System" dated May 2012 and addressed to Mr. Reid Cleland, Waste Management of Canada Corporation from Mr. Frank Ford, GENIVAR Inc.;
ii. Drawings No. 102 and G111 - Landfill Gas Collection System;
iii. Landfill Gas Headers, Gas Building with Blowers and Landfill Gas Flaring System Design Drawings and Design and Operations Plan for Modifications;
iv. Description of Phase 1 of the Gas Collection System;
v. Revised Section 4.7 of the Design and Operations Plan;
vi. Application to Amend Environmental Compliance Approval No. A032203 and supporting documents;
vii. Consultation Summary and Records with Stakeholders; and
viii. Design Drawings for Amended Landfill Gas Management System.

76. Letter dated July 26, 2012 addressed to Mr. Reid Cleland, Waste Management of Canada Corporation from Mr. Dale Gable, Ministry of the Environment requesting additional information on the location of the proposed gas extraction wells.

77. Letter dated August 9, 2012 addressed to Mr. Dale Gable, Ministry of the Environment from Mr. Frank

Ford, GENIVAR Inc. providing details on the location of the gas wells.

78. Letter Report dated May 9, 2012 addressed to Ms. Agatha Garcia Wright, Director, Ministry of the Environment form Mr. Wayne Jenken, Waste Management of Canada requesting Conditions 6.48 to 6.61 be amended. The letter report included the following Sections:

    i. Environmental Compliance Approval application signed by Reid Cleland, WMCC and dated May 9, 2012;
    ii. Proof of legal name and zoning;
    iii. Record of consultation with Township of Warwick;
    iv. Record of consultation with Walpole First Island First Nation; and
    v. Record of consultation with WPLC.

79. Letter report dated September 26, 2012 addressed to Ms. Agatha Garcia-Wright. Director, Environmental Approvals Branch, Ministry of the Environment from Mr. Philip Janisse and Mr. Brent Langille, RWDI Inc. requesting the time frame for the use of ASR be extended and the sampling frequency for the ASR be reduced.

80. Letter dated October 15, 2012 and supporting drawings addresses to Ms. Agatha Garcia-Wright. Director, Environmental Approvals Branch, Ministry of the Environment from Mr. Wayne Jenken, Waste Management of Canada Corporation detailing the proposed changes to the landscape plan for the Site. The supporting drawings include the following drawing prepared by Schollen and Company Inc (Contract No. 27007) dated June 2012:

    i. Cover page entitled "Twin Creeks Landfill Expansion - Landscape and Details Drawings" dated June 29, 2012
    ii. Drawing No. L-1 entitled "Landscape Plan - Screening Berm";
    iii. Drawing L-1A entitled "Landscape Detail at Intersections - Screening Berms";
    iv. Drawing L-2 entitled "Landscape Plan - Screening Berm";
    v. Drawing L-3 entitled "Landscape Plan - Screening Berm and Area F";
    vi. Drawing L-4 entitled "Landscape Plan - Screening Berm";
    vii. Drawing L-5 entitled "Landscape Plan - Screening Berm and Area G";
    viii. Drawing L-6 entitled "Landscape Plan - Area G Planting Area";
    ix. Drawing L-7 entitled "Landscape Plan - Area A and Area B Screen Planting and Creek";
    x. Drawing L-8 entitled "Landscape Plan - Area C, D and E Screen Planting";
    xi. Drawing L-9 entitled "Landscape Plan - Area H Restoration Planting";
    xii. Drawing LD-1 entitled "Landscape Detail Plan";
    xiii. Drawing LD-2 entitled "Landscape Notes and Master Plant List";
    xiv. Drawing LD-3 entitled "Signage Details";
    xv. Drawing LD-4 entitled "Details"; and
    xvi. Drawing LD-5 entitled "Details".

81. Letter dated November 13, 2013 addressed to Agatha Garcia-Wright, Director, Ministry of the Environment from Wayne Jenken, Waste Management of Canada Corporation requesting amendment to Condition 8.6 (a). The following supporting documentation was attached to the memorandum.

i. Amended Environmental Compliance Approval Number A032203 issued December 13, 2011
ii. Amended Environmental Compliance Approval Number A032203 Notice No. 1 issued February 29, 2012
iii. Application to Amend Environmental Compliance Approval No. A032203 with Signature of Reid Cleland in Section 1.4
iv. Record of Consultations with Stakeholders

82. Application package dated May 4, 2016 and received on May 16, 2016 including all subsequently submitted supporting documentation and drawings, including the amendment to the D&O plan and associated drawings.

83. Report titled "Twin Creeks Landfill Site: Best Management Practices Plan (Dust) - Version 7" prepared by RWDI Air Inc., dated May 19, 2017.

84. Report titled "Twin Creeks Landfill Site: Best Management Practices Plan (Odour) - Version 8" prepared by RWDI Air Inc., dated May 19, 2017.

85. Report titled "Twin Creeks Landfill Site: Ambient Air Quality Monitoring Plan (Revision #3)" prepared by RWDI Air Inc., dated May 18, 2017.

86. "WM Twin Creeks Landfill Site, Leachate Management Framework" prepared by HDR, dated November 29, 2017.

87. Application for a an amendment to ECA No. A032203 to provide detailed design for the construction of Cell 4 in response to Condition 4.8. Signed by Reid Cleland and dated October 16, 2018. The supporting documentation for the application included the drawing set titled "Waste Management of Canada Corporation, Twin Creeks Landfill Expansion, Warwick Township, Landfill Base Preparation Cell 4." Prepared by WSP Group, October, 2018. The drawing set consists of the following:

i. Drawing No. 106716P-400 - "Title Sheet";
ii. Drawing No. 106716P-401 - "March 2018 Existing Conditions Plan;
iii. Drawing No. 106716P-402 - "Cell 4 - Bottom of Excavation - West";
iv. Drawing No. 106716P-403 - "Cell 4 - Bottom of Excavation - East";
v. Drawing No. 106716P-404 - "Cell 4 - Top of Primary Clay Liner - West";
vi. Drawing No. 106716P-405 - "Cell 4 - Top of Primary Clay Liner - East";
vii. Drawing No. 106716P-406 - "Cell 4 - Temporary Clay Seal - West";
vii. Drawing No. 106716P-407 - "Cell 4 - Temporary Clay Seal - East";
viii. Drawing No. 106716P-408 - "Cell 4 - Section and Details";
ix. Drawing No. 106716P-409 - "Cell 4 - Section and Details";
x. Drawing No. 106716P-410 - "Cell 4 - Section and Details";
xi. Drawing No. 106716P-411 - "Cell 4 - Pumping Station PS5/PS6 Plans and Sections";
xii. Drawing No. 106716P-412 - "Cell 4 - Pumping Station PS5/PS6 Plans and Sections";
xiii. Drawing No. 106716P-413 - "Cell 4 - Sections and Details"; and

xiv Drawing No. 106716P-414 - "Cell 4 - Sections and Details".

88. Environmental Compliance Approval Application signed by Wayne Jenken dated April 28, 2023, for establishment of a Renewable Natural Gas Facility at the Site.

89. Report entitled "Twin Creeks Environmental Centre Renewable Natural Gas Facility Design and Operations Report" dated April 28, 2023 prepared by WSP.

90. Report entitled "Twin Creeks Landfill: Best Management Practices Plan (Odour) - Version 9" dated November 17, 2023 prepared by RWDI.

91. Letter dated February 27, 2014 from Mike Moroney, District Manager of MECP to Angela McLachlan, Environmental Compliance Manager, Twin Creeks Landfill, WMCC.

The reasons for the imposition of these terms and conditions are as follows:

Conditions 1.1, 1.2, 1.3, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.14, 1.15, 1.23, and 1.24 are to clarify the legal rights and responsibilities of the Owner and Operator under this Approval.

Conditions 1.4 and 1.5 are to ensure that the Site is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.

Condition 1.12 is to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes.

Condition 1.14 is to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this Approval.

Conditions 1.15 and 1.16 are to ensure that the successor is aware of its legal responsibilities.

Conditions 1.17, 1.18, 1.19, and 1.20 clarify that the Part II.1 Director is an individual with authority pursuant to Section 197 of the Environmental Protection Act to require registration on title and provide any person with an interest in property before dealing with the property in any way to give a copy of the Approval to any person who will acquire an interest in the property as a result of the dealing.

Condition 1.21 is to ensure that appropriate Ministry staff has ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Approval. This Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the Act, the OWRA, the PA, the NMA and the SDWA.

Condition 1.25 clarifies what information may be subject to the Freedom of Information Act.

Condition 2.1 is to require Financial Assurance for this company to ensure that sufficient funds are available to the Ministry to clean up the Site in the event that the Owner is unable or unwilling to do so.

Conditions 3.1 to 3.15 inclusive are necessary in order to establish a forum for the exchange of information and public dialogue on activities to be carried out at the landfill site. Open communication with the public and local authorities is important in helping to maintain high standards for site operation and environmental protection.

Condition 3.16 has been included in order to ensure that consultation with First Nations is undertaken during the submission of any application to amend any approval required by the Ministry.

Conditions 4.1 to 4.6 inclusive, 4.8, and 4.9 is to ensure that the Site is designed, constructed and operated in an environmentally acceptable manner, based on the conceptual design and operations for the Site.

Condition 4.7 is to ensure the availability of as-built drawings for inspection and information purposes.

Condition 4.10 has been specifically included to allow for optimization of design for subsequent stages based on operating experience and monitoring results and to ensure that any necessary remedial action is undertaken before landfilling may proceed in the next stage.

Condition 4.11 has been included to ensure that the site has been constructed in accordance with the approved design plans, specifications and QA/QC procedures and to ensure that there is not an adverse impact on the environment.

Condition 4.12 is to ensure that there is a person, reporting directly to the Ministry, with associated costs reimbursed by the Owner, who is responsible for inspecting the Site, based on the requirements in this ECA of Approval to ensure that the Site is operated in an environmentally acceptable manner.

Conditions 4.13, 4.14, 15.1, 15.2 and 15.3 is to specify the amount of days the environmental inspector is required to be on site based on the conditions in this approval and in accordance with the previously approved EA for the site.

Condition 5.1 is to ensure safe side slopes of the berm.

The reason for Condition 5.2 is to approve the diversion area based on the information submitted. This is ensure the protection of the environment and the public.

Condition 5.3 is to approve the use of Cell 12 for contaminated soil.

Condition 5.4 is to ensure the Owner carries out the landscape plan based on the submitted information.

Conditions 6.1 and 6.18 are included in order to ensure that waste disposal at the site is undertaken in accordance with applicable Ministry of the Environment regulations and guidelines. Compliance with these regulations and guidelines will ensure that the site does not cause and adverse effect on the environment.

Conditions 6.4 and 6.7 is to specify the approved areas from which waste may be accepted at the Site and the

types and amounts of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.

Condition 6.5 is to specify restrictions on the extent of landfilling at this Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity of the site. Approval to landfill beyond these limits would require an application with supporting documentation submitted to the Director.

Condition 6.6 specifies the maximum amount of waste that may be received at the site based on the previously approved Environmental Assessment for the site.

Condition 6.8 has been inserted to minimize the potential for clogging of the drainage layer and to minimize temperature effects on the leachate collection system. Failure to maintain the specified minimum thickness of waste and cover material may result in a decrease in the service life of the drainage layer.

Conditions 6.9 to 6.14 inclusive have been included in order to ensure asbestos waste is handled and disposed of in accordance with O. Reg. 347 as amended from time to time. Proper handling and disposal of asbestos waste ensures that the asbestos waste does not cause an adverse impact on the environment and also does not affect human health.

Condition 6.16 is needed to make certain that uses at the site are for waste disposal purposes only and not any other uses which may cause an adverse impact on the environment and human health.

Condition 6.17 is necessary in order to ensure that all waste loads are inspected and waste that is disposed of at the site is in accordance with the terms and conditions in this ECA of Approval.

Condition 6.19 is to ensure that open burning of municipal waste is not permitted because of concerns with air emissions, smoke and other nuisance affects, and the potential fire hazard.

Conditions 6.20 through 6.22 inclusive are to ensure that users of the Site are fully aware of important information and restrictions related to Site operations under this ECA of Approval.

Conditions 6.23 to 6.27 inclusive are to specify the normal hours of operation for the landfill Site and a mechanism for amendment of the hours of operation.

Conditions 6.28 to 6.30 inclusive are to specify site access to/from the Site and to ensure the controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.

Condition 6.31 is needed in order to make certain that the waste received at the site is in accordance with the ECA and O. Reg. 347.

Condition 6.32 has been included is to ensure that access roads are clear and do not pose a safety hazard to the general public.

Condition 6.33 is for the protection of public health and safety and minimization of the potential for damage to environmental control, monitoring and other works at the landfill Site. Scavenging is the uncontrolled removal of material from waste at a landfill site.

Conditions 6.34 to 6.40 inclusive are to ensure that the Site is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.

Condition 6.41 is to ensure that noise from or related to the operation of the landfill is kept to within Ministry limits and does not result in a hazard or nuisance to any person.

Condition 6.42 is included to ensure that noise monitoring is undertaken in accordance with the noise monitoring program prepared and to ensure that an independent acoustic audit is completed in accordance with the Ministry's requirements.

Condition 6.43 is to clarify when the Best Management Plans can be amended and the mechanism for amending the Best Management Plans.

Condition 6.44 is to ensure that appropriate measures are taken in order to prevent surface water from contacting waste so as not to cause an adverse effect on the environment.

Conditions 6.45 and 7.18 is to specify other approvals required for works and activities related to the operation of this Site as a landfill.

Condition 6.46 has been included is in order to prevent ponding in on site ditches and any adverse impact on the environment and human health.

Condition 6.47 is to ensure that landfilling operations are conducted in an environmentally acceptable manner. Daily and intermediate cover is used to control potential nuisance effects, to facilitate vehicle access on the site, and to ensure an acceptable site appearance is maintained. The proper closure of a landfill site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the site.

Condition 6.48 to 6.61 inclusive is to specify the approval requirements for use of alternative cover material at the Site.

Condition 7.1 is necessary so that runoff from contaminated soils does not create and adverse impact on the environment.

Conditions 7.2 and 7.3 are included in order to ensure that the composting and processing operations at the site are conducted in a fashion in accordance with Ministry's regulations, guidelines and so as not to pose a threat to human health or the environment.

Conditions 7.4, 9.3, 9.4, 9.5, 9.6 and 9.7 are to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the

occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this ECA of Approval, the EPA and its regulations.

Conditions 7.5 and 7.6 inclusive have been included are to ensure tire shred storage in accordance with the Fire Protection and Prevention Act and to protect the natural environment.

Condition 7.7 is to ensure that backup power is available so that all facilities remain operational during a power disruption thus preventing any adverse impacts on the environment.

Condition 7.8 has been inserted in order to ensure that concentrations of landfill gas do not pose a hazard to human health or the environment.

Condition 7.9 is to ensure that landfill gas is built and managed in accordance with the Ministry's requirement and regulation.

Condition 7.10 is needed in order to ensure that an adequate landfill gas management system is installed at the site in order to protect human health and the environment.

Conditions 7.11 and 7.12 are to minimize the potential for clogging of leachate collection pipes and to ensure effective operation of the leachate collection system components for as long as they are required. Failure to clean out these components on a regular basis may result in a decrease in their service lives. Regular cleaning of the leachate collection pipes is especially important during stages of landfilling when the level of both organic and inorganic constituents in the leachate is high and, consequently, the potential for clogging due to encrustation is greatest. As the landfill reaches the more stable methane producing stage, pipe cleaning may be required less frequently.

Condition 7.13 has been added to ensure adequate flow of leachate in the leachate collection pipes.

Conditions 7.14 to 7.17 are to ensure that the leachate collection system is designed and built in accordance with Regulations and the ministry's requirements.

Condition 7.18 is included is in order to prevent off site migration of leachate which may cause an adverse effect on the environment.

Condition 7.19 is to approve the proposed Renewable Natural Gas facility for processing of the landfill gas and converting into quality natural gas.

Conditions 7.20 and 21 are to ensure the RNG facility has adequate capacity and the operation of the landfill gas collection system is not impacted.

Condition 7.22 is to ensure the RNG facility is property operated and does not result in any unacceptable impacts to the environment.

Condition 7.23 is to ensure operational record of the RNG facility is maintained for evaluation of the system performance and identification of improvement measures.

Conditions 8.1 to 8.4 inclusive are needed to ensure leachate recirculation is undertaken in accordance with the ministry's requirements and leachate recirculation does not pose an adverse impact on the environment.

Condition 8.5 is in accordance with EA condition 22 and protects the natural environment from any impacts due to discharge of raw or treated leachate to adjacent creeks.

Condition 8.6 is to ensure that a fully functional leachate treatment system is in place on site prior to waste placement.

Condition 8.7 clarifies the responsibilities of the owner, the requirements of the ministry, the authority of the Ministry and protects the natural environment and human health.

Conditions 9.1 and 9.2 are needed to ensure regular inspections of the site are conducted in order to protect the natural environment.

Conditions 9.8 to 9.12 inclusive is to ensure that accurate waste records are maintained to ensure compliance with the conditions in this ECA of Approval (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the EPA and its regulations.

Conditions 9.13, 15.4, 15.5 and 15.6 are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.

Condition 10.1 is to ensure that the Site is supervised and operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.

Conditions 11.1, 11.2, 11.3 and 11.4 is to establish a forum for the exchange of information and public dialogue on activities carried out at the landfill Site. Open communication with the public and local authorities is important in helping to maintain high standards for site operation and environmental protection.

Conditions 12.1 and 12.2 are to ensure that the Ministry is informed of any spills or fires at the Site and to provide public health and safety and environmental protection.

Condition 12.3 is contained in the ECA to guarantee that appropriate measures are taken by the County to prevent future occurrences of spills or fires at the site and to protect public health and safety and the environment.

Conditions 13.1 to 13.5 inclusive are to ensure protection of the natural environment and the integrity of the groundwater monitoring network.

Conditions 13.6 through 13.11 inclusive are to demonstrate that the landfill site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency

action can be taken.

Conditions 14.1 through 14.10 inclusive are to ensure that the Owner follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site. A remedial action / contingency plan is necessary to ensure protection of the natural environment. A leachate contingency plan is a specific requirement of Reg. 232.

Conditions 16.1 and 16.2 are to ensure that final closure of the Site is completed in an aesthetically pleasing manner and to ensure the long-term protection of the natural environment.

Condition 16.3 ensures proper public consultation about the end use of the Site is undertaken and that the end use activities are consistent with those identified during the EA process.

Conditions 16.4 to 16.6 ensure that certain activities are undertaken upon closure of the site in order to ensure that the closed site does not affect the natural environment.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A032203 issued on February 4, 2023

In accordance with Section 139 of the *Environmental Protection Act,* you may by written notice served upon me, the Ontario Land Tribunal and in accordance with Section 47 of the *Environmental Bill of Rights,* 1993, the Minister of the Environment, Conservation and Parks, within 15 days after receipt of this notice, require a hearing by the Tribunal. The Minister of the Environment, Conservation and Parks will place notice of your appeal on the Environmental Registry. Section 142 of the Environmental Protection Act provides that the notice requiring the hearing ("the Notice") shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the *Environmental Protection Act,* a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

Registrar*	The Minister of the Environment,	The Director appointed for the purposes of Part II.1 of the *Environmental Protection Act*

Ontario Land Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario M5G 1E5 OLT.Registrar@ontario.ca	and	Conservation and Parks 777 Bay Street, 5th Floor Toronto, Ontario M7A 2J3	and	Ministry of the Environment, Conservation and Parks 135 St. Clair Avenue West, 1st Floor Toronto, Ontario M4V 1P5

*** Further information on the Ontario Land Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349 or 1 (866) 448-2248, or www.olt.gov.on.ca**

This instrument is subject to Section 38 of the *Environmental Bill of Rights,* 1993, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek leave to appeal within 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry at https://ero.ontario.ca/, you can determine when the leave to appeal period ends.

The above noted activity is approved under s.20.3 of Part II.1 of the *Environmental Protection Act.*

DATED AT TORONTO this 16th day of December, 2023

Mohsen Keyvani, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

RL/

c: District Manager, MECP Sarnia
Cristina Olarte, WSP

APPENDIX B:

Climatic Data

Table B-1
Historical Precipitation Data Summary
Twin Creeks Environmental Centre - Poplar System

Year	Climatological Station Precipitation Total (mm/a)	On-site Precipitation Total (mm/a)
30-Year Normal (1961-1990)	711.9	-
30-Year Normal (1971-2000)	935.5	-
30-Year Normal (1981-2010)	959.2	-
30-Year Normal (1991-2020)	962.1	-
1995	868.7	-
1996, 1997	Complete annual data not available	-
1998	788.8	-
1999	805.1	-
2000	1,140.6	-
2001	867.2	-
2002	682.6	472.0
2003	982.8	726.7
2004	954.8	729.2
2005	898.3	577.0
2006	1,245.8	853.3
2007	804.4	699.8
2008	1,241.8	852.2
2009	1,001.8	729.1
2010	927.1	676.7
2011	1255.0	812.3
2012	860.2	592.7
2013	1,194.4	911.4
2014	895.6	829.5
2015	828.0	724.0
2016	1,012.8	816.5
2017	972.2	843.3
2018	1,169.6	951.3
2019	1007.6	808.6
2020	966.6	725.4
2021	1028.4	870.6
2022	747.1	634.8
2023	1140.4	906.2

Notes

1) Dash (-) denotes climatologial station not operational

2) On-site precipiitation data collected from the automated RWDI Envision climatological station since 2019 instead of manual rain gauge readings, as in years prior.

Environment Canada Environnement Canada

Daily Data Report for January 2023

STRATHROY-MULLIFARRY
ONTARIO

Latitude:	42°58'50.022" N	Longitude:	81°38'34.086" W	Elevation:	243.00 m
Climate ID:	6148122	WMO ID:		TC ID:	

Daily Data Report for January 2023

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01 †	4.5	1	2.8	15.2	0	0	0	0	0		
02 †	5.5	1.5	3.5	14.5	0	0	0	0	0		
03 †	5.5	0.5	3	15	0	9.6	0	9.6	0		
04 †	8	3.5	5.8	12.2	0	15.4	0	15.4	0		
05 †	4	1.5	2.8	15.2	0	1	0	1	0		
06 †	2.5	1	1.8	16.2	0	0	0	0	0		
07 †	1	-1	0	18	0	0	0	0	0		
08 †	-1	-3	-2	20	0	0	0	0	0		
09 †	2.5	-4.5	-1	19	0	0	0	0	0		
10 †	3.5	0	1.8	16.2	0	0	0	0	0		
11 †	4	-2	1	17	0	0	0	0	0		
12 †	4	-0.5	1.8	16.2	0	2	0	2	0		
13 †	-1.5	-3.5	-2.5	20.5	0	0	0	0	0		
14 †	-1.5	-8	-4.8	22.8	0	0	0	0	0		
15 †	2	-11.5	-4.8	22.8	0	0	0	0	0		
16 †	4.5	-5	-0.3	18.3	0	3.4	0	3.4	0		
17 †	10	1	5.5	12.5	0	2	0	2	0		
18 †	4	3	3.5	14.5	0	5.4	0	5.4	0		
19 †	6	1.5	3.8	14.2	0	7.4	0	7.4	0		
20 †	2	0	1	17	0	1.2	0	1.2	0		
21 †	0	-1	-0.5	18.5	0	0	0	0	0		
22 †	0	-1	-0.5	18.5	0	0	6	6	0		
23 †	0	-9.5	-4.8	22.8	0	0	0	0	4		
24 †	2.5	-1.5	0.5	17.5	0	0	0	0	2		
25 †	0.5	-3.5	-1.5	19.5	0	0	15	15	1		
26 †	-1	-1.5	-1.3	19.3	0	0	7	7	14		
27 †	1.5	-5	-1.8	19.8	0	0	2	2	18		
28 †	0	-3	-1.5	19.5	0	0	0	0	15		
29 †	1	-3.5	-1.3	19.3	0	2.4	0	2.4	12		
30 †	-2.5	-6	-4.3	22.3	0	0	0	0	11		
31 †	-9	-14	-11.5	29.5	0	0	0	0	11		
Sum				563.8	0	49.8	30	79.8	88		
Avg	2.0	-2.4	-0.2								
Xtrm	10.0	-14.0									

Summary, average and extreme values are based on the data above.

Environment Canada Environnement Canada

Daily Data Report for February 2023

STRATHROY-MULLIFARRY
ONTARIO

Latitude:	42°58'50.022" N	Longitude:	81°38'34.086" W	Elevation:	243.00 m
Climate ID:	6148122	WMO ID:		TC ID:	

Daily Data Report for February 2023

	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
DAY											
01 †	-4.5	-20.5	-12.5	30.5	0	0	0	0	11		
02 †	0	-10.5	-5.3	23.3	0	0	1	1	10		
03 †	-12.5	-13.5	-13	31	0	0	1	1	10		
04 †	2.5	-17	-7.3	25.3	0	0	0	0	10		
05 †	4	-3.5	0.3	17.7	0	0.6	0	0.6	9		
06 †	-0.5	-2	-1.3	19.3	0	0	0	0	5		
07 †	8.5	-3	2.8	15.2	0	0	0	0	5		
08 †	6	-2	2	16	0	4.4	0	4.4	2		
09 †	10.5	0	5.3	12.7	0	19.8	0	19.8	0		
10 †	2.5	-0.5	1	17	0	0	0	0	0		
11 †	3	-3.5	-0.3	18.3	0	0	0	0	0		
12 †	8.5	-5	1.8	16.2	0	0	0	0	0		
13 †	8.5	-5	1.8	16.2	0	0	0	0	0		
14 †	11.5	-5	3.3	14.7	0	0	0	0	0		
15 †	14.5	4.5	9.5	8.5	0	0	0	0	0		
16 †	2	0.5	1.3	16.7	0	3	0	3	0		
17 †	-4.5	-6.5	-5.5	23.5	0	0	2	2	0		
18 †	4.5	-12	-3.8	21.8	0	0	0	0	1		
19 †	9	0	4.5	13.5	0	0	0	0	0		
20 †	5	0.5	2.8	15.2	0	0	0	0	0		
21 †	4.5	-2	1.3	16.7	0	0	0	0	0		
22 †	-0.5	-2	-1.3	19.3	0	0	4	4	0		
23 †	3	-5.5	-1.3	19.3	0	0	0	0	3		
24 †	-7	-8	-7.5	25.5	0	0	2	2	3		
25 †	-0.5	-9.5	-5	23	0	0	0	0	5		
26 †	2	-3	-0.5	18.5	0	0	0	0	4		
27 †	0.5	-8.5	-4	22	0	1.4	2	3.4	3		
28 †	3	-1.5	0.8	17.2	0	0	0	0	5		
Sum				534.1	0	29.2	12	41.2	86		
Avg	3.0	-5.1	-1.1								
Xtrm	14.5	-20.5									

Summary, average and extreme values are based on the data above.

Environment Canada Environnement Canada

Daily Data Report for March 2023

STRATHROY-MULLIFARRY
ONTARIO

Latitude:	42°58'50.022" N	Longitude:	81°38'34.086" W	Elevation:	243.00 m
Climate ID:	6148122	WMO ID:		TC ID:	

Daily Data Report for March 2023

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01 †	6.5	-4.5	1	17	0	0	0	0	4		
02 †	2.5	-6.5	-2	20	0	0	0	0	3		
03 †	2.5	-6	-1.8	19.8	0	0	23	23	3		
04 †	4	-1.5	1.3	16.7	0	0	0	0	25		
05 †	3.5	-1	1.3	16.7	0	0	0	0	17		
06 †	3	-4.5	-0.8	18.8	0	0	1	1	12		
07 †	-0.5	-5	-2.8	20.8	0	0	0	0	12		
08 †	0.5	-3.5	-1.5	19.5	0	0	0	0	12		
09 †	1	-8	-3.5	21.5	0	0	0	0	11		
10 †	0	-2	-1	19	0	0	10	10	11		
11 †	-2	-8	-5	23	0	0	0	0	20		
12 †	0	-12	-6	24	0	0	0	0	15		
13 †	-0.5	-4	-2.3	20.3	0	0	5	5	15		
14 †	-3.5	-5	-4.3	22.3	0	0	0	0	20		
15 †	5	-8	-1.5	19.5	0	0	0	0	19		
16 †	9.5	-0.5	4.5	13.5	0	8	0	8	14		
17 †	8	3	5.5	12.5	0	4	0	4	5		
18 †	-1.5	-6	-3.8	21.8	0	0	0	0	0		
19 †	3	-6.5	-1.8	19.8	0	0	0	0	0		
20 †	7	-3	2	16	0	0	0	0	0		
21 †	12	1	6.5	11.5	0	0	0	0	0		
22 †	8.5	2	5.3	12.7	0	6.4	0	6.4	0		
23 †	8.5	2.5	5.5	12.5	0	4.8	0	4.8	0		
24 †	5.5	-1.5	2	16	0	3.4	0	3.4	0		
25 †	12.5	0	6.3	11.7	0	10	0	10	0		
26 †	11	0	5.5	12.5	0	8.4	0	8.4	0		
27 †	4	3	3.5	14.5	0	1.6	0	1.6	0		
28 †	7	0	3.5	14.5	0	0	0	0	0		
29 †	7	-2	2.5	15.5	0	0	2	2	0		
30 †	5	-8	-1.5	19.5	0	1.2	0	1.2	0		
31 †	12	0	6	12	0	56	0	56	0		
Sum				535.4	0	103.8	41	144.8	218		
Avg	4.5	-3.1	0.7								
Xtrm	12.5	-12.0									

Summary, average and extreme values are based on the data above.

Environment Canada Environnement Canada

Daily Data Report for April 2023

STRATHROY-MULLIFARRY
ONTARIO

Latitude:	42°58'50.022" N	Longitude:	81°38'34.086" W	Elevation:	243.00 m
Climate ID:	6148122	WMO ID:		TC ID:	

Daily Data Report for April 2023

	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
DAY											
01 †	12	2	7	11	0	11.8	0	11.8	0		
02 †	4	-3	0.5	17.5	0	0	0	0	0		
03 †	12.5	0	6.3	11.7	0	33	0	33	0		
04 †	13.5	6.5	10	8	0	5	0	5	0		
05 †	19.5	7.5	13.5	4.5	0	10.4	0	10.4	0		
06 †	11	4	7.5	10.5	0	0	0	0	0		
07 †	3.5	-0.5	1.5	16.5	0	0	0	0	0		
08 †	10	-5.5	2.3	15.7	0	0	0	0	0		
09 †	13	-2.5	5.3	12.7	0	0	0	0	0		
10 †	18.5	0	9.3	8.7	0	0	0	0	0		
11 †	23	3	13	5	0	0	0	0	0		
12 †	26	11.5	18.8	0	0.8	0	0	0	0		
13 †	27	13.5	20.3	0	2.3	0	0	0	0		
14 †	28	6.5	17.3	0.7	0	0	0	0	0		
15 †	29	9.5	19.3	0	1.3	0	0	0	0		
16 †	26.5	10.5	18.5	0	0.5	8	0	8	0		
17 †	5	1.5	3.3	14.7	0	4.2	0	4.2	0		
18 †	3.5	0.5	2	16	0	0	0	0	0		
19 †	10.5	0.5	5.5	12.5	0	0	0	0	0		
20 †	20	5.5	12.8	5.2	0	0	0	0	0		
21 †	18	8	13	5	0	8.6	0	8.6	0		
22 †	11.5	6	8.8	9.2	0	8.6	0	8.6	0		
23 †	8	2	5	13	0	0.6	0	0.6	0		
24 †	6	1	3.5	14.5	0	0	0	0	0		
25 †	8	-1.5	3.3	14.7	0	0	0	0	0		
26 †	9	-0.5	4.3	13.7	0	0	0	0	0		
27 †	13.5	-2	5.8	12.2	0	0	0	0	0		
28 †	13	5	9	9	0	9	0	9	0		
29 †	12.5	8	10.3	7.7	0	1.4	0	1.4	0		
30 †	10	6.5	8.3	9.7	0	4	0	4	0		
Sum				279.6	4.9	104.6	0	104.6	0		
Avg	14.2	3.5	8.8								
Xtrm	29.0	-5.5									

Summary, average and extreme values are based on the data above.

Environment Canada Environnement Canada

Daily Data Report for May 2023

STRATHROY-MULLIFARRY
ONTARIO

Latitude:	42°58'50.022" N	Longitude:	81°38'34.086" W	Elevation:	243.00 m
Climate ID:	6148122	WMO ID:		TC ID:	

Daily Data Report for May 2023

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01 †	9.5	1	5.3	12.7	0	3	0	3	0		
02 †	5.5	2	3.8	14.2	0	9.4	0	9.4	0		
03 †	9.5	2	5.8	12.2	0	0.8	0	0.8	0		
04 †	14	4	9	9	0	0	0	0	0		
05 †	18	1	9.5	8.5	0	0	0	0	0		
06 †	20.5	3.5	12	6	0	0	0	0	0		
07 †	21.5	9.5	15.5	2.5	0	0	0	0	0		
08 †	20.5	8	14.3	3.7	0	0	0	0	0		
09 †	18.5	6.5	12.5	5.5	0	0	0	0	0		
10 †	22.5	2.5	12.5	5.5	0	0	0	0	0		
11 †	26.5	6	16.3	1.7	0	0	0	0	0		
12 †	28	8.5	18.3	0	0.3	0	0	0	0		
13 †	25.5	9	17.3	0.7	0	0	0	0	0		
14 †	18	7	12.5	5.5	0	0	0	0	0		
15 †	21	2	11.5	6.5	0	0	0	0	0		
16 †	24	6	15	3	0	0	0	0	0		
17 †	11	1	6	12	0	0	0	0	0		
18 †	19	-2	8.5	9.5	0	0	0	0	0		
19 †	25	5	15	3	0	10.4	0	10.4	0		
20 †	13.5	9	11.3	6.7	0	0	0	0	0		
21 †	22.5	8	15.3	2.7	0	0	0	0	0		
22 †	23.5	6.5	15	3	0	0	0	0	0		
23 †	26	7.5	16.8	1.2	0	0	0	0	0		
24 †	19.5	8	13.8	4.2	0	0	0	0	0		
25 †	17	3	10	8	0	0	0	0	0		
26 †	22	1	11.5	6.5	0	0	0	0	0		
27 †	26	3	14.5	3.5	0	0	0	0	0		
28 †	28.5	8.5	18.5	0	0.5	0	0	0	0		
29 †	31	10	20.5	0	2.5	0	0	0	0		
30 †	31	11	21	0	3	0	0	0	0		
31 †	31	12	21.5	0	3.5	0	0	0	0		
Sum				157.5	9.8	23.6	0	23.6	0		
Avg	21.0	5.5	13.2								
Xtrm	31.0	-2.0									

Summary, average and extreme values are based on the data above.

Environment Canada Environnement Canada

Daily Data Report for June 2023

STRATHROY-MULLIFARRY
ONTARIO

Latitude:	42°58'50.022" N	Longitude:	81°38'34.086" W	Elevation:	243.00 m
Climate ID:	6148122	WMO ID:		TC ID:	

Daily Data Report for June 2023

	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
DAY											
01 †	32.5	12	22.3	0	4.3	0	0	0	0		
02 †	32.5	13.5	23	0	5	0	0	0	0		
03 †	29	16.5	22.8	0	4.8	0	0	0	0		
04 †	25.5	7.5	16.5	1.5	0	0	0	0	0		
05 †	25	10	17.5	0.5	0	0	0	0	0		
06 †	22	11	16.5	1.5	0	0	0	0	0		
07 †	21.5	6	13.8	4.2	0	0	0	0	0		
08 †	21.5	8.5	15	3	0	0	0	0	0		
09 †	24	8	16	2	0	0	0	0	0		
10 †	28	8	18	0	0	0	0	0	0		
11 †	23	15.5	19.3	0	1.3	21	0	21	0		
12 †	15	11	13	5	0	0.6	0	0.6	0		
13 †	16	8.5	12.3	5.7	0	11.4	0	11.4	0		
14 †	18.5	6.5	12.5	5.5	0	0	0	0	0		
15 †	21.5	7.5	14.5	3.5	0	3.6	0	3.6	0		
16 †	17.5	14	15.8	2.2	0	0	0	0	0		
17 †	23	10	16.5	1.5	0	0	0	0	0		
18 †	26	6	16	2	0	0	0	0	0		
19 †	28	8	18	0	0	0	0	0	0		
20 †	29.5	17	23.3	0	5.3	0	0	0	0		
21 †	29.5	17	23.3	0	5.3	0	0	0	0		
22 †	26.5	16	21.3	0	3.3	2.4	0	2.4	0		
23 †	20.5	17	18.8	0	0.8	13.4	0	13.4	0		
24 †	26	17	21.5	0	3.5	0	0	0	0		
25 †	28.5	14	21.3	0	3.3	4	0	4	0		
26 †	24	17.5	20.8	0	2.8	15.2	0	15.2	0		
27 †	18.5	15	16.8	1.2	0	0.8	0	0.8	0		
28 †	22	12.5	17.3	0.7	0	0	0	0	0		
29 †	26.5	9	17.8	0.2	0	0	0	0	0		
30 †	29.5	18	23.8	0	5.8	20	0	20	0		
Sum				40.2	45.5	92.4	0	92.4	0		
Avg	24.4	11.9	18.2								
Xtrm	32.5	6.0									

Summary, average and extreme values are based on the data above.

Environment Canada Environnement Canada

Daily Data Report for July 2023

STRATHROY-MULLIFARRY
ONTARIO

Latitude:	42°58'50.022" N	Longitude:	81°38'34.086" W	Elevation:	243.00 m
Climate ID:	6148122	WMO ID:		TC ID:	

Daily Data Report for July 2023

	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
DAY											
01 †	28.5	19	23.8	0	5.8	0	0	0	0		
02 †	23.5	21	22.3	0	4.3	14.6	0	14.6	0		
03 †	26.5	20	23.3	0	5.3	1.4	0	1.4	0		
04 †	30	16	23	0	5	0	0	0	0		
05 †	31.5	17.5	24.5	0	6.5	0	0	0	0		
06 †	27.5	20.5	24	0	6	45.6	0	45.6	0		
07 †	22.5	15.5	19	0	1	0	0	0	0		
08 †	20	12.5	16.3	1.7	0	7.4	0	7.4	0		
09 †	22.5	15.5	19	0	1	0.8	0	0.8	0		
10 †	28	11.5	19.8	0	1.8	0	0	0	0		
11 †	28.5	15.5	22	0	4	10.8	0	10.8	0		
12 †	24	13	18.5	0	0.5	32.2	0	32.2	0		
13 †	23	16	19.5	0	1.5	0	0	0	0		
14 †	26	13.5	19.8	0	1.8	17.8	0	17.8	0		
15 †	22.5	17.5	20	0	2	5.8	0	5.8	0		
16 †	27	18	22.5	0	4.5	0	0	0	0		
17 †	26.5	13.5	20	0	2	0	0	0	0		
18 †	24	13	18.5	0	0.5	0	0	0	0		
19 †	26.5	12.5	19.5	0	1.5	0	0	0	0		
20 †	28.5	16	22.3	0	4.3	10.6	0	10.6	0		
21 †	23.5	16.5	20	0	2	0	0	0	0		
22 †	26	12	19	0	1	0	0	0	0		
23 †	28	14	21	0	3	3	0	3	0		
24 †	27.5	15.5	21.5	0	3.5	0.4	0	0.4	0		
25 †	29	16	22.5	0	4.5	0	0	0	0		
26 †	29	16.5	22.8	0	4.8	30.6	0	30.6	0		
27 †	25.5	20	22.8	0	4.8	0	0	0	0		
28 †	30	17	23.5	0	5.5	2	0	2	0		
29 †	24.5	20	22.3	0	4.3	1.6	0	1.6	0		
30 †	22.5	14	18.3	0	0.3	0	0	0	0		
31 †	23	11.5	17.3	0.7	0	0	0	0	0		
Sum				2.4	93	184.6	0	184.6	0		
Avg	26.0	15.8	20.9								
Xtrm	31.5	11.5									

Summary, average and extreme values are based on the data above.

Environment Canada Environnement Canada

Daily Data Report for August 2023

STRATHROY-MULLIFARRY
ONTARIO

Latitude:	42°58'50.022" N	Longitude:	81°38'34.086" W	Elevation:	243.00 m
Climate ID:	6148122	WMO ID:		TC ID:	

Daily Data Report for August 2023

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01 †	24	11.5	17.8	0.2	0	0	0	0	0		
02 †	26	12.5	19.3	0	1.3	0	0	0	0		
03 †	28.5	16.5	22.5	0	4.5	0	0	0	0		
04 †	25	16	20.5	0	2.5	0	0	0	0		
05 †	24.5	14	19.3	0	1.3	0	0	0	0		
06 †	24	13.5	18.8	0	0.8	13.6	0	13.6	0		
07 †	21	18	19.5	0	1.5	1.4	0	1.4	0		
08 †	25	15	20	0	2	0	0	0	0		
09 †	28	14.5	21.3	0	3.3	12.4	0	12.4	0		
10 †	25	15.5	20.3	0	2.3	0	0	0	0		
11 †	25	12	18.5	0	0.5	0	0	0	0		
12 †	26	17.5	21.8	0	3.8	7.8	0	7.8	0		
13 †	24	14	19	0	1	0	0	0	0		
14 †	24.5	13	18.8	0	0.8	8.8	0	8.8	0		
15 †	19.5	16	17.8	0.2	0	30.2	0	30.2	0		
16 †	25.5	13	19.3	0	1.3	0	0	0	0		
17 †	25	17	21	0	3	24	0	24	0		
18 †	19.5	13	16.3	1.7	0	0	0	0	0		
19 †	24	7	15.5	2.5	0	0	0	0	0		
20 †	28.5	12.5	20.5	0	2.5	0	0	0	0		
21 †	24	17.5	20.8	0	2.8	0	0	0	0		
22 †	23.5	12	17.8	0.2	0	5.4	0	5.4	0		
23 †	18.5	15	16.8	1.2	0	48	0	48	0		
24 †	27.5	17	22.3	0	4.3	3.4	0	3.4	0		
25 †	23	19	21	0	3	0	0	0	0		
26 †	21.5	14	17.8	0.2	0	0	0	0	0		
27 †	21.5	9.5	15.5	2.5	0	0	0	0	0		
28 †	23	8.5	15.8	2.2	0	0	0	0	0		
29 †	24.5	7.5	16	2	0	7.8	0	7.8	0		
30 †	16.5	13	14.8	3.2	0	0	0	0	0		
31 †	21.5	6	13.8	4.2	0	0	0	0	0		
Sum				20.3	42.5	162.8	0	162.8	0		
Avg	23.8	13.6	18.7								
Xtrm	28.5	6.0									

Summary, average and extreme values are based on the data above.

Environment Canada Environnement Canada

Daily Data Report for September 2023

STRATHROY-MULLIFARRY
ONTARIO

Latitude:	42°58'50.022" N	Longitude:	81°38'34.086" W	Elevation:	243.00 m
Climate ID:	6148122	WMO ID:		TC ID:	

Daily Data Report for September 2023

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01 †	23	8.5	15.8	2.2	0	0	0	0	0		
02 †	25	9.5	17.3	0.7	0	0	0	0	0		
03 †	29	14.5	21.8	0	3.8	0	0	0	0		
04 †	31	18	24.5	0	6.5	0	0	0	0		
05 †	31.5	17.5	24.5	0	6.5	0	0	0	0		
06 †	29	19.5	24.3	0	6.3	16.6	0	16.6	0		
07 †	25.5	19	22.3	0	4.3	0	0	0	0		
08 †	18.5	14	16.3	1.7	0	0	0	0	0		
09 †	18	13.5	15.8	2.2	0	0	0	0	0		
10 †	21	15.5	18.3	0	0.3	0	0	0	0		
11 †	23	12	17.5	0.5	0	7	0	7	0		
12 †	20.5	17	18.8	0	0.8	4	0	4	0		
13 †	18	11	14.5	3.5	0	0	0	0	0		
14 †	19	6.5	12.8	5.2	0	0	0	0	0		
15 †	21	5	13	5	0	0	0	0	0		
16 †	21.5	6	13.8	4.2	0	0	0	0	0		
17 †	22.5	12	17.3	0.7	0	20.4	0	20.4	0		
18 †	19.5	10.5	15	3	0	2	0	2	0		
19 †	20	6.5	13.3	4.7	0	0	0	0	0		
20 †	23	7	15	3	0	1.8	0	1.8	0		
21 †	26.5	13.5	20	0	2	0	0	0	0		
22 †	25	15	20	0	2	0	0	0	0		
23 †	22.5	10.5	16.5	1.5	0	0	0	0	0		
24 †	23.5	10	16.8	1.2	0	1.6	0	1.6	0		
25 †	23	15	19	0	1	10	0	10	0		
26 †	19.5	15	17.3	0.7	0	0	0	0	0		
27 †	19.5	14.5	17	1	0	1	0	1	0		
28 †	17.5	12.5	15	3	0	0	0	0	0		
29 †	22	12	17	1	0	0	0	0	0		
30 †	24.5	9.5	17	1	0	0	0	0	0		
Sum				46	33.5	64.4	0	64.4	0		
Avg	22.8	12.4	17.6								
Xtrm	31.5	5.0									

Summary, average and extreme values are based on the data above.

Environment Canada Environnement Canada

Daily Data Report for October 2023

STRATHROY-MULLIFARRY
ONTARIO

Latitude:	42°58'50.022" N	Longitude:	81°38'34.086" W	Elevation:	243.00 m
Climate ID:	6148122	WMO ID:		TC ID:	

Daily Data Report for October 2023

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01 †	25	10.5	17.8	0.2	0	0	0	0	0		
02 †	27.5	14	20.8	0	2.8	0	0	0	0		
03 †	28.5	12	20.3	0	2.3	0	0	0	0		
04 †	28	14	21	0	3	0	0	0	0		
05 †	22.5	17.5	20	0	2	9.8	0	9.8	0		
06 †	21	15	18	0	0	1.2	0	1.2	0		
07 †	12	8	10	8	0	3	0	3	0		
08 †	12	7.5	9.8	8.2	0	0	0	0	0		
09 †	12	3	7.5	10.5	0	0	0	0	0		
10 †	11.5	6	8.8	9.2	0	3.6	0	3.6	0		
11 †	12.5	5.5	9	9	0	0.6	0	0.6	0		
12 †	16.5	4.5	10.5	7.5	0	0	0	0	0		
13 †	12.5	5.5	9	9	0	1.6	0	1.6	0		
14 †	12	8.5	10.3	7.7	0	0	0	0	0		
15 †	10	6	8	10	0	5.6	0	5.6	0		
16 †	12	6.5	9.3	8.7	0	0	0	0	0		
17 †	11.5	7	9.3	8.7	0	0	0	0	0		
18 †	16	3.5	9.8	8.2	0	0	0	0	0		
19 †	17.5	8	12.8	5.2	0	9.6	0	9.6	0		
20 †	14	11.5	12.8	5.2	0	6.2	0	6.2	0		
21 †	9	7.5	8.3	9.7	0	1.6	0	1.6	0		
22 †	8.5	4.5	6.5	11.5	0	1	0	1	0		
23 †	14	-2	6	12	0	0	0	0	0		
24 †	23	7.5	15.3	2.7	0	0	0	0	0		
25 †	20	15	17.5	0.5	0	21.4	0	21.4	0		
26 †	21.5	13.5	17.5	0.5	0	5.4	0	5.4	0		
27 †	23	16.5	19.8	0	1.8	4	0	4	0		
28 †	10.5	8	9.3	8.7	0	2.4	0	2.4	0		
29 †	9	5	7	11	0	4	0	4	0		
30 †	6	4	5	13	0	2.4	0	2.4	0		
31 †	5.5	-3.5	1	17	0	0	15	15	0		
Sum				201.9	11.9	83.4	15	98.4	0		
Avg	15.6	8.1	11.9								
Xtrm	28.5	-3.5									

Summary, average and extreme values are based on the data above.

Environment Canada Environnement Canada

Daily Data Report for November 2023

STRATHROY-MULLIFARRY
ONTARIO

Latitude:	42°58'50.022" N	Longitude:	81°38'34.086" W	Elevation:	243.00 m
Climate ID:	6148122	WMO ID:		TC ID:	

Daily Data Report for November 2023

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01 †	3.5	-2	0.8	17.2	0	0	5	5	15		
02 †	7	-9.5	-1.3	19.3	0	0	0	0	13		
03 †	12.5	4	8.3	9.7	0	3.6	0	3.6	1		
04 †	12	6	9	9	0	0.6	0	0.6	0		
05 †	11.5	0.5	6	12	0	0	0	0	0		
06 †	15	4.5	9.8	8.2	0	0	0	0	0		
07 †	10	5	7.5	10.5	0	0	0	0	0		
08 †	5	-2	1.5	16.5	0	19.8	0	19.8	0		
09 †	11	0.5	5.8	12.2	0	0	0	0	0		
10 †	10	0	5	13	0	4.2	0	4.2	0		
11 †	6	1	3.5	14.5	0	0	0	0	0		
12 †	8.5	-3.5	2.5	15.5	0	0	0	0	0		
13 †	13	1.5	7.3	10.7	0	0	0	0	0		
14 †	11	2.5	6.8	11.2	0	0	0	0	0		
15 †	14	0.5	7.3	10.7	0	0	0	0	0		
16 †	15.5	-1.5	7	11	0	0	0	0	0		
17 †	13.5	4	8.8	9.2	0	2.6	0	2.6	0		
18 †	7.5	-2	2.8	15.2	0	0	0	0	0		
19 †	7	-3	2	16	0	0	0	0	0		
20 †	2	-4	-1	19	0	0	0	0	0		
21 †	8.5	-1	3.8	14.2	0	9	0	9	0		
22 †	5.5	4.5	5	13	0	0	0	0	0		
23 †	6	1	3.5	14.5	0	0	0	0	0		
24 †	0	-2	-1	19	0	0	0	0	0		
25 †	3	-6	-1.5	19.5	0	0	0	0	0		
26 †	5.5	-5	0.3	17.7	0	5	0	5	0		
27 †	0	-2	-1	19	0	0	0	0	0		
28 †	-3	-6.5	-4.8	22.8	0	0	0	0	0		
29 †	-1	-7	-4	22	0	0	0	0	0		
30 †	8.5	-4	2.3	15.7	0	1.6	0	1.6	0		
Sum				438	0	46.4	5	51.4	29		
Avg	7.6	-0.9	3.4								
Xtrm	15.5	-9.5									

Summary, average and extreme values are based on the data above.

Environment Canada Environnement Canada

Daily Data Report for December 2023

STRATHROY-MULLIFARRY
ONTARIO

Latitude:	42°58'50.022" N	Longitude:	81°38'34.086" W	Elevation:	243.00 m
Climate ID:	6148122	WMO ID:		TC ID:	

Daily Data Report for December 2023

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01 †	5.5	2.5	4	14	0	16	0	16	0		
02 †	4	2	3	15	0	0	0	0	0		
03 †	3.5	2	2.8	15.2	0	9.2	0	9.2	0		
04 †	2.5	1.5	2	16	0	0.6	0	0.6	0		
05 †	1.5	-0.5	0.5	17.5	0	0	0	0	0		
06 †	2.5	-1.5	0.5	17.5	0	0	0	0	0		
07 †	5.5	-2	1.8	16.2	0	0	0	0	0		
08 †	11	-1	5	13	0	0	0	0	0		
09 †	12	8.5	10.3	7.7	0	2.4	0	2.4	0		
10 †	5.5	3.5	4.5	13.5	0	0	0	0	0		
11 †	0	-0.5	-0.3	18.3	0	0	0	0	0		
12 †	5	-2.5	1.3	16.7	0	0	0	0	0		
13 †	1	-4.5	-1.8	19.8	0	0	0	0	0		
14 †	7	-7	0	18	0	0	0	0	0		
15 †	10.5	0	5.3	12.7	0	0	0	0	0		
16 †	9	-0.5	4.3	13.7	0	0	0	0	0		
17 †	8	5.5	6.8	11.2	0	9.6	0	9.6	0		
18 †	3.5	0	1.8	16.2	0	5.6	7	12.6	0		
19 †	-1.5	-4	-2.8	20.8	0	0	0	0	5		
20 †	2	-5.5	-1.8	19.8	0	0	0	0	4		
21 †	2	-3	-0.5	18.5	0	0	0	0	2		
22 †	2	-3	-0.5	18.5	0	6.2	0	6.2	1		
23 †	4.5	1	2.8	15.2	0	2.4	0	2.4	0		
24 †	6	2	4	14	0	0	0	0	0		
25 †	10.5	5	7.8	10.2	0	1	0	1	0		
26 †	10.5	6.5	8.5	9.5	0	13.2	0	13.2	0		
27 †	9	8	8.5	9.5	0	7.6	0	7.6	0		
28 †	8	6.5	7.3	10.7	0	3.8	0	3.8	0		
29 †	5	3	4	14	0	3.4	0	3.4	0		
30 †	3	0.5	1.8	16.2	0	0.8	0	0.8	0		
31 †	1.5	0	0.8	17.2	0	3.6	0	3.6	0		
Sum				466.3	0	85.4	7	92.4	12		
Avg	5.2	0.7	3.0								
Xtrm	12.0	-7.0									

Summary, average and extreme values are based on the data above.

Legend

M = Missing
E = Estimated
A = Accumulated
C = Precipitation occurred, amount uncertain
L = Precipitation may or may not have occurred
F = Accumulated and estimated
N = Temperature missing but known to be > 0
Y = Temperature missing but known to be < 0
S = More than one occurrence
T = Trace
* = The value displayed is based on incomplete data
† = Data for this day has undergone only preliminary quality checking
‡ = Partner data that is not subject to review by the National Climate Archives

Table B-3
Precipitation Event Monitoring - RWDI Envision Rain Gauge Report
Twin Creeks Environmental Centre - Poplar System

Year:	2023											
Month:	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Day	**Amount Recorded**											
1			0.2	10.8	5.2		3.8				14.0	11.8
2					9.8		20.4					
3	6.0			29.6			0.2				3.6	7.8
4	2.6		5.6	3.8	0.2							
5	0.6	0.2		8.4						10.6		0.6
6	0.2						29.0	8.8	1.0	1.4		
7			0.4					1.6	1.8	1.8	0.2	
8		7.2					6.4		1.0	1.0	15.4	0.2
9		10.8					0.4	1.2	0.8	0.2	10.0	0.8
10			1.4						0.6	0.8	0.2	0.2
11						13.2	7.8	4.0	0.6	0.8	0.2	
12	0.8					0.6	30.4	11.0	0.6			
13			0.6			4.2	0.2		0.4	0.6		
14		0.4				0.2	11.2	29.0	0.2	0.8		
15						4.6	1.6	22.4	0.2	1.0		
16	5.0		9.0	5.0		0.6				1.2	2.2	0.4
17	2.0		0.2	2.6				16.8	1.6	0.2		6.2
18	4.8	3.2										4.4
19	7.4	1.4		0.2	12.2					0.4		
20	1.0						5.4		0.2	0.4		
21				7.8							0.8	
22	3.8		6.6	6.0		7.8	1.4				6.4	6.0
23	0.8	7.8	2.8			3.4	1.0	114.4				1.2
24			4.2			0.2		1.6	3.6			
25	0.8	3.2	4.0			4.6						0.2
26	2.2		7.4	0.2		11.8	39.8			2.4	6.4	11.8
27	1.6	0.6	0.2			1.0	*0.2*		1.6	3.4		4.2
28		5.8		8.2			3.4			1.8		1.2
29	1.8		0.4	1.2		0.4	*0.2*	13.0		4.8		1.6
30	0.2		5.6	1.4		5.0		4.4		0.2	2.2	
31			43.8							0.4		1.8
Total	**41.6**	**40.6**	**92.4**	**85.2**	**27.4**	**57.6**	**162.8**	**228.2**	**14.2**	**34.2**	**61.6**	**60.4**
										Total	**906.2**	

Notes:

1) Units are in millimetres (mm) of liquid and/or liquid equivalent (i.e. snow melt)

2) *Italics* denotes that the climatic data from the local Strathroy-Mullifarry Climatological Station was used as the onsite rain gauge was not operational due to power failure.

APPENDIX C:

Field Protocols

GENERAL FIELD PROTOCOLS

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1 OVERVIEW

The following field protocol program was developed by Jagger Hims Limited, and updated by RWDI specifically for the Waste Management of Canada Corporation Twin Creeks Landfill Poplar System Monitoring Program. The protocols act as guidelines for field activities.

In considering the accuracy of field collected data, adherence to a protocol is important such that the integrity of a database and the reliability of data are maintained. The protocols outlined in the following sections are based on experience and on an available literature that outlines investigative procedures used by others in the environmental field for similar monitoring programs. Each protocol will be updated, where required, as technology continues to advance and the program monitoring requirements evolve.

2 VISUAL ASSESSMENT

As part of the visual assessment, the following traits will be considered.

- Tree diameter
- Tree height
- Tree mortality
- Crown dieback
- Foliage transparency
- Crown density
- Leaf size
- Discolouration of leaves
- Abnormally shaped leaves
- Length of new tree branch extension shoots
- Deformed growth
- Insect infestation

Five trees per zone of the leachate application area will be selected for the ongoing assessments. It is noted that each assessed tree is marked, such that if that same tree dies, the nearest tree of similar height/diameter is to be selected for the ongoing assessment. Assessment details and methodologies are provided below.

2.1 Tree Diameter

The diameter of a tree provides a measure of tree performance and is useful for estimating tree volume.

- The diameter measuring point is to be taken at the bottom third interval of the tree until year five, at which time the diameter will be measured at approximately breast height (1.3 m).

2.2 Tree Height

Tree height is an important measure to determine if the tree is healthy and is growing at a normal rate for that specific species.

- A physical direct measurement of the height of the tree is required. When trees exceed 7.5 m in height, direct physical measurements will not be possible given current measurement equipment. The use of an inclinometer will be required to measure trees greater than 7.5 m in height. The inclinometer will be used as outlined in the instrument manual.
- Use of inclinometer – select an area away from the tree. Measure the distance from the base of the tree to the selected area. Record. Measure the angle necessary to sight the top of the tree from the selected area. Be sure to sight from the ground.

  Tree height can be calculated using the following equation:
  Tan of angle = tree height / distance to tree
  Therefore,
  Tree height = tan of angle x distance to tree

2.3 Tree Mortality

Mortality refers to an assessment of trees that have died. A tree is defined as dead if all conductive tissues in the stem(s) have died (i.e. when stem is bent 45^{o} it breaks).

Mortality is the number of trees that die between two measurement periods. It is usually expressed as an average annual amount over time. It becomes an indicator of tree health when the mortality rate is greater than expected averages from historical trends.

- Count the number of dead trees and live trees in a pre-selected row of the leachate application area. Dividing the number of dead trees by the sum of the dead and live trees multiplied by 100 yields percent mortality.
- A historic mortality rate will be established as the database expands.

2.4 Crown Dieback

The crown of the tree is defined as the upper part of the tree, including the branches and foliage.

The crown is one component of net primary production and its dimensions reflect general tree health. Large, dense crowns are associated with potential or previous vigorous growth rates. Small, sparse crowns suggest unfavorable conditions or other influences, such as competition between trees.

Crown dieback is defined as recent branch mortality that begins at the terminal portion of a branch in the upper and outer crown and proceeds toward the trunk or base of the live crown.

- Crown dieback is measured as a percentage of the crown area affected, and recorded in 10% increments.

2.5 Foliage Transparency

Foliage transparency is defined as the amount of skylight visible through the live, normally foliated portion of the crown. It is measured as the percent of total light visible through the tree material.

Because of architectural differences, these measures vary among species. An elevated rating or an upward trend in foliage transparency indicates a thinning crown, loss of vigor, and overall decline in tree health.

- Look directly upward through the tree crown for transparency determination. Descriptions can be recorded in 10% increments and be classed into the following three categories:
  1. None/Light (0-20%)
  2. Moderate (21-50%)
  3. Severe (51-100%)
- Mark each tree measured such that monitoring changes are limited to the same tree on an annual basis.
- If one of the trees being monitored dies, an adjacent tree of similar size will be selected as its replacement.

2.6 Crown Density

Crown density is defined as the amount of plant material, such as leaves, branches, and fruit, which blocks skylight from shining through the tree crown. It is measured as the percent of total light that is blocked by tree material.

Elevated density values indicate that the tree has a large amount of leaf material available for photosynthesis and has growing conditions that enable full and symmetrical growth. Low density values indicate poor amounts of foliage, a thin crown, or a missing section of crown that may have resulted from environmental stresses.

Unlike transparency, this measurement accounts for both live and dead parts of the crown rather than just the live portion.

- Density descriptions can be recorded in 10% increments and can be classed into the following three categories:
  1. Poor (0-20%)
  2. Moderate (21-50%)
  3. Good (51-100%)

2.7 Leaf Size

Large leaf sizes increase photosynthesis rates giving favourable growing conditions, while smaller leaf size may slow growing conditions. However, the number of leaves on a tree also contributes to photosynthesis rates, as it is typically measured based on aerial surface coverage where sunlight may be absorbed.

- Leaf size is to be measured from five (5) leaves per assessment tree. Measure from tip to base (length), and from edge to edge (width). The measurements may be to the nearest 1 mm. Make sure the leaf is stretched flat before the measurements are recorded.

2.8 Leaf Discolouration

Leaf discolouration typically indicates diseased or dying vegetation.

- Discolouration determination is a subjective percentage compared to the rest of the tree, and can only be determined while the trees are seasonally active.

2.9 Abnormally Shaped Leaves

Abnormally shaped leaves typically indicate improper growth or diseased trees.

- Determination of abnormally shaped leaves is a subjective percentage compared to the rest of the tree, and can only be determined while the trees are seasonally active.

2.10 Length of New Branch Extension Shoots

New branch extension shoots are an indicator of healthy seasonal growth.

- Each assessment tree will be examined for five (5) new branch extension shoots. Measurements may be recorded to the nearest 1 cm.

2.11 Deformed Growth

Deformed growth indicates poor development from competition of sunlight or disease.

- Five (5) trees will be examined for deformed growth in the leachate application area.

2.12 Insect Infestation

Insect infestation can impact the leaves, bark, and overall growth of an affected tree. Insect infestation occurs when the tree is fully engulfed by a particular insect, which completely hinders growth. Infestation determination is subjective & compared to the rest of the tree as a percentage, recorded in 10% increments

2.13 Documentation

- Identify the tree or row being monitored for each parameter on the applicable Site plan.
- Record observations on the field sheet in the dedicated Project Field Book.
- Photographs may be taken periodically during the irrigation season to monitor year-to-year growth and overall vigour of the Poplar System.

3 ROOT INSPECTION

3.1 Brace Roots

Brace roots enable the trees to collect water near the surface and help prevent tree tipping in high winds.

- Brace root inspections are typically completed to inspect for small animal burrows in the root area that could weaken the brace root structure. Inspections are to be conducted on one (1) tree per zone within the leachate application area. The vegetation around each monitored tree should be trimmed short enough to visually inspect the ground surface in an approximately one-metre radius around the tree. Animal burrows should be classified according to their number and entrance diameter.
- Record observations on the field sheet in the dedicated Project Field Book.

3.2 Root Depth

Root Depth is an indicator of tree health and its ability to resist damage from wind.

- One (1) tree per zone will be selected. The selected tree will be of average height of the five (5) assessment trees. The selected tree will be killed as part of this assessment as the roots are exhumed.
- Measure the tap root's depth of penetration to the nearest 1 cm.

3.3 Root Sampling

Collect a portion of the top or main brace root for sampling. A minimum of 200 grams of sample is required for laboratory analysis. The sample is to be a core (or sliver) sampled from the centre of the tree to the outer limit of the tree, excluding the bark. Analytes are per **Table 1**.

4 STEM SAMPLING

From each tree assessed in Section 3.2, cut out a piece of the stem (trunk) of the tree from approximately 1.5 metres above ground surface. The sample is to be collected per section 3.3. Analytes are per **Table 1**.

5 SOIL SAMPLING

Soil sampling is conducted to determine the effects of leachate application on the shallow soil (typically near the root zone of the trees) in the poplar treatment system area. High chemical concentrations in the soil could indicate leachate effects and the potential for low efficiency of chemical absorption from the trees.

Samples will be collected twice annually (one prior to irrigation treatment and one after treatment), until the poplar trees are four years old, at which time the frequency will be once annually. The annual sample should be collected prior to the drip irrigation system activation, but may be completed after irrigation has occurred for an extended period of time.

- One (1) composite sample per zone of the leachate application area is to be collected from surface to 0.6 m (minimum) to 0.9 m (maximum).
- Analytes are listed in **Table 1.**

6 LEAF TISSUE ANALYSIS

The laboratory analysis of leaf tissues will indicate whether the leachate application has affected the poplar trees and that the trees are absorbing select chemicals.

Samples will be collected annually from each zone of the leachate application area. Samples will be collected from various randomly selected trees.

- One (1) composite sample will be collected from the lower canopy and one (1) composite will be collected from the upper canopy.
- Composite samples will consist of leaves for a total of about 200 g, not including stem weight.
- Leaves shall be washed with deionized water and spun dry in a salad spinner or equivalent prior to submission to the laboratory for analytical testing.
- Analytes are listed in **Table 1.**

7 LEACHATE LEVELS

Leachate levels could indicate if leachate within the waste below the leachate application area is generated as a result of drip irrigation. Levels shall be recorded during the landfill compliance monitoring events.

- Record leachate levels using a contact sensor liquid level meter dedicated for leachate wells, and record value to nearest 0.01 m.
- Leachate levels shall be recorded from the locations indicated in the monitoring program.
- Decontamination of the contact sensor shall be completed between measurements.
- Levels shall be recorded on the applicable field sheet in the Project Field Book.

8 IRRIGATION WATER MONITORING

Irrigation water monitoring provides information toward the quality of irrigation water being applied to the Poplar System. Insight toward the chemical constituent concentrations may be utilized to adjust dilution rates.

- Collect a sample monthly during the irrigation season from the leachate source (Poplar System Holding Tank) prior to the initiation of the irrigation system. Analytes are outlined in **Table 1.**

9 SURFACE WATER MONITORING

Surface water sampling is conducted to assess potential effects to surface water quality as a result of operating the drip irrigation system.

- Surface water samples are to be collected at stations SS14A, SS14B, and SS15A during the routine precipitation compliance monitoring (10 mm in 24 hrs) once per calendar quarter.
- Surface water samples are to be collected at stations SS14A, SS14B, and SS15A after a storm event 25 mm precipitation in 24 hrs for a maximum of two (2) events during irrigation.
- Samples are to be collected within 24 hrs of the storm event.
- The volume of precipitation measured for the Site shall be documented from the on Site meteorological station.
- Surface water flow rates at each station shall be measured and recorded.
- Records shall be maintained on the applicable field sheets in the Project Field Book.
- Analytes are identified in **Table 1.**

10 ODOUR MONITORING

Odour monitoring is completed on and near the leachate application area. Odours that may emanate from manholes are excluded. Strong odours could indicate the over-application of leachate.

11 PONDED WATER

Ponded water may be an indication of over-application of liquid on the leachate application area.

- Ponded water may be measured as a subjective percentage of the total application area. Typically, the area should be measured and documented/sketched on a Site plan to assess persistent problem areas.
- Record observations on the field sheet in the dedicated Project Field Book.

12 UNDERGROWTH

Undergrowth refers to the vegetation which grows under or among trees (specifically, shrubs or small trees) which can affect the growth potential of the poplar trees.

- Perform a visual inspection of the types and amount of undergrowth in the poplar system for the leachate application area.
- Record observations on the field sheet in the dedicated Project Field Book.

APPENDIX D:

Irrigation Application Results

Table D-1
Summary of Irrigation Volumes
Twin Creeks Environmental Centre - Poplar System

Year	Month						Annual Total
	May	June	July	August	September	October	
2017	Poplar System not operating due to expansion construction.				1,107,199	1,049,988	2,157,187
2018	861,921	1,614,383	2,074,983	909,447	148,710		5,609,444
2019	851,704	2,252,526	4,024,733	3,419,266	2,385,383	659,700	13,593,312
2020	2,676,780	5,035,945	2,927,744	1,178,358	1,154,070		12,972,897
2021	1,796,521	1,832,303	1,187,643	1,295,458	510,732		6,622,657
2022	731,410	1,787,242	1,743,932	1,598,061	948,924	363,000	7,172,569
2023	1,696,361	2,807,525	1,128,626	1,401,021	810,508	814,808	8,658,849
Overall Total	**8,614,697**	**15,329,924**	**13,087,661**	**9,801,611**	**7,065,526**	**2,887,496**	**56,786,915**

Notes:

1) Volumes in litres (L).
2) Volume represents total liquid (water & leachate) applied via irrigation

Table D-2
Summary of Irrigation Rates
Twin Creeks Environmental Centre - Poplar System

Date	Precipitation Total (mm)	Poplar System	
		Irrigation Rates (mm/m^2)	Total Liquid Applied (mm/m^2)*
	Poplar System not operating due to expansion construction.		
May-17			
Jun-17			
Jul-17			
Jul-18	77.8	22.3	100.1
Aug-18	158.0	9.8	167.8
Sep-18	95.8	1.6	97.4
Oct-18**	32.6	0.0	32.6
	364.2	**33.7**	**397.9**
May-19**	92.0	9.2	101.2
Jun-19	64.0	24.2	88.2
Jul-19	37.4	43.3	80.7
Aug-19	57.0	36.8	93.8
Sep-19	48.4	25.6	74.0
Oct-19**	62.8	7.1	69.9
	361.6	**146.2**	**507.8**
May-20**	52.8	28.8	81.6
Jun-20	43.0	54.1	97.1
Jul-20	23.4	31.5	54.9
Aug-20	138.0	12.7	150.7
Sep-20	75.6	12.4	88.0
Oct-20**	Poplar system was not operating during the month of October.		
	332.8	**139.5**	**472.3**
May-21**	40.4	19.3	59.7
Jun-21	119.0	19.7	138.7
Jul-21	107.8	12.8	120.6
Aug-21	31.0	13.9	44.9
Sep-21	196.2	5.5	201.7
Oct-21**	Poplar system was not operating during the month of October.		
	494.4	**71.2**	**565.6**
May-22**	42.4	7.9	50.3
Jun-22	69.8	19.2	89.0
Jul-22	49.4	18.8	68.2
Aug-22	101.6	17.2	118.8
Sep-22	93.0	10.2	103.2
Oct-22**	9.8	3.9	13.7
	366.0	**77.1**	**443.1**
May-23**	27.4	18.2	45.6
Jun-23	57.6	18.2	75.8
Jul-23	162.8	12.1	174.9
Aug-23	228.2	15.1	243.3
Sep-23	14.2	8.7	22.9
Oct-23**	19.0	8.8	27.8
	509.2	**81.2**	**590.4**

Notes:

1) "*" denotes total liquid applied: precipitation + irrigation.
2) "**" denotes precipitation total during application period.
3) Following expansion of the Poplar System in 2017 the area of application is approximately 9.3 ha.
4) Precipitation totals assume that trace precipitation is equivalent to 0.25 mm.
5) Differences for precipitation total from on-site precipitation measurements are a result of the timing of measurements.

Table D-3
Annual Leachate Volumes Managed
Twin Creeks Environmental Centre - Poplar System

Year	Annual Volume of Leachate Applied to Poplar System	Annual Volume of Leachate Removed Off-Site	Annual Total Leachate Removed and Treated from Waste
Initial Poplar System			
2003	0	1,732,391	1,732,391
2004	641,208	3,666,721	4,307,929
2005	3,469,037	8,285,564	11,754,601
2006	4,686,000	8,194,072	12,880,072
2014	Poplar System not operating due to expansion construction.		
2015			
2016			
Expanded Poplar System			
2017	1,121,372	22,033,900	23,155,272
2018	4,303,435	26,681,859	30,985,294
2019	13,549,542	42,141,697	55,691,239
2020	10,823,172	38,972,220	49,795,392
2021	6,403,027	44,284,830	50,687,857
2022	7,172,569	47,454,190	54,626,759
2023	8,658,849	61,765,490	70,424,339
Sub-Total Expanded	52,031,966	283,334,186	335,366,152
Overall Total	60,828,211	305,212,934	366,041,145

Notes:

1) Volumes in litres (L).

APPENDIX E:

Irrigation Liquid Analytical Results

Table E-1
General Chemical Results - Irrigation Liquid
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	Target Concentration 100% Leachate	CCME Guideline	PS Holding Tank																																
				28-Sep-17	28-May-18	11-Jun-18	17-Jul-18	22-Aug-18	27-Sep-18	24-May-19	26-Jun-19	5-Jul-19	7-Aug-19	11-Sep-19	7-Oct-19	20-May-20	9-Jun-20	21-Jul-20	31-Aug-20	15-Sep-20	19-May-21	23-Jun-21	14-Jul-21	11-Aug-21	16-Sep-21	24-May-22	7-Jun-22	7-Jul-22	9-Aug-22	1-Sep-22	4-Oct-22	24-May-23	14-Jun-23	19-Jul-23	9-Aug-23	6-Sep-23	11-Oct-23
Alkalinity as $CaCO_3$	mg/L	9,150	-	5000	1800	4800	2700	990	4600	1700	3700	1800	3700	3800	2800	1600	2400	3400	4800	1800	2500	3400	2700	9700	4900	1400	3700	3300	3300	1900	2900	2200	3500	2400	2600	1600	2600
Chloride	mg/L	1,241	700 to 14,000*	1400	370	1200	760	240	730	310	720	500	1200	670	700	510	540	950	1100	520	420	660	560	610	880	400	810	660	680	500	250	300	510	380	550	370	490
Conductivity	uS/cm	10,616	-	9100	3600	8200	5500	3300	980	4700	9200	4600	10000	7900	8200	4830	5690	6110	9770	5910	6000	6060	7080	9940	11310	4460	9570	8020	8300	5100	6680	5120	8940	6810	6790	5200	12450
N-NH_3 (Ammonia)	mg/L	554	-	988	155	682	17	153	533	161	478	207	607	464	473	201	292	604	719	221	299	455	334	1310	639	166	638	366	575	194	39	384	629	468	364	203	398
N-NO_2 (Nitrite)	mg/L		-	<0.20	0.13	<0.20	0.033	0.01	<0.10	<0.050	<0.10	<0.010	<0.10	0.145	<0.10	0.057	<0.050	<0.10	<0.10	0.068	0.155	<0.010	<0.050	<0.10	<0.10	<0.010	0.022	<0.10	<0.10	<0.010	<0.10	<0.010	<0.050	<0.050	<0.010	<0.010	<0.10
N-NO_3 (Nitrate)	mg/L		-	<2.0	<1.0	<2.0	<0.10	<0.10	<1.0	<0.50	<1.0	<0.10	<1.0	<0.10	<1.0	0.36	<0.50	<1.0	<1.0	<0.10	<0.50	<0.10	<0.50	<1.0	<1.0	<0.10	<0.10	0.19	<1.0	<0.10	<1.0	<0.10	<0.50	<0.50	<0.10	<0.10	<1.0
pH	pH units		6.0-8.5	8.0	6.9	7.2	7.8	7.9	7.2	6.9	7.1	7.1	7.6	7.4	7.4	7.3	7.0	8.0	7.6	7.0	7.0	6.9	6.7	7.4	7.9	7.3	7.4	7.1	7.5	6.9	8.1	7.3	7.5	7.5	7.5	7.1	7.3
Sulphate	mg/L		-	<20	370	99	90	140	210	330	77	560	300	250	380	420	270	<50	480	290	440	300	250	83	160	530	66	230	310	430	420	210	170	150	560	380	270
Total Kjeldahl Nitrogen	mg/L	2,948	-	890	150	670	360	150	570	160	500	220	700	440	420	190	280	590	900	220	280	420	340	1300	650	160	650	550	550	210	830	320	620	450	330	200	420
Total Phosphorus	mg/L	2.37	-	5.70	0.45	3.70	2.20	0.77	3.60	0.66	1.90	0.90	3.50	1.80	2.10	0.59	1.10	3.00	3.30	0.68	0.94	1.6	1.3	3.4	2.3	0.5	2.4	1.4	1.5	0.8	0.66	0.76	1.6	0.84	0.99	0.59	0.94
Calcium	mg/L		-	67	260	160	45	51	840	180	150	190	140	170	200	200	160	59	180	200	190	150	150	77	150	220	140	140	150	220	110	170	130	150	210	160	170
Magnesium	mg/L	347	-	170	140	230	88	53	330	130	200	200	170	190	180	110	140	100	180	130	150	160	160	170	280	150	210	150	210	170	64	120	160	120	210	120	150
Potassium	mg/L	238	-	380	74	380	190	78	270	79	230	110	290	180	190	78	120	300	330	120	90	150	140	270	280	51	230	180	200	94	36	86	180	87	120	71	110
Sodium	mg/L	921	-	1300	300	1200	560	240	820	370	770	550	940	650	740	350	530	850	1200	520	600	670	580	1400	1000	320	770	610	790	470	220	390	600	420	550	340	510
Aluminum	mg/L		20.0	0.4	0.3	0.3	1.2	0.2	**56.0**	0.2	0.1	0.5	1.3	0.3	0.7	0.15	0.09	0.55	0.4	2.6	<0.2	0.8	0.56	<0.8	0.44	0.08	0.14	0.13	0.32	0.14	0.33	0.14	0.10	0.12	0.08	0.37	0.46
Arsenic	mg/L		2.0	0.050	0.004	0.039	0.030	0.013	0.078	<0.005	0.009	0.004	0.050	0.008	0.021	0.005	0.007	0.049	0.05	0.012	<0.01	<0.01	0.005	<0.05	0.01	0.008	0.009	0.01	0.012	0.004	0.063	0.014	0.019	0.023	0.013	0.009	0.016
Barium	mg/L		-	0.25	0.13	0.36	0.14	0.058	1.4	0.14	0.28	0.12	0.21	0.22	0.18	0.12	0.18	0.15	0.22	0.18	0.11	0.17	0.16	<0.3	0.26	0.08	0.25	0.22	0.2	0.17	0.083	0.16	0.19	0.12	0.14	0.11	0.17
Beryllium	mg/L		0.1	<0.006	<0.0006	<0.003	<0.003	<0.0006	<0.003	<0.003	<0.003	<0.0006	<0.006	<0.0006	<0.0006	<0.0006	<0.0006	<0.003	<0.006	<0.0006	<0.006	<0.006	<0.003	<0.03	<0.003	<0.003	<0.003	<0.0006	<0.003	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006
Bismuth	mg/L		-	<0.01	<0.001	<0.005	<0.005	<0.001	<0.005	<0.005	<0.005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.001	<0.005	<0.01	<0.001	<0.01	<0.01	<0.005	<0.05	<0.005	<0.005	<0.005	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	25.3	6.0	**21.0**	3.9	**18.0**	**7.0**	3.8	**19.0**	**7.9**	**15.0**	4.1	**7.3**	4.4	**7.9**	3.1	4.4	**6.7**	**20.0**	5.0	**20**	**17**	**6.2**	**110**	**20**	**7.5**	**10**	**7.4**	**6.8**	**7.5**	1.8	**8.2**	**13**	**8.0**	**6.8**	5.5	**12**
Cadmium	mg/L		0.01	<0.001	<0.0001	<0.0005	<0.0005	<0.0001	0.0016	<0.0005	<0.0005	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.001	<0.0001	<0.001	<0.001	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	mg/L	0.12	0.1	**0.22**	0.01	**0.17**	**0.11**	0.04	**0.24**	<0.03	0.04	0.02	**0.18**	0.05	0.10	0.03	0.032	**0.24**	**0.23**	0.06	<0.05	0.05	0.03	*<0.3*	0.07	<0.03	0.05	0.047	0.05	0.023	0.026	0.017	0.039	0.022	0.022	0.017	0.027
Cobalt	mg/L		5.0	0.024	0.007	0.022	0.011	0.0045	0.099	0.004	0.011	0.0057	0.017	0.0089	0.011	0.0057	0.0069	0.019	0.019	0.0092	0.006	0.009	0.008	<0.03	0.015	<0.003	0.012	0.01	0.012	0.0045	0.0028	0.0044	0.0093	0.005	0.0058	0.0033	0.0058
Copper	mg/L	0.43	5	<0.02	0.005	<0.01	<0.01	0.003	0.32	<0.01	<0.01	0.002	<0.02	<0.002	0.004	0.002	<0.002	<0.01	<0.02	0.007	<0.02	<0.02	<0.01	<0.1	<0.01	<0.01	<0.01	0.003	0.1	0.007	<0.002	0.003	0.002	<0.002	<0.002	<0.002	<0.002
Iron	mg/L	25	20.0	3.0	3.7	2.3	1.7	0.6	**210.0**	2.7	1.0	3.5	5.0	2.0	4.5	4.1	2.7	1.9	5.0	7.0	4	5	3.3	<5	2.6	5.9	1.8	2.6	4.2	4.1	1.8	2.5	1.8	2.2	3.8	2.9	2.8
Lead	mg/L	0.33	2.0	<0.005	0.0008	<0.003	<0.003	0.0006	0.15	<0.003	<0.003	0.0025	<0.005	0.0015	0.0021	0.0008	0.0007	<0.003	<0.005	0.004	<0.005	<0.005	<0.003	<0.03	0.003	<0.003	<0.003	0.0008	<0.003	0.0008	0.0006	0.0008	0.0012	0.0007	0.0008	0.0007	0.001
Molybdenum	mg/L	1.82	0.05	<0.02	0.003	<0.01	0.02	0.019	0.05	<0.01	<0.01	0.017	0.05	0.008	0.018	0.02	0.013	0.05	0.05	0.013	0.03	<0.02	0.01	<0.1	<0.01	<0.01	<0.01	0.018	<0.01	0.008	0.017	0.010	0.012	0.015	0.009	0.007	0.008
Nickel	mg/L	29.3	2.0	0.23	0.044	0.19	0.094	0.036	0.37	0.027	0.093	0.046	0.16	0.082	0.1	0.044	0.062	0.16	0.17	0.081	0.05	0.08	0.06	0.12	0.13	0.023	0.099	0.088	0.11	0.047	0.023	0.037	0.073	0.040	0.045	0.030	0.055
Selenium	mg/L		0.05	<0.05	<0.005	<0.03	<0.03	<0.005	<0.03	<0.03	<0.03	<0.005	<0.05	<0.005	<0.005	<0.005	<0.005	<0.03	<0.05	<0.005	<0.05	<0.05	<0.03	<0.3	<0.03	<0.03	<0.03	<0.005	<0.03	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/L		-	<0.004	<0.0004	<0.002	<0.002	<0.0004	<0.002	<0.002	<0.002	<0.0004	<0.004	<0.0004	<0.0004	<0.0004	<0.0004	<0.002	<0.004	<0.0004	<0.004	<0.004	<0.002	<0.02	<0.002	<0.002	<0.002	<0.0004	<0.002	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Strontium	mg/L		-	0.88	1.4	1.6	0.6	0.51	3.5	1.3	1.7	1.7	1.3	1.6	1.9	1.6	1.6	0.58	1.7	1.6	1.5	1.6	1.5	1.0	1.6	2.2	1.6	1.8	1.7	2.2	0.96	1.3	1.4	1.3	2.2	1.4	1.6
Tin	mg/L		-	0.02	0.003	0.02	0.02	0.006	0.04	<0.01	<0.01	0.004	<0.02	0.005	0.008	<0.002	0.003	0.02	<0.02	0.003	<0.02	<0.02	<0.01	<0.1	<0.01	<0.01	<0.01	0.004	<0.01	<0.002	0.008	0.002	0.006	0.004	0.004	<0.002	0.003
Titanium	mg/L		-	0.15	0.016	0.11	0.09	0.031	0.77	<0.03	0.06	0.022	0.18	0.05	0.07	0.026	0.036	0.14	0.16	0.069	<0.05	<0.05	0.05	<0.3	0.06	<0.03	0.05	0.049	0.05	0.023	0.031	0.023	0.033	0.023	0.017	0.018	0.026
Vanadium	mg/L		1.0	0.030	0.004	0.026	0.018	0.006	0.120	0.005	0.015	0.005	0.030	0.011	0.016	0.006	0.009	0.027	0.03	0.014	<0.01	<0.01	0.01	<0.05	0.013	<0.005	0.012	0.014	0.013	0.006	0.007	0.007	0.009	0.007	0.005	0.005	0.007
Zinc	mg/L	0.043	5.0	*<0.1*	0.020	0.080	0.070	0.030	1.800	*<0.05*	*<0.05*	0.030	0.100	0.020	0.040	<0.01	<0.01	0.050	*<0.1*	0.03	*<0.1*	*<0.1*	*<0.05*	*<0.5*	*<0.05*	*<0.05*	<0.05	0.01	*<0.05*	<0.01	<0.01	0.01	0.02	0.02	0.01	<0.01	<0.01

NOTES: 1) Blank denotes data not available.

2) Target Concentrations derived from LMP and "Expansion of Poplar Cap Irrigation System for Existing Waste Disposal Area" report by Genivar Consultants LP dated January 2010.

3) CCME Guidelines denotes maximum concentration for negative effects to vegetation for irrigation water as per Canadian Water Quality Guidelines (2004).

4) '*' denotes concentration estimated based on poplar tree tolerance and vegetable crops of > 710 mg/L (CCME, 2004), and salty water irrgation for poplars at 400 to 14,000 mg/L (Shanon et al, 1998).

5) '-' denotes no CCME Guideline.

6) µs/cm denotes microsiemens per centimeter.

7) mg/L denotes milligrams per litre.

8) "*" denotes parameter not analysed due to log in error at laboratory.

9) Shading indicates exceedances of the target concentrations.

10) Bolding indicates exceedances of CCME guideline.

11) *Italics* denotes parameter concentration was below the laboratory reportable detection limit (RDL), where the RDL exceeds the relevant target concentrations.

Table E-2
Organic VOC Chemical Results - Irrigation Liquid
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	Target Concentration 100% Leachate	PS Holding Tank																																		
			28-Sep-17	28-May-18	11-Jun-18	17-Jul-18	22-Aug-18	27-Sep-18	24-May-19	26-Jun-19	5-Jul-19	7-Aug-19	11-Sep-19	7-Oct-19	20-May-20	9-Jun-20	21-Jul-20	31-Aug-20	15-Sep-20	19-May-21	23-Jun-21	14-Jul-21	11-Aug-21	16-Sep-21	24-May-22	7-Jun-22	7-Jul-22	9-Aug-22	1-Sep-22	4-Oct-22	24-May-23	14-Jun-23	19-Jul-23	9-Aug-23	6-Sep-23	11-Oct-23
BTEX (Total)	µg/L	127*	36.0	17.3	91.8	25.4	11.9	50.2	8.3	79.9	57.3	61.0	55.0	59.3	42.9	30.3	31.9	74.8	42.0	44.0	25.9	9.9	319	131	31	50	40	40	23	66	64	83	55	49	32	63
Acetone (2-Propanone)	ug/L		710.0	20.0	490.0	410.0	75.0	44.0	<100	23.0	<200	330.0	<500	45.0	39	38	800	640	100	<500	<100	<100	<500	53	300	<100	110	110	35	4000	2100	2300	5400	1300	1700	2100
Benzene	ug/L		<5.0	1.6	4.8	0.9	0.4	3.1	<2.0	6.7	5.0	4.2	10.0	2.3	1.7	3	<2.0	3	3.6	<10	3.6	<2.0	<10	5.5	1.2	3.8	2.7	3.1	1.9	3.9	4.2	5.5	<10	2.4	2.7	3.9
Bromodichloromethane	ug/L		<5.0	<0.50	<5.0	<0.50	<0.50	<0.50	<5.0	<0.50	<10	<0.50	<25	<0.50	<0.50	<0.50	<5.0	<5.0	<0.50	<25	<5.0	<5.0	<25	<0.50	<0.50	<5.0	<2.5	<5.0	<0.50	<0.50	<0.50	<5.0	<25	<0.50	<0.50	<1.0
Bromoform	ug/L		<10	<1.0	<10	<1.0	<1.0	<1.0	<10	<1.0	<20	<1.0	<50	<1.0	<1.0	<1.0	<10	<10	<1.0	<50	<10	<10	<1.0	<0.50	<1.0	<1.0	<10	<5.0	<10	<1.0	<1.0	<1.0	<10	<50	<1.0	<1.0	<2.0
Bromomethane	ug/L		<25	<0.50	<5.0	<0.50	<0.50	<0.50	<5.0	<0.50	<10	<0.50	<25	<0.50	<0.50	<0.50	<5.0	<5.0	<0.50	<25	<5.0	<5.0	<25	<0.50	<0.50	<5.0	<2.5	<5.0	<0.50	<0.50	<0.50	<5.0	<25	<0.50	<0.50	<1.0
Carbon Tetrachloride	ug/L		<5.0	<0.20	<2.0	<0.20	<0.20	<0.20	<2.0	<0.20	<4.0	<0.20	<10	<0.20	<0.19	<0.19	<1.9	<1.9	<0.19	<9.5	<1.9	<1.9	<9.5	<0.19	<0.19	<1.9	<0.95	<1.9	<0.19	<0.19	<0.19	<1.9	<9.5	<0.19	<0.19	<0.38
Chlorobenzene	ug/L		<5.0	2.6	5.4	<0.20	<0.20	3.1	<2.0	3.4	<4.0	1.0	<10	2.8	<0.20	3.2	<2.0	<2.0	1.3	<10	4	<2.0	<10	4.8	0.34	4.3	2.4	2.5	2.6	0.4	2.5	8.3	<10	1.5	1.4	3.5
Chloroethane	ug/L		<10	1.5	<10	<1.0	<1.0	2.4	<10	2.0	<20	<1.0	<50	<1.0	1.7	<1.0	<10	<10	1.2	<50	<10	<10	<50	1.6	<1.0	<10	<5.0	<10	<1.0	<1.0	1.7	<10	<50	<1.0	1.4	<2.0
Chloroform	ug/L		7.8	<0.20	<2.0	<0.20	<0.20	<0.20	<2.0	<0.20	<4.0	0.9	<10	<0.20	<0.20	<0.20	18.0	<2.0	<0.20	<10	<2.0	<2.0	<10	<0.20	<0.20	<2.0	<1.0	<2.0	<0.20	<0.20	<0.20	<2.0	<10	<0.20	<0.20	<0.40
Chloromethane	ug/L		<25	<5.0	<50	<5.0	<5.0	<5.0	<50	<5.0	<100	<5.0	<250	<5.0	<5.0	<5.0	<50	<50	<5.0	<250	<50	<50	<250	<5.0	<5.0	<50	<25	<50	<5.0	<5.0	<5.0	<50	<250	<5.0	<5.0	<10
Dibromochloromethane	ug/L		<10	<0.50	<5.0	<0.50	<0.50	<0.50	<5.0	<0.50	<10	<0.50	<25	<0.50	<0.50	<0.50	<5.0	<5.0	<0.50	<25	<5.0	<5.0	<25	<0.50	<0.50	<5.0	<2.5	<5.0	<0.50	<0.50	<0.50	<5.0	<25	<0.50	<0.50	<1.0
1,2-Dichlorobenzene	ug/L		<10	<0.50	<5.0	<2.0	<0.50	<0.50	<5.0	<0.50	<10	<0.50	<25	<0.50	<0.40	<0.40	<4.0	<4.0	<0.40	<20	<4.0	<4.0	<20	<0.40	<0.40	<4.0	<2.0	<4.0	<0.40	<0.40	<0.40	<4.0	<20	<0.40	<0.40	<0.80
1,3-Dichlorobenzene	ug/L		<10	<0.50	<5.0	<2.0	<0.50	<0.50	<5.0	<0.50	<10	<0.50	<25	<0.50	<0.40	<0.40	<4.0	<4.0	<0.40	<20	<4.0	<4.0	<20	<0.40	<0.40	<4.0	<2.0	<4.0	<0.40	<0.40	<0.40	<4.0	<20	<0.40	<0.40	<0.80
1,4-Dichlorobenzene	ug/L		<10	2.0	<5.0	<2.0	<0.50	2.5	<5.0	3.2	<10	1.1	<25	1.9	0.65	1.2	<4.0	<4.0	2.6	<20	<4.0	<4.0	<20	2.9	0.98	4.2	<2.0	<4.0	1.5	1.7	3.1	<4.0	<20	1.2	1.7	2.4
1,1-Dichloroethane	ug/L		<5.0	0.7	<2.0	<0.20	<0.20	1.5	2.1	2.1	<4.0	0.5	<10	0.5	0.88	0.26	<2.0	<2.0	0.88	<10	<2.0	<2.0	<10	0.56	0.28	<2.0	<1.0	<2.0	0.29	<0.20	0.81	<2.0	<10	0.24	0.38	0.42
1,2-Dichloroethane	ug/L		<10	<0.50	<5.0	1.1	<0.50	<0.50	<5.0	<0.50	<10	<0.50	<25	<0.50	<0.40	<0.49	<4.9	<4.9	<0.49	<25	<4.9	<4.9	<25	<0.49	<0.49	<4.9	<2.5	<4.9	<0.49	3.7	2.1	<4.9	<25	0.85	0.81	1.8
1,1-Dichloroethylene	ug/L		<5.0	<0.20	<2.0	<0.20	<0.20	<0.20	<2.0	<0.20	<4.0	<0.20	<10	<0.20	<0.20	<0.20	<2.0	<2.0	<0.20	<10	<2.0	<2.0	<10	<0.20	<0.20	<2.0	<1.0	<2.0	<0.20	<0.20	<0.20	<2.0	<10	<0.20	<0.20	<0.40
cis-1,2-Dichloroethylene	ug/L		<5.0	<0.50	<5.0	<0.50	<0.50	<0.50	<5.0	<0.50	<10	<0.50	<25	<0.50	<0.50	<0.50	<5.0	<5.0	<0.50	<25	<5.0	<5.0	<25	0.9	1.1	<5.0	<2.5	<5.0	<0.50	2.9	1.2	<5.0	<25	0.73	0.56	1.3
trans-1,2-Dichloroethylene	ug/L		<5.0	<0.50	<5.0	<0.50	<0.50	<0.50	<5.0	<0.50	<10	<0.50	<25	<0.50	<0.50	<0.50	<5.0	<5.0	<0.50	<25	<5.0	<5.0	<25	<0.50	<0.50	<5.0	<2.5	<5.0	<0.50	<0.50	<0.50	<5.0	<25	<0.50	<0.50	<1.0
1,2-Dichloropropane	ug/L		<5.0	<0.20	<2.0	<0.20	<0.20	<0.20	<2.0	<0.20	<4.0	<0.20	<10	<0.20	<0.20	<0.20	<2.0	<2.0	<0.20	<10	<2.0	<2.0	<10	<0.20	<0.20	<2.0	<1.0	<2.0	<0.20	0.47	0.21	<2.0	<10	<0.20	<0.20	<0.40
cis-1,3-Dichloropropene	ug/L		<10	<0.30	<3.0	<0.30	<0.30	<0.30	<3.0	<0.30	<6.0	<0.30	<15	<0.30	<0.30	<0.30	<3.0	<3.0	<0.30	<15	<3.0	<3.0	<15	<0.30	<0.30	<3.0	<1.5	<3.0	<0.30	<0.30	<0.30	<3.0	<15	<0.30	<0.30	<0.60
trans-1,3-Dichloropropene	ug/L		<10	<0.40	<4.0	<0.40	<0.40	<0.40	<4.0	<0.40	<8.0	<0.40	<20	<0.40	<0.40	<0.40	<4.0	<4.0	<0.40	<20	<4.0	<4.0	<20	<0.40	<0.40	<4.0	<2.0	<4.0	<0.40	<0.40	<0.40	<4.0	<20	<0.40	<0.40	<0.80
Ethylbenzene	ug/L		<5.0	<0.20	16.0	2.3	1.2	5.9	<2.0	26.0	13.0	6.8	14.0	11.0	1.2	5.3	2.9	7.8	6.4	<10	<2.0	<2.0	24	28	3.0	4.6	11	5.7	3.0	6.8	14	15	<10	11	5.3	6.6
Ethylene Dibromide	ug/L		<10	<0.20	<2.0	<0.20	<0.20	<0.20	<2.0	<0.20	<4.0	<0.20	<10	<0.20	<0.19	<0.19	<1.9	<1.9	<0.19	<9.5	<1.9	<1.9	<9.5	<0.19	<0.19	<1.9	<0.95	<1.9	<0.19	<0.19	<0.19	<1.9	<9.5	<0.19	<0.19	<0.38
Methylene Chloride(Dichloromethane)	ug/L		<25	<2.0	<20	<2.0	<2.0	<2.0	<20	<2.0	<40	<2.0	<100	<2.0	<2.0	<2.0	<20	<20	<2.0	<100	<20	<20	<100	<2.0	<2.0	<20	<10	<20	<2.0	<2.0	<2.0	<20	<100	<2.0	<2.0	<4.0
Methyl Ethyl Ketone (2-Butanone)	ug/L		1000.0	<10	600.0	730.0	150.0	27.0	<100	<10	<200	100.0	<500	25.0	<10	12	1000	840	110	<500	<100	<100	<500	23	300	<100	71	<100	31	4200	2500	2400	5400	1400	1600	2300
Methyl Isobutyl Ketone	ug/L		<250	<5.0	<50	18.0	5.5	<5.0	<50	<5.0	<100	12.0	<250	6.8	<5.0	<5.0	<50	<50	<5.0	<250	<50	<50	<250	7.5	11	<50	<25	<50	<5.0	59	40	<50	<250	19	10	33
Methyl t-butyl ether (MTBE)	ug/L		<10	1.1	<5.0	1.9	0.6	1.1	<5.0	1.1	<10	1.9	<25	1.1	<0.50	0.69	<5.0	<5.0	1.3	<25	<5.0	<5.0	<25	0.97	<0.50	<5.0	<2.5	<5.0	0.82	0.82	0.93	<5.0	<25	0.59	0.6	1.0
Styrene	ug/L		<10	<0.50	<5.0	<0.50	<0.50	<0.50	<5.0	<0.50	<10	<0.50	<25	<0.50	<0.40	<0.40	<4.0	<4.0	<0.40	<20	<4.0	<4.0	<20	<0.40	<0.40	<4.0	<2.0	<4.0	<0.40	<0.40	<0.67	<4.0	<20	<0.60 (1)	<0.40	<0.80
1,1,1,2-Tetrachloroethane	ug/L		<10	<0.50	<5.0	<0.50	<0.50	<0.50	<5.0	<0.50	<10	<0.50	<25	<0.50	<0.50	<0.50	<5.0	<5.0	<0.50	<25	<5.0	<5.0	<25	<0.50	<0.50	<5.0	<2.5	<5.0	<0.50	<0.50	<0.50	<5.0	<25	<0.50	<0.50	<1.0
1,1,2,2-Tetrachloroethane	ug/L		<10	<0.50	<5.0	<0.50	<0.50	<0.50	<5.0	<0.50	<10	<0.50	<25	<0.50	<0.40	<0.40	<4.0	<4.0	<0.40	<20	<4.0	<4.0	<20	<0.40	<0.40	<4.0	<2.0	<4.0	<0.40	<0.40	<0.40	<4.0	<20	<0.40	<0.40	<0.80
Tetrachloroethylene	ug/L		<5.0	<0.20	<2.0	<0.20	<0.20	<0.20	<2.0	<0.20	<4.0	<0.20	<10	<0.20	<0.20	<0.20	<2.0	<2.0	<0.20	<10	<2.0	<2.0	<10	<0.20	<0.20	<2.0	<1.0	<2.0	<0.20	<0.20	<0.20	<2.0	<10	<0.20	<0.20	<0.40
Toluene	ug/L		25.0	1.5	21.0	13.0	6.4	6.2	<2.0	4.2	4.3	21.0	10.0	11.0	4.0	3.0	17	35	6.0	24	7.3	<2.0	200	15	9.3	4.1	2.3	5.1	3.4	27	16	24	26	9.1	6.0	16
1,1,1-Trichloroethane	ug/L		<5.0	<0.20	<2.0	<0.20	<0.20	<0.20	<2.0	<0.20	<4.0	<0.20	<10	<0.20	<0.20	<0.20	<2.0	<2.0	<0.20	<10	<2.0	<2.0	<10	<0.20	<0.20	<2.0	<1.0	<2.0	<0.20	<0.20	<0.20	<2.0	<10	<0.20	<0.20	<0.40
1,1,2-Trichloroethane	ug/L		<10	<0.50	<5.0	<0.50	<0.50	<0.50	<5.0	<0.50	<10	<0.50	<25	<0.50	<0.40	<0.40	<4.0	<4.0	<0.40	<20	<4.0	<4.0	<20	<0.40	<0.40	<4.0	<2.0	<4.0	<0.40	<0.40	<0.40	<4.0	<20	<0.40	<0.40	<0.80
Trichloroethylene	ug/L		<5.0	<0.20	<2.0	<0.20	<0.20	<0.20	<2.0	<0.20	<4.0	<0.20	<10	<0.20	<0.20	<0.20	<2.0	<2.0	<0.20	<10	<2.0	<2.0	<10	<0.20	<0.20	<2.0	<1.0	<2.0	<0.20	<0.20	0.24	<2.0	<10	<0.20	<0.20	<0.40
Trichlorofluoromethane (FREON 11)	ug/L		<10	<0.50	<5.0	<0.50	<0.50	<0.50	<5.0	<0.50	<10	<0.50	<25	<0.50	<0.50	<0.50	<5.0	<5.0	<0.50	<25	<5.0	<5.0	<25	<0.50	<0.50	<5.0	<2.5	<5.0	<0.50	<0.50	<0.50	<5.0	<25	<0.50	<0.50	<1.0
Vinyl Chloride	ug/L		<10	0.3	<2.0	0.3	0.2	0.3	<2.0	0.5	<4.0	0.5	<10	0.4	<0.20	0.23	<2.0	<2.0	0.28	<10	<2.0	<2.0	<10	0.4	0.32	<2.0	<1.0	<2.0	0.26	<0.20	0.31	<2.0	<10	0.24	<0.20	0.48
p+m-Xylene	ug/L		11.0	7.8	38.0	6.2	2.7	23.0	2.3	30.0	25.0	20.0	21.0	25.0	23	14	7.5	20	20	10	6.1	<2.0	63	58	12	22	16	17	11	19	21	27	19	18	13	26
o-Xylene	ug/L		<5.0	6.2	13.0	3.0	1.2	12.0	3.0	12.0	10.0	9.1	<10	11.0	14	5.4	3.7	9	6.6	<10	7.6	6.9	27	24	5.2	15	7.3	8.8	3.5	9.2	9.4	11	<10	7.7	5.2	11
Total Xylenes	ug/L		11.0	14.0	50.0	9.2	3.9	35.0	5.3	43.0	35.0	29.0	21.0	35.0	36	19	11	29	26	10	14	6.9	90	82	17	37	24	26	15	28	30	38	19	26	18	36

NOTES: 1) Blank denotes data not available.
2) < - denotes parameter concentration is below the estimated quantitation limit or method reporting limit.
3) µg/L denotes microgram per litre.
4) VOCs for leachate holding tank not analysed in July 2007 due to an error at laboratory.
5) "*" denotes composite concentration of benzene, ethylbenzene, toluene, and xylene (BTEX); where a concentration was less than the Reported Detection Limit (RDL), the concentration was considered to be equal to one half of the RDL.
6) Shading denotes exceedances of the target concentration.

Table E-3
Organic EPA 625 Chemical Results - Irrigation Liquid
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	Target Concentration 100% Leachate	PS Holding Tank																																		
			28-Sep-17	28-May-18	11-Jun-18	17-Jul-18	22-Aug-18	27-Sep-18	24-May-19	26-Jun-19	5-Jul-19	14-Aug-19	11-Sep-19	7-Oct-19	20-May-20	9-Jun-20	21-Jul-20	31-Aug-20	15-Sep-20	19-May-21	23-Jun-21	14-Jul-21	11-Aug-21	16-Sep-21	24-May-22	7-Jun-22	7-Jul-22	9-Aug-22	1-Sep-22	4-Oct-22	4-Oct-22	24-May-23	14-Jun-23	19-Jul-23	9-Aug-23	6-Sep-23	11-Oct-23
Acenaphthene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	0.81	<0.80	<0.20	0.27	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	0.9	<2.0	<2.0	<2.0	<0.80
Acenaphthylene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
Anthracene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
Benzo(a)anthracene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
Benzo(a)pyrene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
Benzo(b/j)fluoranthene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
Benzo(g,h,i)perylene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
Benzo(k)fluoranthene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
1-Chloronaphthalene	ug/L		<20	<1.0	<4.0	<4.0	<4.0	<10	<1.0	<4.0	<4.0	<4.0	<4.0	<4.0	<1.0	<1.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<5.0	<10	<4.0	<4.0	<10	<10	<10	<4.0	<10	<10	<10	<4.0
2-Chloronaphthalene	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Chrysene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
Dibenz(a,h)anthracene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
Fluoranthene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
Fluorene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	0.25	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
Indeno(1,2,3-cd)pyrene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
1-Methylnaphthalene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	0.26	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	1.1	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	0.96	<2.0	<2.0	<2.0	<0.80
2-Methylnaphthalene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	0.93	<0.80	<1.0	1.1	<0.20	0.24	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	1.3	<0.80	<1.0	<2.0	0.94	<0.80	<2.0	<2.0	<2.0	1.3	<2.0	<2.0	<2.0	<0.80
Naphthalene	ug/L		<4.0	<0.20	3.8	1.7	<0.80	4.4	<0.20	5.0	7.7	1.0	4.8	4.0	<0.20	<0.61	<2.0	<2.5	3.0	<0.80	3.4	<0.80	3.6	6.8	1.5	1.3	13	6.5	<0.80	8.0	8.0	4.6	10	6.1	4.1	2.8	3.8
Perylene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
Phenanthrene	ug/L		<4.0	<0.20	<0.80	0.91	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	0.25	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
Pyrene	ug/L		<4.0	<0.20	<0.80	<0.80	<0.80	<2.0	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<1.0	<2.0	<0.80	<0.80	<2.0	<2.0	<2.0	<0.80	<2.0	<2.0	<2.0	<0.80
1,2-Dichlorobenzene	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
1,3-Dichlorobenzene	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
1,4-Dichlorobenzene	ug/L		<10	1.1	<2.0	<2.0	<2.0	<5.0	1.0	<2.5	<2.0	<2.0	<2.0	<2.0	<0.50	0.74	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	<2.0	2.8	<5.0	<2.0	<2.0	<5.0	<5.0	3.1	<4.0	<20	1.2	1.7	2.4
Hexachlorobenzene	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Pentachlorobenzene	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
1,2,3,5-Tetrachlorobenzene	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
1,2,4,5-Tetrachlorobenzene	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
1,2,3-Trichlorobenzene	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
1,2,4-Trichlorobenzene	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
1,3,5-Trichlorobenzene	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
2-Chlorophenol	ug/L		<6.0	<0.30	<1.2	<1.2	<1.2	<3.0	<0.30	<1.2	<1.2	<1.2	<1.2	<1.2	<0.30	<0.30	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.5	<3.0	<1.2	<1.2	<3.0	<3.0	<3.0	<1.2	<3.0	<3.0	<3.0	<1.2
4-Chloro-3-Methylphenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
m/p-Cresol	ug/L		45.0	<0.50	9.5	57.0	<2.0	<5.0	<0.50	8.5	16.0	7.2	<2.0	6.1	<0.50	<0.50	340	190	18	<2.0	4.5	<2.0	99	8.6	13	<2.5	26	8.5	<2.0	100	100	230	180	260	99	77	110
o-Cresol	ug/L		<10	<0.50	3.9	7.6	<2.0	<5.0	<0.50	<2.0	<2.0	2.7	2.4	2.5	<0.50	0.79	5.0	7.1	<2.0	<2.0	<2.0	<2.0	4.8	<2.0	2.6	<2.5	<5.0	2.1	<2.0	11	11	6.7	6.1	8.8	<5.0	<5.0	4.5
1,2,3,4-Tetrachlorobenzene	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
2,3-Dichlorophenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
2,4-Dichlorophenol	ug/L		<6.0	<0.30	<1.2	<1.2	<1.2	<3.0	<0.30	<1.2	<1.2	<1.2	<1.2	<1.2	<0.30	<0.30	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.5	<3.0	<1.2	<1.2	<3.0	<3.0	<3.0	<1.2	<3.0	<3.0	<3.0	<1.2
2,5-Dichlorophenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
2,6-Dichlorophenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
3,4-Dichlorophenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
3,5-Dichlorophenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
2,4-Dimethylphenol	ug/L		<10	1.0	2.1	<3.0	<2.0	5.2	<0.50	5.5	2.6	<2.0	<2.0	<2.0	<0.80	<1.0 (1)	<2.0	3.5	<2.0	<2.0	<2.0	<2.0	15	5.2	2.4	<2.5	6.0	4.1	<2.0	<5.0	<5.0	6.5	<2.0	7.1	<5.0	<5.0	<2.0
2,4-Dinitrophenol	ug/L		<40	<6.3	<50	<25	<8.0	<25	<2.5	<8.0	<40	<8.0	<8.0	<8.0	<2.0	<2.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<10	<20	<8.0	<8.0	<20	<20	<20	<20	<20	<20	<20	<40
4,6-Dinitro-2-methylphenol	ug/L		<40	<2.0	<50	<8.0	<8.0	<20	<2.0	<8.0	<20	<8.0	<8.0	<8.0	<2.0	<2.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<10	<20	<8.0	<8.0	<20	<20	<20	<8.0	<20	<20	<20	<40
2-Nitrophenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
4-Nitrophenol	ug/L		<28	<1.4	<5.6	<5.6	<5.6	<14	<1.4	<5.6	<5.6	<5.6	<5.6	<5.6	<1.4	<1.4	<5.6	<5.6	<5.6	<5.6	<5.6	<5.6	<5.6	<5.6	<5.6	<7.0	<14	<5.6	<5.6	<14	<14	<14	<5.6	<14	<14	<14	<5.6
Pentachlorophenol	ug/L		<20	<1.0	<4.0	<4.0	<4.0	<10	<2.5	<4.0	<20	<4.0	<4.0	<4.0	<1.0	<1.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<5.0	<10	<4.0	<4.0	<10	<10	<10	<4.0	<10	<10	<10	<8.0
Phenol	ug/L		22.0	<0.50	<2.0	2.3	<2.0	<5.0	<0.50	<2.0	8.6	56.0	<2.0	<2.0	<0.50	<0.50	32	16	2.6	<2.0	<2.0	<2.0	7.4	<2.0	2.5	<2.5	9.1	2.8	<2.0	100	100	80	55	87	34	21	44
2,3,4,5-Tetrachlorophenol	ug/L		<8.0	<0.40	<1.6	<1.6	<1.6	<4.0	<0.40	<1.6	<1.6	<1.6	<1.6	<1.6	<0.40	<0.40	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<2.0	<4.0	<1.6	<1.6	<4.0	<4.0	<4.0	<1.6	<4.0	<4.0	<4.0	<1.6
2,3,4,6-Tetrachlorophenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
2,3,5,6-Tetrachlorophenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
2,3,4-Trichlorophenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
2,3,5-Trichlorophenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
2,3,6-Trichlorophenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
2,4,5-Trichlorophenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
2,4,6-Trichlorophenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
3,4,5-Trichlorophenol	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Benzyl butyl phthalate	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Biphenyl	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Bis(2-chloroethyl)ether	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Bis(2-chloroethoxy)methane	ug/L		<10	<0.60	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Bis(2-chloroisopropyl)ether	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Bis(2-ethylhexyl)phthalate	ug/L		<40	<2.0	12.0	24.0	<8.0	22.0	<2.0	<8.0	<8.0	12.0	<8.0	<8.0	2.0	<2.0	14	17	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<10	<20	<8.0	<8.0	<20	<20	<20	<8.0	<20	<20	<20	<8.0
4-Bromophenyl phenyl ether	ug/L		<6.0	<0.30	<1.2	<1.2	<1.2	<3.0	<0.30	<1.2	<1.2	<1.2	<1.2	<1.2	<0.30	<0.30	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.5	<3.0	<1.2	<1.2	<3.0	<3.0	<3.0	<1.2	<3.0	<3.0	<3.0	<1.2
p-Chloroaniline	ug/L		<20	<1.0	<4.0	<4.0	<4.0	<10	<1.0	<4.0	<4.0	<4.0	<4.0	<4.0	<1.0	<1.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<5.0	<10	<4.0	<4.0	<10	<10	<10	<4.0	<10	<10	<10	<4.0
4-Chlorophenyl phenyl ether	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Di-N-butyl phthalate	ug/L		<40	<2.0	<8.0	<8.0	<8.0	<20	<2.0	<8.0	<8.0	<8.0	<8.0	<8.0	<2.0	<2.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<10	<20	<8.0	<8.0	<20	<20	<20	<8.0	<20	<20	<20	<8.0
Di-N-octyl phthalate	ug/L		<16	<0.80	<3.2	<3.2	<3.2	<8.0	<0.80	<3.2	<3.2	<3.2	<3.2	<3.2	<0.80	<0.80	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<4.0	<8.0	<3.2	<3.2	<8.0	<8.0	<8.0	<3.2	<8.0	<8.0	<8.0	<3.2
2,4-Dinitrotoluene	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Diethyl phthalate	ug/L		<20	<1.0	<4.0	<4.0	<4.0	<10	<1.0	<4.0	<4.0	<4.0	<4.0	<4.0	<1.0	<1.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.2	<4.0	<4.0	<5.0	<10	<4.0	<4.0	<10	<10	<10	<4.0	<10	<10	<10	<4.0
3,3'-Dichlorobenzidine	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Dimethyl phthalate	ug/L		<20	<1.0	<4.0	<4.0	<4.0	<10	<1.0	<4.0	<4.0	<4.0	<4.0	<4.0	<1.0	<1.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<5.0	<10	<4.0	<4.0	<10	<10	<10	<4.0	<10	<10	<10	<4.0
2,6-Dinitrotoluene	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Diphenyl Ether	ug/L		<6.0	<0.30	<1.2	<1.2	<1.2	<3.0	<0.30	<1.2	<1.2	<1.2	<1.2	<1.2	<0.30	<0.30	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.5	<3.0	<1.2	<1.2	<3.0	<3.0	<3.0	<1.2	<3.0	<3.0	<3.0	<1.2
Hexachlorobutadiene	ug/L		<8.0	<0.40	<1.6	<1.6	<1.6	<4.0	<0.40	<1.6	<1.6	<1.6	<1.6	<1.6	<0.40	<0.40	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<2.0	<4.0	<1.6	<1.6	<4.0	<4.0	<4.0	<1.6	<4.0	<4.0	<4.0	<1.6
Hexachlorocyclopentadiene	ug/L		<40	<2.0	<8.0	<8.0	<8.0	<20	<2.0	<8.0	<8.0	<8.0	<8.0	<8.0	<2.0	<2.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<10	<20	<8.0	<8.0	<20	<20	<20	<8.0	<20	<20	<20	<8.0
Hexachloroethane	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Isophorone	ug/L		<10	<0.50	<2.0	<7.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<6.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<4.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Nitrobenzene	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0
Nitrosodiphenylamine/Diphenylamine	ug/L		<20	<1.0	<4.0	<4.0	<4.0	<10	<1.0	<4.0	<4.0	<4.0	<4.0	<4.0	<1.0	<1.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<5.0	<10	<4.0	<4.0	<10	<10	<10	<4.0	<10	<10	<10	<4.0
N-Nitroso-di-n-propylamine	ug/L		<10	<0.50	<2.0	<2.0	<2.0	<5.0	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<0.50	<0.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.5	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<2.0

NOTES: 1) Blank denotes data not available.
2) < - denotes parameter concentration is below the estimated quantitation limit or method reporting limit.
3) µg/L denotes microgram per litre.

APPENDIX E-4:

2023 Certificates of Analysis

Your P.O. #: 12285739
Your Project #: 2303459.01
Site#: 500
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/06/01
Report #: R7653075
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3E8765
Received: 2023/05/25, 08:58

Sample Matrix: Leachable (CGSB)
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
ABN Compounds in Water by GC/MS	1	2023/05/30	2023/05/31	CAM SOP-00301	EPA 8270 m
Alkalinity	1	N/A	2023/05/30	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	1	N/A	2023/05/26	CAM SOP-00463	SM 23 4500-Cl E m
Conductance in Water - On-site	1	N/A	2023/05/30		
Field Measured Dissolved Oxygen in Water	1	N/A	2023/05/30		
Total Metals by ICPMS	1	N/A	2023/05/30	CAM SOP-00447	EPA 6020B m
Ammonia-N	1	N/A	2023/05/29	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	1	N/A	2023/05/26	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Field Measured pH (2)	1	N/A	2023/05/30		Field pH Meter
Sulphate by Automated Turbidimetry	1	N/A	2023/05/26	CAM SOP-00464	SM 23 4500-SO42- E m
Field Temperature (2)	1	N/A	2023/05/30		Field Thermometer
Total Kjeldahl Nitrogen in Water	1	2023/05/29	2023/05/29	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	1	2023/05/29	2023/05/29	CAM SOP-00407	SM 23 4500-P I
Turbidity - On-site	1	N/A	2023/05/30		
Un-ionized Ammonia (3)	1	2023/05/25	2023/05/30	Auto Calc.	PWQO
Volatile Organic Compounds in Water	1	N/A	2023/05/31	CAM SOP-00228	EPA 8260D
Non-Routine Volatile Organic Compounds	1	N/A	2023/05/31	CAM SOP-00226	EPA 8260D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the

Your P.O. #: 12285739
Your Project #: 2303459.01
Site#: 500
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/06/01
Report #: R7653075
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3E8765
Received: 2023/05/25, 08:58
customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.
(3) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799
==========
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3E8765
Report Date: 2023/06/01

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

RESULTS OF ANALYSES OF LEACHABLE (CGSB)

Bureau Veritas ID		VXF237		
Sampling Date		2023/05/24		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Calculated Parameters				
Total Un-ionized Ammonia	mg/L	2.3	0.044	8683790
Field Measurements				
Field Conductivity	uS/cm	5120	N/A	ONSITE
Field Dissolved Oxygen	mg/L	2.39	N/A	ONSITE
Field Temperature	Celsius	13.5	N/A	ONSITE
Field Turbidity	NTU	158	N/A	ONSITE
Field Measured pH	pH	7.3		ONSITE
Inorganics				
Total Ammonia-N	mg/L	384 (1)	7.5	8690174
Total Kjeldahl Nitrogen (TKN)	mg/L	320 (1)	10	8690240
Total Phosphorus	mg/L	0.76	0.10	8690288
Dissolved Sulphate (SO4)	mg/L	210	1.0	8685119
Alkalinity (Total as CaCO3)	mg/L	2200	2.0	8685080
Dissolved Chloride (Cl-)	mg/L	300	3.0	8685108
Nitrite (N)	mg/L	<0.010	0.010	8685026
Nitrate (N)	mg/L	<0.10	0.10	8685026

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1)

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3E8765
Report Date: 2023/06/01

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

ELEMENTS BY ATOMIC SPECTROSCOPY (LEACHABLE (CGSB))

Bureau Veritas ID		VXF237		
Sampling Date		2023/05/24		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Metals				
Total Aluminum (Al)	mg/L	0.14	0.02	8690512
Total Arsenic (As)	mg/L	0.014	0.001	8690512
Total Barium (Ba)	mg/L	0.16	0.005	8690512
Total Beryllium (Be)	mg/L	<0.0006	0.0006	8690512
Total Bismuth (Bi)	mg/L	<0.001	0.001	8690512
Total Boron (B)	mg/L	8.2	0.1	8690512
Total Cadmium (Cd)	mg/L	<0.0001	0.0001	8690512
Total Calcium (Ca)	mg/L	170	0.2	8690512
Total Chromium (Cr)	mg/L	0.017	0.005	8690512
Total Cobalt (Co)	mg/L	0.0044	0.0005	8690512
Total Copper (Cu)	mg/L	0.003	0.002	8690512
Total Iron (Fe)	mg/L	2.5	0.1	8690512
Total Lead (Pb)	mg/L	0.0008	0.0005	8690512
Total Magnesium (Mg)	mg/L	120	0.05	8690512
Total Molybdenum (Mo)	mg/L	0.010	0.002	8690512
Total Nickel (Ni)	mg/L	0.037	0.001	8690512
Total Potassium (K)	mg/L	86	0.2	8690512
Total Selenium (Se)	mg/L	<0.005	0.005	8690512
Total Silver (Ag)	mg/L	<0.0004	0.0004	8690512
Total Sodium (Na)	mg/L	390	0.1	8690512
Total Strontium (Sr)	mg/L	1.3	0.003	8690512
Total Tin (Sn)	mg/L	0.002	0.002	8690512
Total Titanium (Ti)	mg/L	0.023	0.005	8690512
Total Vanadium (V)	mg/L	0.007	0.001	8690512
Total Zinc (Zn)	mg/L	0.01	0.01	8690512

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

SEMI-VOLATILE ORGANICS BY GC-MS (LEACHABLE (CGSB))

Bureau Veritas ID		VXF237		
Sampling Date		2023/05/24		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Semivolatile Organics				
Acenaphthene	ug/L	<2.0	2.0	8691690
Acenaphthylene	ug/L	<2.0	2.0	8691690
Anthracene	ug/L	<2.0	2.0	8691690
Benzo(a)anthracene	ug/L	<2.0	2.0	8691690
Benzo(a)pyrene	ug/L	<2.0	2.0	8691690
Benzo(b/j)fluoranthene	ug/L	<2.0	2.0	8691690
Benzo(g,h,i)perylene	ug/L	<2.0	2.0	8691690
Benzo(k)fluoranthene	ug/L	<2.0	2.0	8691690
1-Chloronaphthalene	ug/L	<10	10	8691690
2-Chloronaphthalene	ug/L	<5.0	5.0	8691690
Chrysene	ug/L	<2.0	2.0	8691690
Dibenzo(a,h)anthracene	ug/L	<2.0	2.0	8691690
Fluoranthene	ug/L	<2.0	2.0	8691690
Fluorene	ug/L	<2.0	2.0	8691690
Indeno(1,2,3-cd)pyrene	ug/L	<2.0	2.0	8691690
1-Methylnaphthalene	ug/L	<2.0	2.0	8691690
2-Methylnaphthalene	ug/L	<2.0	2.0	8691690
Naphthalene	ug/L	4.6	2.0	8691690
Perylene	ug/L	<2.0	2.0	8691690
Phenanthrene	ug/L	<2.0	2.0	8691690
Pyrene	ug/L	<2.0	2.0	8691690
1,2-Dichlorobenzene	ug/L	<5.0	5.0	8691690
1,3-Dichlorobenzene	ug/L	<5.0	5.0	8691690
Hexachlorobenzene	ug/L	<5.0	5.0	8691690
Pentachlorobenzene	ug/L	<5.0	5.0	8691690
1,2,3,5-Tetrachlorobenzene	ug/L	<5.0	5.0	8691690
1,2,4,5-Tetrachlorobenzene	ug/L	<5.0	5.0	8691690
1,2,3-Trichlorobenzene	ug/L	<5.0	5.0	8691690
1,2,4-Trichlorobenzene	ug/L	<5.0	5.0	8691690
1,3,5-Trichlorobenzene	ug/L	<5.0	5.0	8691690
2-Chlorophenol	ug/L	<3.0	3.0	8691690
4-Chloro-3-Methylphenol	ug/L	<5.0	5.0	8691690
m/p-Cresol	ug/L	230	5.0	8691690

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

SEMI-VOLATILE ORGANICS BY GC-MS (LEACHABLE (CGSB))

Bureau Veritas ID		VXF237		
Sampling Date		2023/05/24		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
o-Cresol	ug/L	6.7	5.0	8691690
1,2,3,4-Tetrachlorobenzene	ug/L	<5.0	5.0	8691690
2,3-Dichlorophenol	ug/L	<5.0	5.0	8691690
2,4-Dichlorophenol	ug/L	<3.0	3.0	8691690
2,5-Dichlorophenol	ug/L	<5.0	5.0	8691690
2,6-Dichlorophenol	ug/L	<5.0	5.0	8691690
3,4-Dichlorophenol	ug/L	<5.0	5.0	8691690
3,5-Dichlorophenol	ug/L	<5.0	5.0	8691690
2,4-Dimethylphenol	ug/L	6.5	5.0	8691690
2,4-Dinitrophenol	ug/L	<20	20	8691690
4,6-Dinitro-2-methylphenol	ug/L	<20	20	8691690
2-Nitrophenol	ug/L	<5.0	5.0	8691690
4-Nitrophenol	ug/L	<14	14	8691690
Pentachlorophenol	ug/L	<10	10	8691690
Phenol	ug/L	80	5.0	8691690
2,3,4,5-Tetrachlorophenol	ug/L	<4.0	4.0	8691690
2,3,4,6-Tetrachlorophenol	ug/L	<5.0	5.0	8691690
2,3,5,6-Tetrachlorophenol	ug/L	<5.0	5.0	8691690
2,3,4-Trichlorophenol	ug/L	<5.0	5.0	8691690
2,3,5-Trichlorophenol	ug/L	<5.0	5.0	8691690
2,3,6-Trichlorophenol	ug/L	<5.0	5.0	8691690
2,4,5-Trichlorophenol	ug/L	<5.0	5.0	8691690
2,4,6-Trichlorophenol	ug/L	<5.0	5.0	8691690
3,4,5-Trichlorophenol	ug/L	<5.0	5.0	8691690
Benzyl butyl phthalate	ug/L	<5.0	5.0	8691690
Biphenyl	ug/L	<5.0	5.0	8691690
Bis(2-chloroethyl)ether	ug/L	<5.0	5.0	8691690
Bis(2-chloroethoxy)methane	ug/L	<5.0	5.0	8691690
Bis(2-chloroisopropyl)ether	ug/L	<5.0	5.0	8691690
Bis(2-ethylhexyl)phthalate	ug/L	<20	20	8691690
4-Bromophenyl phenyl ether	ug/L	<3.0	3.0	8691690
p-Chloroaniline	ug/L	<10	10	8691690
4-Chlorophenyl phenyl ether	ug/L	<5.0	5.0	8691690
Di-N-butyl phthalate	ug/L	<20	20	8691690

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SEMI-VOLATILE ORGANICS BY GC-MS (LEACHABLE (CGSB))

Bureau Veritas ID		VXF237		
Sampling Date		2023/05/24		
COC Number		n/a		
	UNITS	**PS HOLDING TANK**	**RDL**	**QC Batch**
di-n-octyl phthalate	ug/L	<8.0	8.0	8691690
2,4-Dinitrotoluene	ug/L	<5.0	5.0	8691690
Diethyl phthalate	ug/L	<10	10	8691690
3,3'-Dichlorobenzidine	ug/L	<5.0	5.0	8691690
Dimethyl phthalate	ug/L	<10	10	8691690
2,6-Dinitrotoluene	ug/L	<5.0	5.0	8691690
Diphenyl Ether	ug/L	<3.0	3.0	8691690
Hexachlorobutadiene	ug/L	<4.0	4.0	8691690
Hexachlorocyclopentadiene	ug/L	<20	20	8691690
Hexachloroethane	ug/L	<5.0	5.0	8691690
Isophorone	ug/L	<5.0	5.0	8691690
Nitrobenzene	ug/L	<5.0	5.0	8691690
Nitrosodiphenylamine/Diphenylamine	ug/L	<10	10	8691690
N-Nitroso-di-n-propylamine	ug/L	<5.0	5.0	8691690
Surrogate Recovery (%)				
2,4,6-Tribromophenol	%	92		8691690
2-Fluorobiphenyl	%	80		8691690
2-Fluorophenol	%	46		8691690
D14-Terphenyl	%	88		8691690
D5-Nitrobenzene	%	85		8691690
D5-Phenol	%	29		8691690

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RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
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Sampler Initials: BEG

VOLATILE ORGANICS BY GC/MS (LEACHABLE (CGSB))

Bureau Veritas ID		VXF237		
Sampling Date		2023/05/24		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Volatile Organics				
Acetone (2-Propanone)	ug/L	2100	10	8690768
Benzene	ug/L	4.2	0.20	8690768
Bromodichloromethane	ug/L	<0.50	0.50	8690768
Bromoform	ug/L	<1.0	1.0	8690768
Bromomethane	ug/L	<0.50	0.50	8690768
Carbon Tetrachloride	ug/L	<0.19	0.19	8690768
Chlorobenzene	ug/L	2.5	0.20	8690768
Chloroethane	ug/L	1.7	1.0	8690768
Chloroform	ug/L	<0.20	0.20	8690768
Chloromethane	ug/L	<5.0	5.0	8690768
Dibromochloromethane	ug/L	<0.50	0.50	8690768
1,2-Dichlorobenzene	ug/L	<0.40	0.40	8690768
1,3-Dichlorobenzene	ug/L	<0.40	0.40	8690768
1,4-Dichlorobenzene	ug/L	3.1	0.40	8690768
1,1-Dichloroethane	ug/L	0.81	0.20	8690768
1,2-Dichloroethane	ug/L	2.1	0.49	8690768
1,1-Dichloroethylene	ug/L	<0.20	0.20	8690768
cis-1,2-Dichloroethylene	ug/L	1.2	0.50	8690768
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	8690768
1,2-Dichloropropane	ug/L	0.21	0.20	8690768
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	8690768
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	8690768
Ethylbenzene	ug/L	14	0.20	8690768
Ethylene Dibromide	ug/L	<0.19	0.19	8690768
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	8690768
Methyl Ethyl Ketone (2-Butanone)	ug/L	2500	10	8690768
Methyl Isobutyl Ketone	ug/L	40	5.0	8690768
Methyl t-butyl ether (MTBE)	ug/L	0.93	0.50	8690768
Styrene	ug/L	<0.67 (1)	0.67	8690768
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	8690768
1,1,2,2-Tetrachloroethane	ug/L	<0.40	0.40	8690768

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) The detection limit was raised due to interference from coeluting o-xylene.

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RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

VOLATILE ORGANICS BY GC/MS (LEACHABLE (CGSB))

Bureau Veritas ID		VXF237		
Sampling Date		2023/05/24		
COC Number		n/a		
	UNITS	**PS HOLDING TANK**	**RDL**	**QC Batch**
Tetrachloroethylene	ug/L	<0.20	0.20	8690768
1,3,5-Trimethylbenzene	ug/L	<5.0	5.0	8690178
Toluene	ug/L	16	0.20	8690768
1,1,1-Trichloroethane	ug/L	<0.20	0.20	8690768
1,1,2-Trichloroethane	ug/L	<0.40	0.40	8690768
Trichloroethylene	ug/L	0.24	0.20	8690768
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	8690768
Vinyl Chloride	ug/L	0.31	0.20	8690768
p+m-Xylene	ug/L	21	0.20	8690768
o-Xylene	ug/L	9.4	0.20	8690768
Total Xylenes	ug/L	30	0.20	8690768
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	108		8690768
D4-1,2-Dichloroethane	%	94		8690768
D8-Toluene	%	93		8690768
4-Bromofluorobenzene	%	100		8690178
D4-1,2-Dichloroethane	%	100		8690178
D8-Toluene	%	101		8690178

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GENERAL COMMENTS

Sample VXF237 [PS HOLDING TANK] : TKN < Ammonia: Both values fall within the method uncertainty for duplicates and are likely equivalent.

VOC Analysis: Due to foaming, sample required dilution. Detection limits were adjusted accordingly.

ABN Analysis: Due to the sample matrix, a smaller than usual portion of the sample was used for extraction. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Bureau Veritas Job #: C3E8765
Report Date: 2023/06/01

QUALITY ASSURANCE REPORT

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8690178	4-Bromofluorobenzene	2023/05/31	101 (2)	70 - 130	106	70 - 130	94	%				
8690178	D4-1,2-Dichloroethane	2023/05/31	94 (2)	70 - 130	93	70 - 130	98	%				
8690178	D8-Toluene	2023/05/31	101 (2)	70 - 130	105	70 - 130	101	%				
8690768	4-Bromofluorobenzene	2023/05/31	108	70 - 130	107	70 - 130	106	%				
8690768	D4-1,2-Dichloroethane	2023/05/31	99	70 - 130	96	70 - 130	97	%				
8690768	D8-Toluene	2023/05/31	94	70 - 130	99	70 - 130	93	%				
8691690	2,4,6-Tribromophenol	2023/05/30	96	10 - 130	99	10 - 130	70	%				
8691690	2-Fluorobiphenyl	2023/05/30	79	30 - 130	70	30 - 130	80	%				
8691690	2-Fluorophenol	2023/05/30	55	10 - 130	51	10 - 130	43	%				
8691690	D14-Terphenyl	2023/05/30	88	30 - 130	88	30 - 130	82	%				
8691690	D5-Nitrobenzene	2023/05/30	97	30 - 130	89	30 - 130	85	%				
8691690	D5-Phenol	2023/05/30	33	10 - 130	30	10 - 130	26	%				
8685026	Nitrate (N)	2023/05/26	NC	80 - 120	102	80 - 120	<0.10	mg/L	1.9 (1)	20		
8685026	Nitrite (N)	2023/05/26	103	80 - 120	105	80 - 120	<0.010	mg/L	4.6 (1)	20		
8685080	Alkalinity (Total as CaCO3)	2023/05/30			97	85 - 115	<1.0	mg/L	0.56 (1)	20		
8685108	Dissolved Chloride (Cl-)	2023/05/26	NC	80 - 120	101	80 - 120	<1.0	mg/L	9.1 (1)	20		
8685119	Dissolved Sulphate (SO4)	2023/05/26	93	75 - 125	97	80 - 120	<1.0	mg/L	2.8 (1)	20		
8690174	Total Ammonia-N	2023/05/29	99	75 - 125	101	80 - 120	<0.15	mg/L	NC (1)	20		
8690178	1,3,5-Trimethylbenzene	2023/05/31	93 (2)	60 - 140	106	60 - 140	<0.20	ug/L	NC (3)	30		
8690240	Total Kjeldahl Nitrogen (TKN)	2023/05/29	NC	80 - 120	102	80 - 120	<0.7	mg/L	2.7 (1)	20	106	80 - 120
8690288	Total Phosphorus	2023/05/29	102	80 - 120	93	80 - 120	<0.030	mg/L	2.1 (1)	25	99	80 - 120
8690512	Total Aluminum (Al)	2023/05/30	100	80 - 120	88	80 - 120	<0.02	mg/L	2.2 (1)	20		
8690512	Total Arsenic (As)	2023/05/30	103	80 - 120	98	80 - 120	<0.001	mg/L				
8690512	Total Barium (Ba)	2023/05/30	97	80 - 120	94	80 - 120	<0.005	mg/L	3.7 (1)	20		
8690512	Total Beryllium (Be)	2023/05/30	102	80 - 120	99	80 - 120	<0.0006	mg/L	NC (1)	20		
8690512	Total Bismuth (Bi)	2023/05/30	89	80 - 120	90	80 - 120	<0.001	mg/L				
8690512	Total Boron (B)	2023/05/30	NC	80 - 120	94	80 - 120	<0.02	mg/L				
8690512	Total Cadmium (Cd)	2023/05/30	100	80 - 120	98	80 - 120	<0.0001	mg/L	NC (1)	20		
8690512	Total Calcium (Ca)	2023/05/30	NC	80 - 120	91	80 - 120	<0.2	mg/L	1.7 (1)	20		
8690512	Total Chromium (Cr)	2023/05/30	97	80 - 120	91	80 - 120	<0.005	mg/L	0.35 (1)	20		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8690512	Total Cobalt (Co)	2023/05/30	95	80 - 120	92	80 - 120	<0.0005	mg/L	6.0 (1)	20		
8690512	Total Copper (Cu)	2023/05/30	97	80 - 120	93	80 - 120	<0.002	mg/L	NC (1)	20		
8690512	Total Iron (Fe)	2023/05/30	NC	80 - 120	94	80 - 120	<0.1	mg/L				
8690512	Total Lead (Pb)	2023/05/30	93	80 - 120	92	80 - 120	<0.0005	mg/L	NC (1)	20		
8690512	Total Magnesium (Mg)	2023/05/30	NC	80 - 120	94	80 - 120	<0.05	mg/L	2.5 (1)	20		
8690512	Total Molybdenum (Mo)	2023/05/30	106	80 - 120	98	80 - 120	<0.002	mg/L	NC (1)	20		
8690512	Total Nickel (Ni)	2023/05/30	95	80 - 120	91	80 - 120	<0.001	mg/L	2.7 (1)	20		
8690512	Total Potassium (K)	2023/05/30	NC	80 - 120	94	80 - 120	<0.2	mg/L	2.5 (1)	20		
8690512	Total Selenium (Se)	2023/05/30	103	80 - 120	100	80 - 120	<0.005	mg/L				
8690512	Total Silver (Ag)	2023/05/30	96	80 - 120	95	80 - 120	<0.0004	mg/L				
8690512	Total Sodium (Na)	2023/05/30	NC	80 - 120	95	80 - 120	<0.1	mg/L	1.8 (1)	20		
8690512	Total Strontium (Sr)	2023/05/30	NC	80 - 120	94	80 - 120	<0.003	mg/L				
8690512	Total Tin (Sn)	2023/05/30	102	80 - 120	97	80 - 120	<0.002	mg/L				
8690512	Total Titanium (Ti)	2023/05/30	98	80 - 120	95	80 - 120	<0.005	mg/L	2.2 (1)	20		
8690512	Total Vanadium (V)	2023/05/30	98	80 - 120	93	80 - 120	<0.001	mg/L	NC (1)	20		
8690512	Total Zinc (Zn)	2023/05/30	98	80 - 120	100	80 - 120	<0.01	mg/L	3.0 (1)	20		
8690768	1,1,1,2-Tetrachloroethane	2023/05/31	98	70 - 130	98	70 - 130	<0.50	ug/L				
8690768	1,1,1-Trichloroethane	2023/05/31	101	70 - 130	100	70 - 130	<0.20	ug/L				
8690768	1,1,2,2-Tetrachloroethane	2023/05/31	90	70 - 130	87	70 - 130	<0.40	ug/L	NC (1)	30		
8690768	1,1,2-Trichloroethane	2023/05/31	90	70 - 130	90	70 - 130	<0.40	ug/L				
8690768	1,1-Dichloroethane	2023/05/31	90	70 - 130	90	70 - 130	<0.20	ug/L				
8690768	1,1-Dichloroethylene	2023/05/31	92	70 - 130	93	70 - 130	<0.20	ug/L				
8690768	1,2-Dichlorobenzene	2023/05/31	94	70 - 130	94	70 - 130	<0.40	ug/L	NC (1)	30		
8690768	1,2-Dichloroethane	2023/05/31	93	70 - 130	91	70 - 130	<0.49	ug/L				
8690768	1,2-Dichloropropane	2023/05/31	92	70 - 130	91	70 - 130	<0.20	ug/L				
8690768	1,3-Dichlorobenzene	2023/05/31	90	70 - 130	94	70 - 130	<0.40	ug/L				
8690768	1,4-Dichlorobenzene	2023/05/31	105	70 - 130	109	70 - 130	<0.40	ug/L	NC (1)	30		
8690768	Acetone (2-Propanone)	2023/05/31	92	60 - 140	90	60 - 140	<10	ug/L				
8690768	Benzene	2023/05/31	91	70 - 130	90	70 - 130	<0.20	ug/L	NC (1)	30		
8690768	Bromodichloromethane	2023/05/31	100	70 - 130	99	70 - 130	<0.50	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8690768	Bromoform	2023/05/31	103	70 - 130	100	70 - 130	<1.0	ug/L				
8690768	Bromomethane	2023/05/31	101	60 - 140	100	60 - 140	<0.50	ug/L				
8690768	Carbon Tetrachloride	2023/05/31	101	70 - 130	100	70 - 130	<0.19	ug/L				
8690768	Chlorobenzene	2023/05/31	97	70 - 130	97	70 - 130	<0.20	ug/L				
8690768	Chloroethane	2023/05/31	92	70 - 130	93	70 - 130	<1.0	ug/L				
8690768	Chloroform	2023/05/31	95	70 - 130	95	70 - 130	<0.20	ug/L	NC (1)	30		
8690768	Chloromethane	2023/05/31	93	60 - 140	90	60 - 140	<5.0	ug/L				
8690768	cis-1,2-Dichloroethylene	2023/05/31	100	70 - 130	100	70 - 130	<0.50	ug/L	NC (1)	30		
8690768	cis-1,3-Dichloropropene	2023/05/31	97	70 - 130	95	70 - 130	<0.30	ug/L				
8690768	Dibromochloromethane	2023/05/31	94	70 - 130	95	70 - 130	<0.50	ug/L				
8690768	Ethylbenzene	2023/05/31	83	70 - 130	87	70 - 130	<0.20	ug/L	NC (1)	30		
8690768	Ethylene Dibromide	2023/05/31	92	70 - 130	92	70 - 130	<0.19	ug/L				
8690768	Methyl Ethyl Ketone (2-Butanone)	2023/05/31	96	60 - 140	95	60 - 140	<10	ug/L	NC (1)	30		
8690768	Methyl Isobutyl Ketone	2023/05/31	89	70 - 130	88	70 - 130	<5.0	ug/L				
8690768	Methyl t-butyl ether (MTBE)	2023/05/31	87	70 - 130	88	70 - 130	<0.50	ug/L				
8690768	Methylene Chloride(Dichloromethane)	2023/05/31	98	70 - 130	96	70 - 130	<2.0	ug/L	NC (1)	30		
8690768	o-Xylene	2023/05/31	84	70 - 130	88	70 - 130	<0.20	ug/L	NC (1)	30		
8690768	p+m-Xylene	2023/05/31	87	70 - 130	91	70 - 130	<0.20	ug/L	NC (1)	30		
8690768	Styrene	2023/05/31	98	70 - 130	103	70 - 130	<0.40	ug/L	NC (1)	30		
8690768	Tetrachloroethylene	2023/05/31	95	70 - 130	97	70 - 130	<0.20	ug/L	NC (1)	30		
8690768	Toluene	2023/05/31	87	70 - 130	91	70 - 130	<0.20	ug/L	NC (1)	30		
8690768	Total Xylenes	2023/05/31					<0.20	ug/L	NC (1)	30		
8690768	trans-1,2-Dichloroethylene	2023/05/31	100	70 - 130	101	70 - 130	<0.50	ug/L				
8690768	trans-1,3-Dichloropropene	2023/05/31	97	70 - 130	98	70 - 130	<0.40	ug/L	NC (1)	30		
8690768	Trichloroethylene	2023/05/31	107	70 - 130	106	70 - 130	<0.20	ug/L	NC (1)	30		
8690768	Trichlorofluoromethane (FREON 11)	2023/05/31	99	70 - 130	99	70 - 130	<0.50	ug/L				
8690768	Vinyl Chloride	2023/05/31	90	70 - 130	91	70 - 130	<0.20	ug/L				
8691690	1,2,3,4-Tetrachlorobenzene	2023/05/30	63	30 - 130	50	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	1,2,3,5-Tetrachlorobenzene	2023/05/30	56	30 - 130	47	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	1,2,3-Trichlorobenzene	2023/05/30	60	30 - 130	50	30 - 130	<0.50	ug/L	NC (1)	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8691690	1,2,4,5-Tetrachlorobenzene	2023/05/30	52	30 - 130	40	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	1,2,4-Trichlorobenzene	2023/05/30	56	30 - 130	46	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	1,2-Dichlorobenzene	2023/05/30	57	30 - 130	50	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	1,3,5-Trichlorobenzene	2023/05/30	72	30 - 130	65	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	1,3-Dichlorobenzene	2023/05/30	51	30 - 130	43	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	1-Chloronaphthalene	2023/05/30	75	30 - 130	67	30 - 130	<1.0	ug/L	NC (1)	40		
8691690	1-Methylnaphthalene	2023/05/30	84	30 - 130	66	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	2,3,4,5-Tetrachlorophenol	2023/05/30	93	10 - 130	99	10 - 130	<0.40	ug/L	NC (1)	40		
8691690	2,3,4,6-Tetrachlorophenol	2023/05/30	111	10 - 130	105	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	2,3,4-Trichlorophenol	2023/05/30	98	10 - 130	92	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	2,3,5,6-Tetrachlorophenol	2023/05/30	89	10 - 130	81	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	2,3,5-Trichlorophenol	2023/05/30	117	10 - 130	106	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	2,3,6-Trichlorophenol	2023/05/30	99	10 - 130	92	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	2,3-Dichlorophenol	2023/05/30	96	10 - 130	90	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	2,4,5-Trichlorophenol	2023/05/30	108	10 - 130	101	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	2,4,6-Trichlorophenol	2023/05/30	110	10 - 130	87	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	2,4-Dichlorophenol	2023/05/30	94	10 - 130	91	10 - 130	<0.30	ug/L	NC (1)	40		
8691690	2,4-Dimethylphenol	2023/05/30	57	10 - 130	62	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	2,4-Dinitrophenol	2023/05/30	81	10 - 130	78	10 - 130	<2.0	ug/L	NC (1)	40		
8691690	2,4-Dinitrotoluene	2023/05/30	105	30 - 130	102	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	2,5-Dichlorophenol	2023/05/30	103	10 - 130	96	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	2,6-Dichlorophenol	2023/05/30	97	10 - 130	94	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	2,6-Dinitrotoluene	2023/05/30	100	30 - 130	96	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	2-Chloronaphthalene	2023/05/30	88	30 - 130	75	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	2-Chlorophenol	2023/05/30	91	10 - 130	85	10 - 130	<0.30	ug/L	NC (1)	40		
8691690	2-Methylnaphthalene	2023/05/30	82	30 - 130	63	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	2-Nitrophenol	2023/05/30	98	10 - 130	93	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	3,3'-Dichlorobenzidine	2023/05/30	76	30 - 130	91	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	3,4,5-Trichlorophenol	2023/05/30	100	10 - 130	92	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	3,4-Dichlorophenol	2023/05/30	99	10 - 130	93	10 - 130	<0.50	ug/L	NC (1)	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8691690	3,5-Dichlorophenol	2023/05/30	110	10 - 130	99	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	4,6-Dinitro-2-methylphenol	2023/05/30	115	10 - 130	110	10 - 130	<2.0	ug/L	NC (1)	40		
8691690	4-Bromophenyl phenyl ether	2023/05/30	84	30 - 130	74	30 - 130	<0.30	ug/L	NC (1)	40		
8691690	4-Chloro-3-Methylphenol	2023/05/30	96	10 - 130	88	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	4-Chlorophenyl phenyl ether	2023/05/30	82	30 - 130	67	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	4-Nitrophenol	2023/05/30	34	10 - 130	32	10 - 130	<1.4	ug/L	NC (1)	40		
8691690	Acenaphthene	2023/05/30	91	30 - 130	82	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Acenaphthylene	2023/05/30	90	30 - 130	82	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Anthracene	2023/05/30	99	30 - 130	99	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Benzo(a)anthracene	2023/05/30	99	30 - 130	95	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Benzo(a)pyrene	2023/05/30	104	30 - 130	101	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Benzo(b/j)fluoranthene	2023/05/30	95	30 - 130	91	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Benzo(g,h,i)perylene	2023/05/30	127	30 - 130	127	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Benzo(k)fluoranthene	2023/05/30	103	30 - 130	93	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Benzyl butyl phthalate	2023/05/30	98	30 - 130	94	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	Biphenyl	2023/05/30	88	30 - 130	73	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	Bis(2-chloroethoxy)methane	2023/05/30	86	30 - 130	81	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	Bis(2-chloroethyl)ether	2023/05/30	86	30 - 130	78	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	Bis(2-chloroisopropyl)ether	2023/05/30	77	30 - 130	67	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	Bis(2-ethylhexyl)phthalate	2023/05/30	109	30 - 130	103	30 - 130	<2.0	ug/L	NC (1)	40		
8691690	Chrysene	2023/05/30	96	30 - 130	93	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Dibenzo(a,h)anthracene	2023/05/30	127	30 - 130	119	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Diethyl phthalate	2023/05/30	95	30 - 130	90	30 - 130	<1.0	ug/L	NC (1)	40		
8691690	Dimethyl phthalate	2023/05/30	101	30 - 130	96	30 - 130	<1.0	ug/L	NC (1)	40		
8691690	Di-N-butyl phthalate	2023/05/30	104	30 - 130	99	30 - 130	<2.0	ug/L	NC (1)	40		
8691690	di-n-octyl phthalate	2023/05/30	96	30 - 130	87	30 - 130	<0.80	ug/L	NC (1)	40		
8691690	Diphenyl Ether	2023/05/30	73	30 - 130	60	30 - 130	<0.30	ug/L	NC (1)	40		
8691690	Fluoranthene	2023/05/30	107	30 - 130	101	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Fluorene	2023/05/30	100	30 - 130	92	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Hexachlorobenzene	2023/05/30	96	30 - 130	92	30 - 130	<0.50	ug/L	NC (1)	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8691690	Hexachlorobutadiene	2023/05/30	40	30 - 130	40	30 - 130	<0.40	ug/L	NC (1)	40		
8691690	Hexachlorocyclopentadiene	2023/05/30	49	30 - 130	43	30 - 130	<2.0	ug/L	NC (1)	40		
8691690	Hexachloroethane	2023/05/30	42	30 - 130	44	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	Indeno(1,2,3-cd)pyrene	2023/05/30	123	30 - 130	123	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Isophorone	2023/05/30	104	30 - 130	95	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	m/p-Cresol	2023/05/30	73	10 - 130	71	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	Naphthalene	2023/05/30	80	30 - 130	65	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Nitrobenzene	2023/05/30	93	30 - 130	86	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	Nitrosodiphenylamine/Diphenylamine	2023/05/30	96	30 - 130	94	30 - 130	<1.0	ug/L	NC (1)	40		
8691690	N-Nitroso-di-n-propylamine	2023/05/30	106	30 - 130	100	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	o-Cresol	2023/05/30	79	10 - 130	78	10 - 130	<0.50	ug/L	NC (1)	40		
8691690	p-Chloroaniline	2023/05/30	71	30 - 130	74	30 - 130	<1.0	ug/L	NC (1)	40		
8691690	Pentachlorobenzene	2023/05/30	58	30 - 130	47	30 - 130	<0.50	ug/L	NC (1)	40		
8691690	Pentachlorophenol	2023/05/30	78	10 - 130	84	10 - 130	<1.0	ug/L	NC (1)	40		
8691690	Perylene	2023/05/30	98	30 - 130	95	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Phenanthrene	2023/05/30	97	30 - 130	95	30 - 130	<0.20	ug/L	NC (1)	40		
8691690	Phenol	2023/05/30	36	10 - 130	34	10 - 130	<0.50	ug/L	NC (1)	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8691690	Pyrene	2023/05/30	88	30 - 130	88	30 - 130	<0.20	ug/L	NC (1)	40		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Matrix Spike Parent ID [VXF237-06]

(3) Duplicate Parent ID [VXF237-06]

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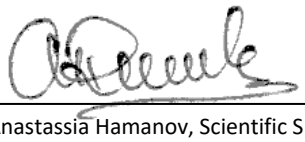
Bureau Veritas Job #: C3E8765
Report Date: 2023/06/01

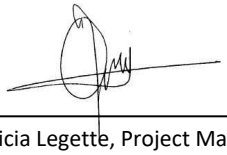
RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist



Patricia Legette, Project Manager

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FIELD INFORMATION FORM

BUREAU VERITAS

WASTE MANAGEMENT

Site Name: TCEC

Site No.:

Sample: PS Holding Tank (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes. Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: (Y) or N

Purging Device: P

Sampling Device: D

X-Other:

A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Filter Device: Y or N — 0.45 µ or ____ µ (circle or fill in)

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other:

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other:

WELL DATA

Well Elevation (at TOC) (ft/msl)

Depth to Water (DTW) (from TOC) (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC) (ft msl)

Total Well Depth (from TOC) (ft)

Stick Up (from ground elevation) (ft)

Casing ID (in)

Casing Material

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
05 24 23	7.3	M 5.12	13.5	158	2.39		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

FIELD COMMENTS

Sample Appearance: opaque — Odor: leachate — Color: Black — Other:

Weather Conditions (required daily, or as conditions change): 16°C — Direction/Speed: 8 Km/h NW — Outlook: clear — Precipitation: Y or (N)

Specific Comments (including purge/well volume calculations if required):

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
05/24/23	Brady Krebs	[signature]	RWDI

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 06/20

0622

Maxxam Analytics

6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #		
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285739	
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Unit 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	CHAIN OF CUSTODY #:
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x:2984 Fax: 519-823-1316	Project Name:	TCEC-LCHCM-MAY	TCEC-LCHCM-MAY
Email:	lmertick@wm.com	Email:	Brent.Langille@RWDI.com, JCL@rwdi.com	Location:	Twin Creeks	
				Sampled By:	BEG	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

[ ] MISA [ ] PWQO [ ] Reg. 558 Reg. 153: [ ] Table 1 [ ] Table 2 [ ] Table 3 Sewer Use: [ ] Sanitary [ ] Storm Region: [x] Other: site specific (specify)

Report Criteria on C of A ? [n]

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ON-WLF-2023 TCLS - LEACHATE (PS HOLDING) MONTHLY	# of Cont.	COMMENTS / TAT COMMENTS
1	PS Holding Tank	24-May-23	AM	LCH	N	N	X	9	
2									See lab addendum for analysis.
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT: [x] 5 to 7 Working Days

Rush TAT: Rush Confirmation # (call Lab for #) [ ] 1 day [ ] 2 days [ ] 3 days

DATE Required: 2-Jun-23

TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details

25-May-23 08:58
Patricia Legette
C3E8765
JDK ENV-866

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:	Laboratory Use Only
BEG 24-May-23 - AM	Ashitha Sukeenar ASHITHA SUKEENAR	2023/05/25	08:58	Temperature (°C) on Receipt: 5/2/2 — Condition of Sample on Receipt: [ ] OK [ ] SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

White: Maxxam Yellow: Mail Pink: Client

Your P.O. #: 12285739
Your Project #: 2303459.01
Site#: 500
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/06/23
Report #: R7685830
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3H4383
Received: 2023/06/15, 10:18

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
ABN Compounds in Water by GC/MS	1	2023/06/16	2023/06/20	CAM SOP-00301	EPA 8270 m
Alkalinity	1	N/A	2023/06/19	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	1	N/A	2023/06/19	CAM SOP-00463	SM 23 4500-Cl E m
Conductance in Water - On-site	1	N/A	2023/06/19		
Field Measured Dissolved Oxygen in Water	1	N/A	2023/06/19		
Total Metals by ICPMS	1	N/A	2023/06/21	CAM SOP-00447	EPA 6020B m
Ammonia-N	1	N/A	2023/06/21	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	1	N/A	2023/06/19	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Field Measured pH (2)	1	N/A	2023/06/19		Field pH Meter
Sulphate by Automated Turbidimetry	1	N/A	2023/06/19	CAM SOP-00464	SM 23 4500-SO42- E m
Field Temperature (2)	1	N/A	2023/06/19		Field Thermometer
Total Kjeldahl Nitrogen in Water	1	2023/06/20	2023/06/21	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	1	2023/06/20	2023/06/21	CAM SOP-00407	SM 23 4500-P I
Turbidity - On-site	1	N/A	2023/06/19		
Un-ionized Ammonia (3)	1	2023/06/15	2023/06/21	Auto Calc.	PWQO
Volatile Organic Compounds in Water	1	N/A	2023/06/20	CAM SOP-00228	EPA 8260D
Non-Routine Volatile Organic Compounds	1	N/A	2023/06/20	CAM SOP-00226	EPA 8260D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the

Your P.O. #: 12285739
Your Project #: 2303459.01
Site#: 500
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/06/23
Report #: R7685830
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3H4383
Received: 2023/06/15, 10:18
customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.
(3) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799
==========
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3H4383
Report Date: 2023/06/23

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		WCP374		
Sampling Date		2023/06/14		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Calculated Parameters				
Total Un-ionized Ammonia	mg/L	5.8	0.069	8728433
Field Measurements				
Field Conductivity	uS/cm	8940	N/A	ONSITE
Field Dissolved Oxygen	mg/L	1.91	N/A	ONSITE
Field Temperature	Celsius	13.3	N/A	ONSITE
Field Turbidity	NTU	52.5	N/A	ONSITE
Field Measured pH	pH	7.5		ONSITE
Inorganics				
Total Ammonia-N	mg/L	629	7.5	8741560
Total Kjeldahl Nitrogen (TKN)	mg/L	620	20	8739716
Total Phosphorus	mg/L	1.6	0.030	8739708
Dissolved Sulphate (SO4)	mg/L	170	1.0	8733595
Alkalinity (Total as CaCO3)	mg/L	3500	5.0	8733562
Dissolved Chloride (Cl-)	mg/L	510	5.0	8733591
Nitrite (N)	mg/L	<0.050	0.050	8733542
Nitrate (N)	mg/L	<0.50	0.50	8733542

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Bureau Veritas Job #: C3H4383
Report Date: 2023/06/23

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		WCP374		
Sampling Date		2023/06/14		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Metals				
Total Aluminum (Al)	mg/L	0.10	0.02	8738218
Total Arsenic (As)	mg/L	0.019	0.001	8738218
Total Barium (Ba)	mg/L	0.19	0.005	8738218
Total Beryllium (Be)	mg/L	<0.0006	0.0006	8738218
Total Bismuth (Bi)	mg/L	<0.001	0.001	8738218
Total Boron (B)	mg/L	13	0.1	8738218
Total Cadmium (Cd)	mg/L	<0.0001	0.0001	8738218
Total Calcium (Ca)	mg/L	130	0.2	8738218
Total Chromium (Cr)	mg/L	0.039	0.005	8738218
Total Cobalt (Co)	mg/L	0.0093	0.0005	8738218
Total Copper (Cu)	mg/L	0.002	0.002	8738218
Total Iron (Fe)	mg/L	1.8	0.1	8738218
Total Lead (Pb)	mg/L	0.0012	0.0005	8738218
Total Magnesium (Mg)	mg/L	160	0.05	8738218
Total Molybdenum (Mo)	mg/L	0.012	0.002	8738218
Total Nickel (Ni)	mg/L	0.073	0.001	8738218
Total Potassium (K)	mg/L	180	0.2	8738218
Total Selenium (Se)	mg/L	<0.005	0.005	8738218
Total Silver (Ag)	mg/L	<0.0004	0.0004	8738218
Total Sodium (Na)	mg/L	600	0.5	8738218
Total Strontium (Sr)	mg/L	1.4	0.003	8738218
Total Tin (Sn)	mg/L	0.006	0.002	8738218
Total Titanium (Ti)	mg/L	0.033	0.005	8738218
Total Vanadium (V)	mg/L	0.009	0.001	8738218
Total Zinc (Zn)	mg/L	0.02	0.01	8738218

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		WCP374		
Sampling Date		2023/06/14		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Semivolatile Organics				
Acenaphthene	ug/L	0.90	0.80	8732808
Acenaphthylene	ug/L	<0.80	0.80	8732808
Anthracene	ug/L	<0.80	0.80	8732808
Benzo(a)anthracene	ug/L	<0.80	0.80	8732808
Benzo(a)pyrene	ug/L	<0.80	0.80	8732808
Benzo(b/j)fluoranthene	ug/L	<0.80	0.80	8732808
Benzo(g,h,i)perylene	ug/L	<0.80	0.80	8732808
Benzo(k)fluoranthene	ug/L	<0.80	0.80	8732808
1-Chloronaphthalene	ug/L	<4.0	4.0	8732808
2-Chloronaphthalene	ug/L	<2.0	2.0	8732808
Chrysene	ug/L	<0.80	0.80	8732808
Dibenzo(a,h)anthracene	ug/L	<0.80	0.80	8732808
Fluoranthene	ug/L	<0.80	0.80	8732808
Fluorene	ug/L	<0.80	0.80	8732808
Indeno(1,2,3-cd)pyrene	ug/L	<0.80	0.80	8732808
1-Methylnaphthalene	ug/L	0.96	0.80	8732808
2-Methylnaphthalene	ug/L	1.3	0.80	8732808
Naphthalene	ug/L	10	0.80	8732808
Perylene	ug/L	<0.80	0.80	8732808
Phenanthrene	ug/L	<0.80	0.80	8732808
Pyrene	ug/L	<0.80	0.80	8732808
1,2-Dichlorobenzene	ug/L	<2.0	2.0	8732808
1,3-Dichlorobenzene	ug/L	<2.0	2.0	8732808
Hexachlorobenzene	ug/L	<2.0	2.0	8732808
Pentachlorobenzene	ug/L	<2.0	2.0	8732808
1,2,3,5-Tetrachlorobenzene	ug/L	<2.0	2.0	8732808
1,2,4,5-Tetrachlorobenzene	ug/L	<2.0	2.0	8732808
1,2,3-Trichlorobenzene	ug/L	<2.0	2.0	8732808
1,2,4-Trichlorobenzene	ug/L	<2.0	2.0	8732808
1,3,5-Trichlorobenzene	ug/L	<2.0	2.0	8732808
2-Chlorophenol	ug/L	<1.2	1.2	8732808
4-Chloro-3-Methylphenol	ug/L	<2.0	2.0	8732808
m/p-Cresol	ug/L	180	2.0	8732808

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		WCP374		
Sampling Date		2023/06/14		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
o-Cresol	ug/L	6.1	2.0	8732808
1,2,3,4-Tetrachlorobenzene	ug/L	<2.0	2.0	8732808
2,3-Dichlorophenol	ug/L	<2.0	2.0	8732808
2,4-Dichlorophenol	ug/L	<1.2	1.2	8732808
2,5-Dichlorophenol	ug/L	<2.0	2.0	8732808
2,6-Dichlorophenol	ug/L	<2.0	2.0	8732808
3,4-Dichlorophenol	ug/L	<2.0	2.0	8732808
3,5-Dichlorophenol	ug/L	<2.0	2.0	8732808
2,4-Dimethylphenol	ug/L	<2.0	2.0	8732808
2,4-Dinitrophenol	ug/L	<20 (1)	20	8732808
4,6-Dinitro-2-methylphenol	ug/L	<8.0	8.0	8732808
2-Nitrophenol	ug/L	<2.0	2.0	8732808
4-Nitrophenol	ug/L	<5.6	5.6	8732808
Pentachlorophenol	ug/L	<4.0	4.0	8732808
Phenol	ug/L	55	2.0	8732808
2,3,4,5-Tetrachlorophenol	ug/L	<1.6	1.6	8732808
2,3,4,6-Tetrachlorophenol	ug/L	<2.0	2.0	8732808
2,3,5,6-Tetrachlorophenol	ug/L	<2.0	2.0	8732808
2,3,4-Trichlorophenol	ug/L	<2.0	2.0	8732808
2,3,5-Trichlorophenol	ug/L	<2.0	2.0	8732808
2,3,6-Trichlorophenol	ug/L	<2.0	2.0	8732808
2,4,5-Trichlorophenol	ug/L	<2.0	2.0	8732808
2,4,6-Trichlorophenol	ug/L	<2.0	2.0	8732808
3,4,5-Trichlorophenol	ug/L	<2.0	2.0	8732808
Benzyl butyl phthalate	ug/L	<2.0	2.0	8732808
Biphenyl	ug/L	<2.0	2.0	8732808
Bis(2-chloroethyl)ether	ug/L	<2.0	2.0	8732808
Bis(2-chloroethoxy)methane	ug/L	<2.0	2.0	8732808
Bis(2-chloroisopropyl)ether	ug/L	<2.0	2.0	8732808
Bis(2-ethylhexyl)phthalate	ug/L	<8.0	8.0	8732808
4-Bromophenyl phenyl ether	ug/L	<1.2	1.2	8732808
p-Chloroaniline	ug/L	<4.0	4.0	8732808
4-Chlorophenyl phenyl ether	ug/L	<2.0	2.0	8732808

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Detection Limit was raised due to matrix interferences.

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Bureau Veritas Job #: C3H4383
Report Date: 2023/06/23

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		WCP374		
Sampling Date		2023/06/14		
COC Number		n/a		
	UNITS	**PS HOLDING TANK**	**RDL**	**QC Batch**
Di-N-butyl phthalate	ug/L	<8.0	8.0	8732808
di-n-octyl phthalate	ug/L	<3.2	3.2	8732808
2,4-Dinitrotoluene	ug/L	<2.0	2.0	8732808
Diethyl phthalate	ug/L	<4.0	4.0	8732808
3,3'-Dichlorobenzidine	ug/L	<2.0	2.0	8732808
Dimethyl phthalate	ug/L	<4.0	4.0	8732808
2,6-Dinitrotoluene	ug/L	<2.0	2.0	8732808
Diphenyl Ether	ug/L	<1.2	1.2	8732808
Hexachlorobutadiene	ug/L	<1.6	1.6	8732808
Hexachlorocyclopentadiene	ug/L	<8.0	8.0	8732808
Hexachloroethane	ug/L	<2.0	2.0	8732808
Isophorone	ug/L	<2.0	2.0	8732808
Nitrobenzene	ug/L	<2.0	2.0	8732808
Nitrosodiphenylamine/Diphenylamine	ug/L	<4.0	4.0	8732808
N-Nitroso-di-n-propylamine	ug/L	<2.0	2.0	8732808
Surrogate Recovery (%)				
2,4,6-Tribromophenol	%	86		8732808
2-Fluorobiphenyl	%	58		8732808
2-Fluorophenol	%	39		8732808
D14-Terphenyl	%	95		8732808
D5-Nitrobenzene	%	69		8732808
D5-Phenol	%	25		8732808

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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VOLATILE ORGANICS BY GC/MS (WATER)

Bureau Veritas ID		WCP374		
Sampling Date		2023/06/14		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Volatile Organics				
Acetone (2-Propanone)	ug/L	2300	100	8735152
Benzene	ug/L	5.5	2.0	8735152
Bromodichloromethane	ug/L	<5.0	5.0	8735152
Bromoform	ug/L	<10	10	8735152
Bromomethane	ug/L	<5.0	5.0	8735152
Carbon Tetrachloride	ug/L	<1.9	1.9	8735152
Chlorobenzene	ug/L	8.3	2.0	8735152
Chloroethane	ug/L	<10	10	8735152
Chloroform	ug/L	<2.0	2.0	8735152
Chloromethane	ug/L	<50	50	8735152
Dibromochloromethane	ug/L	<5.0	5.0	8735152
1,2-Dichlorobenzene	ug/L	<4.0	4.0	8735152
1,3-Dichlorobenzene	ug/L	<4.0	4.0	8735152
1,4-Dichlorobenzene	ug/L	<4.0	4.0	8735152
1,1-Dichloroethane	ug/L	<2.0	2.0	8735152
1,2-Dichloroethane	ug/L	<4.9	4.9	8735152
1,1-Dichloroethylene	ug/L	<2.0	2.0	8735152
cis-1,2-Dichloroethylene	ug/L	<5.0	5.0	8735152
trans-1,2-Dichloroethylene	ug/L	<5.0	5.0	8735152
1,2-Dichloropropane	ug/L	<2.0	2.0	8735152
cis-1,3-Dichloropropene	ug/L	<3.0	3.0	8735152
trans-1,3-Dichloropropene	ug/L	<4.0	4.0	8735152
Ethylbenzene	ug/L	15	2.0	8735152
Ethylene Dibromide	ug/L	<1.9	1.9	8735152
Methylene Chloride(Dichloromethane)	ug/L	<20	20	8735152
Methyl Ethyl Ketone (2-Butanone)	ug/L	2400	100	8735152
Methyl Isobutyl Ketone	ug/L	<50	50	8735152
Methyl t-butyl ether (MTBE)	ug/L	<5.0	5.0	8735152
Styrene	ug/L	<4.0	4.0	8735152
1,1,1,2-Tetrachloroethane	ug/L	<5.0	5.0	8735152
1,1,2,2-Tetrachloroethane	ug/L	<4.0	4.0	8735152
Tetrachloroethylene	ug/L	<2.0	2.0	8735152
1,3,5-Trimethylbenzene	ug/L	<4.0	4.0	8731486

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3H4383
Report Date: 2023/06/23

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

VOLATILE ORGANICS BY GC/MS (WATER)

Bureau Veritas ID		WCP374		
Sampling Date		2023/06/14		
COC Number		n/a		
	UNITS	**PS HOLDING TANK**	**RDL**	**QC Batch**
Toluene	ug/L	24	2.0	8735152
1,1,1-Trichloroethane	ug/L	<2.0	2.0	8735152
1,1,2-Trichloroethane	ug/L	<4.0	4.0	8735152
Trichloroethylene	ug/L	<2.0	2.0	8735152
Trichlorofluoromethane (FREON 11)	ug/L	<5.0	5.0	8735152
Vinyl Chloride	ug/L	<2.0	2.0	8735152
p+m-Xylene	ug/L	27	2.0	8735152
o-Xylene	ug/L	11	2.0	8735152
Total Xylenes	ug/L	38	2.0	8735152
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	100		8735152
D4-1,2-Dichloroethane	%	111		8735152
D8-Toluene	%	91		8735152
4-Bromofluorobenzene	%	105		8731486
D4-1,2-Dichloroethane	%	96		8731486
D8-Toluene	%	107		8731486

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Sample WCP374 [PS HOLDING TANK] : Nitrite/Nitrate: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.
VOC Water Analysis: Due to foaming, sample required dilution. The detection limits were adjusted accordingly.

ABN Analysis: Due to the sample matrix, a smaller amount was used for analysis. Detection limits were adjusted accordingly.

VOC Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.
TKN < Ammonia: Both values fall within the method uncertainty for duplicates and are likely equivalent.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8731486	4-Bromofluorobenzene	2023/06/20	102	70 - 130	105	70 - 130	99	%				
8731486	D4-1,2-Dichloroethane	2023/06/20	91	70 - 130	92	70 - 130	91	%				
8731486	D8-Toluene	2023/06/20	106	70 - 130	105	70 - 130	110	%				
8732808	2,4,6-Tribromophenol	2023/06/20	83	10 - 130	89	10 - 130	69	%				
8732808	2-Fluorobiphenyl	2023/06/20	73	30 - 130	64	30 - 130	63	%				
8732808	2-Fluorophenol	2023/06/20	45	10 - 130	48	10 - 130	40	%				
8732808	D14-Terphenyl	2023/06/20	88	30 - 130	86	30 - 130	84	%				
8732808	D5-Nitrobenzene	2023/06/20	86	30 - 130	86	30 - 130	84	%				
8732808	D5-Phenol	2023/06/20	27	10 - 130	27	10 - 130	24	%				
8735152	4-Bromofluorobenzene	2023/06/20	103	70 - 130	102	70 - 130	102	%				
8735152	D4-1,2-Dichloroethane	2023/06/20	109	70 - 130	107	70 - 130	111	%				
8735152	D8-Toluene	2023/06/20	107	70 - 130	107	70 - 130	91	%				
8731486	1,3,5-Trimethylbenzene	2023/06/20	108	60 - 140	116	60 - 140	<0.20	ug/L	NC (1)	30		
8732808	1,2,3,4-Tetrachlorobenzene	2023/06/20	63	30 - 130	54	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	1,2,3,5-Tetrachlorobenzene	2023/06/20	58	30 - 130	50	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	1,2,3-Trichlorobenzene	2023/06/20	63	30 - 130	57	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	1,2,4,5-Tetrachlorobenzene	2023/06/20	58	30 - 130	47	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	1,2,4-Trichlorobenzene	2023/06/20	59	30 - 130	53	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	1,2-Dichlorobenzene	2023/06/20	58	30 - 130	53	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	1,3,5-Trichlorobenzene	2023/06/20	70	30 - 130	69	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	1,3-Dichlorobenzene	2023/06/20	53	30 - 130	48	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	1-Chloronaphthalene	2023/06/20	69	30 - 130	70	30 - 130	<1.0	ug/L	NC (1)	40		
8732808	1-Methylnaphthalene	2023/06/20	75	30 - 130	72	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	2,3,4,5-Tetrachlorophenol	2023/06/20	94	10 - 130	100	10 - 130	<0.40	ug/L	NC (1)	40		
8732808	2,3,4,6-Tetrachlorophenol	2023/06/20	110	10 - 130	107	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	2,3,4-Trichlorophenol	2023/06/20	90	10 - 130	83	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	2,3,5,6-Tetrachlorophenol	2023/06/20	87	10 - 130	81	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	2,3,5-Trichlorophenol	2023/06/20	104	10 - 130	98	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	2,3,6-Trichlorophenol	2023/06/20	87	10 - 130	84	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	2,3-Dichlorophenol	2023/06/20	82	10 - 130	83	10 - 130	<0.50	ug/L	NC (1)	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8732808	2,4,5-Trichlorophenol	2023/06/20	100	10 - 130	90	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	2,4,6-Trichlorophenol	2023/06/20	101	10 - 130	97	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	2,4-Dichlorophenol	2023/06/20	87	10 - 130	93	10 - 130	<0.30	ug/L	NC (1)	40		
8732808	2,4-Dimethylphenol	2023/06/20	37	10 - 130	73	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	2,4-Dinitrophenol	2023/06/20	66	10 - 130	89	10 - 130	<2.0	ug/L	NC (1)	40		
8732808	2,4-Dinitrotoluene	2023/06/20	97	30 - 130	98	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	2,5-Dichlorophenol	2023/06/20	88	10 - 130	86	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	2,6-Dichlorophenol	2023/06/20	85	10 - 130	87	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	2,6-Dinitrotoluene	2023/06/20	93	30 - 130	88	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	2-Chloronaphthalene	2023/06/20	82	30 - 130	77	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	2-Chlorophenol	2023/06/20	74	10 - 130	78	10 - 130	<0.30	ug/L	NC (1)	40		
8732808	2-Methylnaphthalene	2023/06/20	75	30 - 130	72	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	2-Nitrophenol	2023/06/20	90	10 - 130	90	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	3,3'-Dichlorobenzidine	2023/06/20	24 (2)	30 - 130	86	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	3,4,5-Trichlorophenol	2023/06/20	88	10 - 130	88	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	3,4-Dichlorophenol	2023/06/20	92	10 - 130	90	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	3,5-Dichlorophenol	2023/06/20	93	10 - 130	92	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	4,6-Dinitro-2-methylphenol	2023/06/20	82	10 - 130	106	10 - 130	<2.0	ug/L	NC (1)	40		
8732808	4-Bromophenyl phenyl ether	2023/06/20	79	30 - 130	76	30 - 130	<0.30	ug/L	NC (1)	40		
8732808	4-Chloro-3-Methylphenol	2023/06/20	80	10 - 130	82	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	4-Chlorophenyl phenyl ether	2023/06/20	81	30 - 130	76	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	4-Nitrophenol	2023/06/20	22	10 - 130	28	10 - 130	<1.4	ug/L	NC (1)	40		
8732808	Acenaphthene	2023/06/20	80	30 - 130	79	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Acenaphthylene	2023/06/20	79	30 - 130	78	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Anthracene	2023/06/20	88	30 - 130	91	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Benzo(a)anthracene	2023/06/20	90	30 - 130	92	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Benzo(a)pyrene	2023/06/20	95	30 - 130	97	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Benzo(b/j)fluoranthene	2023/06/20	90	30 - 130	84	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Benzo(g,h,i)perylene	2023/06/20	92	30 - 130	123	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Benzo(k)fluoranthene	2023/06/20	98	30 - 130	93	30 - 130	<0.20	ug/L	NC (1)	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8732808	Benzyl butyl phthalate	2023/06/20	94	30 - 130	93	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	Biphenyl	2023/06/20	80	30 - 130	73	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	Bis(2-chloroethoxy)methane	2023/06/20	72	30 - 130	73	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	Bis(2-chloroethyl)ether	2023/06/20	68	30 - 130	68	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	Bis(2-chloroisopropyl)ether	2023/06/20	63	30 - 130	63	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	Bis(2-ethylhexyl)phthalate	2023/06/20	93	30 - 130	99	30 - 130	<2.0	ug/L	NC (1)	40		
8732808	Chrysene	2023/06/20	88	30 - 130	89	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Dibenzo(a,h)anthracene	2023/06/20	95	30 - 130	119	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Diethyl phthalate	2023/06/20	90	30 - 130	90	30 - 130	<1.0	ug/L	NC (1)	40		
8732808	Dimethyl phthalate	2023/06/20	95	30 - 130	90	30 - 130	<1.0	ug/L	NC (1)	40		
8732808	Di-N-butyl phthalate	2023/06/20	95	30 - 130	97	30 - 130	<2.0	ug/L	NC (1)	40		
8732808	di-n-octyl phthalate	2023/06/20	92	30 - 130	86	30 - 130	<0.80	ug/L	NC (1)	40		
8732808	Diphenyl Ether	2023/06/20	71	30 - 130	61	30 - 130	<0.30	ug/L	NC (1)	40		
8732808	Fluoranthene	2023/06/20	95	30 - 130	95	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Fluorene	2023/06/20	90	30 - 130	87	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Hexachlorobenzene	2023/06/20	81	30 - 130	84	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	Hexachlorobutadiene	2023/06/20	48	30 - 130	46	30 - 130	<0.40	ug/L	NC (1)	40		
8732808	Hexachlorocyclopentadiene	2023/06/20	45	30 - 130	46	30 - 130	<2.0	ug/L	NC (1)	40		
8732808	Hexachloroethane	2023/06/20	47	30 - 130	46	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	Indeno(1,2,3-cd)pyrene	2023/06/20	94	30 - 130	116	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Isophorone	2023/06/20	88	30 - 130	88	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	m/p-Cresol	2023/06/20	59	10 - 130	64	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	Naphthalene	2023/06/20	80	30 - 130	74	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Nitrobenzene	2023/06/20	83	30 - 130	82	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	Nitrosodiphenylamine/Diphenylamine	2023/06/20	70	30 - 130	74	30 - 130	<1.0	ug/L	NC (1)	40		
8732808	N-Nitroso-di-n-propylamine	2023/06/20	83	30 - 130	86	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	o-Cresol	2023/06/20	61	10 - 130	70	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	p-Chloroaniline	2023/06/20	28 (2)	30 - 130	88	30 - 130	<1.0	ug/L	NC (1)	40		
8732808	Pentachlorobenzene	2023/06/20	62	30 - 130	55	30 - 130	<0.50	ug/L	NC (1)	40		
8732808	Pentachlorophenol	2023/06/20	86	10 - 130	76	10 - 130	<1.0	ug/L	NC (1)	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8732808	Perylene	2023/06/20	87	30 - 130	88	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Phenanthrene	2023/06/20	89	30 - 130	89	30 - 130	<0.20	ug/L	NC (1)	40		
8732808	Phenol	2023/06/20	28	10 - 130	30	10 - 130	<0.50	ug/L	NC (1)	40		
8732808	Pyrene	2023/06/20	85	30 - 130	83	30 - 130	<0.20	ug/L	NC (1)	40		
8733542	Nitrate (N)	2023/06/19	93	80 - 120	98	80 - 120	<0.10	mg/L	NC (1)	20		
8733542	Nitrite (N)	2023/06/19	96	80 - 120	98	80 - 120	<0.010	mg/L	NC (1)	20		
8733562	Alkalinity (Total as CaCO3)	2023/06/19			96	85 - 115	<1.0	mg/L	7.3 (1)	20		
8733591	Dissolved Chloride (Cl-)	2023/06/19	NC	80 - 120	95	80 - 120	<1.0	mg/L	0.71 (1)	20		
8733595	Dissolved Sulphate (SO4)	2023/06/19	95	75 - 125	94	80 - 120	<1.0	mg/L	0.014 (1)	20		
8735152	1,1,1,2-Tetrachloroethane	2023/06/20	106	70 - 130	93	70 - 130	<0.50	ug/L				
8735152	1,1,1-Trichloroethane	2023/06/20	104	70 - 130	87	70 - 130	<0.20	ug/L				
8735152	1,1,2,2-Tetrachloroethane	2023/06/20	109	70 - 130	100	70 - 130	<0.40	ug/L				
8735152	1,1,2-Trichloroethane	2023/06/20	119	70 - 130	106	70 - 130	<0.40	ug/L				
8735152	1,1-Dichloroethane	2023/06/20	102	70 - 130	85	70 - 130	<0.20	ug/L				
8735152	1,1-Dichloroethylene	2023/06/20	102	70 - 130	84	70 - 130	<0.20	ug/L				
8735152	1,2-Dichlorobenzene	2023/06/20	96	70 - 130	88	70 - 130	<0.40	ug/L				
8735152	1,2-Dichloroethane	2023/06/20	103	70 - 130	90	70 - 130	<0.49	ug/L				
8735152	1,2-Dichloropropane	2023/06/20	104	70 - 130	89	70 - 130	<0.20	ug/L				
8735152	1,3-Dichlorobenzene	2023/06/20	93	70 - 130	86	70 - 130	<0.40	ug/L				
8735152	1,4-Dichlorobenzene	2023/06/20	103	70 - 130	97	70 - 130	<0.40	ug/L				
8735152	Acetone (2-Propanone)	2023/06/20	110	60 - 140	103	60 - 140	<10	ug/L				
8735152	Benzene	2023/06/20	96	70 - 130	80	70 - 130	<0.20	ug/L				
8735152	Bromodichloromethane	2023/06/20	107	70 - 130	94	70 - 130	<0.50	ug/L				
8735152	Bromoform	2023/06/20	108	70 - 130	98	70 - 130	<1.0	ug/L				
8735152	Bromomethane	2023/06/20	96	60 - 140	81	60 - 140	<0.50	ug/L				
8735152	Carbon Tetrachloride	2023/06/20	101	70 - 130	85	70 - 130	<0.19	ug/L				
8735152	Chlorobenzene	2023/06/20	99	70 - 130	86	70 - 130	<0.20	ug/L				
8735152	Chloroethane	2023/06/20	105	70 - 130	85	70 - 130	<1.0	ug/L				
8735152	Chloroform	2023/06/20	103	70 - 130	87	70 - 130	<0.20	ug/L	NC (1)	30		
8735152	Chloromethane	2023/06/20	108	60 - 140	86	60 - 140	<5.0	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8735152	cis-1,2-Dichloroethylene	2023/06/20	104	70 - 130	88	70 - 130	<0.50	ug/L				
8735152	cis-1,3-Dichloropropene	2023/06/20	74	70 - 130	82	70 - 130	<0.30	ug/L				
8735152	Dibromochloromethane	2023/06/20	105	70 - 130	94	70 - 130	<0.50	ug/L				
8735152	Ethylbenzene	2023/06/20	89	70 - 130	77	70 - 130	<0.20	ug/L				
8735152	Ethylene Dibromide	2023/06/20	104	70 - 130	94	70 - 130	<0.19	ug/L				
8735152	Methyl Ethyl Ketone (2-Butanone)	2023/06/20	119	60 - 140	111	60 - 140	<10	ug/L				
8735152	Methyl Isobutyl Ketone	2023/06/20	116	70 - 130	109	70 - 130	<5.0	ug/L				
8735152	Methyl t-butyl ether (MTBE)	2023/06/20	95	70 - 130	88	70 - 130	<0.50	ug/L				
8735152	Methylene Chloride(Dichloromethane)	2023/06/20	121	70 - 130	102	70 - 130	<2.0	ug/L				
8735152	o-Xylene	2023/06/20	89	70 - 130	80	70 - 130	<0.20	ug/L				
8735152	p+m-Xylene	2023/06/20	93	70 - 130	81	70 - 130	<0.20	ug/L				
8735152	Styrene	2023/06/20	102	70 - 130	92	70 - 130	<0.40	ug/L				
8735152	Tetrachloroethylene	2023/06/20	91	70 - 130	79	70 - 130	<0.20	ug/L				
8735152	Toluene	2023/06/20	99	70 - 130	84	70 - 130	<0.20	ug/L				
8735152	Total Xylenes	2023/06/20					<0.20	ug/L				
8735152	trans-1,2-Dichloroethylene	2023/06/20	98	70 - 130	85	70 - 130	<0.50	ug/L				
8735152	trans-1,3-Dichloropropene	2023/06/20	78	70 - 130	85	70 - 130	<0.40	ug/L				
8735152	Trichloroethylene	2023/06/20	101	70 - 130	87	70 - 130	<0.20	ug/L				
8735152	Trichlorofluoromethane (FREON 11)	2023/06/20	104	70 - 130	85	70 - 130	<0.50	ug/L				
8735152	Vinyl Chloride	2023/06/20	104	70 - 130	83	70 - 130	<0.20	ug/L				
8738218	Total Aluminum (Al)	2023/06/20	109	80 - 120	103	80 - 120	<0.02	mg/L				
8738218	Total Arsenic (As)	2023/06/20	101	80 - 120	100	80 - 120	<0.001	mg/L	NC (1)	20		
8738218	Total Barium (Ba)	2023/06/20	93	80 - 120	97	80 - 120	<0.005	mg/L	3.8 (1)	20		
8738218	Total Beryllium (Be)	2023/06/20	104	80 - 120	103	80 - 120	<0.0006	mg/L				
8738218	Total Bismuth (Bi)	2023/06/20	94	80 - 120	96	80 - 120	<0.001	mg/L				
8738218	Total Boron (B)	2023/06/20	97	80 - 120	100	80 - 120	<0.02	mg/L	6.9 (1)	20		
8738218	Total Cadmium (Cd)	2023/06/20	99	80 - 120	99	80 - 120	<0.0001	mg/L	NC (1)	20		
8738218	Total Calcium (Ca)	2023/06/20	NC	80 - 120	98	80 - 120	<0.2	mg/L				
8738218	Total Chromium (Cr)	2023/06/20	99	80 - 120	98	80 - 120	<0.005	mg/L	NC (1)	20		
8738218	Total Cobalt (Co)	2023/06/20	103	80 - 120	100	80 - 120	<0.0005	mg/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8738218	Total Copper (Cu)	2023/06/20	103	80 - 120	99	80 - 120	<0.002	mg/L	NC (1)	20		
8738218	Total Iron (Fe)	2023/06/20	99	80 - 120	98	80 - 120	<0.1	mg/L	4.4 (1)	20		
8738218	Total Lead (Pb)	2023/06/20	91	80 - 120	96	80 - 120	<0.0005	mg/L	NC (1)	20		
8738218	Total Magnesium (Mg)	2023/06/20	102	80 - 120	101	80 - 120	<0.05	mg/L				
8738218	Total Molybdenum (Mo)	2023/06/20	108	80 - 120	103	80 - 120	<0.002	mg/L				
8738218	Total Nickel (Ni)	2023/06/20	95	80 - 120	96	80 - 120	<0.001	mg/L				
8738218	Total Potassium (K)	2023/06/20	96	80 - 120	100	80 - 120	<0.2	mg/L				
8738218	Total Selenium (Se)	2023/06/20	102	80 - 120	102	80 - 120	<0.005	mg/L				
8738218	Total Silver (Ag)	2023/06/20	94	80 - 120	94	80 - 120	<0.0004	mg/L				
8738218	Total Sodium (Na)	2023/06/20	NC	80 - 120	100	80 - 120	<0.1	mg/L				
8738218	Total Strontium (Sr)	2023/06/20	93	80 - 120	92	80 - 120	<0.003	mg/L				
8738218	Total Tin (Sn)	2023/06/20	101	80 - 120	99	80 - 120	<0.002	mg/L				
8738218	Total Titanium (Ti)	2023/06/20	98	80 - 120	96	80 - 120	<0.005	mg/L				
8738218	Total Vanadium (V)	2023/06/20	96	80 - 120	96	80 - 120	<0.001	mg/L				
8738218	Total Zinc (Zn)	2023/06/20	101	80 - 120	100	80 - 120	<0.01	mg/L	NC (1)	20		
8739708	Total Phosphorus	2023/06/21	104	80 - 120	104	80 - 120	<0.030	mg/L	NC (1)	25	101	80 - 120
8739716	Total Kjeldahl Nitrogen (TKN)	2023/06/21	99	80 - 120	91	80 - 120	<0.7	mg/L	NC (1)	20	96	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8741560	Total Ammonia-N	2023/06/21	NC (3)	75 - 125	102	80 - 120	<0.15	mg/L	1.3 (4)	20		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(3) Matrix Spike Parent ID [WCP374-06]

(4) Duplicate Parent ID [WCP374-06]

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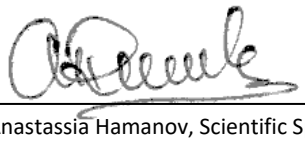
Bureau Veritas Job #: C3H4383
Report Date: 2023/06/23

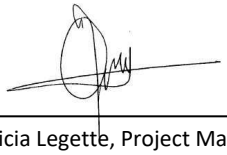
RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist



Patricia Legette, Project Manager

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

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FIELD INFORMATION FORM

BUREAU VERITAS

WASTE MANAGEMENT

Site Name: TLEC

Site No.: Sample: PS Holding Tank Sample ID

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes. Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: Y or N

Purging Device: A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Sampling Device: D

X-Other:

Filter Device: Y or N — 0.45 µ or ____ µ (circle or fill in)

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other: ____

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other: ____

WELL DATA

Well Elevation (at TOC) (ft/msl)

Depth to Water (DTW) (from TOC) (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC) (ft msl)

Total Well Depth (from TOC) (ft)

Stick Up (from ground elevation) (ft)

Casing ID (in)

Casing Material

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
061423	7.5	8.94	13.3	52.5	1.91		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

Sample Appearance: Opaque Odor: leachate Color: Black Other: ____

Weather Conditions (required daily, or as conditions change): 14°C Direction/Speed: 11 Km/h NW Outlook: Overcast Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required): ____

FIELD COMMENTS

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
06/14/23	Brady Gruss		RWDI

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 06/20

0624

Maxxam Analytics Inc 6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

Page 1 of 1

INVOICE INFORMATION:

Company Name: Waste Management of Canada Corporation
Contact Name: Lisa Mertick
Address: 5768 Nauvoo Rd, Watford, ON N0M 2S0
Phone: 519-849-5810 Fax: 519-849-5811
Email: lmertick@wm.com

REPORT INFORMATION (if differs from invoice):

Company Name: RWDI AIR Inc.
Contact Name: Brent Langille
Address: 4510 Rhodes Drive, Unit 530 Windsor, ON, N8W 5K5
Phone: 519-823-1311 x:2984 Fax: 519-823-1316
Email: Brent.Langille@RWDI.com, JCL@rwdi.com

PROJECT INFORMATION:

Quotation #
P.O. #: 12285739
Project #: 2303459.01
Project Name: TCEC-LCHCM-JUNE
Location: Twin Creeks
Sampled By: BEG

MAXXAM JOB NUMBER:

CHAIN OF CUSTODY # : TCEC-LCHCM-JUNE

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

☐ MISA ☐ PWQO ☐ Reg. 558
Reg. 153: ☐ Table 1 ☐ Table 2 ☐ Table 3
Sewer Use: ☐ Sanitary ☐ Storm Region: _____
☒ Other: site specific (specify)
Report Criteria on C of A? n

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ON-WLF-2023 TCLS - LEACHATE (PS HOLDING) MONTHLY	# of Cont.	COMMENTS / TAT COMMENTS
1	PS Holding Tank	14-Jun-23	AM	LCH	N	N	X	9	
2									See lab addendum for analysis.
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
☒ 5 to 7 Working Days

Rush TAT: Rush Confirmation # _____ (call Lab for #)
☐ 1 day ☐ 2 days ☐ 3 days
DATE Required: 23-Jun-23
TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

15-Jun-23 10:18
Patricia Legette
C3H4383
HPK ENV-1206

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:
BEG 14-June-23 - AM	NIRAL PATEL	2023/06/15	10:18

Laboratory Use Only

Temperature (°C) on Receipt	Condition of Sample on Receipt
5/8/12	☑ OK ☐ SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

White: Maxxam Yellow: Mail Pink: Client

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 500
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/07/31
Report #: R7743143
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3L8083
Received: 2023/07/21, 08:25

Sample Matrix: Leachate
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
ABN Compounds in Water by GC/MS	1	2023/07/24	2023/07/25	CAM SOP-00301	EPA 8270 m
Alkalinity	1	N/A	2023/07/24	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	1	N/A	2023/07/24	CAM SOP-00463	SM 23 4500-Cl E m
Conductance in Water - On-site	1	N/A	2023/07/26		
Field Measured Dissolved Oxygen in Water	1	N/A	2023/07/26		
Total Metals by ICPMS	1	N/A	2023/07/27	CAM SOP-00447	EPA 6020B m
Ammonia-N	1	N/A	2023/07/31	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	1	N/A	2023/07/24	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Field Measured pH (2)	1	N/A	2023/07/26		Field pH Meter
Sulphate by Automated Turbidimetry	1	N/A	2023/07/24	CAM SOP-00464	SM 23 4500-SO42- E m
Field Temperature (2)	1	N/A	2023/07/26		Field Thermometer
Total Kjeldahl Nitrogen in Water	1	2023/07/26	2023/07/27	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	1	2023/07/26	2023/07/27	CAM SOP-00407	SM 23 4500-P I
Turbidity - On-site	1	N/A	2023/07/26		
Un-ionized Ammonia (3)	1	2023/07/21	2023/07/31	Auto Calc.	PWQO
Volatile Organic Compounds in Water	1	N/A	2023/07/28	CAM SOP-00228	EPA 8260D
Non-Routine Volatile Organic Compounds	1	N/A	2023/07/27	CAM SOP-00226	EPA 8260D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 500
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/07/31
Report #: R7743143
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3L8083
Received: 2023/07/21, 08:25
customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.
(3) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799
==========
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3L8083
Report Date: 2023/07/31

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BEG

RESULTS OF ANALYSES OF LEACHATE

Bureau Veritas ID		WLR465		
Sampling Date		2023/07/19		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Calculated Parameters				
Total Un-ionized Ammonia	mg/L	7.9	0.13	8805176
Field Measurements				
Field Conductivity	uS/cm	6810	N/A	ONSITE
Field Dissolved Oxygen	mg/L	1.25	N/A	ONSITE
Field Temperature	Celsius	21.6	N/A	ONSITE
Field Turbidity	NTU	117	N/A	ONSITE
Field Measured pH	pH	7.5		ONSITE
Inorganics				
Total Ammonia-N	mg/L	468 (1)	7.5	8812990
Total Kjeldahl Nitrogen (TKN)	mg/L	450	10	8812981
Total Phosphorus	mg/L	0.84	0.10	8812978
Dissolved Sulphate (SO4)	mg/L	150	1.0	8806710
Alkalinity (Total as CaCO3)	mg/L	2400	5.0	8806670
Dissolved Chloride (Cl-)	mg/L	380	3.0	8806705
Nitrite (N)	mg/L	<0.050	0.050	8806495
Nitrate (N)	mg/L	<0.50	0.50	8806495

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) TKN < NH4: Both values fall within acceptable RPD limits for duplicates and are likely equivalent.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3L8083
Report Date: 2023/07/31

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BEG

ELEMENTS BY ATOMIC SPECTROSCOPY (LEACHATE)

Bureau Veritas ID		WLR465		
Sampling Date		2023/07/19		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Metals				
Total Aluminum (Al)	mg/L	0.12	0.02	8812959
Total Arsenic (As)	mg/L	0.023	0.001	8812959
Total Barium (Ba)	mg/L	0.12	0.005	8812959
Total Beryllium (Be)	mg/L	<0.0006	0.0006	8812959
Total Bismuth (Bi)	mg/L	<0.001	0.001	8812959
Total Boron (B)	mg/L	8.0	0.2	8812959
Total Cadmium (Cd)	mg/L	<0.0001	0.0001	8812959
Total Calcium (Ca)	mg/L	150	0.2	8812959
Total Chromium (Cr)	mg/L	0.022	0.005	8812959
Total Cobalt (Co)	mg/L	0.0050	0.0005	8812959
Total Copper (Cu)	mg/L	<0.002	0.002	8812959
Total Iron (Fe)	mg/L	2.2	0.1	8812959
Total Lead (Pb)	mg/L	0.0007	0.0005	8812959
Total Magnesium (Mg)	mg/L	120	0.05	8812959
Total Molybdenum (Mo)	mg/L	0.015	0.002	8812959
Total Nickel (Ni)	mg/L	0.040	0.001	8812959
Total Potassium (K)	mg/L	87	0.2	8812959
Total Selenium (Se)	mg/L	<0.005	0.005	8812959
Total Silver (Ag)	mg/L	<0.0004	0.0004	8812959
Total Sodium (Na)	mg/L	420	0.1	8812959
Total Strontium (Sr)	mg/L	1.3	0.003	8812959
Total Tin (Sn)	mg/L	0.004	0.002	8812959
Total Titanium (Ti)	mg/L	0.023	0.005	8812959
Total Vanadium (V)	mg/L	0.007	0.001	8812959
Total Zinc (Zn)	mg/L	0.02	0.01	8812959

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

SEMI-VOLATILE ORGANICS BY GC-MS (LEACHATE)

Bureau Veritas ID		WLR465		
Sampling Date		2023/07/19		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Semivolatile Organics				
Acenaphthene	ug/L	<2.0	2.0	8807629
Acenaphthylene	ug/L	<2.0	2.0	8807629
Anthracene	ug/L	<2.0	2.0	8807629
Benzo(a)anthracene	ug/L	<2.0	2.0	8807629
Benzo(a)pyrene	ug/L	<2.0	2.0	8807629
Benzo(b/j)fluoranthene	ug/L	<2.0	2.0	8807629
Benzo(g,h,i)perylene	ug/L	<2.0	2.0	8807629
Benzo(k)fluoranthene	ug/L	<2.0	2.0	8807629
1-Chloronaphthalene	ug/L	<10	10	8807629
2-Chloronaphthalene	ug/L	<5.0	5.0	8807629
Chrysene	ug/L	<2.0	2.0	8807629
Dibenzo(a,h)anthracene	ug/L	<2.0	2.0	8807629
Fluoranthene	ug/L	<2.0	2.0	8807629
Fluorene	ug/L	<2.0	2.0	8807629
Indeno(1,2,3-cd)pyrene	ug/L	<2.0	2.0	8807629
1-Methylnaphthalene	ug/L	<2.0	2.0	8807629
2-Methylnaphthalene	ug/L	<2.0	2.0	8807629
Naphthalene	ug/L	6.1	2.0	8807629
Perylene	ug/L	<2.0	2.0	8807629
Phenanthrene	ug/L	<2.0	2.0	8807629
Pyrene	ug/L	<2.0	2.0	8807629
1,2-Dichlorobenzene	ug/L	<5.0	5.0	8807629
1,3-Dichlorobenzene	ug/L	<5.0	5.0	8807629
Hexachlorobenzene	ug/L	<5.0	5.0	8807629
Pentachlorobenzene	ug/L	<5.0	5.0	8807629
1,2,3,5-Tetrachlorobenzene	ug/L	<5.0	5.0	8807629
1,2,4,5-Tetrachlorobenzene	ug/L	<5.0	5.0	8807629
1,2,3-Trichlorobenzene	ug/L	<5.0	5.0	8807629
1,2,4-Trichlorobenzene	ug/L	<5.0	5.0	8807629
1,3,5-Trichlorobenzene	ug/L	<5.0	5.0	8807629
2-Chlorophenol	ug/L	<3.0	3.0	8807629
4-Chloro-3-Methylphenol	ug/L	<5.0	5.0	8807629
m/p-Cresol	ug/L	260	5.0	8807629

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

SEMI-VOLATILE ORGANICS BY GC-MS (LEACHATE)

Bureau Veritas ID		WLR465		
Sampling Date		2023/07/19		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
o-Cresol	ug/L	8.8	5.0	8807629
1,2,3,4-Tetrachlorobenzene	ug/L	<5.0	5.0	8807629
2,3-Dichlorophenol	ug/L	<5.0	5.0	8807629
2,4-Dichlorophenol	ug/L	<3.0	3.0	8807629
2,5-Dichlorophenol	ug/L	<5.0	5.0	8807629
2,6-Dichlorophenol	ug/L	<5.0	5.0	8807629
3,4-Dichlorophenol	ug/L	<5.0	5.0	8807629
3,5-Dichlorophenol	ug/L	<5.0	5.0	8807629
2,4-Dimethylphenol	ug/L	7.1	5.0	8807629
2,4-Dinitrophenol	ug/L	<20	20	8807629
4,6-Dinitro-2-methylphenol	ug/L	<20	20	8807629
2-Nitrophenol	ug/L	<5.0	5.0	8807629
4-Nitrophenol	ug/L	<14	14	8807629
Pentachlorophenol	ug/L	<10	10	8807629
Phenol	ug/L	87	5.0	8807629
2,3,4,5-Tetrachlorophenol	ug/L	<4.0	4.0	8807629
2,3,4,6-Tetrachlorophenol	ug/L	<5.0	5.0	8807629
2,3,5,6-Tetrachlorophenol	ug/L	<5.0	5.0	8807629
2,3,4-Trichlorophenol	ug/L	<5.0	5.0	8807629
2,3,5-Trichlorophenol	ug/L	<5.0	5.0	8807629
2,3,6-Trichlorophenol	ug/L	<5.0	5.0	8807629
2,4,5-Trichlorophenol	ug/L	<5.0	5.0	8807629
2,4,6-Trichlorophenol	ug/L	<5.0	5.0	8807629
3,4,5-Trichlorophenol	ug/L	<5.0	5.0	8807629
Benzyl butyl phthalate	ug/L	<5.0	5.0	8807629
Biphenyl	ug/L	<5.0	5.0	8807629
Bis(2-chloroethyl)ether	ug/L	<5.0	5.0	8807629
Bis(2-chloroethoxy)methane	ug/L	<5.0	5.0	8807629
Bis(2-chloroisopropyl)ether	ug/L	<5.0	5.0	8807629
Bis(2-ethylhexyl)phthalate	ug/L	<20	20	8807629
4-Bromophenyl phenyl ether	ug/L	<3.0	3.0	8807629
p-Chloroaniline	ug/L	<10	10	8807629
4-Chlorophenyl phenyl ether	ug/L	<5.0	5.0	8807629
Di-N-butyl phthalate	ug/L	<20	20	8807629

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BEG

SEMI-VOLATILE ORGANICS BY GC-MS (LEACHATE)

Bureau Veritas ID		WLR465		
Sampling Date		2023/07/19		
COC Number		n/a		
	UNITS	**PS HOLDING TANK**	**RDL**	**QC Batch**
di-n-octyl phthalate	ug/L	<8.0	8.0	8807629
2,4-Dinitrotoluene	ug/L	<5.0	5.0	8807629
Diethyl phthalate	ug/L	<10	10	8807629
3,3'-Dichlorobenzidine	ug/L	<5.0	5.0	8807629
Dimethyl phthalate	ug/L	<10	10	8807629
2,6-Dinitrotoluene	ug/L	<5.0	5.0	8807629
Diphenyl Ether	ug/L	<3.0	3.0	8807629
Hexachlorobutadiene	ug/L	<4.0	4.0	8807629
Hexachlorocyclopentadiene	ug/L	<20	20	8807629
Hexachloroethane	ug/L	<5.0	5.0	8807629
Isophorone	ug/L	<5.0	5.0	8807629
Nitrobenzene	ug/L	<5.0	5.0	8807629
Nitrosodiphenylamine/Diphenylamine	ug/L	<10	10	8807629
N-Nitroso-di-n-propylamine	ug/L	<5.0	5.0	8807629
Surrogate Recovery (%)				
2,4,6-Tribromophenol	%	79		8807629
2-Fluorobiphenyl	%	61		8807629
2-Fluorophenol	%	39		8807629
D14-Terphenyl	%	89		8807629
D5-Nitrobenzene	%	70		8807629
D5-Phenol	%	25		8807629

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BEG

VOLATILE ORGANICS BY GC/MS (LEACHATE)

Bureau Veritas ID		WLR465		
Sampling Date		2023/07/19		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Volatile Organics				
Acetone (2-Propanone)	ug/L	5400	500	8816410
Benzene	ug/L	<10	10	8816410
Bromodichloromethane	ug/L	<25	25	8816410
Bromoform	ug/L	<50	50	8816410
Bromomethane	ug/L	<25	25	8816410
Carbon Tetrachloride	ug/L	<9.5	9.5	8816410
Chlorobenzene	ug/L	<10	10	8816410
Chloroethane	ug/L	<50	50	8816410
Chloroform	ug/L	<10	10	8816410
Chloromethane	ug/L	<250	250	8816410
Dibromochloromethane	ug/L	<25	25	8816410
1,2-Dichlorobenzene	ug/L	<20	20	8816410
1,3-Dichlorobenzene	ug/L	<20	20	8816410
1,4-Dichlorobenzene	ug/L	<20	20	8816410
1,1-Dichloroethane	ug/L	<10	10	8816410
1,2-Dichloroethane	ug/L	<25	25	8816410
1,1-Dichloroethylene	ug/L	<10	10	8816410
cis-1,2-Dichloroethylene	ug/L	<25	25	8816410
trans-1,2-Dichloroethylene	ug/L	<25	25	8816410
1,2-Dichloropropane	ug/L	<10	10	8816410
cis-1,3-Dichloropropene	ug/L	<15	15	8816410
trans-1,3-Dichloropropene	ug/L	<20	20	8816410
Ethylbenzene	ug/L	<10	10	8816410
Ethylene Dibromide	ug/L	<9.5	9.5	8816410
Methylene Chloride(Dichloromethane)	ug/L	<100	100	8816410
Methyl Ethyl Ketone (2-Butanone)	ug/L	5400	500	8816410
Methyl Isobutyl Ketone	ug/L	<250	250	8816410
Methyl t-butyl ether (MTBE)	ug/L	<25	25	8816410
Styrene	ug/L	<20	20	8816410
1,1,1,2-Tetrachloroethane	ug/L	<25	25	8816410
1,1,2,2-Tetrachloroethane	ug/L	<20	20	8816410
Tetrachloroethylene	ug/L	<10	10	8816410
1,3,5-Trimethylbenzene	ug/L	<0.20	0.20	8800803

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3L8083
Report Date: 2023/07/31

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BEG

VOLATILE ORGANICS BY GC/MS (LEACHATE)

Bureau Veritas ID		WLR465		
Sampling Date		2023/07/19		
COC Number		n/a		
	UNITS	**PS HOLDING TANK**	**RDL**	**QC Batch**
Toluene	ug/L	26	10	8816410
1,1,1-Trichloroethane	ug/L	<10	10	8816410
1,1,2-Trichloroethane	ug/L	<20	20	8816410
Trichloroethylene	ug/L	<10	10	8816410
Trichlorofluoromethane (FREON 11)	ug/L	<25	25	8816410
Vinyl Chloride	ug/L	<10	10	8816410
p+m-Xylene	ug/L	19	10	8816410
o-Xylene	ug/L	<10	10	8816410
Total Xylenes	ug/L	19	10	8816410
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	103		8816410
D4-1,2-Dichloroethane	%	101		8816410
D8-Toluene	%	86		8816410
4-Bromofluorobenzene	%	98		8800803
D4-1,2-Dichloroethane	%	99		8800803
D8-Toluene	%	101		8800803

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Sample WLR465 [PS HOLDING TANK] : Nitrite/Nitrate: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.
ABN Analysis: Due to the sample matrix, a smaller than usual portion of the sample was used for extraction. Detection limits were adjusted accordingly.

VOC Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.
TKN < Ammonia: Both values fall within the method uncertainty for duplicates and are likely equivalent.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8800803	4-Bromofluorobenzene	2023/07/27	98	70 - 130	103	70 - 130	97	%				
8800803	D4-1,2-Dichloroethane	2023/07/27	98	70 - 130	102	70 - 130	98	%				
8800803	D8-Toluene	2023/07/27	99	70 - 130	99	70 - 130	101	%				
8807629	2,4,6-Tribromophenol	2023/07/24			87	10 - 130	69	%				
8807629	2-Fluorobiphenyl	2023/07/24			72	30 - 130	60	%				
8807629	2-Fluorophenol	2023/07/24			44	10 - 130	40	%				
8807629	D14-Terphenyl	2023/07/24			86	30 - 130	87	%				
8807629	D5-Nitrobenzene	2023/07/24			78	30 - 130	73	%				
8807629	D5-Phenol	2023/07/24			29	10 - 130	26	%				
8816410	4-Bromofluorobenzene	2023/07/28	107	70 - 130	107	70 - 130	107	%				
8816410	D4-1,2-Dichloroethane	2023/07/28	99	70 - 130	97	70 - 130	105	%				
8816410	D8-Toluene	2023/07/28	104	70 - 130	104	70 - 130	86	%				
8800803	1,3,5-Trimethylbenzene	2023/07/27	110	60 - 140	100	60 - 140	<0.20	ug/L				
8806495	Nitrate (N)	2023/07/24	104	80 - 120	89	80 - 120	<0.10	mg/L	NC (1)	20		
8806495	Nitrite (N)	2023/07/24	103	80 - 120	105	80 - 120	<0.010	mg/L	NC (1)	20		
8806670	Alkalinity (Total as CaCO3)	2023/07/24			94	85 - 115	<1.0	mg/L	3.3 (1)	20		
8806705	Dissolved Chloride (Cl-)	2023/07/24	NC	80 - 120	98	80 - 120	<1.0	mg/L	1.6 (1)	20		
8806710	Dissolved Sulphate (SO4)	2023/07/24	NC	75 - 125	97	80 - 120	<1.0	mg/L	0.90 (1)	20		
8807629	1,2,3,4-Tetrachlorobenzene	2023/07/24			49	30 - 130	<0.50	ug/L	8.7 (1)	40		
8807629	1,2,3,5-Tetrachlorobenzene	2023/07/24			42	30 - 130	<0.50	ug/L	18 (1)	40		
8807629	1,2,3-Trichlorobenzene	2023/07/24			47	30 - 130	<0.50	ug/L	4.5 (1)	40		
8807629	1,2,4,5-Tetrachlorobenzene	2023/07/24			45	30 - 130	<0.50	ug/L	4.4 (1)	40		
8807629	1,2,4-Trichlorobenzene	2023/07/24			45	30 - 130	<0.50	ug/L	10 (1)	40		
8807629	1,2-Dichlorobenzene	2023/07/24			46	30 - 130	<0.50	ug/L	4.3 (1)	40		
8807629	1,3,5-Trichlorobenzene	2023/07/24			63	30 - 130	<0.50	ug/L	3.7 (1)	40		
8807629	1,3-Dichlorobenzene	2023/07/24			41	30 - 130	<0.50	ug/L	11 (1)	40		
8807629	1-Chloronaphthalene	2023/07/24			60	30 - 130	<1.0	ug/L	2.2 (1)	40		
8807629	1-Methylnaphthalene	2023/07/24			59	30 - 130	<0.20	ug/L	4.4 (1)	40		
8807629	2,3,4,5-Tetrachlorophenol	2023/07/24			95	10 - 130	<0.40	ug/L	5.7 (1)	40		
8807629	2,3,4,6-Tetrachlorophenol	2023/07/24			99	10 - 130	<0.50	ug/L	12 (1)	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8807629	2,3,4-Trichlorophenol	2023/07/24			91	10 - 130	<0.50	ug/L	1.9 (1)	40		
8807629	2,3,5,6-Tetrachlorophenol	2023/07/24			89	10 - 130	<0.50	ug/L	0.18 (1)	40		
8807629	2,3,5-Trichlorophenol	2023/07/24			101	10 - 130	<0.50	ug/L	0.069 (1)	40		
8807629	2,3,6-Trichlorophenol	2023/07/24			83	10 - 130	<0.50	ug/L	2.7 (1)	40		
8807629	2,3-Dichlorophenol	2023/07/24			81	10 - 130	<0.50	ug/L	4.2 (1)	40		
8807629	2,4,5-Trichlorophenol	2023/07/24			87	10 - 130	<0.50	ug/L	0.95 (1)	40		
8807629	2,4,6-Trichlorophenol	2023/07/24			91	10 - 130	<0.50	ug/L	0.98 (1)	40		
8807629	2,4-Dichlorophenol	2023/07/24			81	10 - 130	<0.30	ug/L	6.6 (1)	40		
8807629	2,4-Dimethylphenol	2023/07/24			76	10 - 130	<0.50	ug/L	1.9 (1)	40		
8807629	2,4-Dinitrophenol	2023/07/24			66	10 - 130	<2.0	ug/L	10 (1)	40		
8807629	2,4-Dinitrotoluene	2023/07/24			88	30 - 130	<0.50	ug/L	1.5 (1)	40		
8807629	2,5-Dichlorophenol	2023/07/24			87	10 - 130	<0.50	ug/L	5.1 (1)	40		
8807629	2,6-Dichlorophenol	2023/07/24			83	10 - 130	<0.50	ug/L	1.7 (1)	40		
8807629	2,6-Dinitrotoluene	2023/07/24			86	30 - 130	<0.50	ug/L	9.4 (1)	40		
8807629	2-Chloronaphthalene	2023/07/24			90	30 - 130	<0.50	ug/L	6.0 (1)	40		
8807629	2-Chlorophenol	2023/07/24			78	10 - 130	<0.30	ug/L	0.27 (1)	40		
8807629	2-Methylnaphthalene	2023/07/24			58	30 - 130	<0.20	ug/L	3.9 (1)	40		
8807629	2-Nitrophenol	2023/07/24			71	10 - 130	<0.50	ug/L	4.5 (1)	40		
8807629	3,3'-Dichlorobenzidine	2023/07/24			84	30 - 130	<0.50	ug/L	11 (1)	40		
8807629	3,4,5-Trichlorophenol	2023/07/24			84	10 - 130	<0.50	ug/L	3.2 (1)	40		
8807629	3,4-Dichlorophenol	2023/07/24			87	10 - 130	<0.50	ug/L	5.7 (1)	40		
8807629	3,5-Dichlorophenol	2023/07/24			91	10 - 130	<0.50	ug/L	29 (1)	40		
8807629	4,6-Dinitro-2-methylphenol	2023/07/24			92	10 - 130	<2.0	ug/L	2.9 (1)	40		
8807629	4-Bromophenyl phenyl ether	2023/07/24			74	30 - 130	<0.30	ug/L	5.3 (1)	40		
8807629	4-Chloro-3-Methylphenol	2023/07/24			80	10 - 130	<0.50	ug/L	1.6 (1)	40		
8807629	4-Chlorophenyl phenyl ether	2023/07/24			70	30 - 130	<0.50	ug/L	0.64 (1)	40		
8807629	4-Nitrophenol	2023/07/24			29	10 - 130	<1.4	ug/L	2.1 (1)	40		
8807629	Acenaphthene	2023/07/24			73	30 - 130	<0.20	ug/L	0.72 (1)	40		
8807629	Acenaphthylene	2023/07/24			74	30 - 130	<0.20	ug/L	0.067 (1)	40		
8807629	Anthracene	2023/07/24			89	30 - 130	<0.20	ug/L	3.3 (1)	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8807629	Benzo(a)anthracene	2023/07/24			90	30 - 130	<0.20	ug/L	3.0 (1)	40		
8807629	Benzo(a)pyrene	2023/07/24			92	30 - 130	<0.20	ug/L	3.6 (1)	40		
8807629	Benzo(b/j)fluoranthene	2023/07/24			87	30 - 130	<0.20	ug/L	2.1 (1)	40		
8807629	Benzo(g,h,i)perylene	2023/07/24			100	30 - 130	<0.20	ug/L	4.4 (1)	40		
8807629	Benzo(k)fluoranthene	2023/07/24			87	30 - 130	<0.20	ug/L	7.8 (1)	40		
8807629	Benzyl butyl phthalate	2023/07/24			77	30 - 130	<0.50	ug/L	5.5 (1)	40		
8807629	Biphenyl	2023/07/24			64	30 - 130	<0.50	ug/L	0.34 (1)	40		
8807629	Bis(2-chloroethoxy)methane	2023/07/24			76	30 - 130	<0.50	ug/L	2.1 (1)	40		
8807629	Bis(2-chloroethyl)ether	2023/07/24			75	30 - 130	<0.50	ug/L	4.1 (1)	40		
8807629	Bis(2-chloroisopropyl)ether	2023/07/24			59	30 - 130	<0.50	ug/L	3.2 (1)	40		
8807629	Bis(2-ethylhexyl)phthalate	2023/07/24			80	30 - 130	<2.0	ug/L	4.8 (1)	40		
8807629	Chrysene	2023/07/24			91	30 - 130	<0.20	ug/L	0.38 (1)	40		
8807629	Dibenzo(a,h)anthracene	2023/07/24			90	30 - 130	<0.20	ug/L	7.7 (1)	40		
8807629	Diethyl phthalate	2023/07/24			84	30 - 130	<1.0	ug/L	0.52 (1)	40		
8807629	Dimethyl phthalate	2023/07/24			87	30 - 130	<1.0	ug/L	0.99 (1)	40		
8807629	Di-N-butyl phthalate	2023/07/24			84	30 - 130	<2.0	ug/L	1.8 (1)	40		
8807629	di-n-octyl phthalate	2023/07/24			68	30 - 130	<0.80	ug/L	5.1 (1)	40		
8807629	Diphenyl Ether	2023/07/24			59	30 - 130	<0.30	ug/L	1.8 (1)	40		
8807629	Fluoranthene	2023/07/24			92	30 - 130	<0.20	ug/L	1.2 (1)	40		
8807629	Fluorene	2023/07/24			89	30 - 130	<0.20	ug/L	0.17 (1)	40		
8807629	Hexachlorobenzene	2023/07/24			87	30 - 130	<0.50	ug/L	7.3 (1)	40		
8807629	Hexachlorobutadiene	2023/07/24			37	30 - 130	<0.40	ug/L	2.6 (1)	40		
8807629	Hexachlorocyclopentadiene	2023/07/24			39	30 - 130	<2.0	ug/L	1.4 (1)	40		
8807629	Hexachloroethane	2023/07/24			36	30 - 130	<0.50	ug/L	0.85 (1)	40		
8807629	Indeno(1,2,3-cd)pyrene	2023/07/24			93	30 - 130	<0.20	ug/L	2.7 (1)	40		
8807629	Isophorone	2023/07/24			89	30 - 130	<0.50	ug/L	1.5 (1)	40		
8807629	m/p-Cresol	2023/07/24			63	10 - 130	<0.50	ug/L	0.46 (1)	40		
8807629	Naphthalene	2023/07/24			80	30 - 130	<0.20	ug/L	0.29 (1)	40		
8807629	Nitrobenzene	2023/07/24			75	30 - 130	<0.50	ug/L	0.93 (1)	40		
8807629	Nitrosodiphenylamine/Diphenylamine	2023/07/24			91	30 - 130	<1.0	ug/L	1.5 (1)	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8807629	N-Nitroso-di-n-propylamine	2023/07/24			94	30 - 130	<0.50	ug/L	0.33 (1)	40		
8807629	o-Cresol	2023/07/24			71	10 - 130	<0.50	ug/L	1.7 (1)	40		
8807629	p-Chloroaniline	2023/07/24			78	30 - 130	<1.0	ug/L	2.0 (1)	40		
8807629	Pentachlorobenzene	2023/07/24			46	30 - 130	<0.50	ug/L	13 (1)	40		
8807629	Pentachlorophenol	2023/07/24			81	10 - 130	<1.0	ug/L	5.8 (1)	40		
8807629	Perylene	2023/07/24			90	30 - 130	<0.20	ug/L	2.0 (1)	40		
8807629	Phenanthrene	2023/07/24			91	30 - 130	<0.20	ug/L	1.4 (1)	40		
8807629	Phenol	2023/07/24			31	10 - 130	<0.50	ug/L	1.5 (1)	40		
8807629	Pyrene	2023/07/24			82	30 - 130	<0.20	ug/L	8.3 (1)	40		
8812959	Total Aluminum (Al)	2023/07/27	108 (2)	80 - 120	94	80 - 120	<0.02	mg/L	1.6 (4)	20		
8812959	Total Arsenic (As)	2023/07/27	104 (2)	80 - 120	98	80 - 120	<0.001	mg/L	2.4 (4)	20		
8812959	Total Barium (Ba)	2023/07/27	99 (2)	80 - 120	95	80 - 120	<0.005	mg/L	3.2 (4)	20		
8812959	Total Beryllium (Be)	2023/07/27	103 (2)	80 - 120	100	80 - 120	<0.0006	mg/L	NC (4)	20		
8812959	Total Bismuth (Bi)	2023/07/27	100 (2)	80 - 120	100	80 - 120	<0.001	mg/L	NC (4)	20		
8812959	Total Boron (B)	2023/07/27	NC (2)	80 - 120	91	80 - 120	<0.02	mg/L	0.11 (4)	20		
8812959	Total Cadmium (Cd)	2023/07/27	101 (2)	80 - 120	98	80 - 120	<0.0001	mg/L	NC (4)	20		
8812959	Total Calcium (Ca)	2023/07/27	NC (2)	80 - 120	97	80 - 120	<0.2	mg/L	3.2 (4)	20		
8812959	Total Chromium (Cr)	2023/07/27	99 (2)	80 - 120	94	80 - 120	<0.005	mg/L	4.4 (4)	20		
8812959	Total Cobalt (Co)	2023/07/27	98 (2)	80 - 120	93	80 - 120	<0.0005	mg/L	0.88 (4)	20		
8812959	Total Copper (Cu)	2023/07/27	100 (2)	80 - 120	95	80 - 120	<0.002	mg/L	NC (4)	20		
8812959	Total Iron (Fe)	2023/07/27	99 (2)	80 - 120	95	80 - 120	<0.1	mg/L	1.6 (4)	20		
8812959	Total Lead (Pb)	2023/07/27	100 (2)	80 - 120	99	80 - 120	<0.0005	mg/L	1.6 (4)	20		
8812959	Total Magnesium (Mg)	2023/07/27	NC (2)	80 - 120	95	80 - 120	<0.05	mg/L	1.8 (4)	20		
8812959	Total Molybdenum (Mo)	2023/07/27	110 (2)	80 - 120	101	80 - 120	<0.002	mg/L	2.2 (4)	20		
8812959	Total Nickel (Ni)	2023/07/27	95 (2)	80 - 120	93	80 - 120	<0.001	mg/L	1.8 (4)	20		
8812959	Total Potassium (K)	2023/07/27	NC (2)	80 - 120	94	80 - 120	<0.2	mg/L	1.8 (4)	20		
8812959	Total Selenium (Se)	2023/07/27	69 (3,2)	80 - 120	102	80 - 120	<0.005	mg/L	NC (4)	20		
8812959	Total Silver (Ag)	2023/07/27	100 (2)	80 - 120	96	80 - 120	<0.0004	mg/L	NC (4)	20		
8812959	Total Sodium (Na)	2023/07/27	NC (2)	80 - 120	97	80 - 120	<0.1	mg/L	1.8 (4)	20		
8812959	Total Strontium (Sr)	2023/07/27	NC (2)	80 - 120	95	80 - 120	<0.003	mg/L	2.7 (4)	20		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8812959	Total Tin (Sn)	2023/07/27	107 (2)	80 - 120	99	80 - 120	<0.002	mg/L	3.0 (4)	20		
8812959	Total Titanium (Ti)	2023/07/27	99 (2)	80 - 120	91	80 - 120	<0.005	mg/L	0.40 (4)	20		
8812959	Total Vanadium (V)	2023/07/27	101 (2)	80 - 120	94	80 - 120	<0.001	mg/L	8.4 (4)	20		
8812959	Total Zinc (Zn)	2023/07/27	98 (2)	80 - 120	100	80 - 120	<0.01	mg/L	5.2 (4)	20		
8812978	Total Phosphorus	2023/07/27	104 (5)	80 - 120	100	80 - 120	<0.030	mg/L	1.0 (6)	25	112	80 - 120
8812981	Total Kjeldahl Nitrogen (TKN)	2023/07/27	NC (5)	80 - 120	101	80 - 120	<0.7	mg/L	2.4 (7,6)	20	103	80 - 120
8812990	Total Ammonia-N	2023/07/31	NC (8)	75 - 125	102	80 - 120	<0.15	mg/L	1.4 (7,9)	20		
8816410	1,1,1,2-Tetrachloroethane	2023/07/28	102	70 - 130	98	70 - 130	<0.50	ug/L				
8816410	1,1,1-Trichloroethane	2023/07/28	104	70 - 130	100	70 - 130	<0.20	ug/L				
8816410	1,1,2,2-Tetrachloroethane	2023/07/28	95	70 - 130	91	70 - 130	<0.40	ug/L	NC (1)	30		
8816410	1,1,2-Trichloroethane	2023/07/28	94	70 - 130	92	70 - 130	<0.40	ug/L				
8816410	1,1-Dichloroethane	2023/07/28	95	70 - 130	91	70 - 130	<0.20	ug/L				
8816410	1,1-Dichloroethylene	2023/07/28	102	70 - 130	98	70 - 130	<0.20	ug/L				
8816410	1,2-Dichlorobenzene	2023/07/28	99	70 - 130	98	70 - 130	<0.40	ug/L	NC (1)	30		
8816410	1,2-Dichloroethane	2023/07/28	96	70 - 130	91	70 - 130	<0.49	ug/L				
8816410	1,2-Dichloropropane	2023/07/28	97	70 - 130	93	70 - 130	<0.20	ug/L				
8816410	1,3-Dichlorobenzene	2023/07/28	101	70 - 130	98	70 - 130	<0.40	ug/L				
8816410	1,4-Dichlorobenzene	2023/07/28	113	70 - 130	111	70 - 130	<0.40	ug/L	NC (1)	30		
8816410	Acetone (2-Propanone)	2023/07/28	93	60 - 140	91	60 - 140	<10	ug/L				
8816410	Benzene	2023/07/28	96	70 - 130	93	70 - 130	<0.20	ug/L	NC (1)	30		
8816410	Bromodichloromethane	2023/07/28	103	70 - 130	98	70 - 130	<0.50	ug/L				
8816410	Bromoform	2023/07/28	105	70 - 130	100	70 - 130	<1.0	ug/L				
8816410	Bromomethane	2023/07/28	111	60 - 140	102	60 - 140	<0.50	ug/L				
8816410	Carbon Tetrachloride	2023/07/28	105	70 - 130	101	70 - 130	<0.19	ug/L				
8816410	Chlorobenzene	2023/07/28	102	70 - 130	99	70 - 130	<0.20	ug/L				
8816410	Chloroethane	2023/07/28	103	70 - 130	98	70 - 130	<1.0	ug/L				
8816410	Chloroform	2023/07/28	100	70 - 130	96	70 - 130	<0.20	ug/L	0.65 (1)	30		
8816410	Chloromethane	2023/07/28	102	60 - 140	102	60 - 140	<5.0	ug/L				
8816410	cis-1,2-Dichloroethylene	2023/07/28	108	70 - 130	104	70 - 130	<0.50	ug/L	NC (1)	30		
8816410	cis-1,3-Dichloropropene	2023/07/28	102	70 - 130	94	70 - 130	<0.30	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8816410	Dibromochloromethane	2023/07/28	99	70 - 130	95	70 - 130	<0.50	ug/L				
8816410	Ethylbenzene	2023/07/28	94	70 - 130	92	70 - 130	<0.20	ug/L	NC (1)	30		
8816410	Ethylene Dibromide	2023/07/28	98	70 - 130	93	70 - 130	<0.19	ug/L				
8816410	Methyl Ethyl Ketone (2-Butanone)	2023/07/28	102	60 - 140	100	60 - 140	<10	ug/L				
8816410	Methyl Isobutyl Ketone	2023/07/28	105	70 - 130	102	70 - 130	<5.0	ug/L				
8816410	Methyl t-butyl ether (MTBE)	2023/07/28	94	70 - 130	92	70 - 130	<0.50	ug/L				
8816410	Methylene Chloride(Dichloromethane)	2023/07/28	105	70 - 130	100	70 - 130	<2.0	ug/L	NC (1)	30		
8816410	o-Xylene	2023/07/28	93	70 - 130	96	70 - 130	<0.20	ug/L	NC (1)	30		
8816410	p+m-Xylene	2023/07/28	100	70 - 130	99	70 - 130	<0.20	ug/L	NC (1)	30		
8816410	Styrene	2023/07/28	111	70 - 130	112	70 - 130	<0.40	ug/L				
8816410	Tetrachloroethylene	2023/07/28	99	70 - 130	96	70 - 130	<0.20	ug/L	NC (1)	30		
8816410	Toluene	2023/07/28	102	70 - 130	99	70 - 130	<0.20	ug/L	NC (1)	30		
8816410	Total Xylenes	2023/07/28					<0.20	ug/L	NC (1)	30		
8816410	trans-1,2-Dichloroethylene	2023/07/28	107	70 - 130	103	70 - 130	<0.50	ug/L				
8816410	trans-1,3-Dichloropropene	2023/07/28	107	70 - 130	95	70 - 130	<0.40	ug/L	NC (1)	30		
8816410	Trichloroethylene	2023/07/28	111	70 - 130	107	70 - 130	<0.20	ug/L	NC (1)	30		
8816410	Trichlorofluoromethane (FREON 11)	2023/07/28	107	70 - 130	103	70 - 130	<0.50	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8816410	Vinyl Chloride	2023/07/28	104	70 - 130	99	70 - 130	<0.20	ug/L				

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Matrix Spike Parent ID [WLR465-04]

(3) Matrix Spike exceeds accaeptance limits, probable matrix interference.

(4) Duplicate Parent ID [WLR465-04]

(5) Matrix Spike Parent ID [WLR465-03]

(6) Duplicate Parent ID [WLR465-03]

(7) TKN < NH4: Both values fall within acceptable RPD limits for duplicates and are likely equivalent.

(8) Matrix Spike Parent ID [WLR465-06]

(9) Duplicate Parent ID [WLR465-06]

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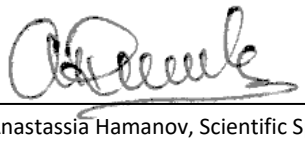
Bureau Veritas Job #: C3L8083
Report Date: 2023/07/31

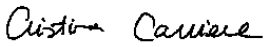
RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BEG

VALIDATION SIGNATURE PAGE

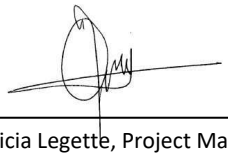
The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist



Cristina Carriere, Senior Scientific Specialist



Patricia Legette, Project Manager

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

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S2437676

BUREAU VERITAS

FIELD INFORMATION FORM

WASTE MANAGEMENT

Site Name: TCEC

Site No.: Sample: PS Holding Tank (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes. Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: (Y) or N

Purging Device:
Sampling Device: D
X-Other:

A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Filter Device: Y or N — 0.45 µ or ____ µ (circle or fill in)

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other: ____

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other: ____

WELL DATA

Well Elevation (at TOC) (ft/msl) — Depth to Water (DTW) (from TOC) (ft) — Groundwater Elevation (GWE) (Site Datum, from TOC) (ft msl)

Total Well Depth (from TOC) (ft) — Stick Up (from ground elevation) (ft) — Casing ID (in) — Casing Material

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
	1"		1"					
	2"		2"					
	3"		3"					
	4"		4"					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE mS/cm @ 25°C	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
071923	7.5	6.81	21.6	117	1.25		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

Sample Appearance: opaque — Odor: moderate — Color: black — Other:

Weather Conditions (required daily, or as conditions change): 25°C — Direction/Speed: 4 km/h SW — Outlook: mostly cloudy — Precipitation: Y or (N)

Specific Comments (including purge/well volume calculations if required):

FIELD COMMENTS

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
07/19/23	Brady Grubbs	[signature]	RWDI

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 06/20

0817

Maxxam Analytics Inc 6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #:		
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285739	CHAIN OF CUSTODY # :
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Unit 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	TCEC-LCHCM-JULY
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x:2984 Fax: 519-823-1316	Project Name:	TCEC-LCHCM-JULY	
Email:	lmertick@wm.com	Email:	Brent.Langille@RWDI.com, JCL@rwdi.com	Location:	Twin Creeks	
				Sampled By:	BEG	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

- [ ] MISA
- [ ] PWQO
- [ ] Reg. 558
- Reg. 153: [ ] Table 1 [ ] Table 2 [ ] Table 3
- Sewer Use: [ ] Sanitary [ ] Storm
- Region: _____
- [x] Other: site specific (specify)

Report Criteria on C of A ? [n]

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ON-WLF-2023 TCLS - LEACHATE (PS HOLDING) MONTHLY	# of Cont.	COMMENTS / TAT COMMENTS
1	PS Holding Tank	19-Jul-23	PM	LCH	N	N	X	9	
2									See lab addendum for analysis.
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
[x] 5 to 7 Working Days

Rush TAT: Rush Confirmation # _____ (call Lab for #)
[ ] 1 day [ ] 2 days [ ] 3 days
DATE Required: 1-Aug-23
TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

21-Jul-23 08:25
Patricia Legette
C3L8083
OK ENV-650

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:
BEG 20-July-23 - PM	ANERI	2023/07/21	08:25

Laboratory Use Only

Temperature (°C) on Receipt	Condition of Sample on Receipt
2/9/2	[ ] OK [ ] SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

on ice
custody seal i present

White: Maxxam Yellow: Mail Pink: Client

Your P.O. #: 12285739
Your Project #: 2303459.01
Site#: 500
Site Location: ON07
Your C.O.C. #: N/A

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/08/21
Report #: R7774750
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3O2576
Received: 2023/08/11, 08:35

Sample Matrix: Leachate
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
ABN Compounds in Water by GC/MS	1	2023/08/16	2023/08/17	CAM SOP-00301	EPA 8270 m
Alkalinity	1	N/A	2023/08/16	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	1	N/A	2023/08/16	CAM SOP-00463	SM 23 4500-Cl E m
Conductance in Water - On-site	1	N/A	2023/08/17		
Field Measured Dissolved Oxygen in Water	1	N/A	2023/08/17		
Total Metals by ICPMS	1	N/A	2023/08/15	CAM SOP-00447	EPA 6020B m
Ammonia-N	1	N/A	2023/08/16	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	1	N/A	2023/08/14	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Field Measured pH (2)	1	N/A	2023/08/17		Field pH Meter
Sulphate by Automated Turbidimetry	1	N/A	2023/08/16	CAM SOP-00464	SM 23 4500-SO42- E m
Field Temperature (2)	1	N/A	2023/08/17		Field Thermometer
Total Kjeldahl Nitrogen in Water	1	2023/08/15	2023/08/17	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	1	2023/08/16	2023/08/18	CAM SOP-00407	SM 23 4500-P I
Turbidity - On-site	1	N/A	2023/08/17		
Un-ionized Ammonia (3)	1	2023/08/11	2023/08/17	Auto Calc.	PWQO
Volatile Organic Compounds in Water	1	N/A	2023/08/14	CAM SOP-00228	EPA 8260D
Non-Routine Volatile Organic Compounds	1	N/A	2023/08/14	CAM SOP-00226	EPA 8260D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the

Your P.O. #: 12285739
Your Project #: 2303459.01
Site#: 500
Site Location: ON07
Your C.O.C. #: N/A

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/08/21
Report #: R7774750
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3O2576
Received: 2023/08/11, 08:35
customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.
(3) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799
==========
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3O2576
Report Date: 2023/08/21

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

RESULTS OF ANALYSES OF LEACHATE

Bureau Veritas ID		WQW017		
Sampling Date		2023/08/09		
COC Number		N/A		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Calculated Parameters				
Total Un-ionized Ammonia	mg/L	5.6	0.046	8847266
Field Measurements				
Field Conductivity	uS/cm	6790	N/A	ONSITE
Field Dissolved Oxygen	mg/L	7.99	N/A	ONSITE
Field Temperature	Celsius	20.3	N/A	ONSITE
Field Turbidity	NTU	128	N/A	ONSITE
Field Measured pH	pH	7.5		ONSITE
Inorganics				
Total Ammonia-N	mg/L	364 (1)	3.0	8851815
Total Kjeldahl Nitrogen (TKN)	mg/L	330 (1)	10	8851552
Total Phosphorus	mg/L	0.99	0.10	8855512
Dissolved Sulphate (SO4)	mg/L	560	2.0	8849629
Alkalinity (Total as CaCO3)	mg/L	2600	5.0	8849286
Dissolved Chloride (Cl-)	mg/L	550	10	8849632
Nitrite (N)	mg/L	<0.010	0.010	8849066
Nitrate (N)	mg/L	<0.10	0.10	8849066

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) TKN < NH4: Both values fall within acceptable RPD limits for duplicates and are likely equivalent.

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Bureau Veritas Job #: C3O2576
Report Date: 2023/08/21

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

ELEMENTS BY ATOMIC SPECTROSCOPY (LEACHATE)

Bureau Veritas ID		WQW017		
Sampling Date		2023/08/09		
COC Number		N/A		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Metals				
Total Aluminum (Al)	mg/L	0.08	0.02	8850798
Total Arsenic (As)	mg/L	0.013	0.001	8850798
Total Barium (Ba)	mg/L	0.14	0.005	8850798
Total Beryllium (Be)	mg/L	<0.0006	0.0006	8850798
Total Bismuth (Bi)	mg/L	<0.001	0.001	8850798
Total Boron (B)	mg/L	6.8	0.1	8850798
Total Cadmium (Cd)	mg/L	<0.0001	0.0001	8850798
Total Calcium (Ca)	mg/L	210	0.2	8850798
Total Chromium (Cr)	mg/L	0.022	0.005	8850798
Total Cobalt (Co)	mg/L	0.0058	0.0005	8850798
Total Copper (Cu)	mg/L	<0.002	0.002	8850798
Total Iron (Fe)	mg/L	3.8	0.1	8850798
Total Lead (Pb)	mg/L	0.0008	0.0005	8850798
Total Magnesium (Mg)	mg/L	210	0.05	8850798
Total Molybdenum (Mo)	mg/L	0.009	0.002	8850798
Total Nickel (Ni)	mg/L	0.045	0.001	8850798
Total Potassium (K)	mg/L	120	0.2	8850798
Total Selenium (Se)	mg/L	<0.005	0.005	8850798
Total Silver (Ag)	mg/L	<0.0004	0.0004	8850798
Total Sodium (Na)	mg/L	550	0.1	8850798
Total Strontium (Sr)	mg/L	2.2	0.003	8850798
Total Tin (Sn)	mg/L	0.004	0.002	8850798
Total Titanium (Ti)	mg/L	0.017	0.005	8850798
Total Vanadium (V)	mg/L	0.005	0.001	8850798
Total Zinc (Zn)	mg/L	0.01	0.01	8850798

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (LEACHATE)

Bureau Veritas ID		WQW017		
Sampling Date		2023/08/09		
COC Number		N/A		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Semivolatile Organics				
Acenaphthene	ug/L	<2.0	2.0	8855321
Acenaphthylene	ug/L	<2.0	2.0	8855321
Anthracene	ug/L	<2.0	2.0	8855321
Benzo(a)anthracene	ug/L	<2.0	2.0	8855321
Benzo(a)pyrene	ug/L	<2.0	2.0	8855321
Benzo(b/j)fluoranthene	ug/L	<2.0	2.0	8855321
Benzo(g,h,i)perylene	ug/L	<2.0	2.0	8855321
Benzo(k)fluoranthene	ug/L	<2.0	2.0	8855321
1-Chloronaphthalene	ug/L	<10	10	8855321
2-Chloronaphthalene	ug/L	<5.0	5.0	8855321
Chrysene	ug/L	<2.0	2.0	8855321
Dibenzo(a,h)anthracene	ug/L	<2.0	2.0	8855321
Fluoranthene	ug/L	<2.0	2.0	8855321
Fluorene	ug/L	<2.0	2.0	8855321
Indeno(1,2,3-cd)pyrene	ug/L	<2.0	2.0	8855321
1-Methylnaphthalene	ug/L	<2.0	2.0	8855321
2-Methylnaphthalene	ug/L	<2.0	2.0	8855321
Naphthalene	ug/L	4.1	2.0	8855321
Perylene	ug/L	<2.0	2.0	8855321
Phenanthrene	ug/L	<2.0	2.0	8855321
Pyrene	ug/L	<2.0	2.0	8855321
1,2-Dichlorobenzene	ug/L	<5.0	5.0	8855321
1,3-Dichlorobenzene	ug/L	<5.0	5.0	8855321
Hexachlorobenzene	ug/L	<5.0	5.0	8855321
Pentachlorobenzene	ug/L	<5.0	5.0	8855321
1,2,3,5-Tetrachlorobenzene	ug/L	<5.0	5.0	8855321
1,2,4,5-Tetrachlorobenzene	ug/L	<5.0	5.0	8855321
1,2,3-Trichlorobenzene	ug/L	<5.0	5.0	8855321
1,2,4-Trichlorobenzene	ug/L	<5.0	5.0	8855321
1,3,5-Trichlorobenzene	ug/L	<5.0	5.0	8855321
2-Chlorophenol	ug/L	<3.0	3.0	8855321
4-Chloro-3-Methylphenol	ug/L	<5.0	5.0	8855321
m/p-Cresol	ug/L	99	5.0	8855321

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (LEACHATE)

Bureau Veritas ID		WQW017		
Sampling Date		2023/08/09		
COC Number		N/A		
	UNITS	PS HOLDING TANK	RDL	QC Batch
o-Cresol	ug/L	<5.0	5.0	8855321
1,2,3,4-Tetrachlorobenzene	ug/L	<5.0	5.0	8855321
2,3-Dichlorophenol	ug/L	<5.0	5.0	8855321
2,4-Dichlorophenol	ug/L	<3.0	3.0	8855321
2,5-Dichlorophenol	ug/L	<5.0	5.0	8855321
2,6-Dichlorophenol	ug/L	<5.0	5.0	8855321
3,4-Dichlorophenol	ug/L	<5.0	5.0	8855321
3,5-Dichlorophenol	ug/L	<5.0	5.0	8855321
2,4-Dimethylphenol	ug/L	<5.0	5.0	8855321
2,4-Dinitrophenol	ug/L	<20	20	8855321
4,6-Dinitro-2-methylphenol	ug/L	<20	20	8855321
2-Nitrophenol	ug/L	<5.0	5.0	8855321
4-Nitrophenol	ug/L	<14	14	8855321
Pentachlorophenol	ug/L	<10	10	8855321
Phenol	ug/L	34	5.0	8855321
2,3,4,5-Tetrachlorophenol	ug/L	<4.0	4.0	8855321
2,3,4,6-Tetrachlorophenol	ug/L	<5.0	5.0	8855321
2,3,5,6-Tetrachlorophenol	ug/L	<5.0	5.0	8855321
2,3,4-Trichlorophenol	ug/L	<5.0	5.0	8855321
2,3,5-Trichlorophenol	ug/L	<5.0	5.0	8855321
2,3,6-Trichlorophenol	ug/L	<5.0	5.0	8855321
2,4,5-Trichlorophenol	ug/L	<5.0	5.0	8855321
2,4,6-Trichlorophenol	ug/L	<5.0	5.0	8855321
3,4,5-Trichlorophenol	ug/L	<5.0	5.0	8855321
Benzyl butyl phthalate	ug/L	<5.0	5.0	8855321
Biphenyl	ug/L	<5.0	5.0	8855321
Bis(2-chloroethyl)ether	ug/L	<5.0	5.0	8855321
Bis(2-chloroethoxy)methane	ug/L	<5.0	5.0	8855321
Bis(2-chloroisopropyl)ether	ug/L	<5.0	5.0	8855321
Bis(2-ethylhexyl)phthalate	ug/L	<20	20	8855321
4-Bromophenyl phenyl ether	ug/L	<3.0	3.0	8855321
p-Chloroaniline	ug/L	<10	10	8855321
4-Chlorophenyl phenyl ether	ug/L	<5.0	5.0	8855321
Di-N-butyl phthalate	ug/L	<20	20	8855321

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (LEACHATE)

Bureau Veritas ID		WQW017		
Sampling Date		2023/08/09		
COC Number		N/A		
	UNITS	**PS HOLDING TANK**	**RDL**	**QC Batch**
di-n-octyl phthalate	ug/L	<8.0	8.0	8855321
2,4-Dinitrotoluene	ug/L	<5.0	5.0	8855321
Diethyl phthalate	ug/L	<10	10	8855321
3,3'-Dichlorobenzidine	ug/L	<5.0	5.0	8855321
Dimethyl phthalate	ug/L	<10	10	8855321
2,6-Dinitrotoluene	ug/L	<5.0	5.0	8855321
Diphenyl Ether	ug/L	<3.0	3.0	8855321
Hexachlorobutadiene	ug/L	<4.0	4.0	8855321
Hexachlorocyclopentadiene	ug/L	<20	20	8855321
Hexachloroethane	ug/L	<5.0	5.0	8855321
Isophorone	ug/L	<5.0	5.0	8855321
Nitrobenzene	ug/L	<5.0	5.0	8855321
Nitrosodiphenylamine/Diphenylamine	ug/L	<10	10	8855321
N-Nitroso-di-n-propylamine	ug/L	<5.0	5.0	8855321
Surrogate Recovery (%)				
2,4,6-Tribromophenol	%	85		8855321
2-Fluorobiphenyl	%	70		8855321
2-Fluorophenol	%	39		8855321
D14-Terphenyl	%	84		8855321
D5-Nitrobenzene	%	80		8855321
D5-Phenol	%	26		8855321

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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VOLATILE ORGANICS BY GC/MS (LEACHATE)

Bureau Veritas ID		WQW017		
Sampling Date		2023/08/09		
COC Number		N/A		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Volatile Organics				
Acetone (2-Propanone)	ug/L	1300	10	8849378
Benzene	ug/L	2.4	0.20	8849378
Bromodichloromethane	ug/L	<0.50	0.50	8849378
Bromoform	ug/L	<1.0	1.0	8849378
Bromomethane	ug/L	<0.50	0.50	8849378
Carbon Tetrachloride	ug/L	<0.19	0.19	8849378
Chlorobenzene	ug/L	1.5	0.20	8849378
Chloroethane	ug/L	<1.0	1.0	8849378
Chloroform	ug/L	<0.20	0.20	8849378
Chloromethane	ug/L	<5.0	5.0	8849378
Dibromochloromethane	ug/L	<0.50	0.50	8849378
1,2-Dichlorobenzene	ug/L	<0.40	0.40	8849378
1,3-Dichlorobenzene	ug/L	<0.40	0.40	8849378
1,4-Dichlorobenzene	ug/L	1.2	0.40	8849378
1,1-Dichloroethane	ug/L	0.24	0.20	8849378
1,2-Dichloroethane	ug/L	0.85	0.49	8849378
1,1-Dichloroethylene	ug/L	<0.20	0.20	8849378
cis-1,2-Dichloroethylene	ug/L	0.73	0.50	8849378
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	8849378
1,2-Dichloropropane	ug/L	<0.20	0.20	8849378
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	8849378
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	8849378
Ethylbenzene	ug/L	11	0.20	8849378
Ethylene Dibromide	ug/L	<0.19	0.19	8849378
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	8849378
Methyl Ethyl Ketone (2-Butanone)	ug/L	1400	10	8849378
Methyl Isobutyl Ketone	ug/L	19	5.0	8849378
Methyl t-butyl ether (MTBE)	ug/L	0.59	0.50	8849378
Styrene	ug/L	<0.60 (1)	0.60	8849378
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	8849378
1,1,2,2-Tetrachloroethane	ug/L	<0.40	0.40	8849378
Tetrachloroethylene	ug/L	<0.20	0.20	8849378

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Detection limit was raised due to matrix interference.

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VOLATILE ORGANICS BY GC/MS (LEACHATE)

Bureau Veritas ID		WQW017		
Sampling Date		2023/08/09		
COC Number		N/A		
	UNITS	**PS HOLDING TANK**	**RDL**	**QC Batch**
1,3,5-Trimethylbenzene	ug/L	<4.0	4.0	8847059
Toluene	ug/L	9.1	0.20	8849378
1,1,1-Trichloroethane	ug/L	<0.20	0.20	8849378
1,1,2-Trichloroethane	ug/L	<0.40	0.40	8849378
Trichloroethylene	ug/L	<0.20	0.20	8849378
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	8849378
Vinyl Chloride	ug/L	0.24	0.20	8849378
p+m-Xylene	ug/L	18	0.20	8849378
o-Xylene	ug/L	7.7	0.20	8849378
Total Xylenes	ug/L	26	0.20	8849378
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	108		8849378
D4-1,2-Dichloroethane	%	98		8849378
D8-Toluene	%	96		8849378
4-Bromofluorobenzene	%	98		8847059
D4-1,2-Dichloroethane	%	101		8847059
D8-Toluene	%	101		8847059

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.0°C

Sample WQW017 [PS HOLDING TANK] : VOC Water Analysis: Due to foaming, sample required dilution. The detection limits were adjusted accordingly.

ABN Analysis: Due to the sample matrix, a smaller than usual portion of the sample was used for extraction. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8847059	4-Bromofluorobenzene	2023/08/14	98	70 - 130	100	70 - 130	`100	%				
8847059	D4-1,2-Dichloroethane	2023/08/14	109	70 - 130	98	70 - 130	98	%				
8847059	D8-Toluene	2023/08/14	97	70 - 130	99	70 - 130	102	%				
8849378	4-Bromofluorobenzene	2023/08/14	107	70 - 130	107	70 - 130	105	%				
8849378	D4-1,2-Dichloroethane	2023/08/14	107	70 - 130	98	70 - 130	96	%				
8849378	D8-Toluene	2023/08/14	94	70 - 130	97	70 - 130	98	%				
8855321	2,4,6-Tribromophenol	2023/08/16	83	10 - 130	75	10 - 130	81	%				
8855321	2-Fluorobiphenyl	2023/08/16	69	30 - 130	61	30 - 130	74	%				
8855321	2-Fluorophenol	2023/08/16	39	10 - 130	40	10 - 130	43	%				
8855321	D14-Terphenyl	2023/08/16	80	30 - 130	75	30 - 130	86	%				
8855321	D5-Nitrobenzene	2023/08/16	77	30 - 130	72	30 - 130	87	%				
8855321	D5-Phenol	2023/08/16	26	10 - 130	27	10 - 130	28	%				
8847059	1,3,5-Trimethylbenzene	2023/08/14	77	60 - 140	105	60 - 140	<0.20	ug/L				
8849066	Nitrate (N)	2023/08/14	102	80 - 120	105	80 - 120	<0.10	mg/L	6.0 (1)	20		
8849066	Nitrite (N)	2023/08/14	105	80 - 120	104	80 - 120	<0.010	mg/L				
8849286	Alkalinity (Total as CaCO3)	2023/08/15			96	85 - 115	<1.0	mg/L	2.3 (1)	20		
8849378	1,1,1,2-Tetrachloroethane	2023/08/14	95	70 - 130	90	70 - 130	<0.50	ug/L	NC (1)	30		
8849378	1,1,1-Trichloroethane	2023/08/14	94	70 - 130	93	70 - 130	<0.20	ug/L	NC (1)	30		
8849378	1,1,2,2-Tetrachloroethane	2023/08/14	104	70 - 130	88	70 - 130	<0.40	ug/L	NC (1)	30		
8849378	1,1,2-Trichloroethane	2023/08/14	105	70 - 130	93	70 - 130	<0.40	ug/L	NC (1)	30		
8849378	1,1-Dichloroethane	2023/08/14	88	70 - 130	83	70 - 130	<0.20	ug/L	NC (1)	30		
8849378	1,1-Dichloroethylene	2023/08/14	91	70 - 130	88	70 - 130	<0.20	ug/L	NC (1)	30		
8849378	1,2-Dichlorobenzene	2023/08/14	94	70 - 130	88	70 - 130	<0.40	ug/L	NC (1)	30		
8849378	1,2-Dichloroethane	2023/08/14	97	70 - 130	84	70 - 130	<0.49	ug/L	NC (1)	30		
8849378	1,2-Dichloropropane	2023/08/14	94	70 - 130	86	70 - 130	<0.20	ug/L	NC (1)	30		
8849378	1,3-Dichlorobenzene	2023/08/14	92	70 - 130	87	70 - 130	<0.40	ug/L	NC (1)	30		
8849378	1,4-Dichlorobenzene	2023/08/14	106	70 - 130	101	70 - 130	<0.40	ug/L	NC (1)	30		
8849378	Acetone (2-Propanone)	2023/08/14	103	60 - 140	87	60 - 140	<10	ug/L	NC (1)	30		
8849378	Benzene	2023/08/14	88	70 - 130	84	70 - 130	<0.20	ug/L	NC (1)	30		
8849378	Bromodichloromethane	2023/08/14	104	70 - 130	93	70 - 130	<0.50	ug/L	NC (1)	30		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8849378	Bromoform	2023/08/14	103	70 - 130	89	70 - 130	<1.0	ug/L	NC (1)	30		
8849378	Bromomethane	2023/08/14	101	60 - 140	93	60 - 140	<0.50	ug/L	NC (1)	30		
8849378	Carbon Tetrachloride	2023/08/14	91	70 - 130	90	70 - 130	<0.19	ug/L	NC (1)	30		
8849378	Chlorobenzene	2023/08/14	94	70 - 130	89	70 - 130	<0.20	ug/L	NC (1)	30		
8849378	Chloroethane	2023/08/14	95	70 - 130	91	70 - 130	<1.0	ug/L				
8849378	Chloroform	2023/08/14	97	70 - 130	90	70 - 130	<0.20	ug/L	NC (1)	30		
8849378	Chloromethane	2023/08/14	93	60 - 140	84	60 - 140	<5.0	ug/L				
8849378	cis-1,2-Dichloroethylene	2023/08/14	98	70 - 130	89	70 - 130	<0.50	ug/L	NC (1)	30		
8849378	cis-1,3-Dichloropropene	2023/08/14	101	70 - 130	90	70 - 130	<0.30	ug/L	NC (1)	30		
8849378	Dibromochloromethane	2023/08/14	96	70 - 130	85	70 - 130	<0.50	ug/L	NC (1)	30		
8849378	Ethylbenzene	2023/08/14	83	70 - 130	83	70 - 130	<0.20	ug/L	NC (1)	30		
8849378	Ethylene Dibromide	2023/08/14	95	70 - 130	83	70 - 130	<0.19	ug/L	NC (1)	30		
8849378	Methyl Ethyl Ketone (2-Butanone)	2023/08/14	115	60 - 140	95	60 - 140	<10	ug/L	NC (1)	30		
8849378	Methyl Isobutyl Ketone	2023/08/14	110	70 - 130	91	70 - 130	<5.0	ug/L	NC (1)	30		
8849378	Methyl t-butyl ether (MTBE)	2023/08/14	90	70 - 130	83	70 - 130	<0.50	ug/L	NC (1)	30		
8849378	Methylene Chloride(Dichloromethane)	2023/08/14	94	70 - 130	83	70 - 130	<2.0	ug/L	NC (1)	30		
8849378	o-Xylene	2023/08/14	86	70 - 130	85	70 - 130	<0.20	ug/L	NC (1)	30		
8849378	p+m-Xylene	2023/08/14	89	70 - 130	89	70 - 130	<0.20	ug/L	NC (1)	30		
8849378	Styrene	2023/08/14	99	70 - 130	95	70 - 130	<0.40	ug/L	NC (1)	30		
8849378	Tetrachloroethylene	2023/08/14	80	70 - 130	80	70 - 130	<0.20	ug/L	NC (1)	30		
8849378	Toluene	2023/08/14	83	70 - 130	81	70 - 130	<0.20	ug/L	NC (1)	30		
8849378	Total Xylenes	2023/08/14					<0.20	ug/L	NC (1)	30		
8849378	trans-1,2-Dichloroethylene	2023/08/14	93	70 - 130	88	70 - 130	<0.50	ug/L	NC (1)	30		
8849378	trans-1,3-Dichloropropene	2023/08/14	94	70 - 130	84	70 - 130	<0.40	ug/L	NC (1)	30		
8849378	Trichloroethylene	2023/08/14	97	70 - 130	94	70 - 130	<0.20	ug/L	NC (1)	30		
8849378	Trichlorofluoromethane (FREON 11)	2023/08/14	99	70 - 130	97	70 - 130	<0.50	ug/L	NC (1)	30		
8849378	Vinyl Chloride	2023/08/14	92	70 - 130	89	70 - 130	<0.20	ug/L	NC (1)	30		
8849629	Dissolved Sulphate (SO4)	2023/08/16	96	75 - 125	101	80 - 120	<1.0	mg/L	0.69 (1)	20		
8849632	Dissolved Chloride (Cl-)	2023/08/16	94	80 - 120	98	80 - 120	<1.0	mg/L	NC (1)	20		
8850798	Total Aluminum (Al)	2023/08/15	100	80 - 120	103	80 - 120	<0.02	mg/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8850798	Total Arsenic (As)	2023/08/15	101	80 - 120	103	80 - 120	<0.001	mg/L				
8850798	Total Barium (Ba)	2023/08/15	97	80 - 120	100	80 - 120	<0.005	mg/L				
8850798	Total Beryllium (Be)	2023/08/15	99	80 - 120	103	80 - 120	<0.0006	mg/L				
8850798	Total Bismuth (Bi)	2023/08/15	87	80 - 120	94	80 - 120	<0.001	mg/L				
8850798	Total Boron (B)	2023/08/15	95	80 - 120	97	80 - 120	<0.02	mg/L				
8850798	Total Cadmium (Cd)	2023/08/15	100	80 - 120	103	80 - 120	<0.0001	mg/L				
8850798	Total Calcium (Ca)	2023/08/15	NC	80 - 120	100	80 - 120	<0.2	mg/L				
8850798	Total Chromium (Cr)	2023/08/15	100	80 - 120	104	80 - 120	<0.005	mg/L	2.2 (1)	20		
8850798	Total Cobalt (Co)	2023/08/15	99	80 - 120	104	80 - 120	<0.0005	mg/L				
8850798	Total Copper (Cu)	2023/08/15	104	80 - 120	101	80 - 120	<0.002	mg/L	1.1 (1)	20		
8850798	Total Iron (Fe)	2023/08/15	99	80 - 120	103	80 - 120	<0.1	mg/L				
8850798	Total Lead (Pb)	2023/08/15	92	80 - 120	99	80 - 120	<0.0005	mg/L				
8850798	Total Magnesium (Mg)	2023/08/15	NC	80 - 120	101	80 - 120	<0.05	mg/L				
8850798	Total Molybdenum (Mo)	2023/08/15	111	80 - 120	108	80 - 120	<0.002	mg/L				
8850798	Total Nickel (Ni)	2023/08/15	98	80 - 120	99	80 - 120	<0.001	mg/L	1.6 (1)	20		
8850798	Total Potassium (K)	2023/08/15	104	80 - 120	102	80 - 120	<0.2	mg/L				
8850798	Total Selenium (Se)	2023/08/15	104	80 - 120	107	80 - 120	<0.005	mg/L				
8850798	Total Silver (Ag)	2023/08/15	97	80 - 120	101	80 - 120	<0.0004	mg/L				
8850798	Total Sodium (Na)	2023/08/15	NC	80 - 120	104	80 - 120	<0.1	mg/L				
8850798	Total Strontium (Sr)	2023/08/15	NC	80 - 120	97	80 - 120	<0.003	mg/L				
8850798	Total Tin (Sn)	2023/08/15	104	80 - 120	102	80 - 120	<0.002	mg/L				
8850798	Total Titanium (Ti)	2023/08/15	99	80 - 120	98	80 - 120	<0.005	mg/L				
8850798	Total Vanadium (V)	2023/08/15	98	80 - 120	99	80 - 120	<0.001	mg/L				
8850798	Total Zinc (Zn)	2023/08/15	99	80 - 120	105	80 - 120	<0.01	mg/L	0.56 (1)	20		
8851552	Total Kjeldahl Nitrogen (TKN)	2023/08/16	NC	80 - 120	102	80 - 120	<0.7	mg/L	1.6 (1)	20	100	80 - 120
8851815	Total Ammonia-N	2023/08/16	102	75 - 125	104	80 - 120	<0.15	mg/L	NC (1)	20		
8855321	1,2,3,4-Tetrachlorobenzene	2023/08/16	57	30 - 130	42	30 - 130	<0.50	ug/L				
8855321	1,2,3,5-Tetrachlorobenzene	2023/08/16	55	30 - 130	35	30 - 130	<0.50	ug/L				
8855321	1,2,3-Trichlorobenzene	2023/08/16	50	30 - 130	42	30 - 130	<0.50	ug/L				
8855321	1,2,4,5-Tetrachlorobenzene	2023/08/16	51	30 - 130	38	30 - 130	<0.50	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8855321	1,2,4-Trichlorobenzene	2023/08/16	50	30 - 130	39	30 - 130	<0.50	ug/L				
8855321	1,2-Dichlorobenzene	2023/08/16	47	30 - 130	41	30 - 130	<0.50	ug/L				
8855321	1,3,5-Trichlorobenzene	2023/08/16	56	30 - 130	52	30 - 130	<0.50	ug/L				
8855321	1,3-Dichlorobenzene	2023/08/16	41	30 - 130	35	30 - 130	<0.50	ug/L				
8855321	1-Chloronaphthalene	2023/08/16	63	30 - 130	55	30 - 130	<1.0	ug/L				
8855321	1-Methylnaphthalene	2023/08/16	73	30 - 130	67	30 - 130	<0.20	ug/L				
8855321	2,3,4,5-Tetrachlorophenol	2023/08/16	89	10 - 130	85	10 - 130	<0.40	ug/L				
8855321	2,3,4,6-Tetrachlorophenol	2023/08/16	102	10 - 130	93	10 - 130	<0.50	ug/L				
8855321	2,3,4-Trichlorophenol	2023/08/16	86	10 - 130	75	10 - 130	<0.50	ug/L				
8855321	2,3,5,6-Tetrachlorophenol	2023/08/16	93	10 - 130	81	10 - 130	<0.50	ug/L				
8855321	2,3,5-Trichlorophenol	2023/08/16	97	10 - 130	89	10 - 130	<0.50	ug/L				
8855321	2,3,6-Trichlorophenol	2023/08/16	84	10 - 130	76	10 - 130	<0.50	ug/L				
8855321	2,3-Dichlorophenol	2023/08/16	81	10 - 130	75	10 - 130	<0.50	ug/L				
8855321	2,4,5-Trichlorophenol	2023/08/16	88	10 - 130	78	10 - 130	<0.50	ug/L				
8855321	2,4,6-Trichlorophenol	2023/08/16	90	10 - 130	82	10 - 130	<0.50	ug/L				
8855321	2,4-Dichlorophenol	2023/08/16	83	10 - 130	75	10 - 130	<0.30	ug/L	NC (1)	40		
8855321	2,4-Dimethylphenol	2023/08/16	79	10 - 130	73	10 - 130	<0.50	ug/L				
8855321	2,4-Dinitrophenol	2023/08/16	82	10 - 130	66	10 - 130	<2.0	ug/L				
8855321	2,4-Dinitrotoluene	2023/08/16	98	30 - 130	87	30 - 130	<0.50	ug/L				
8855321	2,5-Dichlorophenol	2023/08/16	89	10 - 130	83	10 - 130	<0.50	ug/L				
8855321	2,6-Dichlorophenol	2023/08/16	84	10 - 130	79	10 - 130	<0.50	ug/L				
8855321	2,6-Dinitrotoluene	2023/08/16	88	30 - 130	82	30 - 130	<0.50	ug/L				
8855321	2-Chloronaphthalene	2023/08/16	78	30 - 130	67	30 - 130	<0.50	ug/L				
8855321	2-Chlorophenol	2023/08/16	78	10 - 130	74	10 - 130	<0.30	ug/L				
8855321	2-Methylnaphthalene	2023/08/16	73	30 - 130	66	30 - 130	<0.20	ug/L				
8855321	2-Nitrophenol	2023/08/16	89	10 - 130	86	10 - 130	<0.50	ug/L				
8855321	3,3'-Dichlorobenzidine	2023/08/16	89	30 - 130	85	30 - 130	<0.50	ug/L				
8855321	3,4,5-Trichlorophenol	2023/08/16	94	10 - 130	80	10 - 130	<0.50	ug/L				
8855321	3,4-Dichlorophenol	2023/08/16	88	10 - 130	76	10 - 130	<0.50	ug/L				
8855321	3,5-Dichlorophenol	2023/08/16	93	10 - 130	82	10 - 130	<0.50	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8855321	4,6-Dinitro-2-methylphenol	2023/08/16	98	10 - 130	94	10 - 130	<2.0	ug/L				
8855321	4-Bromophenyl phenyl ether	2023/08/16	83	30 - 130	74	30 - 130	<0.30	ug/L				
8855321	4-Chloro-3-Methylphenol	2023/08/16	83	10 - 130	78	10 - 130	<0.50	ug/L				
8855321	4-Chlorophenyl phenyl ether	2023/08/16	84	30 - 130	72	30 - 130	<0.50	ug/L				
8855321	4-Nitrophenol	2023/08/16	24	10 - 130	25	10 - 130	<1.4	ug/L				
8855321	Acenaphthene	2023/08/16	74	30 - 130	68	30 - 130	<0.20	ug/L				
8855321	Acenaphthylene	2023/08/16	74	30 - 130	67	30 - 130	<0.20	ug/L				
8855321	Anthracene	2023/08/16	81	30 - 130	76	30 - 130	<0.20	ug/L				
8855321	Benzo(a)anthracene	2023/08/16	84	30 - 130	78	30 - 130	<0.20	ug/L				
8855321	Benzo(a)pyrene	2023/08/16	89	30 - 130	89	30 - 130	<0.20	ug/L				
8855321	Benzo(b/j)fluoranthene	2023/08/16	82	30 - 130	78	30 - 130	<0.20	ug/L				
8855321	Benzo(g,h,i)perylene	2023/08/16	77	30 - 130	71	30 - 130	<0.20	ug/L				
8855321	Benzo(k)fluoranthene	2023/08/16	91	30 - 130	81	30 - 130	<0.20	ug/L				
8855321	Benzyl butyl phthalate	2023/08/16	83	30 - 130	77	30 - 130	<0.50	ug/L	NC (1)	40		
8855321	Biphenyl	2023/08/16	72	30 - 130	65	30 - 130	<0.50	ug/L				
8855321	Bis(2-chloroethoxy)methane	2023/08/16	77	30 - 130	71	30 - 130	<0.50	ug/L	NC (1)	40		
8855321	Bis(2-chloroethyl)ether	2023/08/16	74	30 - 130	71	30 - 130	<0.50	ug/L				
8855321	Bis(2-chloroisopropyl)ether	2023/08/16	66	30 - 130	61	30 - 130	<0.50	ug/L				
8855321	Bis(2-ethylhexyl)phthalate	2023/08/16	85	30 - 130	80	30 - 130	<2.0	ug/L				
8855321	Chrysene	2023/08/16	86	30 - 130	80	30 - 130	<0.20	ug/L				
8855321	Dibenzo(a,h)anthracene	2023/08/16	80	30 - 130	74	30 - 130	<0.20	ug/L				
8855321	Diethyl phthalate	2023/08/16	84	30 - 130	76	30 - 130	<1.0	ug/L	NC (1)	40		
8855321	Dimethyl phthalate	2023/08/16	90	30 - 130	79	30 - 130	<1.0	ug/L				
8855321	Di-N-butyl phthalate	2023/08/16	87	30 - 130	81	30 - 130	<2.0	ug/L				
8855321	di-n-octyl phthalate	2023/08/16	82	30 - 130	73	30 - 130	<0.80	ug/L	NC (1)	40		
8855321	Diphenyl Ether	2023/08/16	66	30 - 130	58	30 - 130	<0.30	ug/L				
8855321	Fluoranthene	2023/08/16	87	30 - 130	82	30 - 130	<0.20	ug/L				
8855321	Fluorene	2023/08/16	87	30 - 130	75	30 - 130	<0.20	ug/L				
8855321	Hexachlorobenzene	2023/08/16	87	30 - 130	79	30 - 130	<0.50	ug/L				
8855321	Hexachlorobutadiene	2023/08/16	53	30 - 130	38	30 - 130	<0.40	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8855321	Hexachlorocyclopentadiene	2023/08/16	82	30 - 130	47	30 - 130	<2.0	ug/L				
8855321	Hexachloroethane	2023/08/16	50	30 - 130	40	30 - 130	<0.50	ug/L				
8855321	Indeno(1,2,3-cd)pyrene	2023/08/16	78	30 - 130	73	30 - 130	<0.20	ug/L				
8855321	Isophorone	2023/08/16	70	30 - 130	65	30 - 130	<0.50	ug/L				
8855321	m/p-Cresol	2023/08/16	62	10 - 130	60	10 - 130	<0.50	ug/L				
8855321	Naphthalene	2023/08/16	70	30 - 130	61	30 - 130	<0.20	ug/L				
8855321	Nitrobenzene	2023/08/16	78	30 - 130	73	30 - 130	<0.50	ug/L				
8855321	Nitrosodiphenylamine/Diphenylamine	2023/08/16	69	30 - 130	64	30 - 130	<1.0	ug/L				
8855321	N-Nitroso-di-n-propylamine	2023/08/16	76	30 - 130	71	30 - 130	<0.50	ug/L				
8855321	o-Cresol	2023/08/16	71	10 - 130	69	10 - 130	<0.50	ug/L				
8855321	p-Chloroaniline	2023/08/16	89	30 - 130	88	30 - 130	<1.0	ug/L				
8855321	Pentachlorobenzene	2023/08/16	65	30 - 130	49	30 - 130	<0.50	ug/L				
8855321	Pentachlorophenol	2023/08/16	84	10 - 130	74	10 - 130	<1.0	ug/L				
8855321	Perylene	2023/08/16	85	30 - 130	76	30 - 130	<0.20	ug/L				
8855321	Phenanthrene	2023/08/16	81	30 - 130	74	30 - 130	<0.20	ug/L				
8855321	Phenol	2023/08/16	31	10 - 130	30	10 - 130	<0.50	ug/L				
8855321	Pyrene	2023/08/16	76	30 - 130	69	30 - 130	<0.20	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8855512	Total Phosphorus	2023/08/18	92 (2)	80 - 120	99	80 - 120	<0.030	mg/L	0.14 (3)	25	97	80 - 120

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Matrix Spike Parent ID [WQW017-04]

(3) Duplicate Parent ID [WQW017-04]

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Bureau Veritas Job #: C3O2576
Report Date: 2023/08/21

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere, Senior Scientific Specialist

Patricia Legette, Project Manager

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

S2437676

FIELD INFORMATION FORM

BUREAU VERITAS

WASTE MANAGEMENT

Site Name: TCEC

Site No.: Sample: Holding Tank (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes, Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: (Y) or N — Filter Device: Y or N — 0.45 µ or ____ µ (circle or fill in)

Purging Device: ____ A-Submersible Pump B-Peristaltic Pump C-QED Bladder Pump D-Bailer E-Piston Pump F-Dipper/Bottle — Filter Type: ____ A-In-line Disposable B-Pressure C-Vacuum X-Other: ____

Sampling Device: D

X-Other: ____ — Sample Tube Type: ____ A-Teflon B-Stainless Steel C-PVC D-Polypropylene X-Other: ____

WELL DATA

Well Elevation (at TOC) ____ (ft/msl) — Depth to Water (DTW) (from TOC) ____ (ft) — Groundwater Elevation (GWE) (Site Datum, from TOC) ____ (ft msl)

Total Well Depth (from TOC) ____ (ft) — Stick Up (from ground elevation) ____ (ft) — Casing ID ____ (in) — Casing Material ____

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
1st		1st	1st					
2nd		2nd	2nd					
3rd		3rd	3rd					
4th		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	MS CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
080923	7.5 @	6.79	20.3	128	7.99		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

Sample Appearance: translucent — Odor: leachate — Color: black — Other: ____

Weather Conditions (required daily, or as conditions change): 27°C — Direction/Speed: SW 6km/h — Outlook: clear — Precipitation: Y or (N)

Specific Comments (including purge/well volume calculations if required): ____

FIELD COMMENTS

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
08/09/23	Brady Gross	Brady Gross	RWDI

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 06/20

0841

IMMEDIATE

Maxxam Analytics Inc 6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #		
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285739	
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Unit 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	CHAIN OF CUSTODY # :
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x:2984 Fax: 519-823-1316	Project Name:	TCEC-LCHCM-AUGUST	CEC-LCHCM-AUGUS
Email:	lmertick@wm.com	Email:	Brent.Langille@RWDI.com, JCL@rwdi.cor	Location:	Twin Creeks	
				Sampled By:	BEG	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

☐ MISA ☐ PWQO ☐ Reg. 558
Reg. 153: ☐ Table 1 ☐ Table 2 ☐ Table 3
Sewer Use: ☐ Sanitary ☐ Storm Region: _____
☒ Other: site specific (specify)
Report Criteria on C of A ? n

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ON-WLF-2023 TCLS - LEACHATE (PS HOLDING) MONTHLY	# of Cont.	COMMENTS / TAT COMMENTS
1	PS Holding Tank	9-Aug-23	PM	LCH	N	N	X	9	
2									See lab addendum for analysis.
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									CS intact

11-Aug-23 08:35
Patricia Legette
C302576
ATV ENV 1565

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
☒ 5 to 7 Working Days

Rush TAT: Rush Confirmation # _____ (call Lab for #)
☐ 1 day ☐ 2 days ☐ 3 days
DATE Required: 21-Aug-23
TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:
BEG 10-August-23 - AM	[signature]	2023/08/11	08:35

Laboratory Use Only

Temperature (°C) on Receipt	Condition of Sample on Receipt
7/7/7	☐ OK ☐ SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

White: Maxxam Yellow: Mail Pink: Client

Your P.O. #: 12285739
Your Project #: 2303459.01
Site#: 500
Site Location: ON07
Your C.O.C. #: N/A

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/09/18
Report #: R7819743
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3R6138
Received: 2023/09/08, 10:04

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
ABN Compounds in Water by GC/MS	1	2023/09/12	2023/09/13	CAM SOP-00301	EPA 8270 m
Alkalinity	1	N/A	2023/09/12	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	1	N/A	2023/09/12	CAM SOP-00463	SM 23 4500-Cl E m
Conductance in Water - On-site	1	N/A	2023/09/15		
Field Measured Dissolved Oxygen in Water	1	N/A	2023/09/15		
Total Metals by ICPMS	1	N/A	2023/09/16	CAM SOP-00447	EPA 6020B m
Ammonia-N	1	N/A	2023/09/13	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	1	N/A	2023/09/13	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Field Measured pH (2)	1	N/A	2023/09/15		Field pH Meter
Sulphate by Automated Turbidimetry	1	N/A	2023/09/12	CAM SOP-00464	SM 23 4500-SO42- E m
Field Temperature (2)	1	N/A	2023/09/15		Field Thermometer
Total Kjeldahl Nitrogen in Water	1	2023/09/12	2023/09/14	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	1	2023/09/12	2023/09/13	CAM SOP-00407	SM 23 4500-P I
Turbidity - On-site	1	N/A	2023/09/15		
Un-ionized Ammonia (3)	1	2023/09/11	2023/09/15	Auto Calc.	PWQO
Volatile Organic Compounds in Water	1	N/A	2023/09/13	CAM SOP-00228	EPA 8260D
Non-Routine Volatile Organic Compounds	1	N/A	2023/09/15	CAM SOP-00226	EPA 8260D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the

Your P.O. #: 12285739
Your Project #: 2303459.01
Site#: 500
Site Location: ON07
Your C.O.C. #: N/A

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/09/18
Report #: R7819743
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3R6138
Received: 2023/09/08, 10:04
customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.
(3) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799
==========
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3R6138
Report Date: 2023/09/18

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		WYA368		
Sampling Date		2023/09/06		
COC Number		N/A		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Calculated Parameters				
Total Un-ionized Ammonia	mg/L	1.4	0.02	8908036
Field Measurements				
Field Conductivity	uS/cm	5200	N/A	ONSITE
Field Dissolved Oxygen	mg/L	0.55	N/A	ONSITE
Field Temperature	Celsius	20.7	N/A	ONSITE
Field Turbidity	NTU	271	N/A	ONSITE
Field Measured pH	pH	7.12		ONSITE
Inorganics				
Total Ammonia-N	mg/L	203	3.0	8908946
Total Kjeldahl Nitrogen (TKN)	mg/L	200	5	8905787
Total Phosphorus	mg/L	0.59	0.030	8905814
Dissolved Sulphate (SO4)	mg/L	380	1.0	8909607
Alkalinity (Total as CaCO3)	mg/L	1600	1.0	8909580
Dissolved Chloride (Cl-)	mg/L	370	3.0	8909604
Nitrite (N)	mg/L	<0.010	0.010	8909587
Nitrate (N)	mg/L	<0.10	0.10	8909587

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Bureau Veritas Job #: C3R6138
Report Date: 2023/09/18

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		WYA368		
Sampling Date		2023/09/06		
COC Number		N/A		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Metals				
Total Aluminum (Al)	mg/L	0.37	0.02	8915971
Total Arsenic (As)	mg/L	0.009	0.001	8915971
Total Barium (Ba)	mg/L	0.11	0.005	8915971
Total Beryllium (Be)	mg/L	<0.0006	0.0006	8915971
Total Bismuth (Bi)	mg/L	<0.001	0.001	8915971
Total Boron (B)	mg/L	5.5	0.2	8915971
Total Cadmium (Cd)	mg/L	<0.0001	0.0001	8915971
Total Calcium (Ca)	mg/L	160	0.2	8915971
Total Chromium (Cr)	mg/L	0.017	0.005	8915971
Total Cobalt (Co)	mg/L	0.0033	0.0005	8915971
Total Copper (Cu)	mg/L	<0.002	0.002	8915971
Total Iron (Fe)	mg/L	2.9	0.1	8915971
Total Lead (Pb)	mg/L	0.0007	0.0005	8915971
Total Magnesium (Mg)	mg/L	120	0.05	8915971
Total Molybdenum (Mo)	mg/L	0.007	0.002	8915971
Total Nickel (Ni)	mg/L	0.030	0.001	8915971
Total Potassium (K)	mg/L	71	0.2	8915971
Total Selenium (Se)	mg/L	<0.005	0.005	8915971
Total Silver (Ag)	mg/L	<0.0004	0.0004	8915971
Total Sodium (Na)	mg/L	340	0.1	8915971
Total Strontium (Sr)	mg/L	1.4	0.003	8915971
Total Tin (Sn)	mg/L	<0.002	0.002	8915971
Total Titanium (Ti)	mg/L	0.018	0.005	8915971
Total Vanadium (V)	mg/L	0.005	0.001	8915971
Total Zinc (Zn)	mg/L	<0.01	0.01	8915971

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		WYA368		
Sampling Date		2023/09/06		
COC Number		N/A		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Semivolatile Organics				
Acenaphthene	ug/L	<2.0	2.0	8911618
Acenaphthylene	ug/L	<2.0	2.0	8911618
Anthracene	ug/L	<2.0	2.0	8911618
Benzo(a)anthracene	ug/L	<2.0	2.0	8911618
Benzo(a)pyrene	ug/L	<2.0	2.0	8911618
Benzo(b/j)fluoranthene	ug/L	<2.0	2.0	8911618
Benzo(g,h,i)perylene	ug/L	<2.0	2.0	8911618
Benzo(k)fluoranthene	ug/L	<2.0	2.0	8911618
1-Chloronaphthalene	ug/L	<10	10	8911618
2-Chloronaphthalene	ug/L	<5.0	5.0	8911618
Chrysene	ug/L	<2.0	2.0	8911618
Dibenzo(a,h)anthracene	ug/L	<2.0	2.0	8911618
Fluoranthene	ug/L	<2.0	2.0	8911618
Fluorene	ug/L	<2.0	2.0	8911618
Indeno(1,2,3-cd)pyrene	ug/L	<2.0	2.0	8911618
1-Methylnaphthalene	ug/L	<2.0	2.0	8911618
2-Methylnaphthalene	ug/L	<2.0	2.0	8911618
Naphthalene	ug/L	2.8	2.0	8911618
Perylene	ug/L	<2.0	2.0	8911618
Phenanthrene	ug/L	<2.0	2.0	8911618
Pyrene	ug/L	<2.0	2.0	8911618
1,2-Dichlorobenzene	ug/L	<5.0	5.0	8911618
1,3-Dichlorobenzene	ug/L	<5.0	5.0	8911618
Hexachlorobenzene	ug/L	<5.0	5.0	8911618
Pentachlorobenzene	ug/L	<5.0	5.0	8911618
1,2,3,5-Tetrachlorobenzene	ug/L	<5.0	5.0	8911618
1,2,4,5-Tetrachlorobenzene	ug/L	<5.0	5.0	8911618
1,2,3-Trichlorobenzene	ug/L	<5.0	5.0	8911618
1,2,4-Trichlorobenzene	ug/L	<5.0	5.0	8911618
1,3,5-Trichlorobenzene	ug/L	<5.0	5.0	8911618
2-Chlorophenol	ug/L	<3.0	3.0	8911618
4-Chloro-3-Methylphenol	ug/L	<5.0	5.0	8911618
m/p-Cresol	ug/L	77	5.0	8911618

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		WYA368		
Sampling Date		2023/09/06		
COC Number		N/A		
	UNITS	PS HOLDING TANK	RDL	QC Batch
o-Cresol	ug/L	<5.0	5.0	8911618
1,2,3,4-Tetrachlorobenzene	ug/L	<5.0	5.0	8911618
2,3-Dichlorophenol	ug/L	<5.0	5.0	8911618
2,4-Dichlorophenol	ug/L	<3.0	3.0	8911618
2,5-Dichlorophenol	ug/L	<5.0	5.0	8911618
2,6-Dichlorophenol	ug/L	<5.0	5.0	8911618
3,4-Dichlorophenol	ug/L	<5.0	5.0	8911618
3,5-Dichlorophenol	ug/L	<5.0	5.0	8911618
2,4-Dimethylphenol	ug/L	<5.0	5.0	8911618
2,4-Dinitrophenol	ug/L	<20	20	8911618
4,6-Dinitro-2-methylphenol	ug/L	<20	20	8911618
2-Nitrophenol	ug/L	<5.0	5.0	8911618
4-Nitrophenol	ug/L	<14	14	8911618
Pentachlorophenol	ug/L	<10	10	8911618
Phenol	ug/L	21	5.0	8911618
2,3,4,5-Tetrachlorophenol	ug/L	<4.0	4.0	8911618
2,3,4,6-Tetrachlorophenol	ug/L	<5.0	5.0	8911618
2,3,5,6-Tetrachlorophenol	ug/L	<5.0	5.0	8911618
2,3,4-Trichlorophenol	ug/L	<5.0	5.0	8911618
2,3,5-Trichlorophenol	ug/L	<5.0	5.0	8911618
2,3,6-Trichlorophenol	ug/L	<5.0	5.0	8911618
2,4,5-Trichlorophenol	ug/L	<5.0	5.0	8911618
2,4,6-Trichlorophenol	ug/L	<5.0	5.0	8911618
3,4,5-Trichlorophenol	ug/L	<5.0	5.0	8911618
Benzyl butyl phthalate	ug/L	<5.0	5.0	8911618
Biphenyl	ug/L	<5.0	5.0	8911618
Bis(2-chloroethyl)ether	ug/L	<5.0	5.0	8911618
Bis(2-chloroethoxy)methane	ug/L	<5.0	5.0	8911618
Bis(2-chloroisopropyl)ether	ug/L	<5.0	5.0	8911618
Bis(2-ethylhexyl)phthalate	ug/L	<20	20	8911618
4-Bromophenyl phenyl ether	ug/L	<3.0	3.0	8911618
p-Chloroaniline	ug/L	<10	10	8911618
4-Chlorophenyl phenyl ether	ug/L	<5.0	5.0	8911618
Di-N-butyl phthalate	ug/L	<20	20	8911618

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		WYA368		
Sampling Date		2023/09/06		
COC Number		N/A		
	UNITS	**PS HOLDING TANK**	**RDL**	**QC Batch**
di-n-octyl phthalate	ug/L	<8.0	8.0	8911618
2,4-Dinitrotoluene	ug/L	<5.0	5.0	8911618
Diethyl phthalate	ug/L	<10	10	8911618
3,3'-Dichlorobenzidine	ug/L	<5.0	5.0	8911618
Dimethyl phthalate	ug/L	<10	10	8911618
2,6-Dinitrotoluene	ug/L	<5.0	5.0	8911618
Diphenyl Ether	ug/L	<3.0	3.0	8911618
Hexachlorobutadiene	ug/L	<4.0	4.0	8911618
Hexachlorocyclopentadiene	ug/L	<20	20	8911618
Hexachloroethane	ug/L	<5.0	5.0	8911618
Isophorone	ug/L	<5.0	5.0	8911618
Nitrobenzene	ug/L	<5.0	5.0	8911618
Nitrosodiphenylamine/Diphenylamine	ug/L	<10	10	8911618
N-Nitroso-di-n-propylamine	ug/L	<5.0	5.0	8911618
Surrogate Recovery (%)				
2,4,6-Tribromophenol	%	84		8911618
2-Fluorobiphenyl	%	63		8911618
2-Fluorophenol	%	42		8911618
D14-Terphenyl	%	92		8911618
D5-Nitrobenzene	%	81		8911618
D5-Phenol	%	28		8911618

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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VOLATILE ORGANICS BY GC/MS (WATER)

Bureau Veritas ID		WYA368		
Sampling Date		2023/09/06		
COC Number		N/A		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Volatile Organics				
Acetone (2-Propanone)	ug/L	1700	10	8909739
Benzene	ug/L	2.7	0.20	8909739
Bromodichloromethane	ug/L	<0.50	0.50	8909739
Bromoform	ug/L	<1.0	1.0	8909739
Bromomethane	ug/L	<0.50	0.50	8909739
Carbon Tetrachloride	ug/L	<0.19	0.19	8909739
Chlorobenzene	ug/L	1.4	0.20	8909739
Chloroethane	ug/L	1.4	1.0	8909739
Chloroform	ug/L	<0.20	0.20	8909739
Chloromethane	ug/L	<5.0	5.0	8909739
Dibromochloromethane	ug/L	<0.50	0.50	8909739
1,2-Dichlorobenzene	ug/L	<0.40	0.40	8909739
1,3-Dichlorobenzene	ug/L	<0.40	0.40	8909739
1,4-Dichlorobenzene	ug/L	1.7	0.40	8909739
1,1-Dichloroethane	ug/L	0.38	0.20	8909739
1,2-Dichloroethane	ug/L	0.81	0.49	8909739
1,1-Dichloroethylene	ug/L	<0.20	0.20	8909739
cis-1,2-Dichloroethylene	ug/L	0.56	0.50	8909739
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	8909739
1,2-Dichloropropane	ug/L	<0.20	0.20	8909739
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	8909739
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	8909739
Ethylbenzene	ug/L	5.3	0.20	8909739
Ethylene Dibromide	ug/L	<0.19	0.19	8909739
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	8909739
Methyl Ethyl Ketone (2-Butanone)	ug/L	1600	10	8909739
Methyl Isobutyl Ketone	ug/L	10	5.0	8909739
Methyl t-butyl ether (MTBE)	ug/L	0.60	0.50	8909739
Styrene	ug/L	<0.40	0.40	8909739
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	8909739
1,1,2,2-Tetrachloroethane	ug/L	<0.40	0.40	8909739
Tetrachloroethylene	ug/L	<0.20	0.20	8909739
1,3,5-Trimethylbenzene	ug/L	<10	10	8911263

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Job #: C3R6138
Report Date: 2023/09/18

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

VOLATILE ORGANICS BY GC/MS (WATER)

Bureau Veritas ID		WYA368		
Sampling Date		2023/09/06		
COC Number		N/A		
	UNITS	**PS HOLDING TANK**	**RDL**	**QC Batch**
Toluene	ug/L	6.0	0.20	8909739
1,1,1-Trichloroethane	ug/L	<0.20	0.20	8909739
1,1,2-Trichloroethane	ug/L	<0.40	0.40	8909739
Trichloroethylene	ug/L	<0.20	0.20	8909739
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	8909739
Vinyl Chloride	ug/L	<0.20	0.20	8909739
p+m-Xylene	ug/L	13	0.20	8909739
o-Xylene	ug/L	5.2	0.20	8909739
Total Xylenes	ug/L	18	0.20	8909739
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	98		8909739
D4-1,2-Dichloroethane	%	106		8909739
D8-Toluene	%	92		8909739
4-Bromofluorobenzene	%	113		8911263
D4-1,2-Dichloroethane	%	87		8911263
D8-Toluene	%	106		8911263

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3R6138
Report Date: 2023/09/18

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.7°C

Sample WYA368 [PS HOLDING TANK] : ABN Analysis: Due to matrix of the sample, a smaller than usual portion of the sample was used. Detection limits were adjusted accordingly.

VOC Water Analysis: Due to foaming, sample required dilution. The detection limits were adjusted accordingly.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8909739	4-Bromofluorobenzene	2023/09/13	102	70 - 130	102	70 - 130	102	%				
8909739	D4-1,2-Dichloroethane	2023/09/13	104	70 - 130	98	70 - 130	103	%				
8909739	D8-Toluene	2023/09/13	101	70 - 130	102	70 - 130	90	%				
8911263	4-Bromofluorobenzene	2023/09/15	114	70 - 130	118	70 - 130	108	%				
8911263	D4-1,2-Dichloroethane	2023/09/15	81	70 - 130	87	70 - 130	86	%				
8911263	D8-Toluene	2023/09/15	108	70 - 130	104	70 - 130	108	%				
8911618	2,4,6-Tribromophenol	2023/09/13	85	10 - 130	80	10 - 130	61	%				
8911618	2-Fluorobiphenyl	2023/09/13	71	30 - 130	66	30 - 130	67	%				
8911618	2-Fluorophenol	2023/09/13	45	10 - 130	44	10 - 130	37	%				
8911618	D14-Terphenyl	2023/09/13	90	30 - 130	87	30 - 130	83	%				
8911618	D5-Nitrobenzene	2023/09/13	84	30 - 130	83	30 - 130	81	%				
8911618	D5-Phenol	2023/09/13	29	10 - 130	34	10 - 130	26	%				
8905787	Total Kjeldahl Nitrogen (TKN)	2023/09/14	NC	80 - 120	103	80 - 120	<0.7	mg/L	0.78 (1)	20	99	80 - 120
8905814	Total Phosphorus	2023/09/13	101	80 - 120	99	80 - 120	<0.030	mg/L	2.1 (1)	25	97	80 - 120
8908946	Total Ammonia-N	2023/09/13	101	75 - 125	101	80 - 120	<0.15	mg/L	6.6 (1)	20		
8909580	Alkalinity (Total as CaCO3)	2023/09/12			99	85 - 115	<1.0	mg/L	1.9 (1)	20		
8909587	Nitrate (N)	2023/09/13	89	80 - 120	103	80 - 120	<0.10	mg/L	NC (1)	20		
8909587	Nitrite (N)	2023/09/13	93	80 - 120	109	80 - 120	<0.010	mg/L	NC (1)	20		
8909604	Dissolved Chloride (Cl-)	2023/09/12	98	80 - 120	98	80 - 120	<1.0	mg/L	4.1 (1)	20		
8909607	Dissolved Sulphate (SO4)	2023/09/12	NC	75 - 125	98	80 - 120	<1.0	mg/L	0.67 (1)	20		
8909739	1,1,1,2-Tetrachloroethane	2023/09/13	105	70 - 130	100	70 - 130	<0.50	ug/L				
8909739	1,1,1-Trichloroethane	2023/09/13	101	70 - 130	97	70 - 130	<0.20	ug/L				
8909739	1,1,2,2-Tetrachloroethane	2023/09/13	105	70 - 130	95	70 - 130	<0.40	ug/L	NC (1)	30		
8909739	1,1,2-Trichloroethane	2023/09/13	106	70 - 130	97	70 - 130	<0.40	ug/L				
8909739	1,1-Dichloroethane	2023/09/13	103	70 - 130	97	70 - 130	<0.20	ug/L				
8909739	1,1-Dichloroethylene	2023/09/13	99	70 - 130	95	70 - 130	<0.20	ug/L				
8909739	1,2-Dichlorobenzene	2023/09/13	99	70 - 130	95	70 - 130	<0.40	ug/L	NC (1)	30		
8909739	1,2-Dichloroethane	2023/09/13	107	70 - 130	97	70 - 130	<0.49	ug/L				
8909739	1,2-Dichloropropane	2023/09/13	102	70 - 130	96	70 - 130	<0.20	ug/L				
8909739	1,3-Dichlorobenzene	2023/09/13	99	70 - 130	98	70 - 130	<0.40	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8909739	1,4-Dichlorobenzene	2023/09/13	101	70 - 130	100	70 - 130	<0.40	ug/L	NC (1)	30		
8909739	Acetone (2-Propanone)	2023/09/13	119	60 - 140	106	60 - 140	<10	ug/L				
8909739	Benzene	2023/09/13	101	70 - 130	97	70 - 130	<0.20	ug/L	NC (1)	30		
8909739	Bromodichloromethane	2023/09/13	104	70 - 130	97	70 - 130	<0.50	ug/L				
8909739	Bromoform	2023/09/13	104	70 - 130	95	70 - 130	<1.0	ug/L				
8909739	Bromomethane	2023/09/13	96	60 - 140	89	60 - 140	<0.50	ug/L				
8909739	Carbon Tetrachloride	2023/09/13	101	70 - 130	97	70 - 130	<0.19	ug/L				
8909739	Chlorobenzene	2023/09/13	102	70 - 130	99	70 - 130	<0.20	ug/L				
8909739	Chloroethane	2023/09/13	93	70 - 130	88	70 - 130	<1.0	ug/L				
8909739	Chloroform	2023/09/13	103	70 - 130	97	70 - 130	<0.20	ug/L	NC (1)	30		
8909739	Chloromethane	2023/09/13	91	60 - 140	82	60 - 140	<5.0	ug/L				
8909739	cis-1,2-Dichloroethylene	2023/09/13	105	70 - 130	99	70 - 130	<0.50	ug/L	NC (1)	30		
8909739	cis-1,3-Dichloropropene	2023/09/13	105	70 - 130	97	70 - 130	<0.30	ug/L				
8909739	Dibromochloromethane	2023/09/13	102	70 - 130	95	70 - 130	<0.50	ug/L				
8909739	Ethylbenzene	2023/09/13	99	70 - 130	100	70 - 130	<0.20	ug/L	NC (1)	30		
8909739	Ethylene Dibromide	2023/09/13	108	70 - 130	99	70 - 130	<0.19	ug/L				
8909739	Methyl Ethyl Ketone (2-Butanone)	2023/09/13	121	60 - 140	108	60 - 140	<10	ug/L				
8909739	Methyl Isobutyl Ketone	2023/09/13	119	70 - 130	108	70 - 130	<5.0	ug/L				
8909739	Methyl t-butyl ether (MTBE)	2023/09/13	104	70 - 130	97	70 - 130	<0.50	ug/L				
8909739	Methylene Chloride(Dichloromethane)	2023/09/13	103	70 - 130	95	70 - 130	<2.0	ug/L	NC (1)	30		
8909739	o-Xylene	2023/09/13	96	70 - 130	101	70 - 130	<0.20	ug/L	NC (1)	30		
8909739	p+m-Xylene	2023/09/13	100	70 - 130	101	70 - 130	<0.20	ug/L	NC (1)	30		
8909739	Styrene	2023/09/13	99	70 - 130	100	70 - 130	<0.40	ug/L				
8909739	Tetrachloroethylene	2023/09/13	101	70 - 130	99	70 - 130	<0.20	ug/L	NC (1)	30		
8909739	Toluene	2023/09/13	101	70 - 130	98	70 - 130	<0.20	ug/L	NC (1)	30		
8909739	Total Xylenes	2023/09/13					<0.20	ug/L	NC (1)	30		
8909739	trans-1,2-Dichloroethylene	2023/09/13	103	70 - 130	98	70 - 130	<0.50	ug/L				
8909739	trans-1,3-Dichloropropene	2023/09/13	103	70 - 130	95	70 - 130	<0.40	ug/L	NC (1)	30		
8909739	Trichloroethylene	2023/09/13	102	70 - 130	99	70 - 130	<0.20	ug/L	NC (1)	30		
8909739	Trichlorofluoromethane (FREON 11)	2023/09/13	94	70 - 130	90	70 - 130	<0.50	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8909739	Vinyl Chloride	2023/09/13	92	70 - 130	88	70 - 130	<0.20	ug/L				
8911263	1,3,5-Trimethylbenzene	2023/09/15	114	60 - 140	108	60 - 140	<0.20	ug/L	NC (1)	30		
8911618	1,2,3,4-Tetrachlorobenzene	2023/09/13	55	30 - 130	38	30 - 130	<0.50	ug/L				
8911618	1,2,3,5-Tetrachlorobenzene	2023/09/13	46	30 - 130	31	30 - 130	<0.50	ug/L				
8911618	1,2,3-Trichlorobenzene	2023/09/13	50	30 - 130	38	30 - 130	<0.50	ug/L				
8911618	1,2,4,5-Tetrachlorobenzene	2023/09/13	54	30 - 130	36	30 - 130	<0.50	ug/L				
8911618	1,2,4-Trichlorobenzene	2023/09/13	49	30 - 130	36	30 - 130	<0.50	ug/L				
8911618	1,2-Dichlorobenzene	2023/09/13	51	30 - 130	38	30 - 130	<0.50	ug/L				
8911618	1,3,5-Trichlorobenzene	2023/09/13	68	30 - 130	58	30 - 130	<0.50	ug/L				
8911618	1,3-Dichlorobenzene	2023/09/13	47	30 - 130	32	30 - 130	<0.50	ug/L				
8911618	1-Chloronaphthalene	2023/09/13	71	30 - 130	51	30 - 130	<1.0	ug/L				
8911618	1-Methylnaphthalene	2023/09/13	75	30 - 130	53	30 - 130	<0.20	ug/L				
8911618	2,3,4,5-Tetrachlorophenol	2023/09/13	111	10 - 130	107	10 - 130	<0.40	ug/L				
8911618	2,3,4,6-Tetrachlorophenol	2023/09/13	96	10 - 130	86	10 - 130	<0.50	ug/L				
8911618	2,3,4-Trichlorophenol	2023/09/13	103	10 - 130	93	10 - 130	<0.50	ug/L				
8911618	2,3,5,6-Tetrachlorophenol	2023/09/13	76	10 - 130	82	10 - 130	<0.50	ug/L				
8911618	2,3,5-Trichlorophenol	2023/09/13	118	10 - 130	105	10 - 130	<0.50	ug/L				
8911618	2,3,6-Trichlorophenol	2023/09/13	90	10 - 130	84	10 - 130	<0.50	ug/L				
8911618	2,3-Dichlorophenol	2023/09/13	91	10 - 130	87	10 - 130	<0.50	ug/L				
8911618	2,4,5-Trichlorophenol	2023/09/13	99	10 - 130	92	10 - 130	<0.50	ug/L				
8911618	2,4,6-Trichlorophenol	2023/09/13	100	10 - 130	94	10 - 130	<0.50	ug/L				
8911618	2,4-Dichlorophenol	2023/09/13	86	10 - 130	82	10 - 130	<0.30	ug/L				
8911618	2,4-Dimethylphenol	2023/09/13	53	10 - 130	54	10 - 130	<0.50	ug/L				
8911618	2,4-Dinitrophenol	2023/09/13	105	10 - 130	83	10 - 130	<2.0	ug/L				
8911618	2,4-Dinitrotoluene	2023/09/13	108	30 - 130	102	30 - 130	<0.50	ug/L				
8911618	2,5-Dichlorophenol	2023/09/13	107	10 - 130	96	10 - 130	<0.50	ug/L				
8911618	2,6-Dichlorophenol	2023/09/13	95	10 - 130	88	10 - 130	<0.50	ug/L				
8911618	2,6-Dinitrotoluene	2023/09/13	126	30 - 130	93	30 - 130	<0.50	ug/L				
8911618	2-Chloronaphthalene	2023/09/13	105	30 - 130	57	30 - 130	<0.50	ug/L				
8911618	2-Chlorophenol	2023/09/13	87	10 - 130	84	10 - 130	<0.30	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8911618	2-Methylnaphthalene	2023/09/13	73	30 - 130	52	30 - 130	<0.20	ug/L				
8911618	2-Nitrophenol	2023/09/13	100	10 - 130	92	10 - 130	<0.50	ug/L				
8911618	3,3'-Dichlorobenzidine	2023/09/13	17 (2)	30 - 130	91	30 - 130	<0.50	ug/L				
8911618	3,4,5-Trichlorophenol	2023/09/13	100	10 - 130	92	10 - 130	<0.50	ug/L				
8911618	3,4-Dichlorophenol	2023/09/13	104	10 - 130	97	10 - 130	<0.50	ug/L				
8911618	3,5-Dichlorophenol	2023/09/13	97	10 - 130	91	10 - 130	<0.50	ug/L				
8911618	4,6-Dinitro-2-methylphenol	2023/09/13	110	10 - 130	106	10 - 130	<2.0	ug/L				
8911618	4-Bromophenyl phenyl ether	2023/09/13	79	30 - 130	67	30 - 130	<0.30	ug/L				
8911618	4-Chloro-3-Methylphenol	2023/09/13	97	10 - 130	88	10 - 130	<0.50	ug/L				
8911618	4-Chlorophenyl phenyl ether	2023/09/13	80	30 - 130	63	30 - 130	<0.50	ug/L				
8911618	4-Nitrophenol	2023/09/13	53	10 - 130	39	10 - 130	<1.4	ug/L				
8911618	Acenaphthene	2023/09/13	81	30 - 130	67	30 - 130	<0.20	ug/L				
8911618	Acenaphthylene	2023/09/13	79	30 - 130	67	30 - 130	<0.20	ug/L				
8911618	Anthracene	2023/09/13	92	30 - 130	86	30 - 130	<0.20	ug/L				
8911618	Benzo(a)anthracene	2023/09/13	92	30 - 130	91	30 - 130	<0.20	ug/L				
8911618	Benzo(a)pyrene	2023/09/13	100	30 - 130	95	30 - 130	<0.20	ug/L				
8911618	Benzo(b/j)fluoranthene	2023/09/13	94	30 - 130	89	30 - 130	<0.20	ug/L				
8911618	Benzo(g,h,i)perylene	2023/09/13	72	30 - 130	79	30 - 130	<0.20	ug/L				
8911618	Benzo(k)fluoranthene	2023/09/13	93	30 - 130	94	30 - 130	<0.20	ug/L				
8911618	Benzyl butyl phthalate	2023/09/13	90	30 - 130	85	30 - 130	<0.50	ug/L				
8911618	Biphenyl	2023/09/13	72	30 - 130	56	30 - 130	<0.50	ug/L				
8911618	Bis(2-chloroethoxy)methane	2023/09/13	77	30 - 130	73	30 - 130	<0.50	ug/L				
8911618	Bis(2-chloroethyl)ether	2023/09/13	77	30 - 130	71	30 - 130	<0.50	ug/L				
8911618	Bis(2-chloroisopropyl)ether	2023/09/13	68	30 - 130	59	30 - 130	<0.50	ug/L				
8911618	Bis(2-ethylhexyl)phthalate	2023/09/13	94	30 - 130	89	30 - 130	<2.0	ug/L	2.3 (1)	40		
8911618	Chrysene	2023/09/13	90	30 - 130	91	30 - 130	<0.20	ug/L				
8911618	Dibenzo(a,h)anthracene	2023/09/13	77	30 - 130	84	30 - 130	<0.20	ug/L				
8911618	Diethyl phthalate	2023/09/13	86	30 - 130	80	30 - 130	<1.0	ug/L				
8911618	Dimethyl phthalate	2023/09/13	92	30 - 130	84	30 - 130	<1.0	ug/L				
8911618	Di-N-butyl phthalate	2023/09/13	32	30 - 130	87	30 - 130	<2.0	ug/L	NC (1)	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8911618	di-n-octyl phthalate	2023/09/13	93	30 - 130	84	30 - 130	<0.80	ug/L				
8911618	Diphenyl Ether	2023/09/13	69	30 - 130	56	30 - 130	<0.30	ug/L				
8911618	Fluoranthene	2023/09/13	100	30 - 130	94	30 - 130	<0.20	ug/L				
8911618	Fluorene	2023/09/13	95	30 - 130	85	30 - 130	<0.20	ug/L				
8911618	Hexachlorobenzene	2023/09/13	91	30 - 130	85	30 - 130	<0.50	ug/L				
8911618	Hexachlorobutadiene	2023/09/13	58	30 - 130	47	30 - 130	<0.40	ug/L				
8911618	Hexachlorocyclopentadiene	2023/09/13	54	30 - 130	45	30 - 130	<2.0	ug/L				
8911618	Hexachloroethane	2023/09/13	61	30 - 130	45	30 - 130	<0.50	ug/L				
8911618	Indeno(1,2,3-cd)pyrene	2023/09/13	79	30 - 130	86	30 - 130	<0.20	ug/L				
8911618	Isophorone	2023/09/13	72	30 - 130	69	30 - 130	<0.50	ug/L				
8911618	m/p-Cresol	2023/09/13	65	10 - 130	61	10 - 130	<0.50	ug/L				
8911618	Naphthalene	2023/09/13	92	30 - 130	73	30 - 130	<0.20	ug/L				
8911618	Nitrobenzene	2023/09/13	84	30 - 130	79	30 - 130	<0.50	ug/L				
8911618	Nitrosodiphenylamine/Diphenylamine	2023/09/13	65	30 - 130	67	30 - 130	<1.0	ug/L				
8911618	N-Nitroso-di-n-propylamine	2023/09/13	79	30 - 130	73	30 - 130	<0.50	ug/L				
8911618	o-Cresol	2023/09/13	69	10 - 130	67	10 - 130	<0.50	ug/L				
8911618	p-Chloroaniline	2023/09/13	39	30 - 130	87	30 - 130	<1.0	ug/L				
8911618	Pentachlorobenzene	2023/09/13	55	30 - 130	32	30 - 130	<0.50	ug/L				
8911618	Pentachlorophenol	2023/09/13	68	10 - 130	72	10 - 130	<1.0	ug/L				
8911618	Perylene	2023/09/13	91	30 - 130	89	30 - 130	<0.20	ug/L				
8911618	Phenanthrene	2023/09/13	90	30 - 130	84	30 - 130	<0.20	ug/L				
8911618	Phenol	2023/09/13	48	10 - 130	34	10 - 130	<0.50	ug/L				
8911618	Pyrene	2023/09/13	89	30 - 130	82	30 - 130	<0.20	ug/L				
8915971	Total Aluminum (Al)	2023/09/16	100	80 - 120	100	80 - 120	<0.02	mg/L				
8915971	Total Arsenic (As)	2023/09/16	98	80 - 120	95	80 - 120	<0.001	mg/L				
8915971	Total Barium (Ba)	2023/09/16	98	80 - 120	97	80 - 120	<0.005	mg/L				
8915971	Total Beryllium (Be)	2023/09/16	101	80 - 120	100	80 - 120	<0.0006	mg/L				
8915971	Total Bismuth (Bi)	2023/09/16	96	80 - 120	99	80 - 120	<0.001	mg/L				
8915971	Total Boron (B)	2023/09/16	96	80 - 120	96	80 - 120	<0.02	mg/L				
8915971	Total Cadmium (Cd)	2023/09/16	97	80 - 120	97	80 - 120	<0.0001	mg/L				

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8915971	Total Calcium (Ca)	2023/09/16	NC	80 - 120	103	80 - 120	<0.2	mg/L				
8915971	Total Chromium (Cr)	2023/09/16	98	80 - 120	95	80 - 120	<0.005	mg/L	1.3 (1)	20		
8915971	Total Cobalt (Co)	2023/09/16	96	80 - 120	95	80 - 120	<0.0005	mg/L				
8915971	Total Copper (Cu)	2023/09/16	98	80 - 120	96	80 - 120	<0.002	mg/L	3.2 (1)	20		
8915971	Total Iron (Fe)	2023/09/16	97	80 - 120	95	80 - 120	<0.1	mg/L				
8915971	Total Lead (Pb)	2023/09/16	95	80 - 120	96	80 - 120	<0.0005	mg/L				
8915971	Total Magnesium (Mg)	2023/09/16	93	80 - 120	94	80 - 120	<0.05	mg/L				
8915971	Total Molybdenum (Mo)	2023/09/16	106	80 - 120	100	80 - 120	<0.002	mg/L				
8915971	Total Nickel (Ni)	2023/09/16	94	80 - 120	94	80 - 120	<0.001	mg/L	12 (1)	20		
8915971	Total Potassium (K)	2023/09/16	NC	80 - 120	96	80 - 120	<0.2	mg/L				
8915971	Total Selenium (Se)	2023/09/16	106	80 - 120	109	80 - 120	<0.005	mg/L				
8915971	Total Silver (Ag)	2023/09/16	96	80 - 120	95	80 - 120	<0.0004	mg/L				
8915971	Total Sodium (Na)	2023/09/16	NC	80 - 120	96	80 - 120	<0.1	mg/L				
8915971	Total Strontium (Sr)	2023/09/16	NC	80 - 120	94	80 - 120	<0.003	mg/L				
8915971	Total Tin (Sn)	2023/09/16	101	80 - 120	98	80 - 120	<0.002	mg/L				
8915971	Total Titanium (Ti)	2023/09/16	101	80 - 120	103	80 - 120	<0.005	mg/L				
8915971	Total Vanadium (V)	2023/09/16	100	80 - 120	96	80 - 120	<0.001	mg/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8915971	Total Zinc (Zn)	2023/09/16	97	80 - 120	100	80 - 120	<0.01	mg/L	0.0042 (1)	20		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

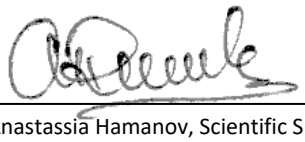
Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3R6138
Report Date: 2023/09/18

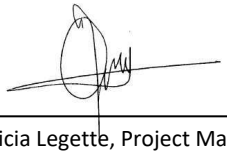
RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: BEG

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist



Patricia Legette, Project Manager

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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FIELD INFORMATION FORM

BUREAU VERITAS

WASTE MANAGEMENT

Site Name: TCEC

Site No.: ____ Sample: PS Holding Tank (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes, Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: (Y) or N

Purging Device: ____ A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Sampling Device: D

X-Other: ____

Filter Device: Y or N — 0.45 µ or ____ µ (circle or fill in)

Filter Type: ____ A-In-line Disposable, B-Pressure, C-Vacuum, X-Other: ____

Sample Tube Type: ____ A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other: ____

WELL DATA

Well Elevation (at TOC) ____ (ft/msl)

Depth to Water (DTW) (from TOC) ____ (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC) ____ (ft msl)

Total Well Depth (from TOC) ____ (ft)

Stick Up (from ground elevation) ____ (ft)

Casing ID ____ (in)

Casing Material ____

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit ____	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
090623	~~5.20~~ 7.12	5.29	20.7	271	0.55		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

FIELD COMMENTS

Sample Appearance: translucent Odor: leachate Color: grey Other: ____

Weather Conditions (required daily, or as conditions change): Direction/Speed: 23Km/h SW Outlook: Overcast Precipitation: (Y) or N

Specific Comments (including purge/well volume calculations if required): ____

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
09/06/23	Eric Wilson	E.W/Sam.	RWDI
/ /			

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 06/20

0812

Maxxam Analytics Inc 6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

Page 1 of 1

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #		
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285739	
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Unit 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	CHAIN OF CUSTODY # :
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x:2984 Fax: 519-823-1316	Project Name:	TCEC-LCHCM-SEPTEMBER	EC-LCHCM-SEPTEMB
Email:	lmertick@wm.com	Email:	Brent.Langille@RWDI.com, JCL@rwdi.com	Location:	Twin Creeks	
				Sampled By:	BEG	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

☐ MISA Reg. 153 Sewer Use ☒ Other
☐ Table 1 ☐ Sanitary site specific
☐ PWQO ☐ Table 2 ☐ Storm specify
☐ Table 3 Region
☐ Reg. 558

Report Criteria on C of A ? n

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ON-WLF-2023 TCLS - LEACHATE (PS HOLDING) MONTHLY	# of Cont.	COMMENTS / TAT COMMENTS
1	PS Holding Tank	6-Sep-23	PM	LCH	N	N	X	9	
2									See lab addendum for analysis.
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

NONT-09-807

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
☒ 5 to 7 Working Days

Rush TAT: Rush Confirmation # (call Lab for #)
☐ 1 day ☐ 2 days ☐ 3 days
DATE Required: 18-Sep-23
TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:	Laboratory Use Only	
EW 7-September-23 - AM		06/09/08	1009	Temperature (°C) on Receipt 7/6/10	Condition of Sample on Receipt ☐ OK ☐ SIF

* MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS

White: Maxxam Yellow: Mail Pink: Client

Your P.O. #: 12285739
Your Project #: 2303459.01
Site#: 500
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/10/24
Report #: R7876383
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3V9151
Received: 2023/10/13, 10:22

Sample Matrix: Leachate
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
ABN Compounds in Water by GC/MS	1	2023/10/17	2023/10/19	CAM SOP-00301	EPA 8270 m
Alkalinity	1	N/A	2023/10/19	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	1	N/A	2023/10/17	CAM SOP-00463	SM 23 4500-Cl E m
Conductance in Water - On-site	1	N/A	2023/10/24		
Field Measured Dissolved Oxygen in Water	1	N/A	2023/10/24		
Total Metals by ICPMS	1	N/A	2023/10/19	CAM SOP-00447	EPA 6020B m
Ammonia-N	1	N/A	2023/10/20	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	1	N/A	2023/10/16	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Field Measured pH (2)	1	N/A	2023/10/24		Field pH Meter
Sulphate by Automated Turbidimetry	1	N/A	2023/10/18	CAM SOP-00464	SM 23 4500-SO42- E m
Field Temperature (2)	1	N/A	2023/10/24		Field Thermometer
Total Kjeldahl Nitrogen in Water	1	2023/10/19	2023/10/20	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	1	2023/10/19	2023/10/20	CAM SOP-00407	SM 23 4500-P I
Turbidity - On-site	1	N/A	2023/10/24		
Un-ionized Ammonia (3)	1	2023/10/14	2023/10/24	Auto Calc.	PWQO
Volatile Organic Compounds in Water	1	N/A	2023/10/20	CAM SOP-00228	EPA 8260D
Non-Routine Volatile Organic Compounds	1	N/A	2023/10/19	CAM SOP-00226	EPA 8260D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the

Your P.O. #: 12285739
Your Project #: 2303459.01
Site#: 500
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/10/24
Report #: R7876383
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3V9151
Received: 2023/10/13, 10:22
customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.
(3) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799
==========
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Bureau Veritas Job #: C3V9151
Report Date: 2023/10/24

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: JRA

RESULTS OF ANALYSES OF LEACHATE

Bureau Veritas ID		XHC169		
Sampling Date		2023/10/11		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Calculated Parameters				
Total Un-ionized Ammonia	mg/L	3.1	0.059	8981124
Field Measurements				
Field Conductivity	uS/cm	12450	N/A	ONSITE
Field Dissolved Oxygen	mg/L	8.47	N/A	ONSITE
Field Temperature	Celsius	17.3	N/A	ONSITE
Field Measured Field Turbidity	NTU	159	N/A	ONSITE
Field Measured pH	pH	7.3		ONSITE
Inorganics				
Total Ammonia-N	mg/L	398	7.5	8992021
Total Kjeldahl Nitrogen (TKN)	mg/L	420	10	8992283
Total Phosphorus	mg/L	0.94	0.030	8992301
Dissolved Sulphate (SO4)	mg/L	270	1.0	8983690
Alkalinity (Total as CaCO3)	mg/L	2600	5.0	8983556
Dissolved Chloride (Cl-)	mg/L	490	7.0	8983806
Nitrite (N)	mg/L	<0.10	0.10	8983059
Nitrate (N)	mg/L	<1.0	1.0	8983059

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3V9151
Report Date: 2023/10/24

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: JRA

ELEMENTS BY ATOMIC SPECTROSCOPY (LEACHATE)

Bureau Veritas ID		XHC169		
Sampling Date		2023/10/11		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Metals				
Total Aluminum (Al)	mg/L	0.46	0.02	8988094
Total Arsenic (As)	mg/L	0.016	0.001	8988094
Total Barium (Ba)	mg/L	0.17	0.005	8988094
Total Beryllium (Be)	mg/L	<0.0006	0.0006	8988094
Total Bismuth (Bi)	mg/L	<0.001	0.001	8988094
Total Boron (B)	mg/L	12	0.2	8988094
Total Cadmium (Cd)	mg/L	<0.0001	0.0001	8988094
Total Calcium (Ca)	mg/L	170	0.2	8988094
Total Chromium (Cr)	mg/L	0.027	0.005	8988094
Total Cobalt (Co)	mg/L	0.0058	0.0005	8988094
Total Copper (Cu)	mg/L	<0.002	0.002	8988094
Total Iron (Fe)	mg/L	2.8	0.1	8988094
Total Lead (Pb)	mg/L	0.0010	0.0005	8988094
Total Magnesium (Mg)	mg/L	150	0.05	8988094
Total Molybdenum (Mo)	mg/L	0.008	0.002	8988094
Total Nickel (Ni)	mg/L	0.055	0.001	8988094
Total Potassium (K)	mg/L	110	0.2	8988094
Total Selenium (Se)	mg/L	<0.005	0.005	8988094
Total Silver (Ag)	mg/L	<0.0004	0.0004	8988094
Total Sodium (Na)	mg/L	510	0.1	8988094
Total Strontium (Sr)	mg/L	1.6	0.003	8988094
Total Tin (Sn)	mg/L	0.003	0.002	8988094
Total Titanium (Ti)	mg/L	0.026	0.005	8988094
Total Vanadium (V)	mg/L	0.007	0.001	8988094
Total Zinc (Zn)	mg/L	<0.01	0.01	8988094

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: JRA

SEMI-VOLATILE ORGANICS BY GC-MS (LEACHATE)

Bureau Veritas ID		XHC169		
Sampling Date		2023/10/11		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Semivolatile Organics				
Acenaphthene	ug/L	<0.80	0.80	8987107
Acenaphthylene	ug/L	<0.80	0.80	8987107
Anthracene	ug/L	<0.80	0.80	8987107
Benzo(a)anthracene	ug/L	<0.80	0.80	8987107
Benzo(a)pyrene	ug/L	<0.80	0.80	8987107
Benzo(b/j)fluoranthene	ug/L	<0.80	0.80	8987107
Benzo(g,h,i)perylene	ug/L	<0.80	0.80	8987107
Benzo(k)fluoranthene	ug/L	<0.80	0.80	8987107
1-Chloronaphthalene	ug/L	<4.0	4.0	8987107
2-Chloronaphthalene	ug/L	<2.0	2.0	8987107
Chrysene	ug/L	<0.80	0.80	8987107
Dibenzo(a,h)anthracene	ug/L	<0.80	0.80	8987107
Fluoranthene	ug/L	<0.80	0.80	8987107
Fluorene	ug/L	<0.80	0.80	8987107
Indeno(1,2,3-cd)pyrene	ug/L	<0.80	0.80	8987107
1-Methylnaphthalene	ug/L	<0.80	0.80	8987107
2-Methylnaphthalene	ug/L	<0.80	0.80	8987107
Naphthalene	ug/L	3.8	0.80	8987107
Perylene	ug/L	<0.80	0.80	8987107
Phenanthrene	ug/L	<0.80	0.80	8987107
Pyrene	ug/L	<0.80	0.80	8987107
1,2-Dichlorobenzene	ug/L	<2.0	2.0	8987107
1,3-Dichlorobenzene	ug/L	<2.0	2.0	8987107
Hexachlorobenzene	ug/L	<2.0	2.0	8987107
Pentachlorobenzene	ug/L	<2.0	2.0	8987107
1,2,3,5-Tetrachlorobenzene	ug/L	<2.0	2.0	8987107
1,2,4,5-Tetrachlorobenzene	ug/L	<2.0	2.0	8987107
1,2,3-Trichlorobenzene	ug/L	<2.0	2.0	8987107
1,2,4-Trichlorobenzene	ug/L	<2.0	2.0	8987107
1,3,5-Trichlorobenzene	ug/L	<2.0	2.0	8987107
2-Chlorophenol	ug/L	<1.2	1.2	8987107
4-Chloro-3-Methylphenol	ug/L	<2.0	2.0	8987107
m/p-Cresol	ug/L	110	2.0	8987107

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (LEACHATE)

Bureau Veritas ID		XHC169		
Sampling Date		2023/10/11		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
o-Cresol	ug/L	4.5	2.0	8987107
1,2,3,4-Tetrachlorobenzene	ug/L	<2.0	2.0	8987107
2,3-Dichlorophenol	ug/L	<2.0	2.0	8987107
2,4-Dichlorophenol	ug/L	<1.2	1.2	8987107
2,5-Dichlorophenol	ug/L	<2.0	2.0	8987107
2,6-Dichlorophenol	ug/L	<2.0	2.0	8987107
3,4-Dichlorophenol	ug/L	<2.0	2.0	8987107
3,5-Dichlorophenol	ug/L	<2.0	2.0	8987107
2,4-Dimethylphenol	ug/L	<2.0	2.0	8987107
2,4-Dinitrophenol	ug/L	<40 (1)	40	8987107
4,6-Dinitro-2-methylphenol	ug/L	<40 (1)	40	8987107
2-Nitrophenol	ug/L	<2.0	2.0	8987107
4-Nitrophenol	ug/L	<5.6	5.6	8987107
Pentachlorophenol	ug/L	<8.0 (1)	8.0	8987107
Phenol	ug/L	44	2.0	8987107
2,3,4,5-Tetrachlorophenol	ug/L	<1.6	1.6	8987107
2,3,4,6-Tetrachlorophenol	ug/L	<2.0	2.0	8987107
2,3,5,6-Tetrachlorophenol	ug/L	<2.0	2.0	8987107
2,3,4-Trichlorophenol	ug/L	<2.0	2.0	8987107
2,3,5-Trichlorophenol	ug/L	<2.0	2.0	8987107
2,3,6-Trichlorophenol	ug/L	<2.0	2.0	8987107
2,4,5-Trichlorophenol	ug/L	<2.0	2.0	8987107
2,4,6-Trichlorophenol	ug/L	<2.0	2.0	8987107
3,4,5-Trichlorophenol	ug/L	<2.0	2.0	8987107
Benzyl butyl phthalate	ug/L	<2.0	2.0	8987107
Biphenyl	ug/L	<2.0	2.0	8987107
Bis(2-chloroethyl)ether	ug/L	<2.0	2.0	8987107
Bis(2-chloroethoxy)methane	ug/L	<2.0	2.0	8987107
Bis(2-chloroisopropyl)ether	ug/L	<2.0	2.0	8987107
Bis(2-ethylhexyl)phthalate	ug/L	<8.0	8.0	8987107
4-Bromophenyl phenyl ether	ug/L	<1.2	1.2	8987107
p-Chloroaniline	ug/L	<4.0	4.0	8987107
4-Chlorophenyl phenyl ether	ug/L	<2.0	2.0	8987107

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Detection Limit was raised due to matrix interferences.

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Bureau Veritas Job #: C3V9151
Report Date: 2023/10/24

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: JRA

SEMI-VOLATILE ORGANICS BY GC-MS (LEACHATE)

Bureau Veritas ID		XHC169		
Sampling Date		2023/10/11		
COC Number		n/a		
	UNITS	**PS HOLDING TANK**	**RDL**	**QC Batch**
Di-N-butyl phthalate	ug/L	<8.0	8.0	8987107
di-n-octyl phthalate	ug/L	<3.2	3.2	8987107
2,4-Dinitrotoluene	ug/L	<2.0	2.0	8987107
Diethyl phthalate	ug/L	<4.0	4.0	8987107
3,3'-Dichlorobenzidine	ug/L	<2.0	2.0	8987107
Dimethyl phthalate	ug/L	<4.0	4.0	8987107
2,6-Dinitrotoluene	ug/L	<2.0	2.0	8987107
Diphenyl Ether	ug/L	<1.2	1.2	8987107
Hexachlorobutadiene	ug/L	<1.6	1.6	8987107
Hexachlorocyclopentadiene	ug/L	<8.0	8.0	8987107
Hexachloroethane	ug/L	<2.0	2.0	8987107
Isophorone	ug/L	<2.0	2.0	8987107
Nitrobenzene	ug/L	<2.0	2.0	8987107
Nitrosodiphenylamine/Diphenylamine	ug/L	<4.0	4.0	8987107
N-Nitroso-di-n-propylamine	ug/L	<2.0	2.0	8987107
Surrogate Recovery (%)				
2,4,6-Tribromophenol	%	84		8987107
2-Fluorobiphenyl	%	71		8987107
2-Fluorophenol	%	39		8987107
D14-Terphenyl	%	160 (1)		8987107
D5-Nitrobenzene	%	76		8987107
D5-Phenol	%	28		8987107

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: JRA

VOLATILE ORGANICS BY GC/MS (LEACHATE)

Bureau Veritas ID		XHC169		
Sampling Date		2023/10/11		
COC Number		n/a		
	UNITS	PS HOLDING TANK	RDL	QC Batch
Volatile Organics				
Acetone (2-Propanone)	ug/L	2100	20	8983912
Benzene	ug/L	3.9	0.40	8983912
Bromodichloromethane	ug/L	<1.0	1.0	8983912
Bromoform	ug/L	<2.0	2.0	8983912
Bromomethane	ug/L	<1.0	1.0	8983912
Carbon Tetrachloride	ug/L	<0.38	0.38	8983912
Chlorobenzene	ug/L	3.5	0.40	8983912
Chloroethane	ug/L	<2.0	2.0	8983912
Chloroform	ug/L	<0.40	0.40	8983912
Chloromethane	ug/L	<10	10	8983912
Dibromochloromethane	ug/L	<1.0	1.0	8983912
1,2-Dichlorobenzene	ug/L	<0.80	0.80	8983912
1,3-Dichlorobenzene	ug/L	<0.80	0.80	8983912
1,4-Dichlorobenzene	ug/L	2.4	0.80	8983912
1,1-Dichloroethane	ug/L	0.42	0.40	8983912
1,2-Dichloroethane	ug/L	1.8	0.98	8983912
1,1-Dichloroethylene	ug/L	<0.40	0.40	8983912
cis-1,2-Dichloroethylene	ug/L	1.3	1.0	8983912
trans-1,2-Dichloroethylene	ug/L	<1.0	1.0	8983912
1,2-Dichloropropane	ug/L	<0.40	0.40	8983912
cis-1,3-Dichloropropene	ug/L	<0.60	0.60	8983912
trans-1,3-Dichloropropene	ug/L	<0.80	0.80	8983912
Ethylbenzene	ug/L	6.6	0.40	8983912
Ethylene Dibromide	ug/L	<0.38	0.38	8983912
Methylene Chloride(Dichloromethane)	ug/L	<4.0	4.0	8983912
Methyl Ethyl Ketone (2-Butanone)	ug/L	2300	20	8983912
Methyl Isobutyl Ketone	ug/L	33	10	8983912
Methyl t-butyl ether (MTBE)	ug/L	1.0	1.0	8983912
Styrene	ug/L	<0.80	0.80	8983912
1,1,1,2-Tetrachloroethane	ug/L	<1.0	1.0	8983912
1,1,2,2-Tetrachloroethane	ug/L	<0.80	0.80	8983912
Tetrachloroethylene	ug/L	<0.40	0.40	8983912
1,3,5-Trimethylbenzene	ug/L	<4.0	4.0	8989517

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: JRA

VOLATILE ORGANICS BY GC/MS (LEACHATE)

Bureau Veritas ID		XHC169		
Sampling Date		2023/10/11		
COC Number		n/a		
	UNITS	**PS HOLDING TANK**	**RDL**	**QC Batch**
Toluene	ug/L	16	0.40	8983912
1,1,1-Trichloroethane	ug/L	<0.40	0.40	8983912
1,1,2-Trichloroethane	ug/L	<0.80	0.80	8983912
Trichloroethylene	ug/L	<0.40	0.40	8983912
Trichlorofluoromethane (FREON 11)	ug/L	<1.0	1.0	8983912
Vinyl Chloride	ug/L	0.48	0.40	8983912
p+m-Xylene	ug/L	26	0.40	8983912
o-Xylene	ug/L	11	0.40	8983912
Total Xylenes	ug/L	36	0.40	8983912
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	98		8983912
D4-1,2-Dichloroethane	%	112		8983912
D8-Toluene	%	98		8983912
4-Bromofluorobenzene	%	101		8989517
D4-1,2-Dichloroethane	%	108		8989517
D8-Toluene	%	98		8989517

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.0°C

Sample XHC169 [PS HOLDING TANK] : Nitrite/Nitrate: Due to colour interferences, sample required dilution. Detection limits were adjusted accordingly.
ABN Analysis: Due to the sample matrix, a smaller amount was used for analysis. Detection limits were adjusted accordingly.

VOC Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

VOC Water Analysis: Due to foaming, sample required dilution. The detection limits were adjusted accordingly.

Results relate only to the items tested.

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Bureau Veritas Job #: C3V9151
Report Date: 2023/10/24

QUALITY ASSURANCE REPORT

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: JRA

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8983912	4-Bromofluorobenzene	2023/10/19	97	70 - 130	96	70 - 130	96	%				
8983912	D4-1,2-Dichloroethane	2023/10/19	126	70 - 130	120	70 - 130	122	%				
8983912	D8-Toluene	2023/10/19	107	70 - 130	107	70 - 130	100	%				
8987107	2,4,6-Tribromophenol	2023/10/18	77	10 - 130	82	10 - 130	49	%				
8987107	2-Fluorobiphenyl	2023/10/18	61	30 - 130	63	30 - 130	61	%				
8987107	2-Fluorophenol	2023/10/18	25	10 - 130	42	10 - 130	26	%				
8987107	D14-Terphenyl	2023/10/18	166 (2)	30 - 130	89	30 - 130	88	%				
8987107	D5-Nitrobenzene	2023/10/18	67	30 - 130	74	30 - 130	73	%				
8987107	D5-Phenol	2023/10/18	24	10 - 130	27	10 - 130	21	%				
8989517	4-Bromofluorobenzene	2023/10/19	103 (5)	70 - 130	100	70 - 130	98	%				
8989517	D4-1,2-Dichloroethane	2023/10/19	106 (5)	70 - 130	103	70 - 130	104	%				
8989517	D8-Toluene	2023/10/19	97 (5)	70 - 130	97	70 - 130	97	%				
8983059	Nitrate (N)	2023/10/16	96	80 - 120	98	80 - 120	<0.10	mg/L	NC (1)	20		
8983059	Nitrite (N)	2023/10/16	106	80 - 120	108	80 - 120	<0.010	mg/L	NC (1)	20		
8983556	Alkalinity (Total as CaCO3)	2023/10/19			98	85 - 115	<1.0	mg/L	0.97 (1)	20		
8983690	Dissolved Sulphate (SO4)	2023/10/18	NC	75 - 125	96	80 - 120	<1.0	mg/L	0.75 (1)	20		
8983806	Dissolved Chloride (Cl-)	2023/10/17	NC	80 - 120	100	80 - 120	<1.0	mg/L	0.48 (1)	20		
8983912	1,1,1,2-Tetrachloroethane	2023/10/19	110	70 - 130	106	70 - 130	<0.50	ug/L				
8983912	1,1,1-Trichloroethane	2023/10/19	109	70 - 130	104	70 - 130	<0.20	ug/L				
8983912	1,1,2,2-Tetrachloroethane	2023/10/19	115	70 - 130	107	70 - 130	<0.40	ug/L	NC (1)	30		
8983912	1,1,2-Trichloroethane	2023/10/19	126	70 - 130	117	70 - 130	<0.40	ug/L				
8983912	1,1-Dichloroethane	2023/10/19	119	70 - 130	112	70 - 130	<0.20	ug/L				
8983912	1,1-Dichloroethylene	2023/10/19	117	70 - 130	112	70 - 130	<0.20	ug/L				
8983912	1,2-Dichlorobenzene	2023/10/19	91	70 - 130	89	70 - 130	<0.40	ug/L	NC (1)	30		
8983912	1,2-Dichloroethane	2023/10/19	116	70 - 130	107	70 - 130	<0.49	ug/L				
8983912	1,2-Dichloropropane	2023/10/19	113	70 - 130	106	70 - 130	<0.20	ug/L				
8983912	1,3-Dichlorobenzene	2023/10/19	94	70 - 130	92	70 - 130	<0.40	ug/L				
8983912	1,4-Dichlorobenzene	2023/10/19	102	70 - 130	101	70 - 130	<0.40	ug/L	NC (1)	30		
8983912	Acetone (2-Propanone)	2023/10/19	126	60 - 140	112	60 - 140	<10	ug/L				
8983912	Benzene	2023/10/19	99	70 - 130	94	70 - 130	<0.20	ug/L	NC (1)	30		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8983912	Bromodichloromethane	2023/10/19	124	70 - 130	116	70 - 130	<0.50	ug/L				
8983912	Bromoform	2023/10/19	105	70 - 130	99	70 - 130	<1.0	ug/L				
8983912	Bromomethane	2023/10/19	119	60 - 140	107	60 - 140	<0.50	ug/L				
8983912	Carbon Tetrachloride	2023/10/19	112	70 - 130	107	70 - 130	<0.19	ug/L				
8983912	Chlorobenzene	2023/10/19	100	70 - 130	97	70 - 130	<0.20	ug/L				
8983912	Chloroethane	2023/10/19	120	70 - 130	113	70 - 130	<1.0	ug/L				
8983912	Chloroform	2023/10/19	118	70 - 130	110	70 - 130	<0.20	ug/L	NC (1)	30		
8983912	Chloromethane	2023/10/19	140	60 - 140	131	60 - 140	<5.0	ug/L				
8983912	cis-1,2-Dichloroethylene	2023/10/19	103	70 - 130	97	70 - 130	<0.50	ug/L	NC (1)	30		
8983912	cis-1,3-Dichloropropene	2023/10/19	103	70 - 130	91	70 - 130	<0.30	ug/L				
8983912	Dibromochloromethane	2023/10/19	114	70 - 130	108	70 - 130	<0.50	ug/L				
8983912	Ethylbenzene	2023/10/19	88	70 - 130	87	70 - 130	<0.20	ug/L	NC (1)	30		
8983912	Ethylene Dibromide	2023/10/19	106	70 - 130	99	70 - 130	<0.19	ug/L				
8983912	Methyl Ethyl Ketone (2-Butanone)	2023/10/19	123	60 - 140	110	60 - 140	<10	ug/L				
8983912	Methyl Isobutyl Ketone	2023/10/19	111	70 - 130	102	70 - 130	<5.0	ug/L				
8983912	Methyl t-butyl ether (MTBE)	2023/10/19	101	70 - 130	97	70 - 130	<0.50	ug/L				
8983912	Methylene Chloride(Dichloromethane)	2023/10/19	110	70 - 130	102	70 - 130	<2.0	ug/L	NC (1)	30		
8983912	o-Xylene	2023/10/19	78	70 - 130	79	70 - 130	<0.20	ug/L	NC (1)	30		
8983912	p+m-Xylene	2023/10/19	93	70 - 130	92	70 - 130	<0.20	ug/L	NC (1)	30		
8983912	Styrene	2023/10/19	98	70 - 130	97	70 - 130	<0.40	ug/L				
8983912	Tetrachloroethylene	2023/10/19	95	70 - 130	92	70 - 130	<0.20	ug/L	NC (1)	30		
8983912	Toluene	2023/10/19	96	70 - 130	93	70 - 130	<0.20	ug/L	NC (1)	30		
8983912	Total Xylenes	2023/10/19					<0.20	ug/L	NC (1)	30		
8983912	trans-1,2-Dichloroethylene	2023/10/19	106	70 - 130	100	70 - 130	<0.50	ug/L				
8983912	trans-1,3-Dichloropropene	2023/10/19	115	70 - 130	97	70 - 130	<0.40	ug/L	NC (1)	30		
8983912	Trichloroethylene	2023/10/19	98	70 - 130	94	70 - 130	<0.20	ug/L	NC (1)	30		
8983912	Trichlorofluoromethane (FREON 11)	2023/10/19	116	70 - 130	111	70 - 130	<0.50	ug/L				
8983912	Vinyl Chloride	2023/10/19	120	70 - 130	114	70 - 130	<0.20	ug/L				
8987107	1,2,3,4-Tetrachlorobenzene	2023/10/19	54	30 - 130	39	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	1,2,3,5-Tetrachlorobenzene	2023/10/19	42	30 - 130	28 (2)	30 - 130	<0.50	ug/L	NC (1)	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8987107	1,2,3-Trichlorobenzene	2023/10/19	35	30 - 130	36	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	1,2,4,5-Tetrachlorobenzene	2023/10/19	48	30 - 130	36	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	1,2,4-Trichlorobenzene	2023/10/19	32	30 - 130	32	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	1,2-Dichlorobenzene	2023/10/19	27 (2)	30 - 130	34	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	1,3,5-Trichlorobenzene	2023/10/19	54	30 - 130	54	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	1,3-Dichlorobenzene	2023/10/19	24 (2)	30 - 130	27 (2)	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	1-Chloronaphthalene	2023/10/19	63	30 - 130	66	30 - 130	<1.0	ug/L	NC (1)	40		
8987107	1-Methylnaphthalene	2023/10/19	66	30 - 130	66	30 - 130	<0.20	ug/L	NC (1)	40		
8987107	2,3,4,5-Tetrachlorophenol	2023/10/19	106	10 - 130	95	10 - 130	<0.40	ug/L	NC (1)	40		
8987107	2,3,4,6-Tetrachlorophenol	2023/10/19	95	10 - 130	83	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	2,3,4-Trichlorophenol	2023/10/19	124	10 - 130	85	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	2,3,5,6-Tetrachlorophenol	2023/10/19	85	10 - 130	67	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	2,3,5-Trichlorophenol	2023/10/19	104	10 - 130	100	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	2,3,6-Trichlorophenol	2023/10/19	86	10 - 130	77	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	2,3-Dichlorophenol	2023/10/19	91	10 - 130	78	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	2,4,5-Trichlorophenol	2023/10/19	58	10 - 130	86	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	2,4,6-Trichlorophenol	2023/10/19	81	10 - 130	85	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	2,4-Dichlorophenol	2023/10/19	47	10 - 130	72	10 - 130	<0.30	ug/L	NC (1)	40		
8987107	2,4-Dimethylphenol	2023/10/19	54	10 - 130	41	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	2,4-Dinitrophenol	2023/10/19	34	10 - 130	74	10 - 130	<2.0	ug/L	NC (3,1)	40		
8987107	2,4-Dinitrotoluene	2023/10/19	98	30 - 130	97	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	2,5-Dichlorophenol	2023/10/19	95	10 - 130	81	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	2,6-Dichlorophenol	2023/10/19	78	10 - 130	75	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	2,6-Dinitrotoluene	2023/10/19	104	30 - 130	90	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	2-Chloronaphthalene	2023/10/19	68	30 - 130	93	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	2-Chlorophenol	2023/10/19	54	10 - 130	69	10 - 130	<0.30	ug/L	NC (1)	40		
8987107	2-Methylnaphthalene	2023/10/19	67	30 - 130	66	30 - 130	<0.20	ug/L	NC (1)	40		
8987107	2-Nitrophenol	2023/10/19	69	10 - 130	75	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	3,3'-Dichlorobenzidine	2023/10/19	17 (2)	30 - 130	78	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	3,4,5-Trichlorophenol	2023/10/19	75	10 - 130	84	10 - 130	<0.50	ug/L	NC (1)	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8987107	3,4-Dichlorophenol	2023/10/19	79	10 - 130	84	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	3,5-Dichlorophenol	2023/10/19	84	10 - 130	65	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	4,6-Dinitro-2-methylphenol	2023/10/19	67	10 - 130	96	10 - 130	<2.0	ug/L	NC (3,1)	40		
8987107	4-Bromophenyl phenyl ether	2023/10/19	79	30 - 130	73	30 - 130	<0.30	ug/L	NC (1)	40		
8987107	4-Chloro-3-Methylphenol	2023/10/19	87	10 - 130	82	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	4-Chlorophenyl phenyl ether	2023/10/19	82	30 - 130	65	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	4-Nitrophenol	2023/10/19	85	10 - 130	36	10 - 130	<1.4	ug/L	NC (1)	40		
8987107	Acenaphthene	2023/10/19	73	30 - 130	73	30 - 130	<0.20	ug/L	5.5 (1)	40		
8987107	Acenaphthylene	2023/10/19	75	30 - 130	73	30 - 130	<0.20	ug/L	NC (1)	40		
8987107	Anthracene	2023/10/19	80	30 - 130	85	30 - 130	<0.20	ug/L	NC (1)	40		
8987107	Benzo(a)anthracene	2023/10/19	88	30 - 130	91	30 - 130	<0.20	ug/L	9.0 (1)	40		
8987107	Benzo(a)pyrene	2023/10/19	102	30 - 130	96	30 - 130	<0.20	ug/L	34 (1)	40		
8987107	Benzo(b/j)fluoranthene	2023/10/19	110	30 - 130	92	30 - 130	<0.20	ug/L	21 (1)	40		
8987107	Benzo(g,h,i)perylene	2023/10/19	59	30 - 130	92	30 - 130	<0.20	ug/L	NC (1)	40		
8987107	Benzo(k)fluoranthene	2023/10/19	110	30 - 130	101	30 - 130	<0.20	ug/L	NC (1)	40		
8987107	Benzyl butyl phthalate	2023/10/19	111	30 - 130	84	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	Biphenyl	2023/10/19	71	30 - 130	69	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	Bis(2-chloroethoxy)methane	2023/10/19	60	30 - 130	66	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	Bis(2-chloroethyl)ether	2023/10/19	51	30 - 130	59	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	Bis(2-chloroisopropyl)ether	2023/10/19	46	30 - 130	50	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	Bis(2-ethylhexyl)phthalate	2023/10/19	106	30 - 130	84	30 - 130	<2.0	ug/L	NC (1)	40		
8987107	Chrysene	2023/10/19	85	30 - 130	91	30 - 130	<0.20	ug/L	0.62 (1)	40		
8987107	Dibenzo(a,h)anthracene	2023/10/19	59	30 - 130	89	30 - 130	<0.20	ug/L	NC (1)	40		
8987107	Diethyl phthalate	2023/10/19	86	30 - 130	86	30 - 130	<1.0	ug/L	NC (1)	40		
8987107	Dimethyl phthalate	2023/10/19	86	30 - 130	90	30 - 130	<1.0	ug/L	NC (1)	40		
8987107	Di-N-butyl phthalate	2023/10/19	89	30 - 130	91	30 - 130	<2.0	ug/L	NC (1)	40		
8987107	di-n-octyl phthalate	2023/10/19	159 (2)	30 - 130	82	30 - 130	<0.80	ug/L	NC (1)	40		
8987107	Diphenyl Ether	2023/10/19	47	30 - 130	52	30 - 130	<0.30	ug/L	NC (1)	40		
8987107	Fluoranthene	2023/10/19	81	30 - 130	96	30 - 130	<0.20	ug/L	24 (1)	40		
8987107	Fluorene	2023/10/19	96	30 - 130	86	30 - 130	<0.20	ug/L	NC (1)	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8987107	Hexachlorobenzene	2023/10/19	83	30 - 130	85	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	Hexachlorobutadiene	2023/10/19	38	30 - 130	34	30 - 130	<0.40	ug/L	NC (1)	40		
8987107	Hexachlorocyclopentadiene	2023/10/19	31	30 - 130	42	30 - 130	<2.0	ug/L	NC (1)	40		
8987107	Hexachloroethane	2023/10/19	35	30 - 130	36	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	Indeno(1,2,3-cd)pyrene	2023/10/19	65	30 - 130	94	30 - 130	<0.20	ug/L	NC (1)	40		
8987107	Isophorone	2023/10/19	72	30 - 130	84	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	m/p-Cresol	2023/10/19	54	10 - 130	55	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	Naphthalene	2023/10/19	64	30 - 130	82	30 - 130	<0.20	ug/L	0.89 (1)	40		
8987107	Nitrobenzene	2023/10/19	64	30 - 130	71	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	Nitrosodiphenylamine/Diphenylamine	2023/10/19	83	30 - 130	85	30 - 130	<1.0	ug/L	NC (1)	40		
8987107	N-Nitroso-di-n-propylamine	2023/10/19	73	30 - 130	83	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	o-Cresol	2023/10/19	56	10 - 130	59	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	p-Chloroaniline	2023/10/19	32	30 - 130	67	30 - 130	<1.0	ug/L	NC (1)	40		
8987107	Pentachlorobenzene	2023/10/19	70	30 - 130	54	30 - 130	<0.50	ug/L	NC (1)	40		
8987107	Pentachlorophenol	2023/10/19	70	10 - 130	59	10 - 130	<1.0	ug/L	NC (3,1)	40		
8987107	Perylene	2023/10/19	87	30 - 130	91	30 - 130	<0.20	ug/L	NC (1)	40		
8987107	Phenanthrene	2023/10/19	88	30 - 130	85	30 - 130	<0.20	ug/L	13 (1)	40		
8987107	Phenol	2023/10/19	27	10 - 130	29	10 - 130	<0.50	ug/L	NC (1)	40		
8987107	Pyrene	2023/10/19	155 (2)	30 - 130	82	30 - 130	<0.20	ug/L	NC (3,1)	40		
8988094	Total Aluminum (Al)	2023/10/18	NC (4)	80 - 120	95	80 - 120	<0.02	mg/L				
8988094	Total Arsenic (As)	2023/10/19	NC (4)	80 - 120	98	80 - 120	<0.001	mg/L	0.76 (1)	20		
8988094	Total Barium (Ba)	2023/10/19	NC (4)	80 - 120	97	80 - 120	<0.005	mg/L	0.58 (1)	20		
8988094	Total Beryllium (Be)	2023/10/18	NC (4)	80 - 120	96	80 - 120	<0.0006	mg/L				
8988094	Total Bismuth (Bi)	2023/10/18	NC (4)	80 - 120	96	80 - 120	<0.001	mg/L				
8988094	Total Boron (B)	2023/10/19	NC (4)	80 - 120	95	80 - 120	<0.02	mg/L	9.8 (1)	20		
8988094	Total Cadmium (Cd)	2023/10/19	NC (4)	80 - 120	97	80 - 120	<0.0001	mg/L	NC (1)	20		
8988094	Total Calcium (Ca)	2023/10/19	NC (4)	80 - 120	99	80 - 120	<0.2	mg/L	0.36 (1)	20		
8988094	Total Chromium (Cr)	2023/10/19	NC (4)	80 - 120	93	80 - 120	<0.005	mg/L	1.5 (1)	20		
8988094	Total Cobalt (Co)	2023/10/18	NC (4)	80 - 120	100	80 - 120	<0.0005	mg/L				
8988094	Total Copper (Cu)	2023/10/19	NC (4)	80 - 120	93	80 - 120	<0.002	mg/L	NC (1)	20		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8988094	Total Iron (Fe)	2023/10/19	NC (4)	80 - 120	99	80 - 120	<0.1	mg/L	NC (1)	20		
8988094	Total Lead (Pb)	2023/10/19	NC (4)	80 - 120	95	80 - 120	<0.0005	mg/L	NC (1)	20		
8988094	Total Magnesium (Mg)	2023/10/19	NC (4)	80 - 120	96	80 - 120	<0.05	mg/L	1.6 (1)	20		
8988094	Total Molybdenum (Mo)	2023/10/18	NC (4)	80 - 120	96	80 - 120	<0.002	mg/L				
8988094	Total Nickel (Ni)	2023/10/19	NC (4)	80 - 120	97	80 - 120	<0.001	mg/L	2.0 (1)	20		
8988094	Total Potassium (K)	2023/10/19	NC (4)	80 - 120	97	80 - 120	<0.2	mg/L	1.1 (1)	20		
8988094	Total Selenium (Se)	2023/10/18	NC (4)	80 - 120	99	80 - 120	<0.005	mg/L				
8988094	Total Silver (Ag)	2023/10/18	NC (4)	80 - 120	93	80 - 120	<0.0004	mg/L				
8988094	Total Sodium (Na)	2023/10/19	NC (4)	80 - 120	96	80 - 120	<0.1	mg/L	0.28 (1)	20		
8988094	Total Strontium (Sr)	2023/10/18	NC (4)	80 - 120	95	80 - 120	<0.003	mg/L				
8988094	Total Tin (Sn)	2023/10/18	NC (4)	80 - 120	98	80 - 120	<0.002	mg/L				
8988094	Total Titanium (Ti)	2023/10/18	NC (4)	80 - 120	98	80 - 120	<0.005	mg/L				
8988094	Total Vanadium (V)	2023/10/18	NC (4)	80 - 120	94	80 - 120	<0.001	mg/L				
8988094	Total Zinc (Zn)	2023/10/19	NC (4)	80 - 120	99	80 - 120	<0.01	mg/L	NC (1)	20		
8989517	1,3,5-Trimethylbenzene	2023/10/19	101 (5)	60 - 140	94	60 - 140	<0.20	ug/L	NC (6)	30		
8992021	Total Ammonia-N	2023/10/20	NC (7)	75 - 125	102	80 - 120	<0.15	mg/L	5.2 (8)	20		
8992283	Total Kjeldahl Nitrogen (TKN)	2023/10/20	NC	80 - 120	97	80 - 120	<0.7	mg/L	4.3 (1)	20	97	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8992301	Total Phosphorus	2023/10/20	110 (9)	80 - 120	101	80 - 120	<0.030	mg/L	2.4 (10)	25	103	80 - 120

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(3) Detection Limit was raised due to matrix interferences.

(4) Matrix Spike not calculated. Original sample and matrix spike sample were analyzed at a dilution, due to high target analytes, or sample matrix interference

(5) Matrix Spike Parent ID [XHC169-06]

(6) Duplicate Parent ID [XHC169-06]

(7) Matrix Spike Parent ID [XHC169-05]

(8) Duplicate Parent ID [XHC169-05]

(9) Matrix Spike Parent ID [XHC169-04]

(10) Duplicate Parent ID [XHC169-04]

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Bureau Veritas Job #: C3V9151
Report Date: 2023/10/24

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285739
Sampler Initials: JRA

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Anastassia Hamanov, Scientific Specialist

Cristina Carriere, Senior Scientific Specialist

Patricia Legette, Project Manager

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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FIELD INFORMATION FORM

BUREAU VERITAS

WASTE MANAGEMENT

Site Name: TCEC

Site No.: Sample: PS HOLDING TANK Sample ID

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes, Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: Y or N

Filter Device: Y or N 0.45 µ or ____ µ (circle or fill in)

Purging Device: A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Sampling Device: O

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other: ____

X-Other:

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other: ____

WELL DATA

Well Elevation (at TOC) (ft/msl)

Depth to Water (DTW) (from TOC) (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC) (ft msl)

Total Well Depth (from TOC) (ft)

Stick Up (from ground elevation) (ft)

Casing ID (in)

Casing Material

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
	1st	1st	1st					
	2nd	2nd	2nd					
	3rd	3rd	3rd					
	4th	4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
10 11 23	7.3	12.45	17.3	159	8.47		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

FIELD COMMENTS

Sample Appearance: cloudy, opaque Odor: strong leachate Color: Grey Other: ____

Weather Conditions (required daily, or as conditions change): 4°C Direction/Speed: 15Km/h W Outlook: Partly cloudy Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required): ____

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
10/11/23	Jake Artibello		

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v.3.1 10/20

0897

Maxxam Analytics Inc 6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #		
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285739	
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Unit 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	CHAIN OF CUSTODY # :
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x:2984 Fax: 519-823-1316	Project Name:	TCEC-LCHCM-OCT	TCEC-LCHCM-OCT
Email:	lmertick@wm.com	Email:	Brent.Langille@RWDI.com, JCL@rwdi.co	Location:	Twin Creeks	
				Sampled By:	JRA	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

☐ MISA Reg. 153 ☐ Table 1 ☐ Table 2 ☐ Table 3 Sewer Use ☐ Sanitary ☐ Storm Region _____ ☒ Other site specific (specify)

☐ PWQO

☐ Reg. 558

Report Criteria on C of A ? n

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ON-WLF-2023 TCLS - LEACHATE (PS HOLDING) MONTHLY	# of Cont.	COMMENTS / TAT COMMENTS
1	PS Holding Tank	11-Oct-23	PM	LCH	N	N	X	9	
2									See lab addendum for analysis.
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:

☒ 5 to 7 Working Days

Rush TAT: Rush Confirmation # _____ (call Lab for #)

☐ 1 day ☐ 2 days ☐ 3 days

DATE Required: 23-Oct-23

TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

13-Oct-23 10:22
Patricia Legette
C3V9151
WP ENV-936

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:
JRA 11-Oct-23 - AM			

Laboratory Use Only

Temperature (°C) on Receipt: 7 7 / 9 1 6 6

Condition of Sample on Receipt: ☐ OK ☐ SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

White: Maxxam Yellow: Mail Pink: Client

APPENDIX F:

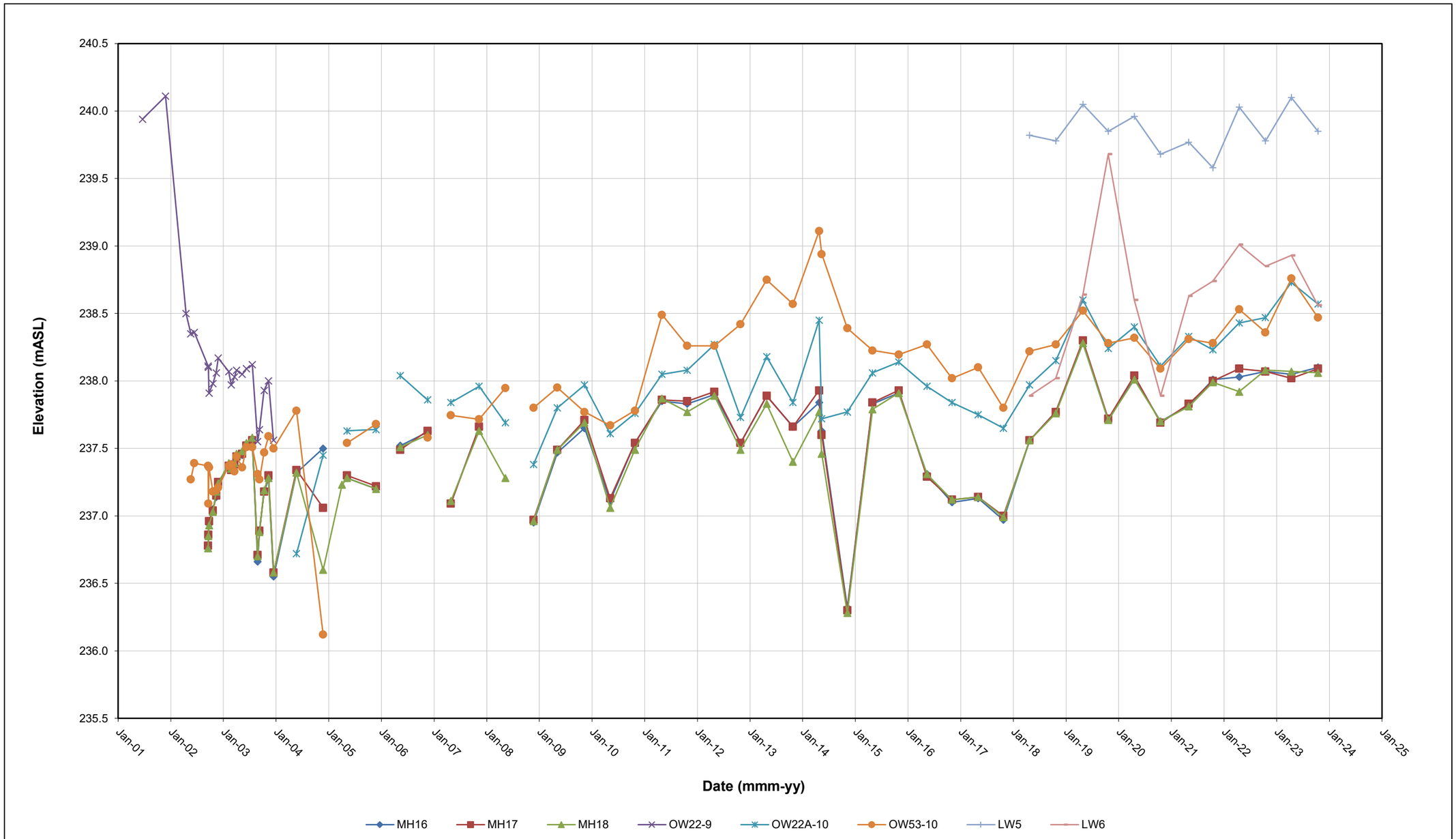
Liquid Level Results

Table F-1
Liquid Elevations
Twin Creeks Environmental Centre - Poplar System

Monitoring Area	Poplar System																			
	South Cell								Cell 3S						Cell 3	Cell 4			West Cell
Monitoring Locations	MH16	MH17	MH18	OW22-9	OW22A-10	OW53-10	LW5	LW6	MH3SA	MH3SB	MH3SC	MH3SD	MH3SE	MH3SF	OW51A-15	MH4A	MH4B	LW4	Sump
Measuring Point	239.69	239.6	239.23	243.98	243.66	244.55	247.20	247.76	241.27	241.19	239.8	239.9	249.99	249.02	250.45	241.07	245.64	248.24	248.9
Invert	235.41	235.1	234.93	NA	NA	NA	NA	NA	237.2	237.15	235.8	235.75	236.45	236.5	NA			NA	
20-Jun-01				239.94															
26-Nov-01				240.11															
18-Apr-02				238.50															
21-May-02				238.35		237.27			Dry	Dry	236.56	236.54	237.81	239.50		239.46	238.78		239.16
15-Jun-02				238.36		237.39			Dry	Dry	236.49	236.46	237.71	239.13		238.15	238.75		239.37
19-Sep-02	236.77	236.78	236.76	238.11		237.37													
20-Sep-02	236.85	236.86	236.85	238.10		237.09													
25-Sep-02	236.94	236.96	236.93	237.91		237.36													
22-Oct-02	237.05	237.04	237.03	237.98		237.18			Dry	Dry	236.11	236.22	237.57	238.82		238.42	238.93		239.48
14-Nov-02	237.14	237.15	237.18	238.06		237.19													
28-Nov-02	237.25	237.25	237.24	238.17		237.21													
9-Feb-03	237.36	237.37	237.39	238.07		237.37													
26-Feb-03	237.35	237.34	237.35	237.97		237.38													
21-Mar-03	237.38	237.38	237.39	238.03		237.33													
4-Apr-03	237.45	237.44	237.46	238.08		237.44													
13-May-03	237.45	237.46	237.48	238.05		237.36			Dry	Dry	236.92	237.03	238.61	241.87		239.65	239.02		240.10
12-Jun-03	237.52	237.52	237.54	238.09		237.51													
22-Jul-03	237.57	237.56	237.58	238.12		237.51													
28-Aug-03	236.66	236.71	236.70	237.55		237.31													
10-Sep-03	236.89	236.89	236.88	237.64		237.27													
13-Oct-03	237.18	237.18	237.19	237.93		237.47													
12-Nov-03	237.27	237.30	237.28	238.00		237.59			237.59	Dry	236.78	236.79	239.66	242.40		238.56	238.85		239.86
17-Dec-03	236.55	236.58	236.58	237.56		237.50													
25-May-04	237.32	237.34	237.32		236.72	237.78			238.34	Dry	236.75	236.76				239.86	238.89		239.68
26-Nov-04	237.50	237.06	236.60		237.45	236.12			238.20	238.04	235.89	235.44	239.85	242.34		238.36	238.87		
6-Apr-05			237.23									236.93				239.19			239.40
12-May-05	237.28	237.30	237.28		237.63	237.54			239.14	238.73	236.82	236.83	241.85	244.56		239.15	239.15		239.27
29-Nov-05	237.20	237.22	237.20		237.64	237.68			Dry	Dry	236.68	236.60	246.08	246.80	235.97	237.59	239.19		239.40
27-Mar-06											236.75					238.26			239.15
17-May-06	237.52	237.49	237.51		238.04				237.65	Dry	236.35	236.36	242.00	245.02	236.16	238.66	239.68		239.45
22-Nov-06	237.62	237.63	237.60		237.86	237.58			237.47	Dry	236.90	237.03	242.46	244.99	236.40	238.19	240.08		239.38
4-Apr-07												236.90				238.89			239.54
3-May-07	237.10	237.09	237.11		237.84	237.75			237.82	238.09	236.64	236.75	242.69	244.93	235.98	238.68	238.63		239.15
15-Nov-07	237.65	237.66	237.63		237.96	237.72			237.54	<237.18	236.90	236.93	241.07	243.17	235.78	237.71	238.98		239.31
15-May-08			237.28		237.69	237.95			237.87	237.85	236.65	236.77	242.61	244.20	235.93	238.51	240.29		239.51
4-Nov-08									237.63	237.73	236.86	237.82	242.49	245.14	237.98*	237.52	238.40		239.47
27-Nov-08	236.95	236.97	236.96		237.38	237.80													
12-May-09	237.47	237.49	237.49		237.80	237.95			238.47	237.92	236.56	236.72	240.44	243.79	236.18	237.87	240.62		239.40
16-Nov-09	237.65	237.71	237.69		237.97	237.77			237.83	Dry	236.07	236.07	241.34	243.39	236.03	236.34	240.61		239.15
14-May-10	237.11	237.13	237.06		237.61	237.67			237.73	Dry	233.17	Dry		243.38	235.85	238.06	240.33		239.59
2-Nov-10	237.54	237.54	237.49		237.76	237.78			237.67	Dry	233.38	235.59	240.85	243.20	235.90	238.06	240.39		239.63
9-May-11	237.85	237.86	237.87		238.05	238.49			237.96	237.41	234.43	235.64	242.79	244.89	236.03	238.29	241.56		240.20
1-Nov-11	237.83	237.85	237.77		238.08	238.26			237.86	Dry	234.83	234.97	242.38	244.45	235.91	236.52	237.12		238.83
7-May-12	237.90	237.92	237.89		238.27	238.26			238.19	237.41	233.09	Dry	242.43	244.31	236.07	238.38	237.57		239.89
5-Nov-12	237.54	237.54	237.49		237.73	238.42			237.95	237.19	234.83	Dry	241.86	243.53	235.98	238.19	237.57		238.69
6-May-13	237.89	237.89	237.83		238.18	238.75			238.88	238.67	232.95	Dry	243.04	245.01	236.05	238.54	238.35		240.91
4-Nov-13	237.66	237.66	237.40		237.84	238.57			237.99	237.16	234.79	235.29	242.68	242.72	236.47	238.37	237.66		239.03
5-May-14	237.84	237.93	237.77		238.45	239.11			238.89	238.76	233.00	<235.32	242.97	245.06	236.71	238.60	238.38		240.86
23-May-14	237.63	237.60	237.46		237.72	238.94			237.91	237.24	234.61	235.31	242.70	242.82	236.50	238.24	237.73		238.99
17-Nov-14	236.32	236.30	236.28		237.77	238.39			238.18	<237.29	234.21	<233.65	243.58	243.08	236.32	237.27	238.80		238.65
11-May-15	237.83	237.84	237.79		238.06	238.23			238.60	237.72	233.90	<234.67	244.08	241.34	236.23	237.99	240.32		238.34
10-Nov-15	237.91	237.93	237.91		238.14	238.20			238.05	237.05	233.64	<234.67	242.82	242.97	236.23	237.71	238.74		237.31
24-May-16	237.31	237.29	237.31		237.96	238.27			238.30	237.05	233.72	<234.69	243.19	244.04	236.03	238.39	239.61		241.40
14-Nov-16	237.10	237.12	237.12		237.84	238.02			238.78	237.44	233.72	<234.69	242.78	242.88	236.05	237.64	239.66		240.26
15-May-17	237.13	237.14	237.14		237.75	238.10			238.99	237.32	234.46	<234.36	243.35	244.04	236.02	238.38	239.63		242.01
6-Nov-17	236.97	237.00	236.99		237.65	237.80			238.56	238.00	236.01	<234.36	243.99	242.01	236.27	235.92	239.58		242.05
7-May-18	237.56	237.56	237.56		237.97	238.22	239.82	237.89	239.53	239.32	236.03	235.74	243.98	244.04	236.05	234.58	238.91	240.44	243.26
5-Nov-18	237.77	237.77	237.76		238.15	238.27	239.78	238.02	240.25	240.30	234.83	234.36	243.89	243.92	236.04	234.48	239.74	240.29	244.12
13-May-19	238.28	238.30	238.28		238.60	238.52	240.05	238.64	239.01	239.60	237.44	237.11	243.89	243.92	236.26	238.49	239.62	240.54	245.14
4-Nov-19	237.71	237.72	237.71		238.24	238.28	239.85	239.68	239.00	238.57	237.40	238.11	243.90	243.92	236.20	238.79	238.93	240.49	242.54
4-May-20	238.02	238.04	238.01		238.40	238.32	239.96	238.60	237.93	238.06	235.54	235.51	243.94	243.99	236.14	239.24	239.32	240.96	240.37
2-Nov-20	237.70	237.69	237.70		238.11	238.09	239.68	237.89	238.67	237.99	233.69	235.55	243.43	243.66	236.34	235.89	239.43	241.39	241.03
17-May-21	237.82	237.83	237.81		238.33	238.31	239.77	238.63	239.43	239.51	236.79	236.49	243.88	243.90	236.47	238.59	239.44	241.90	241.92
1-Nov-21	238.01	238.00	237.99		238.23	238.28	239.58	238.74	239.74	239.58	236.82	237.97	243.88	243.92	236.29	239.92	239.95	242.01	242.66
2-May-22	238.03	238.09	237.92		238.43	238.53	240.03	239.01	240.09	239.99	235.57	235.37	244.01	244.05	236.30	238.50	239.46	242.27	242.43
1-Nov-22	238.07	238.07	238.08		238.47	238.36	239.78	238.85	238.77	238.52	237.15	236.84	243.65	243.70	236.58	238.38	239.37	242.10	242.56
1-May-23	238.05	238.02	238.07		238.73	238.76	240.10	238.93	239.45	239.42	236.05	235.99	244.00	244.00	237.67	240.11	240.20	242.41	245.45
1-Nov-23	238.10	238.09	238.06		238.57	238.47	239.85	238.56	238.91	238.84	236.45	236.08	243.81	243.48	236.94	240.09	240.31	242.18	244.08

Notes:

1) NA indicates not applicable.
2) Blank indicates data not available.
3) Monitoring well OW22-9 was decommissioned and reinstalled as OW22A-10 in March 2004.
4) Elevations in metres above sea level.
5) Measuring point elevations for MW16, MW17, and MW18 updated based on a June 2015 survey.



NOTES:

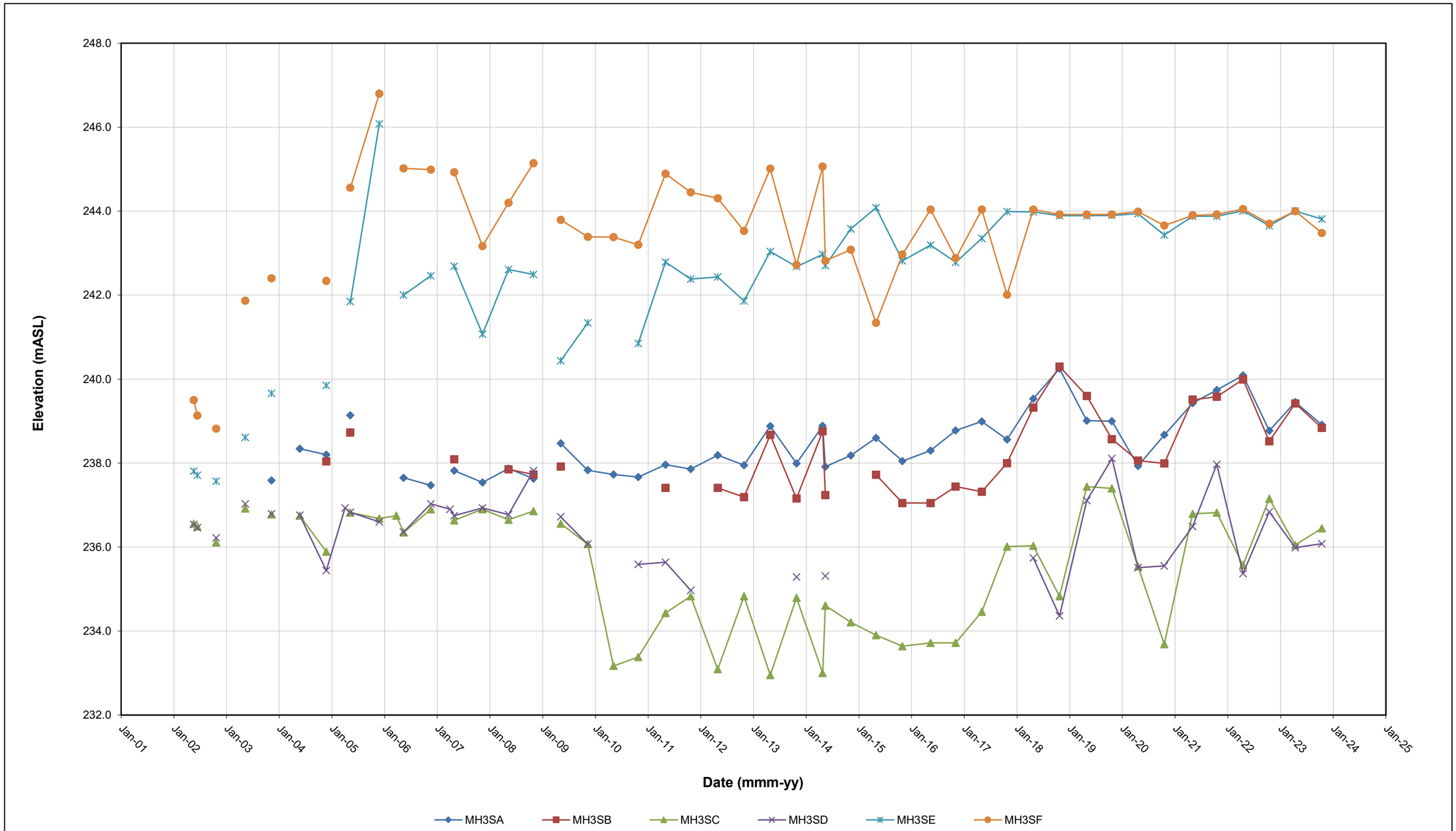
1. mASL denotes metres above sea level

LEACHATE ELEVATION HYDROGRAPH
South Cell

2023 FOURTH QUARTER AND ANNUAL MONITORING REPORT

TWIN CREEKS ENVIRONMENTAL CENTRE
WASTE MANAGEMENT OF CANADA CORPORATION

FIGURE NUMBER	PROJECT NUMBER
F-1	2303459
DATE REVISED	**REVISED BY**
21-Dec-23	JMH



NOTES:

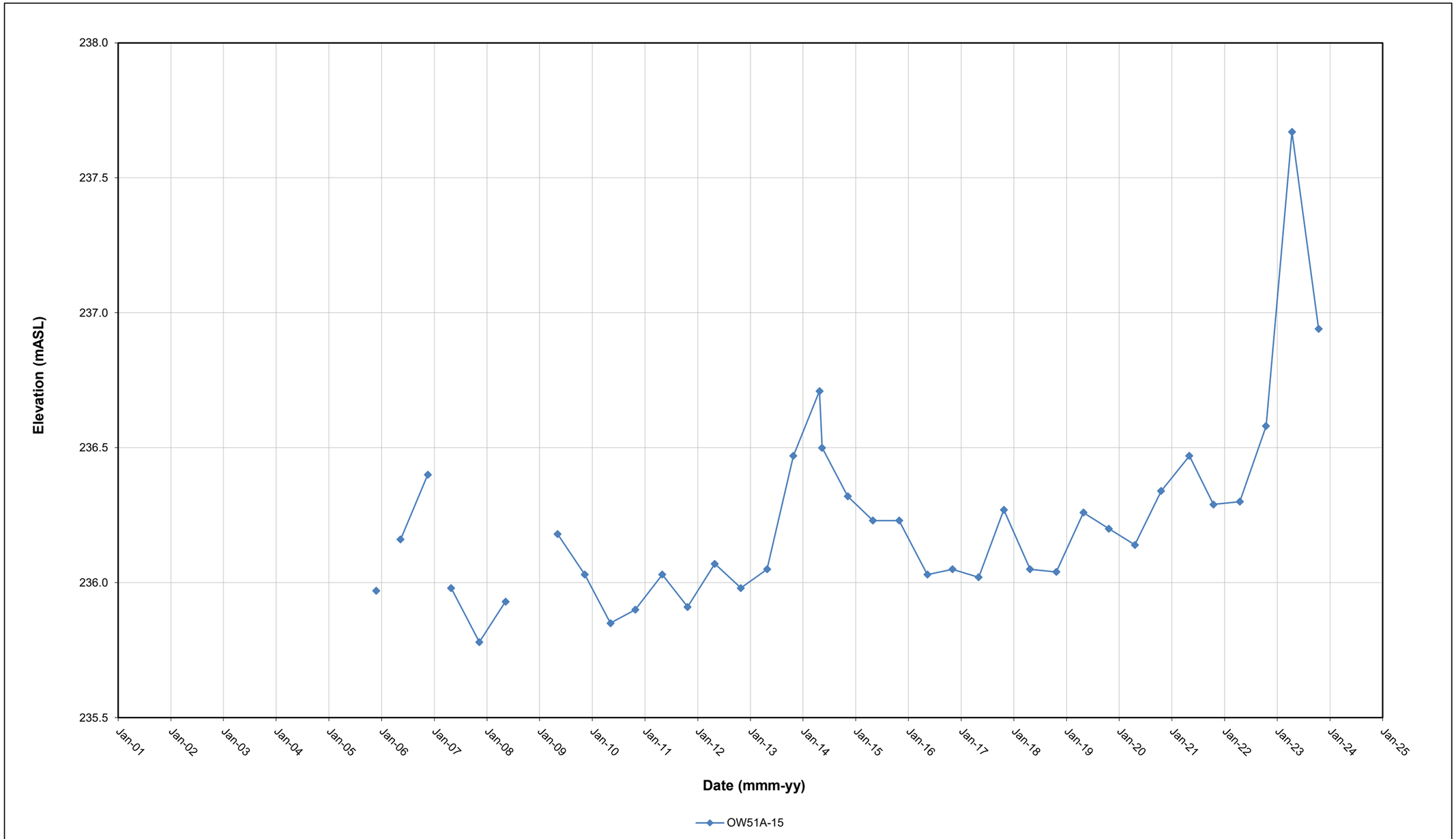
1. mASL denotes metres above sea level

LEACHATE ELEVATION HYDROGRAPH
Cell 3S

2023 FOURTH QUARTER AND ANNUAL MONITORING REPORT

TWIN CREEKS ENVIRONMENTAL CENTRE
WASTE MANAGEMENT OF CANADA CORPORATION

FIGURE NUMBER	PROJECT NUMBER
F-2	2303459
DATE REVISED	**REVISED BY**
21-Dec-23	JMH



NOTES:

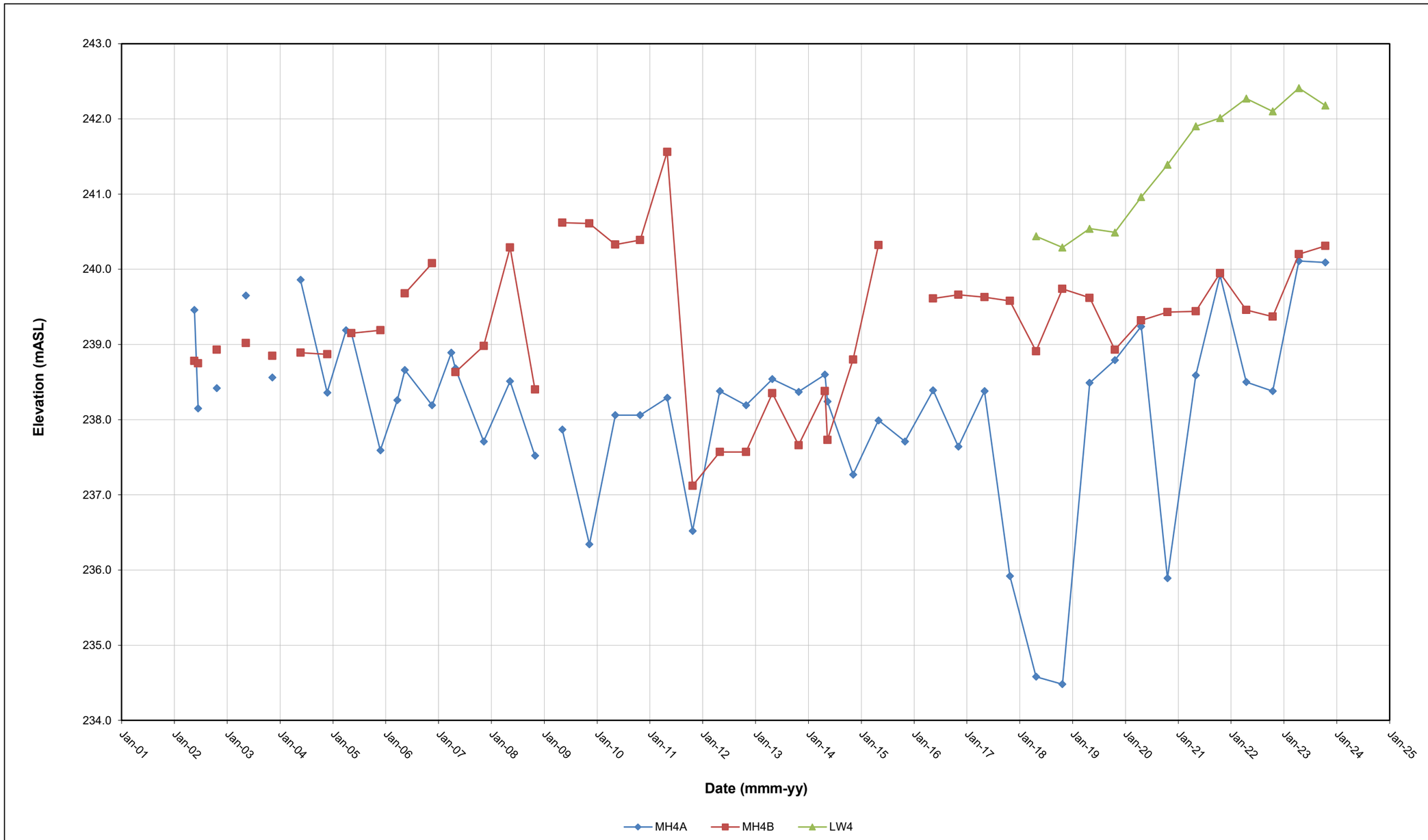
1. mASL denotes metres above sea level

LEACHATE ELEVATION HYDROGRAPH
Cell 3

2023 FOURTH QUARTER AND ANNUAL MONITORING REPORT

TWIN CREEKS ENVIRONMENTAL CENTRE
WASTE MANAGEMENT OF CANADA CORPORATION

FIGURE NUMBER	PROJECT NUMBER
F-3	2303459
DATE REVISED	**REVISED BY**
21-Dec-23	JMH



NOTES:

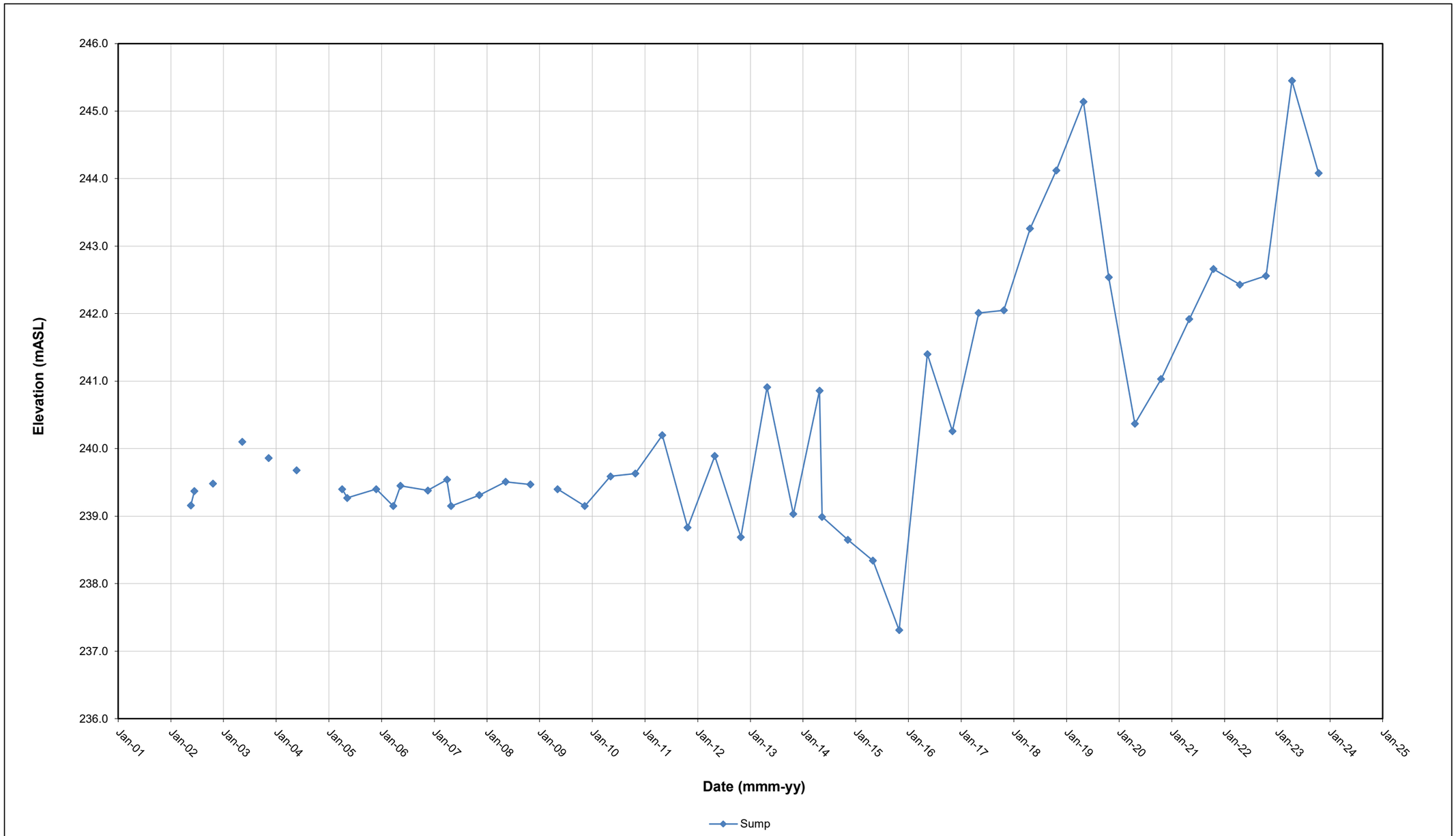
1. mASL denotes metres above sea level

LEACHATE ELEVATION HYDROGRAPH
Cell 4

2023 FOURTH QUARTER AND ANNUAL MONITORING REPORT

TWIN CREEKS ENVIRONMENTAL CENTRE
WASTE MANAGEMENT OF CANADA CORPORATION

FIGURE NUMBER	PROJECT NUMBER
F-4	2303459
DATE REVISED	**REVISED BY**
21-Dec-23	JMH



NOTES:

1. mASL denotes metres above sea level

LEACHATE ELEVATION HYDROGRAPH
West Cell

2023 FOURTH QUARTER AND ANNUAL MONITORING REPORT

TWIN CREEKS ENVIRONMENTAL CENTRE
WASTE MANAGEMENT OF CANADA CORPORATION

FIGURE NUMBER	PROJECT NUMBER
F-5	2303459
DATE REVISED	**REVISED BY**
21-Dec-23	JMH

APPENDIX G:

Soil Analytical Results

Table G-1
Soil - General Chemical Results - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	Soil Concentration Indicators	Poplar System											
			S1 (Zone 1)											
			28-Sep-17	27-Sep-18	10-Sep-19	4-Sep-20	16-Sep-21	21-Sep-22	12-Sep-23					
Total Ammonia	ug/g		<20	29	<20	<20	<20	<20	<20					
Total Organic Carbon	mg/kg		17000	13000	16000	15000	15000	14000	19000					
Calculated Total Kjeldahl Nitrogen	ug/g		1730	1330	1820	1790	1470	1490	1710					
Chloride (Cl)	ug/g	0.2-0.3%	58	273	183	36	68	108	15					
Nitrate (N)	ug/g		<4	69	19	3	<2	<2	<2					
Sulphate (SO4)	ug/g		160	90	172	92	326	777	67					
Hot Water Ext. Boron (B)	ug/g	>5	4.7	8.2	3.2	1.3	2.8	4.2	1.1					
Acid Extractable Aluminum (Al)	ug/g		16000	16000	18000	16000	17000	16000	16000					
Acid Extractable Arsenic (As)	ug/g	14*	6.7	7.2	7.6	6.8	6.8	6.7	6.9					
Acid Extractable Barium (Ba)	ug/g		81	85	88	82	79	85	84					
Acid Extractable Beryllium (Be)	ug/g		0.76	0.74	0.85	0.77	0.76	0.76	0.83					
Acid Extractable Bismuth (Bi)	ug/g		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Acid Extractable Cadmium (Cd)	ug/g	1.6*	0.19	0.19	0.19	0.17	0.16	0.21	0.21					
Acid Extractable Chromium (Cr)	ug/g		28	28	30	28	28	29	28					
Acid Extractable Cobalt (Co)	ug/g	20*	13	14	14	14	13	14	14					
Acid Extractable Lead (Pb)	ug/g	60*	16	15	17	17	15	16	18					
Acid Extractable Molybdenum (Mo)	ug/g	4*	2.7	3.3	2.7	3.1	3.0	3.4	2.8					
Acid Extractable Nickel (Ni)	ug/g	32*	29	37	34	32	32	33	30					
Acid Extractable Selenium (Se)	ug/g	1.6*	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50					
Acid Extractable Silver (Ag)	ug/g		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20					
Acid Extractable Strontium (Sr)	ug/g		29	81	53	39	59	59	28					
Acid Extractable Tin (Sn)	ug/g		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Acid Extractable Titanium (Ti)	ug/g		71	84	69	50	70	82	54					
Acid Extractable Vanadium (V)	ug/g		35	32	34	34	33	33	34					
Acid Extractable Zinc (Zn)	ug/g	200/220*	59	68	73	59	60	57	62					
P ($NaHCO_3$ Extractable)	µg/g		10	9	7	8	10	6	6					
Calcium (NH_4 Acetate Extractable)	mg/L		310	270	490	81	120	150	33					
Magnesium (NH4 Acetate Extractable)	mg/L		29	35	31	12	40	57	5.5					
Potassium (NH4 Acetate Extractable)	mg/L		7.8	19	12	0.11	6.3	7.5	2.2					
Sodium (NH4 Acetate Extractable)	mg/L		16	36	27	52	120	190	55					
Ammonia (KCl Extractable)	mg/kg	>500 kg/ha	<2.0	25	<2.0	<2.0	<2.0	<2.0	<2.0					
SAR - Sodium Absorption Ratio (calculated)	<10-low;10-18 - medium;18-26-high		1.2	2.9	1.7	7.6	13.4	18.7	12.5					

NOTES:

1) Blank indicates data not available.
2) '*' Indicates Maximum Permissible Metal Content in Soils Receiving Waste Materials (MOE, 1996).
3) Shading indicates exceedances of Maximum Permissible Metal Content in Soils Receiving Waste Materials.
4) IS indicates insufficient sample.
5) ppm indicates parts per million, ug/g indicates micrograms per gram, and kg/ha indicates kilograms per hectare.
6) Italics denotes parameter concentration is presented as half the laboratory RDL for SAR calculation purposes.

Table G-1
Soil - General Chemical Results - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	Soil Concentration Indicators	Poplar System											
			S2 (Zone 2)											
			28-Sep-17	27-Sep-18	10-Sep-19	4-Sep-20	16-Sep-21	21-Sep-22	12-Sep-23					
Total Ammonia	ug/g		<20	<20	<20	<20	<20	<20	<20					
Total Organic Carbon	mg/kg		17000	14000	16000	15000	18000	14000	19000					
Calculated Total Kjeldahl Nitrogen	ug/g		1410	1470	1690	1580	1630	1530	1520					
Chloride (Cl)	ug/g	0.2-0.3%	73	47	<10	11	260	<10	26					
Nitrate (N)	ug/g		8	6	<2	<2	4	<2	4					
Sulphate (SO4)	ug/g		98	50	<20	31	180	100	100					
Hot Water Ext. Boron (B)	ug/g	>5	0.99	0.49	0.58	0.84	5.0	1.4	1.0					
Acid Extractable Aluminum (Al)	ug/g		17000	19000	18000	17000	13000	15000	13000					
Acid Extractable Arsenic (As)	ug/g	14*	7.4	7.6	6.9	7.4	5.7	6.9	5.8					
Acid Extractable Barium (Ba)	ug/g		84	92	84	84	68	86	71					
Acid Extractable Beryllium (Be)	ug/g		0.79	0.92	0.87	0.80	0.57	0.75	0.62					
Acid Extractable Bismuth (Bi)	ug/g		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Acid Extractable Cadmium (Cd)	ug/g	1.6*	0.24	0.17	0.18	0.19	0.18	0.21	0.19					
Acid Extractable Chromium (Cr)	ug/g		29	32	30	28	23	28	22					
Acid Extractable Cobalt (Co)	ug/g	20*	15	16	14	15	9.9	13	10					
Acid Extractable Lead (Pb)	ug/g	60*	18	18	17	18	15	15	16					
Acid Extractable Molybdenum (Mo)	ug/g	4*	2.6	3.1	2.5	2.8	2.5	3.5	2.3					
Acid Extractable Nickel (Ni)	ug/g	32*	33	37	32	32	27	35	25					
Acid Extractable Selenium (Se)	ug/g	1.6*	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50					
Acid Extractable Silver (Ag)	ug/g		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20					
Acid Extractable Strontium (Sr)	ug/g		39	32	34	34	57	66	39					
Acid Extractable Tin (Sn)	ug/g		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Acid Extractable Titanium (Ti)	ug/g		64	62	47	57	100	84	99					
Acid Extractable Vanadium (V)	ug/g		35	37	35	35	27	32	28					
Acid Extractable Zinc (Zn)	ug/g	200/220*	69	67	64	59	61	57	59					
P ($NaHCO_3$ Extractable)	µg/g		8	10	11	9	10	4	6					
Calcium (NH_4 Acetate Extractable)	mg/L		330	330	520	43	160	50	68					
Magnesium (NH4 Acetate Extractable)	mg/L		23	22	26	6	32	12	11					
Potassium (NH4 Acetate Extractable)	mg/L		8.2	13	14	0.12	6.3	2.5	3.2					
Sodium (NH4 Acetate Extractable)	mg/L		8.4	2.2	1	29	120	39	56					
Ammonia (KCl Extractable)	mg/kg	>500 kg/ha	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0					
SAR - Sodium Adsorption Ratio (calculated)	<10-low;10-18-medium;18-26-high		0.6	0.2	0.03	5.9	12.2	7.0	8.9					

NOTES:

1) Blank indicates data not available.
2) '*' Indicates Maximum Permissible Metal Content in Soils Receiving Waste Materials (MOE, 1996).
3) Shading indicates exceedances of Maximum Permissible Metal Content in Soils Receiving Waste Materials.
4) IS indicates insufficient sample.
5) ppm indicates parts per million, ug/g indicates micrograms per gram, and kg/ha indicates kilograms per hectare.
6) *Italics* denotes parameter concentration is presented as half the laboratory RDL for SAR calculation purposes.

Table G-1
Soil - General Chemical Results - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	Soil Concentration Indicators	Poplar system											
			S3 (Zone 3)											
			28-Sep-17	27-Sep-18	10-Sep-19	4-Sep-20	16-Sep-21	21-Sep-22	12-Sep-23					
Total Ammonia	ug/g		<20	<20	<20	<20	<20	<20	<20					
Total Organic Carbon	mg/kg		16000	14000	20000	11000	16000	6400	12000					
Calculated Total Kjeldahl Nitrogen	ug/g		1640	1420	1700	1160	1530	853	683					
Chloride (Cl)	ug/g	0.2-0.3%	11	40	20	193	288	140	150					
Nitrate (N)	ug/g		<4	3	<2	44	6	<2	33					
Sulphate (SO4)	ug/g		47	791	152	339	373	1540	240					
Hot Water Ext. Boron (B)	ug/g	>5	0.48	2.8	2	4.2	3.8	3.2	4.7					
Acid Extractable Aluminum (Al)	ug/g		18000	16000	16000	14000	13000	13000	15000					
Acid Extractable Arsenic (As)	ug/g	14*	7.4	6.9	6.7	6.2	7.1	6.2	6.5					
Acid Extractable Barium (Ba)	ug/g		87	81	72	81	77	72	79					
Acid Extractable Beryllium (Be)	ug/g		0.86	0.78	0.76	0.65	0.65	0.64	0.72					
Acid Extractable Bismuth (Bi)	ug/g		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Acid Extractable Cadmium (Cd)	ug/g	1.6*	0.26	0.16	0.2	0.19	0.21	<0.10	0.13					
Acid Extractable Chromium (Cr)	ug/g		30	29	28	26	27	25	27					
Acid Extractable Cobalt (Co)	ug/g	20*	16	14	12	12	11	13	12					
Acid Extractable Lead (Pb)	ug/g	60*	18	16	18	16	19	11	13					
Acid Extractable Molybdenum (Mo)	ug/g	4*	2.7	3.4	2.8	3.2	2.7	3.7	3.2					
Acid Extractable Nickel (Ni)	ug/g	32*	34	36	31	33	29	35	35					
Acid Extractable Selenium (Se)	ug/g	1.6*	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50					
Acid Extractable Silver (Ag)	ug/g		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20					
Acid Extractable Strontium (Sr)	ug/g		30	82	55	73	63	100	75					
Acid Extractable Tin (Sn)	ug/g		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Acid Extractable Titanium (Ti)	ug/g		62	78	62	74	72	97	97					
Acid Extractable Vanadium (V)	ug/g		37	34	33	30	28	27	30					
Acid Extractable Zinc (Zn)	ug/g	200/220*	65	64	71	59	73	50	56					
P ($NaHCO_3$ Extractable)	µg/g		9	4	6	5	7	2	4					
Calcium (NH_4 Acetate Extractable)	mg/L		330	310	480	300	230	430	99					
Magnesium (NH4 Acetate Extractable)	mg/L		24	33	39	82	57	120	33					
Potassium (NH4 Acetate Extractable)	mg/L		8.8	9.6	10	0.09	6.3	6.6	13					
Sodium (NH4 Acetate Extractable)	mg/L		2	8.2	7	170	310	240	290					
Ammonia (KCl Extractable)	mg/kg	>500 kg/ha	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0					
SAR - Sodium Adsorption Ratio (calculated)	<10-low;10-18-medium;18-26-high		0.2	0.6	0.5	12.3	25.9	14.5	35.7					

NOTES:

1) Blank indicates data not available.
2) '*' Indicates Maximum Permissible Metal Content in Soils Receiving Waste Materials (MOE, 1996).
3) Shading indicates exceedances of Maximum Permissible Metal Content in Soils Receiving Waste Materials.
4) IS indicates insufficient sample.
5) ppm indicates parts per million, ug/g indicates micrograms per gram, and kg/ha indicates kilograms per hectare.
6) *Italics* denotes parameter concentration is presented as half the laboratory RDL for SAR calculation purposes.

Table G-1
Soil - General Chemical Results - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	Soil Concentration Indicators	Poplar system											
			S4 (Zone 4)											
			28-Sep-17	27-Sep-18	10-Sep-19	4-Sep-20	16-Sep-21	21-Sep-22	12-Sep-23					
Total Ammonia	ug/g		<20	<20	<20	<20	<20	<20	<20					
Total Organic Carbon	mg/kg		24000	26000	23000	20000	17000	13000	16000					
Calculated Total Kjeldahl Nitrogen	ug/g		2290	2380	2190	2430	1670	1310	1180					
Chloride (Cl)	ug/g	0.2-0.3%	47	57	<10	214	45	186	330					
Nitrate (N)	ug/g		7	25	6	140	7	<2	18					
Sulphate (SO4)	ug/g		56	38	<20	125	<20	362	420					
Hot Water Ext. Boron (B)	ug/g	>5	1.4	0.72	0.4	4.6	0.66	5.6	5.4					
Acid Extractable Aluminum (Al)	ug/g		16000	11000	16000	16000	16000	15000	15000					
Acid Extractable Arsenic (As)	ug/g	14*	6.7	6.1	6.8	6.2	4.6	6.1	6.3					
Acid Extractable Barium (Ba)	ug/g		76	57	79	77	78	83	78					
Acid Extractable Beryllium (Be)	ug/g		0.77	0.51	0.84	0.76	0.68	0.73	0.76					
Acid Extractable Bismuth (Bi)	ug/g		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Acid Extractable Cadmium (Cd)	ug/g	1.6*	0.25	0.24	0.21	0.16	0.18	0.14	0.17					
Acid Extractable Chromium (Cr)	ug/g		29	21	28	27	26	28	27					
Acid Extractable Cobalt (Co)	ug/g	20*	13	7.5	13	12	10	13	13					
Acid Extractable Lead (Pb)	ug/g	60*	20	23	18	15	14	13	15					
Acid Extractable Molybdenum (Mo)	ug/g	4*	2.9	1.4	2.6	3	1.3	3.5	2.8					
Acid Extractable Nickel (Ni)	ug/g	32*	31	19	30	31	25	34	30					
Acid Extractable Selenium (Se)	ug/g	1.6*	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50					
Acid Extractable Silver (Ag)	ug/g		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20					
Acid Extractable Strontium (Sr)	ug/g		45	23	30	37	46	71	39					
Acid Extractable Tin (Sn)	ug/g		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Acid Extractable Titanium (Ti)	ug/g		67	100	47	61	130	78	60					
Acid Extractable Vanadium (V)	ug/g		34	26	35	34	30	31	33					
Acid Extractable Zinc (Zn)	ug/g	200/220*	73	83	66	59	53	56	56					
P ($NaHCO_3$ Extractable)	ug/g		9	10	8	8	7	<2	4					
Calcium (NH_4 Acetate Extractable)	mg/L		330	390	520	200	94	130	130					
Magnesium (NH4 Acetate Extractable)	mg/L		32	17	28	40	16	35	46					
Potassium (NH4 Acetate Extractable)	mg/L		11	7.8	15	0.14	2.8	4.4	6.6					
Sodium (NH4 Acetate Extractable)	mg/L		5.8	2.2	0.2	270	37	250	330					
Ammonia (KCl Extractable)	mg/kg	>500 kg/ha	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0					
SAR - Sodium Adsorption Ratio (calculated)	<10-low;10-18-medium;18-26-high		0.4	0.2	0.01	24.6	5.0	27.5	35.2					

NOTES:

1) Blank indicates data not available.
2) '*' Indicates Maximum Permissible Metal Content in Soils Receiving Waste Materials (MOE, 1996).
3) Shading indicates exceedances of Maximum Permissible Metal Content in Soils Receiving Waste Materials.
4) IS indicates insufficient sample.
5) ppm indicates parts per million, ug/g indicates micrograms per gram, and kg/ha indicates kilograms per hectare.
6) *Italics* denotes parameter concentration is presented as half the laboratory RDL for SAR calculation purposes.

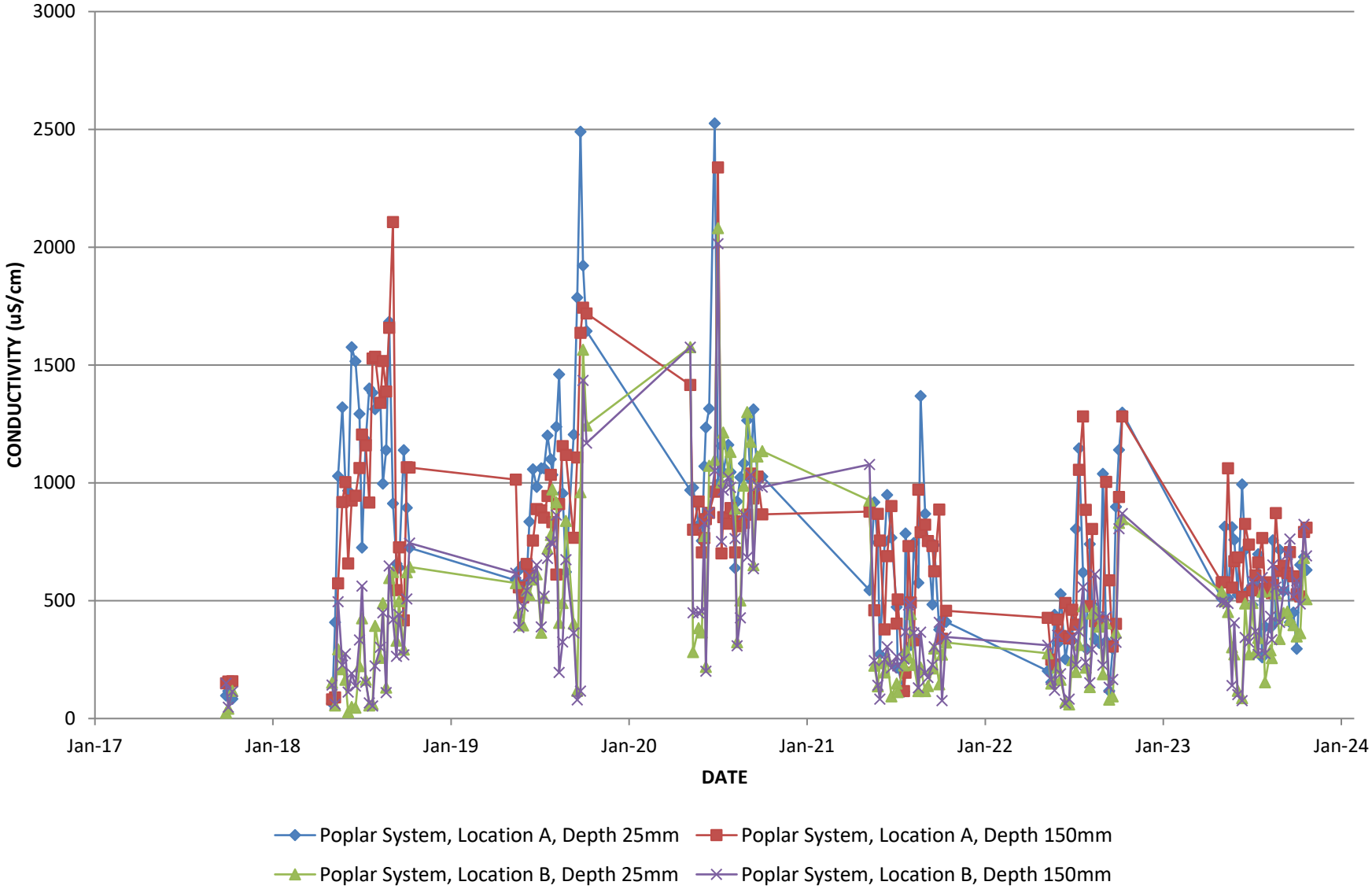
Table G-2
Soil - Electrical Conductivity Results
Twin Creeks Environmental Centre - Poplar System

Location	Depth (mm)	Conductivity (µS/cm)																									
		3-May-23	9-May-23	16-May-23	24-May-23	29-May-23	5-Jun-23	14-Jun-23	20-Jun-23	28-Jun-23	5-Jul-23	11-Jul-23	17-Jul-23	25-Jul-23	31-Jul-23	11-Aug-23	14-Aug-23	16-Aug-23	22-Aug-23	30-Aug-23	7-Sep-23	15-Sep-23	20-Sep-23	27-Sep-23	4-Oct-23	11-Oct-23	19-Oct-23	24-Oct-23
1-A	25	470	1,120	160	720	1,160	1,190	1,320	640	340	280	260	800	360	150	250	100	500	260	1,110	440	510	330	400	270	870	920	750
	150	600	890	40	810	1,090	1,010	1,110	1,000	280	320	340	980	650	420	210	250	510	540	840	690	640	590	700	440	1,050	1,000	1,190
1-B	25	570	480	280	130	90	20	400	70	380	220	140	820	120	210	210	330	630	380	660	350	580	430	360	320	820	740	1,330
	150	570	350	270	290	40	10	390	140	380	270	400	870	240	300	110	480	590	530	890	950	940	770	860	520	870	920	1,410
2-A	25	250	1,620	1,150	1,530	1,330	1,020	1,360	960	1,480	980	920	970	180	830	320	1,540	1,480	650	510	370	610	500	420	290	1,110	620	530
	150	340	2,690	1,060	1,190	1,480	920	1,200	970	1,420	1,180	1,060	1,010	650	1,000	410	1,510	1,800	1,120	440	420	600	540	370	660	1,120	610	700
2-B	25	210	680	840	760	350	320	1,220	1,140	1,460	660	840	580	190	480	300	1,610	490	350	500	270	180	310	290	380	1,070	380	540
	150	290	840	80	1,090	290	210	610	1,160	1,880	720	130	730	230	680	390	1,880	580	360	560	360	520	330	430	590	1,170	690	820
3-A	25	810	360	60	210	70	80	220	30	300	220	290	560	150	250	610	340	460	310	560	870	720	230	450	560	540	460	490
	150	1,060	430	180	170	20	120	270	10	350	310	330	530	300	330	1,020	450	510	410	450	560	820	650	490	670	730	610	380
3-B	25	650	340	110	150	50	30	370	20	240	230	240	420	70	330	230	300	410	310	280	330	530	480	540	850	540	430	550
	150	620	380	170	220	100	90	360	70	380	310	270	410	320	400	540	320	490	340	420	700	870	280	770	880	730	520	610
4-A	25	570	630	1,070	1,390	1,090	320	1,670	1,860	220	780	1,160	690	480	550	430	430	880	510	520	310	790	630	570	170	610	1,110	880
	150	480	720	1,000	930	730	450	1,450	1,640	230	970	1,180	790	860	750	870	280	1,030	610	530	560	770	720	480	540	600	1,220	1,080
4-B	25	610	350	100	120	40	10	220	70	300	150	340	300	220	120	370	230	540	350	500	820	600	500	320	110	740	710	930
	150	630	430	50	160	70	20	240	110	230	250	340	420	290	330	450	320	580	450	600	1,030	850	620	550	220	970	940	1,100
5-A	25	450	340	120	210	140	10	400	90	390	150	220	470	130	170	320	200	460	320	880	720	500	350	410	190	130	320	500
	150	410	580	500	240	100	80	100	70	440	260	400	520	290	390	150	340	510	450	980	860	700	520	600	280	460	610	830
5-B	25	450	410	180	200	60	50	230	60	70	150	150	570	170	310	170	240	580	300	300	500	200	260	230	150	240	270	300
	150	360	440	130	270	10	50	120	140	50	300	220	560	300	460	180	260	550	360	250	440	630	590	310	220	380	380	530
Geometric Mean of A Locations	25	510	814	512	812	758	524	994	716	546	482	570	698	260	390	386	522	756	410	716	542	626	408	450	296	652	686	630
	150	578	1,062	556	668	684	516	826	738	544	608	662	766	550	578	532	566	872	626	648	618	706	604	528	518	792	810	836
Geometric Mean of B Locations	25	498	452	302	272	118	86	488	272	490	282	342	538	154	290	256	542	530	338	448	454	418	396	348	362	682	506	730
	150	494	488	140	406	102	76	344	324	584	370	272	598	276	434	334	652	558	408	544	696	762	518	584	486	824	690	894

Notes:

1) µS/cm denotes microsiemens per centimetre.
2) mm denotes millimetre.
3) 'A' denotes sample collected near drip emitter.
4) 'B' denotes sample collected between irrigation lines.

FIGURE G-1
SOIL CONDUCTIVITY DISTRIBUTION
EXPANDED POPLAR SYSTEM



APPENDIX G-3:

2023 Certificates of Analysis

Your P.O. #: 12285741
Your Project #: 2303459.01
Site#: 900
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/10/26
Report #: R7879743
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3S3198
Received: 2023/09/14, 08:38

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Anions	1	2023/09/15	2023/09/19	CAM SOP-00435	SM 23 4110 B m
Anions	4	2023/09/19	2023/09/19	CAM SOP-00435	SM 23 4110 B m
Hot Water Extractable Boron	5	2023/09/18	2023/09/19	CAM SOP-00408	R153 Ana. Prot. 2011
Acid Extractable Metals by ICPMS	4	2023/09/18	2023/09/18	CAM SOP-00447	EPA 6020B m
Acid Extractable Metals by ICPMS	1	2023/09/18	2023/09/19	CAM SOP-00447	EPA 6020B m
Moisture	5	N/A	2023/09/15	CAM SOP-00445	Carter 2nd ed 51.2 m
Ammonia-N	5	2023/09/15	2023/09/18	CAM SOP-00441	Carter, SS&A
Nitrogen	5	N/A	2023/09/18	CAM SOP-00460	EN0000:2003 TC WI
Nitrate & Nitrite as Nitrogen in Soil	5	2023/09/19	2023/09/19	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Additional Subcontracted Analysis (1)	5	N/A	N/A		
Subcontracted Analysis (2)	5	N/A	N/A		
Calculated Total Kjeldahl Nitrogen	5	N/A	2023/09/19	Auto Calc.	
Total Organic Carbon in Soil	5	N/A	2023/09/18	CAM SOP-00468	BCMOE TOC Aug 2014

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Your P.O. #: 12285741
Your Project #: 2303459.01
Site#: 900
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/10/26
Report #: R7879743
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3S3198
Received: 2023/09/14, 08:38

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Eurofins Environment Testing Canada, 146 Colonnade Road, Unit #8 , Ottawa, ON, K2E 7Y1
(2) This test was performed by Bureau Veritas Calgary (41st), 2021 41st Ave NE , Calgary, AB, T2E 6P2

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3S3198
Report Date: 2023/10/26

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: EW

RESULTS OF ANALYSES OF SOIL

Bureau Veritas ID		WZK975	WZK976		WZK977		WZK978	WZK979		
Sampling Date		2023/09/12	2023/09/12		2023/09/12		2023/09/12	2023/09/12		
COC Number		n/a	n/a		n/a		n/a	n/a		
	UNITS	S1	S2	QC Batch	S3	QC Batch	S4	SODUP	RDL	QC Batch
Inorganics										
Total Ammonia-N	ug/g	<20	<20	8919262	<20	8919262	<20	<20	20	8919262
Moisture	%	17	15	8921137	20	8921213	19	21	1.0	8921137
Nitrogen (N)	%	0.17	0.15	8921781	0.072	8921781	0.12	0.092	0.010	8921781
Total Organic Carbon	mg/kg	19000	19000	8922105	12000	8922105	16000	17000	500	8922105
Calculated Total Kjeldahl Nitrogen	ug/g	1710	1520	8918283	683	8918283	1180	903	100	8918283
Chloride (Cl-)	ug/g	15	26	8925611	150	8925611	330	460	10	8925611
Nitrate (N)	ug/g	<2	4	8925583	33	8925583	18	17	2	8925583
Sulphate (SO4)	ug/g	67	100	8925611	240	8925611	420	630	20	8925611

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3S3198
Report Date: 2023/10/26

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: EW

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Bureau Veritas ID		WZK975		WZK976	WZK977		WZK978		
Sampling Date		2023/09/12		2023/09/12	2023/09/12		2023/09/12		
COC Number		n/a		n/a	n/a		n/a		
	UNITS	S1	QC Batch	S2	S3	QC Batch	S4	RDL	QC Batch
Metals									
Hot Water Ext. Boron (B)	ug/g	1.1	8922877	1.0	4.7	8922877	5.4	0.050	8922877
Acid Extractable Aluminum (Al)	ug/g	16000	8923411	13000	15000	8923929	15000	50	8923411
Acid Extractable Arsenic (As)	ug/g	6.9	8923411	5.8	6.5	8923929	6.3	1.0	8923411
Acid Extractable Barium (Ba)	ug/g	84	8923411	71	79	8923929	78	0.50	8923411
Acid Extractable Beryllium (Be)	ug/g	0.83	8923411	0.62	0.72	8923929	0.76	0.20	8923411
Acid Extractable Bismuth (Bi)	ug/g	<1.0	8923411	<1.0	<1.0	8923929	<1.0	1.0	8923411
Acid Extractable Cadmium (Cd)	ug/g	0.21	8923411	0.19	0.13	8923929	0.17	0.10	8923411
Acid Extractable Chromium (Cr)	ug/g	28	8923411	22	27	8923929	27	1.0	8923411
Acid Extractable Cobalt (Co)	ug/g	14	8923411	10	12	8923929	13	0.10	8923411
Acid Extractable Lead (Pb)	ug/g	18	8923411	16	13	8923929	15	1.0	8923411
Acid Extractable Molybdenum (Mo)	ug/g	2.8	8923411	2.3	3.2	8923929	2.8	0.50	8923411
Acid Extractable Nickel (Ni)	ug/g	30	8923411	25	35	8923929	30	0.50	8923411
Acid Extractable Selenium (Se)	ug/g	<0.50	8923411	<0.50	<0.50	8923929	<0.50	0.50	8923411
Acid Extractable Silver (Ag)	ug/g	<0.20	8923411	<0.20	<0.20	8923929	<0.20	0.20	8923411
Acid Extractable Strontium (Sr)	ug/g	28	8923411	39	75	8923929	39	1.0	8923411
Acid Extractable Tin (Sn)	ug/g	<1.0	8923411	<1.0	<1.0	8923929	<1.0	1.0	8923411
Acid Extractable Titanium (Ti)	ug/g	54	8923411	99	97	8923929	60	5.0	8923411
Acid Extractable Vanadium (V)	ug/g	34	8923411	28	30	8923929	33	5.0	8923411
Acid Extractable Zinc (Zn)	ug/g	62	8923411	59	56	8923929	56	5.0	8923411

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3S3198
Report Date: 2023/10/26

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: EW

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Bureau Veritas ID		WZK979		
Sampling Date		2023/09/12		
COC Number		n/a		
	UNITS	SODUP	RDL	QC Batch
Metals				
Hot Water Ext. Boron (B)	ug/g	6.2	0.050	8922877
Acid Extractable Aluminum (Al)	ug/g	15000	50	8923929
Acid Extractable Arsenic (As)	ug/g	6.2	1.0	8923929
Acid Extractable Barium (Ba)	ug/g	79	0.50	8923929
Acid Extractable Beryllium (Be)	ug/g	0.76	0.20	8923929
Acid Extractable Bismuth (Bi)	ug/g	<1.0	1.0	8923929
Acid Extractable Cadmium (Cd)	ug/g	0.17	0.10	8923929
Acid Extractable Chromium (Cr)	ug/g	26	1.0	8923929
Acid Extractable Cobalt (Co)	ug/g	13	0.10	8923929
Acid Extractable Lead (Pb)	ug/g	15	1.0	8923929
Acid Extractable Molybdenum (Mo)	ug/g	2.6	0.50	8923929
Acid Extractable Nickel (Ni)	ug/g	29	0.50	8923929
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	8923929
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	8923929
Acid Extractable Strontium (Sr)	ug/g	41	1.0	8923929
Acid Extractable Tin (Sn)	ug/g	<1.0	1.0	8923929
Acid Extractable Titanium (Ti)	ug/g	85	5.0	8923929
Acid Extractable Vanadium (V)	ug/g	32	5.0	8923929
Acid Extractable Zinc (Zn)	ug/g	56	5.0	8923929

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3S3198
Report Date: 2023/10/26

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: EW

SUBCONTRACTED ANALYSIS (SOIL)

Bureau Veritas ID		WZK975	WZK976	WZK977	WZK978	WZK979	
Sampling Date		2023/09/12	2023/09/12	2023/09/12	2023/09/12	2023/09/12	
COC Number		n/a	n/a	n/a	n/a	n/a	
	UNITS	S1	S2	S3	S4	SODUP	QC Batch
Subcontracted Analysis							
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	ATTACHED	8989954
Subcontracted Test	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	ATTACHED	8989936
QC Batch = Quality Control Batch							

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.0°C

Results relate only to the items tested.

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Bureau Veritas Job #: C3S3198
Report Date: 2023/10/26

QUALITY ASSURANCE REPORT

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: EW

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8919262	Total Ammonia-N	2023/09/18	118	80 - 120	112	80 - 120	<20	ug/g	NC (1)	35		
8921137	Moisture	2023/09/15							0.77 (1)	20		
8921213	Moisture	2023/09/15							6.7 (2)	20		
8921781	Nitrogen (N)	2023/09/18					<0.010	%	9.6 (3)	35	100	95 - 105
8922105	Total Organic Carbon	2023/09/18					<500	mg/kg	1.3 (2)	35	98	75 - 125
8922877	Hot Water Ext. Boron (B)	2023/09/19	NC	75 - 125	101	75 - 125	<0.050	ug/g	1.1 (1)	40		
8923411	Acid Extractable Aluminum (Al)	2023/09/18	NC	75 - 125	99	80 - 120	<50	ug/g				
8923411	Acid Extractable Arsenic (As)	2023/09/18	112	75 - 125	96	80 - 120	<1.0	ug/g				
8923411	Acid Extractable Barium (Ba)	2023/09/18	NC	75 - 125	100	80 - 120	<0.50	ug/g				
8923411	Acid Extractable Beryllium (Be)	2023/09/18	107	75 - 125	98	80 - 120	<0.20	ug/g				
8923411	Acid Extractable Bismuth (Bi)	2023/09/18	95	75 - 125	88	80 - 120	<1.0	ug/g				
8923411	Acid Extractable Cadmium (Cd)	2023/09/18	109	75 - 125	97	80 - 120	<0.10	ug/g				
8923411	Acid Extractable Chromium (Cr)	2023/09/18	114	75 - 125	97	80 - 120	<1.0	ug/g				
8923411	Acid Extractable Cobalt (Co)	2023/09/18	109	75 - 125	97	80 - 120	<0.10	ug/g				
8923411	Acid Extractable Lead (Pb)	2023/09/18	103	75 - 125	98	80 - 120	<1.0	ug/g				
8923411	Acid Extractable Molybdenum (Mo)	2023/09/18	114	75 - 125	97	80 - 120	<0.50	ug/g				
8923411	Acid Extractable Nickel (Ni)	2023/09/18	107	75 - 125	99	80 - 120	<0.50	ug/g				
8923411	Acid Extractable Selenium (Se)	2023/09/18	112	75 - 125	101	80 - 120	<0.50	ug/g				
8923411	Acid Extractable Silver (Ag)	2023/09/18	110	75 - 125	99	80 - 120	<0.20	ug/g				
8923411	Acid Extractable Strontium (Sr)	2023/09/18	NC	75 - 125	94	80 - 120	<1.0	ug/g				
8923411	Acid Extractable Tin (Sn)	2023/09/18	112	75 - 125	95	80 - 120	<1.0	ug/g				
8923411	Acid Extractable Titanium (Ti)	2023/09/18	NC	75 - 125	97	80 - 120	<5.0	ug/g				
8923411	Acid Extractable Vanadium (V)	2023/09/18	112	75 - 125	97	80 - 120	<5.0	ug/g				
8923411	Acid Extractable Zinc (Zn)	2023/09/18	101	75 - 125	100	80 - 120	<5.0	ug/g				
8923929	Acid Extractable Aluminum (Al)	2023/09/18	NC	75 - 125	97	80 - 120	<50	ug/g				
8923929	Acid Extractable Arsenic (As)	2023/09/18	109	75 - 125	99	80 - 120	<1.0	ug/g	6.3 (1)	30		
8923929	Acid Extractable Barium (Ba)	2023/09/18	NC	75 - 125	98	80 - 120	<0.50	ug/g	3.9 (1)	30		
8923929	Acid Extractable Beryllium (Be)	2023/09/18	109	75 - 125	98	80 - 120	<0.20	ug/g	5.2 (1)	30		
8923929	Acid Extractable Bismuth (Bi)	2023/09/18	109	75 - 125	98	80 - 120	<1.0	ug/g				
8923929	Acid Extractable Cadmium (Cd)	2023/09/18	111	75 - 125	97	80 - 120	<0.10	ug/g	27 (1)	30		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8923929	Acid Extractable Chromium (Cr)	2023/09/18	114	75 - 125	97	80 - 120	<1.0	ug/g	1.6 (1)	30		
8923929	Acid Extractable Cobalt (Co)	2023/09/18	107	75 - 125	98	80 - 120	<0.10	ug/g	2.1 (1)	30		
8923929	Acid Extractable Lead (Pb)	2023/09/18	110	75 - 125	98	80 - 120	<1.0	ug/g	1.1 (1)	30		
8923929	Acid Extractable Molybdenum (Mo)	2023/09/18	108	75 - 125	96	80 - 120	<0.50	ug/g	2.3 (1)	30		
8923929	Acid Extractable Nickel (Ni)	2023/09/18	108	75 - 125	99	80 - 120	<0.50	ug/g	0.93 (1)	30		
8923929	Acid Extractable Selenium (Se)	2023/09/18	109	75 - 125	100	80 - 120	<0.50	ug/g	NC (1)	30		
8923929	Acid Extractable Silver (Ag)	2023/09/18	113	75 - 125	101	80 - 120	<0.20	ug/g	NC (1)	30		
8923929	Acid Extractable Strontium (Sr)	2023/09/18	NC	75 - 125	100	80 - 120	<1.0	ug/g				
8923929	Acid Extractable Tin (Sn)	2023/09/18	113	75 - 125	97	80 - 120	<1.0	ug/g				
8923929	Acid Extractable Titanium (Ti)	2023/09/18	NC	75 - 125	97	80 - 120	<5.0	ug/g				
8923929	Acid Extractable Vanadium (V)	2023/09/18	NC	75 - 125	96	80 - 120	<5.0	ug/g	1.2 (1)	30		
8923929	Acid Extractable Zinc (Zn)	2023/09/18	NC	75 - 125	100	80 - 120	<5.0	ug/g	18 (1)	30		
8925583	Nitrate (N)	2023/09/19	105	N/A			<2	ug/g	13 (1)	30		
8925611	Chloride (Cl-)	2023/09/19	NC (4)	70 - 130	100	70 - 130	<10	ug/g	2.6 (2)	30		
8925611	Sulphate (SO4)	2023/09/19	102 (4)	75 - 125	101	75 - 125	<20	ug/g	0.72 (2)	30		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Duplicate Parent ID [WZK977-01]

(3) Duplicate Parent ID [WZK978-01]

(4) Matrix Spike Parent ID [WZK977-01]

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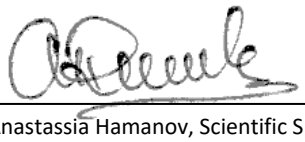
Bureau Veritas Job #: C3S3198
Report Date: 2023/10/26

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: EW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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CHAIN OF CUSTODY RECORD

Maxxam Analytics Inc
6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

Page 1 of 1

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #		
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285741	CHAIN OF CUSTODY # :
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Unit 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	TCPS-SS-SEP
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 ext. 2984 Fax: 519-823-1316	Project Name:	TCPS-SS-SEP	
Email:	lmertick@wm.com	Email:	Brent.Langille@rwdi.com, JCL@rwdi.com	Location:	Twin Creeks	
				Sampled By:	EW	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

☐ MISA Reg. 153 Sewer Use ☒ Other
☐ Table 1 ☐ Sanitary Site Specific
☐ PWQO ☐ Table 2 ☐ Storm specify
☐ Table 3 Region _____
☐ Reg. 558

Report Criteria on C of A ? N

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ONWLF-2023 TCLS - POPLAR SYSTEM SOIL ANNUAL (Group ZS)	# of Cont.	COMMENTS / TAT COMMENTS
1	S1	12-Sep-23	PM	SOIL	N	N	X	3	
2	S2	12-Sep-23	PM	SOIL	N	N	X	3	
3	S3	12-Sep-23	PM	SOIL	N	N	X	3	
4	S4	12-Sep-23	PM	SOIL	N	N	X	3	SODUP Taken
5	SODUP	12-Sep-23	PM	SOIL	N	N	X	3	
6									
7									
8									
9									
10									
11									
12									

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
☒ 5 to 7 Working Days

Rush TAT: Rush Confirmation # _____ (call Lab for #)
☐ 1 day ☐ 2 days ☐ 3 days
DATE Required: 22-Sep-23
TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

14-Sep-23 08:38
Patricia Legette
C3S3198
AK0 ENV-1584

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:	Laboratory Use Only	
EW / 13-SEP-2023/ PM	Twinkle Kaura TWINKLE KAURA	2023/09/14	08:38	Temperature (°C) on Receipt: 7/6/5	Condition of Sample on Receipt: ☐ OK ☐ SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

White: Maxxam Yellow: Mail Pink: Client

Your Project #: C3S3198
Site Location: 2303459-01
Your C.O.C. #: C3S3198-M060-01-01

Attention: Patricia Legette

BUREAU VERITAS
CAMPOBELLO
6740 CAMPOBELLO ROAD
MISSISSAUGA, ON
CANADA L5N 2L8

Report Date: 2023/10/21
Report #: R3414286
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C375805
Received: 2023/09/22, 10:30

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Potassium (Available)	5	2023/10/17	2023/10/20	CAL SOP-00153 / AB SOP-00042	EPA 6010d R5 m
Moisture	5	N/A	2023/10/10	AB SOP-00002	CCME PHC-CWS m
Ammonia-N (Available)	5	2023/10/09	2023/10/10	AB SOP-00027 / AB SOP-00007	SM 24 4500 NH3 A G m
Soluble Ions	1	2023/10/19	2023/10/19	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Ions	4	2023/10/20	2023/10/20	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Paste	1	2023/10/19	2023/10/19	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Paste	4	2023/10/20	2023/10/20	AB SOP-00033	Carter 2nd ed 15.2 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Bureau Veritas Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Your Project #: C3S3198
Site Location: 2303459-01
Your C.O.C. #: C3S3198-M060-01-01

Attention: Patricia Legette

BUREAU VERITAS
CAMPOBELLO
6740 CAMPOBELLO ROAD
MISSISSAUGA, ON
CANADA L5N 2L8

Report Date: 2023/10/21
Report #: R3414286
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C375805
Received: 2023/09/22, 10:30

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Customer Solutions, Western Canada Customer Experience Team
Email: customersolutionswest@bvlabs.com
Phone# (403) 291-3077

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Bureau Veritas Job #: C375805
Report Date: 2023/10/21

BUREAU VERITAS
Client Project #: C3S3198
Site Location: 2303459-01

RESULTS OF CHEMICAL ANALYSES OF SOIL

Bureau Veritas ID		BZU885	BZU886	BZU887	BZU888		
Sampling Date		2023/09/12	2023/09/12	2023/09/12	2023/09/12		
COC Number		C3S3198-M060-01-01	C3S3198-M060-01-01	C3S3198-M060-01-01	C3S3198-M060-01-01		
	UNITS	WZ975-S1	WZ976-S2	WZ977-S3	WZ978-S4	RDL	QC Batch
Nutrients							
Available (KCl) Ammonia (N)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	B145408
Available (NH4OAc) Potassium (K)	mg/kg	100	99	260	150	2.0	B158075
Soluble Parameters							
Soluble Calcium (Ca)	mg/L	33	68	99	130	1.5	B163367
Soluble Magnesium (Mg)	mg/L	5.5	11	33	46	1.0	B163367
Soluble Sodium (Na)	mg/L	55	56	290	330	2.5	B163367
Soluble Potassium (K)	mg/L	2.2	3.2	13	6.6	1.3	B163367
Saturation %	%	58	56	71	62	N/A	B154254
Soluble Sulphate (SO4)	mg/L	74	120	270	460	5.0	B163367

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas ID		BZU889		
Sampling Date		2023/09/12		
COC Number		C3S3198-M060-01-01		
	UNITS	WZ979-SODUP	RDL	QC Batch
Nutrients				
Available (KCl) Ammonia (N)	mg/kg	<2.0	2.0	B145408
Available (NH4OAc) Potassium (K)	mg/kg	120	2.0	B158075
Soluble Parameters				
Soluble Calcium (Ca)	mg/L	130	1.5	B161157
Soluble Magnesium (Mg)	mg/L	43	1.0	B161157
Soluble Sodium (Na)	mg/L	300	2.5	B161157
Soluble Potassium (K)	mg/L	3.9	1.3	B161157
Saturation %	%	64	N/A	B154178
Soluble Sulphate (SO4)	mg/L	520	5.0	B161157

RDL = Reportable Detection Limit
N/A = Not Applicable

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PHYSICAL TESTING (SOIL)

Bureau Veritas ID		BZU885	BZU886	BZU887	BZU888		
Sampling Date		2023/09/12	2023/09/12	2023/09/12	2023/09/12		
COC Number		C3S3198-M060-01-01	C3S3198-M060-01-01	C3S3198-M060-01-01	C3S3198-M060-01-01		
	UNITS	WZ975-S1	WZ976-S2	WZ977-S3	WZ978-S4	RDL	QC Batch
Physical Properties							
Moisture	%	20	15	21	22	0.30	B145290
RDL = Reportable Detection Limit							

Bureau Veritas ID		BZU889		
Sampling Date		2023/09/12		
COC Number		C3S3198-M060-01-01		
	UNITS	WZ979-SODUP	RDL	QC Batch
Physical Properties				
Moisture	%	22	0.30	B145290
RDL = Reportable Detection Limit				

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Bureau Veritas Job #: C375805
Report Date: 2023/10/21

BUREAU VERITAS
Client Project #: C3S3198
Site Location: 2303459-01

TEST SUMMARY

Bureau Veritas ID: BZU885
Sample ID: WZ975-S1
Matrix: Soil

Collected: 2023/09/12
Shipped: 2023/09/18
Received: 2023/09/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Potassium (Available)	ICPA	B158075	2023/10/17	2023/10/20	Vincy Scaria
Moisture	BAL	B145290	N/A	2023/10/10	Tarun Sunibhai Patel
Ammonia-N (Available)	KONE/NH4	B145408	2023/10/09	2023/10/10	Adam Fishleigh
Soluble Ions	ICPA	B163367	2023/10/20	2023/10/20	Mohammad Pousti
Soluble Paste	BAL	B154254	2023/10/20	2023/10/20	Darlene PADLAN

Bureau Veritas ID: BZU886
Sample ID: WZ976-S2
Matrix: Soil

Collected: 2023/09/12
Shipped: 2023/09/18
Received: 2023/09/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Potassium (Available)	ICPA	B158075	2023/10/17	2023/10/20	Vincy Scaria
Moisture	BAL	B145290	N/A	2023/10/10	Tarun Sunibhai Patel
Ammonia-N (Available)	KONE/NH4	B145408	2023/10/09	2023/10/10	Adam Fishleigh
Soluble Ions	ICPA	B163367	2023/10/20	2023/10/20	Mohammad Pousti
Soluble Paste	BAL	B154254	2023/10/20	2023/10/20	Darlene PADLAN

Bureau Veritas ID: BZU887
Sample ID: WZ977-S3
Matrix: Soil

Collected: 2023/09/12
Shipped: 2023/09/18
Received: 2023/09/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Potassium (Available)	ICPA	B158075	2023/10/17	2023/10/20	Vincy Scaria
Moisture	BAL	B145290	N/A	2023/10/10	Tarun Sunibhai Patel
Ammonia-N (Available)	KONE/NH4	B145408	2023/10/09	2023/10/10	Adam Fishleigh
Soluble Ions	ICPA	B163367	2023/10/20	2023/10/20	Mohammad Pousti
Soluble Paste	BAL	B154254	2023/10/20	2023/10/20	Darlene PADLAN

Bureau Veritas ID: BZU888
Sample ID: WZ978-S4
Matrix: Soil

Collected: 2023/09/12
Shipped: 2023/09/18
Received: 2023/09/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Potassium (Available)	ICPA	B158075	2023/10/17	2023/10/20	Vincy Scaria
Moisture	BAL	B145290	N/A	2023/10/10	Tarun Sunibhai Patel
Ammonia-N (Available)	KONE/NH4	B145408	2023/10/09	2023/10/10	Adam Fishleigh
Soluble Ions	ICPA	B163367	2023/10/20	2023/10/20	Mohammad Pousti
Soluble Paste	BAL	B154254	2023/10/20	2023/10/20	Darlene PADLAN

Bureau Veritas ID: BZU889
Sample ID: WZ979-SODUP
Matrix: Soil

Collected: 2023/09/12
Shipped: 2023/09/18
Received: 2023/09/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Potassium (Available)	ICPA	B158075	2023/10/17	2023/10/20	Vincy Scaria
Moisture	BAL	B145290	N/A	2023/10/10	Tarun Sunibhai Patel
Ammonia-N (Available)	KONE/NH4	B145408	2023/10/09	2023/10/10	Adam Fishleigh

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Bureau Veritas Job #: C375805
Report Date: 2023/10/21

BUREAU VERITAS
Client Project #: C3S3198
Site Location: 2303459-01

TEST SUMMARY

Bureau Veritas ID: BZU889
Sample ID: WZ979-SODUP
Matrix: Soil

Collected: 2023/09/12
Shipped: 2023/09/18
Received: 2023/09/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Soluble Ions	ICPA	B161157	2023/10/19	2023/10/19	Harry (Peng) Liang
Soluble Paste	BAL	B154178	2023/10/19	2023/10/19	Nerissa Schwartz

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	14.7°C

Sample BZU885 [WZ975-S1] : Sample was analyzed past method specified hold time for Potassium (Available).

Sample BZU886 [WZ976-S2] : Sample was analyzed past method specified hold time for Potassium (Available).

Sample BZU887 [WZ977-S3] : Sample was analyzed past method specified hold time for Potassium (Available).

Sample BZU888 [WZ978-S4] : Sample was analyzed past method specified hold time for Potassium (Available).

Sample BZU889 [WZ979-SODUP] : Sample was analyzed past method specified hold time for Potassium (Available).

Results relate only to the items tested.

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Bureau Veritas Job #: C375805
Report Date: 2023/10/21

QUALITY ASSURANCE REPORT

BUREAU VERITAS
Client Project #: C3S3198
Site Location: 2303459-01

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
B145290	Moisture	2023/10/10					<0.30	%	5.0	20		
B145408	Available (KCl) Ammonia (N)	2023/10/10	112	75 - 125	99	80 - 120	<2.0	mg/kg	NC	35		
B154178	Saturation %	2023/10/19							1.9	12	101	75 - 125
B154254	Saturation %	2023/10/20							2.5	12	101	75 - 125
B158075	Available (NH4OAc) Potassium (K)	2023/10/20	104	75 - 125	103	80 - 120	<2.0	mg/kg	2.1	35		
B161157	Soluble Calcium (Ca)	2023/10/19	101	75 - 125	100	80 - 120	<1.5	mg/L	6.6	30	87	75 - 125
B161157	Soluble Magnesium (Mg)	2023/10/19	101	75 - 125	100	80 - 120	<1.0	mg/L	5.6	30	91	75 - 125
B161157	Soluble Potassium (K)	2023/10/19	97	75 - 125	97	80 - 120	<1.3	mg/L	3.5	30	106	75 - 125
B161157	Soluble Sodium (Na)	2023/10/19	NC	75 - 125	99	80 - 120	<2.5	mg/L	3.6	30	100	75 - 125
B161157	Soluble Sulphate (SO4)	2023/10/19					<5.0	mg/L	4.7	30	88	75 - 125
B163367	Soluble Calcium (Ca)	2023/10/20	105	75 - 125	101	80 - 120	<1.5	mg/L	11	30	86	75 - 125
B163367	Soluble Magnesium (Mg)	2023/10/20	104	75 - 125	103	80 - 120	<1.0	mg/L	12	30	88	75 - 125
B163367	Soluble Potassium (K)	2023/10/20	103	75 - 125	101	80 - 120	<1.3	mg/L	9.3	30	113	75 - 125
B163367	Soluble Sodium (Na)	2023/10/20	101	75 - 125	101	80 - 120	<2.5	mg/L	6.5	30	97	75 - 125
B163367	Soluble Sulphate (SO4)	2023/10/20					<5.0	mg/L	20	30	85	75 - 125

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

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eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS : 3707871

WORK REQUEST : 100243457

Report Date : 2023-09-26

Bureau Veritas Canada (2019) Inc
6740 Campobello Road
Mississauga, Ontario
L5N 2L8
Attention : Patricia Legette

Reception Date :	2023-09-19
Project :	C3S3198
Sampler :	NA
PO Number :	Not Applicable
Temperature :	2 °C

Analysis	Quantity	External Method
Phosphorus (Soil, NaHCO3 Ext, Colorimetry)	5	Modified from 84-017, Analytical Methods, Ag Can

Sample status upon receipt :

7238566 7238567 7238568 7238570 7238571
Compliant

Notes :

- All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise stated.
- Eurofins Environment Testing Canada Inc. is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at https://directory.cala.ca/
- Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline or regulatory limits listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official guideline or regulation as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Legend :

RL : Reporting limit	N/A : Not applicable	* : Analysis conducted by external subcontracting
QC : Reference material (QC)	1 : Results in annex	^ : Analysis not accredited

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OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Bureau Veritas Canada (2019) Inc
Project : C3S3198

Reception Date: 2023-09-19

Eurofins Sample No :			**7238566**	**7238567**	**7238568**	**7238570**	**7238571**		
Matrix :			Soil	Soil	Soil	Soil	Soil		
Sampling Date :			2023-09-12	2023-09-12	2023-09-12	2023-09-12	2023-09-12		
Client Sample Identification :			WZK975-S1	WZK976-S2	WZK977-S3	WZK978-S4	WZK979-SO DUP		
Phosphorus (NaHCO3 Extractable)	**RL**	**Unit**							
Phosphorus (NaHCO3 Ext)	2	ppm	6	6	4	4	6		

Approved by : R. Zafari
Raheleh Zafari,
Ottawa, Environmental Chemist, PhD

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OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Bureau Veritas Canada (2019) Inc
Project : C3S3198

Reception Date: 2023-09-19

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Phosphorus (Soil, NaHCO3 Ext, Colorimetry)									
Method : Phosphorus (Soil, NaHCO3 Ext, Colorimetry). Internal method: AMPHOSA2.									
Phosphorus (NaHCO3 Ext)	ppm	2	<2	111	67-133			-	0-30
Associated Samples : 7238566, 7238567, 7238568, 7238570, 7238571								Prep Date: 2023-09-26 Analysis Date: 2023-09-26	

Where RPD % is reported as "-" the calculation is not available because one or both of the duplicates is within 5 times the RL.

Sent To: **Eurofins Environment Testing Ca**
146 Colonnade Road, Unit #8
Ottawa, ON, K2E 7Y1
Tel: (613) 727-5692

CHAIN OF CUSTODY RECORD FOR SUBCONTRACTED WORK

COC # C3S3198-MEUR-01-01

REPORT INFORMATION	
Company:	Bureau Veritas Laboratories
Address:	6740 Campobello Road, Mississauga, Ontario, L5N 2L8
Contact Name:	Patricia Legette
Email:	Patricia.Legette@bureauveritas.com, scontractor@bureauveritas.com
Phone:	(905) 817-5799
BV Labs Project #:	C3S3198

100243457

Printed On : 2023-09-19 14:50:44

#	SAMPLE ID	MATRIX	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	SAMPLER INITIALS	# CONT.	ANALYSIS REQUESTED: Additional Subcontracted Analysis	ADDITIONAL SAMPLE INFORMATION
1	WZK975-S1	SOIL	2023/09/12		EW	1	X	(P: 02) 7238566
2	WZK976-S2	SOIL	2023/09/12		EW	1	X	(P: 02) 67
3	WZK977-S3	SOIL	2023/09/12		EW	1	X	(P: 02) 68
4	WZK978-S4	SOIL	2023/09/12		EW	1	X	(P: 02) ~~69~~ 70
5	WZK979-SODUP	SOIL	2023/09/12		EW	1	X	(P: 02) ~~70~~ 71
6								
7								
8								
9								
10								

REGULATORY CRITERIA

SPECIAL INSTRUCTIONS

Please inform Bureau Veritas immediately if you are not accredited for the requested test(s) or the hold time is approaching.
Please return a copy of this form with the report.
SUB-MISC for NH4Acetate Extractable K + Available Ammonia to BV Calgary.

SUB-MISC2 for NaHCO3 Extractable P to Eurofins (Test location code: MEUR).

TURNAROUND TIME

☐ Rush Required

2023/09/22
Date Required

Please inform us if rush charges will be incurred.

COOLER ID:

	YES	NO	Temp: (°C)	1	2	3
Custody Seal Present						
Custody Seal Intact						
Cooling Media Present						

COOLER ID:

	YES	NO	Temp: (°C)	1	2	3
Custody Seal Present						
Custody Seal Intact						
Cooling Media Present						

COOLER ID:

	YES	NO	Temp: (°C)	1	2	3
Custody Seal Present						
Custody Seal Intact						
Cooling Media Present				2.1		

RELINQUISHED BY: (SIGN & PRINT)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (SIGN & PRINT)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
1. Nirali NIRAL PATEL	2023/09/18	13:08	1.	2023/09/19	12:00
2.			2.		

APPENDIX H:

Poplar Tissue Analytical Results

Table H-1
Leaf Tissue - General Chemical Results - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	Indicator Values	Poplar System										
			Lower Canopy					Upper Canopy					Geomean: LC=UC
28-Sep-17			**Z1**	**Z2**	**Z3**	**Z4**	**geom**	**Z1**	**Z2**	**Z3**	**Z4**	**geom**	**geom**
Phosphorus	%	0.45	0.0558	0.0468	0.055	0.0569	0.0535	0.0544	0.0546	0.0529	0.0557	0.0544	0.0539
TKN	%	3.20	2.7	2.8	2.8	2.7	2.7	3	2.9	2.8	2.7	2.8	2.8
Potassium	%	3	0.556	0.455	0.477	0.417	0.474	0.525	0.556	0.429	0.469	0.492	0.483
Chloride	ppm		2900	2500	2600	2400	2593	3000	3300	<2000	3000	3097	2834
Boron	ppm	65	120	125	122	76.5	109	146	150	117	69.4	115	112
Copper	ppm	30	3.6	2.9	2.7	3.1	3.1	3.5	3.6	2.7	3.1	3.2	3.1
Iron	ppm	350	50	49	54	48	50	60	62	43	51	53	52
Manganese	ppm	175	28.6	16.6	17.7	26.4	21.7	22.7	16	19.1	29.2	21.2	21.5
Zinc	ppm	55	28	20	14	21	20	22	19	20	16	19	20
18-Sep-18			**Z1**	**Z2**	**Z3**	**Z4**	**geom**	**Z1**	**Z2**	**Z3**	**Z4**	**geom**	**geom**
Phosphorus	%	0.45	0.0662	0.067	0.0662	0.073	0.0680	0.0728	0.0742	0.0672	0.0667	0.0701	0.0691
TKN	%	3.20	2.7	2.9	3.1	2.9	2.9	3.2	3.2	3.3	2.9	3.1	3.0
Potassium	%	3	0.258	0.259	0.198	0.265	0.243	0.271	0.3	0.378	0.414	0.336	0.286
Chloride	ppm		5100	5200	6500	3700	5025	10000	6700	6100	9900	7976	6331
Boron	ppm	65	121	121	101	119	115	123	122	90.6	99.7	108	111
Copper	ppm	30	3.9	3.9	3.8	4.4	4.0	3.9	3.9	3.9	3.8	3.9	3.9
Iron	ppm	350	60	69	78	89	73	63	75	57	64	64	69
Manganese	ppm	175	37.5	26.2	39.4	33.3	34	32.6	23.7	22.8	19.7	24	28.6
Zinc	ppm	55	28	14	12	32	20	15	19	18	18	17	19
9-Sep-19			**Z1**	**Z2**	**Z3**	**Z4**	**geom**	**Z1**	**Z2**	**Z3**	**Z4**	**geom**	**geom**
Phosphorus	%	0.45	0.0683	0.0678	0.0644	0.0862	0.0712	0.0839	0.0695	0.0866	0.0691	0.0769	0.0740
TKN	%	3.20	3	2.7	3	3.1	2.9	3.3	3.2	3.5	2.7	3.2	3.1
Potassium	%	3	0.339	0.420	0.479	0.428	0.413	0.362	0.426	0.520	0.419	0.400	0.407
Chloride	ppm		6000	3500	4900	2900	4156	4500	4300	5100	3500	4311	4233
Boron	ppm	65	179	177	177	160	173	181	166	194	132	167	170
Copper	ppm	30	3.2	3	3.4	3.6	3.3	3.2	3.2	3.8	3.4	3.4	3.3
Iron	ppm	350	61	56	71	102	71	60	58	57	101	67	69
Manganese	ppm	175	23.4	24.2	19.0	24.8	22.7	24.4	20.5	20.1	34.3	24	23.5
Zinc	ppm	55	18	19	17	16	17	20	19	17	18	18	18
2-Sep-20			**Z1**	**Z2**	**Z3**	**Z4**	**geom**	**Z1**	**Z2**	**Z3**	**Z4**	**geom**	**geom**
Phosphorus	%	0.45	0.0575	0.0616	0.0617	0.0641	0.0612	0.0684	0.0647	0.0639	0.0577	0.0636	0.0624
TKN	%	3.20	2.6	2.9	2.7	2.9	2.8	2.6	2.9	3.1	3.1	2.9	2.8
Potassium	%	3	0.411	0.404	0.351	0.403	0.391	0.370	0.351	0.436	0.401	0.400	0.396
Chloride	ppm		4000	4100	6400	5300	4857	3200	3300	4200	4100	3672	4223
Boron	ppm	65	153	134	103	178	139	150	119	170	154	147	143
Copper	ppm	30	3.6	3.6	3.2	3.5	3.5	3.7	3.6	4.0	3.5	3.7	3.6
Iron	ppm	350	32	38	30	55	38	35	27	30	35	32	34
Manganese	ppm	175	26	30.6	24.9	27.4	27.1	28.1	28.1	24.5	26.2	27	26.9
Zinc	ppm	55	22	18	27	14	20	33	24	22	18	24	22
16-Sep-21			**Z1**	**Z2**	**Z3**	**Z4**	**geom**	**Z1**	**Z2**	**Z3**	**Z4**	**geom**	**geom**
Phosphorus	%	0.45	0.0662	0.0648	0.0694	0.0619	0.0655	0.0732	0.0800	0.0813	0.0770	0.0778	0.0714
TKN	%	3.20	2.3	2.2	2.6	2.3	2.3	2.8	2.7	3.0	2.8	2.8	2.6
Potassium	%	3	0.493	0.557	0.582	0.520	0.537	0.504	0.554	0.659	0.608	0.400	0.463
Chloride	ppm		4000	3100	5200	3100	3760	6100	3700	4200	4100	4440	4086
Boron	ppm	65	214	130	178	222	182	210	106	191	176	165	174
Copper	ppm	30	3.2	3.6	4.2	4.3	3.8	3.9	3.6	4.4	4.1	4.0	3.9
Iron	ppm	350	21	17	24	29	22	24	21	21	28	23	23
Manganese	ppm	175	19.4	14.8	19	28.6	19.9	15.6	13	12.1	18	14	17.0
Zinc	ppm	55	20	113	22	29	35	26	22	19	15	20	26
21-Sep-22			**Z1**	**Z2**	**Z3**	**Z4**	**geom**	**Z1**	**Z2**	**Z3**	**Z4**	**geom**	**geom**
Phosphorus	%	0.45	0.0634	0.0567	0.0567	0.0477	0.0558	0.0670	0.0688	0.0559	0.0570	0.0619	0.0588
TKN	%	3.20	2.9	2.6	2.7	2.5	2.7	2.5	2.7	2.7	3.2	2.8	2.7
Potassium	%	3	0.355	0.503	0.577	0.378	0.444	0.444	0.564	0.682	0.530	0.400	0.422
Chloride	ppm		6500	3800	3000	6600	4703	3200	2700	<2000	6300	3790	4222
Boron	ppm	65	146	169	276	179	187	309	273	242	230	262	221
Copper	ppm	30	2.9	3.3	4.2	3.2	3.4	3.5	3.7	3.6	3.8	3.6	3.5
Iron	ppm	350	28	55	51	64	47	57	47	63	50	54	51
Manganese	ppm	175	17.4	35.7	23.7	31.1	26.0	21.2	24.0	23.4	19.6	22	23.9
Zinc	ppm	55	11	33	37	14	21	21	18	23	14	19	20
19-Sep-23			**Z1**	**Z2**	**Z3**	**Z4**	**geom**	**Z1**	**Z2**	**Z3**	**Z4**	**geom**	**geom**
Phosphorus	%	0.45	0.0572	0.0712	0.0690	0.0540	0.0624	0.0663	0.0851	0.0489	0.0662	0.0654	0.0639
TKN	%	3.20	2.3	2.2	2.8	2.4	2.4	2.5	3.0	2.6	2.9	2.7	2.6
Potassium	%	3	0.363	0.396	0.600	0.344	0.415	0.395	0.556	0.426	0.673	0.400	0.407
Chloride	ppm		12000	6000	7800	7700	8109	17000	11000	5500	7200	9277	8673
Boron	ppm	65	179	121	206	111	149	215	191	141	242	193	170
Copper	ppm	30	3.1	3.8	4.0	3.8	3.7	2.9	4.1	4.3	3.6	3.7	3.7
Iron	ppm	350	29	29	20	33	27	27	24	33	29	28	28
Manganese	ppm	175	31.8	39.6	17.3	40.1	30.6	21.1	18.7	34.3	17.1	22	25.9
Zinc	ppm	55	38	34	24	37	33	19	24	56	59	35	34

NOTES:

1) Shading denotes concentration greater than indicator value.
2) "geom" denotes geometrical mean.
3) "UC" denotes upper canopy.
4) "LC" denotes lower canopy.
5) ppm denotes parts per million.
6) Blank denotes parameter not tested.

Table H-2
Leaf Tissue - General Chemical Results Assessment - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	Indicator Values	Poplar System													
			28-Sep-17	18-Sep-18	9-Sep-19	2-Sep-20	16-Sep-21	21-Sep-22	19-Sep-23							
Phosphorus	%	0.45	0.0539	0.0691	0.0740	0.0624	0.0714	0.0588	0.0639							
Total Kjeldahl Nitrogen	%	3.20	2.8	3.0	3.1	2.8	2.6	2.7	2.6							
Potassium	%	3	0.483	0.286	0.407	0.396	0.463	0.422	0.407							
Chloride	ppm		2834	6331	4233	4223	4086	4222	8673							
Boron	ppm	65	112	111	170	143	174	221	170							
Copper	ppm	30	3.1	3.9	3.3	3.6	3.9	3.5	3.7							
Iron	ppm	350	51.8	68.7	68.7	34.5	22.8	50.5	27.7							
Manganese	ppm	175	21.5	28.6	23.5	26.9	17.0	23.9	25.9							
Zinc	ppm	55	19.6	18.5	18.0	21.6	26.4	19.7	33.9							

NOTES:

1) Shading denotes concentration greater than indicator value.

2) Parameter concentration was calculated for each area as geometrical mean of concentrations for upper and lower canopy.

3) ppm denotes parts per million.

4) Blank denotes data not available

Table H-3
Stem Core - General Chemical Results - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	Poplar System								
		Zone 1								
		28-Sep-17	28-Sep-18	13-Sep-19	2-Sep-20	21-Sep-21	21-Sep-22	19-Sep-23		
Aluminum	µg/g	23	14	129	11.5	23.6	6.9	5.2		
Arsenic	µg/g	<0.1	<0.1	0.149	<0.040	<0.020	<0.020	<0.020		
Barium	µg/g	1.5	1.9	7.71	2.97	1.63	3.01	1.39		
Beryllium	µg/g	<0.05	<0.05	<0.010	<0.020	<0.010	<0.010	<0.010		
Bismuth	µg/g	<0.05	<0.05	<0.010	<0.020	<0.010	<0.010	<0.010		
Boron	µg/g	10.1	6.3	20.6	22.3	5.1	8.1	3.6		
Boron (H.W.E.)	µg/g	2.3	1.4	1.9	6.7	<0.50	<0.50	0.91		
Cadmium	µg/g	0.27	0.63	0.73	0.64	0.341	0.364	0.252		
Calcium	µg/g	2210	3250	10600	2520	1390	5170	1000		
Chromium	µg/g	1.3	<0.3	43.2	<0.20	<0.10	<0.10	<0.10		
Cobalt	µg/g	0.066	0.087	0.065	0.104	0.035	0.028	0.089		
Copper	µg/g	3.5	3	7.51	2.17	1.87	1.29	1.70		
Lead	µg/g	0.07	0.15	2.33	0.058	0.073	0.012	0.025		
Magnesium	µg/g	417	850	1320	462	379	800	286		
Molybdenum	µg/g	<0.05	<0.05	0.926	<0.040	0.026	<0.020	<0.020		
Nickel	µg/g	0.24	0.21	21.20	0.14	0.176	0.585	0.050		
Phosphorus	µg/g	583	925	887	363	426	717	257		
Potassium	µg/g	1860	1470	2700	2610	991	2380	969		
Selenium	µg/g	<0.1	<0.1	<0.050	<0.10	<0.050	<0.050	<0.050		
Silver	µg/g	<0.05	<0.05	0.01	<0.010	<0.0050	<0.0050	<0.0050		
Sodium	µg/g	72	60	320	925	20	72	38		
Strontium	µg/g	9.0	18.4	30.5	10.0	6.32	15.5	6.35		
Tin	µg/g	<0.3	<0.3	0.51	<0.20	<0.10	<0.10	0.26		
Titanium	µg/g	0.8	1	3.03	<1.0	0.55	<0.50	<0.50		
Vanadium	µg/g	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Zinc	µg/g	15	24	62.4	11	9.87	23.2	11.0		
Chloride	µg/g	<400	<200	<200	990	30	43	<20		

NOTES:

1) ug/g denotes micrograms per gram.
2) Boron (H.W.E.) denotes boron that is analysed using the Hot Water Extraction laboratory method.

Table H-3
Stem Core - General Chemical Results - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	Poplar System								
		Zone 2								
		28-Sep-17	28-Sep-18	13-Sep-19	2-Sep-20	21-Sep-21	21-Sep-22	19-Sep-23		
Aluminum	µg/g	44	8	64.9	15.6	27.8	5.7	3.0		
Arsenic	µg/g	<0.1	<0.1	0.123	<0.040	<0.020	<0.020	<0.020		
Barium	µg/g	1.3	1.3	5.1	2.1	1.43	1.5	0.715		
Beryllium	µg/g	<0.05	<0.05	<0.010	<0.020	<0.010	<0.010	<0.010		
Bismuth	µg/g	<0.05	<0.05	<0.010	<0.020	<0.010	<0.010	<0.010		
Boron	µg/g	6.8	8.8	20.1	8.8	4.0	6.6	3.4		
Boron (H.W.E.)	µg/g	1.4	2.8	3.4	1.4	<0.50	<0.50	3.0		
Cadmium	µg/g	0.20	0.30	0.76	0.38	0.205	0.377	0.272		
Calcium	µg/g	1820	1350	5160	1650	1070	3290	892		
Chromium	µg/g	0.5	0.4	15.6	<0.20	<0.10	<0.10	<0.10		
Cobalt	µg/g	0.088	0.088	0.078	0.055	0.025	0.037	0.097		
Copper	µg/g	3.8	5.8	4.5	2.1	1.92	1.40	1.79		
Lead	µg/g	0.09	0.07	1.40	0.12	0.097	0.013	0.062		
Magnesium	µg/g	401	572	820	339	273	496	338		
Molybdenum	µg/g	<0.05	<0.05	0.362	<0.040	<0.020	<0.020	<0.020		
Nickel	µg/g	0.31	0.15	8.15	0.17	0.139	0.082	<0.050		
Phosphorus	µg/g	652	732	707	868	346	489	240		
Potassium	µg/g	1710	2940	2270	1630	647	1900	1090		
Selenium	µg/g	<0.1	<0.1	<0.050	<0.10	<0.050	<0.050	<0.050		
Silver	µg/g	<0.05	<0.05	0.0053	<0.010	<0.0050	<0.0050	<0.0050		
Sodium	µg/g	<50	127	558	50	18	43	206		
Strontium	µg/g	5.1	9.9	14.1	8.3	5.76	8.5	6.67		
Tin	µg/g	<0.3	<0.3	0.21	<0.20	0.10	<0.10	0.20		
Titanium	µg/g	1.4	0.8	1.5	<1.0	0.54	<0.50	<0.50		
Vanadium	µg/g	0.10	<0.05	<0.05	0.05	<0.05	<0.05	<0.05		
Zinc	µg/g	11	19	27.2	12.4	9.38	14.3	7.32		
Chloride	µg/g	<400	610	300	<1000	37	80	<20		

NOTES:

1) ug/g denotes micrograms per gram.
2) Boron (H.W.E.) denotes boron that is analysed using the Hot Water Extraction laboratory method.

Table H-3
Stem Core - General Chemical Results - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	Poplar System								
		Zone 3								
		28-Sep-17	28-Sep-18	13-Sep-19	2-Sep-20	21-Sep-21	21-Sep-22	19-Sep-23		
Aluminum	µg/g	7	10	46	605	6.5	5.4	6.6		
Arsenic	µg/g	<0.1	<0.1	0.054	0.095	<0.020	<0.020	0.026		
Barium	µg/g	1.1	2.0	5.0	7.8	2.13	1.01	4.37		
Beryllium	µg/g	<0.05	<0.05	<0.010	<0.020	<0.010	<0.010	<0.010		
Bismuth	µg/g	<0.05	<0.05	<0.010	<0.020	<0.010	<0.010	<0.010		
Boron	µg/g	6.8	6.8	19.0	29.2	8.1	3.5	15.0		
Boron (H.W.E.)	µg/g	1.1	2.4	4.6	2.2	<0.50	<0.50	2.6		
Cadmium	µg/g	0.56	0.4	0.901	0.686	0.291	0.269	0.619		
Calcium	µg/g	2320	2530	5520	7630	2820	690	4440		
Chromium	µg/g	<0.3	<0.3	12.2	0.7	<0.10	<0.10	<0.10		
Cobalt	µg/g	0.065	0.095	0.089	0.07	0.026	0.036	0.078		
Copper	µg/g	3.00	3.20	4.39	4.49	2.03	2.32	6.46		
Lead	µg/g	<0.03	0.16	2.97	0.23	0.021	0.018	0.025		
Magnesium	µg/g	497	535	801	907	479	205	558		
Molybdenum	µg/g	<0.05	<0.05	0.234	0.191	<0.020	<0.020	0.024		
Nickel	µg/g	0.12	0.16	5.93	0.63	0.229	0.135	0.249		
Phosphorus	µg/g	627	1020	711	1520	525	69	330		
Potassium	µg/g	2140	1390	2310	6090	2100	2840	4650		
Selenium	µg/g	<0.1	<0.1	<0.050	<0.10	<0.050	<0.050	<0.050		
Silver	µg/g	<0.05	<0.05	<0.0050	<0.010	<0.0050	<0.0050	<0.0050		
Sodium	µg/g	<50	111	210	534	51	203	204		
Strontium	µg/g	8.6	8.6	15.1	23.7	12.5	4.73	17.2		
Tin	µg/g	<0.3	<0.3	0.3	<0.20	<0.10	<0.10	0.25		
Titanium	µg/g	0.6	1.0	1.0	5.6	<0.50	<0.50	<0.50		
Vanadium	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Zinc	µg/g	15	13	30.8	30.4	16.8	6.5	38.6		
Chloride	µg/g	<400	410	660	<1000	60	25	<400		

NOTES:

1) ug/g denotes micrograms per gram.
2) Boron (H.W.E.) denotes boron that is analysed using the Hot Water Extraction laboratory method.

Table H-3
Stem Core - General Chemical Results - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	Poplar System								
		Zone 4								
		28-Sep-17	28-Sep-18	13-Sep-19	2-Sep-20	21-Sep-21	21-Sep-22	19-Sep-23		
Aluminum	µg/g	20	13	48	12	3.5	7.8	1.9		
Arsenic	µg/g	<0.1	<0.1	0.049	0.045	<0.020	<0.020	0.023		
Barium	µg/g	0.9	2.6	5.4	1.7	1.06	1.4	1.36		
Beryllium	µg/g	<0.05	<0.05	<0.010	<0.020	<0.010	<0.010	<0.010		
Bismuth	µg/g	<0.05	<0.05	<0.010	<0.020	<0.010	<0.010	<0.010		
Boron	µg/g	9.6	7	14.9	11.8	4.6	2.9	3.7		
Boron (H.W.E.)	µg/g	1.3	2.7	2.7	2.3	<0.50	<0.50	0.85		
Cadmium	µg/g	0.21	0.85	0.971	0.448	0.386	0.579	0.414		
Calcium	µg/g	1910	2150	7610	2670	943	903	1240		
Chromium	µg/g	<0.3	<0.3	12	<0.20	<0.10	<0.10	<0.10		
Cobalt	µg/g	0.139	0.082	0.052	0.071	0.036	0.042	0.060		
Copper	µg/g	3.2	2.8	5.3	2.4	1.24	1.64	1.59		
Lead	µg/g	0.06	0.18	1.24	0.056	0.019	0.017	0.022		
Magnesium	µg/g	635	487	882	633	256	277	207		
Molybdenum	µg/g	<0.05	0.06	0.27	<0.040	<0.020	<0.020	<0.020		
Nickel	µg/g	0.24	0.16	6.05	0.25	0.074	0.366	0.062		
Phosphorus	µg/g	469	831	1020	587	164	288	184		
Potassium	µg/g	2250	1460	2880	2020	707	906	748		
Selenium	µg/g	<0.1	<0.1	<0.050	<0.10	<0.050	<0.050	<0.050		
Silver	µg/g	<0.05	<0.05	<0.0050	<0.010	<0.0050	<0.0050	<0.0050		
Sodium	µg/g	60	361	166	166	30	112	117		
Strontium	µg/g	14.5	9.7	16.9	22.4	6.75	5.44	8.51		
Tin	µg/g	<0.3	<0.3	<0.10	<0.20	<0.10	<0.10	0.17		
Titanium	µg/g	0.7	0.9	1.0	<1.0	<0.50	<0.50	<0.50		
Vanadium	µg/g	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05		
Zinc	µg/g	14	13	29.3	20	5.85	6.02	8.51		
Chloride	µg/g	<400	840	<200	1000	<400	24	<20		

NOTES:

1) ug/g denotes micrograms per gram.
2) Boron (H.W.E.) denotes boron that is analysed using the Hot Water Extraction laboratory method.

Table H-4
Root Tissue - General Chemical Results - Poplar System
Twin Creeks Environemntal Centre - Poplar System

Parameter	Units	Poplar System								
		Zone 1								
		28-Sep-17	28-Sep-18	13-Sep-19	2-Sep-20	21-Sep-21	21-Sep-22	19-Sep-23		
Aluminum	µg/g	310	41	306	2160	47.9	78.7	9.7		
Arsenic	µg/g	0.2	<0.1	0.2	1.0	0.024	0.032	0.023		
Barium	µg/g	4.0	1.1	5.5	28.6	1.86	1.79	1.56		
Beryllium	µg/g	<0.05	<0.05	0.01	0.096	<0.010	<0.010	<0.010		
Bismuth	µg/g	<0.05	<0.05	<0.010	0.023	<0.010	<0.010	<0.010		
Boron	µg/g	15.3	5	16.5	84.8	5.1	3.3	4.5		
Boron (H.W.E.)	µg/g	13	2.1	2.9	9.5	<0.50	0.73	0.65		
Cadmium	µg/g	0.14	0.22	0.42	2.49	0.344	0.223	0.320		
Calcium	µg/g	3400	933	10800	20500	1630	857	1220		
Chromium	µg/g	0.9	0.3	32.8	3.5	0.15	0.13	<0.10		
Cobalt	µg/g	0.385	0.121	0.443	3.840	0.060	0.066	0.093		
Copper	µg/g	4.1	3.4	6.6	10.7	2.41	2.35	2.92		
Lead	µg/g	0.35	0.21	0.807	1.86	0.097	0.066	0.047		
Magnesium	µg/g	743	346	1260	3850	510	266	598		
Molybdenum	µg/g	0.18	0.07	0.52	0.45	0.023	<0.020	<0.020		
Nickel	µg/g	0.83	0.27	15.70	4.19	0.387	0.333	0.148		
Phosphorus	µg/g	596	688	1810	1810	834	1130	1200		
Potassium	µg/g	4090	3880	5850	18600	1670	1220	2200		
Selenium	µg/g	<0.1	<0.1	<0.050	0.3	<0.050	<0.050	<0.050		
Silver	µg/g	<0.05	<0.05	0.006	<0.010	<0.0050	<0.0050	<0.0050		
Sodium	µg/g	305	263	408	4650	57	104	156		
Strontium	µg/g	11.5	10.5	33.9	52.3	8.77	4.33	7.89		
Tin	µg/g	<0.3	<0.3	0.1	<0.20	<0.10	0.17	0.26		
Titanium	µg/g	5.3	1.3	5.6	28.1	1.09	0.87	<0.50		
Vanadium	µg/g	0.71	0.09	0.75	6.51	<0.05	<0.05	0.08		
Zinc	µg/g	9.0	10.0	49.1	77.5	15.1	7.64	22.0		
Chloride	µg/g	INS	390	340	3900	71	1000	37		

NOTES:

1) ug/g indicates micrograms per gram.
2) Boron (H.W.E.) denotes boron that is analysed using the Hot Water Extraction laboratory method.
3) INS denotes insufficient sample aliquot to complete analysis.

Table H-4
Root Tissue - General Chemical Results - Poplar System
Twin Creeks Environemntal Centre - Poplar System

Parameter	Units	Poplar System								
		Zone 2								
		28-Sep-17	28-Sep-18	13-Sep-19	2-Sep-20	21-Sep-21	21-Sep-22	19-Sep-23		
Aluminum	µg/g	500	70	3540	2200	16.2	20.7	7.9		
Arsenic	µg/g	0.3	<0.1	1.5	0.9	<0.020	<0.020	0.024		
Barium	µg/g	5.7	1.3	36.3	20.3	1.92	1.86	1.17		
Beryllium	µg/g	<0.05	<0.05	0.16	0.096	<0.010	<0.010	<0.010		
Bismuth	µg/g	<0.05	<0.05	0.04	0.024	<0.010	<0.010	<0.010		
Boron	µg/g	10.7	4.8	62.8	51.7	4.2	10.4	5.9		
Boron (H.W.E.)	µg/g	6.3	1.6	18.0	3.6	<0.50	0.56	0.77		
Cadmium	µg/g	0.11	0.16	0.86	0.68	0.182	0.323	0.370		
Calcium	µg/g	3000	1100	15500	14900	1540	5420	1200		
Chromium	µg/g	1.0	0.7	24.3	3.3	<0.10	<0.10	<0.10		
Cobalt	µg/g	0.652	0.140	0.987	0.379	0.044	0.062	0.100		
Copper	µg/g	4.5	4.3	10.9	6.7	2.25	2.14	2.96		
Lead	µg/g	0.60	0.19	3.07	1.78	0.043	0.026	0.054		
Magnesium	µg/g	722	470	3560	2270	316	602	599		
Molybdenum	µg/g	0.21	0.08	1.41	0.46	<0.020	<0.020	<0.020		
Nickel	µg/g	1.29	0.43	15.60	3.51	0.134	0.216	0.147		
Phosphorus	µg/g	561	687	1060	1600	1180	889	1330		
Potassium	µg/g	4040	4220	7830	8700	1390	3780	3090		
Selenium	µg/g	<0.1	<0.1	0.32	0.10	<0.050	<0.050	<0.050		
Silver	µg/g	<0.05	<0.05	0.0184	<0.0050	<0.0050	<0.0050	<0.0050		
Sodium	µg/g	189	439	3010	1870	21	119	323		
Strontium	µg/g	6.3	9.5	44.7	37.5	6.23	14	10.4		
Tin	µg/g	<0.3	<0.3	0.3	0.2	0.13	<0.10	0.13		
Titanium	µg/g	6.9	1.9	39.2	14.5	0.61	<0.50	<0.50		
Vanadium	µg/g	1.1	0.2	2.22	0.70	<0.05	0.07	0.06		
Zinc	µg/g	9.0	10.0	49.8	35.7	10.4	19.3	27.5		
Chloride	µg/g	460	870	5700	2100	78	110	230		

NOTES:

1) ug/g indicates micrograms per gram.
2) Boron (H.W.E.) denotes boron that is analysed using the Hot Water Extraction laboratory method.
3) INS denotes insufficient sample aliquot to complete analysis.

Table H-4
Root Tissue - General Chemical Results - Poplar System
Twin Creeks Environemntal Centre - Poplar System

Parameter	Units	Poplar System								
		Zone 3								
		28-Sep-17	28-Sep-18	13-Sep-19	2-Sep-20	21-Sep-21	21-Sep-22	19-Sep-23		
Aluminum	µg/g	160	41	3700	2910	37.8	29.1	56.0		
Arsenic	µg/g	<0.1	<0.1	1.7	1.6	0.047	0.031	0.035		
Barium	µg/g	3.1	1	34.5	38.8	1.83	1.1	2.40		
Beryllium	µg/g	<0.05	<0.05	0.17	0.14	<0.010	<0.010	<0.010		
Bismuth	µg/g	<0.05	<0.05	0.05	0.038	<0.010	<0.010	<0.010		
Boron	µg/g	7.1	28.6	71.3	164.0	13.8	3.6	7.1		
Boron (H.W.E.)	µg/g	3.2	0.8	13.0	10.0	0.95	0.62	1.4		
Cadmium	µg/g	0.24	0.26	0.91	0.53	0.443	0.366	0.281		
Calcium	µg/g	2890	3440	18300	12300	1370	859	943		
Chromium	µg/g	0.6	0.4	26.0	6.1	0.14	0.1	0.11		
Cobalt	µg/g	0.193	0.209	0.923	1.060	0.028	0.044	0.113		
Copper	µg/g	3.5	6.6	12.7	11.8	2.38	1.78	4.56		
Lead	µg/g	0.16	0.11	3.34	3.43	0.109	0.065	1.88		
Magnesium	µg/g	641	955	4220	2290	409	307	427		
Molybdenum	µg/g	0.09	0.12	1.87	1.18	0.039	0.02	0.022		
Nickel	µg/g	0.45	0.47	17.5	6.82	0.253	0.238	0.247		
Phosphorus	µg/g	504	1350	1450	881	281	409	1000		
Potassium	µg/g	3680	6090	11900	2970	1240	890	3420		
Selenium	µg/g	<0.1	<0.1	0.21	0.45	<0.050	<0.050	<0.050		
Silver	µg/g	<0.05	<0.05	0.0172	<0.010	<0.0050	<0.0050	<0.0050		
Sodium	µg/g	136	2430	2540	2410	391	117	294		
Strontium	µg/g	7.6	17.1	47.3	40.5	11.3	7.78	6.94		
Tin	µg/g	<0.3	<0.3	0.2	0.3	0.14	0.1	0.34		
Titanium	µg/g	2.70	1.5	38.2	27.1	1.07	<0.50	1.03		
Vanadium	µg/g	0.33	0.10	2.15	2.09	0.06	0.06	0.18		
Zinc	µg/g	10.0	10.0	42.5	25.1	11.7	8.89	12.4		
Chloride	µg/g	<400	<400	5900	3700	390	150	<400		

NOTES:

1) ug/g indicates micrograms per gram.
2) Boron (H.W.E.) denotes boron that is analysed using the Hot Water Extraction laboratory method.
3) INS denotes insufficient sample aliquot to complete analysis.

Table H-4
Root Tissue - General Chemical Results - Poplar System
Twin Creeks Environemntal Centre - Poplar System

Parameter	Units	Poplar System								
		Zone 4								
		28-Sep-17	28-Sep-18	13-Sep-19	2-Sep-20	21-Sep-21	21-Sep-22	19-Sep-23		
Aluminum	µg/g	180	130	2940	2430	21.8	9.4	22.9		
Arsenic	µg/g	<0.1	<0.1	1.1	1.1	0.03	<0.020	0.024		
Barium	µg/g	2.6	3.9	43.4	21.8	1.25	0.281	0.927		
Beryllium	µg/g	<0.05	<0.05	0.12	0.11	<0.010	<0.010	<0.010		
Bismuth	µg/g	<0.05	<0.05	0.04	0.03	<0.010	<0.010	<0.010		
Boron	µg/g	8.8	7.3	83.7	61.1	4.6	2.9	4.2		
Boron (H.W.E.)	µg/g	2.1	1.7	17.0	4.0	<0.50	<0.50	0.92		
Cadmium	µg/g	0.11	0.67	1.28	1.23	0.263	0.0816	0.253		
Calcium	µg/g	2830	5440	14600	12000	1190	602	1240		
Chromium	µg/g	0.5	0.6	16.2	3.8	<0.10	<0.10	<0.10		
Cobalt	µg/g	0.297	0.183	0.548	0.955	0.088	0.12	0.106		
Copper	µg/g	3.6	7.1	10.9	6.9	3.1	1.97	3.15		
Lead	µg/g	0.22	0.16	2.16	2.03	0.079	0.033	0.111		
Magnesium	µg/g	688	713	2570	2420	429	667	664		
Molybdenum	µg/g	0.12	0.12	2.41	0.58	0.029	<0.020	0.022		
Nickel	µg/g	0.77	0.42	10.10	4.34	0.349	0.366	0.247		
Phosphorus	µg/g	498	1890	1740	956	666	609	688		
Potassium	µg/g	5090	6350	9580	3670	2170	3610	2550		
Selenium	µg/g	<0.1	<0.1	0.428	0.19	<0.050	<0.050	<0.050		
Silver	µg/g	<0.05	<0.05	0.0141	<0.010	<0.0050	<0.0050	<0.0050		
Sodium	µg/g	153	1110	2480	3330	265	206	196		
Strontium	µg/g	11.2	10.8	37.6	29.6	9.46	7.7	11.4		
Tin	µg/g	<0.3	<0.3	0.3	<0.20	<0.10	<0.10	0.32		
Titanium	µg/g	3.10	3.3	30.4	26.2	0.69	<0.50	<0.50		
Vanadium	µg/g	0.38	0.26	1.49	1.41	0.12	<0.05	0.10		
Zinc	µg/g	9.0	16.0	32.7	24.8	12.8	7.05	12.2		
Chloride	µg/g	<400	3100	5300	3300	190	680	900		

NOTES:

1) ug/g indicates micrograms per gram.
2) Boron (H.W.E.) denotes boron that is analysed using the Hot Water Extraction laboratory method.
3) INS denotes insufficient sample aliquot to complete analysis.

APPENDIX H-5:

2023 Certificates of Analysis

Your P.O. #: 12285741
Your Project #: 2303459.01
Site#: 900
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/10/02
Report #: R7841217
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3T1872
Received: 2023/09/21, 10:14

Sample Matrix: Tissue
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Chloride (20:1 extract)	8	2023/09/26	2023/09/28	CAM SOP-00463	MOE E3013 m
Metals in Vegetation by ICPMS	8	N/A	2023/09/26	CAM SOP-00447	EPA 6020/200.3 m
Moisture	8	N/A	2023/09/23	CAM SOP-00445	Carter 2nd ed 51.2 m
Nitrogen	8	N/A	2023/09/29	CAM SOP-00460	EN0000:2003 TC WI
Sulphate (20:1 Extract)	8	2023/09/26	2023/09/28	CAM SOP-00464	MOE E3013 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your P.O. #: 12285741
Your Project #: 2303459.01
Site#: 900
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/10/02
Report #: R7841217
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3T1872
Received: 2023/09/21, 10:14

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

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Bureau Veritas Job #: C3T1872
Report Date: 2023/10/02

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: JRA

RESULTS OF ANALYSES OF TISSUE

Bureau Veritas ID		XBF068	XBF069	XBF070	XBF071	XBF072	XBF073	XBF074		
Sampling Date		2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	Z1-UC	Z1-LC	Z2-UC	Z2-LC	Z3-UC	Z3-LC	Z4-UC	RDL	QC Batch
Inorganics										
Soluble (20:1) Chloride (Cl-)	ug/g	17000	12000	11000	6000	5500	7800	7200	4000	8940859
Moisture	%	64	63	63	62	65	66	66	1.0	8937469
Nitrogen (N)	%	2.5	2.3	3.0	2.2	2.6	2.8	2.9	0.010	8949170
Soluble (20:1) Sulphate (SO4)	ug/g	8700	8100	10000	8100	6800	6500	7600	4000	8940867

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas ID		XBF075		
Sampling Date		2023/09/19		
COC Number		n/a		
	UNITS	Z4-LC	RDL	QC Batch
Inorganics				
Soluble (20:1) Chloride (Cl-)	ug/g	7700	4000	8940859
Moisture	%	65	1.0	8937490
Nitrogen (N)	%	2.4	0.010	8949170
Soluble (20:1) Sulphate (SO4)	ug/g	6800	4000	8940867

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3T1872
Report Date: 2023/10/02

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: JRA

ELEMENTS BY ICP/MS (TISSUE)

Bureau Veritas ID		XBF068	XBF069	XBF070	XBF071	XBF072	XBF073	XBF074		
Sampling Date		2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	Z1-UC	Z1-LC	Z2-UC	Z2-LC	Z3-UC	Z3-LC	Z4-UC	RDL	QC Batch
Metals										
Boron (B)	ug/g	215	179	191	121	141	206	242	0.5	8938312
Copper (Cu)	ug/g	2.9	3.1	4.1	3.8	4.3	4.0	3.6	0.5	8938312
Iron (Fe)	ug/g	27	29	24	29	33	20	29	3	8938312
Manganese (Mn)	ug/g	21.1	31.8	18.7	39.6	34.3	17.3	17.1	0.3	8938312
Phosphorus (P)	ug/g	663	572	851	712	489	690	662	50	8938312
Potassium (K)	ug/g	3950	3630	5560	3960	4260	6000	6730	100	8938312
Zinc (Zn)	ug/g	19	38	24	34	56	24	59	2	8938312

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas ID		XBF075		
Sampling Date		2023/09/19		
COC Number		n/a		
	UNITS	Z4-LC	RDL	QC Batch
Metals				
Boron (B)	ug/g	111	0.5	8938312
Copper (Cu)	ug/g	3.8	0.5	8938312
Iron (Fe)	ug/g	33	3	8938312
Manganese (Mn)	ug/g	40.1	0.3	8938312
Phosphorus (P)	ug/g	540	50	8938312
Potassium (K)	ug/g	3440	100	8938312
Zinc (Zn)	ug/g	37	2	8938312

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3T1872
Report Date: 2023/10/02

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: JRA

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.7°C

Results relate only to the items tested.

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Bureau Veritas Job #: C3T1872
Report Date: 2023/10/02

QUALITY ASSURANCE REPORT

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: JRA

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8937469	Moisture	2023/09/23							5.0 (1)	20		
8937490	Moisture	2023/09/23							6.8 (1)	20		
8938312	Boron (B)	2023/09/26	NC	75 - 125	95	80 - 120	<0.5	ug/g	7.9 (1)	30	89	70 - 130
8938312	Copper (Cu)	2023/09/26	98	75 - 125	95	80 - 120	<0.5	ug/g	4.9 (1)	30	90	70 - 130
8938312	Iron (Fe)	2023/09/26	98	75 - 125	94	80 - 120	<3	ug/g	3.0 (1)	30		
8938312	Manganese (Mn)	2023/09/26	NC	75 - 125	99	80 - 120	<0.3	ug/g	2.9 (1)	30	97	70 - 130
8938312	Phosphorus (P)	2023/09/26	NC	75 - 125	107	80 - 120	<50	ug/g	4.8 (1)	30	101	70 - 130
8938312	Potassium (K)	2023/09/26	NC	75 - 125	97	80 - 120	<100	ug/g	0.82 (1)	30	94	70 - 130
8938312	Zinc (Zn)	2023/09/26	NC	75 - 125	101	80 - 120	<2	ug/g	1.3 (1)	30	88	70 - 130
8940859	Soluble (20:1) Chloride (Cl-)	2023/09/28	NC (2)	70 - 130	103	70 - 130	<20	ug/g	26 (3)	35		
8940867	Soluble (20:1) Sulphate (SO4)	2023/09/28	NC (2)	70 - 130	99	70 - 130	<20	ug/g	12 (3)	35		
8949170	Nitrogen (N)	2023/09/29					<0.010	%	3.4 (1)	35	101	95 - 105

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

(1) Duplicate Parent ID

(2) Matrix Spike Parent ID [XBF069-01]

(3) Duplicate Parent ID [XBF069-01]

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Bureau Veritas Job #: C3T1872
Report Date: 2023/10/02

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: JRA

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere

Cristina Carriere, Senior Scientific Specialist

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Maxxam Analytics Inc
6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #		
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285741	
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Suite 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	CHAIN OF CUSTODY # :
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x 2984 Fax: 519-823-1316	Project Name:	TCPS-LT-SEP	TCPS-LT-SEP
Email:	lmertick@wm.com	Email:	Brent.Langille@rwdi.com, JCL@rwdi.com	Location:	Twin Creeks	
				Sampled By:	JRA	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

☐ MISA Reg. 153 ☐ Table 1 ☐ Table 2 ☐ Table 3 Sewer Use ☐ Sanitary ☐ Storm Region _____ ☐ PWQO ☐ Reg. 558 ☒ Other site specific (specify)

Report Criteria on C of A ? n

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ON-WLF TCLS - LEAF TISSUE ANNUAL (POPLAR) (Group ZO)	# of Cont.	COMMENTS / TAT COMMENTS
1	Z1-UC	19-Sep-23	PM	Leaf Tissue	n	n	X	2	
2	Z1-LC	19-Sep-23	PM	Leaf Tissue	n	n	X	2	
3	Z2-UC	19-Sep-23	PM	Leaf Tissue	n	n	X	2	
4	Z2-LC	19-Sep-23	PM	Leaf Tissue	n	n	X	2	
5	Z3-UC	19-Sep-23	PM	Leaf Tissue	n	n	X	2	
6	Z3-LC	19-Sep-23	PM	Leaf Tissue	n	n	X	2	
7	Z4-UC	19-Sep-23	PM	Leaf Tissue	n	n	X	2	
8	Z4-LC	19-Sep-23	PM	Leaf Tissue	n	n	X	2	
9									See lab addendum for lab group coding
10									
11									
12									

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
☒ 5 to 7 Working Days

Rush TAT: Rush Confirmation # _____ (call Lab for #)
☐ 1 day ☐ 2 days ☐ 3 days
DATE Required: 29-Oct-23
TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

21-Sep-23 10:14
Patricia Legette
C3T1872
WP ENV-2095

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:
EW - 20-Sep-23 / PM	BRAND IRWEOVSEN	23/09/21	10:14

Laboratory Use Only
Temperature (°C) on Receipt: 6/4/10
Condition of Sample on Receipt: ☐ OK ☐ SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

White: Maxxam Yellow: Mail Pink: Client

Your P.O. #: 12285741
Your Project #: 2303459.01
Site#: 900
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/11/30
Report #: R7935610
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C3T3642
Received: 2023/09/22, 15:10

Sample Matrix: Tissue
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Hot Water Extractable Boron	8	2023/11/30	2023/11/30	CAM SOP-00408	R153 Ana. Prot. 2011
Chloride (20:1 extract)	8	2023/09/28	2023/09/29	CAM SOP-00463	MOE E3013 m
Metals in Vegetation by ICPMS	8	N/A	2023/09/28	CAM SOP-00447	EPA 6020/200.3 m
Elements in Plants by CRC ICPMS -Dry Wt (1)	8	2023/10/26	2023/10/27	BBY7SOP-00021 / BBY7SOP-00002	EPA 6020b R2 m
Moisture in Tissue (Subcontracted) (1, 2)	8	2023/10/13	2023/10/14	BBY8SOP-00017	BCMOE BCLM Dec2000 m
Moisture	8	N/A	2023/09/27	CAM SOP-00445	Carter 2nd ed 51.2 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Burnaby, 4606 Canada Way , Burnaby, BC, V5G 1K5
(2) Offsite analysis requires that subcontracted moisture be reported.

Your P.O. #: 12285741
Your Project #: 2303459.01
Site#: 900
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/11/30
Report #: R7935610
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C3T3642
Received: 2023/09/22, 15:10

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3T3642
Report Date: 2023/11/30

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: JCL

RESULTS OF ANALYSES OF TISSUE

Bureau Veritas ID		XBO106	XBO107		XBO108		XBO109	XBO110		
Sampling Date		2023/09/19	2023/09/19		2023/09/19		2023/09/19	2023/09/19		
COC Number		n/a	n/a		n/a		n/a	n/a		
	UNITS	Z1- ROOT	Z2- ROOT	RDL	Z3- ROOT	RDL	Z4- ROOT	Z1- STEM	RDL	QC Batch
Inorganics										
Soluble (20:1) Chloride (Cl-)	ug/g	37	230	20	<400 (1)	400	900	<20	20	8947240
Moisture	%	45	45	1.0	48	1.0	43	39	1.0	8945979
Metals										
Total (Dry Wt) Aluminum (Al)	mg/kg	9.7	7.9	1.0	56.0	1.0	22.9	5.2	1.0	9018710
Total (Dry Wt) Arsenic (As)	mg/kg	0.023	0.024	0.020	0.035	0.020	0.024	<0.020	0.020	9018710
Total (Dry Wt) Barium (Ba)	mg/kg	1.56	1.17	0.050	2.40	0.050	0.927	1.39	0.050	9018710
Total (Dry Wt) Beryllium (Be)	mg/kg	<0.010	<0.010	0.010	<0.010	0.010	<0.010	<0.010	0.010	9018710
Total (Dry Wt) Bismuth (Bi)	mg/kg	<0.010	<0.010	0.010	<0.010	0.010	<0.010	<0.010	0.010	9018710
Total (Dry Wt) Boron (B)	mg/kg	4.5	5.9	1.0	7.1	1.0	4.2	3.6	1.0	9018710
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.320	0.370	0.0050	0.281	0.0050	0.253	0.252	0.0050	9018710
Total (Dry Wt) Calcium (Ca)	mg/kg	1220	1200	10	943	10	1240	1000	10	9018710
Total (Dry Wt) Chromium (Cr)	mg/kg	<0.10	<0.10	0.10	0.11	0.10	<0.10	<0.10	0.10	9018710
Total (Dry Wt) Copper (Cu)	mg/kg	2.92	2.96	0.050	4.56	0.050	3.15	1.70	0.050	9018710
Total (Dry Wt) Lead (Pb)	mg/kg	0.047	0.054	0.010	1.88	0.010	0.111	0.025	0.010	9018710
Total (Dry Wt) Magnesium (Mg)	mg/kg	598	599	5.0	427	5.0	664	286	5.0	9018710
Total (Dry Wt) Molybdenum (Mo)	mg/kg	<0.020	<0.020	0.020	0.022	0.020	0.022	<0.020	0.020	9018710
Total (Dry Wt) Nickel (Ni)	mg/kg	0.148	0.147	0.050	0.247	0.050	0.247	0.050	0.050	9018710
Total (Dry Wt) Phosphorus (P)	mg/kg	1200	1330	10	1000	10	688	257	10	9018710
Total (Dry Wt) Potassium (K)	mg/kg	2200	3090	10	3420	10	2550	969	10	9018710
Total (Dry Wt) Selenium (Se)	mg/kg	<0.050	<0.050	0.050	<0.050	0.050	<0.050	<0.050	0.050	9018710
Total (Dry Wt) Silver (Ag)	mg/kg	<0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	<0.0050	0.0050	9018710
Total (Dry Wt) Sodium (Na)	mg/kg	156	323	10	294	10	196	38	10	9018710
Total (Dry Wt) Strontium (Sr)	mg/kg	7.89	10.4	0.050	6.94	0.050	11.4	6.35	0.050	9018710
Total (Dry Wt) Tin (Sn)	mg/kg	0.26	0.13	0.10	0.34	0.10	0.32	0.26	0.10	9018710
Total (Dry Wt) Titanium (Ti)	mg/kg	<0.50	<0.50	0.50	1.03	0.50	<0.50	<0.50	0.50	9018710
Total (Dry Wt) Vanadium (V)	mg/kg	<0.20	<0.20	0.20	<0.20	0.20	<0.20	<0.20	0.20	9018710
Total (Dry Wt) Zinc (Zn)	mg/kg	22.0	27.5	0.20	12.4	0.20	12.2	11.0	0.20	9018710
PHYSICAL PROPERTIES										
Moisture-Subcontracted	%	42	62	0.30	46	0.30	46	36	0.30	9018711

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Due to colour interferences, sample required dilution. Detection limit was adjusted accordingly.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3T3642
Report Date: 2023/11/30

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: JCL

RESULTS OF ANALYSES OF TISSUE

Bureau Veritas ID		XBO111		XBO112		XBO113		
Sampling Date		2023/09/19		2023/09/19		2023/09/19		
COC Number		n/a		n/a		n/a		
	UNITS	Z2- STEM	RDL	Z3- STEM	RDL	Z4- STEM	RDL	QC Batch
Inorganics								
Soluble (20:1) Chloride (Cl-)	ug/g	<20	20	<400 (1)	400	<20	20	8947240
Moisture	%	39	1.0	54	1.0	38	1.0	8945979
Metals								
Total (Dry Wt) Aluminum (Al)	mg/kg	3.0	1.0	6.6	1.0	1.9	1.0	9018710
Total (Dry Wt) Arsenic (As)	mg/kg	<0.020	0.020	0.026	0.020	0.023	0.020	9018710
Total (Dry Wt) Barium (Ba)	mg/kg	0.715	0.050	4.37	0.050	1.36	0.050	9018710
Total (Dry Wt) Beryllium (Be)	mg/kg	<0.010	0.010	<0.010	0.010	<0.010	0.010	9018710
Total (Dry Wt) Bismuth (Bi)	mg/kg	<0.010	0.010	<0.010	0.010	<0.010	0.010	9018710
Total (Dry Wt) Boron (B)	mg/kg	3.4	1.0	15.0	1.0	3.7	1.0	9018710
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.272	0.0050	0.619	0.0050	0.414	0.0050	9018710
Total (Dry Wt) Calcium (Ca)	mg/kg	892	10	4440	10	1240	10	9018710
Total (Dry Wt) Chromium (Cr)	mg/kg	<0.10	0.10	<0.10	0.10	<0.10	0.10	9018710
Total (Dry Wt) Copper (Cu)	mg/kg	1.79	0.050	6.46	0.050	1.59	0.050	9018710
Total (Dry Wt) Lead (Pb)	mg/kg	0.062	0.010	0.025	0.010	0.022	0.010	9018710
Total (Dry Wt) Magnesium (Mg)	mg/kg	338	5.0	558	5.0	207	5.0	9018710
Total (Dry Wt) Molybdenum (Mo)	mg/kg	<0.020	0.020	0.024	0.020	<0.020	0.020	9018710
Total (Dry Wt) Nickel (Ni)	mg/kg	<0.050	0.050	0.249	0.050	0.062	0.050	9018710
Total (Dry Wt) Phosphorus (P)	mg/kg	240	10	330	10	184	10	9018710
Total (Dry Wt) Potassium (K)	mg/kg	1090	10	4650	10	748	10	9018710
Total (Dry Wt) Selenium (Se)	mg/kg	<0.050	0.050	<0.050	0.050	<0.050	0.050	9018710
Total (Dry Wt) Silver (Ag)	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	9018710
Total (Dry Wt) Sodium (Na)	mg/kg	206	10	204	10	117	10	9018710
Total (Dry Wt) Strontium (Sr)	mg/kg	6.67	0.050	17.2	0.050	8.51	0.050	9018710
Total (Dry Wt) Tin (Sn)	mg/kg	0.20	0.10	0.25	0.10	0.17	0.10	9018710
Total (Dry Wt) Titanium (Ti)	mg/kg	<0.50	0.50	<0.50	0.50	<0.50	0.50	9018710
Total (Dry Wt) Vanadium (V)	mg/kg	<0.20	0.20	<0.20	0.20	<0.20	0.20	9018710
Total (Dry Wt) Zinc (Zn)	mg/kg	7.32	0.20	38.6	0.20	8.51	0.20	9018710
PHYSICAL PROPERTIES								
Moisture-Subcontracted	%	32	0.30	60	0.30	38	0.30	9018711

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Due to colour interferences, sample required dilution. Detection limit was adjusted accordingly.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3T3642
Report Date: 2023/11/30

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: JCL

ELEMENTS BY ICP/MS (TISSUE)

Bureau Veritas ID		XBO106	XBO107	XBO108	XBO109	XBO110	XBO111	XBO112		
Sampling Date		2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	Z1- ROOT	Z2- ROOT	Z3- ROOT	Z4- ROOT	Z1- STEM	Z2- STEM	Z3- STEM	RDL	QC Batch
Metals										
Cobalt (Co)	ug/g	0.093	0.100	0.113	0.106	0.089	0.097	0.078	0.005	8946881
Vanadium (V)	ug/g	0.08	0.06	0.18	0.10	<0.05	<0.05	<0.05	0.05	8946881

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas ID		XBO113		
Sampling Date		2023/09/19		
COC Number		n/a		
	UNITS	Z4- STEM	RDL	QC Batch
Metals				
Cobalt (Co)	ug/g	0.060	0.005	8946881
Vanadium (V)	ug/g	<0.05	0.05	8946881

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3T3642
Report Date: 2023/11/30

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: JCL

ELEMENTS BY ATOMIC SPECTROSCOPY (TISSUE)

Bureau Veritas ID		XBO106	XBO107	XBO108	XBO109	XBO110	XBO111	XBO112		
Sampling Date		2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	Z1- ROOT	Z2- ROOT	Z3- ROOT	Z4- ROOT	Z1- STEM	Z2- STEM	Z3- STEM	RDL	QC Batch
Metals										
Hot Water Ext. Boron (B)	ug/g	0.65	0.77	1.4	0.92	0.91	3.0	2.6	0.25	9081713

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas ID		XBO113		
Sampling Date		2023/09/19		
COC Number		n/a		
	UNITS	Z4- STEM	RDL	QC Batch
Metals				
Hot Water Ext. Boron (B)	ug/g	0.85	0.25	9081713

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.7°C

Revised Report (2023/11/30): Hot water soluble boron results reported in this CofA.

Metals: Due to limited amount of sample available for analysis, a smaller than usual portion of the sample was used. Detection limits were adjusted accordingly.

Metals Analysis: Due to limited amount of sample available for analysis, a smaller than usual portion of the sample was used. Detection limits were adjusted accordingly.

Results relate only to the items tested.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3T3642
Report Date: 2023/11/30

QUALITY ASSURANCE REPORT

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: JCL

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8945979	Moisture	2023/09/27							1.5 (1)	20		
8946881	Cobalt (Co)	2023/09/28	92 (2)	75 - 125	89	80 - 120	<0.005	ug/g	2.9 (3)	30	79	70 - 130
8946881	Vanadium (V)	2023/09/28	95 (2)	75 - 125	89	80 - 120	<0.05	ug/g	22 (3)	30	36	28 - 52
8947240	Soluble (20:1) Chloride (Cl-)	2023/09/28	NC	70 - 130	98	70 - 130	<20	ug/g	5.5 (1)	35		
9018710	Total (Dry Wt) Aluminum (Al)	2023/10/27			105	80 - 120	<1.0	mg/kg				
9018710	Total (Dry Wt) Arsenic (As)	2023/10/27			103	80 - 120	<0.020	mg/kg			82	N/A
9018710	Total (Dry Wt) Barium (Ba)	2023/10/27			101	80 - 120	<0.050	mg/kg				
9018710	Total (Dry Wt) Beryllium (Be)	2023/10/27			94	80 - 120	<0.010	mg/kg				
9018710	Total (Dry Wt) Bismuth (Bi)	2023/10/27			98	80 - 120	<0.010	mg/kg				
9018710	Total (Dry Wt) Boron (B)	2023/10/27			99	80 - 120	<1.0	mg/kg			94	N/A
9018710	Total (Dry Wt) Cadmium (Cd)	2023/10/27			99	80 - 120	<0.0050	mg/kg			84	N/A
9018710	Total (Dry Wt) Calcium (Ca)	2023/10/27			101	80 - 120	<10	mg/kg			87	N/A
9018710	Total (Dry Wt) Chromium (Cr)	2023/10/27			101	80 - 120	<0.10	mg/kg				
9018710	Total (Dry Wt) Copper (Cu)	2023/10/27			99	80 - 120	<0.050	mg/kg			82	N/A
9018710	Total (Dry Wt) Lead (Pb)	2023/10/27			101	80 - 120	<0.010	mg/kg				
9018710	Total (Dry Wt) Magnesium (Mg)	2023/10/27			102	80 - 120	<5.0	mg/kg				
9018710	Total (Dry Wt) Molybdenum (Mo)	2023/10/27			105	80 - 120	<0.020	mg/kg				
9018710	Total (Dry Wt) Nickel (Ni)	2023/10/27			99	80 - 120	<0.050	mg/kg			72	N/A
9018710	Total (Dry Wt) Phosphorus (P)	2023/10/27			102	80 - 120	<10	mg/kg			93	N/A
9018710	Total (Dry Wt) Potassium (K)	2023/10/27			103	80 - 120	<10	mg/kg			89	N/A
9018710	Total (Dry Wt) Selenium (Se)	2023/10/27			101	80 - 120	<0.050	mg/kg			95	N/A
9018710	Total (Dry Wt) Silver (Ag)	2023/10/27			99	80 - 120	<0.0050	mg/kg				
9018710	Total (Dry Wt) Sodium (Na)	2023/10/27			105	80 - 120	<10	mg/kg			89	N/A
9018710	Total (Dry Wt) Strontium (Sr)	2023/10/27			101	80 - 120	<0.050	mg/kg			90	N/A
9018710	Total (Dry Wt) Tin (Sn)	2023/10/27			97	80 - 120	<0.10	mg/kg				
9018710	Total (Dry Wt) Titanium (Ti)	2023/10/27			106	80 - 120	<0.50	mg/kg				
9018710	Total (Dry Wt) Vanadium (V)	2023/10/27			100	80 - 120	<0.20	mg/kg				
9018710	Total (Dry Wt) Zinc (Zn)	2023/10/27			102	80 - 120	<0.20	mg/kg			81	N/A
9018711	Moisture-Subcontracted	2023/10/14							9.0 (4)	20		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9081713	Hot Water Ext. Boron (B)	2023/11/30	95 (5)	75 - 125	99	75 - 125	<0.050	ug/g	18 (6)	40		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

(1) Duplicate Parent ID

(2) Matrix Spike Parent ID [XBO106-02]

(3) Duplicate Parent ID [XBO106-02]

(4) Duplicate Parent ID [XBO106-03]

(5) Matrix Spike Parent ID [XBO113-01]

(6) Duplicate Parent ID [XBO113-01]

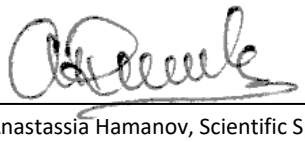
Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3T3642
Report Date: 2023/11/30

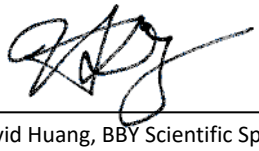
RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285741
Sampler Initials: JCL

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist



David Huang, BBY Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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CHAIN OF CUSTODY RECORD

Maxxam Analytics Inc
6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

Page 1 of 1

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #:		
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285741	CHAIN OF CUSTODY # :
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Suite 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	TCPS-SCRT-SEP
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x 2984 Fax: 519-823-1316	Project Name:	TCPS-SCRT-SEP	
Email:	lmertick@wm.com	Email:	Brent.Langille@RWDI.com, JCL@rwdi.com	Location:	Twin Creeks	
				Sampled By:	JCL	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

☐ MISA ☐ PWQO ☐ Reg. 558
Reg. 153: ☐ Table 1 ☐ Table 2 ☐ Table 3
Sewer Use: ☐ Sanitary ☐ Storm Region: _____
☒ Other: site specific (specify)
Report Criteria on C of A ? n

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ON-WLF-2023 TCLS - STEM CORE & ROOT TISSUE ANNUAL (Group ZT)	# of Cont.	COMMENTS / TAT COMMENTS
1	Z1-Root	19-Sep-23	PM	Tissue	n	n	X	3	Do not analyze soil particles on root material
2	Z2-Root	19-Sep-23	PM	Tissue	n	n	X	3	Do not analyze soil particles on root material
3	Z3-Root	19-Sep-23	PM	Tissue	n	n	X	3	Do not analyze soil particles on root material
4	Z4-Root	19-Sep-23	PM	Tissue	n	n	X	3	Do not analyze soil particles on root material
5	Z1-Stem	19-Sep-23	PM	Tissue	n	n	X	3	
6	Z2-Stem	19-Sep-23	PM	Tissue	n	n	X	3	
7	Z3-Stem	19-Sep-23	PM	Tissue	n	n	X	3	
8	Z4-Stem	19-Sep-23	PM	Tissue	n	n	X	3	
9									See lab addendum for lab group coding
10									
11									
12									

22-Sep-23 15:10
Patricia Legette
C3T3642
HPK ENV-1724

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
☒ 5 to 7 Working Days

Rush TAT: Rush Confirmation # _____ (call Lab for #)
☐ 1 day ☐ 2 days ☐ 3 days
DATE Required: 2-Oct-23
TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:
JCL- 21-Sep-23 / AM			

Laboratory Use Only

Temperature (°C) on Receipt	Condition of Sample on Receipt
8.1 8.7	☐ OK ☐ SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

White: Maxxam Yellow: Mail Pink: Client

Maxxam Analytics Inc
6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #		
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285741	
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Suite 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	CHAIN OF CUSTODY # :
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x 2984 Fax: 519-823-1316	Project Name:	TCPS-SCRT-SEP	TCPS-SCRT-SEP
Email:	lmertick@wm.com	Email:	Brent.Langille@RWDI.com, JCL@rwdi.com	Location:	Twin Creeks	
				Sampled By:	JCL	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

☐ MISA Reg. 153 Sewer Use ☒ Other
☐ Table 1 ☐ Sanitary site specific
☐ PWQO ☐ Table 2 ☐ Storm specify
☐ Table 3 Region _____
☐ Reg. 558

Report Criteria on C of A ? n

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
☒ 5 to 7 Working Days

Rush TAT: Rush Confirmation # _____ (call Lab for #)
☐ 1 day ☐ 2 days ☐ 3 days
DATE Required: _____
TIME Required: _____

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ON-WLF-2023 TCLS - STEM CORE & ROOT TISSUE ANNUAL (Group ZT)	# of Cont.	COMMENTS / TAT COMMENTS
1	Z1-Root	19-Sep-23	PM	Tissue	n	n	X	2	Do not analyze soil particles on root material
2	Z2-Root	19-Sep-23	PM	Tissue	n	n	X	2	Do not analyze soil particles on root material
3	Z3-Root	19-Sep-23	PM	Tissue	n	n	X	2	Do not analyze soil particles on root material
4	Z4-Root	19-Sep-23	PM	Tissue	n	n	X	2	Do not analyze soil particles on root material
5	Z1-Stem	19-Sep-23	PM	Tissue	n	n	X	2	
6	Z2-Stem	19-Sep-23	PM	Tissue	n	n	X	2	
7	Z3-Stem	19-Sep-23	PM	Tissue	n	n	X	2	
8	Z4-Stem	19-Sep-23	PM	Tissue	n	n	X	2	
9									See lab addendum for lab group coding
10									
11									These samples are a re-submission of the
12									Job#C3T3642 - ticket # - 819878

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:
JCL- 25-Oct-23 / AM	Sylvie Jacoby Sullivan	2023/10/25	08:41

Laboratory Use Only

Temperature (°C) on Receipt	Condition of Sample on Receipt
9/8/8	☐ OK ☐ SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

White: Maxxam Yellow: Mail Pink: Client

Your Project #: Campobello job# C3T3642

Attention: Patricia Legette

BUREAU VERITAS
CAMPOBELLO
6740 CAMPOBELLO ROAD
MISSISSAUGA, ON
CANADA L5N 2L8

Report Date: 2023/10/31
Report #: R3418839
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C376201
Received: 2023/09/25, 10:50

Sample Matrix: Vegetation
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Elements in Tissue by CRC ICPMS - Dry Wt	8	2023/10/26	2023/10/27	BBY7SOP-00021 / BBY7SOP-00002	EPA 6020b R2 m
Moisture in Tissue	8	2023/10/13	2023/10/14	BBY8SOP-00017	BCMOE BCLM Dec2000 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your Project #: Campobello job# C3T3642

Attention: Patricia Legette

BUREAU VERITAS
CAMPOBELLO
6740 CAMPOBELLO ROAD
MISSISSAUGA, ON
CANADA L5N 2L8

Report Date: 2023/10/31
Report #: R3418839
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C376201
Received: 2023/09/25, 10:50

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Customer Solutions, Western Canada Customer Experience Team
Email: customersolutionswest@bvlabs.com
Phone# (604) 734 7276

==========

This report has been generated and distributed using a secure automated process.
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Bureau Veritas Job #: C376201
Report Date: 2023/10/31

BUREAU VERITAS
Client Project #: Campobello job# C3T3642
Sampler Initials: JCL

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (VEGETATION)

Bureau Veritas ID		BZX885	BZX886	BZX887	BZX888	BZX889	BZX890		
Sampling Date		2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19		
	UNITS	Z1- ROOT	Z2- ROOT	Z3- ROOT	Z4- ROOT	Z1- STEM	Z2- STEM	RDL	QC Batch
Total Metals by ICPMS									
Total (Dry Wt) Aluminum (Al)	mg/kg	9.7	7.9	56.0	22.9	5.2	3.0	1.0	B171372
Total (Dry Wt) Arsenic (As)	mg/kg	0.023	0.024	0.035	0.024	<0.020	<0.020	0.020	B171372
Total (Dry Wt) Barium (Ba)	mg/kg	1.56	1.17	2.40	0.927	1.39	0.715	0.050	B171372
Total (Dry Wt) Beryllium (Be)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	B171372
Total (Dry Wt) Bismuth (Bi)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	B171372
Total (Dry Wt) Boron (B)	mg/kg	4.5	5.9	7.1	4.2	3.6	3.4	1.0	B171372
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.320	0.370	0.281	0.253	0.252	0.272	0.0050	B171372
Total (Dry Wt) Calcium (Ca)	mg/kg	1220	1200	943	1240	1000	892	10	B171372
Total (Dry Wt) Chromium (Cr)	mg/kg	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	0.10	B171372
Total (Dry Wt) Copper (Cu)	mg/kg	2.92	2.96	4.56	3.15	1.70	1.79	0.050	B171372
Total (Dry Wt) Lead (Pb)	mg/kg	0.047	0.054	1.88	0.111	0.025	0.062	0.010	B171372
Total (Dry Wt) Magnesium (Mg)	mg/kg	598	599	427	664	286	338	5.0	B171372
Total (Dry Wt) Molybdenum (Mo)	mg/kg	<0.020	<0.020	0.022	0.022	<0.020	<0.020	0.020	B171372
Total (Dry Wt) Nickel (Ni)	mg/kg	0.148	0.147	0.247	0.247	0.050	<0.050	0.050	B171372
Total (Dry Wt) Phosphorus (P)	mg/kg	1200	1330	1000	688	257	240	10	B171372
Total (Dry Wt) Potassium (K)	mg/kg	2200	3090	3420	2550	969	1090	10	B171372
Total (Dry Wt) Selenium (Se)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	B171372
Total (Dry Wt) Silver (Ag)	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	B171372
Total (Dry Wt) Sodium (Na)	mg/kg	156	323	294	196	38	206	10	B171372
Total (Dry Wt) Strontium (Sr)	mg/kg	7.89	10.4	6.94	11.4	6.35	6.67	0.050	B171372
Total (Dry Wt) Tin (Sn)	mg/kg	0.26	0.13	0.34	0.32	0.26	0.20	0.10	B171372
Total (Dry Wt) Titanium (Ti)	mg/kg	<0.50	<0.50	1.03	<0.50	<0.50	<0.50	0.50	B171372
Total (Dry Wt) Vanadium (V)	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	B171372
Total (Dry Wt) Zinc (Zn)	mg/kg	22.0	27.5	12.4	12.2	11.0	7.32	0.20	B171372

RDL = Reportable Detection Limit

Bureau Veritas Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (VEGETATION)

Bureau Veritas ID		BZX891	BZX892		
Sampling Date		2023/09/19	2023/09/19		
	UNITS	Z3- STEM	Z4- STEM	RDL	QC Batch
Total Metals by ICPMS					
Total (Dry Wt) Aluminum (Al)	mg/kg	6.6	1.9	1.0	B171372
Total (Dry Wt) Arsenic (As)	mg/kg	0.026	0.023	0.020	B171372
Total (Dry Wt) Barium (Ba)	mg/kg	4.37	1.36	0.050	B171372
Total (Dry Wt) Beryllium (Be)	mg/kg	<0.010	<0.010	0.010	B171372
Total (Dry Wt) Bismuth (Bi)	mg/kg	<0.010	<0.010	0.010	B171372
Total (Dry Wt) Boron (B)	mg/kg	15.0	3.7	1.0	B171372
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.619	0.414	0.0050	B171372
Total (Dry Wt) Calcium (Ca)	mg/kg	4440	1240	10	B171372
Total (Dry Wt) Chromium (Cr)	mg/kg	<0.10	<0.10	0.10	B171372
Total (Dry Wt) Copper (Cu)	mg/kg	6.46	1.59	0.050	B171372
Total (Dry Wt) Lead (Pb)	mg/kg	0.025	0.022	0.010	B171372
Total (Dry Wt) Magnesium (Mg)	mg/kg	558	207	5.0	B171372
Total (Dry Wt) Molybdenum (Mo)	mg/kg	0.024	<0.020	0.020	B171372
Total (Dry Wt) Nickel (Ni)	mg/kg	0.249	0.062	0.050	B171372
Total (Dry Wt) Phosphorus (P)	mg/kg	330	184	10	B171372
Total (Dry Wt) Potassium (K)	mg/kg	4650	748	10	B171372
Total (Dry Wt) Selenium (Se)	mg/kg	<0.050	<0.050	0.050	B171372
Total (Dry Wt) Silver (Ag)	mg/kg	<0.0050	<0.0050	0.0050	B171372
Total (Dry Wt) Sodium (Na)	mg/kg	204	117	10	B171372
Total (Dry Wt) Strontium (Sr)	mg/kg	17.2	8.51	0.050	B171372
Total (Dry Wt) Tin (Sn)	mg/kg	0.25	0.17	0.10	B171372
Total (Dry Wt) Titanium (Ti)	mg/kg	<0.50	<0.50	0.50	B171372
Total (Dry Wt) Vanadium (V)	mg/kg	<0.20	<0.20	0.20	B171372
Total (Dry Wt) Zinc (Zn)	mg/kg	38.6	8.51	0.20	B171372
RDL = Reportable Detection Limit					

Bureau Veritas Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Bureau Veritas Job #: C376201
Report Date: 2023/10/31

BUREAU VERITAS
Client Project #: Campobello job# C3T3642
Sampler Initials: JCL

PHYSICAL TESTING (VEGETATION)

Bureau Veritas ID		BZX885	BZX885	BZX886	BZX887	BZX888	BZX889	BZX890		
Sampling Date		2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19	2023/09/19		
	UNITS	Z1- ROOT	Z1- ROOT Lab-Dup	Z2- ROOT	Z3- ROOT	Z4- ROOT	Z1- STEM	Z2- STEM	RDL	QC Batch
Physical Properties										
Moisture	%	42	38	62	46	46	36	32	0.30	B152503

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas ID		BZX891	BZX892		
Sampling Date		2023/09/19	2023/09/19		
	UNITS	Z3- STEM	Z4- STEM	RDL	QC Batch
Physical Properties					
Moisture	%	60	38	0.30	B152503

RDL = Reportable Detection Limit

Bureau Veritas Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

TEST SUMMARY

Bureau Veritas ID: BZX885 **Collected:** 2023/09/19
Sample ID: Z1- ROOT **Shipped:**
Matrix: Vegetation **Received:** 2023/09/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements in Tissue by CRC ICPMS - Dry Wt	ICP/CRCM	B171372	2023/10/26	2023/10/27	Megan Mak
Moisture in Tissue	BAL/BAL	B152503	2023/10/13	2023/10/14	Cyrhea Goda

Bureau Veritas ID: BZX885 Dup **Collected:** 2023/09/19
Sample ID: Z1- ROOT **Shipped:**
Matrix: Vegetation **Received:** 2023/09/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture in Tissue	BAL/BAL	B152503	2023/10/13	2023/10/14	Cyrhea Goda

Bureau Veritas ID: BZX886 **Collected:** 2023/09/19
Sample ID: Z2- ROOT **Shipped:**
Matrix: Vegetation **Received:** 2023/09/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements in Tissue by CRC ICPMS - Dry Wt	ICP/CRCM	B171372	2023/10/26	2023/10/27	Megan Mak
Moisture in Tissue	BAL/BAL	B152503	2023/10/13	2023/10/14	Cyrhea Goda

Bureau Veritas ID: BZX887 **Collected:** 2023/09/19
Sample ID: Z3- ROOT **Shipped:**
Matrix: Vegetation **Received:** 2023/09/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements in Tissue by CRC ICPMS - Dry Wt	ICP/CRCM	B171372	2023/10/26	2023/10/27	Megan Mak
Moisture in Tissue	BAL/BAL	B152503	2023/10/13	2023/10/14	Cyrhea Goda

Bureau Veritas ID: BZX888 **Collected:** 2023/09/19
Sample ID: Z4- ROOT **Shipped:**
Matrix: Vegetation **Received:** 2023/09/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements in Tissue by CRC ICPMS - Dry Wt	ICP/CRCM	B171372	2023/10/26	2023/10/27	Megan Mak
Moisture in Tissue	BAL/BAL	B152503	2023/10/13	2023/10/14	Cyrhea Goda

Bureau Veritas ID: BZX889 **Collected:** 2023/09/19
Sample ID: Z1- STEM **Shipped:**
Matrix: Vegetation **Received:** 2023/09/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements in Tissue by CRC ICPMS - Dry Wt	ICP/CRCM	B171372	2023/10/26	2023/10/27	Megan Mak
Moisture in Tissue	BAL/BAL	B152503	2023/10/13	2023/10/14	Cyrhea Goda

Bureau Veritas Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Bureau Veritas Job #: C376201
Report Date: 2023/10/31

BUREAU VERITAS
Client Project #: Campobello job# C3T3642
Sampler Initials: JCL

TEST SUMMARY

Bureau Veritas ID: BZX890
Sample ID: Z2- STEM
Matrix: Vegetation

Collected: 2023/09/19
Shipped:
Received: 2023/09/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements in Tissue by CRC ICPMS - Dry Wt	ICP/CRCM	B171372	2023/10/26	2023/10/27	Megan Mak
Moisture in Tissue	BAL/BAL	B152503	2023/10/13	2023/10/14	Cyrhea Goda

Bureau Veritas ID: BZX891
Sample ID: Z3- STEM
Matrix: Vegetation

Collected: 2023/09/19
Shipped:
Received: 2023/09/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements in Tissue by CRC ICPMS - Dry Wt	ICP/CRCM	B171372	2023/10/26	2023/10/27	Megan Mak
Moisture in Tissue	BAL/BAL	B152503	2023/10/13	2023/10/14	Cyrhea Goda

Bureau Veritas ID: BZX892
Sample ID: Z4- STEM
Matrix: Vegetation

Collected: 2023/09/19
Shipped:
Received: 2023/09/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Elements in Tissue by CRC ICPMS - Dry Wt	ICP/CRCM	B171372	2023/10/26	2023/10/27	Megan Mak
Moisture in Tissue	BAL/BAL	B152503	2023/10/13	2023/10/14	Cyrhea Goda

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GENERAL COMMENTS

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
B152503	Moisture	2023/10/14					9.0	20		
B171372	Total (Dry Wt) Aluminum (Al)	2023/10/27	105	80 - 120	<1.0	mg/kg	3.7	40		
B171372	Total (Dry Wt) Arsenic (As)	2023/10/27	103	80 - 120	<0.020	mg/kg	27	40	82	N/A
B171372	Total (Dry Wt) Barium (Ba)	2023/10/27	101	80 - 120	<0.050	mg/kg	8.4	40		
B171372	Total (Dry Wt) Beryllium (Be)	2023/10/27	94	80 - 120	<0.010	mg/kg	NC	40		
B171372	Total (Dry Wt) Bismuth (Bi)	2023/10/27	98	80 - 120	<0.010	mg/kg	NC	40		
B171372	Total (Dry Wt) Boron (B)	2023/10/27	99	80 - 120	<1.0	mg/kg	12	40	94	N/A
B171372	Total (Dry Wt) Cadmium (Cd)	2023/10/27	99	80 - 120	<0.0050	mg/kg	20	40	84	N/A
B171372	Total (Dry Wt) Calcium (Ca)	2023/10/27	101	80 - 120	<10	mg/kg	11	60	87	N/A
B171372	Total (Dry Wt) Chromium (Cr)	2023/10/27	101	80 - 120	<0.10	mg/kg	NC	40		
B171372	Total (Dry Wt) Copper (Cu)	2023/10/27	99	80 - 120	<0.050	mg/kg	13	40	82	N/A
B171372	Total (Dry Wt) Lead (Pb)	2023/10/27	101	80 - 120	<0.010	mg/kg	49 (1)	40		
B171372	Total (Dry Wt) Magnesium (Mg)	2023/10/27	102	80 - 120	<5.0	mg/kg	6.1	40		
B171372	Total (Dry Wt) Molybdenum (Mo)	2023/10/27	105	80 - 120	<0.020	mg/kg	6.1	40		
B171372	Total (Dry Wt) Nickel (Ni)	2023/10/27	99	80 - 120	<0.050	mg/kg	16	40	72	N/A
B171372	Total (Dry Wt) Phosphorus (P)	2023/10/27	102	80 - 120	<10	mg/kg	2.1	40	93	N/A
B171372	Total (Dry Wt) Potassium (K)	2023/10/27	103	80 - 120	<10	mg/kg	5.6	40	89	N/A
B171372	Total (Dry Wt) Selenium (Se)	2023/10/27	101	80 - 120	<0.050	mg/kg	NC	40	95	N/A
B171372	Total (Dry Wt) Silver (Ag)	2023/10/27	99	80 - 120	<0.0050	mg/kg	NC	40		
B171372	Total (Dry Wt) Sodium (Na)	2023/10/27	105	80 - 120	<10	mg/kg	NC	40	89	N/A
B171372	Total (Dry Wt) Strontium (Sr)	2023/10/27	101	80 - 120	<0.050	mg/kg	8.6	60	90	N/A
B171372	Total (Dry Wt) Tin (Sn)	2023/10/27	97	80 - 120	<0.10	mg/kg	NC	40		
B171372	Total (Dry Wt) Titanium (Ti)	2023/10/27	106	80 - 120	<0.50	mg/kg	NC	40		
B171372	Total (Dry Wt) Vanadium (V)	2023/10/27	100	80 - 120	<0.20	mg/kg	NC	40		
B171372	Total (Dry Wt) Zinc (Zn)	2023/10/27	102	80 - 120	<0.20	mg/kg	1.2	40	81	N/A

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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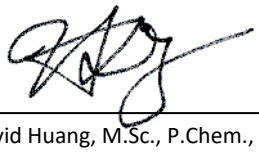
VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Raphael Kwan, Senior Manager, BC and Yukon Regions responsible for British Columbia Environmental laboratory operations.

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APPENDIX I:

Tree Growth

Table I-1
Poplar System Inspection Records
Twin Creeks Environmental Centre - Poplar System

Date: 27-Sep-23
Weather: Overcast, 17°C, SE 19 km/h

Monitoring of Poplar Tree Treatment System

Task	Monitoring Parameter	ZONE 1 - Leachate Application Area					
		Row 1	Row 4	Row 21	Row 32	Row 38	Geometric Mean
Visual Assessment	Tree Diameter (cm)	6.0	9.5	7.5	6.6	6.4	7.1
	Tree Height (m)	3.9	7.2	3.6	6.2	5.9	5.2
	Tree Mortality (%)	32					
	Crown Dieback (%)	<5	<5	<5	<5	<5	2.5
	Foliage Transparency (%)	20	10	10	30	20	16
	Crown Density (%)	80	90	90	70	80	82
	Leaf Size (cm) (length/width)	8.0	9.2	8.1	10.4	7.9	
		9.3	9.4	6.6	10.1	12.6	
		8.8	9.4	7.8	8.8	10.8	
		8.2	4.8	7.4	7.3	6.2	
		5.4	9.7	7.1	6.7	7.6	7.7
		7.6	8.3	4.8	7.5	6.9	7.5
		8.9	7.0	5.2	4.5	8.7	
		7.8	7.7	7.2	7.3	4.9	
		8.9	9.4	6.7	6.7	5.5	
		6.4	10.1	9.1	8.1	6.7	
	Discolouration of Leaves (%)	95	70	80	90	80	83
	Abnormally Shaped Leaves (%)	<5	<5	10	<5	10	4.4
	Length of New Tree Branch Extension Shoots (cm)	7.1	10.3	16.5	11.4	16.6	8.2
		6.6	4.9	2.7	4.3	40.0	
		4.3	7.4	6.6	43.1	10.5	
		8.2	4.4	7.2	4.0	6.1	
		23.1	5.0	8.2	6.5	5.6	
	Deformed Growth (%)	10	20	10	10	10	11.5
	Insect Infestation (%)	<5	<5	<5	<5	<5	2.5
Root Depth	Depth of Root Penetration (m)	0.82					
Inspections	Brace Root Inspection for Animal Damage	0	0	0	1	0	0.2

NOTES:

1) Blank denotes data is not available.
2) "m" denotes metre.
3) "cm" denotes centimetre.
4) The tree mortality is based on the number of trees which died from the previous year (Determined from row 18).

Table I-1
Poplar System Inspection Records
Twin Creeks Environmental Centre - Poplar System

Date: 27-Sep-23
Weather: Overcast, 17°C, SE 19 km/h

Monitoring of Poplar Tree Treatment System

Task	Monitoring Parameter	ZONE 2 - Leachate Application Area					
		Row 5	**Row 11**	**Row 27**	**Row 38**	**Row 42**	**Geometric Mean**
Visual Assessment	Tree Diameter (cm)	8.0	7.1	14.2	5.6	9.0	8.4
	Tree Height (m)	7.2	6.9	10.4	5.6	8.3	7.5
	Tree Mortality (%)	33					
	Crown Dieback (%)	<5	<5	<5	<5	<5	2.5
	Foliage Transparency (%)	20	30	<5	25	10	13
	Crown Density (%)	80	70	95	75	90	81
	Leaf Size (cm) (length/width)	7.2	8.3	8.8	8.1	5.0	
		6.6	11.2	8.7	10.7	8.6	
		8.2	10.2	9.2	10.2	7.1	
		8.8	6.6	10.1	7.0	10.7	
		6.4	9.2	12.2	8.6	8.6	7.8
		8.4	8.1	10.9	9.4	7.0	7.6
		5.2	8.0	3.5	8.1	8.3	
		7.6	9.5	10.2	4.0	5.2	
		8.6	6.2	8.2	9.9	6.6	
		7.5	5.1	4.5	4.6	7.2	
	Discolouration of Leaves (%)	80	80	90	90	90	86
	Abnormally Shaped Leaves (%)	10	10	10	10	10	10.0
	Length of New Tree Branch Extension Shoots (cm)	4.1	8.3	10.5	19.7	28.2	9.3
		5.8	12.2	3.1	10.2	34.2	
		3.2	13.1	10.2	37.2	9.2	
		7.2	8.0	7.1	31.2	7.3	
		5.5	3.9	5.8	7.1	8.8	
	Deformed Growth (%)	<5	<5	<5	<5	<5	2.5
	Insect Infestation (%)	<5	<5	<5	<5	<5	2.5
Root Depth	Depth of Root Penetration (m)	0.76					
Inspections	Brace Root Inspection for Animal Damage	0	0	0	1	0	0.2

NOTES:

1) Blank denotes data is not available.
2) "m" denotes metre.
3) "cm" denotes centimetre.
4) The tree mortality is based on the number of trees which died from the previous year (Determined from row 13).

Table I-1
Poplar System Inspection Records
Twin Creeks Environmental Centre - Poplar System

Date: 27-Sep-23
Weather: Overcast, 17°C, SE 19 km/h

Monitoring of Poplar Tree Treatment System

Task	Monitoring Parameter	ZONE 3 - Leachate Application Area					
		Row 2	Row 6	Row 15	Row 26	Row 34	Geometric Mean
Visual Assessment	Tree Diameter (cm)	5.5	6.2	12.1	7.2	13.3	8.3
	Tree Height (m)	6.0	4.3	10.1	7.3	15.2	7.8
	Tree Mortality (%)	45					
	Crown Dieback (%)	<5	<5	20	<5	<5	3.8
	Foliage Transparency (%)	30	20	35	10	10	18
	Crown Density (%)	70	80	65	90	90	78
	Leaf Size (cm) (length/width)	9.1	8.8	10.6	9.8	6.5	
		8.2	7.5	8.6	6.7	5.0	
		6.8	6.2	4.8	6.3	9.2	
		9.2	7.5	8.5	10.2	10.1	
		3.9	10.5	12.7	8.9	10.7	7.9
		9.6	12.1	10.5	7.6	8.2	8.5
		8.4	11.5	9.2	8.3	7.7	
		8.8	9.0	6.1	11.3	6.5	
		5.0	7.6	3.3	10.2	11.3	
		7.2	7.9	8.3	11.7	9.6	
	Discolouration of Leaves (%)	15	25	<5	55	<5	11
	Abnormally Shaped Leaves (%)	10	<5	<5	15	<5	4.7
	Length of New Tree Branch Extension Shoots (cm)	7.5	11.2	31.2	12.2	7.0	9.1
		7.1	8.8	15.6	23.6	16.9	
		6.9	1.5	7.8	52.0	4.7	
		15.1	4.7	9.7	19.2	6.9	
		7.9	15.2	3.2	6.7	2.6	
	Deformed Growth (%)	<5	<5	<5	20	<5	3.8
	Insect Infestation (%)	<5	<5	<5	<5	<5	2.5
Root Depth	Depth of Root Penetration (m)	0.81					
Inspections	Brace Root Inspection for Animal Damage	0	0	0	0	0	0

NOTES:

1) Blank denotes data is not available.
2) "m" denotes metre.
3) "cm" denotes centimetre.
4) The tree mortality is based on the number of trees which died from the previous year (Determined from row 8).

Table I-1
Poplar System Inspection Records
Twin Creeks Environmental Centre - Poplar System

Date: 27-Sep-23
Weather: Overcast, 17°C, SE 19 km/h

Monitoring of Poplar Tree Treatment System

Task	Monitoring Parameter	ZONE 4 - Leachate Application Area					
		Row 6	Row 11	Row 24	Row 37	Row 42	Geometric Mean
Visual Assessment	Tree Diameter (cm)	6.5	7.3	9.3	7.7	10.1	8.1
	Tree Height (m)	7.3	8.1	8.7	7.8	9.5	8.2
	Tree Mortality (%)	36					
	Crown Dieback (%)	<5	<5	<5	<5	<5	2.5
	Foliage Transparency (%)	15	10	20	10	10	12
	Crown Density (%)	85	90	80	90	90	87
	Leaf Size (cm) (length/width)	5.5	11.3	8.2	9.9	10.8	
		10.2	9.2	7.6	7.3	10.7	
		11.1	7.6	8.9	8.1	8.3	
		8.5	3.2	7.3	5.9	8.8	
		7.7	8.1	3.9	7.1	10.1	8.2
		6.5	6.6	13.3	6.8	11.3	7.9
		9.1	10.5	5.8	6.5	12.7	
		10.5	2.5	6.3	10.2	7.9	
		9.6	9.9	7.7	9.8	8.3	
		3.9	2.2	9.9	6.5	5.5	
	Discolouration of Leaves (%)	80	80	65	80	70	75
	Abnormally Shaped Leaves (%)	<5	<5	<5	<5	<5	2.5
	Length of New Tree Branch Extension Shoots (cm)	4.5	6.3	10.2	8.8	7.8	5.9
		6.1	5.5	6.6	2.5	8.9	
		5.2	3.9	2.5	6.6	5.5	
		3.7	10.1	1.7	4.8	3.3	
		10.1	15.2	12.1	5.3	8.9	
	Deformed Growth (%)	<5	<5	<5	<5	<5	2.5
	Insect Infestation (%)	<5	<5	<5	<5	<5	2.5
Root Depth	Depth of Root Penetration (m)	1.68					
Inspections	Brace Root Inspection for Animal Damage	0	0	0	0	0	0

NOTES:

1) Blank denotes data is not available.
2) "m" denotes metre.
3) "cm" denotes centimetre.
4) The tree mortality is based on the number of trees which died from the previous year (Determined from row 9).

Table I-2
Poplar System Inspection Records - Historical Summary
Twin Creeks Environmental Centre - Poplar System

Task	Inspection Parameter	Poplar System							
		S1 (Zone 1)							
		28-Sep-17	27-Sep-18	9-Sep-19	3-Sep-20	16-Sep-21	20-Sep-22	27-Sep-23	
Visual Assessment	Tree Diameter (cm)	3.1	4.0	2.7	3.5	4.0	5.0	7.1	
	Tree Height (m)	2.1	2.3	2.9	3.0	4.5	4.6	5.2	
	Tree Mortality (%)	0	0	18	8	20	8	32	
	Crown Density (%)	58	50	40	50	40	75	82	
	Leaf Size (cm)	9.2	7.0	8.0	6.7	7.2	6.6	7.7	
	(length/width)	8.9	6.2	7.8	6.0	7.4	6.3	7.5	
	Discolouration Of Leaves (%)	38	25	5	8	5	83	83	
	Length Of New Tree Branch Extension Shoots (cm)	25.3	27.0	41.5	21.0	15.9	11.3	8.2	
	Insect Infestation (%)	<1.0	5.0	<5.0	2.5	2.5	4.4	2.5	

NOTES:

1) Blank denotes data is not available.
2) "m" denotes metre.
3) "cm" denotes centimetre.
4) The tree mortality is based on the number of trees which died from the previous year (Determined from row 18).

Table I-2
Poplar System Inspection Records - Historical Summary
Twin Creeks Environmental Centre - Poplar System

Task	Inspection Parameter	Poplar System							
		S2 (Zone 2)							
		28-Sep-17	27-Sep-18	9-Sep-19	3-Sep-20	16-Sep-21	20-Sep-22	27-Sep-23	
Visual Assessment	Tree Diameter (cm)	1.9	3.7	3.0	3.4	4.6	5.5	8.4	
	Tree Height (m)	1.6	2.2	2.8	4.7	4.7	4.8	7.5	
	Tree Mortality (%)	0	0	3	9	6	15	33	
	Crown Density (%)	49	52	50	43	53	87	81	
	Leaf Size (cm)	8.9	7.1	9.0	6.6	8.8	6.9	7.8	
	(length/width)	8.4	6.8	9.0	6.2	9.5	6.5	7.6	
	Discolouration Of Leaves (%)	37	24	3	3	4	56	86	
	Length Of New Tree Branch Extension Shoots (cm)	26.9	32.3	45.9	11.1	18.7	11.7	9.3	
	Insect Infestation (%)	<1.0	5.0	4.0	2.0	2.5	6.9	2.5	

NOTES:

1) Blank denotes data is not available.
2) "m" denotes metre.
3) "cm" denotes centimetre.
4) The tree mortality is based on the number of trees which died from the previous year (Determined from row 13).

Table I-2
Poplar System Inspection Records - Historical Summary
Twin Creeks Environmental Centre - Poplar System

Task	Inspection Parameter	Poplar system							
		S3 (Zone 3)							
		28-Sep-17	27-Sep-18	9-Sep-19	3-Sep-20	16-Sep-21	20-Sep-22	27-Sep-23	
Visual Assessment	Tree Diameter (cm)	2.6	5.0	3.7	6.3	5.5	7.2	8.3	
	Tree Height (m)	2.1	2.5	4.1	4.4	5.3	6.2	7.8	
	Tree Mortality (%)	3	0	3	4	11	24	45	
	Crown Density (%)	50	55	49	59	45	78	78	
	Leaf Size (cm)	9.5	7.0	10.3	7.1	7.9	6.0	7.9	
	(length/width)	9.2	6.8	9.3	6.7	8.9	5.8	8.5	
	Discolouration Of Leaves (%)	33	16	3	11	10	53	11	
	Length Of New Tree Branch Extension Shoots (cm)	29.4	25.1	44.7	15.8	16.8	9.6	9.1	
	Insect Infestation (%)	<1.0	5.7	2.0	2.5	2.5	2.5	2.5	

NOTES:

1) Blank denotes data is not available.
2) "m" denotes metre.
3) "cm" denotes centimetre.
4) The tree mortality is based on the number of trees which died from the previous year (Determined from row 8).

Table I-2
Poplar System Inspection Records - Historical Summary
Twin Creeks Environmental Centre - Poplar System

Task	Inspection Parameter	Poplar system							
		S4 (Zone 4)							
		28-Sep-17	27-Sep-18	9-Sep-19	3-Sep-20	16-Sep-21	20-Sep-22	27-Sep-23	
Visual Assessment	Tree Diameter (cm)	3.2	5.1	3.7	4.7	5.1	8.0	8.1	
	Tree Height (m)	2.2	2.8	3.9	4.5	5.3	6.8	8.2	
	Tree Mortality (%)	0	3	5	10	14	25	36	
	Crown Density (%)	57	45	53	67	36	82	87	
	Leaf Size (cm)	11.2	8.1	9.2	8.2	8.4	6.9	8.2	
	(length/width)	10.7	7.7	8.6	8.0	8.7	6.5	7.9	
	Discolouration Of Leaves (%)	14	16	5	8	8	75	75	
	Length Of New Tree Branch Extension Shoots (cm)	31.0	29.6	49.3	24.1	11.4	6.5	5.9	
	Insect Infestation (%)	<1.0	2.0	<5.0	3.0	2.5	2.5	2.5	

NOTES:

1) Blank denotes data is not available.
2) "m" denotes metre.
3) "cm" denotes centimetre.
4) The tree mortality is based on the number of trees which died from the previous year (Determined from row 9).

APPENDIX J:

Surface Water Analytical Results

Table J-1
Precipitation Event Surface Water Quality - Field Analytical Results
Twin Creeks Environmental Centre - Poplar System

Station Number	Location	pH	Conductivity	Temperature	Turbidity	Dissolved Oxygen	Estimated Flow Rate
		(pH units)	(mS/cm)	(°C)	(NTU)	(mg/L)	(L/s)
First Quarter							
February 10, 2023 (Routine monitoring for February 9, 2023 precipitation event)							
SS14A	On-Site Flow into East Ditch Line, Upstream of Poplar System	8.1	0.980	2.4	34.2	12.8	3
SS14B	On-Site Flow into West Ditch Line, Background of Poplar System	8.4	1.330	3.3	77.8	12.6	1
SS15A	On-Site Flow into Sedimentation Pond 1, intersecting point of East and West Ditch Line South of the Poplar System	7.9	0.820	2.5	141	12.6	10
Second Quarter							
April 4, 2023 (Routine monitoring for April 3, 2023 precipitation event)							
SS14A	On-Site Flow into East Ditch Line, Upstream of Poplar System	7.6	0.354	9.6	>1000	9.97	4
SS14B	On-Site Flow into West Ditch Line, Background of Poplar System	7.8	0.414	9.8	446	10.1	4
SS15A	On-Site Flow into Sedimentation Pond 1, intersecting point of East and West Ditch Line South of the Poplar System	7.2	0.313	9.5	>1000	9.06	95
Third Quarter							
July 3, 2023 (Routine monitoring for July 2, 2023 precipitation event)							
SS14A	On-Site Flow into East Ditch Line, Upstream of Poplar System	Ins	Ins	Ins	Ins	Ins	Ins
SS14B	On-Site Flow into West Ditch Line, Background of Poplar System	8.3	0.690	32.5	>1000	8.27	2
SS15A	On-Site Flow into Sedimentation Pond 1, intersecting point of East and West Ditch Line South of the Poplar System	8.1	0.452	27.3	426	7.27	2
July 7, 2023 (Routine monitoring for July 6, 2023 precipitation event)							
SS14A	On-Site Flow into East Ditch Line, Upstream of Poplar System	8.0	0.520	25.8	29.0	5.95	1
July 7, 2023 (Storm event monitoring for July 6, 2023 precipitation event)							
SS14A	On-Site Flow into East Ditch Line, Upstream of Poplar System	8.0	0.520	25.8	29.0	5.95	1
SS14B	On-Site Flow into West Ditch Line, Background of Poplar System	8.4	0.975	23.3	34.0	9.34	3
SS15A	On-Site Flow into Sedimentation Pond 1, intersecting point of East and West Ditch Line South of the Poplar System	7.9	0.520	21.5	122	6.88	6
July 13, 2023 (Storm event monitoring for July 12, 2023 precipitation event)							
SS14A	On-Site Flow into East Ditch Line, Upstream of Poplar System	7.5	0.436	20.4	79.1	7.50	1
SS14B	On-Site Flow into West Ditch Line, Background of Poplar System	8.3	0.871	20.5	63.2	4.23	4
SS15A	On-Site Flow into Sedimentation Pond 1, intersecting point of East and West Ditch Line South of the Poplar System	7.5	0.381	19.4	>1000	6.82	16
Fourth Quarter							
November 2, 2023 (routine monitoring for November 1, 2023 precipitation event)							
SS14A	On-Site Flow into West Ditch Line, Background of Poplar System	6.8	0.818	4.3	13.0	12.6	2
SS14B	On-Site Flow into West Ditch Line, Background of Poplar System	6.9	1.218	4.5	31.1	13.3	8
SS15A	On-Site Flow into Sedimentation Pond 1, intersecting point of East and West Ditch Line South of the Poplar System	6.7	0.852	4.5	54.4	12.6	23

NOTES:

1) INS denotes insufficient volume to sample.
2) mS/cm denotes milliSeimens per centimetre.
3) °C denotes degrees Celsius.
4) NTU denotes nephelometric turbidity unit.
5) mg/L denotes milligrams per litre.
6) L/s denotes litres per second.
7) Estimated Flow Rate = Average flow velocity (m/s) x channel width (m) x channel depth (m)
8) NR denotes monitoring not required, as there were no precipitation events greater than 10 mm in a 24 hr period recorded in that quarter that produced an observable flow.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	East Ditch Line (Poplar System) - SS14 / SS14A										
Date			9-Apr-02	4-Apr-03	13-Jun-03	15-Sep-03	3-May-04	31-Jul-04	23-Sep-05	9-Nov-05	18-Jan-06	9-Mar-06	3-Aug-06
Routine/Storm Monitoring			Routine	Routine	Routine	Routine	Routine	Routine	Storm	Routine	Routine	Routine	Storm
Laboratory			Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Alkalinity (as $CaCO_3$)	mg/L	<25%***	102	91	42	66	74	82	129	69	227	105	98
Chloride	mg/L		19	11	8	18	8	9	51	25	21	14	22
Sulphate	mg/L		155	193	443	340	426	178	244	103	163	78	318
Ammonia (as N)	mg/L		0.14	0.08	0.04	0	0.17	0.11	0.06	0.35	1.94	0.61	0.09
Ammonia Unionized	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate	mg/L		2.42	1.70	1.37	0.15	0.77	0.81	6.02	7.85	0.54	0.74	0.37
Nitrite	mg/L								0.18				<0.10
Phenols	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	0.200	0.18	0.12	0.08	**0.22**	0.14	0.17	**0.32**	0.16	**0.38**	0.14	**0.24**
Calcium	mg/L		62	74	119	116	112	65	102	66	94	46	106
Chromium	mg/L	0.0089	<0.01	<0.005	<0.005	<0.005	<0.005	0.003	0.002	**0.026**	0.003	0.002	0.005
Iron	mg/L	0.300		**1.24**	**0.93**	0.22	**1.97**	**1.21**	**0.64**	**19.4**	**0.66**	**0.83**	**3.08**
Magnesium	mg/L		23	27	58	33	53	22	32	21	32	15	38
Potassium	mg/L		4	3	3	6	3	5	6	4	5	4	5
Sodium	mg/L		21	12	21	21	20	13	17	9	19	10	21
Nickel	mg/L	0.025	<0.01	<0.005	<0.005	<0.005	0.006	0.004	0.007	0.024	0.006	0.005	0.013
Zinc	mg/L	0.02	<0.01	0.008	<0.005	<0.005	<0.01	<0.01	0.01	**0.06**	0.01	<0.01	0.02
pH	(pH units)	6.5-8.5							7.42	7.84	7.73	7.48	7.49
Total Organic Carbon	mg/L								13.3		9.4	5.8	11.2
Aluminum	mg/L	0.075*							**0.73**				**2.56**
Arsenic	mg/L	0.100*							0.001				0.003
Barium	mg/L								0.03				0.04
Beryllium	mg/L	1.100							<0.001				<0.001
Bismuth	mg/L								<0.005				<0.005
Cadmium	mg/L	0.0002							<0.0001				0.0002
Cobalt	mg/L	0.0009							0.0009				**0.0034**
Dissolved Oxygen	mg/L								9.7				
Lead	mg/L	0.005							<0.001				0.001
Molybdenum	mg/L	0.040*							0.013				0.012
Selenium	mg/L	0.100							0.003				0.004
Silver	mg/L	0.0001							<0.0001				<0.0001
Strontium	mg/L								0.491				0.627
Tin	mg/L								<0.01				<0.01
Titanium	mg/L								0.03				<0.01
Total Kjeldahl Nitrogen (TKN)	mg/L								1.35				0.74
Total Phosphorus	mg/L	0.02*							**0.20**				**2.68**
Vanadium	mg/L	0.006*							0.004				0.006
Ion Percentage	%		2.5	2.8	3.4	35.8	1.1	2.0	0.0	8.2	2.0	2.3	1.6

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	East Ditch Line (Poplar System) - SS14 / SS14A										
Date			5-Oct-06	17-Nov-06	2-Mar-07	9-Jan-08	19-Mar-08	14-Jun-08	17-Jul-08	9-Sep-08	4-Nov-08	12-Feb-09	6-Apr-09
Routine/Storm Monitoring			Routine	Storm	Routine	Routine	Routine	Storm	Storm	Storm	Storm	Routine	Routine
Laboratory			Accutest	Accutest	Accutest	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam
Alkalinity (as $CaCO_3$)	mg/L	<25%***	117	56	121	239	129		78	98	145	139	153
Chloride	mg/L		52	19	9	26	10	23	27	17	24	5	13
Sulphate	mg/L		108	25	72	242	70		257	216	251	69	180
Ammonia (as N)	mg/L		0.02	0.07	0.66		0.41	0.075	0.075	0.075	0.17	0.11	0.075
Ammonia Unionized	mg/L	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate	mg/L		53.2	7.24	1.72	0.05	0.6	0.05	0.1	0.2	1.8	1.3	1.1
Nitrite	mg/L		<0.10	<0.10			0.02	<0.01	0.04	0.02	0.03	0.03	
Phenols	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	0.200	**0.23**	0.09	0.11	**0.51**	**0.23**	**0.25**	0.15	0.16	**0.24**	0.13	0.16
Calcium	mg/L		130	32	56	130	58	130	100	100	98	66	130
Chromium	mg/L	0.0089	0.002	<0.001	<0.001	**0.010**	**0.010**	**0.020**	0.008	**0.015**	**0.009**	**0.013**	**0.030**
Iron	mg/L	0.300	0.16	**0.47**	0.27	**4.6**	**5.6**	**20**	**7.8**	**10**	**4.7**	**13**	**29**
Magnesium	mg/L		38	10	17	39	19	45	37	36	35	20	43
Potassium	mg/L		7	4	4	5	5.2	6.9	5	8.5	8.4	4.8	7.2
Sodium	mg/L		20	7	10	20	11	22	21	16	15	6.6	13
Nickel	mg/L	0.025	<0.005	<0.005	<0.005	0.008	0.008	**0.032**	0.012	0.015	0.006	0.017	**0.045**
Zinc	mg/L	0.02	<0.01	<0.01	<0.01	0.02	0.02	**0.07**	**0.025**	**0.03**	0.02	**0.036**	**0.097**
pH	(pH units)	6.5-8.5	7.89	7.33	7.79	7.83	6.87	8.32	7.82	7.32	7.98	6.77	8.44
Total Organic Carbon	mg/L		8.9	7.7	7.1	10.0	7.4	13.5	9.7	6.1	12.5	9.4	17
Aluminum	mg/L	0.075*		**1.77**				**11**	**4.5**	**9.4**	**7.9**		
Arsenic	mg/L	0.100*		<0.001				0.007	0.004	0.004	0.002		
Barium	mg/L			0.05				0.098	0.05	0.085	0.063		
Beryllium	mg/L	1.100		<0.001				0.0007	<0.0006	<0.0006	<0.0006		
Bismuth	mg/L			<0.005					<0.001	<0.001	<0.001		
Cadmium	mg/L	0.0002		<0.0001				0.0002	<0.0001	<0.0001	<0.0001		
Cobalt	mg/L	0.0009		0.0008				**0.0088**	**0.0033**	**0.0044**	**0.0019**		
Copper	mg/L	0.005		0.004				**0.020**	**0.009**	**0.009**	**0.006**		
Lead	mg/L	0.005		0.002				**0.011**	0.0038	0.0044	0.0018		
Molybdenum	mg/L	0.040*		<0.005				0.025	0.027	0.023	0.011		
Selenium	mg/L	0.100		<0.001				<0.002	<0.05	<0.005	<0.005		
Silver	mg/L	0.0001		<0.0001				**0.0002**		<0.0001	<0.0001		
Strontium	mg/L			0.086				0.52	0.44	0.50	0.43		
Tin	mg/L			<0.01				<0.001	<0.002	<0.002	<0.002		
Titanium	mg/L			<0.01				0.22		0.27	0.25		
Total Kjeldahl Nitrogen (TKN)	mg/L		0.92	1.91				3	1	0.8	1.5		
Total Phosphorus	mg/L	0.02*	**0.11**	**0.87**				**0.33**	**0.21**	**<0.15**	**0.15**		
Vanadium	mg/L	0.006*		0.002				**0.025**	**0.009**	**0.022**	**0.016**		
Ion Percentage	%		15.6	9.1	6.1	2.6	7.1		5.1	7.4	1.1	8.4	12.0
Benzene	ug/L							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	ug/L							<0.2	<0.2	<0.3	<0.2	<0.3	<0.3
Ethylbenzene	ug/L							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-Xylene	ug/L							<0.2	<0.2	<0.3	<0.2	<0.3	<0.3
p+m-Xylene	ug/L							<0.4	<0.4	<0.6	<0.4	<0.6	<0.6
Total Xylenes	ug/L							<0.4	<0.4	<0.6	<0.4	<0.6	<0.6
Total Oil & Grease	mg/L							<0.5	<0.5	<0.5	<0.5		

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	East Ditch Line (Poplar System) - SS14 / SS14A										
Date			9-Aug-09	10-Oct-09	24-Oct-09	25-Jan-10	6-Apr-10	6-Jun-10	14-Oct-10	28-Feb-11	20-Apr-11	7-Jun-11	8-Aug-11
Routine/Storm Monitoring			Routine	Storm	Routine	Routine	Routine	Storm	Storm	Routine	Routine	Storm	Storm
Laboratory			Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam
Alkalinity (as $CaCO_3$)	mg/L	<25%***	80		120	126	91		95	122	179		132
Chloride	mg/L		22	32	31	8	8	9	18	11	17	3	13
Sulphate	mg/L		210		350	99	150		220	89	210		290
Ammonia (as N)	mg/L		0.075	0.075	0.075	0.075	0.270	0.230	0.075	0.570	0.075	0.150	0.075
Ammonia Unionized	mg/L	0.02	<0.02		<0.02	<0.02	<0.02		<0.02	<0.02	<0.02		<0.02
Nitrate	mg/L		0.5	0.9	0.3	1.3	0.7	0.7	0.05	2.3	0.3	0.02	0.05
Nitrite	mg/L			0.03					0.01			0.3	<0.01
Phenols	mg/L	0.001	<0.001		<0.001	<0.001	<0.001		<0.001	<0.001	<0.001		
Boron	mg/L	0.200	0.08	0.14	0.10	0.12	**0.4**	0.14	0.09	0.17	**0.31**	0.13	**0.25**
Calcium	mg/L		66	120	130	64	670	180	95	60	100	51	120
Chromium	mg/L	0.0089	<0.005	<0.005	<0.005	0.006	**0.26**	**0.073**	<0.005	<0.005	<0.005	**0.045**	<0.005
Iron	mg/L	0.300	**1.8**	**1.0**	**1.4**	**3.0**	**260**	**76**	**2.5**	**1.5**	**3.6**	**45**	**0.8**
Magnesium	mg/L		22	40	44	19	160	48	23	20	34	18	27
Potassium	mg/L		3.9	4.3	7.1	5.0	41	11	7.7	4.6	4.2	7.5	6.7
Sodium	mg/L		12	19	20	7.3	16	9.1	11	8.3	15	4.3	14
Nickel	mg/L	0.025	0.004	<0.001	0.003	0.004	**0.36**	**0.11**	0.003	0.002	0.006	**0.056**	0.002
Zinc	mg/L	0.02	0.009	<0.01	**0.031**	0.012	**0.78**	**0.16**	0.010	0.012	0.019	**0.12**	<0.005
pH	(pH units)	6.5-8.5	7.48	8.24	7.88	8.65	7.94	7.94	7.85	7.85	7.91	7.23	7.35
Total Organic Carbon	mg/L		6.9		8.2	5.8	14.8		10.7	6.0	13.2		11.1
Aluminum	mg/L	0.075*		**0.91**				**40**	**4.1**			**28**	**0.72**
Arsenic	mg/L	0.100*		<0.001				0.019	0.001			0.011	0.003
Barium	mg/L			0.039				0.23	0.048			0.17	0.053
Beryllium	mg/L	1.100		<0.0006				0.0024	<0.0006			0.0014	<0.0005
Bismuth	mg/L			<0.001				<0.001	<0.001			<0.001	0.001
Cadmium	mg/L	0.0002		<0.0001				**0.0003**	<0.0001			**0.0003**	<0.0001
Cobalt	mg/L	0.0009		0.0005				**0.032**	0.0008			**0.016**	0.0007
Copper	mg/L	0.005		0.003				**0.055**	0.003			**0.028**	0.004
Lead	mg/L	0.005		<0.0005				**0.029**	0.0012			**0.019**	<0.0005
Molybdenum	mg/L	0.040*		0.014				0.022	0.008			0.010	0.019
Selenium	mg/L	0.100		<0.005				<0.005	<0.005			<0.005	<0.002
Silver	mg/L	0.0001		<0.0001				<0.0001	<0.0001			<0.0001	
Strontium	mg/L			0.52				0.46	0.33			0.16	0.44
Tin	mg/L			<0.002				<0.002	<0.002			<0.002	<0.001
Titanium	mg/L			0.026				0.75	0.16			0.51	0.021
Total Kjeldahl Nitrogen (TKN)	mg/L			0.9				5	1.2			11	1
Total Phosphorus	mg/L	0.02*		**0.05**				**1.3**	**0.11**			**0.10**	**0.10**
Vanadium	mg/L	0.006*		0.002				**0.079**	**0.009**			**0.053**	0.002
Ion Percentage	%		2.4		2.4	4.6	40.9		2.4	2.7	0.2		0.3
Benzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	ug/L		<0.3	<0.2	<0.3	<0.3	<0.3	<0.2	<0.2	<0.3	<0.3	<0.2	<0.3
Ethylbenzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-Xylene	ug/L		<0.3	<0.2	<0.3	<0.3	<0.3	<0.2	<0.2	<0.3	<0.3	<0.2	<0.3
p+m-Xylene	ug/L		<0.6	<0.4	<0.6	<0.6	<0.6	<0.4	<0.4	<0.6	<0.6	<0.4	<0.6
Total Xylenes	ug/L		<0.6	<0.4				<0.4	<0.4			<0.4	<0.6
Total Oil & Grease	mg/L			<0.5				<0.5	<1			<0.5	

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	East Ditch Line (Poplar System) - SS14A										
Date			13-Oct-11	13-Mar-12	4-May-12	28-Jul-12	30-Oct-12	13-Jan-13	10-Apr-13	29-May-13	5-Jul-13	28-Aug-13	7-Oct-13
Routine/Storm Monitoring			Routine	Routine	Routine	Routine	Routine	Routine	Routine	Storm	Routine	Storm	Routine
Laboratory			Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam
Alkalinity (as $CaCO_3$)	mg/L	<25%***	176	140	92	92	74	150	130		81		160
Chloride	mg/L		20	12	12	12	6	7	9	7	6	5	15
Sulphate	mg/L		210	170	250	190	94	120	120		130		110
Ammonia (as N)	mg/L		0.075	0.075	0.075	0.075	0.200	0.075	0.075	0.150	0.075	0.075	0.075
Ammonia Unionized	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.021		<0.0076
Nitrate	mg/L		0.7	1.6	1.8	0.99	2.4	0.56	1.0	0.17	0.05	0.05	0.05
Nitrite	mg/L									0.032		<0.010	
Phenols	mg/L	0.001	**0.015**	**0.0013**	<0.0010	**0.0035**	<0.0010	<0.0010	<0.0010		<0.0010		0.0012
Boron	mg/L	0.200	0.20	0.19	0.18	**0.22**	0.093	0.14	0.14	**0.23**	**1.5**	**0.49**	**0.39**
Calcium	mg/L		120	88	100	95	51	79	80	87	92	58	80
Chromium	mg/L	0.0089	0.007	**0.013**	0.0051	**0.0094**	**0.026**	0.0064	0.0063	<0.005	<0.005	0.006	<0.0050
Iron	mg/L	0.300	**5.6**	**11**	**3.2**	**9.0**	**25**	**6.1**	**3.3**	**1.2**	**3.8**	**4.1**	**2.2**
Magnesium	mg/L		28	26	26	24	18	23	21	22	32	15	22
Potassium	mg/L		13	6.6	4.7	5.1	8.2	5.0	5.8	5.1	9	7.7	9.1
Sodium	mg/L		14	10	12	12	5.9	8.7	8.5	9.4	68	10	13
Nickel	mg/L	0.025	0.011	0.015	0.005	0.013	**0.029**	0.0081	0.0051	0.004	0.013	0.006	0.0041
Zinc	mg/L	0.02	**0.044**	**0.032**	0.019	**0.030**	**0.061**	0.018	0.012	0.02	0.016	0.01	0.01
pH	(pH units)	6.5-8.5	7.10	7.92	8.12	7.22	7.69	7.82	7.00		8.37	8.33	8.21
Total Organic Carbon	mg/L		33.3	16	23	14	9.4	10	9.5		8.1		14
Aluminum	mg/L	0.075*								**0.80**		**6.1**	
Arsenic	mg/L	0.100*								0.001		0.003	
Barium	mg/L									0.035		0.061	
Beryllium	mg/L	1.100								<0.0006		<0.0006	
Bismuth	mg/L									<0.0010		<0.0010	
Cadmium	mg/L	0.0002								<0.0001		<0.0001	
Cobalt	mg/L	0.0009								0.0007		**0.0017**	
Copper	mg/L	0.005								**0.007**		**0.008**	
Lead	mg/L	0.005								0.001		0.0019	
Molybdenum	mg/L	0.040*								0.011		0.017	
Selenium	mg/L	0.100								<0.005		<0.005	
Silver	mg/L	0.0001								<0.00010		<0.00010	
Strontium	mg/L									0.29		0.25	
Tin	mg/L									<0.002		<0.002	
Titanium	mg/L									0.017		0.26	
Total Kjeldahl Nitrogen (TKN)	mg/L									1.3		1.3	
Total Phosphorus	mg/L	0.02*								**0.093**		**0.10**	
Vanadium	mg/L	0.006*								0.002		0.014	
Ion Percentage	%		2.2	1.6	1.2	4.6	5.6	2.7	3.9		20.1		2.8
Benzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.20	<0.2	<0.20	<0.2
Toluene	ug/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.20	<0.3	<0.20	<0.3
Ethylbenzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.20	<0.2	<0.20	<0.2
o-Xylene	ug/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.20	<0.3	<0.20	<0.3
p+m-Xylene	ug/L		<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.40	<0.6	<0.40	<0.6
Total Xylenes	ug/L												
Total Oil & Grease	mg/L												

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	East Ditch Line (Poplar System) - SS14A										
Date			**11-Jan-14**	**8-Apr-14**	**7-Jul-14**	**15-Oct-14**	**4-Jan-15**	**10-Apr-15**	**25-Oct-15**	**25-Feb-16**	**7-Apr-16**	**21-Oct-16**	**12-Jan-17**
Routine/Storm Monitoring			**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**
Laboratory			**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**
Alkalinity (as $CaCO_3$)	mg/L	<25%***	64		52	200	70	220	180	180	180	91	120
Chloride	mg/L		7	140	5	24	10	15	35	11	7.4	33	21
Sulphate	mg/L		37	190	23	96	37	110	250	160	93	290	56
Ammonia (as N)	mg/L		0.58	0.075	0.08	0.075	0.45	0.075	0.075	0.075	0.24	0.075	0.49
Ammonia Unionized	mg/L	0.02	0.009	<0.0013	<0.0073	<0.0028	0.0051	<0.009	<0.00076	<0.0021	0.0019	<0.0048	0.0014
Nitrate	mg/L		1.4	0.05	0.31	0.05	1.22	0.05	0.1	0.37	0.12	4.64	1.81
Nitrite	mg/L												
Phenols	mg/L	0.001	**0.002**	**0.005**	**0.002**	**0.0097**	**0.0077**	<0.0010	<0.0010	<0.0010	<0.0010	*<0.0040*	*<0.0040*
Boron	mg/L	0.200	0.06	**1.5**	0.10	0.18	0.063	0.10	**0.54**	0.16	0.10	0.07	0.13
Calcium	mg/L		30	100	25	85	33	91	110	89	73	120	120
Chromium	mg/L	0.0089	<0.0050	<0.0050	**0.027**	<0.0050	<0.0050	<0.0050	<0.005	<0.0050	**0.011**	<0.005	0.061
Iron	mg/L	0.300	**0.33**	0.21	**24.0**	**3.3**	**2.2**	**0.58**	**0.60**	**0.32**	**6.2**	**0.90**	**58**
Magnesium	mg/L		7.8	36	9	29	8.7	26	24	26	22	27	34
Potassium	mg/L		7.3	8.4	7.8	13	8.3	5.2	5.9	4.1	5.8	3.7	17
Sodium	mg/L		3.4	110	2	9.5	3.3	8.9	31	11	8.2	16	7.1
Nickel	mg/L	0.025	<0.0010	0.01	**0.031**	0.0056	0.0033	0.002	0.002	0.0013	0.0078	0.006	0.077
Zinc	mg/L	0.02	0.0089	0.0059	**0.065**	**0.023**	0.013	0.006	<0.01	0.0077	**0.027**	<0.01	0.15
pH	(pH units)	6.5-8.5	8.07	7.73	7.97	7.85	7.99	8.45	7.46	8.21	7.72	8.24	7.40
Total Organic Carbon	mg/L		7.5	12	16	33	9.2	9.7	10	5.9	9.5	10	8.6
Aluminum	mg/L	0.075*											
Arsenic	mg/L	0.100*											
Barium	mg/L												
Beryllium	mg/L	1.100											
Bismuth	mg/L												
Cadmium	mg/L	0.0002											
Cobalt	mg/L	0.0009											
Copper	mg/L	0.005											
Lead	mg/L	0.005											
Molybdenum	mg/L	0.040*											
Selenium	mg/L	0.100											
Silver	mg/L	0.0001											
Strontium	mg/L												
Tin	mg/L												
Titanium	mg/L												
Total Kjeldahl Nitrogen (TKN)	mg/L												
Total Phosphorus	mg/L	0.02*											
Vanadium	mg/L	0.006*											
Ion Percentage	%		2.5		8.0	2.6	2.7	0.3	2.4	0.4	0.9	0.5	20.3
Benzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.10	<0.10
Toluene	ug/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.10	<0.20
Ethylbenzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.20	<0.10
o-Xylene	ug/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.10	<0.10
p+m-Xylene	ug/L		<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.10	<0.10
Total Xylenes	ug/L											<0.10	<0.10
Total Oil & Grease	mg/L												

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
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4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Italics denotes parameter concentration was below the laboratory RDL, where the RDL exceeds the relevant PWQO.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	East Ditch Line (Poplar System) - SS14A										
Date			6-Apr-17	13-Jul-17	28-Oct-17	23-Jan-18	4-Apr-18	8-Aug-18	8-Aug-18	31-Oct-18	7-Feb-19	17-Apr-19	2-Oct-19
Routine/Storm Monitoring			Routine	Routine	Routine	Routine	Routine	Routine	Storm	Routine	Routine	Routine	Routine
Laboratory			Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Bureau Veritas
Alkalinity (as $CaCO_3$)	mg/L	<25%***	220	98	120	160	170	84		140	190	230	150
Chloride	mg/L		33	4.4	17	13	13	4.6	4.7	13	13	15	6.3
Sulphate	mg/L		160	26	200	150	110	97		72	95	210	180
Ammonia (as N)	mg/L		0.075	0.075	0.03	0.22	0.13	0.025	0.025	0.057	0.025	0.025	0.025
Ammonia Unionized	mg/L	0.02	<0.0005	<0.013	<0.0005	0.0061	<0.0005	<0.0005		<0.00061	<0.00061	<0.0079	<0.0015
Nitrate	mg/L		0.55	0.05	1.28	1.84	1.22	0.05	0.1	0.9	1.5	0.05	0.11
Nitrite	mg/L								<0.010				
Phenols	mg/L	0.001	*<0.0040*	*<0.0040*	<0.0010	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	0.001
Boron	mg/L	0.200	0.19	0.1	0.09	0.11	**0.29**	0.07	0.07	0.06	0.06	0.1	0.16
Calcium	mg/L		110	53	86	79	83	57	58	60	74	110	87
Chromium	mg/L	0.0089	<0.005	0.016	<0.005	<0.005	**0.013**	**0.011**	**0.01**	<0.005	<0.005	<0.005	<0.005
Iron	mg/L	0.300	**1.8**	**18**	**1.8**	**3.3**	**13**	**9.2**	**8.4**	**4.4**	<0.1	0.1	**1.6**
Magnesium	mg/L		34	11	23	27	26	14	14	18	26	43	28
Potassium	mg/L		7.5	6.2	6.3	4.4	5.9	0.014	6	11	5.5	4.9	4.4
Sodium	mg/L		18	7	10	9.6	12	6.1	5.2	4.3	7.5	13	10
Nickel	mg/L	0.025	0.004	0.028	0.003	0.006	0.016	**5.2**	0.012	0.007	0.001	0.001	0.004
Zinc	mg/L	0.02	0.02	0.14	0.02	<0.01	0.04	0.02	0.02	0.02	<0.01	<0.01	<0.01
pH	(pH units)	6.5-8.5	7.19	8.17	7.25	8.4	7.21	7.06	7.06	6.72	7.85	**8.53**	7.86
Total Organic Carbon	mg/L		11	12	10	6.2	12	11		15	9.9	9.7	10
Aluminum	mg/L	0.075*							**5.3**				
Arsenic	mg/L	0.100*							0.003				
Barium	mg/L								0.045				
Beryllium	mg/L	1.100							<0.0006				
Bismuth	mg/L								<0.001				
Cadmium	mg/L	0.0002							<0.0001				
Cobalt	mg/L	0.0009							**0.0034**				
Copper	mg/L	0.005							**0.01**				
Lead	mg/L	0.005							0.0035				
Molybdenum	mg/L	0.040*							0.007				
Selenium	mg/L	0.100							<0.005				
Silver	mg/L	0.0001							*<0.0004*				
Strontium	mg/L								0.18				
Tin	mg/L								<0.002				
Titanium	mg/L								0.075				
Total Kjeldahl Nitrogen (TKN)	mg/L								<0.7				
Total Phosphorus	mg/L	0.02*							**0.18**				
Vanadium	mg/L	0.006*							**0.011**				
Ion Percentage	%		1.7	11.1	1.1	0.1	3.6	2.7	47.1	1.5	0.6	0.8	0.9
Benzene	ug/L		<0.10	<0.10	<0.10	<0.10	<0.25	<0.20	<0.20	<0.25	<0.20	<0.25	<0.50
Toluene	ug/L		<0.20	<0.20	<0.10	<0.20	<0.50	<0.20	<0.20	<0.50	<0.40	<0.50	<1.0
Ethylbenzene	ug/L		<0.10	<0.10	<0.20	<0.10	<0.25	<0.20	<0.20	<0.25	<0.20	<0.25	<0.50
o-Xylene	ug/L		<0.10	<0.10	<0.10	<0.10	<0.25	<0.20	<0.20	<0.25	<0.20	<0.25	<0.50
p+m-Xylene	ug/L		<0.10	<0.10	<0.10	<0.10	<0.25	<0.20	<0.20	<0.25	<0.20	<0.25	<0.50
Total Xylenes	ug/L		<0.10	<0.10	<0.10	<0.10	<0.25	<0.20	<0.20	<0.25	<0.20	<0.25	<0.50
Total Oil & Grease	mg/L												

NOTES:

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2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Italics denotes parameter concentration was below the laboratory RDL, where the RDL exceeds the relevant PWQO.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	East Ditch Line (Poplar System) - SS14A										
Date			**2-Oct-19**	**11-Jan-20**	**18-May-20**	**15-Nov-20**	**26-Mar-21**	**23-Sep-21**	**23-Sep-21**	**26-Oct-21**	**17-Feb-22**	**4-May-22**	**28-Sep-22**
Routine/Storm Monitoring			**Storm**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Storm**	**Routine**	**Routine**	**Routine**	**Routine**
Laboratory			**Bureau Veritas**	**Bureau Veritas**	**Bureau Veritas**	**Bureau Veritas**	**Bureau Veritas**	**Bureau Veritas**	**Bureau Veritas**	**Bureau Veritas**	**Bureau Veritas**	**Bureau Veritas**	**Bureau Veritas**
Alkalinity (as $CaCO_3$)	mg/L	<25%***		120	170	170	150	170		290	84	270	130
Chloride	mg/L		6.9	8.6	5.6	210	14	9.4	9.3	12	4.8	11	22
Sulphate	mg/L			74	140	200	150	130		140	14	93	66
Ammonia (as N)	mg/L		0.025	0.025	0.078	0.064	0.025	0.025	0.075	0.11	2.1	0.025	0.025
Ammonia Unionized	mg/L	0.02		0.00048	0.0035	0.00083	<0.00055	<0.0012		0.0008	0.0060	<0.0039	<0.0011
Nitrate	mg/L		0.16	0.49	0.22	23.7	1.88	0.05	0.05	0.22	0.35	0.05	0.05
Nitrite	mg/L		0.019						<0.010				
Phenols	mg/L	0.001		0.0005	<0.0010	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010
Boron	mg/L	0.200	0.15	0.03	0.06	**1.30**	0.05	0.07	0.07	0.07	0.03	0.09	0.08
Calcium	mg/L		86	55	72	130	83	80	79	110	26	94	70
Chromium	mg/L	0.0089	0.0025	0.0025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Iron	mg/L	0.300	**1.6**	**2.5**	**1.9**	**1.8**	**1.2**	**0.4**	**0.4**	**0.4**	**4.3**	**0.6**	**1.0**
Magnesium	mg/L		29	17	22	42	26	24	23	35	6.9	32	21
Potassium	mg/L		4.4	0.004	3.5	18	7.4	8.5	8.4	6.8	8.4	4.2	4.1
Sodium	mg/L		10	4.4	6.8	120	8.7	7.4	7.1	8.9	2.3	9.2	9.7
Nickel	mg/L	0.025	0.004	0.004	0.004	0.017	0.003	0.002	0.002	0.002	0.007	0.002	0.003
Zinc	mg/L	0.02	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01
pH	(pH units)	6.5-8.5	8.0	8.2	8.2	7.8	7.8	7.9	7.9	7.6	7.4	8.3	7.8
Total Organic Carbon	mg/L			7.5	18.0	23	18	12		10	14	11	9.9
Aluminum	mg/L	0.075*	**1**						**0.23**				
Arsenic	mg/L	0.100*	0.001						<0.001				
Barium	mg/L		0.043						0.044				
Beryllium	mg/L	1.100	<0.0006						<0.0006				
Bismuth	mg/L		<0.001						<0.001				
Cadmium	mg/L	0.0002	<0.0001						<0.0001				
Cobalt	mg/L	0.0009	0.0008						<0.0005				
Copper	mg/L	0.005	0.005						0.005				
Lead	mg/L	0.005	0.001						<0.0005				
Molybdenum	mg/L	0.040*	0.012						0.008				
Selenium	mg/L	0.100	<0.005						<0.005				
Silver	mg/L	0.0001	*<0.0004*						*<0.0004*				
Strontium	mg/L		0.4						0.32				
Tin	mg/L		<0.002						<0.002				
Titanium	mg/L		0.021						0.007				
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.7						0.8				
Total Phosphorus	mg/L	0.02*	**0.088**						**0.091**				
Vanadium	mg/L	0.006*	0.003						<0.001				
Ion Percentage	%		47.4	0.9	3.0	3.7	1.2	0.5	46.1	0.4	1.0	0.6	5.8
Benzene	ug/L		<0.20	<0.10	<0.25	<0.25	<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Toluene	ug/L		<0.20	<0.20	<0.50	<0.50	<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	ug/L		<0.20	<0.10	<0.25	<0.25	<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
o-Xylene	ug/L		<0.20	<0.10	<0.25	<0.25	<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
p+m-Xylene	ug/L		<0.20	<0.10	<0.25	<0.25	<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Xylenes	ug/L		<0.20	<0.10	<0.25	<0.25	<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Oil & Grease	mg/L												

NOTES:

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6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Italics denotes parameter concentration was below the laboratory RDL, where the RDL exceeds the relevant PWQO.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	East Ditch Line (Poplar System) - SS14A										
Date			28-Sep-22	19-Oct-22	10-Feb-23	4-Apr-23	7-Jul-23	7-Jul-23	13-Jul-23	2-Nov-23			
Routine/Storm Monitoring			Storm	Routine	Routine	Routine	Routine	Storm	Storm	Routine			
Laboratory			Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas			
Alkalinity (as $CaCO_3$)	mg/L	<25%***		120	210	140	160			230			
Chloride	mg/L		24	8.7	9.6	3.4	5	4.7	1.4	12			
Sulphate	mg/L			89	180	65	110			210			
Ammonia (as N)	mg/L		0.075	0.2	<0.050	<0.050	<0.050	<0.15	<0.15	<0.050			
Ammonia Unionized	mg/L	0.02		0.0027	<0.00076	<0.00061	<0.0035			<0.00061			
Nitrate	mg/L		0.05	<0.10	0.40	0.82	<0.10	<0.10	<0.10	<0.10			
Nitrite	mg/L		<0.010					<0.010	<0.010				
Phenols	mg/L	0.001		**0.0018**	<0.0010	<0.0010	0.0012			<0.0010			
Boron	mg/L	0.200	0.07	0.04	0.05	0.06	0.1	0.11	0.07	0.18			
Calcium	mg/L		64	55	110	87	79	76	67	95			
Chromium	mg/L	0.0089	<0.005	0.005	<0.005	**0.026**	<0.005	<0.005	<0.005	<0.005			
Iron	mg/L	0.300	**1.3**	**4.6**	**0.4**	**26**	**0.8**	**0.7**	**2.4**	**1.8**			
Magnesium	mg/L		17	16	34	25	22	20	18	29			
Potassium	mg/L		3.9	7.2	4.5	6.3	6.4	6.1	5.5	6.8			
Sodium	mg/L		8.5	5.8	9.8	4.7	7.7	7.4	5.6	20			
Nickel	mg/L	0.025	0.003	0.007	0.001	**0.036**	0.003	0.003	0.005	0.004			
Zinc	mg/L	0.02	0.01	0.01	<0.01	**0.06**	<0.01	<0.01	<0.01	<0.01			
pH	(pH units)	6.5-8.5	7.8	7.8	8.1	7.6	8.0	8.0	7.5	6.8			
Total Organic Carbon	mg/L			10	5.7	9.7	13			8.4			
Aluminum	mg/L	0.075*	**1.2**					**0.48**	**1.6**				
Arsenic	mg/L	0.100*	<0.001					<0.001	0.001				
Barium	mg/L		0.042					0.038	0.033				
Beryllium	mg/L	1.100	<0.0006					<0.0006	<0.0006				
Bismuth	mg/L		<0.001					<0.001	<0.001				
Cadmium	mg/L	0.0002	<0.0001					<0.0001	<0.0001				
Cobalt	mg/L	0.0009	0.0007					<0.0005	**0.0013**				
Copper	mg/L	0.005	0.005					0.005	0.005				
Lead	mg/L	0.005	0.001					<0.0005	0.0024				
Molybdenum	mg/L	0.040*	0.009					0.011	0.009				
Selenium	mg/L	0.100	<0.005					<0.005	<0.005				
Silver	mg/L	0.0001	*<0.0004*					<0.0004	<0.0004				
Strontium	mg/L		0.24					0.3	0.31				
Tin	mg/L		<0.002					<0.002	<0.002				
Titanium	mg/L		0.026					0.01	0.033				
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.7					0.8	<0.7				
Total Phosphorus	mg/L	0.02*	**0.067**					**0.053**	**0.065**				
Vanadium	mg/L	0.006*	0.003					0.001	0.003				
Ion Percentage	%		38.3	0.1	1.8	12.0	2.7	47.8	49.3	3.5			
Benzene	ug/L		<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10			
Toluene	ug/L		<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20			
Ethylbenzene	ug/L		<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10			
o-Xylene	ug/L		<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10			
p+m-Xylene	ug/L		<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10			
Total Xylenes	ug/L		<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10			
Total Oil & Grease	mg/L												

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Italics denotes parameter concentration was below the laboratory RDL, where the RDL exceeds the relevant PWQO.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	West Ditch Line (Poplar System) - SS15 / SS14B										
Date			**9-Apr-02**	**4-Apr-03**	**13-Jun-03**	**15-Sep-03**	**3-May-04**	**31-Jul-04**	**23-Sep-05**	**9-Nov-05**	**18-Jan-06**	**9-Mar-06**	**3-Aug-06**
Routine/Storm Monitoring			**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Storm**	**Routine**	**Routine**	**Routine**	**Storm**
Laboratory			**Accutest**	**Accutest**	**Accutest**	**Accutest**	**Accutest**	**Accutest**	**Accutest**	**Accutest**	**Accutest**	**Accutest**	**Accutest**
Alkalinity (as $CaCO_3$)	mg/L	<25%***	105	89	148	76	166	84	131	75	141	97	102
Chloride	mg/L		13	13	16	20	8	10	48	26	14	11	32
Sulphate	mg/L		169	183	322	277	226	163	241	132	120	60	364
Ammonia (as N)	mg/L		0.12	0.07	0.06	0.03	0.35	0.08	0.05	0.11	0.39	0.60	0.03
Ammonia Unionized	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02
Nitrate	mg/L		2.86	6.01	7.19	0.39	3.01	0.34	7.56	5.63	1.81	0.89	2.38
Nitrite	mg/L								0.14				<0.10
Phenols	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	0.200	**0.48**	**0.21**	**0.51**	**0.35**	**0.37**	0.20	**0.63**	**0.26**	**0.37**	0.15	**0.26**
Calcium	mg/L		68	78	126	122	93	57	107	71	67	39	119
Chromium	mg/L	0.0089	<0.01	<0.005	<0.005	<0.005	<0.005	**0.012**	0.002	**0.074**	0.002	0.001	0.002
Iron	mg/L	0.300	**1.01**	**1.33**	**1.28**	**0.52**	**0.75**	**8.42**	**0.51**	**59.0**	**0.47**	**0.65**	0.21
Magnesium	mg/L		23	26	47	28	28	21	31	22	21	12	37
Potassium	mg/L		4	3	3	10	4	4	6	4	3	4	7
Sodium	mg/L		20	12	19	18	15	11	26	16	12	8	26
Nickel	mg/L	0.025	<0.01	<0.005	<0.005	<0.005	<0.005	**0.037**	0.009	**0.083**	<0.005	<0.005	0.005
Zinc	mg/L	0.020	<0.01	0.012	**0.027**	<0.005	**0.03**	**0.34**	<0.01	**0.15**	0.01	<0.01	<0.01
pH	(pH units)	6.5-8.5							7.31	7.89	7.68	7.84	7.45
Total Organic Carbon	mg/L								12.4		7.7	5.5	8.3
Aluminum	mg/L	0.075*							**0.68**				**0.20**
Arsenic	mg/L	0.100*							0.001				0.001
Barium	mg/L								0.04				0.04
Beryllium	mg/L	1.100							<0.001				<0.001
Bismuth	mg/L								<0.005				<0.005
Cadmium	mg/L	0.0002							<0.0001				<0.0001
Cobalt	mg/L	0.0009							0.0009				0.0005
Copper													
Lead	mg/L	0.005							<0.001				**0.006**
Molybdenum	mg/L	0.040*							0.012				0.025
Selenium	mg/L	0.100							0.003				0.003
Silver	mg/L	0.0001							<0.0001				<0.0001
Strontium	mg/L								0.461				0.533
Tin	mg/L								<0.01				<0.01
Titanium	mg/L								0.02				<0.01
Total Kjeldahl Nitrogen (TKN)	mg/L								1.29				0.73
Total Phosphorus	mg/L	0.02*							**0.19**				**0.07**
Vanadium	mg/L	0.006*							0.003				0.001
Ion Percentage	%		2.8	4.1	3.6	4.7	0.1	0.5	1.9	6.7	2.3	2.0	0.3

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Downstream station SS15 redesignated as background station SS14B as a result of grading modifications in September 2009, and was further redesignated as a station adjacent to the Poplar System in late spring of 2011.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	West Ditch Line (Poplar System) - SS15 / SS14B										
Date			5-Oct-06	17-Nov-06	2-Mar-07	9-Jan-08	19-Mar-08	14-Jun-08	17-Jul-08	9-Sep-08	4-Nov-08	12-Feb-09	6-Apr-09
Routine/Storm Monitoring			Routine	Storm	Routine	Routine	Routine	Storm	Storm	Storm	Storm	Routine	Routine
Laboratory			Accutest	Accutest	Accutest	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam
Alkalinity (as $CaCO_3$)	mg/L	<25%***	140	169	101	123	99		100	85	118	101	111
Chloride	mg/L		51	28	16	33	12	21	27	17	25	10	16
Sulphate	mg/L		111	139	68	145	59		216	192	173	48	120
Ammonia (as N)	mg/L		0.04	0.20	0.76		0.33	0.075	0.075	0.075	0.23	0.1	0.075
Ammonia Unionized	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate	mg/L		26.3	2.88	1.92	3.5	0.8	1.0	0.8	0.5	1.4	1.5	2.0
Nitrite	mg/L		<0.10	<0.10			0.02	0.03	0.04	0.03	0.03	0.02	
Phenols	mg/L	0.001	0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	0.200	**0.36**	**0.43**	0.16	**0.33**	0.18	0.19	0.19	0.14	**0.23**	0.16	0.20
Calcium	mg/L		110	80	48	73	45	79	95	88	79	48	86
Chromium	mg/L	0.0089	0.002	0.001	<0.001	**0.017**	<0.005	**0.009**	<0.005	**0.017**	0.008	**0.02**	**0.014**
Iron	mg/L	0.300	**0.37**	**0.35**	0.27	**7.8**	**2.1**	**9.2**	**1.4**	**11**	**8.6**	**22**	**14**
Magnesium	mg/L		30	25	14	22	14	23	29	31	26	16	27
Potassium	mg/L		7	5	5	5	3.8	5.2	4.3	8.9	7.8	6	4.9
Sodium	mg/L		20	19	14	19	10	16	19	15	14	8.2	13
Nickel	mg/L	0.025	<0.005	<0.005	<0.005	0.014	0.003	0.015	0.003	0.017	0.011	**0.026**	0.022
Zinc	mg/L	0.020	<0.01	<0.01	<0.01	**0.03**	0.01	**0.03**	0.008	**0.04**	**0.04**	**0.058**	**0.10**
pH	(pH units)	6.5-8.5	7.86	7.96	7.75	7.83	6.84	7.66	7.41	7.32	8.08	6.70	8.45
Total Organic Carbon	mg/L		10.5	9.8	7.7	10.6	7.1	8.2	7.6	6.9	11.1	12.7	17
Aluminum	mg/L	0.075*		**0.80**				**5.9**	**0.93**	**11**	**5.5**		
Arsenic	mg/L	0.100*		<0.001				0.004	0.001	0.004	0.003		
Barium	mg/L			0.04				0.058	0.04	0.088	0.055		
Beryllium	mg/L	1.100		<0.001				<0.0006	<0.0006	<0.0006	<0.0006		
Bismuth	mg/L			<0.005					<0.001	<0.001	<0.001		
Cadmium	mg/L	0.0002		<0.0001				**0.0005**	<0.0001	<0.0001	<0.0001		
Cobalt	mg/L	0.0009		0.0005				**0.0038**	0.0006	**0.0047**	**0.0033**		
Copper	mg/L	0.005		0.003				**0.010**	0.004	**0.010**	**0.008**		
Lead	mg/L	0.005		<0.001				0.0044	0.0007	0.005	0.0034		
Molybdenum	mg/L	0.040*		<0.005				0.015	0.02	0.023	0.009		
Selenium	mg/L	0.100		<0.001				<0.002	<0.005	<0.005	<0.005		
Silver	mg/L	0.0001		<0.0001				<0.0001		<0.0001	<0.0001		
Strontium	mg/L			0.291				0.30	0.39	0.42	0.31		
Tin	mg/L			<0.01				<0.001	<0.002	<0.002	<0.002		
Titanium	mg/L			0.01				0.10		0.39	0.096		
Total Kjeldahl Nitrogen (TKN)	mg/L		1.18	1.28				2	0.7	1	1.8		
Total Phosphorus	mg/L	0.02*	**0.13**	**0.20**				**0.21**	**0.07**	**0.23**	**0.78**		
Vanadium	mg/L	0.006*		0.001				**0.012**	0.002	**0.025**	**0.011**		
Ion Percentage	%		10.0	2.2	5.1	1.9	5.4		3.9	7.1	2.5	9.2	10.3
Benzene	ug/L							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	ug/L							<0.2	<0.2	<0.3	<0.2	<0.3	<0.3
Ethylbenzene	ug/L							<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-Xylene	ug/L							<0.2	<0.2	<0.3	<0.2	<0.3	<0.3
p+m-Xylene	ug/L							<0.4	<0.4	<0.6	<0.4	<0.6	<0.6
Total Xylenes	ug/L							<0.4	<0.4	<0.6	<0.4		
Total Oil & Grease	mg/L							<0.5	<0.5	<0.5	<0.5		

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Downstream station SS15 redesignated as background station SS14B as a result of grading modifications in September 2009, and was further redesignated as a station adjacent to the Poplar System in late spring of 2011.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	West Ditch Line (Poplar System) - SS14B										
Date			7-Jun-11	9-Aug-11	29-Nov-11	13-Jan-13	10-Apr-13	5-Jul-13	28-Aug-13	7-Oct-13	11-Jan-14	8-Apr-14	7-Jul-14
Routine/Storm Monitoring			Storm	Storm	Routine	Routine	Routine	Routine	Storm	Routine	Routine	Routine	Routine
Laboratory			Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam
Alkalinity (as $CaCO_3$)	mg/L	<25%***		56	98	200	110	130		250	60		64
Chloride	mg/L		6	28	28	110	48	85	21	130	7	130	12
Sulphate	mg/L			220	46	210	95	150		170	24	180	120
Ammonia (as N)	mg/L		0.15	0.075	0.075	0.075	0.21	0.075	0.075	0.075	0.83	0.075	0.075
Ammonia Unionized	mg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.014		<0.0079	0.0075	<0.0034	<0.0013
Nitrate	mg/L		0.02	1.2	0.2	0.37	0.58	0.05	0.05	0.05	0.99	0.05	0.05
Nitrite	mg/L		0.3	<0.01					<0.010				
Phenols	mg/L	0.001		0.001	<0.001	<0.0010	<0.0010	<0.0010		<0.0010	**0.0024**	**0.005**	**0.003**
Boron	mg/L	0.200	0.16	**0.41**	**0.67**	**1.4**	**0.75**	**1.5**	**0.3**	**2.0**	0.042	**1.4**	**0.23**
Calcium	mg/L		52	74	30	110	250	92	77	120	26	100	80
Chromium	mg/L	0.0089	**0.029**	<0.005	<0.005	<0.0050	**0.092**	<0.0050	**0.01**	<0.0050	<0.0050	<0.0050	**0.013**
Iron	mg/L	0.300	**30**	**3.2**	**4.3**	**0.86**	**94**	**3.8**	**7**	**1.8**	**3.3**	0.14	**12**
Magnesium	mg/L		16	23	11	35	57	21	19	36	6.2	33	19
Potassium	mg/L		6.3	5.4	6.2	8.3	13	9	9.8	10	8.4	8.1	5.9
Sodium	mg/L		4.7	31	34	100	45	68	18	110	2.3	100	13
Nickel	mg/L	0.025	**0.039**	0.006	0.007	0.0080	**0.13**	0.013	0.011	0.012	0.005	0.0096	0.018
Zinc	mg/L	0.020	**0.08**	0.008	**0.022**	0.0067	**0.45**	0.016	0.02	0.0077	0.018	<0.0050	**0.03**
pH	(pH units)	6.5-8.5	7.21	6.92	7.10	7.47	7.09	8.19	8.22	8.11	7.84	8.12	7.16
Total Organic Carbon	mg/L			7.8	8.2	11	7.9	16		17	9.3	12	10
Aluminum	mg/L	0.075*	**18**	**1.9**					**8.4**				
Arsenic	mg/L	0.100*	0.008	0.002					0.004				
Barium	mg/L		0.14	0.031					0.078				
Beryllium	mg/L	1.100	0.0010	<0.0005					<0.0006				
Bismuth	mg/L		<0.001	<0.001					<0.0010				
Cadmium	mg/L	0.0002	0.0002	<0.0001					<0.0001				
Cobalt	mg/L	0.0009	**0.011**	**0.0015**					**0.0039**				
Copper	mg/L	0.005	**0.021**	0.005					**0.01**				
Lead	mg/L	0.005	**0.015**	0.0013					0.0037				
Molybdenum	mg/L	0.040*	0.009	0.02					0.016				
Selenium	mg/L	0.100	<0.005	0.004					<0.005				
Silver	mg/L	0.0001	<0.0001						<0.00010				
Strontium	mg/L		0.16	0.36					0.39				
Tin	mg/L		<0.002	<0.001					<0.002				
Titanium	mg/L		0.34	0.047					0.2				
Total Kjeldahl Nitrogen (TKN)	mg/L		5	2					1.5				
Total Phosphorus	mg/L	0.02*	**0.8**	**0.092**					**0.18**				
Vanadium	mg/L	0.006*	**0.035**	0.004					**0.017**				
Ion Percentage	%			2.0	2.2	3.0	28.3	4.0	41.6	3.5	3.0	12.2	10.5
Benzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	ug/L		<0.2	<0.3	<0.3	<0.3	<0.3	<0.3	<0.2	<0.3	<0.3	<0.3	<0.3
Ethylbenzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-Xylene	ug/L		<0.2	<0.3	<0.3	<0.3	<0.3	<0.3	<0.2	<0.3	<0.3	<0.3	<0.3
p+m-Xylene	ug/L		<0.4	<0.6	<0.6	<0.6	<0.6	<0.6	<0.4	<0.6	<0.6	<0.6	<0.6
Total Xylenes	ug/L		<0.4	<0.6									
Total Oil & Grease	mg/L		<0.5										

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Downstream station SS15 redesignated as background station SS14B as a result of grading modifications in September 2009, and was further redesignated as a station adjacent to the Poplar System in late spring of 2011.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	West Ditch Line (Poplar System) - SS14B										
Date			**4-Jan-15**	**10-Apr-15**	**25-Oct-15**	**7-Apr-16**	**14-Jul-16**	**21-Oct-16**	**12-Jan-17**	**6-Apr-17**	**13-Jul-17**	**28-Oct-17**	**23-Jan-18**
Routine/Storm Monitoring			**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**
Laboratory			**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**
Alkalinity (as $CaCO_3$)	mg/L	<25%***	70	250	77	210	100	97	120	220	65	130	180
Chloride	mg/L		10	48	30	21	22	33	21	33	13	33	39
Sulphate	mg/L		38	250	150	130	110	310	62	160	98	240	70
Ammonia (as N)	mg/L		0.44	0.075	0.075	0.075	0.075	0.075	0.51	0.075	0.075	0.056	0.089
Ammonia Unionized	mg/L	0.02	0.0076	<0.0061	<0.0014	<0.0019	<0.0068	<0.0037	0.0013	<0.0014	<0.013	<0.0005	0.0021
Nitrate	mg/L		1.19	1.15	0.57	0.65	0.05	4.28	1.89	0.54	1.46	0.75	1.26
Nitrite	mg/L												
Phenols	mg/L	0.001	**0.0084**	<0.0010	<0.0010	<0.0010	*<0.0040*	*<0.0040*	*<0.0040*	*<0.0040*	*<0.0040*	<0.0010	0.0015
Boron	mg/L	0.200	0.064	**0.28**	0.10	0.15	0.13	0.08	0.14	0.20	0.1	0.09	0.46
Calcium	mg/L		33	150	62	94	64	130	110	120	200	100	66
Chromium	mg/L	0.0089	<0.0050	0.0057	<0.005	<0.0050	0.007	<0.005	0.052	<0.005	0.11	<0.005	<0.005
Iron	mg/L	0.300	**2.2**	**5.2**	**1.4**	**1.6**	**3.5**	**1.7**	**52**	**2.4**	**110**	**0.7**	**1.5**
Magnesium	mg/L		9	48	15	27	16	28	31	35	51	27	16
Potassium	mg/L		8.3	5.5	11	4.2	9.9	4.7	15	6.7	26	5.5	6.9
Sodium	mg/L		3.3	29	16	14	12	16	6.7	18	9	19	30
Nickel	mg/L	0.025	0.0035	0.014	0.004	0.0029	0.006	0.004	0.072	0.005	0.15	0.003	0.005
Zinc	mg/L	0.020	0.012	**0.032**	0.020	0.011	0.010	<0.01	**0.14**	0.020	**0.4**	<0.01	0.01
pH	(pH units)	6.5-8.5	8.14	8.27	7.71	8.02	7.93	8.09	7.36	7.81	8.16	7.35	8.32
Total Organic Carbon	mg/L		11	11	6.9	9.2	9.5	12	8.6	11	8.2	8.6	9.8
Aluminum	mg/L	0.075*											
Arsenic	mg/L	0.100*											
Barium	mg/L												
Beryllium	mg/L	1.100											
Bismuth	mg/L												
Cadmium	mg/L	0.0002											
Cobalt	mg/L	0.0009											
Copper	mg/L	0.005											
Lead	mg/L	0.005											
Molybdenum	mg/L	0.040*											
Selenium	mg/L	0.100											
Silver	mg/L	0.0001											
Strontium	mg/L												
Tin	mg/L												
Titanium	mg/L												
Total Kjeldahl Nitrogen (TKN)	mg/L												
Total Phosphorus	mg/L	0.02*											
Vanadium	mg/L	0.006*											
Ion Percentage	%		2.7	2.6	1.1	0.4	1.8	0.6	17.7	3.2	30.8	1.2	0.3
Benzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Toluene	ug/L		<0.3	<0.3	<0.3	<0.3	<0.10	<0.10	<0.20	<0.20	<0.20	<0.10	<0.20
Ethylbenzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.20	<0.20	<0.10	<0.10	<0.10	<0.20	<0.10
o-Xylene	ug/L		<0.3	<0.3	<0.3	<0.3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
p+m-Xylene	ug/L		<0.6	<0.6	<0.6	<0.6	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Xylenes	ug/L						<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Oil & Grease	mg/L												

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Downstream station SS15 redesignated as background station SS14B as a result of grading modifications in September 2009, and was further redesignated as a station adjacent to the Poplar System in late spring of 2011.
13) Italics denotes parameter concentration was below the laboratory RDL, where the RDL exceeds the relevant PWQO.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	West Ditch Line (Poplar System) - SS14B										
Date			4-Apr-18	8-Aug-18	8-Aug-18	2-Oct-18	7-Feb-19	19-Apr-19	2-Oct-19	2-Oct-19	11-Jan-20	18-May-20	15-Nov-20
Routine/Storm Monitoring			Routine	Routine	Storm	Routine	Routine	Routine	Routine	Storm	Routine	Routine	Routine
Laboratory			Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas
Alkalinity (as $CaCO_3$)	mg/L	<25%***	170	49		240	180	180	140		150	200	130
Chloride	mg/L		13	7.7	9.5	120	45	33	150	150	49	94	140
Sulphate	mg/L		120	63		180	84	93	240		48	150	190
Ammonia (as N)	mg/L		0.13	0.13	0.086	0.092	0.19	0.025	0.76	0.93	0.11	0.62	0.17
Ammonia Unionized	mg/L	0.02	0.0009	0.0025		0.0018	0.0019	<0.0024	**0.081**		0.0026	**0.034**	0.0046
Nitrate	mg/L		1.19	1.07	1.07	8.63	2.23	0.99	5.16	5.15	6.15	6.00	12
Nitrite	mg/L				0.026					0.915			
Phenols	mg/L	0.001	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	0.001		0.0005	<0.0010	<0.0010
Boron	mg/L	0.200	**0.24**	0.06	0.06	0.02	0.16	0.11	**0.77**	**0.78**	**0.43**	**0.77**	**1**
Calcium	mg/L		83	45	44	0.2	80	160	130	130	120	100	110
Chromium	mg/L	0.0089	**0.013**	0.008	0.007	0.005	<0.005	**0.052**	<0.005	<0.005	**0.041**	**0.012**	**0.009**
Iron	mg/L	0.300	**12**	**6.6**	**6.2**	0.1	**0.8**	**51**	**1.4**	**1.3**	**41**	**11**	**6.2**
Magnesium	mg/L		26	16	16	0.05	24	41	40	40	32	33	35
Potassium	mg/L		5.7	4.1	3.9	0.2	5.5	10	10	10	14	10	21
Sodium	mg/L		12	7.6	7.6	0.1	21	17	63	62	37	63	86
Nickel	mg/L	0.025	0.015	0.01	0.009	0.001	0.003	**0.072**	0.014	0.014	**0.06**	0.022	0.02
Zinc	mg/L	0.020	**0.04**	0.01	0.01	0.01	<0.01	**0.14**	0.01	0.01	**0.14**	**0.04**	0.02
pH	(pH units)	6.5-8.5	7.71	7.5	7.5	7.67	7.96	8.43	8.43	8.43	8.23	8.30	8.1
Total Organic Carbon	mg/L		12	4.9		16	7.3	18	18		7.1	0.4	27
Aluminum	mg/L	0.075*			**4.4**					**0.77**			
Arsenic	mg/L	0.100*			0.002					0.001			
Barium	mg/L				0.038					0.063			
Beryllium	mg/L	1.100			<0.0006					<0.0006			
Bismuth	mg/L				<0.001					<0.001			
Cadmium	mg/L	0.0002			<0.0001					0.0002			
Cobalt	mg/L	0.0009			**0.0026**					**0.0022**			
Copper	mg/L	0.005			**0.007**					**0.01**			
Lead	mg/L	0.005			0.0021					0.0009			
Molybdenum	mg/L	0.040*			0.018					0.021			
Selenium	mg/L	0.100			<0.005					<0.005			
Silver	mg/L	0.0001			*<0.0004*					*<0.0004*			
Strontium	mg/L				0.16					0.56			
Tin	mg/L				<0.002					<0.002			
Titanium	mg/L				0.054					0.018			
Total Kjeldahl Nitrogen (TKN)	mg/L				<0.7					2.4			
Total Phosphorus	mg/L	0.02*			**0.087**					**0.11**			
Vanadium	mg/L	0.006*			**0.009**					0.002			
Ion Percentage	%		2.7	11.7	43.7	54.1	1.5	16.2	1.5	25.2	16.9	2.3	4.7
Benzene	ug/L		<0.25	<0.20	<0.20	<0.25	<0.10	<0.25	<0.50	<0.20	<0.10	<0.25	<0.50
Toluene	ug/L		<0.50	<0.20	<0.20	<0.50	<0.20	<0.50	<1.0	<0.20	<0.20	<0.50	<1.0
Ethylbenzene	ug/L		<0.25	<0.20	<0.20	<0.25	<0.10	<0.25	<0.50	<0.20	<0.10	<0.25	<0.50
o-Xylene	ug/L		<0.25	<0.20	<0.20	<0.25	<0.10	<0.25	<0.50	<0.20	<0.10	<0.25	<0.50
p+m-Xylene	ug/L		<0.25	<0.20	<0.20	<0.25	<0.10	<0.25	<0.50	<0.20	<0.10	<0.25	<0.50
Total Xylenes	ug/L		<0.25	<0.20	<0.20	<0.25	<0.10	<0.25	<0.50	<0.20	<0.10	<0.25	<0.50
Total Oil & Grease	mg/L												

NOTES:

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2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Downstream station SS15 redesignated as background station SS14B as a result of grading modifications in September 2009, and was further redesignated as a station adjacent to the Poplar System in late spring of 2011.
13) Italics denotes parameter concentration was below the laboratory RDL, where the RDL exceeds the relevant PWQO.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	West Ditch Line (Poplar System) - SS14B										
Date			26-Mar-21	3-Jun-21	9-Jul-21	8-Sep-21	23-Sep-21	26-Oct-21	17-Feb-22	4-May-22	30-Aug-22	28-Sep-22	18-Oct-22
Routine/Storm Monitoring			Routine	Routine	Routine	Storm	Storm	Routine	Routine	Routine	Routine	Storm	Routine
Laboratory			Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas
Alkalinity (as $CaCO_3$)	mg/L	<25%***	160	72	120			330	120	300	68		58
Chloride	mg/L		130	41	94	33	130	120	18	84	31	7.0	14
Sulphate	mg/L		160	400	170			150	24	120	270		170
Ammonia (as N)	mg/L		0.19	0.09	0.025	0.075	0.075	0.025	2.4	0.13	0.15	0.075	<0.050
Ammonia Unionized	mg/L	0.02	0.0020	0.0019	<0.0068			<0.0015	0.0084	**0.03**	0.01		<0.0011
Nitrate	mg/L		9.91	0.48	0.05	0.30	2.64	0.15	0.63	0.05	0.05	0.24	0.27
Nitrite	mg/L					0.031	0.027					<0.010	
Phenols	mg/L	0.001	<0.0010	**0.0011**	<0.0010			<0.0010	**0.0012**	<0.0010	**0.0020**		<0.0010
Boron	mg/L	0.200	**0.71**	0.14	**0.82**	0.13	**0.89**	**0.92**	**0.29**	**0.98**	0.20	0.05	0.09
Calcium	mg/L		110	120	75	85	160	130	42	100	130	52	87
Chromium	mg/L	0.0089	0.007	<0.005	0.005	<0.005	**0.017**	<0.005	<0.005	<0.005	**0.010**	**0.016**	**0.027**
Iron	mg/L	0.300	**6.4**	**2.1**	**4.2**	**2.0**	**16**	**0.9**	**4.2**	**2.5**	**9.3**	**16**	**25**
Magnesium	mg/L		34	43	27	31	46	38	11	32	38	19	28
Potassium	mg/L		13	4.4	8	5.7	11	9.3	10	6.5	7.2	4.6	8
Sodium	mg/L		72	28	58	21	76	74	13	61	19	5.9	10
Nickel	mg/L	0.025	0.018	0.004	0.012	0.004	**0.030**	0.009	0.008	0.011	0.015	0.022	**0.038**
Zinc	mg/L	0.020	0.02	<0.01	0.01	<0.01	**0.04**	<0.01	**0.03**	<0.01	0.02	**0.04**	**0.07**
pH	(pH units)	6.5-8.5	7.8	7.6	8.5	8.1	8.2	8.2	7.5	**8.8**	8.1	8.1	8.1
Total Organic Carbon	mg/L		22	5	13			13	16	13	10		7.7
Aluminum	mg/L	0.075*				**1.5**	**9.1**					**9.1**	
Arsenic	mg/L	0.100*				0.001	0.005					0.005	
Barium	mg/L					0.026	0.11					0.056	
Beryllium	mg/L	1.100				<0.0006	<0.0006					<0.0006	
Bismuth	mg/L					<0.001	<0.001					<0.001	
Cadmium	mg/L	0.0002				<0.0001	0.0001					<0.0001	
Cobalt	mg/L	0.0009				**0.0011**	**0.0074**					**0.006**	
Copper	mg/L	0.005				**0.006**	**0.019**					**0.013**	
Lead	mg/L	0.005				0.0009	**0.0061**					**0.0053**	
Molybdenum	mg/L	0.040*				0.023	0.011					0.016	
Selenium	mg/L	0.100				<0.005	<0.005					<0.005	
Silver	mg/L	0.0001				*<0.0004*	*<0.0004*					<0.0004	
Strontium	mg/L					0.43	0.57					0.22	
Tin	mg/L					<0.002	<0.002					<0.002	
Titanium	mg/L					0.025	0.13					0.1	
Total Kjeldahl Nitrogen (TKN)	mg/L					<0.7	1.3					<0.7	
Total Phosphorus	mg/L	0.02*				**0.048**	**0.33**					**0.17**	
Vanadium	mg/L	0.006*				0.003	**0.018**					**0.018**	
Ion Percentage	%		3.6	0.3	0.2	39.5	30.8	0.1	3.1	1.1	7.5	45.9	8.9
Benzene	ug/L		<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Toluene	ug/L		<0.50	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	ug/L		<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
o-Xylene	ug/L		<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
p+m-Xylene	ug/L		<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Xylenes	ug/L		<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Oil & Grease	mg/L												

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
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8) BOD denotes biological oxygen demand.
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10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Downstream station SS15 redesignated as background station SS14B as a result of grading modifications in September 2009, and was further redesignated as a station adjacent to the Poplar System in late spring of 2011.
13) Italics denotes parameter concentration was below the laboratory RDL, where the RDL exceeds the relevant PWQO.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	West Ditch Line (Poplar System) - SS14B										
Date			**10-Feb-23**	**4-Apr-23**	**3-Jul-23**	**7-Jul-23**	**13-Jul-23**	**2-Nov-23**					
Routine/Storm Monitoring			**Routine**	**Routine**	**Routine**	**Storm**	**Storm**	**Storm**					
Laboratory			**Bureau Veritas**	**Bureau Veritas**	**Bureau Veritas**	**Bureau Veritas**	**Bureau Veritas**	**Bureau Veritas**					
Alkalinity (as $CaCO_3$)	mg/L	<25%***	220	160	32			180					
Chloride	mg/L		110	25	16	31	41	110					
Sulphate	mg/L		200	45	140			320					
Ammonia (as N)	mg/L		0.065	0.45	<0.050	<0.15	<0.15	<0.050					
Ammonia Unionized	mg/L	0.02	0.0021	0.0063	<0.009			<0.00061					
Nitrate	mg/L		2.65	0.20	1.11	0.99	1.17	2.4					
Nitrite	mg/L					0.409	0.037						
Phenols	mg/L	0.001	<0.0010	<0.0010	0.0013			<0.0010					
Boron	mg/L	0.200	**0.48**	**0.49**	0.14	**0.27**	**1.3**	**0.45**					
Calcium	mg/L		120	69	79	120	98	79					
Chromium	mg/L	0.0089	<0.005	**0.011**	<0.005	<0.005	<0.005	**0.011**					
Iron	mg/L	0.300	**0.4**	**11**	**2.5**	**0.5**	**1.5**	**10**					
Magnesium	mg/L		40	19	31	52	29	31					
Potassium	mg/L		7.7	6.9	3.1	3.3	11	6.5					
Sodium	mg/L		68	27	22	34	72	42					
Nickel	mg/L	0.025	0.006	0.018	0.005	0.003	0.009	0.018					
Zinc	mg/L	0.020	<0.01	**0.03**	<0.01	<0.01	<0.01	**0.03**					
pH	(pH units)	6.5-8.5	8.4	7.8	8.3	8.4	8.3	6.9					
Total Organic Carbon	mg/L		7.9	10	4.6			9					
Aluminum	mg/L	0.075*				**0.40**	**0.85**						
Arsenic	mg/L	0.100*				0.001	0.002						
Barium	mg/L					0.029	0.05						
Beryllium	mg/L	1.100				<0.0006	<0.0006						
Bismuth	mg/L					<0.001	<0.001						
Cadmium	mg/L	0.0002				<0.0001	<0.0001						
Cobalt	mg/L	0.0009				0.0005	**0.0012**						
Copper	mg/L	0.005				0.003	**0.009**						
Lead	mg/L	0.005				<0.0005	0.0008						
Molybdenum	mg/L	0.040*				0.034	0.009						
Selenium	mg/L	0.100				<0.005	<0.005						
Silver	mg/L	0.0001				*<0.0004*	<0.0004						
Strontium	mg/L					0.59	0.43						
Tin	mg/L					<0.002	<0.002						
Titanium	mg/L					0.008	0.018						
Total Kjeldahl Nitrogen (TKN)	mg/L					<0.7	1.3						
Total Phosphorus	mg/L	0.02*				**0.039**	**0.086**						
Vanadium	mg/L	0.006*				0.001	0.002						
Ion Percentage	%		1.6	7.1	15.3	43.2	40.3	11.7					
Benzene	ug/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10					
Toluene	ug/L		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20					
Ethylbenzene	ug/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10					
o-Xylene	ug/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10					
p+m-Xylene	ug/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10					
Total Xylenes	ug/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10					
Total Oil & Grease	mg/L												

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Downstream station SS15 redesignated as background station SS14B as a result of grading modifications in September 2009, and was further redesignated as a station adjacent to the Poplar System in late spring of 2011.
13) Italics denotes parameter concentration was below the laboratory RDL, where the RDL exceeds the relevant PWQO.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	Inlet Point to Sedimentation Pond 1 (Poplar System) - SS15A										
Date			3-Oct-09	10-Oct-09	25-Jan-10	6-Apr-10	6-Jun-10	5-Aug-10	14-Oct-10	28-Feb-11	20-Apr-11	7-Jun-11	9-Aug-11
Routine/Storm Monitoring			Routine	Storm	Routine	Routine	Storm	Routine	Storm	Routine	Routine	Storm	Storm
Laboratory			Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam
Alkalinity (as $CaCO_3$)	mg/L	<25%***	118		101	116		167	88	115	160		123
Chloride	mg/L		24	39	15	18	8	18	14	19	20	5	12
Sulphate	mg/L		260		73	180		230	180	91	140		310
Ammonia (as N)	mg/L		0.075	0.075	0.075	0.870	0.240	0.075	0.075	0.640	0.075	0.075	0.075
Ammonia Unionized	mg/L	0.02	<0.02		<0.02	<0.02		<0.02	<0.02	<0.02	<0.02		<0.02
Nitrate	mg/L		0.4	1.8	1.7	2.4	0.9	0.05	0.4	1.9	0.8	0.02	0.1
Nitrite	mg/L			0.02					0.01			0.3	0.03
Phenols	mg/L	0.001	<0.001		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001		
Boron	mg/L	0.200	0.11	**0.21**	0.17	**0.5**	0.15	**0.31**	0.16	**0.26**	**0.38**	0.14	**0.32**
Calcium	mg/L		100	94	50	530	150	120	250	56	88	48	130
Chromium	mg/L	0.0089	<0.005	<0.005	<0.005	**0.31**	**0.057**	<0.005	**0.080**	<0.005	0.007	**0.030**	<0.005
Iron	mg/L	0.300	**2.2**	**2.7**	**2.5**	**310**	**59**	**1.0**	**84**	**1.4**	**3.6**	**31**	**0.4**
Magnesium	mg/L		32	28	15	150	40	29	61	19	29	16	27
Potassium	mg/L		5.4	5.8	5.2	41	10	6.8	16	4.5	5.5	6.9	6.6
Sodium	mg/L		17	19	12	22	8.9	16	9.2	16	21	4.5	16
Nickel	mg/L	0.025	0.004	0.004	0.004	**0.42**	**0.083**	0.002	**0.11**	0.003	0.011	**0.041**	0.002
Zinc	mg/L	0.020	0.006	<0.01	0.013	**0.76**	**0.13**	<0.005	**0.20**	0.012	**0.025**	**0.08**	<0.005
pH	(pH units)	6.5-8.5	7.72	8.26	**8.83**	7.94	7.98	7.73	8.10	7.70	8.01	7.23	8.16
Total Organic Carbon	mg/L		6.6		6.5	16.7		13.2	9.3	6.5	14.0		10.4
Aluminum	mg/L	0.075*		**2.0**			**32**		**45**			**19**	**0.45**
Arsenic	mg/L	0.100*		0.001			0.015		0.019			0.009	0.001
Barium	mg/L			0.043			0.18		0.26			0.12	0.05
Beryllium	mg/L	1.100		<0.0006			0.0017		0.0022			0.0011	<0.0005
Bismuth	mg/L			<0.001			<0.001		<0.001			<0.001	<0.001
Cadmium	mg/L	0.0002		<0.001			0.0002		**0.0005**			0.0002	<0.0001
Cobalt	mg/L	0.0009		**0.0010**			**0.025**		**0.033**			**0.012**	<0.0005
Copper	mg/L	0.005		0.005			**0.044**		**0.054**			**0.021**	0.005
Lead	mg/L	0.005		0.0011			**0.022**		**0.033**			**0.014**	<0.0005
Molybdenum	mg/L	0.040*		0.009			0.020		0.017			0.008	0.014
Selenium	mg/L	0.100		<0.005			<0.005		<0.005			<0.005	<0.002
Silver	mg/L	0.0001		<0.0001			<0.0001		0.0001			<0.0001	
Strontium	mg/L			0.39			0.39		0.47			0.15	0.43
Tin	mg/L			<0.002			<0.002		<0.002			<0.002	<0.001
Titanium	mg/L			0.037			0.66		0.72			0.35	0.015
Total Kjeldahl Nitrogen (TKN)	mg/L			1.5			4		5			7	1.5
Total Phosphorus	mg/L	0.02*		**0.12**			**1.0**		**1.6**			**1.0**	**0.086**
Vanadium	mg/L	0.006*		0.004			**0.063**		**0.085**			**0.037**	0.0014
Ion Percentage	%		1.4		5.1	36.9		3.6	26.6	2.2	4.1		0.7
Benzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	ug/L		<0.3	<0.2	<0.3	<0.3	<0.2	<0.3	<0.2	<0.3	<0.3	<0.2	<0.3
Ethylbenzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-Xylene	ug/L		<0.3	<0.2	<0.3	<0.3	<0.2	<0.6	<0.2	<0.3	<0.3	<0.2	<0.3
p+m-Xylene	ug/L		<0.6	<0.4	<0.6	<0.6	<0.4	<0.3	<0.4	<0.6	<0.6	<0.4	<0.6
Total Xylenes	ug/L		<0.6	<0.4			<0.4		<0.4			<0.4	<0.6
Total Oil & Grease	mg/L			<0.5			<0.5		<1			<0.5	

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	Inlet Point to Sedimentation Pond 1 (Poplar System) - SS15A										
Date			13-Oct-11	13-Mar-12	4-May-12	28-Jul-12	30-Oct-12	13-Jan-13	10-Apr-13	29-May-13	5-Jul-13	28-Aug-13	7-Oct-13
Routine/Storm Monitoring			Routine	Routine	Routine	Routine	Routine	Routine	Routine	Storm	Routine	Storm	Routine
Laboratory			Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam
Alkalinity (as $CaCO_3$)	mg/L	<25%***	191	140	95	82	81	120	100		82		180
Chloride	mg/L		20	15	28	11	19	14	11	10	13	21	44
Sulphate	mg/L		140	130	200	120	84	87	79		110		110
Ammonia (as N)	mg/L		0.075	0.075	0.075	0.075	0.20	0.075	0.075	0.70	0.075	0.075	1.69
Ammonia Unionized	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.015		**0.12**
Nitrate	mg/L		0.5	1.2	4.9	1.1	2.3	0.62	0.82	1.6	0.34	0.05	0.42
Nitrite	mg/L									0.11		<0.010	
Phenols	mg/L	0.001	**0.012**	**0.0023**	<0.0010	**0.0041**	<0.0010	<0.0010	<0.0010		<0.0010		**0.0011**
Boron	mg/L	0.200	**0.26**	**0.29**	**0.38**	**0.21**	0.18	0.20	**0.26**	**0.32**	**0.29**	**0.39**	**0.91**
Calcium	mg/L		93	78	86	73	56	59	110	59	60	63	78
Chromium	mg/L	0.0089	0.005	**0.012**	<0.0050	**0.015**	**0.027**	0.0073	**0.042**	<0.005	<0.0050	<0.005	<0.0050
Iron	mg/L	0.300	**4.0**	**12**	**2.7**	**15**	**27**	**6.8**	**43**	**3.6**	**3.9**	**2.8**	**2.1**
Magnesium	mg/L		24	24	24	19	19	18	30	15	16	22	23
Potassium	mg/L		13	6.5	5.7	6.2	8.7	5.5	8.9	5.7	6.5	5.2	11
Sodium	mg/L		14	14	15	11	13	13	12	11	13	12	41
Nickel	mg/L	0.025	0.016	0.016	0.005	0.021	**0.033**	0.0090	**0.059**	0.007	0.0065	0.005	0.0065
Zinc	mg/L	0.020	**0.021**	**0.031**	0.010	**0.039**	**0.070**	**0.021**	**0.11**	0.02	0.015	<0.01	0.011
pH	(pH units)	6.5-8.5	6.87	8.28	7.39	7.36	7.65	7.88	7.16		8.2	7.9	8.13
Total Organic Carbon	mg/L		29.5	17	14.0	12.0	17	11	8.8		8.7		15
Aluminum	mg/L	0.075*								**2.6**		**4.5**	
Arsenic	mg/L	0.100*								0.002		0.002	
Barium	mg/L									0.036		0.054	
Beryllium	mg/L	1.100								<0.0006		<0.0006	
Bismuth	mg/L									<0.0010		<0.0010	
Cadmium	mg/L	0.0002								<0.0001		<0.0001	
Cobalt	mg/L	0.0009								**0.0015**		**0.0012**	
Copper	mg/L	0.005								**0.007**		**0.007**	
Lead	mg/L	0.005								0.0017		0.0011	
Molybdenum	mg/L	0.040*								0.007		0.014	
Selenium	mg/L	0.100								<0.005		<0.005	
Silver	mg/L	0.0001								<0.00010		<0.00010	
Strontium	mg/L									0.18		0.33	
Tin	mg/L									<0.002		<0.002	
Titanium	mg/L									0.045		0.16	
Total Kjeldahl Nitrogen (TKN)	mg/L									1.9		1.5	
Total Phosphorus	mg/L	0.02*								**0.10**		**0.2**	
Vanadium	mg/L	0.006*								0.005		0.01	
Ion Percentage	%		0.9	2.9	0.7	6.9	7.0	2.8	19.3		4.0		2.4
Benzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.20	<0.2	<0.20	<0.2
Toluene	ug/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.20	<0.3	<0.20	<0.3
Ethylbenzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.20	<0.2	<0.20	<0.2
o-Xylene	ug/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.20	<0.3	<0.20	<0.3
p+m-Xylene	ug/L		<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.40	<0.6	<0.40	<0.6
Total Xylenes	ug/L												
Total Oil & Grease	mg/L												

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	Inlet Point to Sedimentation Pond 1 (Poplar System) - SS15A										
Date			**11-Jan-14**	**8-Apr-14**	**7-Jul-14**	**15-Oct-14**	**4-Jan-15**	**10-Apr-15**	**25-Oct-15**	**25-Feb-16**	**7-Apr-16**	**14-Jul-16**	**12-Jan-17**
Routine/Storm Monitoring			**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**
Laboratory			**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**
Alkalinity (as $CaCO_3$)	mg/L	<25%***	60		61	150	71	170	51	130	150	77	110
Chloride	mg/L		11	26	6	28	9	11	8.2	6.9	5.8	8.4	13
Sulphate	mg/L		46	120	68	56	33	60	900	92	70	120	40
Ammonia (as N)	mg/L		0.58	0.075	0.19	0.075	0.27	0.075	0.35	0.08	0.075	0.075	0.42
Ammonia Unionized	mg/L	0.02	0.0055	<0.0019	0.0085	<0.0021	0.0031	<0.0057	0.0051	<0.0013	<0.0018	<0.0044	0.0009
Nitrate	mg/L		1.60	0.79	0.47	0.05	1.02	0.35	1.67	1.00	0.37	1.15	1.23
Nitrite	mg/L												
Phenols	mg/L	0.001	**0.002**	**0.006**	**0.002**	**0.013**	**0.0083**	<0.0010	<0.0010	<0.0010	<0.0010	*<0.0040*	*<0.0040*
Boron	mg/L	0.200	0.095	**0.28**	0.19	0.19	0.099	0.12	0.13	0.11	0.12	0.18	0.13
Calcium	mg/L		30	80	41	67	32	63	250	63	64	62	50
Chromium	mg/L	0.0089	<0.0050	0.005	**0.033**	0.0057	<0.0050	<0.0050	<0.005	<0.0050	**0.013**	**0.009**	**0.027**
Iron	mg/L	0.300	**0.36**	**2.90**	**30**	**4.7**	**2.0**	**3.2**	0.20	**2.4**	**6.6**	**7.9**	**23**
Magnesium	mg/L		8.3	24	14	27	8.4	17	88	18	19	14	16
Potassium	mg/L		7.8	6.2	8.4	17	9.3	5.2	2.6	4.8	6.3	4.6	12
Sodium	mg/L		6.3	17	4.9	8.0	4	5.8	14	6.6	6.7	8.0	4.8
Nickel	mg/L	0.025	0.001	0.0078	**0.038**	0.0079	0.003	0.0047	0.002	0.0038	0.0086	0.012	**0.030**
Zinc	mg/L	0.020	0.012	0.011	**0.077**	**0.021**	0.014	0.010	<0.02	0.0069	0.019	0.020	**0.060**
pH	(pH units)	6.5-8.5	7.82	7.87	7.88	7.74	8.02	8.27	7.84	7.99	7.98	7.76	7.29
Total Organic Carbon	mg/L		7.4	10	18.0	42	11	9.9	7.6	6.4	10	6.7	15
Aluminum	mg/L	0.075*											
Arsenic	mg/L	0.100*											
Barium	mg/L												
Beryllium	mg/L	1.100											
Bismuth	mg/L												
Cadmium	mg/L	0.0002											
Cobalt	mg/L	0.0009											
Copper	mg/L	0.005											
Lead	mg/L	0.005											
Molybdenum	mg/L	0.040*											
Selenium	mg/L	0.100											
Silver	mg/L	0.0001											
Strontium	mg/L												
Tin	mg/L												
Titanium	mg/L												
Total Kjeldahl Nitrogen (TKN)	mg/L												
Total Phosphorus	mg/L	0.02*											
Vanadium	mg/L	0.006*											
Ion Percentage	%		1.9		6.6	6.5	3.5	0.2	0.3	1.7	3.1	2.4	6.4
Benzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.10	<0.10
Toluene	ug/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.20	<0.20
Ethylbenzene	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.10	<0.10
o-Xylene	ug/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.10	<0.10
p+m-Xylene	ug/L		<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.10	<0.10
Total Xylenes	ug/L											<0.10	<0.10
Total Oil & Grease	mg/L												

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Italics denotes parameter concentration was below the laboratory RDL, where the RDL exceeds the relevant PWQO.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	Inlet Point to Sedimentation Pond 1 (Poplar System) - SS15A										
Date			**6-Apr-17**	**13-Jul-17**	**28-Oct-17**	**23-Jan-18**	**4-Apr-18**	**8-Aug-18**	**8-Aug-18**	**26-Sep-18**	**2-Oct-18**	**24-Jan-19**	**17-Apr-19**
Routine/Storm Monitoring			**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Routine**	**Storm**	**Storm**	**Routine**	**Routine**	**Routine**
Laboratory			**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**	**Maxxam**
Alkalinity (as $CaCO_3$)	mg/L	<25%***	220	84	100	120	170	80			180	77	210
Chloride	mg/L		33	2.9	15	10	12	7.6	7.4	7.9	28	12	28
Sulphate	mg/L		160	77	160	110	120	150			110	26	160
Ammonia (as N)	mg/L		0.075	0.55	0.03	0.13	0.16	0.025	0.025	0.025	0.025	0.9	0.025
Ammonia Unionized	mg/L	0.02	<0.0016	0.04	<0.0005	0.0032	0.0006	<0.0005			<0.00061	0.00087	<0.008
Nitrate	mg/L		0.52	1.04	2.73	3.14	1.22	5.28	4.83	0.05	2.75	0.88	0.90
Nitrite	mg/L								0.196	<0.010			
Phenols	mg/L	0.001	*<0.0040*	*<0.0040*	<0.0010	0.001	<0.0010	<0.0010			<0.0010	**0.0014**	<0.0010
Boron	mg/L	0.200	0.19	0.25	0.15	0.12	**0.26**	**0.33**	**0.34**	0.16	0.26	0.06	**0.29**
Calcium	mg/L		110	76	81	64	86	79	78	59	78	26	92
Chromium	mg/L	0.0089	<0.005	0.037	0.008	0.008	**0.012**	0.008	**0.009**	<0.005	<0.005	<0.005	<0.005
Iron	mg/L	0.300	**2.00**	**38**	**5.5**	**7.7**	**12**	**7.3**	**7.3**	**1.60**	3.8	**0.6**	**0.7**
Magnesium	mg/L		33	21	22	21	27	19	18	16	23	7.1	32
Potassium	mg/L		6.8	7.6	5.6	4.5	5.6	6	6.4	5.5	6.5	10	4.6
Sodium	mg/L		18	5.8	10	7.8	12	9.9	9.4	7.1	14	4.2	16
Nickel	mg/L	0.025	0.004	**0.051**	0.008	0.01	0.015	0.0110	0.011	0.003	0.007	0.001	0.003
Zinc	mg/L	0.020	0.020	**0.10**	0.02	0.02	**0.04**	0.020	0.02	<0.01	0.01	0.01	<0.01
pH	(pH units)	6.5-8.5	7.81	8.1	7.05	8.31	7.49	7.1	7.1	7.14	7.15	6.98	**8.63**
Total Organic Carbon	mg/L		11	14	10	8.4	12	11			13	12	10
Aluminum	mg/L	0.075*							**5.8**	**1**			
Arsenic	mg/L	0.100*							0.003	0.001			
Barium	mg/L								0.052	0.028			
Beryllium	mg/L	1.100							<0.0006	<0.0006			
Bismuth	mg/L								<0.001	<0.001			
Cadmium	mg/L	0.0002							<0.0001	<0.0001			
Cobalt	mg/L	0.0009							**0.0028**	0.0006			
Copper	mg/L	0.005							**0.008**	0.004			
Lead	mg/L	0.005							0.0029	0.0007			
Molybdenum	mg/L	0.040*							0.009	0.007			
Selenium	mg/L	0.100							<0.005	<0.005			
Silver	mg/L	0.0001							*<0.0004*	*<0.0004*			
Strontium	mg/L								0.26	0.22			
Tin	mg/L								<0.002	<0.002			
Titanium	mg/L								0.15	0.016			
Total Kjeldahl Nitrogen (TKN)	mg/L								<0.7	<0.7			
Total Phosphorus	mg/L	0.02*							**0.18**	**0.066**			
Vanadium	mg/L	0.006*							**0.012**	0.003			
Ion Percentage	%		1.4	14.4	2.8	2.0	3.6	5.3	46.6	45.5	0.5	1.1	1.0
Benzene	ug/L		<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.25	<0.25	<0.25
Toluene	ug/L		<0.20	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20	<0.50	<0.50	<0.50
Ethylbenzene	ug/L		<0.10	<0.20	<0.20	<0.10	<0.20	<0.20	<0.20	<0.20	<0.25	<0.25	<0.25
o-Xylene	ug/L		<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.25	<0.25	<0.25
p+m-Xylene	ug/L		<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.25	<0.25	<0.25
Total Xylenes	ug/L		<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.25	<0.25	<0.25
Total Oil & Grease	mg/L												

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Italics denotes parameter concentration was below the laboratory RDL, where the RDL exceeds the relevant PWQO.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	Inlet Point to Sedimentation Pond 1 (Poplar System) - SS15A										
Date			2-Oct-19	2-Oct-19	11-Jan-20	18-May-20	15-Nov-20	26-Mar-21	9-Jul-21	23-Sep-21	4-Oct-21	17-Feb-22	4-May-22
Routine/Storm Monitoring			Routine	Storm	Routine	Routine	Routine	Routine	Routine	Storm	Routine	Routine	Routine
Laboratory			Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas
Alkalinity (as $CaCO_3$)	mg/L	<25%***	120		120	170	100	130	160		190	85	200
Chloride	mg/L		24	24	24	41	35	48	94	65	66	11	21
Sulphate	mg/L		90		50	110	63	120	110		140	23	79
Ammonia (as N)	mg/L		0.12	0.03	0.099	0.39	0.42	0.089	0.025	0.075	0.0025	1.3	0.12
Ammonia Unionized	mg/L	0.02	0.01		0.003	0.014	0.008	<0.00061	<0.0011		<0.0013	0.0043	0.0052
Nitrate	mg/L		1.21	1.13	1.95	4.36	7.61	5.22	5.82	4.55	1.48	0.97	1.18
Nitrite	mg/L			0.28						0.023			
Phenols	mg/L	0.001	<0.0010		0.0005	<0.0010	<0.0010	<0.0010	<0.0010		<0.0010	0.0010	<0.0010
Boron	mg/L	0.200	**0.34**	**0.33**	**0.21**	**0.56**	0.17	**0.42**	**0.26**	**0.64**	**0.77**	0.07	**0.39**
Calcium	mg/L		61	61	62	64	57	74	81	76	92	33	70
Chromium	mg/L	0.0089	<0.0050	<0.0050	**0.037**	0.006	0.007	**0.016**	<0.005	<0.005	<0.005	**0.020**	0.006
Iron	mg/L	0.300	**2.30**	**2.30**	**36.0**	**5.3**	**6.1**	**14**	**1.5**	**2.5**	**1.8**	**20**	**5.5**
Magnesium	mg/L		17	17	22	20	16	26	21	22	26	11	23
Potassium	mg/L		8.1	8.3	12.0	6.6	19	9.9	5.9	8.8	11	7.3	4.9
Sodium	mg/L		15	14	14.0	33	9.3	34	14	38	40	4.5	20
Nickel	mg/L	0.025	0.005	0.005	**0.044**	0.012	0.01	0.023	0.004	0.008	0.007	**0.027**	0.009
Zinc	mg/L	0.020	0.010	0.010	**0.1**	**0.030**	**0.040**	**0.04**	0.005	0.01	<0.01	**0.05**	0.02
pH	(pH units)	6.5-8.5	8.0	7.9	8.3	8.1	7.9	7.5	7.7	7.8	7.7	7.4	8.1
Total Organic Carbon	mg/L		11		9.7	20	34	25	12		15	17	12
Aluminum	mg/L	0.075*		**1.40**						**1.8**			
Arsenic	mg/L	0.100*		0.002						0.001			
Barium	mg/L			0.035						0.046			
Beryllium	mg/L	1.100		<0.0006						<0.0006			
Bismuth	mg/L			<0.001						<0.001			
Cadmium	mg/L	0.0002		<0.0001						<0.0001			
Cobalt	mg/L	0.0009		**0.0011**						**0.0011**			
Copper	mg/L	0.005		0.005						**0.006**			
Lead	mg/L	0.005		0.001						0.0009			
Molybdenum	mg/L	0.040*		0.009						0.006			
Selenium	mg/L	0.100		<0.005						<0.005			
Silver	mg/L	0.0001		*<0.0004*						*<0.0004*			
Strontium	mg/L			0.22						0.27			
Tin	mg/L			<0.002						<0.002			
Titanium	mg/L			0.027						0.027			
Total Kjeldahl Nitrogen (TKN)	mg/L			0.8						1.2			
Total Phosphorus	mg/L	0.02*		**0.11**						**0.15**			
Vanadium	mg/L	0.006*		0.003						0.004			
Ion Percentage	%		1.7	38.7	9.0	1.7	4.2	4.0	5.7	30.4	0.5	4.4	0.6
Benzene	ug/L		<0.50	<0.20	<0.10	<0.25	<0.50	<0.25	<0.10	<0.10	<0.25	<0.10	<0.10
Toluene	ug/L		<1.0	<0.20	<0.20	<0.50	<1.0	<0.50	<0.20	<0.20	<0.50	<0.20	<0.20
Ethylbenzene	ug/L		<0.50	<0.20	<0.10	<0.25	<0.50	<0.25	<0.10	<0.10	<0.25	<0.10	<0.10
o-Xylene	ug/L		<0.50	<0.20	<0.10	<0.25	<0.50	<0.25	<0.10	<0.10	<0.25	<0.10	<0.10
p+m-Xylene	ug/L		<0.50	<0.20	<0.10	<0.25	<0.50	<0.25	<0.10	<0.10	<0.25	<0.10	<0.10
Total Xylenes	ug/L		<0.50	<0.20	<0.10	<0.25	<0.50	<0.25	<0.10	<0.10	<0.25	<0.10	<0.10
Total Oil & Grease	mg/L												

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
7) umho/cm denotes microsiemens per centimeter.
8) BOD denotes biological oxygen demand.
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10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Italics denotes parameter concentration was below the laboratory RDL, where the RDL exceeds the relevant PWQO.

Table J-2
Precipitation Event Surface Water Quality - Poplar System
Twin Creeks Environmental Centre - Poplar System

Parameter	Units	PWQO	Inlet Point to Sedimentation Pond 1 (Poplar System) - SS15A										
Date			4-Aug-22	4-Aug-22	28-Sep-22	18-Oct-22	10-Feb-23	4-Apr-23	3-Jul-23	7-Jul-23	13-Jul-23	2-Nov-23	
Routine/Storm Monitoring			Routine	Storm	Storm	Routine	Routine	Routine	Routine	Storm	Storm	Routine	
Laboratory			Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	Bureau Veritas	
Alkalinity (as $CaCO_3$)	mg/L	<25%***	88			76	170	110	130			220	
Chloride	mg/L		13	13	14	8.4	27	7.4	11	9.1	7.1	63	
Sulphate	mg/L		220			240	130	33	100			130	
Ammonia (as N)	mg/L		0.074	0.075	0.075	<0.050	0.14	0.054	<0.050	<0.15	<0.15	<0.050	
Ammonia Unionized	mg/L	0.02	0.002			<0.0011	0.0014	<0.00061	<0.0049			<0.00061	
Nitrate	mg/L		2.19	2.34	0.38	0.29	1.62	0.42	0.26	7.8	3.85	1.43	
Nitrite	mg/L			0.153	0.011					0.127	0.073		
Phenols	mg/L	0.001	0.0012			<0.0010	<0.0010	<0.0010	0.0014			<0.0010	
Boron	mg/L	0.200	**0.24**	**0.23**	0.15	0.1	**0.32**	**0.24**	**0.42**	**0.28**	**0.30**	**1.4**	
Calcium	mg/L		180	90	49	87	84	59	110	71	56	110	
Chromium	mg/L	0.0089	**0.023**	<0.005	**0.010**	0.006	<0.005	**0.050**	**0.021**	<0.005	**0.039**	<0.005	
Iron	mg/L	0.300	**23**	**4.3**	**9.4**	**5.7**	**4.3**	**50**	**21**	**3.5**	**39**	**0.9**	
Magnesium	mg/L		39	21	13	26	27	22	26	16	20	35	
Potassium	mg/L		9.4	6.9	6.9	6.3	5.1	7.4	8.1	4.1	8.8	13	
Sodium	mg/L		12	12	6.8	8.5	24	11	14	11	14	100	
Nickel	mg/L	0.025	**0.033**	0.008	0.014	0.009	0.007	**0.066**	**0.030**	0.006	**0.049**	0.012	
Zinc	mg/L	0.020	**0.05**	0.01	**0.03**	0.02	0.01	**0.12**	**0.06**	<0.01	**0.10**	**0.07**	
pH	(pH units)	6.5-8.5	7.5	7.5	7.8	8.1	7.9	7.2	8.1	7.8	7.5	6.7	
Total Organic Carbon	mg/L		11			8.4	7.5	17	8.7			11	
Aluminum	mg/L	0.075*		**2.8**	**5.7**					**2.7**	**25**		
Arsenic	mg/L	0.100*		0.002	0.003					0.002	0.009		
Barium	mg/L			0.036	0.039					0.04	0.17		
Beryllium	mg/L	1.100		<0.0006	<0.0006					<0.0006	0.0014		
Bismuth	mg/L			<0.001	<0.001					<0.001	<0.001		
Cadmium	mg/L	0.0002		<0.0001	<0.0001					<0.0001	0.0002		
Cobalt	mg/L	0.0009		**0.0023**	**0.0044**					**0.0013**	**0.013**		
Copper	mg/L	0.005		**0.007**	**0.010**					**0.006**	**0.026**		
Lead	mg/L	0.005		0.0019	0.0040					0.0013	**0.013**		
Molybdenum	mg/L	0.040*		0.01	0.007					0.006	0.007		
Selenium	mg/L	0.100		<0.005	<0.005					<0.005	<0.005		
Silver	mg/L	0.0001		*<0.0004*	*<0.0004*					*<0.0004*	*<0.0004*		
Strontium	mg/L			0.33	0.18					0.20	0.19		
Tin	mg/L			<0.002	<0.002					<0.002	<0.002		
Titanium	mg/L			0.045	0.08					0.035	0.15		
Total Kjeldahl Nitrogen (TKN)	mg/L			<0.7	<0.7					<0.7	<0.7		
Total Phosphorus	mg/L	0.02*		**0.11**	**0.17**					**0.062**	**0.23**		
Vanadium	mg/L	0.006*		0.005	**0.011**					0.005	**0.045**		
Ion Percentage	%		16.1	45.0	41.0	0.8	2.5	14.4	13.3	45.5	46.4	9.8	
Benzene	ug/L		<0.25	<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Toluene	ug/L		<0.25	<0.25	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Ethylbenzene	ug/L		<0.50	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
o-Xylene	ug/L		<0.25	<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
p+m-Xylene	ug/L		<0.25	<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Total Xylenes	ug/L		<0.25	<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Total Oil & Grease	mg/L												

NOTES:

1) PWQO denotes Provincial Water Quality Objectives (1994) with updates.
2) * denotes interim PWQO.
3) *** denotes change from background concentrations.
4) Historic chemical anomalies retained in database.
5) Unionized ammonia values are calculated based on field determined pH and temperature values.
6) mg/L denotes milligrams per litre.
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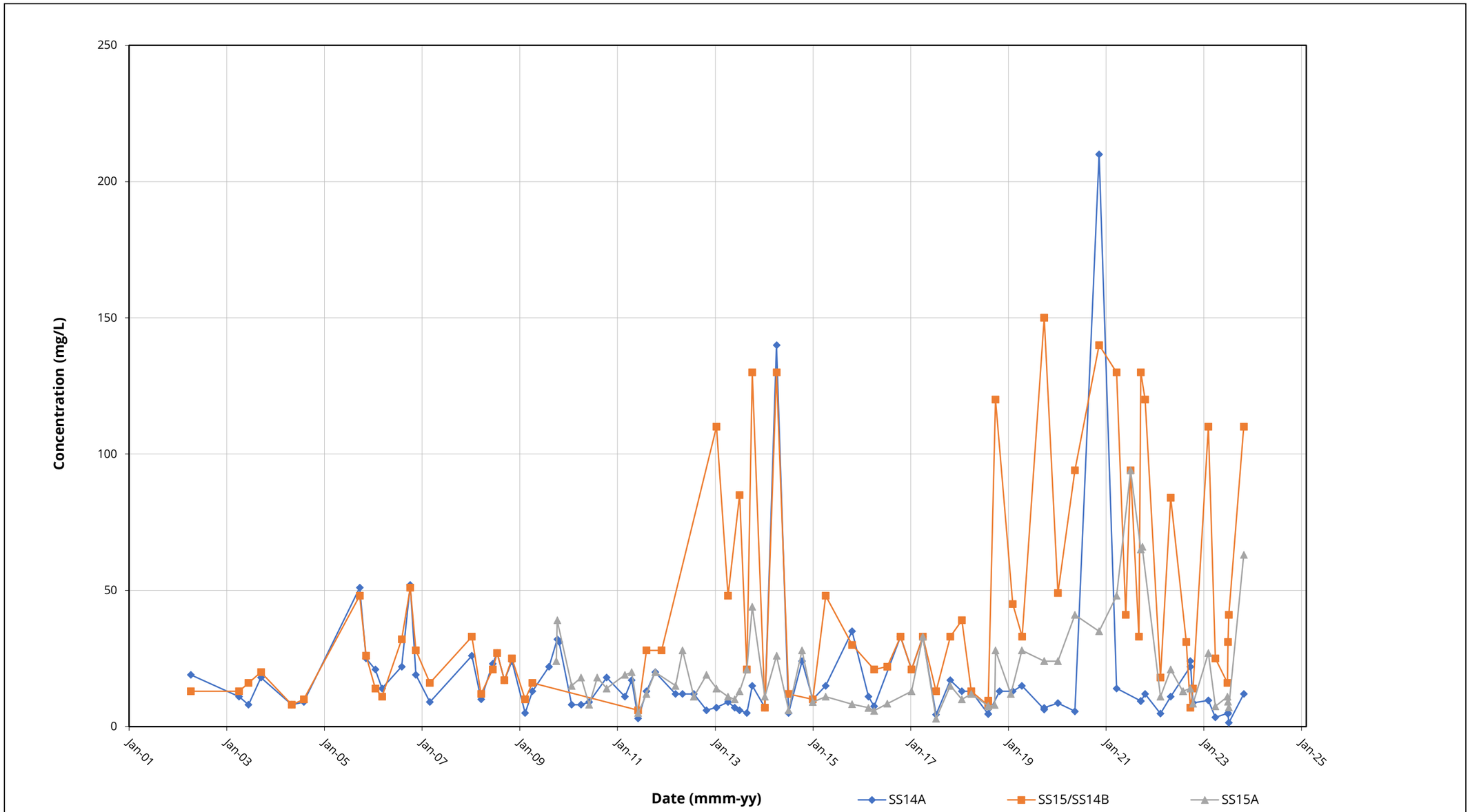
8) BOD denotes biological oxygen demand.
9) COD denotes chemical oxygen demand.
10) Blank denotes parameter not analyzed.
11) Bolded text and shading denotes concentration exceeds criterion.
12) Italics denotes parameter concentration was below the laboratory RDL, where the RDL exceeds the relevant PWQO.



NOTES:

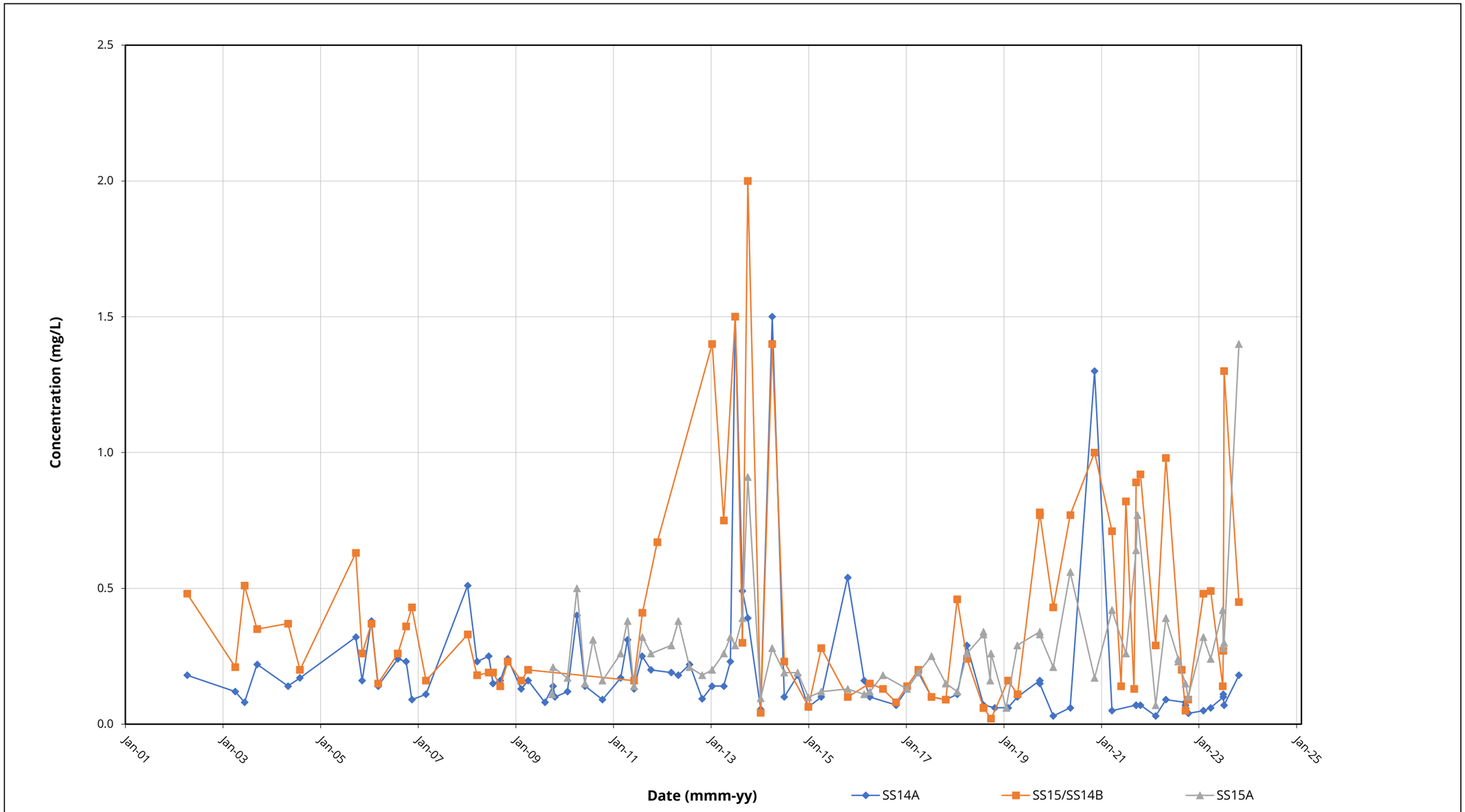
1. mg/L denotes milligrams per litre.

CONCENTRATION VS. TIME PLOT
Chloride

2023 FOURTH QUARTER & ANNUAL MONITORING REPORT

TWIN CREEKS ENVIRONMENTAL CENTRE
WASTE MANAGEMENT OF CANADA CORPORATION

FIGURE NUMBER	PROJECT NUMBER
J-1	2303459
DATE REVISED	**REVISED BY**
16-Jan-24	JMH



NOTES:

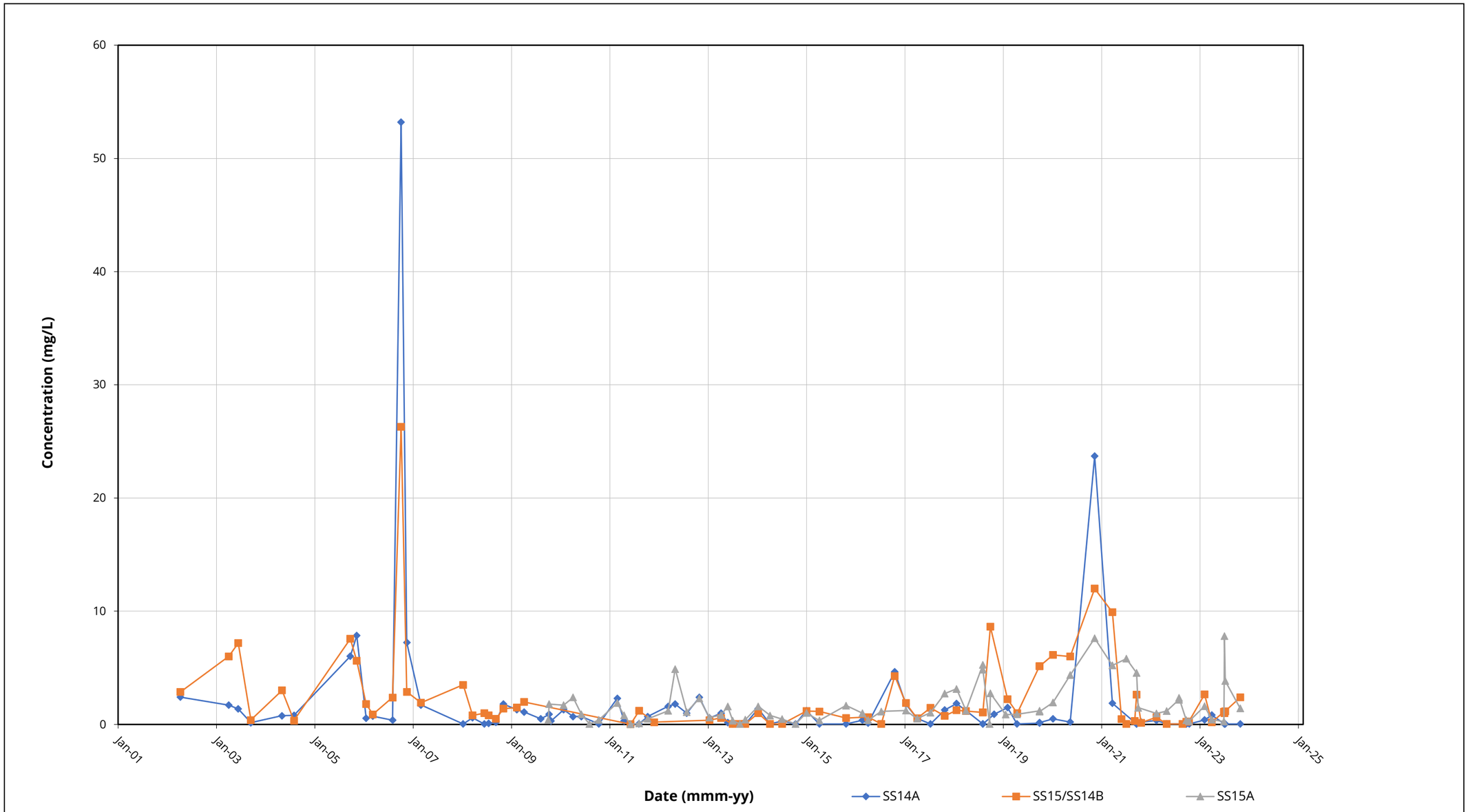
1. mg/L denotes milligrams per litre.

CONCENTRATION VS. TIME PLOT
Boron

2023 FOURTH QUARTER & ANNUAL MONITORING REPORT

TWIN CREEKS ENVIRONMENTAL CENTRE
WASTE MANAGEMENT OF CANADA CORPORATION

FIGURE NUMBER	PROJECT NUMBER
J-2	2303459
DATE REVISED	**REVISED BY**
16-Jan-24	JMH



NOTES:

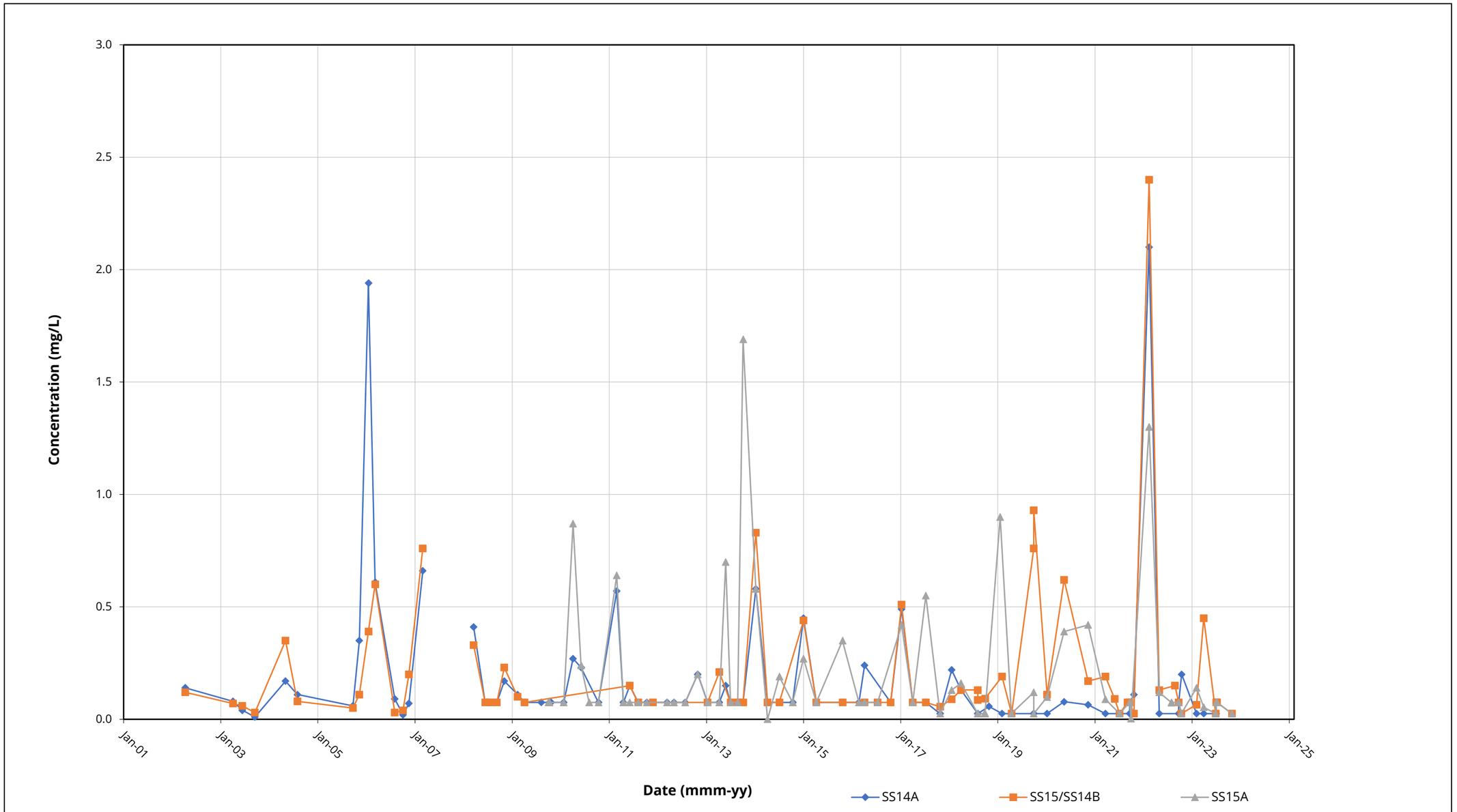
1. mg/L denotes milligrams per litre.

CONCENTRATION VS. TIME PLOT
Nitrate

2023 FOURTH QUARTER & ANNUAL MONITORING REPORT

TWIN CREEKS ENVIRONMENTAL CENTRE
WASTE MANAGEMENT OF CANADA CORPORATION

FIGURE NUMBER	PROJECT NUMBER
J-3	2303459
DATE REVISED	**REVISED BY**
16-Jan-24	JMH



NOTES:

1. mg/L denotes milligrams per litre.

CONCENTRATION VS. TIME PLOT
Ammonia

2023 FOURTH QUARTER & ANNUAL MONITORING REPORT

TWIN CREEKS ENVIRONMENTAL CENTRE
WASTE MANAGEMENT OF CANADA CORPORATION

FIGURE NUMBER	PROJECT NUMBER
J-4	2303459
DATE REVISED	**REVISED BY**
16-Jan-24	JMH

APPENDIX J-3:

2023 Certificates of Analysis

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 700
Site Location: ON07
Your C.O.C. #: TCEC-SWCM-FEB

Attention: Khalid Hussein

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/02/23
Report #: R7520210
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C344455
Received: 2023/02/15, 11:39

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	4	N/A	2023/02/16	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	3	N/A	2023/02/16	CAM SOP-00463	SM 23 4500-Cl E m
Chloride by Automated Colourimetry	1	N/A	2023/02/17	CAM SOP-00463	SM 23 4500-Cl E m
Conductance in Water - On-site	4	N/A	2023/02/17		
Field Measured Dissolved Oxygen in Water	4	N/A	2023/02/17		
Total Metals by ICPMS	4	N/A	2023/02/16	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	4	N/A	2023/02/16	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	4	N/A	2023/02/16	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Phenols (4AAP)	3	N/A	2023/02/21	CAM SOP-00444	OMOE E3179 m
Phenols (4AAP)	1	N/A	2023/02/22	CAM SOP-00444	OMOE E3179 m
Field Measured pH (2)	4	N/A	2023/02/17		Field pH Meter
Sulphate by Automated Turbidimetry	4	N/A	2023/02/17	CAM SOP-00464	SM 23 4500-SO42- E m
Field Temperature (2)	4	N/A	2023/02/17		Field Thermometer
Total Organic Carbon (TOC) (3)	2	N/A	2023/02/15	CAM SOP-00446	SM 23 5310B m
Total Organic Carbon (TOC) (3)	2	N/A	2023/02/16	CAM SOP-00446	SM 23 5310B m
Turbidity - On-site	4	N/A	2023/02/17		
Un-ionized Ammonia (4)	4	2023/02/15	2023/02/17	Auto Calc.	PWQO
Volatile Organic Compounds in Water	4	N/A	2023/02/16	CAM SOP-00226	EPA 8260C m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 700
Site Location: ON07
Your C.O.C. #: TCEC-SWCM-FEB

Attention: Khalid Hussein

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/02/23
Report #: R7520210
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C344455
Received: 2023/02/15, 11:39

otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.
(3) Total Organic Carbon (TOC) present in the sample should be considered as non-purgeable TOC.
(4) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C344455
Report Date: 2023/02/23

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: JRA

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VBJ808		VBJ809			VBJ810		
Sampling Date		2023/02/10		2023/02/10			2023/02/10		
COC Number		TCEC-SWCM-FEB		TCEC-SWCM-FEB			TCEC-SWCM-FEB		
	UNITS	SS14A	RDL	SS14B	RDL	QC Batch	SS15A	RDL	QC Batch
Calculated Parameters									
Total Un-ionized Ammonia	mg/L	<0.00076	0.00076	0.0021	0.0016	8505417	0.0014	0.00061	8505417
Field Measurements									
Field Conductivity	uS/cm	980	N/A	1330	N/A	ONSITE	820	N/A	ONSITE
Field Dissolved Oxygen	mg/L	12.8	N/A	12.6	N/A	ONSITE	12.6	N/A	ONSITE
Field Temperature	Celsius	2.4	N/A	3.3	N/A	ONSITE	2.5	N/A	ONSITE
Field Turbidity	NTU	34.2	N/A	77.8	N/A	ONSITE	141	N/A	ONSITE
Field Measured pH	pH	8.1		8.4		ONSITE	7.9		ONSITE
Inorganics									
Total Ammonia-N	mg/L	<0.050	0.050	0.065	0.050	8506988	0.14	0.050	8506988
Total Organic Carbon (TOC)	mg/L	5.7	0.40	7.9	0.40	8506601	7.5	0.40	8506601
Phenols-4AAP	mg/L	<0.0010	0.0010	<0.0010	0.0010	8514121	<0.0010	0.0010	8514121
Dissolved Sulphate (SO4)	mg/L	180	1.0	200	1.0	8507843	130	1.0	8507843
Alkalinity (Total as CaCO3)	mg/L	210	1.0	220	1.0	8506523	170	1.0	8506523
Dissolved Chloride (Cl-)	mg/L	9.6	1.0	110	1.0	8506694	27	1.0	8507963
Nitrate (N)	mg/L	0.40	0.10	2.65	0.10	8506527	1.62	0.10	8506527

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Bureau Veritas Job #: C344455
Report Date: 2023/02/23

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: JRA

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VBJ811		
Sampling Date		2023/02/10		
COC Number		TCEC-SWCM-FEB		
	UNITS	**PSSWDUP**	**RDL**	**QC Batch**
Calculated Parameters				
Total Un-ionized Ammonia	mg/L	<0.00061	0.00061	8505417
Field Measurements				
Field Conductivity	uS/cm	820	N/A	ONSITE
Field Dissolved Oxygen	mg/L	12.6	N/A	ONSITE
Field Temperature	Celsius	2.5	N/A	ONSITE
Field Turbidity	NTU	141	N/A	ONSITE
Field Measured pH	pH	7.9		ONSITE
Inorganics				
Total Ammonia-N	mg/L	0.051	0.050	8506988
Total Organic Carbon (TOC)	mg/L	8.1	0.40	8506601
Phenols-4AAP	mg/L	<0.0010	0.0010	8514121
Dissolved Sulphate (SO4)	mg/L	130	1.0	8507843
Alkalinity (Total as CaCO3)	mg/L	160	1.0	8506523
Dissolved Chloride (Cl-)	mg/L	26	1.0	8506694
Nitrate (N)	mg/L	1.51	0.10	8506527

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Bureau Veritas Job #: C344455
Report Date: 2023/02/23

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: JRA

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		VBJ808	VBJ809	VBJ810	VBJ811		
Sampling Date		2023/02/10	2023/02/10	2023/02/10	2023/02/10		
COC Number		TCEC-SWCM-FEB	TCEC-SWCM-FEB	TCEC-SWCM-FEB	TCEC-SWCM-FEB		
	UNITS	SS14A	SS14B	SS15A	PSSWDUP	RDL	QC Batch
Metals							
Total Boron (B)	mg/L	0.05	0.48	0.32	0.30	0.02	8507950
Total Calcium (Ca)	mg/L	110	120	84	84	0.2	8507950
Total Chromium (Cr)	mg/L	<0.005	<0.005	<0.005	<0.005	0.005	8507950
Total Iron (Fe)	mg/L	0.4	0.4	4.3	4.3	0.1	8507950
Total Magnesium (Mg)	mg/L	34	40	27	26	0.05	8507950
Total Nickel (Ni)	mg/L	0.001	0.006	0.007	0.007	0.001	8507950
Total Potassium (K)	mg/L	4.5	7.7	5.1	5.1	0.2	8507950
Total Sodium (Na)	mg/L	9.8	68	24	23	0.1	8507950
Total Zinc (Zn)	mg/L	<0.01	<0.01	0.01	0.01	0.01	8507950

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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VOLATILE ORGANICS BY GC/MS (WATER)

Bureau Veritas ID		VBJ808	VBJ809	VBJ810	VBJ811		
Sampling Date		2023/02/10	2023/02/10	2023/02/10	2023/02/10		
COC Number		TCEC-SWCM-FEB	TCEC-SWCM-FEB	TCEC-SWCM-FEB	TCEC-SWCM-FEB		
	UNITS	SS14A	SS14B	SS15A	PSSWDUP	RDL	QC Batch
Volatile Organics							
Benzene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8503456
Ethylbenzene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8503456
Toluene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	8503456
p+m-Xylene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8503456
o-Xylene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8503456
Total Xylenes	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8503456
Surrogate Recovery (%)							
4-Bromofluorobenzene	%	107	108	106	107		8503456
D4-1,2-Dichloroethane	%	93	94	93	92		8503456
D8-Toluene	%	99	98	97	99		8503456

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Results relate only to the items tested.

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Bureau Veritas Job #: C344455
Report Date: 2023/02/23

QUALITY ASSURANCE REPORT

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: JRA

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8503456	4-Bromofluorobenzene	2023/02/16	109	70 - 130	109	70 - 130	104	%		
8503456	D4-1,2-Dichloroethane	2023/02/16	92	70 - 130	92	70 - 130	89	%		
8503456	D8-Toluene	2023/02/16	100	70 - 130	99	70 - 130	99	%		
8503456	Benzene	2023/02/16	91	70 - 130	90	70 - 130	<0.10	ug/L	NC (1)	30
8503456	Ethylbenzene	2023/02/16	90	70 - 130	89	70 - 130	<0.10	ug/L	NC (1)	30
8503456	o-Xylene	2023/02/16	90	70 - 130	88	70 - 130	<0.10	ug/L	NC (1)	30
8503456	p+m-Xylene	2023/02/16	96	70 - 130	94	70 - 130	<0.10	ug/L	NC (1)	30
8503456	Toluene	2023/02/16	94	70 - 130	92	70 - 130	<0.20	ug/L	NC (1)	30
8503456	Total Xylenes	2023/02/16					<0.10	ug/L	NC (1)	30
8506523	Alkalinity (Total as CaCO3)	2023/02/16			99	85 - 115	<1.0	mg/L	0.0047 (1)	20
8506527	Nitrate (N)	2023/02/16	97 (2)	80 - 120	101	80 - 120	<0.10	mg/L	2.7 (3)	20
8506601	Total Organic Carbon (TOC)	2023/02/15	NC	80 - 120	97	80 - 120	<0.40	mg/L	0.91 (1)	20
8506694	Dissolved Chloride (Cl-)	2023/02/16	96 (4)	80 - 120	103	80 - 120	<1.0	mg/L	1.3 (5)	20
8506988	Total Ammonia-N	2023/02/16	101	75 - 125	97	80 - 120	<0.050	mg/L	12 (1)	20
8507843	Dissolved Sulphate (SO4)	2023/02/17	NC	75 - 125	102	80 - 120	<1.0	mg/L	1.1 (1)	20
8507950	Total Boron (B)	2023/02/16	NC	80 - 120	95	80 - 120	<0.02	mg/L		
8507950	Total Calcium (Ca)	2023/02/16	NC	80 - 120	105	80 - 120	<0.2	mg/L		
8507950	Total Chromium (Cr)	2023/02/17	99	80 - 120	101	80 - 120	<0.005	mg/L	NC (1)	20
8507950	Total Iron (Fe)	2023/02/16	96	80 - 120	102	80 - 120	<0.1	mg/L		
8507950	Total Magnesium (Mg)	2023/02/16	NC	80 - 120	103	80 - 120	<0.05	mg/L		
8507950	Total Nickel (Ni)	2023/02/17	95	80 - 120	99	80 - 120	<0.001	mg/L	4.2 (1)	20
8507950	Total Potassium (K)	2023/02/16	NC	80 - 120	106	80 - 120	<0.2	mg/L		
8507950	Total Sodium (Na)	2023/02/16	NC	80 - 120	104	80 - 120	<0.1	mg/L		
8507950	Total Zinc (Zn)	2023/02/17	99	80 - 120	107	80 - 120	<0.01	mg/L	3.6 (1)	20
8507963	Dissolved Chloride (Cl-)	2023/02/17	111	80 - 120	102	80 - 120	<1.0	mg/L	NC (1)	20

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8514121	Phenols-4AAP	2023/02/21	80	80 - 120	101	80 - 120	<0.0010	mg/L	5.4 (1)	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Matrix Spike Parent ID [VBJ810-02]

(3) Duplicate Parent ID [VBJ810-02]

(4) Matrix Spike Parent ID [VBJ808-02]

(5) Duplicate Parent ID [VBJ808-02]

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Bureau Veritas Job #: C344455
Report Date: 2023/02/23

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: JRA

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere

Cristina Carriere, Senior Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

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S2437676

FIELD INFORMATION FORM

BUREAU VERITAS

WASTE MANAGEMENT

Site Name: TCEC

Site No.: Sample: SS19A (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes. Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: [Y] or [N]

Filter Device: [Y] or [N] [0.45 µ] or [ ] µ (circle or fill in)

Purging Device: [ ] A-Submersible Pump B-Peristaltic Pump C-QED Bladder Pump D-Bailer E-Piston Pump F-Dipper/Bottle

Sampling Device: [ ]

Filter Type: [ ] A-In-line Disposable B-Pressure C-Vacuum X-Other:

X-Other:

Sample Tube Type: [ ] A-Teflon B-Stainless Steel C-PVC D-Polypropylene X-Other:

WELL DATA

Well Elevation (at TOC): (ft/msl)

Depth to Water (DTW) (from TOC): (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC): (ft msl)

Total Well Depth (from TOC): (ft)

Stick Up (from ground elevation): (ft)

Casing ID: (in)

Casing Material:

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e., complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
02 10 23	8.1	0.98	2.4	34.2	12.8		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

Sample Appearance: transparent Odor: N/O Color: clear Other:

Weather Conditions (required daily, or as conditions change): 2-C Direction/Speed: 25 Km/h NW Outlook: overcast Precipitation: Y or (N)

Specific Comments (including purge/well volume calculations if required):

FIELD COMMENTS

Depth: 10 cm Flow: 60 sec

Width: 2cm 55 sec

63 sec

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
02/10/23	Eric Wilson	E.Wilson	RWDI

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 06/20

0584

S2437676

BUREAU VERITAS

FIELD INFORMATION FORM

WASTE MANAGEMENT

Site Name: TLEC

Site No.: Sample: S511 4B (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes. Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: [Y] or [N]

Filter Device: [Y] or [N] [0.45 µ] or [ ] µ (circle or fill in)

Purging Device: [ ] A-Submersible Pump B-Peristaltic Pump C-QED Bladder Pump D-Bailer E-Piston Pump F-Dipper/Bottle

Sampling Device: [ ]

X-Other: [ ]

Filter Type: [ ] A-In-line Disposable B-Pressure C-Vacuum X-Other: ____

Sample Tube Type: [ ] A-Teflon B-Stainless Steel C-PVC D-Polypropylene X-Other: ____

WELL DATA

Well Elevation (at TOC): [ ] (ft/msl)

Depth to Water (DTW) (from TOC): [ ] (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC): [ ] (ft msl)

Total Well Depth (from TOC): [ ] (ft)

Stick Up (from ground elevation): [ ] (ft)

Casing ID: [ ] (in)

Casing Material: [ ]

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
021023	8.44	1.33 mS	3.3	778	12.6		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

FIELD COMMENTS

Sample Appearance: transparent Odor: N/O Color: Yellow Hue Other: ____

Weather Conditions (required daily, or as conditions change): 3°C Direction/Speed: 20 km/h NW Outlook: overcast Precipitation: Y or (N)

Specific Comments (including purge/well volume calculations if required):

Depth 0.07m
with 0.7m
time @1m: 1. 4/5
2. 395
3. 375

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
02/10/23	Jake Arbiello		RWDI
/ /			

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 09/20

0585

S2437676

BUREAU VERITAS

FIELD INFORMATION FORM

WM WASTE MANAGEMENT

Site Name: TCEC

Site No.: Sample: SS1SA (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes, Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: Y or N

Filter Device: Y or N — 0.45 µ or ____ µ (circle or fill in)

Purging Device: A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Sampling Device:

X-Other:

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other:

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other:

WELL DATA

Well Elevation (at TOC) (ft/msl) — Depth to Water (DTW) (from TOC) (ft) — Groundwater Elevation (GWE) (Site Datum, from TOC) (ft msl)

Total Well Depth (from TOC) (ft) — Stick Up (from ground elevation) (ft) — Casing ID (in) — Casing Material

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (mS ~~µmhos~~/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
02 10 23	7.99	0.82	2.5	141	12.6		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

Sample Appearance: transparent — Odor: None — Color: clear — Other:

Weather Conditions (required daily, or as conditions change): 2°C — Direction/Speed: 20km/h NW — Outlook: Overcast — Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required):

FIELD COMMENTS

Depth ~~of~~ 0.30M — PSSW Dup taken

width 0.3M

time @ 1m 1:25s

2:28s

3 27s

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
02/10/23	Jake Arbiolo		RMDE
/ /			

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 (6/20)

0583

Maxxam Analytics
6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

CHAIN OF CUSTODY RECORD

IMMEDIATE

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #		
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285756	CHAIN OF CUSTODY # :
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Unit 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	TCEC-SWCM-FEB
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x 2618 Fax: 519-823-1316	Project Name:	Twin Creeks SW	
Email:	lmertick@wm.com	Email:	BJL@RWDI.com, JCL@RWDI.com	Location:	Twin Creeks	
				Sampled By:	JRA	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

☐ MISA Reg. 153 Sewer Use ☐ Other
☐ Table 1 ☐ Sanitary
☒ PWQO ☐ Table 2 ☐ Storm specify
☐ Table 3 Region
☐ Reg. 558

Report Criteria on C of A ? n

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ZP-ON-WLF-2023 TCLS - SW (POPLAR) QUARTERLY	# of Cont.	COMMENTS / TAT COMMENTS
1	SS14A	10-Feb-23	AM	SW	N	N	X	7	
2	SS14B	10-Feb-23	AM	SW	N	N	X	7	
3	SS15A	10-Feb-23	AM	SW	N	N	X	7	PSSWDUP taken
4	PSSWDUP	10-Feb-23	AM	SW	N	N	X	7	
5									
6									
7									
8									
9									
10									
11									
12									See lab addendum for lab group coding

15-Feb-23 11:39
Patricia Legette
C344455
MT IM ENV-576

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
☒ 5 to 7 Working Days

Rush TAT: Rush Confirmation # _____ (call Lab for #)
☐ 1 day ☐ 2 days ☐ 3 days
DATE Required: 21-Feb-22
TIME Required: _____

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:
BEG-2/10/2023	[signature]	FEB 15 2023	11:39

Laboratory Use Only

Temperature (°C) on Receipt	Condition of Sample on Receipt
1 9 / 1 9 / 1 9	☐ OK ☐ SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

ice melted

White: Maxxam Yellow: Mail Pink: Client

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 700
Site Location: ON07
Your C.O.C. #: TCEC-SWCM-APR

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/04/14
Report #: R7586954
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C396348
Received: 2023/04/06, 09:13

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2023/04/10	CAM SOP-00448	SM 23 2320 B m
Alkalinity	3	N/A	2023/04/11	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	4	N/A	2023/04/10	CAM SOP-00463	SM 23 4500-Cl E m
Conductance in Water - On-site	4	N/A	2023/04/13		
Field Measured Dissolved Oxygen in Water	4	N/A	2023/04/13		
Total Metals by ICPMS	4	N/A	2023/04/12	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	4	N/A	2023/04/12	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	4	N/A	2023/04/10	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Phenols (4AAP)	4	N/A	2023/04/10	CAM SOP-00444	OMOE E3179 m
Field Measured pH (2)	4	N/A	2023/04/13		Field pH Meter
Sulphate by Automated Turbidimetry	4	N/A	2023/04/10	CAM SOP-00464	SM 23 4500-SO42- E m
Field Temperature (2)	4	N/A	2023/04/13		Field Thermometer
Total Organic Carbon (TOC) (3)	4	N/A	2023/04/11	CAM SOP-00446	SM 23 5310B m
Turbidity - On-site	4	N/A	2023/04/13		
Un-ionized Ammonia (4)	4	2023/04/06	2023/04/13	Auto Calc.	PWQO
Volatile Organic Compounds in Water	2	N/A	2023/04/11	CAM SOP-00226	EPA 8260C m
Volatile Organic Compounds in Water	2	N/A	2023/04/12	CAM SOP-00226	EPA 8260C m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 700
Site Location: ON07
Your C.O.C. #: TCEC-SWCM-APR

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/04/14
Report #: R7586954
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C396348
Received: 2023/04/06, 09:13
customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.
(3) Total Organic Carbon (TOC) present in the sample should be considered as non-purgeable TOC.
(4) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C396348
Report Date: 2023/04/14

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BEG

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VME661		VME662		VME663	VME664		
Sampling Date		2023/04/04		2023/04/04		2023/04/04	2023/04/04		
COC Number		TCEC-SWCM-APR		TCEC-SWCM-APR		TCEC-SWCM-APR	TCEC-SWCM-APR		
	UNITS	SS14A	RDL	SS14B	RDL	SS15A	PSSWDUP	RDL	QC Batch
Calculated Parameters									
Total Un-ionized Ammonia	mg/L	<0.00061	0.00061	0.0063	0.0007	<0.00061	<0.00061	0.00061	8594696
Field Measurements									
Field Conductivity	uS/cm	354	N/A	414	N/A	313	313	N/A	ONSITE
Field Dissolved Oxygen	mg/L	9.97	N/A	10.1	N/A	9.06	9.06	N/A	ONSITE
Field Temperature	Celsius	9.6	N/A	9.8	N/A	9.5	9.5	N/A	ONSITE
Field Turbidity	NTU	>1000	N/A	446	N/A	>1000	>1000	N/A	ONSITE
Field Measured pH	pH	7.6		7.8		7.2	7.2		ONSITE
Inorganics									
Total Ammonia-N	mg/L	<0.050	0.050	0.45	0.050	0.054	0.052	0.050	8599612
Total Organic Carbon (TOC)	mg/L	9.7	0.40	10	0.40	17	17	0.40	8599017
Phenols-4AAP	mg/L	<0.0010	0.0010	<0.0010	0.0010	<0.0010	<0.0010	0.0010	8599394
Dissolved Sulphate (SO4)	mg/L	65	1.0	45	1.0	33	33	1.0	8595389
Alkalinity (Total as CaCO3)	mg/L	140	1.0	160	1.0	110	110	1.0	8595277
Dissolved Chloride (Cl-)	mg/L	3.4	1.0	25	1.0	7.4	7.6	1.0	8595377
Nitrate (N)	mg/L	0.82	0.10	0.20	0.10	0.42	0.39	0.10	8595627

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Bureau Veritas Job #: C396348
Report Date: 2023/04/14

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BEG

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		VME661	VME662	VME663	VME664		
Sampling Date		2023/04/04	2023/04/04	2023/04/04	2023/04/04		
COC Number		TCEC-SWCM-APR	TCEC-SWCM-APR	TCEC-SWCM-APR	TCEC-SWCM-APR		
	UNITS	SS14A	SS14B	SS15A	PSSWDUP	RDL	QC Batch
Metals							
Total Boron (B)	mg/L	0.06	0.49	0.24	0.24	0.02	8602421
Total Calcium (Ca)	mg/L	87	69	59	59	0.2	8602421
Total Chromium (Cr)	mg/L	0.026	0.011	0.050	0.050	0.005	8602421
Total Iron (Fe)	mg/L	26	11	50	50	0.1	8602421
Total Magnesium (Mg)	mg/L	25	19	22	22	0.05	8602421
Total Nickel (Ni)	mg/L	0.036	0.018	0.066	0.067	0.001	8602421
Total Potassium (K)	mg/L	6.3	6.9	7.4	7.5	0.2	8602421
Total Sodium (Na)	mg/L	4.7	27	11	11	0.1	8602421
Total Zinc (Zn)	mg/L	0.06	0.03	0.12	0.12	0.01	8602421

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C396348
Report Date: 2023/04/14

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BEG

VOLATILE ORGANICS BY GC/MS (WATER)

Bureau Veritas ID		VME661	VME662		VME663	VME664		
Sampling Date		2023/04/04	2023/04/04		2023/04/04	2023/04/04		
COC Number		TCEC-SWCM-APR	TCEC-SWCM-APR		TCEC-SWCM-APR	TCEC-SWCM-APR		
	UNITS	SS14A	SS14B	QC Batch	SS15A	PSSWDUP	RDL	QC Batch
Volatile Organics								
Benzene	ug/L	<0.10	<0.10	8597970	<0.10	<0.10	0.10	8597969
Ethylbenzene	ug/L	<0.10	<0.10	8597970	<0.10	<0.10	0.10	8597969
Toluene	ug/L	<0.20	<0.20	8597970	<0.20	<0.20	0.20	8597969
p+m-Xylene	ug/L	<0.10	<0.10	8597970	<0.10	<0.10	0.10	8597969
o-Xylene	ug/L	<0.10	<0.10	8597970	<0.10	<0.10	0.10	8597969
Total Xylenes	ug/L	<0.10	<0.10	8597970	<0.10	<0.10	0.10	8597969
Surrogate Recovery (%)								
4-Bromofluorobenzene	%	100	98	8597970	91	92		8597969
D4-1,2-Dichloroethane	%	101	100	8597970	95	92		8597969
D8-Toluene	%	100	100	8597970	103	104		8597969

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Results relate only to the items tested.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8597969	4-Bromofluorobenzene	2023/04/11	98	70 - 130	102	70 - 130	91	%		
8597969	D4-1,2-Dichloroethane	2023/04/11	94	70 - 130	98	70 - 130	91	%		
8597969	D8-Toluene	2023/04/11	103	70 - 130	102	70 - 130	102	%		
8597970	4-Bromofluorobenzene	2023/04/11	99	70 - 130	100	70 - 130	97	%		
8597970	D4-1,2-Dichloroethane	2023/04/11	92	70 - 130	97	70 - 130	97	%		
8597970	D8-Toluene	2023/04/11	101	70 - 130	99	70 - 130	100	%		
8595277	Alkalinity (Total as CaCO3)	2023/04/10			97	85 - 115	<1.0	mg/L	1.9 (1)	20
8595377	Dissolved Chloride (Cl-)	2023/04/10	88	80 - 120	92	80 - 120	<1.0	mg/L	4.2 (2)	20
8595389	Dissolved Sulphate (SO4)	2023/04/10	NC	75 - 125	91	80 - 120	<1.0	mg/L	4.5 (2)	20
8595627	Nitrate (N)	2023/04/10	91 (3)	80 - 120	95	80 - 120	<0.10	mg/L	0.64 (4)	20
8597969	Benzene	2023/04/11	NC	70 - 130	88	70 - 130	<0.10	ug/L	0.54 (2)	30
8597969	Ethylbenzene	2023/04/11	94	70 - 130	92	70 - 130	<0.10	ug/L	0.41 (2)	30
8597969	o-Xylene	2023/04/11	NC	70 - 130	92	70 - 130	<0.10	ug/L	1.5 (2)	30
8597969	p+m-Xylene	2023/04/11	NC	70 - 130	97	70 - 130	<0.10	ug/L	0.40 (2)	30
8597969	Toluene	2023/04/11	NC	70 - 130	91	70 - 130	<0.20	ug/L	0.51 (2)	30
8597969	Total Xylenes	2023/04/11					<0.10	ug/L	0.79 (2)	30
8597970	Benzene	2023/04/12	93	70 - 130	98	70 - 130	<0.10	ug/L	NC (5)	30
8597970	Ethylbenzene	2023/04/12	95	70 - 130	99	70 - 130	<0.10	ug/L	NC (5)	30
8597970	o-Xylene	2023/04/12	94	70 - 130	98	70 - 130	<0.10	ug/L	NC (5)	30
8597970	p+m-Xylene	2023/04/12	100	70 - 130	102	70 - 130	<0.10	ug/L	NC (5)	30
8597970	Toluene	2023/04/12	97	70 - 130	98	70 - 130	<0.20	ug/L	NC (5)	30
8597970	Total Xylenes	2023/04/12					<0.10	ug/L	NC (5)	30
8599017	Total Organic Carbon (TOC)	2023/04/11	93	80 - 120	99	80 - 120	<0.40	mg/L	1.1 (2)	20
8599394	Phenols-4AAP	2023/04/10	98	80 - 120	99	80 - 120	<0.0010	mg/L	NC (2)	20
8599612	Total Ammonia-N	2023/04/12	96	75 - 125	98	80 - 120	<0.050	mg/L	10 (2)	20
8602421	Total Boron (B)	2023/04/12	97 (6)	80 - 120	97	80 - 120	<0.02	mg/L	5.1 (7)	20
8602421	Total Calcium (Ca)	2023/04/12	NC (6)	80 - 120	97	80 - 120	<0.2	mg/L	6.8 (7)	20
8602421	Total Chromium (Cr)	2023/04/12	96 (6)	80 - 120	95	80 - 120	<0.005	mg/L	7.4 (7)	20
8602421	Total Iron (Fe)	2023/04/12	97 (6)	80 - 120	98	80 - 120	<0.1	mg/L	6.7 (7)	20
8602421	Total Magnesium (Mg)	2023/04/12	92 (6)	80 - 120	95	80 - 120	<0.05	mg/L	5.0 (7)	20

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8602421	Total Nickel (Ni)	2023/04/12	95 (6)	80 - 120	96	80 - 120	<0.001	mg/L	8.8 (7)	20
8602421	Total Potassium (K)	2023/04/12	100 (6)	80 - 120	94	80 - 120	<0.2	mg/L	4.1 (7)	20
8602421	Total Sodium (Na)	2023/04/12	NC (6)	80 - 120	96	80 - 120	<0.1	mg/L	4.4 (7)	20
8602421	Total Zinc (Zn)	2023/04/12	103 (6)	80 - 120	104	80 - 120	<0.01	mg/L	3.5 (7)	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID [VME662-01]

(2) Duplicate Parent ID

(3) Matrix Spike Parent ID [VME663-01]

(4) Duplicate Parent ID [VME663-01]

(5) Duplicate Parent ID [VME661-05]

(6) Matrix Spike Parent ID [VME662-02]

(7) Duplicate Parent ID [VME662-02]

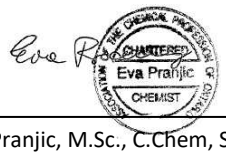
Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C396348
Report Date: 2023/04/14

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BEG

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

FIELD INFORMATION FORM

BUREAU VERITAS

WASTE MANAGEMENT

Site Name: TCEC

Site No.: ____ Sample: SS19A (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes, Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: Y or N

Filter Device: Y or N — 0.45 µ or ____ µ (circle or fill in)

Purging Device: ____ A-Submersible Pump B-Peristaltic Pump C-QED Bladder Pump D-Bailer E-Piston Pump F-Dipper/Bottle

Sampling Device: ____

X-Other: ____

Filter Type: ____ A-In-line Disposable B-Pressure C-Vacuum X-Other: ____

Sample Tube Type: ____ A-Teflon B-Stainless Steel C-PVC D-Polypropylene X-Other: ____

WELL DATA

Well Elevation (at TOC) ____ (ft/msl)

Depth to Water (DTW) (from TOC) ____ (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC) ____ (ft msl)

Total Well Depth (from TOC) ____ (ft)

Stick Up (from ground elevation) ____ (ft)

Casing ID ____ (in)

Casing Material ____

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
04/04/23	7.6	354	9.6	71000	9.97		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

FIELD COMMENTS

Sample Appearance: opaque Odor: NO Color: brown Other: ____

Weather Conditions (required daily, or as conditions change): 8°C Direction/Speed: 10km/h E Outlook: overcast Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required):

Streamflow @ 1m: T1 11s
T2 15s
T3 17s
depth: 0.2m
width: 2.5m

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
04/04/23	Brady Grubb	Brady Grubb	RWDI

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 06/20

0612

FIELD INFORMATION FORM

BUREAU VERITAS

WASTE MANAGEMENT

Site Name: TLEC

Site No.:

Sample: 3 3 1 4 B (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes. Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: Y or N

Filter Device: Y or N — 0.45 µ or ____ µ (circle or fill in)

Purging Device: A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Sampling Device: A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other:

X-Other:

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other:

WELL DATA

Well Elevation (at TOC): (ft/msl)

Depth to Water (DTW) (from TOC): (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC): (ft msl)

Total Well Depth (from TOC): (ft)

Stick Up (from ground elevation): (ft)

Casing ID: (in)

Casing Material:

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
1st		1st	1st					
2nd		2nd	2nd					
3rd		3rd	3rd					
4th		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
04 04 23	7.8	414	9.8	496	10.1		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

FIELD COMMENTS

Sample Appearance: opaque — Odor: N/O — Color: brown — Other:

Weather Conditions (required daily, or as conditions change): 8°C — Direction/Speed: 10 km/h E — Outlook: overcast — Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required):

Stream flow over 1m — T_1: 8s

T_2: 8s

W. Ith: 1.4m — T_3: 10s

depth: 0.7m

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
04/04/23	Brady Grabb	Brady Grabb	RWDI

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v.3.1 06/20

0611

BUREAU VERITAS

FIELD INFORMATION FORM

WM WASTE MANAGEMENT

Site Name: TCEC

Site No.: Sample: 3S15A (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes, Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: [Y] or [N]

Filter Device: [Y] or [N] [0.45 µ] or [ ] µ (circle or fill in)

Purging Device: [ ] A-Submersible Pump B-Peristaltic Pump C-QED Bladder Pump D-Bailer E-Piston Pump F-Dipper/Bottle

Sampling Device: [ ]

X-Other: [ ]

Filter Type: [ ] A-In-line Disposable B-Pressure C-Vacuum X-Other: ____

Sample Tube Type: [ ] A-Teflon B-Stainless Steel C-PVC D-Polypropylene X-Other: ____

WELL DATA

Well Elevation (at TOC) [ ] (ft/msl)

Depth to Water (DTW) (from TOC) [ ] (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC) [ ] (ft msl)

Total Well Depth (from TOC) [ ] (ft)

Stick Up (from ground elevation) [ ] (ft)

Casing ID [ ] (in)

Casing Material [ ]

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
04 04 23	7.2	313	9.5	>1000	9.06		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

FIELD COMMENTS

Sample Appearance: opaque Odor: NIO Color: brown Other: ____

Weather Conditions (required daily, or as conditions change): 8°C Direction/Speed: 10km/h E Outlook: overcast Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required):

PSSWDUP TAKEN

Stream flow @ 1m T1: 5

Width 1m T2: 7

depth 0.6m T3: 7

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
04/04/23	Brady Grubb	Brady Grubb	RWDI

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 06/20

0607

Maxxam Analytics Inc 6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

CHAIN OF CUSTODY RECORD

Page 1 of 1

IMMEDIATE

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #:		
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285756	
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Unit 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	CHAIN OF CUSTODY # :
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x 2618 Fax: 519-823-1316	Project Name:	Twin Creeks SW	TCEC-SWCM-APR
Email:	lmertick@wm.com	Email:	BJL@RWDI.com, JCL@RWDI.com	Location:	Twin Creeks	
				Sampled By:	BEG	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

☐ MISA ☐ Reg. 153 (☐ Table 1 ☐ Table 2 ☐ Table 3) Sewer Use (☐ Sanitary ☐ Storm) Region ____ ☐ Other ____ specify

☒ PWQO ☐ Reg. 558

Report Criteria on C of A ? n

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ZP-ON-WLF-2023 TCLS - SW (POPLAR) QUARTERLY	# of Cont.	COMMENTS / TAT COMMENTS
1	SS14A	4-Apr-23	AM	SW	N	N	X	7	
2	SS14B	4-Apr-23	AM	SW	N	N	X	7	
3	SS15A	4-Apr-23	AM	SW	N	N	X	7	PSSWDUP taken
4	PSSWDUP	4-Apr-23	AM	SW	N	N	X	7	
5									
6									
7									
8									
9									
10									
11									
12									

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
☒ 5 to 7 Working Days

Rush TAT: Rush Confirmation # ____ (call Lab for #)
☐ 1 day ☐ 2 days ☐ 3 days
DATE Required: 17-Apr-23
TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

06-Apr-23 09:13
Patricia Legette
C396348
KTN ENV-1421

See lab addendum for lab group coding

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:
BEG-4/5/2023	mom [illegible] MAXXAM	2023/04/06	0913

Laboratory Use Only

Temperature (°C) on Receipt: 8 | 7 | 7

Condition of Sample on Receipt: ☐ OK ☐ SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

omile

White: Maxxam Yellow: Mail Pink: Client

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 700
Site Location: ON07
Your C.O.C. #: N/A

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/07/12
Report #: R7711279
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3J6425
Received: 2023/07/05, 08:53

Sample Matrix: Surface Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	3	N/A	2023/07/07	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	3	N/A	2023/07/06	CAM SOP-00463	SM 23 4500-Cl E m
Conductance in Water - On-site	3	N/A	2023/07/07		
Field Measured Dissolved Oxygen in Water	3	N/A	2023/07/07		
Total Metals by ICPMS	3	N/A	2023/07/11	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	3	N/A	2023/07/10	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	3	N/A	2023/07/06	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Phenols (4AAP)	3	N/A	2023/07/10	CAM SOP-00444	OMOE E3179 m
Field Measured pH (2)	3	N/A	2023/07/07		Field pH Meter
Sulphate by Automated Turbidimetry	3	N/A	2023/07/06	CAM SOP-00464	SM 23 4500-SO42- E m
Field Temperature (2)	3	N/A	2023/07/07		Field Thermometer
Total Organic Carbon (TOC) (3)	1	N/A	2023/07/07	CAM SOP-00446	SM 23 5310B m
Total Organic Carbon (TOC) (3)	2	N/A	2023/07/08	CAM SOP-00446	SM 23 5310B m
Turbidity - On-site	3	N/A	2023/07/07		
Un-ionized Ammonia (4)	2	2023/07/05	2023/07/10	Auto Calc.	PWQO
Un-ionized Ammonia (4)	1	2023/07/05	2023/07/11	Auto Calc.	PWQO
Volatile Organic Compounds in Water	3	N/A	2023/07/07	CAM SOP-00226	EPA 8260D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 700
Site Location: ON07
Your C.O.C. #: N/A

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/07/12
Report #: R7711279
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3J6425
Received: 2023/07/05, 08:53
customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.
(3) Total Organic Carbon (TOC) present in the sample should be considered as non-purgeable TOC.
(4) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3J6425
Report Date: 2023/07/12

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BG

RESULTS OF ANALYSES OF SURFACE WATER

Bureau Veritas ID		WHE369			WHE370		WHE371		
Sampling Date		2023/07/03			2023/07/03		2023/07/03		
COC Number		N/A			N/A		N/A		
	UNITS	SS14B	RDL	QC Batch	SS15A	QC Batch	PSSWDUP	RDL	QC Batch
Calculated Parameters									
Total Un-ionized Ammonia	mg/L	<0.009	0.009	8769373	<0.0049	8769373	<0.0049	0.0049	8769373
Field Measurements									
Field Conductivity	uS/cm	690	N/A	ONSITE	452	ONSITE	452	N/A	ONSITE
Field Dissolved Oxygen	mg/L	8.27	N/A	ONSITE	7.27	ONSITE	7.27	N/A	ONSITE
Field Temperature	Celsius	32.5	N/A	ONSITE	27.3	ONSITE	27.3	N/A	ONSITE
Field Turbidity	NTU	>1000	N/A	ONSITE	426	ONSITE	426	N/A	ONSITE
Field Measured pH	pH	8.26		ONSITE	8.12	ONSITE	8.12		ONSITE
Inorganics									
Total Ammonia-N	mg/L	<0.050	0.050	8775935	<0.050	8774707	<0.050	0.050	8775935
Total Organic Carbon (TOC)	mg/L	4.6	0.40	8776241	8.7	8776241	8.5	0.40	8774869
Phenols-4AAP	mg/L	0.0013	0.0010	8779751	0.0014	8779751	0.0010	0.0010	8779751
Dissolved Sulphate (SO4)	mg/L	140	1.0	8769820	100	8769820	100	1.0	8769820
Alkalinity (Total as CaCO3)	mg/L	32	1.0	8772781	130	8772781	130	1.0	8772781
Dissolved Chloride (Cl-)	mg/L	16	1.0	8769814	11	8769814	11	1.0	8769814
Nitrate (N)	mg/L	1.11	0.10	8769789	0.26	8769789	0.30	0.10	8769789

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3J6425
Report Date: 2023/07/12

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BG

ELEMENTS BY ATOMIC SPECTROSCOPY (SURFACE WATER)

Bureau Veritas ID		WHE369	WHE370	WHE371		
Sampling Date		2023/07/03	2023/07/03	2023/07/03		
COC Number		N/A	N/A	N/A		
	UNITS	SS14B	SS15A	PSSWDUP	RDL	QC Batch
Metals						
Total Boron (B)	mg/L	0.14	0.42	0.42	0.02	8774144
Total Calcium (Ca)	mg/L	79	110	98	0.2	8774144
Total Chromium (Cr)	mg/L	<0.005	0.021	0.017	0.005	8774144
Total Iron (Fe)	mg/L	2.5	21	17	0.1	8774144
Total Magnesium (Mg)	mg/L	31	26	24	0.05	8774144
Total Nickel (Ni)	mg/L	0.005	0.030	0.025	0.001	8774144
Total Potassium (K)	mg/L	3.1	8.1	7.6	0.2	8774144
Total Sodium (Na)	mg/L	22	14	15	0.1	8774144
Total Zinc (Zn)	mg/L	<0.01	0.06	0.05	0.01	8774144

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3J6425
Report Date: 2023/07/12

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BG

VOLATILE ORGANICS BY GC/MS (SURFACE WATER)

Bureau Veritas ID		WHE369	WHE370	WHE371		
Sampling Date		2023/07/03	2023/07/03	2023/07/03		
COC Number		N/A	N/A	N/A		
	UNITS	SS14B	SS15A	PSSWDUP	RDL	QC Batch
Volatile Organics						
Benzene	ug/L	<0.10	<0.10	<0.10	0.10	8768734
Ethylbenzene	ug/L	<0.10	<0.10	<0.10	0.10	8768734
Toluene	ug/L	<0.20	<0.20	<0.20	0.20	8768734
p+m-Xylene	ug/L	<0.10	<0.10	<0.10	0.10	8768734
o-Xylene	ug/L	<0.10	<0.10	<0.10	0.10	8768734
Total Xylenes	ug/L	<0.10	<0.10	<0.10	0.10	8768734
Surrogate Recovery (%)						
4-Bromofluorobenzene	%	98	96	97		8768734
D4-1,2-Dichloroethane	%	102	103	101		8768734
D8-Toluene	%	100	98	99		8768734

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3J6425
Report Date: 2023/07/12

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BG

GENERAL COMMENTS

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8768734	4-Bromofluorobenzene	2023/07/07	101	70 - 130	102	70 - 130	95	%		
8768734	D4-1,2-Dichloroethane	2023/07/07	98	70 - 130	99	70 - 130	98	%		
8768734	D8-Toluene	2023/07/07	100	70 - 130	99	70 - 130	100	%		
8768734	Benzene	2023/07/07	100	70 - 130	90	70 - 130	<0.10	ug/L	NC (1)	30
8768734	Ethylbenzene	2023/07/07	97	70 - 130	88	70 - 130	<0.10	ug/L	NC (1)	30
8768734	o-Xylene	2023/07/07	98	70 - 130	90	70 - 130	<0.10	ug/L	NC (1)	30
8768734	p+m-Xylene	2023/07/07	103	70 - 130	94	70 - 130	<0.10	ug/L	NC (1)	30
8768734	Toluene	2023/07/07	101	70 - 130	90	70 - 130	<0.20	ug/L	NC (1)	30
8768734	Total Xylenes	2023/07/07					<0.10	ug/L	NC (1)	30
8769789	Nitrate (N)	2023/07/06	86	80 - 120	98	80 - 120	<0.10	mg/L	0.18 (1)	20
8769814	Dissolved Chloride (Cl-)	2023/07/06	NC	80 - 120	95	80 - 120	<1.0	mg/L	0.24 (1)	20
8769820	Dissolved Sulphate (SO4)	2023/07/06	NC	75 - 125	94	80 - 120	<1.0	mg/L	0.78 (1)	20
8772781	Alkalinity (Total as CaCO3)	2023/07/06			95	85 - 115	<1.0	mg/L	2.4 (1)	20
8774144	Total Boron (B)	2023/07/11	99	80 - 120	99	80 - 120	<0.02	mg/L		
8774144	Total Calcium (Ca)	2023/07/11	NC	80 - 120	95	80 - 120	<0.2	mg/L		
8774144	Total Chromium (Cr)	2023/07/11	97	80 - 120	94	80 - 120	<0.005	mg/L	0.67 (1)	20
8774144	Total Iron (Fe)	2023/07/11	95	80 - 120	94	80 - 120	<0.1	mg/L		
8774144	Total Magnesium (Mg)	2023/07/11	97	80 - 120	96	80 - 120	<0.05	mg/L		
8774144	Total Nickel (Ni)	2023/07/11	94	80 - 120	94	80 - 120	<0.001	mg/L	1.2 (1)	20
8774144	Total Potassium (K)	2023/07/11	NC	80 - 120	94	80 - 120	<0.2	mg/L		
8774144	Total Sodium (Na)	2023/07/11	NC	80 - 120	98	80 - 120	<0.1	mg/L		
8774144	Total Zinc (Zn)	2023/07/11	95	80 - 120	99	80 - 120	<0.01	mg/L	0.44 (1)	20
8774707	Total Ammonia-N	2023/07/10	102	75 - 125	98	80 - 120	<0.050	mg/L	NC (1)	20
8774869	Total Organic Carbon (TOC)	2023/07/07	101	80 - 120	103	80 - 120	<0.40	mg/L	0.073 (1)	20
8775935	Total Ammonia-N	2023/07/10	94	75 - 125	101	80 - 120	<0.050	mg/L	NC (1)	20
8776241	Total Organic Carbon (TOC)	2023/07/08	96 (2)	80 - 120	97	80 - 120	<0.40	mg/L	3.5 (3)	20

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8779751	Phenols-4AAP	2023/07/10	101	80 - 120	100	80 - 120	<0.0010	mg/L	0 (1)	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Matrix Spike Parent ID [WHE369-03]

(3) Duplicate Parent ID [WHE369-03]

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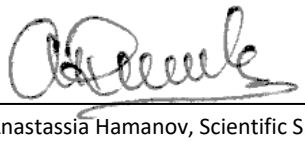
Bureau Veritas Job #: C3J6425
Report Date: 2023/07/12

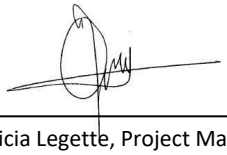
RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BG

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist



Patricia Legette, Project Manager

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

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BUREAU VERITAS

FIELD INFORMATION FORM

WM WASTE MANAGEMENT

Site Name: TCEC Rooftop

Site No.:

Sample: [illegible] 55MB
Sample ID

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vol Purged. Mark Changes, Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: [Y] or [N]

Filter Device: [Y] or [N] 0.45 µ or [ ] µ (circle or fill in)

Purging Device: [ ]
A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Sampling Device: [ ]

X-Other:

Filter Type: [A] A-In-line Disposable, B-Pressure, C-Vacuum, X-Other:

Sample Tube Type: [ ] A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other:

WELL DATA

Well Elevation (at TOC)	Depth to Water (DTW) (from TOC)	Groundwater Elevation (GWE) (Site Datum, from TOC)
(ft/msl)	(ft)	(ft msl)

Total Well Depth (from TOC)	Stick Up (from ground elevation)	Casing ID	Casing Material
(ft)	(ft)	(in)	

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
070323	8.26	690	32.5	>1000	8.27		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

Sample Appearance: opaque Odor: N/O Color: brown Other:

Weather Conditions (required daily, or as conditions change): 24°C Direction/Speed: 10 km/h NE Outlook: overcast Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required):

FIELD COMMENTS

Wo 1.50 m
D: 0.10 m
80c
85s
80s

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
07/03/23	Brady Lubbs	Brady Lubbs	RWDI

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 06/20

0799

S2437676

BUREAU VERITAS

FIELD INFORMATION FORM

WM WASTE MANAGEMENT

Site Name: TCEC

Site No.: Sample: [illegible] SS154 (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes, Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: Y or N

Purging Device: A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Sampling Device: A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

X-Other:

Filter Device: Y or N [illegible] or [ ] µ (circle or fill in)

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other:

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other:

WELL DATA

Well Elevation (at TOC) (ft/msl)

Depth to Water (DTW) (from TOC) (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC) (ft msl)

Total Well Depth (from TOC) (ft)

Stick Up (from ground elevation) (ft)

Casing ID (in)

Casing Material

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
07 03 23	8.12	452	27.3	426	7.27		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

Sample Appearance: opaque Odor: n/a Color: brown Other:

Weather Conditions (required daily, or as conditions change): 24°C Direction/Speed: 10 KNOTS NE Outlook: overcast Precipitation: Y or N

FIELD COMMENTS

Specific Comments (including purge/well volume calculations if required):

W: 0.80 m

D: 0.15 m

95 s

98 s

50 s

PSSWDUP TAKEN

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
07/03/23	Brady Gulp	Brady Gulp	RWDI
/ /			

CHAIN OF CUSTODY RECORD

MAXXAM IMMEDIATE 6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

Page 1 of 1

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #:		
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285756	
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Unit 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	CHAIN OF CUSTODY # :
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x 2618 Fax: 519-823-1316	Project Name:	Twin Creeks SW	TCEC-SWCM-JUL
Email:	lmertick@wm.com	Email:	BJL@RWDI.com, JCL@RWDI.com	Location:	Twin Creeks	
				Sampled By:	BG	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

- [ ] MISA — Reg. 153: [ ] Table 1 [ ] Table 2 [ ] Table 3 — Sewer Use: [ ] Sanitary [ ] Storm — Region _____
- [x] PWQO
- [ ] Reg. 558
- [ ] Other — specify _____

Report Criteria on C of A ? [n]

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ZP-ON-WLF-2023 TCLS - SW (POPLAR) QUARTERLY	# of Cont.	COMMENTS / TAT COMMENTS
1	SS14B	3-Jul-23	PM	SW	N	N	X	7	
2	SS15A	3-Jul-23	PM	SW	N	N	X	7	PSSWDUP taken
3	PSSWDUP	3-Jul-23	PM	SW	N	N	X	7	
4									
5									
6									
7									
8									
9									
10									
11									
12									See lab addendum for lab group coding

05-Jul-23 08:53
Patricia Legette
C3J6425
AJH ENV-603

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
[x] 5 to 7 Working Days

Rush TAT: Rush Confirmation # _____ (call Lab for #)
[ ] 1 day [ ] 2 days [ ] 3 days
DATE Required: 13-Jul-23
TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:	Laboratory Use Only
BG-7/4/2023				Temperature (°C) on Receipt: 18/20/11 — Condition of Sample on Receipt: [ ] OK [ ] SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.**

7-23

White: Maxxam Yellow: Mail Pink: Client

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 700
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/07/17
Report #: R7720667
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3K1644
Received: 2023/07/08, 12:29

Sample Matrix: Surface Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2023/07/13	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	1	N/A	2023/07/13	CAM SOP-00463	SM 23 4500-Cl E m
Conductance in Water - On-site	1	N/A	2023/07/12		
Field Measured Dissolved Oxygen in Water	1	N/A	2023/07/12		
Total Metals by ICPMS	1	N/A	2023/07/13	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	1	N/A	2023/07/13	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	1	N/A	2023/07/13	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Phenols (4AAP)	1	N/A	2023/07/11	CAM SOP-00444	OMOE E3179 m
Field Measured pH (2)	1	N/A	2023/07/12		Field pH Meter
Sulphate by Automated Turbidimetry	1	N/A	2023/07/13	CAM SOP-00464	SM 23 4500-SO42- E m
Field Temperature (2)	1	N/A	2023/07/12		Field Thermometer
Total Organic Carbon (TOC) (3)	1	N/A	2023/07/13	CAM SOP-00446	SM 23 5310B m
Turbidity - On-site	1	N/A	2023/07/12		
Un-ionized Ammonia (4)	1	2023/07/10	2023/07/13	Auto Calc.	PWQO
Volatile Organic Compounds in Water	1	N/A	2023/07/11	CAM SOP-00226	EPA 8260D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 700
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/07/17
Report #: R7720667
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3K1644
Received: 2023/07/08, 12:29

dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.
(3) Total Organic Carbon (TOC) present in the sample should be considered as non-purgeable TOC.
(4) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3K1644
Report Date: 2023/07/17

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BG

RESULTS OF ANALYSES OF SURFACE WATER

Bureau Veritas ID		WIF648		
Sampling Date		2023/07/07		
COC Number		n/a		
	UNITS	SS14A	RDL	QC Batch
Calculated Parameters				
Total Un-ionized Ammonia	mg/L	<0.0035	0.0035	8778915
Field Measurements				
Field Conductivity	uS/cm	520	N/A	ONSITE
Field Dissolved Oxygen	mg/L	5.95	N/A	ONSITE
Field Temperature	Celsius	25.8	N/A	ONSITE
Field Turbidity	NTU	29.0	N/A	ONSITE
Field Measured pH	pH	8.0		ONSITE
Inorganics				
Total Ammonia-N	mg/L	<0.050	0.050	8781030
Total Organic Carbon (TOC)	mg/L	13	0.40	8783728
Phenols-4AAP	mg/L	0.0012	0.0010	8782515
Dissolved Sulphate (SO4)	mg/L	110	1.0	8780075
Alkalinity (Total as CaCO3)	mg/L	160	1.0	8779281
Dissolved Chloride (Cl-)	mg/L	5.0	1.0	8780070
Nitrate (N)	mg/L	<0.10	0.10	8779183

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3K1644
Report Date: 2023/07/17

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BG

ELEMENTS BY ATOMIC SPECTROSCOPY (SURFACE WATER)

Bureau Veritas ID		WIF648		
Sampling Date		2023/07/07		
COC Number		n/a		
	UNITS	SS14A	RDL	QC Batch
Metals				
Total Boron (B)	mg/L	0.10	0.02	8783356
Total Calcium (Ca)	mg/L	79	0.2	8783356
Total Chromium (Cr)	mg/L	<0.005	0.005	8783356
Total Iron (Fe)	mg/L	0.8	0.1	8783356
Total Magnesium (Mg)	mg/L	22	0.05	8783356
Total Nickel (Ni)	mg/L	0.003	0.001	8783356
Total Potassium (K)	mg/L	6.4	0.2	8783356
Total Sodium (Na)	mg/L	7.7	0.1	8783356
Total Zinc (Zn)	mg/L	<0.01	0.01	8783356

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3K1644
Report Date: 2023/07/17

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BG

VOLATILE ORGANICS BY GC/MS (SURFACE WATER)

Bureau Veritas ID		WIF648		
Sampling Date		2023/07/07		
COC Number		n/a		
	UNITS	**SS14A**	**RDL**	**QC Batch**
Volatile Organics				
Benzene	ug/L	<0.50	0.50	8778716
Ethylbenzene	ug/L	<0.50	0.50	8778716
Toluene	ug/L	<1.0	1.0	8778716
p+m-Xylene	ug/L	<0.50	0.50	8778716
o-Xylene	ug/L	<0.50	0.50	8778716
Total Xylenes	ug/L	<0.50	0.50	8778716
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	100		8778716
D4-1,2-Dichloroethane	%	105		8778716
D8-Toluene	%	98		8778716

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Sample WIF648 [SS14A] : VOC Water Analysis: Due to foaming, sample required dilution. The detection limits were adjusted accordingly.

Results relate only to the items tested.

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Bureau Veritas Job #: C3K1644
Report Date: 2023/07/17

QUALITY ASSURANCE REPORT

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BG

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8778716	4-Bromofluorobenzene	2023/07/11	103 (1)	70 - 130	104	70 - 130	98	%		
8778716	D4-1,2-Dichloroethane	2023/07/11	103 (1)	70 - 130	107	70 - 130	102	%		
8778716	D8-Toluene	2023/07/11	98 (1)	70 - 130	97	70 - 130	97	%		
8778716	Benzene	2023/07/11	94 (1)	70 - 130	97	70 - 130	<0.10	ug/L	NC (2)	30
8778716	Ethylbenzene	2023/07/11	91 (1)	70 - 130	92	70 - 130	<0.10	ug/L	NC (2)	30
8778716	o-Xylene	2023/07/11	94 (1)	70 - 130	96	70 - 130	<0.10	ug/L	NC (2)	30
8778716	p+m-Xylene	2023/07/11	98 (1)	70 - 130	99	70 - 130	<0.10	ug/L	NC (2)	30
8778716	Toluene	2023/07/11	95 (1)	70 - 130	95	70 - 130	<0.20	ug/L	NC (2)	30
8778716	Total Xylenes	2023/07/11					<0.10	ug/L	NC (2)	30
8779183	Nitrate (N)	2023/07/13	99	80 - 120	98	80 - 120	<0.10	mg/L	NC (3)	20
8779281	Alkalinity (Total as CaCO3)	2023/07/13			99	85 - 115	<1.0	mg/L	8.4 (3)	20
8780070	Dissolved Chloride (Cl-)	2023/07/13	86 (4)	80 - 120	93	80 - 120	<1.0	mg/L	17 (5)	20
8780075	Dissolved Sulphate (SO4)	2023/07/13	NC (4)	75 - 125	97	80 - 120	<1.0	mg/L	2.2 (5)	20
8781030	Total Ammonia-N	2023/07/13	98	75 - 125	102	80 - 120	<0.050	mg/L	4.4 (3)	20
8782515	Phenols-4AAP	2023/07/11	99	80 - 120	101	80 - 120	<0.0010	mg/L	NC (3)	20
8783356	Total Boron (B)	2023/07/13	NC	80 - 120	102	80 - 120	<0.02	mg/L		
8783356	Total Calcium (Ca)	2023/07/13	NC	80 - 120	100	80 - 120	<0.2	mg/L		
8783356	Total Chromium (Cr)	2023/07/13	98	80 - 120	96	80 - 120	<0.005	mg/L	0.55 (3)	20
8783356	Total Iron (Fe)	2023/07/13	100	80 - 120	98	80 - 120	<0.1	mg/L		
8783356	Total Magnesium (Mg)	2023/07/13	NC	80 - 120	99	80 - 120	<0.05	mg/L		
8783356	Total Nickel (Ni)	2023/07/13	95	80 - 120	97	80 - 120	<0.001	mg/L	1.2 (3)	20
8783356	Total Potassium (K)	2023/07/13	98	80 - 120	99	80 - 120	<0.2	mg/L		
8783356	Total Sodium (Na)	2023/07/13	NC	80 - 120	99	80 - 120	<0.1	mg/L		
8783356	Total Zinc (Zn)	2023/07/13	100	80 - 120	102	80 - 120	<0.01	mg/L	1.4 (3)	20

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8783728	Total Organic Carbon (TOC)	2023/07/12	96	80 - 120	98	80 - 120	<0.40	mg/L	NC (3)	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Matrix Spike Parent ID [WIF648-05]

(2) Duplicate Parent ID [WIF648-05]

(3) Duplicate Parent ID

(4) Matrix Spike Parent ID [WIF648-01]

(5) Duplicate Parent ID [WIF648-01]

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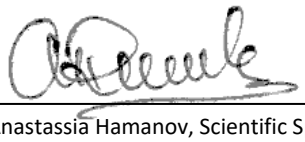
Bureau Veritas Job #: C3K1644
Report Date: 2023/07/17

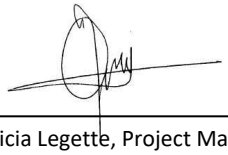
RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: BG

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist



Patricia Legette, Project Manager

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FIELD INFORMATION FORM

BUREAU VERITAS

WASTE MANAGEMENT

Site Name: TCEC

Site No.: Sample: 5514A (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes, Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: Y or N — Filter Device: Y or N — 0.45 µ or ____ µ (circle or fill in)

Purging Device: / Sampling Device: — A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other: ____

X-Other: — Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other: ____

WELL DATA

Well Elevation (at TOC) (ft/msl)	Depth to Water (DTW) (from TOC) (ft)	Groundwater Elevation (GWE) (Site Datum, from TOC) (ft msl)

Total Well Depth (from TOC) (ft)	Stick Up (from ground elevation) (ft)	Casing ID (in)	Casing Material

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: ____ Units ____
07 07 23	8,0	562	35,8	29,0	5,95		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

Sample Appearance: Transparent — Odor: N/O — Color: Yellow/brown — Other: ____

Weather Conditions (required daily, or as conditions change): 20°C — Direction/Speed: N 14 km/h — Outlook: Clear — Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required):

FIELD COMMENTS

flow 1m: 120s — width: 1m — Quarterly
110s — depth: 8cm
115s

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
07.07.23	Alex Watterson	Alex Watterson	RWDE

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 06/20

0824

Maxxam Analytics Inc
6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:	
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #	
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285756
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Unit 530 Windsor, ON, N8W 5K5	Project #:	2303459.01
				Project Name:	Twin Creeks SW
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x 2618 Fax: 519-823-1316	Location:	Twin Creeks
Email:	lmertick@wm.com	Email:	BJL@RWDI.com, JCL@RWDI.com	Sampled By:	AW

MAXXAM JOB NUMBER:

CHAIN OF CUSTODY # : TCEC-SWCM-JUL

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

- [ ] MISA
- Reg. 153: [ ] Table 1 [ ] Table 2 [ ] Table 3
- Sewer Use: [ ] Sanitary [ ] Storm Region _____
- [ ] Other _____ specify
- [x] PWQO
- [ ] Reg. 558

Report Criteria on C of A ? [n]

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ZP-ON-WLF-2023 TCLS - SW (POPLAR) QUARTERLY	# of Cont.	COMMENTS / TAT COMMENTS
1	SS14A	7-Jul-23	PM	SW	N	N	X	7	
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
[x] 5 to 7 Working Days

Rush TAT: Rush Confirmation # _____ (call Lab for #)
[ ] 1 day [ ] 2 days [ ] 3 days

DATE Required: 18-Jul-23
TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

08-Jul-23 12:29
Patricia Legette
C3K1644
ENV 868

See lab addendum for lab group coding

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:
AW ~~7/7/2023~~ 8-Jul-2023	Patricia Legette	2023/07/08	12:29

Laboratory Use Only

Temperature (°C) on Receipt	Condition of Sample on Receipt
13/12/11 ice	[ ] OK [ ] SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

White: Maxxam Yellow: Mail Pink: Client

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 700
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/07/17
Report #: R7720586
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3K1641
Received: 2023/07/08, 12:29

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Chloride by Automated Colourimetry	4	N/A	2023/07/11	CAM SOP-00463	SM 23 4500-Cl E m
Conductance in Water - On-site	4	N/A	2023/07/12		
Field Measured Dissolved Oxygen in Water	4	N/A	2023/07/12		
Total Metals by ICPMS	4	N/A	2023/07/13	CAM SOP-00447	EPA 6020B m
Ammonia-N	4	N/A	2023/07/12	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	4	N/A	2023/07/13	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Field Measured pH (2)	4	N/A	2023/07/12		Field pH Meter
Field Temperature (2)	4	N/A	2023/07/12		Field Thermometer
Total Kjeldahl Nitrogen in Water	4	2023/07/11	2023/07/13	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	4	2023/07/11	2023/07/12	CAM SOP-00407	SM 23 4500-P I
Turbidity - On-site	4	N/A	2023/07/12		
Volatile Organic Compounds in Water	4	N/A	2023/07/11	CAM SOP-00226	EPA 8260D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 700
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/07/17
Report #: R7720586
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3K1641

Received: 2023/07/08, 12:29

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

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Bureau Veritas Job #: C3K1641
Report Date: 2023/07/17

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: AW

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		WIF625	WIF626	WIF627	WIF628		
Sampling Date		2023/07/07	2023/07/07	2023/07/07	2023/07/07		
COC Number		n/a	n/a	n/a	n/a		
	UNITS	SS14A	SS14B	SS15A	PS-STORMDUP	RDL	QC Batch
Field Measurements							
Field Conductivity	uS/cm	520	975	520	520	N/A	ONSITE
Field Dissolved Oxygen	mg/L	5.95	9.34	6.66	6.66	N/A	ONSITE
Field Temperature	Celsius	25.8	23.3	21.5	21.5	N/A	ONSITE
Field Turbidity	NTU	26.7	34.0	12.2	12.2	N/A	ONSITE
Field Measured pH	pH	8.0	8.4	7.8	7.8		ONSITE
Inorganics							
Total Ammonia-N	mg/L	<0.15	<0.15	<0.15	<0.15	0.15	8781046
Total Kjeldahl Nitrogen (TKN)	mg/L	0.8	<0.7	<0.7	<0.7	0.7	8780987
Total Phosphorus	mg/L	0.053	0.039	0.062	0.060	0.030	8780980
Dissolved Chloride (Cl-)	mg/L	4.7	31	9.1	9.5	1.0	8779395
Nitrite (N)	mg/L	<0.010	0.409	0.127	0.131	0.010	8779183
Nitrate (N)	mg/L	<0.10	0.99	7.80	7.69	0.10	8779183

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Bureau Veritas Job #: C3K1641
Report Date: 2023/07/17

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: AW

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		WIF625	WIF626		WIF627		WIF628		
Sampling Date		2023/07/07	2023/07/07		2023/07/07		2023/07/07		
COC Number		n/a	n/a		n/a		n/a		
	UNITS	SS14A	SS14B	RDL	SS15A	RDL	PS-STORMDUP	RDL	QC Batch
Metals									
Total Aluminum (Al)	mg/L	0.48	0.40	0.02	2.7	0.08	2.7	0.08	8783356
Total Arsenic (As)	mg/L	<0.001	0.001	0.001	0.002	0.001	0.002	0.001	8783356
Total Barium (Ba)	mg/L	0.038	0.029	0.005	0.040	0.005	0.040	0.005	8783356
Total Beryllium (Be)	mg/L	<0.0006	<0.0006	0.0006	<0.0006	0.0006	<0.0006	0.0006	8783356
Total Bismuth (Bi)	mg/L	<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	8783356
Total Boron (B)	mg/L	0.11	0.27	0.02	0.28	0.02	0.29	0.02	8783356
Total Cadmium (Cd)	mg/L	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	8783356
Total Calcium (Ca)	mg/L	76	120	0.2	71	0.2	73	0.2	8783356
Total Chromium (Cr)	mg/L	<0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	8783356
Total Cobalt (Co)	mg/L	<0.0005	0.0005	0.0005	0.0013	0.0005	0.0014	0.0005	8783356
Total Copper (Cu)	mg/L	0.005	0.003	0.002	0.006	0.002	0.006	0.002	8783356
Total Iron (Fe)	mg/L	0.7	0.5	0.1	3.5	0.1	3.6	0.1	8783356
Total Lead (Pb)	mg/L	<0.0005	<0.0005	0.0005	0.0013	0.0005	0.0013	0.0005	8783356
Total Magnesium (Mg)	mg/L	20	52	0.05	16	0.05	17	0.05	8783356
Total Molybdenum (Mo)	mg/L	0.011	0.034	0.002	0.006	0.002	0.006	0.002	8783356
Total Nickel (Ni)	mg/L	0.003	0.003	0.001	0.006	0.001	0.007	0.001	8783356
Total Potassium (K)	mg/L	6.1	3.3	0.2	4.1	0.2	4.2	0.2	8783356
Total Selenium (Se)	mg/L	<0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	8783356
Total Silver (Ag)	mg/L	<0.0004	<0.0004	0.0004	<0.0004	0.0004	<0.0004	0.0004	8783356
Total Sodium (Na)	mg/L	7.4	34	0.1	11	0.1	11	0.1	8783356
Total Strontium (Sr)	mg/L	0.30	0.59	0.003	0.20	0.003	0.20	0.003	8783356
Total Tin (Sn)	mg/L	<0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	8783356
Total Titanium (Ti)	mg/L	0.010	0.008	0.005	0.035	0.005	0.04	0.03	8783356
Total Vanadium (V)	mg/L	0.001	0.001	0.001	0.005	0.001	0.006	0.001	8783356
Total Zinc (Zn)	mg/L	<0.01	<0.01	0.01	<0.01	0.01	0.01	0.01	8783356

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3K1641
Report Date: 2023/07/17

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: AW

VOLATILE ORGANICS BY GC/MS (WATER)

Bureau Veritas ID		WIF625	WIF626	WIF627	WIF628		
Sampling Date		2023/07/07	2023/07/07	2023/07/07	2023/07/07		
COC Number		n/a	n/a	n/a	n/a		
	UNITS	SS14A	SS14B	SS15A	PS-STORMDUP	RDL	QC Batch
Volatile Organics							
Benzene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8778716
Ethylbenzene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8778716
Toluene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	8778716
p+m-Xylene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8778716
o-Xylene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8778716
Total Xylenes	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8778716
Surrogate Recovery (%)							
4-Bromofluorobenzene	%	100	104	101	99		8778716
D4-1,2-Dichloroethane	%	106	106	106	105		8778716
D8-Toluene	%	97	96	98	97		8778716

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8778716	4-Bromofluorobenzene	2023/07/11	103	70 - 130	104	70 - 130	98	%				
8778716	D4-1,2-Dichloroethane	2023/07/11	103	70 - 130	107	70 - 130	102	%				
8778716	D8-Toluene	2023/07/11	98	70 - 130	97	70 - 130	97	%				
8778716	Benzene	2023/07/11	94	70 - 130	97	70 - 130	<0.10	ug/L	NC (1)	30		
8778716	Ethylbenzene	2023/07/11	91	70 - 130	92	70 - 130	<0.10	ug/L	NC (1)	30		
8778716	o-Xylene	2023/07/11	94	70 - 130	96	70 - 130	<0.10	ug/L	NC (1)	30		
8778716	p+m-Xylene	2023/07/11	98	70 - 130	99	70 - 130	<0.10	ug/L	NC (1)	30		
8778716	Toluene	2023/07/11	95	70 - 130	95	70 - 130	<0.20	ug/L	NC (1)	30		
8778716	Total Xylenes	2023/07/11					<0.10	ug/L	NC (1)	30		
8779183	Nitrate (N)	2023/07/13	99	80 - 120	98	80 - 120	<0.10	mg/L	NC (1)	20		
8779183	Nitrite (N)	2023/07/13	104	80 - 120	105	80 - 120	<0.010	mg/L	NC (1)	20		
8779395	Dissolved Chloride (Cl-)	2023/07/11	NC	80 - 120	92	80 - 120	<1.0	mg/L	0.80 (1)	20		
8780980	Total Phosphorus	2023/07/12	97	80 - 120	100	80 - 120	<0.030	mg/L	3.6 (1)	25	104	80 - 120
8780987	Total Kjeldahl Nitrogen (TKN)	2023/07/13	97	80 - 120	95	80 - 120	<0.7	mg/L	NC (1)	20	94	80 - 120
8781046	Total Ammonia-N	2023/07/12	101	75 - 125	99	80 - 120	<0.15	mg/L	NC (1)	20		
8783356	Total Aluminum (Al)	2023/07/13	104	80 - 120	99	80 - 120	<0.02	mg/L				
8783356	Total Arsenic (As)	2023/07/13	103	80 - 120	100	80 - 120	<0.001	mg/L				
8783356	Total Barium (Ba)	2023/07/13	98	80 - 120	95	80 - 120	<0.005	mg/L				
8783356	Total Beryllium (Be)	2023/07/13	110	80 - 120	103	80 - 120	<0.0006	mg/L				
8783356	Total Bismuth (Bi)	2023/07/13	95	80 - 120	95	80 - 120	<0.001	mg/L				
8783356	Total Boron (B)	2023/07/13	NC	80 - 120	102	80 - 120	<0.02	mg/L				
8783356	Total Cadmium (Cd)	2023/07/13	99	80 - 120	98	80 - 120	<0.0001	mg/L				
8783356	Total Calcium (Ca)	2023/07/13	NC	80 - 120	100	80 - 120	<0.2	mg/L				
8783356	Total Chromium (Cr)	2023/07/13	98	80 - 120	96	80 - 120	<0.005	mg/L	0.55 (1)	20		
8783356	Total Cobalt (Co)	2023/07/13	100	80 - 120	100	80 - 120	<0.0005	mg/L				
8783356	Total Copper (Cu)	2023/07/13	105	80 - 120	100	80 - 120	<0.002	mg/L	0.19 (1)	20		
8783356	Total Iron (Fe)	2023/07/13	100	80 - 120	98	80 - 120	<0.1	mg/L				
8783356	Total Lead (Pb)	2023/07/13	98	80 - 120	100	80 - 120	<0.0005	mg/L				
8783356	Total Magnesium (Mg)	2023/07/13	NC	80 - 120	99	80 - 120	<0.05	mg/L				
8783356	Total Molybdenum (Mo)	2023/07/13	108	80 - 120	102	80 - 120	<0.002	mg/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8783356	Total Nickel (Ni)	2023/07/13	95	80 - 120	97	80 - 120	<0.001	mg/L	1.2 (1)	20		
8783356	Total Potassium (K)	2023/07/13	98	80 - 120	99	80 - 120	<0.2	mg/L				
8783356	Total Selenium (Se)	2023/07/13	108	80 - 120	106	80 - 120	<0.005	mg/L				
8783356	Total Silver (Ag)	2023/07/13	98	80 - 120	98	80 - 120	<0.0004	mg/L				
8783356	Total Sodium (Na)	2023/07/13	NC	80 - 120	99	80 - 120	<0.1	mg/L				
8783356	Total Strontium (Sr)	2023/07/13	NC	80 - 120	93	80 - 120	<0.003	mg/L				
8783356	Total Tin (Sn)	2023/07/13	100	80 - 120	96	80 - 120	<0.002	mg/L				
8783356	Total Titanium (Ti)	2023/07/13	102	80 - 120	96	80 - 120	<0.005	mg/L				
8783356	Total Vanadium (V)	2023/07/13	101	80 - 120	96	80 - 120	<0.001	mg/L				
8783356	Total Zinc (Zn)	2023/07/13	100	80 - 120	102	80 - 120	<0.01	mg/L	1.4 (1)	20		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

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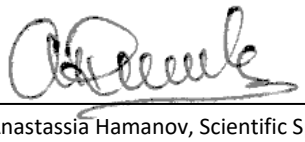
Bureau Veritas Job #: C3K1641
Report Date: 2023/07/17

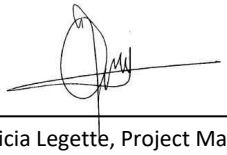
RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: AW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist



Patricia Legette, Project Manager

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FIELD INFORMATION FORM

BUREAU VERITAS

WASTE MANAGEMENT

Site Name: TCEC

Site No.: Sample: 55144 (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes. Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: [Y] or [N]

Filter Device: [Y] or [N] [0.45 µ] or [ ] µ (circle or fill in)

Purging Device: [ ] A-Submersible Pump B-Peristaltic Pump C-QED Bladder Pump D-Bailer E-Piston Pump F-Dipper/Bottle

Filter Type: [ ] A-In-line Disposable B-Pressure C-Vacuum X-Other: ____

Sampling Device: [ ]

X-Other: [ ]

Sample Tube Type: [ ] A-Teflon B-Stainless Steel C-PVC D-Polypropylene X-Other: ____

WELL DATA

Well Elevation (at TOC) [ ] (ft/msl)

Depth to Water (DTW) (from TOC) [ ] (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC) [ ] (ft msl)

Total Well Depth (from TOC) [ ] (ft)

Stick Up (from ground elevation) [ ] (ft)

Casing ID [ ] (in)

Casing Material [ ]

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
07 07 23	8.0	320	25.8	2.67	5.95		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

Sample Appearance: Transparent Odor: NIA Color: yellow/brown Other: ____

Weather Conditions (required daily, or as conditions change): 20°C Direction/Speed: N 14kn/h Outlook: Clear Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required): ____

FIELD COMMENTS

flow 1m: 130s W.lvl: 1m Storm Sample

110s delh: 8cm

115s

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
07/07/23	Alex Waterson	Alex Waterson	GWDE

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v.3.1 06/20

0823

FIELD INFORMATION FORM

BUREAU VERITAS

WASTE MANAGEMENT

Site Name: TCEC

Site No.: Sample: SS146 (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes, Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: Y or N

Filter Device: Y or N — 0.45 µ or ____ µ (circle or fill in)

Purging Device: A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Sampling Device: (same codes)

X-Other:

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other:

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other:

WELL DATA

Well Elevation (at TOC) (ft/msl) | Depth to Water (DTW) (from TOC) (ft) | Groundwater Elevation (GWE) (Site Datum, from TOC) (ft msl)

Total Well Depth (from TOC) (ft) | Stick Up (from ground elevation) (ft) | Casing ID (in) | Casing Material

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
07 07 23	8.4	MS 975	23.3	34.0	9.34		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

Sample Appearance: Translucent Odor: N/O Color: Colourless Other:

Weather Conditions (required daily, or as conditions change): 19°C Direction/Speed: N 16 km/h Outlook: Fair Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required):

FIELD COMMENTS

Flow rate: 105
11 s
9 s

depth 3cm
Width 1m

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
07 07 23	Alex Watson	Alex Watson	RAGI

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v. 3.1 06/20

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FIELD INFORMATION FORM

BUREAU VERITAS

WASTE MANAGEMENT

Site Name: TCEC

Site No.: Sample: SJ1 5A (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes. Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: Y or N

Filter Device: Y or N; 0.45 µ or ____ µ (circle or fill in)

Purging Device: A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Sampling Device: (same codes)

X-Other:

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other: ____

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other: ____

WELL DATA

Well Elevation (at TOC) (ft/msl)

Depth to Water (DTW) (from TOC) (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC) (ft msl)

Total Well Depth (from TOC) (ft)

Stick Up (from ground elevation) (ft)

Casing ID (in)

Casing Material

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
070723	7.84	5210	21.5	122	~~7.26~~ 6.68		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

FIELD COMMENTS

Sample Appearance: Translucent Odor: N10 Color: Grey/Brown Other: ____

Weather Conditions (required daily, or as conditions change): 19°C Direction/Speed: N 14 Km/h Outlook: Fair Precipitation: Y or (N)

Specific Comments (including purge/well volume calculations if required): ____

Flow rate: 115 depth 6cm PZ-STORMDR1

115 Width 1m PS-STORMDR1

15 Collected

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
07.07.23	Alex Watson	Alex Watson	Rincon

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v.3.1 06/20

0821

Maxxam Analytics Inc
6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #		
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285756	
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Unit 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	CHAIN OF CUSTODY # :
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x 2618 Fax: 519-823-1316	Project Name:	Twin Creeks SW	
Email:	lmertick@wm.com	Email:	BJL@RWDI.com, JCL@RWDI.com	Location:	Twin Creeks	TCEC-SWCM-JUL
				Sampled By:	AW	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

- [ ] MISA — Reg. 153 — Sewer Use — [ ] Other
- [x] PWQO — [ ] Table 1 / [ ] Table 2 / [ ] Table 3 — [ ] Sanitary / [ ] Storm — specify
- [ ] Reg. 558 — Region _____

Report Criteria on C of A ? [n]

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ON-WLF-2023 TCLS - SW POPLAR STORM EVENT	# of Cont.	COMMENTS / TAT COMMENTS
1	SS14A	7-Jul-23	PM	SW	N	N	X	6	
2	SS14B	7-Jul-23	AM	SW	N	N	X	6	
3	SS15A	7-Jul-23	AM	SW	N	N	X	6	PS-STORMDUP collected
4	PS-STORMDUP	7-Jul-23	AM	SW	N	N	X	6	
5									
6									
7									
8									
9									
10									
11									
12									

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
[x] 5 to 7 Working Days

Rush TAT: Rush Confirmation # _____ (call Lab for #)
[ ] 1 day [ ] 2 days [ ] 3 days
DATE Required: 18-Jul-23
TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

08-Jul-23 12:29
Patricia Legette
C3K1641
ENV-868

See lab addendum for lab group coding

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:
AW-7/2023	Jagdeep JAGDEEP KAUR	2023/07/08	12:29
8-Jul-2023			
Luke Lawson			

Laboratory Use Only

Temperature (°C) on Receipt	Condition of Sample on Receipt
9/10/10 ice	[ ] OK [ ] SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

White: Maxxam Yellow: Mail Pink: Client

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 700
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/07/24
Report #: R7732310
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3K9610
Received: 2023/07/14, 09:00

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Chloride by Automated Colourimetry	4	N/A	2023/07/18	CAM SOP-00463	SM 23 4500-Cl E m
Conductance in Water - On-site	4	N/A	2023/07/19		
Field Measured Dissolved Oxygen in Water	4	N/A	2023/07/19		
Total Metals by ICPMS	4	N/A	2023/07/21	CAM SOP-00447	EPA 6020B m
Ammonia-N	4	N/A	2023/07/20	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	4	N/A	2023/07/17	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Field Measured pH (2)	4	N/A	2023/07/19		Field pH Meter
Field Temperature (2)	4	N/A	2023/07/19		Field Thermometer
Total Kjeldahl Nitrogen in Water	4	2023/07/17	2023/07/18	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	4	2023/07/18	2023/07/18	CAM SOP-00407	SM 23 4500-P I
Turbidity - On-site	4	N/A	2023/07/19		
Volatile Organic Compounds in Water	4	N/A	2023/07/17	CAM SOP-00226	EPA 8260D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 700
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/07/24
Report #: R7732310
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3K9610

Received: 2023/07/14, 09:00

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3K9610
Report Date: 2023/07/24

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: AW

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		WJW667	WJW668	WJW669	WJW670		
Sampling Date		2023/07/13	2023/07/13	2023/07/13	2023/07/13		
COC Number		n/a	n/a	n/a	n/a		
	UNITS	SS14A	SS14B	SS15A	PS-STORMDUP	RDL	QC Batch
Field Measurements							
Field Conductivity	uS/cm	436	871	381	381	N/A	ONSITE
Field Dissolved Oxygen	mg/L	7.50	9.23	6.82	6.82	N/A	ONSITE
Field Temperature	Celsius	20.4	20.5	19.4	19.4	N/A	ONSITE
Field Turbidity	NTU	79.1	63.2	>1000	>1000	N/A	ONSITE
Field Measured pH	pH	7.5	8.3	7.5	7.5		ONSITE
Inorganics							
Total Ammonia-N	mg/L	<0.15	<0.15	<0.15	<0.15	0.15	8796490
Total Kjeldahl Nitrogen (TKN)	mg/L	<0.7	1.3	<0.7	<0.7	0.7	8793374
Total Phosphorus	mg/L	0.065	0.086	0.23	0.23	0.030	8795617
Dissolved Chloride (Cl-)	mg/L	1.4	41	7.1	12	1.0	8791307
Nitrite (N)	mg/L	<0.010	0.037	0.073	0.070	0.010	8791304
Nitrate (N)	mg/L	<0.10	1.17	3.85	3.88	0.10	8791304

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3K9610
Report Date: 2023/07/24

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: AW

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		WJW667	WJW668		WJW669	WJW670		
Sampling Date		2023/07/13	2023/07/13		2023/07/13	2023/07/13		
COC Number		n/a	n/a		n/a	n/a		
	UNITS	SS14A	SS14B	RDL	SS15A	PS-STORMDUP	RDL	QC Batch
Metals								
Total Aluminum (Al)	mg/L	1.6	0.85	0.02	25	25	0.2	8795263
Total Arsenic (As)	mg/L	0.001	0.002	0.001	0.009	0.009	0.001	8795263
Total Barium (Ba)	mg/L	0.033	0.050	0.005	0.17	0.16	0.005	8795263
Total Beryllium (Be)	mg/L	<0.0006	<0.0006	0.0006	0.0014	0.0013	0.0006	8795263
Total Bismuth (Bi)	mg/L	<0.001	<0.001	0.001	<0.001	<0.001	0.001	8795263
Total Boron (B)	mg/L	0.07	1.3	0.02	0.30	0.30	0.02	8795263
Total Cadmium (Cd)	mg/L	<0.0001	<0.0001	0.0001	0.0002	0.0002	0.0001	8795263
Total Calcium (Ca)	mg/L	67	98	0.2	56	55	0.2	8795263
Total Chromium (Cr)	mg/L	<0.005	<0.005	0.005	0.039	0.040	0.005	8795263
Total Cobalt (Co)	mg/L	0.0013	0.0012	0.0005	0.013	0.012	0.0005	8795263
Total Copper (Cu)	mg/L	0.005	0.009	0.002	0.026	0.026	0.002	8795263
Total Iron (Fe)	mg/L	2.4	1.5	0.1	39	38	0.1	8795263
Total Lead (Pb)	mg/L	0.0024	0.0008	0.0005	0.013	0.013	0.0005	8795263
Total Magnesium (Mg)	mg/L	18	29	0.05	20	20	0.05	8795263
Total Molybdenum (Mo)	mg/L	0.009	0.009	0.002	0.007	0.007	0.002	8795263
Total Nickel (Ni)	mg/L	0.005	0.009	0.001	0.049	0.051	0.001	8795263
Total Potassium (K)	mg/L	5.5	11	0.2	8.8	8.9	0.2	8795263
Total Selenium (Se)	mg/L	<0.005	<0.005	0.005	<0.005	<0.005	0.005	8795263
Total Silver (Ag)	mg/L	<0.0004	<0.0004	0.0004	<0.0004	<0.0004	0.0004	8795263
Total Sodium (Na)	mg/L	5.6	72	0.1	14	14	0.1	8795263
Total Strontium (Sr)	mg/L	0.31	0.43	0.003	0.19	0.19	0.003	8795263
Total Tin (Sn)	mg/L	<0.002	<0.002	0.002	<0.002	<0.002	0.002	8795263
Total Titanium (Ti)	mg/L	0.033	0.018	0.005	0.15	0.15	0.005	8795263
Total Vanadium (V)	mg/L	0.003	0.002	0.001	0.045	0.047	0.001	8795263
Total Zinc (Zn)	mg/L	<0.01	<0.01	0.01	0.10	0.10	0.01	8795263

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3K9610
Report Date: 2023/07/24

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: AW

VOLATILE ORGANICS BY GC/MS (WATER)

Bureau Veritas ID		WJW667	WJW668	WJW669	WJW670		
Sampling Date		2023/07/13	2023/07/13	2023/07/13	2023/07/13		
COC Number		n/a	n/a	n/a	n/a		
	UNITS	SS14A	SS14B	SS15A	PS-STORMDUP	RDL	QC Batch
Volatile Organics							
Benzene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8788966
Ethylbenzene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8788966
Toluene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	8788966
p+m-Xylene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8788966
o-Xylene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8788966
Total Xylenes	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8788966
Surrogate Recovery (%)							
4-Bromofluorobenzene	%	100	99	99	99		8788966
D4-1,2-Dichloroethane	%	101	101	99	99		8788966
D8-Toluene	%	98	97	100	98		8788966

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

GENERAL COMMENTS

Results relate only to the items tested.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3K9610
Report Date: 2023/07/24

QUALITY ASSURANCE REPORT

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: AW

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8788966	4-Bromofluorobenzene	2023/07/17	104	70 - 130	105	70 - 130	100	%				
8788966	D4-1,2-Dichloroethane	2023/07/17	97	70 - 130	99	70 - 130	102	%				
8788966	D8-Toluene	2023/07/17	97	70 - 130	99	70 - 130	97	%				
8788966	Benzene	2023/07/17	94	70 - 130	99	70 - 130	<0.10	ug/L	NC (1)	30		
8788966	Ethylbenzene	2023/07/17	91	70 - 130	96	70 - 130	<0.10	ug/L	NC (1)	30		
8788966	o-Xylene	2023/07/17	94	70 - 130	98	70 - 130	<0.10	ug/L	NC (1)	30		
8788966	p+m-Xylene	2023/07/17	98	70 - 130	103	70 - 130	<0.10	ug/L	NC (1)	30		
8788966	Toluene	2023/07/17	94	70 - 130	98	70 - 130	<0.20	ug/L	NC (1)	30		
8788966	Total Xylenes	2023/07/17					<0.10	ug/L	NC (1)	30		
8791304	Nitrate (N)	2023/07/17	NC	80 - 120	102	80 - 120	<0.10	mg/L	1.2 (1)	20		
8791304	Nitrite (N)	2023/07/17	NC	80 - 120	106	80 - 120	<0.010	mg/L				
8791307	Dissolved Chloride (Cl-)	2023/07/18	91 (2)	80 - 120	88	80 - 120	<1.0	mg/L	0.20 (3)	20		
8793374	Total Kjeldahl Nitrogen (TKN)	2023/07/18	99 (4)	80 - 120	103	80 - 120	<0.7	mg/L	NC (5)	20	101	80 - 120
8795263	Total Aluminum (Al)	2023/07/21	NC	80 - 120	99	80 - 120	<0.02	mg/L				
8795263	Total Arsenic (As)	2023/07/21	102	80 - 120	101	80 - 120	<0.001	mg/L	1.5 (1)	20		
8795263	Total Barium (Ba)	2023/07/21	100	80 - 120	99	80 - 120	<0.005	mg/L	1.7 (1)	20		
8795263	Total Beryllium (Be)	2023/07/21	102	80 - 120	103	80 - 120	<0.0006	mg/L				
8795263	Total Bismuth (Bi)	2023/07/21	102	80 - 120	97	80 - 120	<0.001	mg/L				
8795263	Total Boron (B)	2023/07/21	97	80 - 120	99	80 - 120	<0.02	mg/L	0.73 (1)	20		
8795263	Total Cadmium (Cd)	2023/07/21	101	80 - 120	100	80 - 120	<0.0001	mg/L	NC (1)	20		
8795263	Total Calcium (Ca)	2023/07/21	NC	80 - 120	102	80 - 120	<0.2	mg/L	2.8 (1)	20		
8795263	Total Chromium (Cr)	2023/07/21	97	80 - 120	96	80 - 120	<0.005	mg/L	2.2 (1)	20		
8795263	Total Cobalt (Co)	2023/07/21	95	80 - 120	96	80 - 120	<0.0005	mg/L				
8795263	Total Copper (Cu)	2023/07/21	98	80 - 120	100	80 - 120	<0.002	mg/L	1.8 (1)	20		
8795263	Total Iron (Fe)	2023/07/21	99	80 - 120	98	80 - 120	<0.1	mg/L	1.8 (1)	20		
8795263	Total Lead (Pb)	2023/07/21	99	80 - 120	95	80 - 120	<0.0005	mg/L	0.65 (1)	20		
8795263	Total Magnesium (Mg)	2023/07/21	NC	80 - 120	98	80 - 120	<0.05	mg/L	0.87 (1)	20		
8795263	Total Molybdenum (Mo)	2023/07/21	105	80 - 120	103	80 - 120	<0.002	mg/L				
8795263	Total Nickel (Ni)	2023/07/21	94	80 - 120	95	80 - 120	<0.001	mg/L	2.0 (1)	20		
8795263	Total Potassium (K)	2023/07/21	102	80 - 120	101	80 - 120	<0.2	mg/L	1.1 (1)	20		

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8795263	Total Selenium (Se)	2023/07/21	104	80 - 120	104	80 - 120	<0.005	mg/L				
8795263	Total Silver (Ag)	2023/07/21	98	80 - 120	96	80 - 120	<0.0004	mg/L				
8795263	Total Sodium (Na)	2023/07/21	96	80 - 120	99	80 - 120	<0.1	mg/L	1.5 (1)	20		
8795263	Total Strontium (Sr)	2023/07/21	99	80 - 120	96	80 - 120	<0.003	mg/L				
8795263	Total Tin (Sn)	2023/07/21	102	80 - 120	100	80 - 120	<0.002	mg/L				
8795263	Total Titanium (Ti)	2023/07/21	114	80 - 120	97	80 - 120	<0.005	mg/L				
8795263	Total Vanadium (V)	2023/07/21	98	80 - 120	97	80 - 120	<0.001	mg/L				
8795263	Total Zinc (Zn)	2023/07/21	100	80 - 120	100	80 - 120	<0.01	mg/L	5.5 (1)	20		
8795617	Total Phosphorus	2023/07/18	103 (4)	80 - 120	105	80 - 120	<0.030	mg/L	2.8 (5)	25	109	80 - 120
8796490	Total Ammonia-N	2023/07/20	101	75 - 125	101	80 - 120	<0.15	mg/L	17 (1)	20		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Matrix Spike Parent ID [WJW667-01]

(3) Duplicate Parent ID [WJW667-01]

(4) Matrix Spike Parent ID [WJW667-02]

(5) Duplicate Parent ID [WJW667-02]

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3K9610
Report Date: 2023/07/24

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: AW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere, Senior Scientific Specialist

Patricia Legette, Project Manager

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

S2437676

BUREAU VERITAS

FIELD INFORMATION FORM

WM WASTE MANAGEMENT

Site Name: TCEC

Site No.: Sample: JSC4A (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes, Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: Y or N

Purging Device:
Sampling Device:
X-Other:

A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Filter Device: Y or N — 0.45 µ or ____ µ (circle or fill in)

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other:

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other:

WELL DATA

Well Elevation (at TOC) (ft/msl)
Depth to Water (DTW) (from TOC) (ft)
Groundwater Elevation (GWE) (Site Datum, from TOC) (ft msl)
Total Well Depth (from TOC) (ft)
Stick Up (from ground elevation) (ft)
Casing ID (in)
Casing Material

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
07 13 23	7.5	436	20.4	79.1	7.50		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

Sample Appearance: opaque Odor: NIL Color: yellow/brown Other:

Weather Conditions (required daily, or as conditions change): 18°C Direction/Speed: NW 24 Km/h Outlook: Overcast Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required):

FIELD COMMENTS

Flow 1m Width 1m
90s depth 10cm
90s
100s

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
07/13/23	Alex Watson	[signature]	AWDI

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 06/20

S2437676

BUREAU VERITAS

FIELD INFORMATION FORM

WASTE MANAGEMENT

Site Name: TCEC

Site No.: Sample: MS14B (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes, Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: Y or N

Filter Device: Y or N — 0.45 µ or ____ µ (circle or fill in)

Purging Device: A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Sampling Device:

X-Other:

Filter Type: A-In-line Disposable, B-Pressure, X-Other:

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other:

WELL DATA

Well Elevation (at TOC) (ft/msl)

Depth to Water (DTW) (from TOC) (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC) (ft msl)

Total Well Depth (from TOC) (ft)

Stick Up (from ground elevation) (ft)

Casing ID (in)

Casing Material

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
07 13 23	8.3	MS 871	20.5	63.2	7.23		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

FIELD COMMENTS

Sample Appearance: Translucent Odor: None Color: yellow Other:

Weather Conditions (required daily, or as conditions change): 18°C Direction/Speed: VV 24 km/h Outlook: Overcast Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required):

Flow 1m 20s depth 7cm

20s width 1m

10s

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
07,13,23	Alan Vaterson	Alan Vaterson	RLDZ
/ /			

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 09/20

FIELD INFORMATION FORM

BUREAU VERITAS

WM WASTE MANAGEMENT

e Name: TCEC

te No.: Sample: JSCSA (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes, Record field data below.

EQUIPMENT

Purging and Sampling Equipment ... Dedicated: [Y] or [N]

Filter Device: [Y] or [N] [0.45 µ] or [ ] µ (circle or fill in)

Purging Device: A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other:

Sampling Device:

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other:

X-Other:

WELL DATA

Well Elevation (at TOC)	(ft/msl)	Depth to Water (DTW) (from TOC)	(ft)	Groundwater Elevation (GWE) (Site Datum, from TOC)	(ft msl)
Total Well Depth (from TOC)	(ft)	Stick Up (from ground elevation)	(ft)	Casing ID	(in)

Casing Material:

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
07 13 23	7.5	384 (NS 391)	19.4	>1000	8.82		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

FIELD COMMENTS

Sample Appearance: Plaque Odor: NO Color: brown Other:

Weather Conditions (required daily, or as conditions change): 17°C Direction/Speed: NW 21 km/h Outlook: overcast Precipitation: Y or (N)

Specific Comments (including purge/well volume calculations if required):

Flow Inc Width 1m PS Stormdup taken

5s depth 80cm

7s

5s

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
07/13/23	Alex Waterson	Alex Waterson	RLDE

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v 3.1 06/20

0835

IMMEDIATE

Maxxam Analytics Inc 6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #		
Contact Name:	Lisa Mertick	Contact Name:	Brent Langille	P.O. #:	12285756	
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Unit 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	CHAIN OF CUSTODY # :
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x 2618 Fax: 519-823-1316	Project Name:	Twin Creeks SW	TCEC-SWCM-JUL
Email:	lmertick@wm.com	Email:	BJL@RWDI.com, JCL@RWDI.com	Location:	Twin Creeks	
				Sampled By:	AW	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

- [ ] MISA — Reg. 153: [ ] Table 1 [ ] Table 2 [ ] Table 3 — Sewer Use: [ ] Sanitary [ ] Storm — Region ____
- [x] PWQO
- [ ] Reg. 558
- [ ] Other — specify ____

Report Criteria on C of A ? [n]

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ON-WLF-2023 TCLS - SW POPLAR STORM EVENT	# of Cont.	COMMENTS / TAT COMMENTS
1	SS14A	13-Jul-23	AM	SW	N	N	X	6	
2	SS14B	13-Jul-23	AM	SW	N	N	X	6	
3	SS15A	13-Jul-23	AM	SW	N	N	X	6	PS-STORMDUP collected
4	PS-STORMDUP	13-Jul-23	AM	SW	N	N	X	6	
5									
6									
7									
8									
9									
10									
11									cs intact
12									See lab addendum for lab group coding

14-Jul-23 09:00
Patricia Legette
C3K9610
HPK ENV-713

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
[x] 5 to 7 Working Days

Rush TAT: Rush Confirmation # ____ (call Lab for #)
[ ] 1 day [ ] 2 days [ ] 3 days
DATE Required: 24-Jul-23
TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:
AW-13-Jul-23		023/07/14	0P200

Laboratory Use Only

Temperature (°C) on Receipt: 2/3/5 5/5/5

Condition of Sample on Receipt: [ ] OK [ ] SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

White: Maxxam Yellow: Mail Pink: Client

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 700
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/11/15
Report #: R7912525
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3Y5345
Received: 2023/11/03, 08:57

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	4	N/A	2023/11/05	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	4	N/A	2023/11/06	CAM SOP-00463	SM 23 4500-Cl E m
Conductance in Water - On-site	4	N/A	2023/11/10		
Field Measured Dissolved Oxygen in Water	4	N/A	2023/11/10		
Total Metals by ICPMS	4	N/A	2023/11/06	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	3	N/A	2023/11/06	CAM SOP-00441	USGS I-2522-90 m
Total Ammonia-N	1	N/A	2023/11/07	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	2	N/A	2023/11/13	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Nitrate & Nitrite as Nitrogen in Water (1)	2	N/A	2023/11/15	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Phenols (4AAP)	4	N/A	2023/11/08	CAM SOP-00444	OMOE E3179 m
Field Measured pH (2)	4	N/A	2023/11/10		Field pH Meter
Sulphate by Automated Turbidimetry	4	N/A	2023/11/06	CAM SOP-00464	SM 23 4500-SO42- E m
Field Temperature (2)	4	N/A	2023/11/10		Field Thermometer
Total Organic Carbon (TOC) (3)	4	N/A	2023/11/07	CAM SOP-00446	SM 23 5310B m
Turbidity - On-site	4	N/A	2023/11/10		
Un-ionized Ammonia (4)	4	2023/11/03	2023/11/10	Auto Calc.	PWQO
Volatile Organic Compounds in Water	4	N/A	2023/11/06	CAM SOP-00226	EPA 8260D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the

Your P.O. #: 12285756
Your Project #: 2303459.01
Site#: 700
Site Location: ON07
Your C.O.C. #: n/a

Attention: Khalid Hussein - Twin Creeks

RWDI Inc.
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2023/11/15
Report #: R7912525
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3Y5345
Received: 2023/11/03, 08:57
customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.
(3) Total Organic Carbon (TOC) present in the sample should be considered as non-purgeable TOC.
(4) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3Y5345
Report Date: 2023/11/15

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: JRA

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XMR924		XMR925		XMR926		
Sampling Date		2023/11/02		2023/11/02		2023/11/02		
COC Number		n/a		n/a		n/a		
	UNITS	SS14A	QC Batch	SS14B	QC Batch	SS15A	RDL	QC Batch
Calculated Parameters								
Total Un-ionized Ammonia	mg/L	<0.00061	9027219	<0.00061	9027219	<0.00061	0.00061	9027219
Field Measurements								
Field Conductivity	uS/cm	818	ONSITE	1218	ONSITE	852	N/A	ONSITE
Field Dissolved Oxygen	mg/L	12.6	ONSITE	13.31	ONSITE	12.54	N/A	ONSITE
Field Temperature	Celsius	4.3	ONSITE	4.5	ONSITE	4.5	N/A	ONSITE
Field Measured Field Turbidity	NTU	13.0	ONSITE	31.1	ONSITE	54.4	N/A	ONSITE
Field Measured pH	pH	6.8	ONSITE	6.9	ONSITE	6.7		ONSITE
Inorganics								
Total Ammonia-N	mg/L	<0.050	9032099	<0.050	9032099	<0.050	0.050	9032099
Total Organic Carbon (TOC)	mg/L	8.4	9031429	9.0	9031429	11	0.40	9031429
Phenols-4AAP	mg/L	<0.0010	9036043	<0.0010	9036043	<0.0010	0.0010	9036043
Dissolved Sulphate (SO4)	mg/L	210	9028232	320	9028232	130	1.0	9028232
Alkalinity (Total as CaCO3)	mg/L	230	9028253	180	9028253	220	1.0	9028253
Dissolved Chloride (Cl-)	mg/L	12	9028223	110	9028223	63	1.0	9028223
Nitrate (N)	mg/L	<0.10	9028220	2.40	9028730	1.43	0.10	9028220

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Bureau Veritas Job #: C3Y5345
Report Date: 2023/11/15

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: JRA

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XMR927		
Sampling Date		2023/11/02		
COC Number		n/a		
	UNITS	PSSWDUP	RDL	QC Batch
Calculated Parameters				
Total Un-ionized Ammonia	mg/L	<0.00061	0.00061	9027219
Field Measurements				
Field Conductivity	uS/cm	1218	N/A	ONSITE
Field Dissolved Oxygen	mg/L	13.1	N/A	ONSITE
Field Temperature	Celsius	4.5	N/A	ONSITE
Field Measured Field Turbidity	NTU	31.1	N/A	ONSITE
Field Measured pH	pH	6.9		ONSITE
Inorganics				
Total Ammonia-N	mg/L	0.061	0.050	9032099
Total Organic Carbon (TOC)	mg/L	9.2	0.40	9031429
Phenols-4AAP	mg/L	<0.0010	0.0010	9036043
Dissolved Sulphate (SO4)	mg/L	310	1.0	9028232
Alkalinity (Total as CaCO3)	mg/L	180	1.0	9028253
Dissolved Chloride (Cl-)	mg/L	110	1.0	9028223
Nitrate (N)	mg/L	2.40	0.10	9028730

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Bureau Veritas Job #: C3Y5345
Report Date: 2023/11/15

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: JRA

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		XMR924	XMR925	XMR926	XMR927		
Sampling Date		2023/11/02	2023/11/02	2023/11/02	2023/11/02		
COC Number		n/a	n/a	n/a	n/a		
	UNITS	SS14A	SS14B	SS15A	PSSWDUP	RDL	QC Batch
Metals							
Total Boron (B)	mg/L	0.18	0.45	1.4	0.47	0.02	9030359
Total Calcium (Ca)	mg/L	95	79	110	83	0.2	9030359
Total Chromium (Cr)	mg/L	<0.005	0.011	<0.005	0.011	0.005	9030359
Total Iron (Fe)	mg/L	1.8	10	0.9	10	0.1	9030359
Total Magnesium (Mg)	mg/L	29	31	35	32	0.05	9030359
Total Nickel (Ni)	mg/L	0.004	0.018	0.012	0.018	0.001	9030359
Total Potassium (K)	mg/L	6.8	6.5	13	6.8	0.2	9030359
Total Sodium (Na)	mg/L	20	42	100	43	0.1	9030359
Total Zinc (Zn)	mg/L	<0.01	0.03	0.07	0.03	0.01	9030359

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: JRA

VOLATILE ORGANICS BY GC/MS (WATER)

Bureau Veritas ID		XMR924	XMR925	XMR926	XMR927		
Sampling Date		2023/11/02	2023/11/02	2023/11/02	2023/11/02		
COC Number		n/a	n/a	n/a	n/a		
	UNITS	SS14A	SS14B	SS15A	PSSWDUP	RDL	QC Batch
Volatile Organics							
Benzene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	9029684
Ethylbenzene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	9029684
Toluene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	9029684
p+m-Xylene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	9029684
o-Xylene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	9029684
Total Xylenes	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	9029684
Surrogate Recovery (%)							
4-Bromofluorobenzene	%	103	103	103	103		9029684
D4-1,2-Dichloroethane	%	109	108	108	109		9029684
D8-Toluene	%	98	98	98	98		9029684

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3Y5345
Report Date: 2023/11/15

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: JRA

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.7°C
Package 2	6.7°C
Package 3	9.0°C
Package 4	7.3°C
Package 5	6.3°C
Package 6	5.0°C

Nitrate & Nitrite: Analysis was performed past sample holding time. This may increase the variability associated with these results.

Results relate only to the items tested.

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Bureau Veritas Job #: C3Y5345
Report Date: 2023/11/15

QUALITY ASSURANCE REPORT

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: JRA

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9029684	4-Bromofluorobenzene	2023/11/06	104	70 - 130	105	70 - 130	100	%		
9029684	D4-1,2-Dichloroethane	2023/11/06	100	70 - 130	104	70 - 130	104	%		
9029684	D8-Toluene	2023/11/06	101	70 - 130	100	70 - 130	99	%		
9028220	Nitrate (N)	2023/11/15	96	80 - 120	95	80 - 120	<0.10	mg/L	NC (1)	20
9028223	Dissolved Chloride (Cl-)	2023/11/06	97	80 - 120	99	80 - 120	<1.0	mg/L	NC (1)	20
9028232	Dissolved Sulphate (SO4)	2023/11/06	90	75 - 125	101	80 - 120	<1.0	mg/L	NC (1)	20
9028253	Alkalinity (Total as CaCO3)	2023/11/05			96	85 - 115	<1.0	mg/L	1.1 (1)	20
9028730	Nitrate (N)	2023/11/13	90	80 - 120	101	80 - 120	<0.10	mg/L	NC (1)	20
9029684	Benzene	2023/11/06	95	70 - 130	95	70 - 130	<0.10	ug/L	NC (1)	30
9029684	Ethylbenzene	2023/11/06	97	70 - 130	96	70 - 130	<0.10	ug/L	NC (1)	30
9029684	o-Xylene	2023/11/06	87	70 - 130	89	70 - 130	<0.10	ug/L	NC (1)	30
9029684	p+m-Xylene	2023/11/06	102	70 - 130	101	70 - 130	<0.10	ug/L	NC (1)	30
9029684	Toluene	2023/11/06	95	70 - 130	94	70 - 130	<0.20	ug/L	NC (1)	30
9029684	Total Xylenes	2023/11/06					<0.10	ug/L		
9030359	Total Boron (B)	2023/11/06	NC	80 - 120	101	80 - 120	<0.02	mg/L	6.4 (1)	20
9030359	Total Calcium (Ca)	2023/11/06	NC	80 - 120	97	80 - 120	<0.2	mg/L	5.2 (1)	20
9030359	Total Chromium (Cr)	2023/11/06	98	80 - 120	97	80 - 120	<0.005	mg/L	0 (1)	20
9030359	Total Iron (Fe)	2023/11/06	98	80 - 120	98	80 - 120	<0.1	mg/L		
9030359	Total Magnesium (Mg)	2023/11/06	NC	80 - 120	98	80 - 120	<0.05	mg/L	3.4 (1)	20
9030359	Total Nickel (Ni)	2023/11/06	94	80 - 120	96	80 - 120	<0.001	mg/L	0.66 (1)	20
9030359	Total Potassium (K)	2023/11/06	NC	80 - 120	99	80 - 120	<0.2	mg/L	3.5 (1)	20
9030359	Total Sodium (Na)	2023/11/06	NC	80 - 120	99	80 - 120	<0.1	mg/L	3.4 (1)	20
9030359	Total Zinc (Zn)	2023/11/06	95	80 - 120	97	80 - 120	<0.01	mg/L	6.8 (1)	20
9031429	Total Organic Carbon (TOC)	2023/11/07	94	80 - 120	99	80 - 120	<0.40	mg/L	2.5 (1)	20
9032099	Total Ammonia-N	2023/11/06	98	75 - 125	102	80 - 120	<0.050	mg/L	0.64 (1)	20

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9036043	Phenols-4AAP	2023/11/08	103	80 - 120	102	80 - 120	<0.0010	mg/L	NC (1)	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

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Bureau Veritas Job #: C3Y5345
Report Date: 2023/11/15

RWDI Inc.
Client Project #: 2303459.01
Site Location: ON07
Your P.O. #: 12285756
Sampler Initials: JRA

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Anastassia Hamanov, Scientific Specialist

Cristina Carriere, Senior Scientific Specialist

Patricia Legette, Project Manager

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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FIELD INFORMATION FORM

BUREAU VERITAS

WASTE MANAGEMENT

Site Name: TCC

Site No.: Sample: SS14 (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes, Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: Y or N

Filter Device: Y or N 0.45 µ or _____ µ (circle or fill in)

Purging Device: A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Sampling Device:

X-Other:

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other: _____

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other: _____

WELL DATA

Well Elevation (at TOC) (ft/msl)

Depth to Water (DTW) (from TOC) (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC) (ft msl)

Total Well Depth (from TOC) (ft)

Stick Up (from ground elevation) (ft)

Casing ID (in)

Casing Material

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
11 02 23	6.8	818	4.3	13.0	12.6		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

Sample Appearance: transparent Odor: N/O Color: N/C Other: _____

Weather Conditions (required daily, or as conditions change): 4°C Direction/Speed: 20km/45w Outlook: partly cloud Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required):

FIELD COMMENTS

Width : 0.40m
Depth 0.15m
time in 1:33
2:35
3:35

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
11/02/23	Jake Arbak		KWPZ

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v-3.1 06/2

0903

BUREAU VERITAS

FIELD INFORMATION FORM

WASTE MANAGEMENT

Site Name: TCC

Site No.: Sample: S3144 (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes. Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: Y or N

Filter Device: Y or N 0.45 µ or ____ µ (circle or fill in)

Purging Device: A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other: ____

Sampling Device:

X-Other:

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other: ____

WELL DATA

Well Elevation (at TOC) ____ (ft/msl) Depth to Water (DTW) (from TOC) ____ (ft) Groundwater Elevation (GWE) (Site Datum, from TOC) ____ (ft msl)

Total Well Depth (from TOC) ____ (ft) Stick Up (from ground elevation) ____ (ft) Casing ID ____ (in) Casing Material ____

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
11 02 23	6.99	1218	4.5	31.1	13.31		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

FIELD COMMENTS

Sample Appearance: transparent Odor: N/o Color: N/c Other: ____

Weather Conditions (required daily, or as conditions change): 4°C Direction/Speed: 20km/hr SW Outlook: partly cloudy Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required):

wd th. 1m PSSWPump take.
Depth @ 2M
time @ 1m 1:26
2.25
3.25

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
11/02/23	Jake Arbelle		RWDI

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form V-3 1 06/20

0904

FIELD INFORMATION FORM

BUREAU VERITAS

WASTE MANAGEMENT

Site Name: TCBC

Site No.: Sample: SS1 ST A (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID:

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark Changes, Record field data below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: Y or N

Purging Device: A-Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Sampling Device:

X-Other:

Filter Device: Y or N — 0.45 µ or ____ µ (circle or fill in)

Filter Type: A-In-line Disposable, B-Pressure, C-Vacuum, X-Other: ____

Sample Tube Type: A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other: ____

WELL DATA

Well Elevation (at TOC) ____ (ft/msl)

Depth to Water (DTW) (from TOC) ____ (ft)

Groundwater Elevation (GWE) (Site Datum, from TOC) ____ (ft msl)

Total Well Depth (from TOC) ____ (ft)

Stick Up (from ground elevation) ____ (ft)

Casing ID ____ (in)

Casing Material ____

Note: Total Depth, Stick Up, Casing ID, etc. are optional and can be from historical data, unless required by Site/Permit. Well Elevation, DTW, and GWE must be current, obtained from site.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25°C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
		1st	1st					
		2nd	2nd					
		3rd	3rd					
		4th	4th					
Input Range for 3 consec. readings or Permit/State requirements:		+/-	+/-	+/-	+/-	+/-	+/-	

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (µmhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L - ppm)	eH/ORP (mV)	Other: Units
11 01 23	6.7	852	4.5	54.4	12.59		

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.)*

FIELD COMMENTS

Sample Appearance: transparent Odor: N/A Color: N/A Other: ____

Weather Conditions (required daily, or as conditions change): 4°C Direction/Speed: 20Km/h SW Outlook: partly cloudy Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required):

Well: 1.2m

Bkg: 0.4m

time o/m 1:23

2:20

3:21

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
11/01/23	Jake Arbtalk		RWS
/ /			

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

Field Information Form v3.1 06/20

0901

Maxxam Analytics Inc
6740 Campobello Road Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5777 Toll Free: (800) 563-6266

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		MAXXAM JOB NUMBER:
Company Name:	Waste Management of Canada Corporation	Company Name:	RWDI AIR Inc.	Quotation #		
Contact Name:	Lisa Merlick	Contact Name:	Brent Langille	P.O. #:	12285756	
Address:	5768 Nauvoo Rd, Watford, ON N0M 2S0	Address:	4510 Rhodes Drive, Unit 530 Windsor, ON, N8W 5K5	Project #:	2303459.01	CHAIN OF CUSTODY # :
Phone:	519-849-5810 Fax: 519-849-5811	Phone:	519-823-1311 x 2618 Fax: 519-823-1316	Project Name:	Twin Creeks SW	TCEC-SWCM-NOV
Email:	lmertick@wm.com	Email:	BJL@RWDI.com, JCL@RWDI.com	Location:	Twin Creeks	
				Sampled By:	JRA	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

- [ ] MISA — Reg. 153: [ ] Table 1 [ ] Table 2 [ ] Table 3 — Sewer Use: [ ] Sanitary [ ] Storm — Region _____
- [x] PWQO
- [ ] Reg. 558
- [ ] Other — specify _____

Report Criteria on C of A ? [n]

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	ZP-ON-WLF-2023 TCLS - SW (POPLAR) QUARTERLY	# of Cont.	COMMENTS / TAT COMMENTS
1	SS14A	2-Nov-23	AM	SW	N	N	X	7	
2	SS14B	2-Nov-23	AM	SW	N	N	X	7	
3	SS15A	2-Nov-23	AM	SW	N	N	X	7	PSSWDUP taken
4	PSSWDUP	2-Nov-23	AM	SW	N	N	X	7	
5									
6									
7									
8									
9									
10									
11									
12									

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT:
[x] 5 to 7 Working Days

Rush TAT: Rush Confirmation # _____ (call Lab for #)
[ ] 1 day [ ] 2 days [ ] 3 days

DATE Required: 13-Nov-23
TIME Required: 12:00 PM

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

03-Nov-23 08:57
Patricia Legette
C3Y5345
RUK ENV-1617

See lab addendum for lab group coding

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	Date:	Time:
JRA-2-Nov-23/PM	RAVNEET RAVE BRAR	2023/11/03	08:57

Laboratory Use Only

Temperature (°C) on Receipt: Refer to ACTR

Condition of Sample on Receipt: [ ] OK [ ] SIF

*** MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS**

White: Maxxam Yellow: Mail Pink: Client