



Barrie Landfill Stormwater Management Facility

2021 Annual Monitoring Report

Environmental Compliance Approval 1681-AFGMVU

ORIGINAL

MARCH 2022

Prepared By: Justin Haskett
The City of Barrie
Operations Department
Solid Waste Operations Branch
P.O. Box 400 Barrie, Ontario L4M 4T5
Telephone 705.739.4219 • Fax:705.739.4251 • www.barrie.ca

BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY 2021 ANNUAL MONITORING REPORT

EXECUTIVE SUMMARY

This report outlines the operations, maintenance and monitoring activities associated with the Stormwater Management Facility (Works) Environmental Compliance Approval 1681-AFGMVU (*ECA*) issued March 15, 2017, located at the Barrie Landfill Site. The Compost Stormwater Management Pond and Ponds 2 and 8 (Figure 2) are monitored on a regular basis to ensure compliance with *Section 4* of the *ECA*.

Four (4) sampling events were triggered during 2021 (March 26th, July 8th, July 29th, and September 23rd) as per *ECA* requirements as a result of major rainfall events. During each sampling event a sample was taken from the Compost Pond as a proactive measure in the event water levels exceeded the capacity of the Pond, however, a discharge was not required as water infiltrated as intended. Pond 2 was also sampled on each date during the same rainfall events causing the Pond to discharge at the outlet. Samples taken were compared to effluent limits as required by the *ECA* and each event is further summarized in the report.

Laboratory analysis completed on the Compost Pond and Pond 2 stormwater samples noted exceedances of varying parameters during 2021. Exceedances in the samples obtained from the Compost Pond include Iron (March 26, July 8, July 29 and September 23), Lead (March 26) and Total Suspended Solids (TSS) (March 26 and September 23). The Compost Pond did not require a discharge during any storm event in 2021 and water infiltrated as designed. Exceedances in the samples obtained from Pond 2 included Chromium (July 29), Total Phosphorus (TP) (March 26, July 29 and September 23) and Total Suspended Solids (TSS) (March 26). The laboratory analysis were reviewed by City staff and in accordance with *ECA* Section 5(15) the *Stormwater Management Contingency and Remedial Action Plan* was implemented. The Compost Pond and Pond 2 outlet exceedances are further discussed in Section 3.0 of this report.

One storm event on July 15, 2021 triggered a sampling event from the Compost Pond and Pond 2 outlet but was not completed due to health and safety concerns. As City staff were mobilizing to conduct the stormwater sampling of the ponds a Tornado Warning was issued and staff sought shelter. At approximately 2:30 PM on Thursday, July 15, 2021 a suspected tornado touched down causing significant damage in the south end of Barrie. Environment Canada later confirmed the tornado to be an EF (Enhanced Fujita Scale) 2.

An inspection of the *Works* was completed in September of 2021. Outstanding deficiencies and recommendations from the inspection will be addressed as part of the maintenance in 2022, which will include continuation of vegetation establishment and removal, sediment and debris removal from the *Works* as-needed, and the installation of sediment bags in catch basins for the summer months.

BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY 2021 ANNUAL MONITORING REPORT

TABLE OF CONTENTS

SECTION	PAGE
EXECUTIVE SUMMARY	
TABLE OF CONTENTS	
1.0 INTRODUCTION	1
2.0 ECA REQUIREMENTS.....	1
2.1 SAMPLING REQUIREMENTS.....	1
2.2 REPORTING REQUIREMENTS.....	2
3.0 RESULTS & ANALYSIS	2
3.1 MONITORING DATA SUMMARY	3
4.0 OPERATIONS AND MAINTENANCE.....	3
4.1 EASTERN STORMWATER MANAGEMENT FACILITY	3
4.2 WESTERN AND SOUTHERN STORMWATER MANAGEMENT FACILITY	4
4.3 NORTHERN STORMWATER MANAGEMENT FACILITY.....	4
5.0 CONCLUSIONS.....	4
6.0 RECOMMENDATIONS.....	5
SIGNATURE PAGE	6

FIGURES

Figure 1 – Key Plan – Location

Figure 2 – Site Plan

TABLES

Table 1 – Stormwater Monitoring Parameters (Compost Pond and Pond 8)

Table 2 – Stormwater Monitoring Parameters (Pond 2)

Table 3 – Stormwater Effluent Limits

APPENDICES

Appendix A – Environmental Compliance Approval 1681-AFGMVU

Appendix B – 2021 Stormwater Management Facility Monitoring Results

Appendix C – 2021 Stormwater Sampling Results

Appendix D – 2021 Annual Stormwater Inspection Report

BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY 2021 ANNUAL MONITORING REPORT

1.0 INTRODUCTION

This report outlines the operations, maintenance and monitoring activities associated with the Stormwater Management Facility (Works) located at the Barrie Landfill Site, 272 Ferndale Drive North, Lot 22, Concession 7, Barrie, Ontario as illustrated in Figure 1. The Works are operated as per the Environmental Compliance Approval 1681-AFGMVU (ECA) issued March 15, 2017.

2.0 ECA REQUIREMENTS

The Compost Stormwater Management Pond and Ponds 2 and 8 are monitored by the City to identify when conditions trigger a requirement for sampling and the outlet sluice gate valve in the Compost Stormwater Management Pond is inspected to ensure compliance with *Section 5 (6)* of the ECA.

Compost Stormwater Management Pond

The Compost Stormwater Management Pond is inspected daily during the period of March 15 to October 31 by the City to determine if water has reached a depth greater than 150 millimeters (mm). The depth of accumulated stormwater is measured with a meter stick which is fastened securely to a steel bar located in the immediate vicinity of the outlet of the pond.

On a monthly basis the City inspects the vegetative growth in the pond, inspects the ditches leading to the pond for flow and sediment issues and inspects the outlet sluice gate valve. In accordance with *Section 5 (6)* of the ECA the City has kept the outlet sluice gate valve in the closed position.

Pond 2

Pond 2 is inspected during the period of March 15 to October 31. Precipitation accumulation of greater than or equal to 15 mm and outlet discharge within this timeframe triggers a sampling event.

Pond 8

Pond 8 is inspected daily by the City to determine if water has accumulated in the pond. Any discharge from the outlet triggers a sampling event.

2.1 Sampling Requirements

As per *Section 4* of the ECA, samples collected from the Compost Pond or Pond 8 Outlets are analyzed for the parameters outlined in Table 1. Samples collected from the Pond 2 Outlet are analyzed for the parameters outlined in Table 2. The outlets of each pond act as the designated sample location. The monitoring results are used to determine if a sampling event is required, as follows:

- For routine operations, the collection of a sample from the Compost Pond is required when the water in the pond has exceeded a depth of 150 mm during the period of March 15 to October 31;

BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY 2021 ANNUAL MONITORING REPORT

- *Section 5 (7)* of the *ECA* outlines that prior to any planned discharge of stormwater from the Compost Pond, the City must collect samples and ensure the laboratory results comply with the effluent limits indicated in Table 3;
- The collection of a sample from Pond 2 is required after a major rainfall event of 15 mm or more during the period of March 15 to October 31; and
- The collection of a sample from Pond 8 is required when there is discharge from the Outlet (sample location).

If field measurements are required, measurements are obtained using a YSI Water Quality Multiprobe (YSI). Monthly calibrations are conducted on the YSI and recorded. All calibrations are performed in accordance with manufacturer's requirements.

2.2 Reporting Requirements

In accordance with *Section 7 (3)* of the *ECA*, a detailed performance report is submitted annually to the District Manager of the Ministry of the Environment, Conservation and Parks (MECP), Barrie District Office for review and shall include:

- A summary of all monitoring results undertaken in the reporting period including sampling locations and dates;
- A tabulation of volumes of effluent discharged from the Works (Compost Pond) into the receiving surface water during the reporting period;
- A description of any operational problems encountered and corrective actions taken;
- A summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works;
- A summary of the calibration and maintenance carried out on all effluent monitoring equipment;
- A summary of all spill or abnormal discharge events;
- A copy of all Notice of Modification submitted to the District Manager as a result of Schedule B, Section 1 with a status report on the implementation of each modification; and
- Any other information the District Manager requires from time to time.

3.0 RESULTS AND ANALYSIS

Throughout the 2021 reporting period, there were four (4) stormwater events that triggered sampling requirements. The Certificate of Analysis for the sampling event are included in Appendix C. A summary of the monitoring results are outlined below.

BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY 2021 ANNUAL MONITORING REPORT

On March 26th, July 8th, July 29th, and September 23rd, 2021 the Compost Pond and Pond 2 were sampled in accordance with *Section 4* of the *ECA* during major rainfall events. Sample results for the Compost Pond were analyzed for parameters listed in Table 1 and Table 3 – Effluent Limits of the *ECA* and the results indicated exceedances of Iron (2.45 mg/L on March 26, 0.573 mg/L on July 8, 0.471 mg/L on July 29, and 0.995 mg/L on September 23) in comparison to the concentration limit of 0.3 mg/L in Table 3. On March 26, 2021, the sample analysis indicated an exceedance of Lead (0.0062 mg/L) in comparison to the concentration limit of 0.005 mg/L and exceedances of Total Suspended Solids (TSS) were also reported on March 26 (99 mg/L) and September 23 (38 mg/L) in comparison to the concentration limit of 25 mg/L. The Compost Pond did not require a discharge during any storm event in 2021 and water infiltrated as designed.

Sample results for Pond 2 were analyzed for parameters listed in Table 2 and Table 4 – Effluent Objectives of the *ECA* and the results indicated exceedances of Chromium (0.002 mg/L on July 29) in comparison to the concentration limit of 0.001 mg/L in Table 3; Total Phosphorus (TP) (0.09 mg/L on March 26, 0.07 mg/L on July 29, and 0.11 mg/L on September 23) in comparison to the concentration limit of 0.03 mg/L in Table 3; and, Total Suspended Solids (TSS) (29 mg/L on March 26) in comparison to the concentration limit of 25 mg/L in Table 3.

In accordance with Section 6.3 of the *Stormwater Management Contingency and Remedial Action Plan* a review of the likely cause of exceedances was completed. At the time laboratory analysis were reported there was no active discharge at the Pond 2 outlet or water within Pond 2 resultant from the delay in sample result analysis and reporting. Pond 2 outlet was sampled during the next triggered sampling event as required in the remedial action plan. The exceedances from Pond 2 are believed to be from surface water runoff from the Recycling Depot located to the north and, in accordance with the Site's *Stormwater Management Operations Manual and Contingency and Remedial Action Plan*, the requirement to notify the MECP had not been triggered since exceedances of the same parameter in three consecutive samples were not reported.

3.1 Monitoring Data Summary

The results of the 2021 Monitoring Program are listed in Appendix B. Water was present within the Compost Pond on five (5) occasions throughout 2021; four (4) samples were taken per the Stormwater *ECA* requirements. Water was discharging from Pond 2 on five (5) occasions in 2021; four (4) samples were taken per the Stormwater *ECA* requirements and there were a total of ten (10) storm events in 2021 with rainfall in excess of 15 millimeters (mm). There was no presence of water within Pond 8 throughout 2021.

BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY 2021 ANNUAL MONITORING REPORT

4.0 OPERATIONS AND MAINTENANCE

Inspection of the Works was completed by City Staff in September 2021, in accordance with *Section 5 (3) of the ECA*. The assessment of the Works included all elements of the Stormwater Management Facility including ponds, sediment forebays, conveyance ditches, culverts, catch basins and double catch basins. The 2021 Stormwater Inspection Report is included as part of Appendix D; the findings of the inspection and recommendations are summarized below.

4.1 Eastern Stormwater Management Facility

During the fall inspection small amounts of litter and vegetation were noted within the ditches and in Pond 2. Litter collection from around the Site is completed by City staff on a regular and as-needed basis and documented daily. Pond 1, Pond 2, and the ditches and culverts all appeared to be in good condition at the time of the annual inspection. Minor erosion at the Pond 2 outlet plunge pool discharge to Dyments Creek was noted and will continue to be monitored. The immediate requirement for remedial actions were not required and will continue to be monitored in 2022.

4.2 Western and Southern Stormwater Management Facility

During the fall inspection Ponds 3, 4, 5, 6, 7, 8, final outflow channel, flow spreader, and culverts and ditches all appeared to be in good condition with no signs of erosion or disturbed areas, no accumulation of sediment, and no accumulation of litter. Minor vegetative growth within the final outflow channel and the conveyance swales of Pond 3 and Pond 4 was noted during the 2021 annual inspection. In September 2021 vegetation within Ponds 3, 4, 5, 6, and 7 was trimmed using a brush cutter attachment for a rental track-mounted skid steer. The bottom of the ponds were also tilled using a skid steer-mounted tiller attachment to allow for continued infiltration of stormwater.

BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY 2021 ANNUAL MONITORING REPORT

4.3 Northern Stormwater Management Facility

During the fall inspection the Compost Pond and Culverts and Ditches appeared to be in good condition with minimal accumulation of sediment, vegetative growth, and litter. Sediment was removed from the conveyance ditch east of the compost pond and new sod was laid in all disturbed areas. All catch basins were reviewed during the annual inspection and appeared to be in good condition. Previously noted minor erosion concerns at CB14A/B were repaired by City Roads, Fleet, and Stormwater staff in the spring of 2021. Minor asphalt concerns at CB7 were noted again during the 2021 inspection; however, the concerns do not appear to be affecting drainage and will continue to be monitored and repaired if necessary. Minor damage to catch basin grates at DCB2 and DCB4A/B also remain in 2021 but are not affecting the functionality of the stormwater facilities. All stormwater catch basins, catch basin leads, and linear stormwater conveyance infrastructure were cleaned, flushed, and inspected by Sewer Technologies Inc. between September 13th and September 20st, 2021.

In September 2021, the City initiated an Environmental Centre drainage improvement project through the use of contracted services to address localized ponding and drainage concerns in, and surrounding, the coverall storage building located west of the Household Hazardous Waste and Commodities building and to the north of the Waste and Recycling Depot. The project consisted of full depth asphalt removal, installation of two new catch basins, regrading of granular base materials, and new asphalt paving with grade revisions from previous. An *ECA* amendment was not required as this work was completed to address site concerns and did not increase the catchment area but the MECP was notified of this planned work on July 13, 2021. The work was completed by Dufferin Construction Company, a Division of CRH Canada, in September and October 2021 and the Site has noted improved drainage and a reduction in ponding water in this area.

5.0 CONCLUSIONS

During the 2021 reporting period there were no operating problems encountered with the existing Stormwater Management Facility and no modifications were required. As a result, no "Notice of Modifications" were submitted to the District Manager as per Schedule B, Section 4. There were no discharges of stormwater or leachate contaminated stormwater from the Compost Pond in 2021.

BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY 2021 ANNUAL MONITORING REPORT

6.0 RECOMMENDATIONS

The outstanding minor deficiencies noted in each inspection will be addressed as part of the maintenance work that will be completed in 2022, which will include:

- Removal and monitoring of blown litter and vegetation from all stormwater infrastructure;
- Continued use of sediment bags in catch basins during summer months;
- Removal of vegetation and sediment from ponds, swales, and ditches when required;
- Tilling of pond bottoms when required; and
- Coordinate the repair of asphalt around CB7 with City Roads, Fleet and Stormwater Operations, if required.


BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY 2021 ANNUAL MONITORING REPORT

The following staff of the Operations Branch have prepared, reviewed and confirm the findings and conclusions presented in this annual report:

Signature: 

Email: justin.haskett@barrie.ca

Justin Haskett
Landfill Systems Technologist

Signature: 

Email: lindsay.quinn@barrie.ca

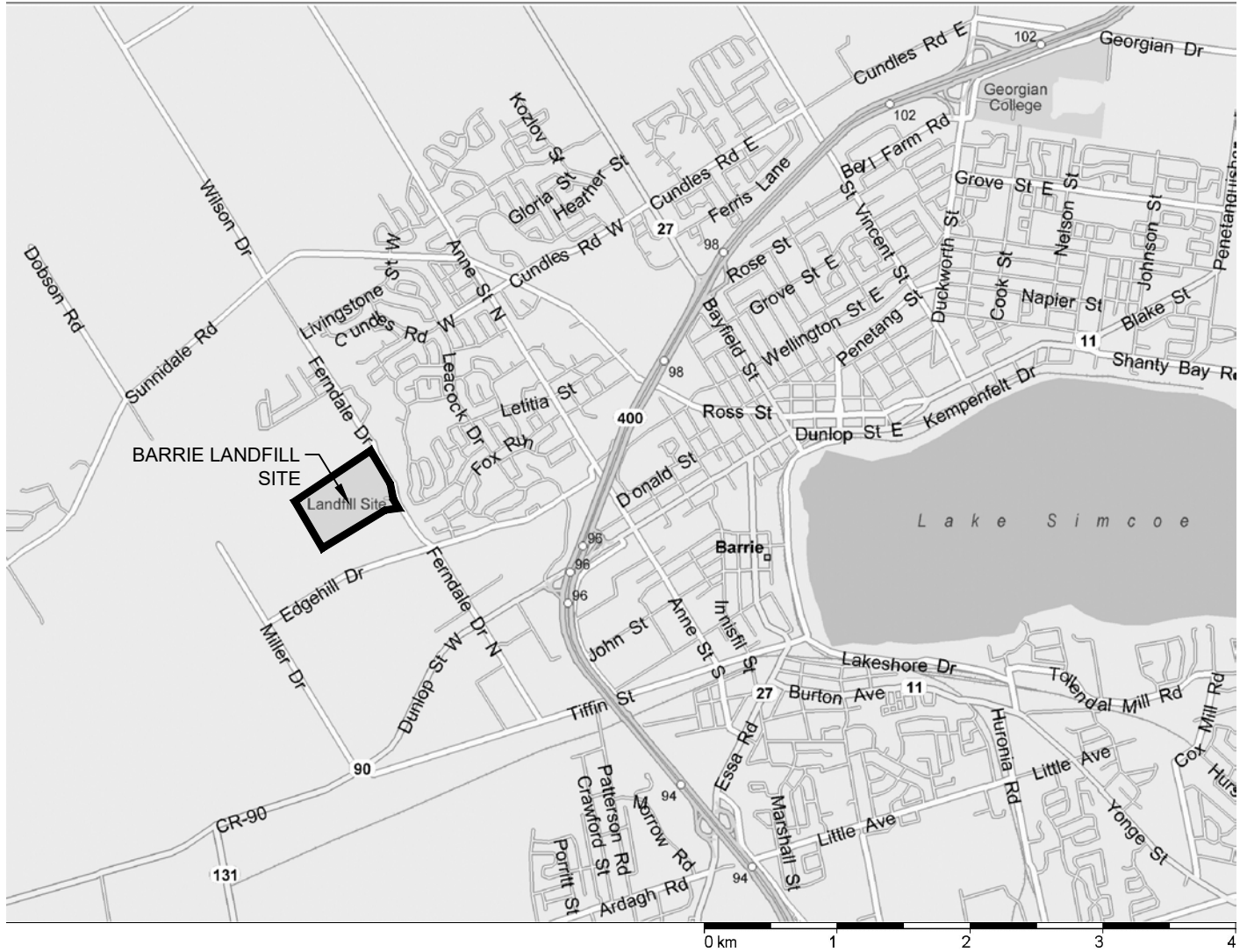
Lindsay Quinn, B.Sc., C.E.T.
Supervisor of Waste Disposal

Signature: 
Chris Marchant (Mar 29, 2022 15:43 EDT)

Email: chris.marchant@barrie.ca

Chris Marchant
Manager of Solid Waste Operations

FIGURES




Path: \\golder\g5f\gdm\mississauga\cas\Projects\2008\08-1170-0519\COB_Reclaim and Re-Eng_Barrie\XRRF_1 File Name: 0811700519\0811700519\0811700519\0811700519.dwg

Copyright © 1988-2003 Microsoft Corp. and/or its suppliers. All rights reserved. <http://www.microsoft.com/mappoint>
 © Copyright 2002 by Geographic Data Technology, Inc. All rights reserved. © 2002 Navigation Technologies. All rights reserved. This data includes information taken with permission from Canadian authorities © 1991-2002 Government of Canada (Statistics Canada and/or Geomatics Canada), all rights reserved.

CLIENT
The City of
BARRIE THE CITY OF BARRIE
 BARRIE, ONTARIO

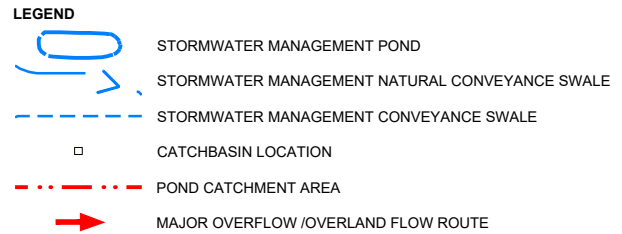
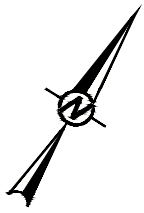
PROJECT
 STORMWATER MANAGEMENT OPERATIONS MANUAL
 BARRIE LANDFILL, BARRIE, ONTARIO

CONSULTANT	YYYY-MM-DD	2016-01-29
	PREPARED	FC
	DESIGN	-
	REVIEW	MK
	APPROVED	DK

TITLE	PROJECT No.	PHASE No.	Rev.	FIGURE No.
KEY PLAN	08-1170-0519	-	A	1

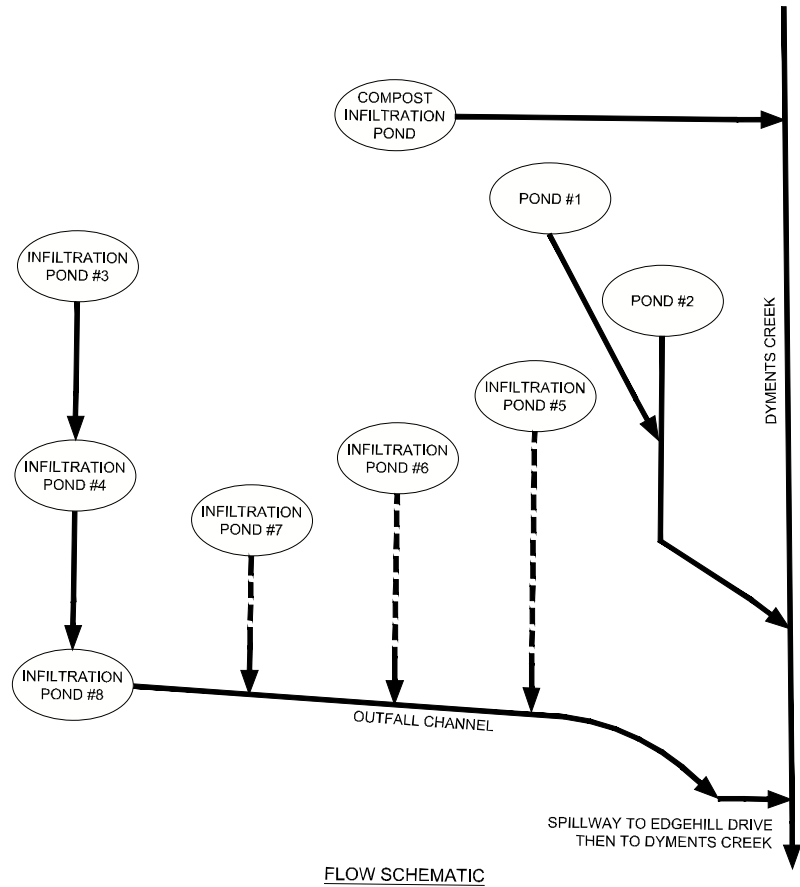
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A

26 mm



REFERENCE

1. BASE IMAGERY IS APPROXIMATE AND IS BASED ON AERIAL PHOTOGRAPHY DATED JUNE 2015 PROVIDED BY THE CITY OF BARRIE.
2. BASE PLAN IS BASED ON A COMPILATION OF VARIOUS ANNUAL TOPOGRAPHIC SURVEYS AND AS-BUILT SURVEYS PROVIDED BY THE CITY OF BARRIE.



Path: \\polder.gds\gdm\saugha\saugha\Projects\200903-170-0519 (COB, Reclaim and Re-Eng. Barrie)\H&L\Landfill SWM\Operations Manual | File Name: 0811700519\04\000.dwg

CLIENT
The City of BARRIE
 THE CITY OF BARRIE
 BARRIE, ONTARIO

CONSULTANT	YYYY-MM-DD	2019-10-28
	PREPARED	FC
	DESIGN	-
	REVIEW	MK
	APPROVED	DK



PROJECT
 STORMWATER MANAGEMENT OPERATIONS MANUAL
 BARRIE LANDFILL, BARRIE, ONTARIO

TITLE
POND CATCHMENTS AND FLOW SCHEMATIC

PROJECT No.	CONTROL	Rev.	FIGURE 2
1773343	-	A	

28 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANS B

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

TABLES

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

**TABLE 1
STORMWATER MONITORING PARAMETERS – COMPOST POND OUTLET AND POND 8
OUTLET**

ECA SECTION 4 (2) TABLE 1

PARAMETERS
pH
Alkalinity
Chloride
Sulphate
Dissolved Organic Carbon (DOC)
Biological Oxygen Demand (CBOD5)
Total Suspended Solids
Total Dissolved Solids
Total Phosphorus
Total Ammonia Nitrogen
Nitrate Nitrogen
Nitrite Nitrogen
Total Kjeldahl Nitrogen
Iron
Lead
FIELD PARAMETERS
pH
Temperature
Dissolved Oxygen

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

**TABLE 2
STORMWATER MONITORING PARAMETERS – POND 2 OUTLET
ECA SECTION 4 (3) TABLE 2**

PARAMETERS
pH
Alkalinity
Chloride
Dissolved Organic Carbon (DOC)
Total Phosphorus
Total Ammonia Nitrogen
Total Suspended Solids
Total Petroleum Hydrocarbons (TPH)
Petroleum Hydrocarbons Fractions (PHC F1-F4)
Phenolics (4AAP)
Arsenic
Cadmium
Chromium
Cobalt
Iron
Lead
FIELD PARAMETERS
pH
Temperature
Dissolved Oxygen

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

**TABLE 3
COMPOST POND EFFLUENT LIMITS
ECA SECTION 5 (7) TABLE 3**

PARAMETERS	CONCENTRATION (mg/L)
Total Suspended Solids (TSS)	25.0
CBOD5	25.0
Total Ammonia Nitrogen (Nov 1 to Mar 31)	4.0
Total Ammonia Nitrogen (Apr 1 to Oct 31)	2.0
Total Phosphorus (TP)	1.0
Hydrogen Sulphide	0.002
Iron	0.3
Lead	0.005

**TABLE 4
POND 2 EFFLUENT LIMITS
ECA SECTION 5 (14) TABLE 4**

PARAMETERS	CONCENTRATION (mg/L)
Total Suspended Solids	25.0
Total Phosphorus	0.03
Phenolics (4AAP)	0.008
Cadmium	0.0005
Chromium	0.001
Cobalt	0.0009
Lead	0.005

Appendix A

Environmental Compliance Approval 1681-AFGMVU

AMENDED ENVIRONMENTAL COMPLIANCE APPROVALNUMBER 1681-AFGMVU
Issue Date: March 15, 2017

The Corporation of the City of Barrie
70 Collier St P.O. Box 400
Post Office Box, No. 400
Barrie, Ontario
L4M 4T5

Site Location: Barrie Landfill Site - 272 Ferndale Drive North
Lot 22, Concession 7
City of Barrie, County of Simcoe
L4M 4T5

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:

Establishment of a stormwater management facility to service the Barrie Landfill Site, located 1,000 meters northwest of the intersection of Ferndale Drive North and Edgehill Drive, City of Barrie, designed to attenuate post-development flow levels from storm events of up to 1:100 year return frequency to or below the pre-development flow level, discharging into the Dyments Creek, consisting of:

PROPOSED WORKS:

Upgrade of the stormwater management facility to service a total drainage area of 0.56 ha including asphalted roadways, segregated waste recycling drop off bins, public waste recycling drop off areas, and household hazardous waste (HHW) recycling depot in the existing public waste recycling depot (**East Gate Facility**) located at the **north east part** of the Barrie Landfill Site consisting of the following:

- Filling of the parts of the existing perimeter ditches located in the location where the proposed upgraded waste recycling depot (East Gate Facility) will be constructed;
- Construction of one (1) 500 mm diameter storm sewer with a total approximate length of 108 m equipped with one (1) 1500 mm diameter manhole, conveying stormwater runoff from the asphalted public waste recycling drop off area to an existing perimeter ditch which discharges through one (1) 500 mm diameter HDPE culvert to the Stormwater Management Facility (Pond No. 2) described below; and

- including all controls and associated appurtenances.

PREVIOUS WORKS APPROVED ON JUNE 8, 2015 UNDER ECA No. 1242-9UJPNC:

Construction of stormwater management facility to service a total of approximately 15.6 ha of drainage area located within the **south and west section of the Barrie Landfill Site** consisting of approximately 9.7 ha landfill footprint (Cells 2A, 2B, 2C, 3A, 3B, and 3C) and 5.9 ha of forested area, consisting of the following:

Perimeter Collection Swales

- one (1) approximately 500 m long perimeter collection swale running along the northwestern and western side of the landfill footprint, with approximate dimensions of 3H:1V side slopes and 1.0 m bottom width, lined with vegetation or riprap as required, discharging to **Pond No. 8** described below;
- one (1) approximately 360 m long perimeter collection swale running along the southern side of the landfill footprint, with approximate dimensions of 3H:1V side slopes and 1.0 m bottom width, lined with vegetation or rip-rap as required, discharging to **Pond No. 8** described below;
- approximately nineteen (19) sediment traps to be located along the perimeter collection swales, consisting of excavated basins having a minimum depth of 0.5 m, bottom length of 2.0 m, and 2H:1V side slopes;

Stormwater Management Facility (Pond No. 3)

A stormwater management facility to service a total of 1.99 ha drainage area which includes portions of Cell 3A and portions of the landfill access roads, located on the **west side of Barrie Landfill Site**, consisting of the following:

- one (1) approximately 35 m long 1.0 m wide bottom, 3H:1V side slopes inlet conveyance swale, lined with a combination of native vegetation and channel armour and equipped with check dams as required, discharging to **Pond No. 3** described below;
- one (1) infiltration pond - **Pond No. 3** (previously know as West Infiltration Pond No. 1) providing a total storage capacity of 280 m³ with approximate dimensions of 3H:1V side slopes, a depth of 0.6 m (at elevation of 301.9 m amsl), bottom length of 30 m and bottom width of 6 m, equipped with a forebay having 3H:1V side slopes, a depth of 1.0 m, bottom length of 9 m, bottom width of 3 m, and one (1) 5 m wide spillway, discharging to a natural swale which flows to **Pond No. 4** described below;

Stormwater Management Facility (Pond No. 4)

A stormwater management facility to service a total of 4.22 ha drainage area which includes portions of Cell 3B and portions of the landfill access roads, located on the **west side of Barrie Landfill Site**, consisting of the following:

- one (1) infiltration pond - **Pond No. 4** (previously know as West Infiltration Pond No. 2) providing a total storage capacity of 520 m³ with approximate dimensions of 3H:1V side slopes, a depth of 0.6 m (at elevation of 278.4 m amsl), bottom length of 40 m and bottom width of 9 m, equipped with a forebay having 3H:1V side slopes, a depth of 1.0 m, bottom length of 15 m, bottom width of 6 m, and one (1) 5 m wide spillway, discharging to a conveyance swale described below;
- one (1) approximately 80 m long 1.0 m wide bottom, 3H:1V side slopes conveyance swale, lined with a combination of native vegetation and channel armour and equipped with check dams as required, discharging to **Pond No. 8** described below;

Stormwater Management Facility (Pond No. 5)

A stormwater management facility to service a total of 3.92 ha drainage area which includes portions of Cells 2A and 2B and portions of the landfill access roads, located on the **south side of Barrie Landfill Site**, consisting of the following:

- one (1) approximately 50 m long 1.0 m wide bottom, 3H:1V side slopes inlet conveyance swale, lined with a combination of native vegetation and channel armour and equipped with check dams as required, discharging to **Pond No. 5** described below;
- one (1) infiltration pond - **Pond No. 5** (previously know as South Infiltration Pond No. 3) providing a total storage capacity of 250 m³ with approximate dimensions of 3H:1V side slopes, a depth of 0.6 m (at elevation of 276.2 m amsl), bottom length of 30 m and bottom width of 6 m, equipped with a forebay having 3H:1V side slopes, a depth of 1.0 m, bottom length of 5 m, bottom width of 3 m, and one (1) 32 m wide spillway, discharging to a natural slope directing flows to **Final Outfall Channel** described below;

Stormwater Management Facility (Pond No. 6)

A stormwater management facility to service a total of 3.0 ha drainage area which includes portions of Cells 3A and 3B and portions of the landfill access roads, located on the **south side of Barrie Landfill Site**, consisting of the following:

- one (1) approximately 80 m long 1.0 m wide bottom, 3H:1V side slopes inlet conveyance swale, lined with a combination of native vegetation and channel armour and equipped with check dams as required, discharging to **Pond No. 6** described below;
- one (1) infiltration pond - **Pond No. 6** (previously know as South Infiltration Pond No. 4) providing a total storage capacity of 360 m³ with approximate dimensions of 3H:1V side slopes, a depth of 0.6 m

(at elevation of 272.8 m amsl), bottom length of 40 m and bottom width of 6 m, equipped with a forebay having 3H:1V side slopes, a depth of 1.0 m, bottom length of 12 m, bottom width of 3.0 m, and one (1) 42 m wide spillway, discharging to a natural slope directing flows to **Final Outfall Channel** described below;

Stormwater Management Facility (Pond No. 7)

A stormwater management facility to service a total of 4.19 ha drainage area which includes portions of Cell 3A and portions of the landfill access roads, located on the **south side of Barrie Landfill Site**, consisting of the following:

- one (1) approximately 70 m long 1.0 m wide bottom, 3H:1V side slopes inlet conveyance swale, lined with a combination of native vegetation and channel armour and equipped with check dams as required, discharging to **Pond No. 7** described below;
- one (1) infiltration pond - **Pond No. 7** (previously know as South Infiltration Pond No. 5) providing a total storage capacity of 560 m³ with approximate dimensions of 3H:1V side slopes, a depth of 0.6 m (at elevation of 269.3 m amsl), bottom length of 50 m and bottom width of 8 m, equipped with a forebay having 3H:1V side slopes, a depth of 1.0 m, bottom length of 17 m, bottom width of 5 m, and one (1) 52.0 m wide spillway, discharging to a natural slope directing flows to **Final Outfall Channel** described below;

Stormwater Management Facility (Pond No. 8)

A stormwater management facility to service stormwater runoff collected by the perimeter collection swales described above and a total of 3.39 ha drainage area which includes portions of Cell 3B and portions of the landfill access roads, located on the **south side of Barrie Landfill Site**, consisting of the following:

- one (1) infiltration pond - **Pond No. 8** (previously know as South Infiltration Pond No. 6) providing a total storage capacity of 3,990 m³ with approximate dimensions of 3H:1V side slopes, a depth of 1.3 m (at elevation of 260.0 m amsl), bottom length of 70 m and bottom width of 35 m, equipped with a forebay having 3H:1V side slopes, a depth of 1.0 m, bottom length of 29.6 m, bottom width of 29.6 m, and one (1) 15.0 m wide spillway, discharging to a final outfall to Edgehill Drive described below;
- one (1) approximately 500 m long **Final Outfall Channel**, with approximate dimensions of 3.5 m bottom width and 1.0 m average depth, equipped with a 13.0 m bottom wide and 3H:1V side slope flow spreader located downstream of the outfall channel, discharging to Edgehill Drive major system and eventually into the Dyments Creek ; and
- Including all controls and associated appurtenance.

All in accordance with documents listed in Schedule 'A'.

Stormwater Management Facility (Pond No. 1)

an upgrade of an existing stormwater management facility to service a total of 8.77 ha drainage area which includes portions of Cells 1, 2, and 3, and portions of the landfill access roads, on the **north and east side of Barrie Landfill Site**, consisting of the following:

- one (1) approximately 29 m long 0.5 m wide bottom rip-rap lined ditch (**D1**) running along the north side of the Barrie Landfill Site having a minimum of 1.0 m depth, 3H:1V side slopes, and 7.6% longitudinal slope, discharging through one (1) 400 mm diameter CSP culvert (C1) to ditch (**D2**) described below;
- one (1) approximately 405 m long 0.5 m wide bottom rip-rap lined ditch (**D2**) running along the north side of the Barrie Landfill Site having a minimum of 1.0 m depth, 3H:1V side slopes, and 7.0% average longitudinal slope, discharging to an existing stormwater detention/infiltration pond (**Pond No. 1**) described below;
- one (1) extended detention/infiltration pond - **Pond No. 1** (previously know as North Pond No. 1) providing a total storage capacity of 1,500 m³ at a depth of 2.5 m (at elevation of 275.5 m amsl), equipped with one (1) 900 mm diameter perforated corrugated PE riser pipe, one (1) 450 mm diameter corrugated PE outlet discharge pipe, and one rip rap outlet channel, discharging to ditch (**D6**) described below;
- one (1) approximately 120 m long 1.0 m wide bottom rip-rap lined ditch (**D6**) running along the east side of the Barrie Landfill Site having a minimum of 1.0 m depth, 3H:1V side slopes, and 4.6% average longitudinal slope, discharging through one (1) 900 mm diameter HDPE culvert (C3) to ditch (**D7**) described above;
- including all controls and associated appurtenances.

Stormwater Management Facility (Pond No. 2)

Addition of drainage ditches, culverts, and a stormwater management pond to service a 0.97 ha drainage area on the **east side of the Barrie Landfill Site**, consisting of the following:

- one (1) approximately 100 m long 0.5 m wide bottom rip-rap lined ditch (**D3**) running along the north east side of the Barrie Landfill Site having a minimum of 1.0 m depth, 3H:1V side slopes, and 9.7% average longitudinal slope, discharging through one (1) 525 mm diameter HDPE culvert (C4) to ditch (**D4**) described below;
- one (1) approximately 134 m long 0.5 m wide bottom rip-rap lined ditch (**D4**) running along the north east side of the Barrie Landfill Site having a minimum of 1.0 m depth, 3H:1V side slopes, and 5.7% average longitudinal slope, discharging through one (1) 525 mm diameter HDPE culvert (C2) to ditch (**D5**) described below;

- one (1) approximately 105 m long 0.5 m wide bottom rip-rap lined ditch (**D5**) running along the east side of the Barrie Landfill Site having a minimum of 1.0 m depth, 3H:1V side slopes, and 5.7% average longitudinal slope, discharging to a stormwater management pond (**Pond No. 2**) described below;
- one (1) extended detention/infiltration pond - **Pond No. 2** (previously know as East Pond No. 2) providing a total storage capacity of 800 m³ at a depth of 1.0 m (at elevation of 262.5 m amsl), equipped with one (1) 900 mm diameter perforated corrugated PE riser pipe, one (1) 300 mm diameter corrugated PE outlet discharge pipe, and one rip rap lined plunge pool, discharging to ditch (**D7**) described below
- one (1) approximately 35 m long 1.0 m wide bottom rip-rap lined ditch (**D7**) running along the south east side of the Barrie Landfill Site having a minimum of 1.0 m depth, 3H:1V side slopes, and 2.3% average longitudinal slope, discharging to Dyments Creek;
- one (1) approximately 95 m long 1.0 m wide bottom rip-rap lined ditch (**D8**) running along the south east side of the Barrie Landfill Site having a minimum of 1.0 m depth, 3H:1V side slopes, and 3.7% average longitudinal slope, discharging to Dyments Creek; and
- including all controls and associated appurtenances.

All in accordance with the documents listed in Schedule "A".

PREVIOUS WORKS APPROVED ON MAY 31, 2007 UNDER ECA No. 0279-6ZAKCH:

an upgrade of an existing stormwater management facility to service a total of 6.49 ha drainage area located on the **north side of the Barrie Landfill Site** including a waste segregation/transfer facility and a

composting pad at the Barrie Landfill Site, located 1,000 meters northwest of the intersection of Ferndale Drive North and Edgehill Drive, City of Barrie, designed to attenuate post-development flow levels from storm events of up to 1:100 year return frequency to or below the pre-development flow level of 0.563 m³ /sec, discharging into the Dyments Creek, consisting of:

Composting Pad SWM Facility

- one (1) 1.7 ha asphalt paved leaf and yard waste composting pad with approximate dimensions of 130 m long X 130 m wide with a slope of 1% towards an existing ditch, located west of the existing waste segregation/transfer facility, equipped with two (2) 1500 mm diameter catch basins discharging through 150 mm diameter sewers to an existing ditch which eventually discharges to an existing stormwater detention/infiltration pond described below;

Extended Detention/Infiltration Pond (Compost Pond)

- stormwater collection system consisting of ditches, swales, and culverts with minimum slopes to promote infiltration of runoff;
- one (1) extended detention/infiltration pond - **Compost Pond** (Previously known as Compost SWM Pond) with top dimensions of 88.4 m long X 24.4 m wide X 1.8 m depth with 3:1 side slopes, providing a permanent pool storage volume of 932 m³ at a depth of 0.8 m and an extended detention storage volume of 2,091 m³ at a depth of 1.2 m;
- one (1) detention pond outlet control structure consisting of a 300 mm diameter orifice plate installed at 302.6 m elevation providing a 0.8 m permanent pool depth, one (1) 3.0 m long overflow weir at 303.4 m elevation providing a 1.0 m extended detention depth, both discharging into a 20 m long of 600 mm diameter CSP outlet culvert; and
- one (1) emergency gate valve located at the upstream end of a concrete box structure consisting of 700 mm x 700 mm aluminum plate and locking mechanism to be used to stop any release of stormwater collected in the pond in an event of emergency spill.
- including all controls and associated appurtenances.

All in accordance with the documents listed in Schedule "A".

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

"Approval" means this entire document and any schedules attached to it, and the application;

"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;

"District Manager" means the District Manager of the Barrie District Office of the Ministry;

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

"Limited Operational Flexibility" (LOF) means any modifications that the Owner is permitted to make to the Works under this Approval;

"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;

"Notice of Modifications" means the form entitled "Notice of Modifications to Sewage Works";

"Owner" means The Corporation of the City of Barrie and its successors and assignees;

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

"Previous Works" means those portions of the sewage works previously constructed and approved under an Approval;

"Proposed Works" means the sewage works described in the Owner's application, this Approval, to the extent approved by this Approval; and

"Works" means the sewage works described in the Owner's application, and 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. 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 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 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 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. EXPIRY OF APPROVAL

The approval issued by this Approval will cease to apply to those parts of the Proposed Works which have not been constructed within five (5) years of the date of this Approval.

3. CHANGE OF OWNER

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;
- (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; and
- (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.

4. MONITORING AND RECORDING

The Owner shall carry out the following 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) The Owner shall collect a stormwater grab sample from each of the designated sampling locations **at least four times annually** and analyse for the parameters listed in Table 1.

Table 1 - Stormwater Monitoring		
Sampling Location: Compost Pond Outlet*^{NOTE 1} and Pond No. 8 Outlet		
Parameter	Parameter	Field Parameter
pH	Total Phosphorus	pH
Alkalinity	Total Ammonia Nitrogen	Temperature
Chloride	Nitrate Nitrogen	Dissolved Oxygen
Sulphate	Nitrite Nitrogen	
Dissolved Organic Carbon (DOC)	Total Kjeldahl Nitrogen	
Biological Oxygen Demand (CBOD5)	Iron	
Total Suspended Solids	Lead	
Total Dissolved Solids		

Note 1: Samples shall be collected within twenty four hours after a major rainfall event resulting in the accumulation of **more than 150 mm deep stormwater runoff in the Compost Pond** during the period of March 15 and October 31. A minimum of one (1) month interval shall be maintained between consecutive sampling events.

- (3) The Owner shall collect a stormwater grab sample from each of the designated sampling locations **at least four times annually** and analyse for the parameters listed in Table 2.

Table 2 - Stormwater Monitoring		
Sampling Location: Pond No. 2 Outlet * ^{NOTE 2}		
Parameter	Parameter	Field Parameter
pH	Phenolics (4AAP)	pH
Alkalinity	Arsenic	Temperature
Chloride	Cadmium	Dissolved Oxygen
Dissolved Organic Carbon (DOC)	Chromium	
Total Phosphorus	Cobalt	
Total Ammonia Nitrogen	Iron	
Total Suspended Solids	Lead	
Total Petroleum Hydrocarbons (TPH)		
Petroleum Hydrocarbons Fractions (PHC F1-F4)		

Note 2: Samples shall be collected within twenty four hours after a major rainfall event of 15 mm or more during the period of March 15 and October 31. A minimum of one (1) month interval shall be maintained between consecutive sampling events.

- (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;
 - (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 subsection (2) and subsection (3) in respect to any parameter are minimum requirements which may, after two (2) years of monitoring in accordance with this Condition, be modified by the District Manager in writing from time to time.
- (6) 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.

5. OPERATION AND MAINTENANCE

GENERAL:

- (1) The Owner shall prepare a revised operations manual for the Works prior to the commencement of operation of the Proposed 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) 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.
- (2) 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.
- (3) The Owner shall inspect the Works at least once a year and, if necessary, clean and maintain the Works to prevent the excessive build-up of sediments and/or vegetation.
- (4) 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 and/or Owner's operational headquarter for inspection by the Ministry. The logbook shall include the following:
 - (a) the name of the Works;
 - (b) the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed; and
 - (c) the volume of contaminated stormwater disposed off-site, the date, and the name of the receiving sewage treatment plant;
- (5) Within six (6) months of the issuance date of this Approval, the Owner shall prepare an updated and revised "**Stormwater Management Contingency and Remedial Action Plan**" for the Works (Compost Pond and Pond No. 2) and submit it for approval to the District Manager;

COMPOST POND:

- (6) The Owner shall keep the **Compost Pond** discharge outlet sluice gate valve in **closed position** during normal operation periods.
- (7) Prior to any planned discharge of stormwater from the **Compost Pond** to the natural environment, the Owner shall collect stormwater grab sample from a designated sampling location at the **Compost Pond** and analyse for the parameters listed in Table 3. The Owner shall compare monitoring results with the corresponding effluent limit of each parameter listed in Table 3 to identify any leachate contamination of stormwater **before allowing any discharge of stormwater from the Compost Pond** .

Parameter	Concentration (mg/L)
Total Suspended Solids	25.0
CBOD5	25.0
Total Ammonia Nitrogen (Nov 1 to Mar 31)	4.0
Total Ammonia Nitrogen (Apr 1 to Oct 31)	2.0
Total Phosphorus	1.0
Hydrogen Sulphide	0.002
Iron	0.3
Lead	0.005

- (8) In the event of an exceedence of a trigger level for any trigger parameter, the Owner shall implement the "**Stormwater Management Contingency and Remedial Action Plan**" approved under Condition 5 (5) to identify the cause of contamination and implement remedial measures.
- (9) After the implementation of remedial measures, the Owner shall ensure that the content of the stormwater pond which is still deemed to be leachate contaminated is disposed of in a preapproved manner;
- (10) The Owner shall maintain a record of each event when a contaminated stormwater is disposed off-site to an approved site;
- (11) Discharge of leachate contaminated stormwater to the receiving surface water from the Works (Compost Pond) is prohibited, except where it is necessary to avoid loss of life, personal injury, danger to public health or severe property damage;
- (12) The Owner shall notify the District Manager orally, as soon as possible, and in writing within seven days of the discharge to receiving surface water of leachate contaminated stormwater from the Compost Pond including an assessment of the relative extent of leachate contamination, estimated volume of stormwater discharged, and proposed or completed

remedial actions.

- (13) The Owner shall maintain the water level in the Compost Pond at a level that ensures adequate storage is available for stormwater runoff associated with major storm events by ensuring that detained stormwater is disposed of in a timely manner to minimize the occurrence of emergency overflow during major storm events.

POND No. 2:

- (14) The Owner shall compare monitoring results for Pond No. 2 for parameters listed in Table 2 of Condition 4 (2) with the corresponding effluent objective for each parameter listed in Table 4 below to identify any leachate contamination of stormwater.

Table 4 - Effluent Objectives	
Effluent Parameter	Objective Concentration (milligrams per litre unless otherwise indicated)
Total Suspended Solids	25.0
Total Phosphorus	0.03
Phenolics (4AAP)	0.008
Cadmium	0.0005
Chromium	0.001
Cobalt	0.0009
Lead	0.005

- (15) In the event of an exceedence of a trigger level for any trigger parameter, the Owner shall implement the "**Stormwater Management Contingency and Remedial Action Plan**" approved under Condition 5 (5) to identify the cause of contamination and implement remedial measures.

6. **LIMITED OPERATIONAL FLEXIBILITY**

- (1) The Owner may make modifications to the Works in accordance with the Terms and Conditions of this Approval and subject to the Ministry's "Limited Operational Flexibility Criteria for Modifications to Sewage Works", included under Schedule B of this Approval, as amended.
- (2) Sewage works under Limited Operational Flexibility shall adhere to the design guidelines contained within the Ministry's publication "Stormwater Management Planning and Design Manual – March 2003", as amended.

- (3) The Owner shall ensure at all times, that the Works, related equipment and appurtenances which are installed or used to achieve compliance are operated in accordance with all Terms and Conditions of this Approval.
- (4) For greater certainty, the following are not permitted as part of Limited Operational Flexibility:
 - (a) Modifications to the Works that result in an increase of the approved Rated Capacity of the Works;
 - (b) Modifications to the Works that may adversely affect the approved effluent quality criteria or the location of the discharge/outfall;
 - (c) Modifications to the treatment process technology of the Works, or modifications that involve construction of new reactors (tanks) or alter the treatment train process design;
 - (d) Modifications to the Works approved under s.9 of the EPA, and
 - (e) Modifications to the Works pursuant to an order issued by the Ministry.
- (5) Implementation of Limited Operational Flexibility is not intended to be used for piecemeal measures that result in major alterations or expansions.
- (6) If the implementation of Limited Operational Flexibility requires changes to be made to the Emergency Response, Spill Reporting and Contingency Plan, the Owner shall, provide a revised copy of this plan to the local fire services authority prior to implementing Limited Operational Flexibility.
- (7) For greater certainty, any modification made under the Limited Operational Flexibility may only be carried out after other legal obligations have been complied with, including those arising from the *Environmental Protection Act, Niagara Escarpment Planning and Development Act, Oak Ridges Moraine Conservation Act, Lake Simcoe Protection Act* and *Greenbelt Act*.
- (8) At least thirty (30) days prior to implementing Limited Operational Flexibility, the Owner shall complete a Notice of Modifications describing any proposed modifications to the Works and submit it to the District Manager.
- (9) The Owner shall not proceed with implementation of Limited Operational Flexibility until the District Manager has provided written acceptance of the Notice of Modifications or a minimum of thirty (30) days have passed since the day the District Manager acknowledged the receipt of the Notice of Modifications.

7. REPORTING

- (1) 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.
- (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 to the District Manager upon request, a performance report, on an annual basis, within ninety (90) days following the end of the period being reported upon. 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 of all monitoring results undertaken in the reporting period including sampling locations and dates;
 - (b) a tabulation of volumes of effluent discharged from the Works (**Compost Pond**) into the receiving surface water during the reporting period;
 - (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 the calibration and maintenance carried out on all effluent monitoring equipment;
 - (f) a summary of all spill or abnormal discharge events;
 - (g) a copy of all Notice of Modifications submitted to the District Manager as a result of Schedule B, Section 1, with a status report on the implementation of each modification; and
 - (h) any other information the District Manager requires from time to time.

Schedule 'A'

I. PREVIOUS WORKS APPROVED ON MAY 31, 2007:

1. Application for Approval of Municipal and Private Sewage Works submitted by The Corporation of the City of Barrie dated March 6, 2007, drawings and design specifications prepared by Golder Associates Ltd., Kanata, Ontario.
2. "Report on Stormwater Analysis and Design - City of Barrie Landfill (Operations Centre) Compost Pad Expansion" dated February 5, 2007, prepared by Golder Associates Ltd., Kanata, Ontario.
3. "Stormwater Analysis and Design Report Barrie Landfill Site Facilities Upgrade Project" dated March 2001, prepared by CH2MHILL, Consulting Engineers, North York, Ontario.

II. PREVIOUS WORKS APPROVED ON AUGUST 6, 2013:

1. Application for Environmental Compliance Approval submitted by The Corporation of the City of Barrie dated May 25, 2013, drawings and design specifications prepared by Golder Associates Ltd., Whitby, Ontario.
2. Letter from Mr. Chris Visser, Project Coordinator, Golder Associates, to Stefanos Habtom, P. Eng, MOE, EAB, providing review comments on a draft Environmental Compliance Approval for Barrie Landfill Site and a "Revised Technical Memorandum - Cell 1 East Stormwater Management Works" dated July 31, 2013, prepared by Golder Associates, Whitby, Ontario.

III. PREVIOUS WORKS APPROVED ON JUNE 8, 2015 UNDER ECA No. 1242-9UJPNC:

1. Application for Environmental Compliance Approval submitted by The Corporation of the City of Barrie dated November 10, 2014, drawings and design specifications prepared by Golder Associates Ltd., Kingston, Ontario.

IV. PROPOSED WORKS:

1. Application for Environmental Compliance Approval submitted by The Corporation of the City of Barrie dated February 12, 2016, drawings and design specifications prepared by Golder Associates Ltd., Whitby, Ontario.

Schedule B

Limited Operational Flexibility Criteria for Modifications to Industrial Sewage Works

1. The modifications to sewage works approved under an Environmental Compliance Approval (Approval) that are permitted under the Limited Operational Flexibility (LOF), are outlined below and are subject to the LOF conditions in the Approval, and require the submission of the Notice of Modifications. If there is a conflict between the sewage works listed below and the Terms and Conditions in the Approval, the Terms and Conditions in the Approval shall take precedence.
 - 1.1 Stormwater Management System
 - a. Modifications of stormwater management works to service the existing approved drainage area located within the site, provided that there is no increase in the average impervious area established in the original design and the discharges from the site will not exceed the attenuated flows established in the original design.
 - b. Installation of new oil grit separators.
2. Sewage works that are exempt from section 53 of the OWRA by O. Reg. 525/98 continue to be exempt and are not required to follow the notification process under this Limited Operational Flexibility.
3. Normal or emergency operational modifications, such as repairs, reconstructions, or other improvements that are part of maintenance activities, including cleaning, renovations to existing approved sewage works equipment, provided that the modification is made with Equivalent Equipment, are considered pre-approved.
4. The modifications noted in section (3) above are not required to follow the notification protocols under Limited Operational Flexibility, provided that the number of pieces and description of the equipment as described in the Approval does not change.

RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA AND SEND A COPY TO THE WATER SUPERVISOR (FOR MUNICIPAL) OR DISTRICT MANAGER (FOR NON-MUNICIPAL SYSTEMS)

Part 1 – Environmental Compliance Approval (ECA) with Limited Operational Flexibility <i>(Insert the ECA's owner, number and issuance date and notice number, which should start with "01" and consecutive numbers thereafter)</i>		
ECA Number	Issuance Date (mm/dd/yy)	Notice number (if applicable)
ECA Owner		Municipality

Part 2: Description of the modifications as part of the Limited Operational Flexibility <i>(Attach a detailed description of the sewage works.)</i>
<p>Description shall include:</p> <ol style="list-style-type: none"> 1. A detail description of the modifications and/or operations to the sewage works (e.g. sewage work component, location, size, equipment type/model, material, process name, etc.) 2. Confirmation that the anticipated environmental effects are negligible. 3. List of updated versions of, or amendments to, all relevant technical documents that are affected by the modifications as applicable, i.e. submission of documentation is not required, but the listing of updated documents is (design brief, drawings, emergency plan, etc.)

Part 3 – Declaration by Professional Engineer	
<p>I hereby declare that I have verified the scope and technical aspects of this modification and confirm that the design:</p> <ol style="list-style-type: none"> 1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice in the Province of Ontario; 2. Has been designed in accordance with the Limited Operational Flexibility as described in the ECA; 3. Has been designed consistent with Ministry's Design Guidelines, adhering to engineering standards, industry's best management practices, and demonstrating ongoing compliance with s.53 of the Ontario Water Resources Act; and other appropriate regulations. <p>I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate</p>	
Name (Print)	PEO License Number
Signature	Date (mm/dd/yy)
Name of Employer	

Part 4 – Declaration by Owner	
<p>I hereby declare that:</p> <ol style="list-style-type: none"> 1. I am authorized by the Owner to complete this Declaration; 2. The Owner consents to the modification; and 3. This modifications to the sewage works are proposed in accordance with the Limited Operational Flexibility as described in the ECA. 4. The Owner has fulfilled all applicable requirements of the <i>Environmental Assessment Act</i>. <p>I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate</p>	
Name of Owner Representative (Print)	Owner representative's title (Print)
Owner Representative's Signature	Date (mm/dd/yy)



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 Works are constructed in a timely manner so that standards applicable at the time of Approval of the Works are still applicable at the time of construction, to ensure the ongoing protection of the environment.
3. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to 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.
4. Condition 4 is included to enable the Owner to evaluate and demonstrate the performance of the Works, on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives specified in the Approval and that the Works does not cause any impairment to the receiving watercourse.
5. Condition 5 is included to require that the Works be properly operated, maintained, funded, staffed and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or 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.
6. Condition 6 is included to ensure that the Works are operated 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. These Conditions are also included to ensure that a Professional Engineer has reviewed the proposed modifications and attests that the modifications are in line with that of Limited Operational Flexibility, and provide assurance that the proposed modifications comply with the Ministry's requirements stipulated in the Terms and Conditions of this Approval, MOE policies, guidelines, and industry engineering standards and best management practices.
7. Condition 7 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.

**Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s).
1242-9UJPNC issued on June 8, 2015**

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:

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

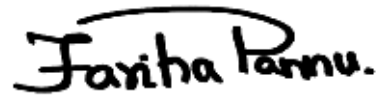
AND

The 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**

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

DATED AT TORONTO this 15th day of March, 2017



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

SH/

c: DWMD Supervisor, MOECC Barrie
Chris Visser, Golder Associates Ltd.



Notice of Modifications Dec-2013.pdf

Appendix B

2021 Stormwater Management Facility Monitoring Results

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS - POND 8

Date Inspected	Time (24 Hr)	Water Present (Yes/No)	Sampled (Yes/No)
02-Jan-2021	09:30	No	No
04-Jan-2021	14:00	No	No
05-Jan-2021	11:30	No	No
06-Jan-2021	13:00	No	No
07-Jan-2021	13:00	No	No
08-Jan-2021	13:15	No	No
09-Jan-2021	08:15	No	No
11-Jan-2021	11:00	No	No
12-Jan-2021	10:00	No	No
13-Jan-2021	13:00	No	No
15-Jan-2021	14:30	No	No
16-Jan-2021	08:30	No	No
18-Jan-2021	13:00	No	No
19-Jan-2021	10:30	No	No
20-Jan-2021	13:00	No	No
21-Jan-2021	09:15	No	No
22-Jan-2021	13:30	No	No
23-Jan-2021	09:00	No	No
25-Jan-2021	13:45	No	No
26-Jan-2021	13:30	No	No
27-Jan-2021	13:30	No	No
28-Jan-2021	14:30	No	No
29-Jan-2021	14:00	No	No
30-Jan-2021	12:00	No	No
01-Feb-2021	15:00	No	No
02-Feb-2021	12:00	No	No
03-Feb-2021	12:00	No	No
04-Feb-2021	14:00	No	No
05-Feb-2021	14:00	No	No
06-Feb-2021	09:30	No	No
08-Feb-2021	13:00	No	No
09-Feb-2021	15:00	No	No
10-Feb-2021	11:00	No	No
11-Feb-2021	14:00	No	No
12-Feb-2021	13:00	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS - POND 8

Date Inspected	Time (24 Hr)	Water Present (Yes/No)	Sampled (Yes/No)
13-Feb-2021	16:00	No	No
16-Feb-2021	13:30	No	No
18-Feb-2021	13:30	No	No
19-Feb-2021	13:30	No	No
20-Feb-2021	09:59	No	No
21-Feb-2021	11:00	No	No
22-Feb-2021	13:00	No	No
23-Feb-2021	13:30	No	No
24-Feb-2021	11:00	No	No
25-Feb-2021	11:00	No	No
26-Feb-2021	11:00	No	No
01-Mar-2021	10:30	No	No
02-Mar-2021	14:15	No	No
03-Mar-2021	13:00	No	No
04-Mar-2021	14:00	No	No
06-Mar-2021	11:30	No	No
08-Mar-2021	11:00	No	No
09-Mar-2021	13:30	No	No
10-Mar-2021	14:00	No	No
11-Mar-2021	12:00	No	No
12-Mar-2021	14:00	No	No
13-Mar-2021	08:30	No	No
15-Mar-2021	13:30	No	No
16-Mar-2021	11:15	No	No
17-Mar-2021	10:00	No	No
18-Mar-2021	13:30	No	No
19-Mar-2021	13:30	No	No
20-Mar-2021	08:30	No	No
22-Mar-2021	13:30	No	No
23-Mar-2021	14:00	No	No
24-Mar-2021	15:00	No	No
25-Mar-2021	11:00	No	No
26-Mar-2021	09:00	No	No
27-Mar-2021	14:00	No	No
29-Mar-2021	14:20	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS - POND 8

Date Inspected	Time (24 Hr)	Water Present (Yes/No)	Sampled (Yes/No)
30-Mar-2021	15:00	No	No
31-Mar-2021	13:45	No	No
01-Apr-2021		No	No
03-Apr-2021	13:45	No	No
06-Apr-2021	11:30	No	No
07-Apr-2021	14:00	No	No
08-Apr-2021	14:00	No	No
09-Apr-2021	11:00	No	No
10-Apr-2021	11:15	No	No
12-Apr-2021	11:00	No	No
13-Apr-2021	10:45	No	No
14-Apr-2021	12:00	No	No
15-Apr-2021	10:00	No	No
16-Apr-2021	14:00	No	No
17-Apr-2021	13:30	No	No
19-Apr-2021	10:00	No	No
20-Apr-2021	10:30	No	No
21-Apr-2021	14:30	No	No
22-Apr-2021	14:00	No	No
23-Apr-2021	14:30	No	No
24-Apr-2021	08:28	No	No
26-Apr-2021	10:30	No	No
27-Apr-2021	11:00	No	No
28-Apr-2021	13:30	No	No
29-Apr-2021	14:00	No	No
30-Apr-2021	10:30	No	No
01-May-2021	16:00	No	No
03-May-2021	13:15	No	No
04-May-2021	09:30	No	No
05-May-2021	11:43	No	No
06-May-2021	10:30	No	No
07-May-2021	13:30	No	No
10-May-2021	15:30	No	No
11-May-2021	15:34	No	No
12-May-2021	14:00	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS - POND 8

Date Inspected	Time (24 Hr)	Water Present (Yes/No)	Sampled (Yes/No)
13-May-2021	08:40	No	No
14-May-2021	09:55	No	No
15-May-2021	09:30	No	No
17-May-2021	13:49	No	No
18-May-2021	08:22	No	No
19-May-2021	08:56	No	No
20-May-2021	09:49	No	No
21-May-2021	10:02	No	No
22-May-2021	13:30	No	No
25-May-2021	08:20	No	No
26-May-2021	15:00	No	No
27-May-2021	15:36	No	No
28-May-2021	09:05	No	No
29-May-2021	09:30	No	No
31-May-2021	15:19	No	No
01-Jun-2021	12:17	No	No
02-Jun-2021	11:30	No	No
03-Jun-2021	10:30	No	No
04-Jun-2021	09:15	No	No
05-Jun-2021	09:30	No	No
06-Jun-2021	11:24	No	No
08-Jun-2021	10:50	No	No
09-Jun-2021	08:31	No	No
10-Jun-2021	11:16	No	No
11-Jun-2021	09:24	No	No
14-Jun-2021	10:45	No	No
15-Jun-2021	08:14	No	No
16-Jun-2021	09:08	No	No
17-Jun-2021	11:04	No	No
18-Jun-2021	09:04	No	No
19-Jun-2021		No	No
21-Jun-2021	08:27	No	No
22-Jun-2021	08:51	No	No
23-Jun-2021	08:36	No	No
24-Jun-2021	09:00	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS - POND 8

Date Inspected	Time (24 Hr)	Water Present (Yes/No)	Sampled (Yes/No)
25-Jun-2021	10:03	No	No
26-Jun-2021	08:14	No	No
28-Jun-2021	08:22	No	No
29-Jun-2021	10:18	No	No
30-Jun-2021	08:33	No	No
02-Jul-2021	09:25	No	No
03-Jul-2021	09:30	No	No
05-Jul-2021	07:59	No	No
06-Jul-2021	10:19	No	No
07-Jul-2021	10:07	No	No
08-Jul-2021	08:22	Yes	Yes
09-Jul-2021	08:18	No	No
10-Jul-2021	15:00	No	No
12-Jul-2021	07:56	No	No
13-Jul-2021	11:00	No	No
14-Jul-2021	08:26	No	No
15-Jul-2021	10:57	No	No
16-Jul-2021	09:03	No	No
17-Jul-2021	14:00	No	No
19-Jul-2021	08:13	No	No
20-Jul-2021	09:10	No	No
21-Jul-2021	08:41	No	No
22-Jul-2021	07:54	No	No
23-Jul-2021	07:56	No	No
24-Jul-2021	13:15	No	No
26-Jul-2021	09:41	No	No
27-Jul-2021	08:53	No	No
29-Jul-2021	11:37	No	No
30-Jul-2021	11:16	No	No
31-Jul-2021	13:00	No	No
03-Aug-2021	11:08	No	No
04-Aug-2021	10:56	No	No
05-Aug-2021	10:07	No	No
06-Aug-2021	09:30	No	No
07-Aug-2021	08:14	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS - POND 8

Date Inspected	Time (24 Hr)	Water Present (Yes/No)	Sampled (Yes/No)
09-Aug-2021	09:43	No	No
10-Aug-2021	13:06	No	No
11-Aug-2021	09:39	No	No
12-Aug-2021	09:29	No	No
13-Aug-2021	10:00	No	No
14-Aug-2021	08:30	No	No
16-Aug-2021	09:55	No	No
17-Aug-2021	11:40	No	No
18-Aug-2021	09:52	No	No
19-Aug-2021	15:00	No	No
20-Aug-2021	09:52	No	No
21-Aug-2021	08:00	No	No
23-Aug-2021	09:30	No	No
24-Aug-2021	09:14	No	No
25-Aug-2021	09:26	No	No
26-Aug-2021	09:37	No	No
27-Aug-2021	08:22	No	No
28-Aug-2021	14:00	No	No
30-Aug-2021	10:15	No	No
31-Aug-2021	09:35	No	No
01-Sep-2021	08:38	No	No
02-Sep-2021	08:52	No	No
03-Sep-2021	08:17	No	No
04-Sep-2021	14:30	No	No
07-Sep-2021	10:30	No	No
08-Sep-2021	13:30	No	No
09-Sep-2021	13:00	No	No
10-Sep-2021	11:00	No	No
11-Sep-2021	08:22	No	No
13-Sep-2021	10:45	No	No
14-Sep-2021	13:30	No	No
15-Sep-2021	13:00	No	No
16-Sep-2021	09:00	No	No
17-Sep-2021	09:30	No	No
18-Sep-2021	08:11	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS - POND 8

Date Inspected	Time (24 Hr)	Water Present (Yes/No)	Sampled (Yes/No)
20-Sep-2021	09:00	No	No
21-Sep-2021	09:30	No	No
22-Sep-2021	10:40	No	No
23-Sep-2021	08:30	No	No
24-Sep-2021	09:00	No	No
25-Sep-2021	08:45	No	No
27-Sep-2021	11:30	No	No
28-Sep-2021	08:30	No	No
29-Sep-2021	08:45	No	No
30-Sep-2021	08:30	No	No
01-Oct-2021	08:30	No	No
02-Oct-2021	14:30	No	No
04-Oct-2021	09:30	No	No
05-Oct-2021	08:40	No	No
06-Oct-2021	08:45	No	No
07-Oct-2021	08:40	No	No
08-Oct-2021	08:40	No	No
09-Oct-2021	08:18	No	No
12-Oct-2021	08:30	No	No
13-Oct-2021	09:45	No	No
14-Oct-2021	08:30	No	No
15-Oct-2021	09:00	No	No
16-Oct-2021	08:30	No	No
18-Oct-2021	08:30	No	No
19-Oct-2021	09:45	No	No
20-Oct-2021	09:00	No	No
21-Oct-2021	08:45	No	No
22-Oct-2021	08:30	No	No
23-Oct-2021	08:40	No	No
25-Oct-2021	08:30	No	No
26-Oct-2021	08:40	No	No
27-Oct-2021	08:15	No	No
28-Oct-2021	08:30	No	No
29-Oct-2021	08:40	No	No
30-Oct-2021	08:10	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS - POND 8

Date Inspected	Time (24 Hr)	Water Present (Yes/No)	Sampled (Yes/No)
01-Nov-2021	08:30	No	No
02-Nov-2021	08:45	No	No
03-Nov-2021	08:30	No	No
04-Nov-2021	08:25	No	No
05-Nov-2021	08:40	No	No
06-Nov-2021	08:23	No	No
08-Nov-2021	08:55	No	No
09-Nov-2021	08:20	No	No
10-Nov-2021	09:40	No	No
11-Nov-2021	09:20	No	No
12-Nov-2021	08:30	No	No
13-Nov-2021	08:15	No	No
15-Nov-2021	08:50	No	No
16-Nov-2021	08:20	No	No
17-Nov-2021	08:30	No	No
18-Nov-2021	08:30	No	No
19-Nov-2021	09:00	No	No
20-Nov-2021	09:30	No	No
22-Nov-2021	08:45	No	No
23-Nov-2021	10:30	No	No
24-Nov-2021	10:00	No	No
25-Nov-2021	09:45	No	No
26-Nov-2021	08:45	No	No
27-Nov-2021	10:30	No	No
29-Nov-2021	10:00	No	No
30-Nov-2021	08:45	No	No
01-Dec-2021	10:30	No	No
02-Dec-2021	08:40	No	No
03-Dec-2021	08:45	No	No
04-Dec-2021	08:15	No	No
06-Dec-2021	13:30	No	No
07-Dec-2021	08:45	No	No
08-Dec-2021	09:30	No	No
09-Dec-2021	09:10	No	No
10-Dec-2021	09:00	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS - POND 8

Date Inspected	Time (24 Hr)	Water Present (Yes/No)	Sampled (Yes/No)
11-Dec-2021	09:14	No	No
13-Dec-2021	08:40	No	No
14-Dec-2021	08:45	No	No
15-Dec-2021	08:55	No	No
16-Dec-2021	10:00	No	No
17-Dec-2021	08:45	No	No
18-Dec-2021	08:30	No	No
20-Dec-2021	09:50	No	No
21-Dec-2021	09:30	No	No
22-Dec-2021	10:00	No	No
23-Dec-2021	08:55	No	No
24-Dec-2021	09:00	No	No
29-Dec-2021	12:40	No	No
30-Dec-2021	08:15	No	No
31-Dec-2021	09:45	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS – COMPOST STORMWATER MANAGEMENT POND

Date Inspected	Time (24 Hr)	Water Present (>150 mm) (Yes/No)	Sampled (Yes/No)
15-Mar-2021	13:30	No	No
16-Mar-2021	11:15	No	No
17-Mar-2021	10:00	No	No
18-Mar-2021	13:30	No	No
19-Mar-2021	13:30	No	No
20-Mar-2021	08:30	No	No
22-Mar-2021	13:30	No	No
23-Mar-2021	14:00	No	No
24-Mar-2021	15:00	No	No
25-Mar-2021	11:00	No	No
26-Mar-2021	09:00	Yes	Yes
27-Mar-2021	14:00	No	No
29-Mar-2021	14:20	No	No
30-Mar-2021	15:00	No	No
31-Mar-2021	13:45	No	No
01-Apr-2021		No	No
03-Apr-2021	13:45	No	No
06-Apr-2021	11:30	No	No
07-Apr-2021	14:00	No	No
08-Apr-2021	14:00	No	No
09-Apr-2021	11:00	No	No
10-Apr-2021	11:15	No	No
12-Apr-2021	11:00	No	No
13-Apr-2021	10:45	No	No
14-Apr-2021	12:00	No	No
15-Apr-2021	10:00	No	No
16-Apr-2021	14:00	No	No
17-Apr-2021	13:30	No	No
19-Apr-2021	10:00	No	No
20-Apr-2021	10:30	No	No
21-Apr-2021	14:30	No	No
22-Apr-2021	14:00	No	No
23-Apr-2021	14:30	No	No
24-Apr-2021	08:28	No	No
26-Apr-2021	10:30	No	No
27-Apr-2021	11:00	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS – COMPOST STORMWATER MANAGEMENT POND

Date Inspected	Time (24 Hr)	Water Present (>150 mm) (Yes/No)	Sampled (Yes/No)
28-Apr-2021	13:30	No	No
29-Apr-2021	14:00	No	No
30-Apr-2021	10:30	No	No
01-May-2021	16:00	No	No
03-May-2021	13:15	No	No
04-May-2021	09:30	No	No
05-May-2021	11:43	No	No
06-May-2021	10:30	No	No
07-May-2021	13:30	No	No
10-May-2021	15:30	No	No
11-May-2021	15:34	No	No
12-May-2021	14:00	No	No
13-May-2021	08:40	No	No
14-May-2021	09:55	No	No
15-May-2021	09:30	No	No
17-May-2021	13:49	No	No
18-May-2021	08:22	No	No
19-May-2021	08:56	No	No
20-May-2021	09:49	No	No
21-May-2021	10:02	No	No
22-May-2021	13:30	No	No
25-May-2021	08:20	No	No
26-May-2021	15:00	No	No
27-May-2021	15:36	No	No
28-May-2021	09:05	No	No
29-May-2021	09:30	No	No
31-May-2021	15:19	No	No
01-Jun-2021	12:17	No	No
02-Jun-2021	11:30	No	No
03-Jun-2021	10:30	No	No
04-Jun-2021	09:15	No	No
05-Jun-2021	09:30	No	No
06-Jun-2021	11:24	No	No
08-Jun-2021	10:50	No	No
09-Jun-2021	08:31	No	No
10-Jun-2021	11:16	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS – COMPOST STORMWATER MANAGEMENT POND

Date Inspected	Time (24 Hr)	Water Present (>150 mm) (Yes/No)	Sampled (Yes/No)
11-Jun-2021	09:24	No	No
14-Jun-2021	10:45	No	No
15-Jun-2021	08:14	No	No
16-Jun-2021	09:08	No	No
17-Jun-2021	11:04	No	No
18-Jun-2021	09:04	No	No
19-Jun-2021		No	No
21-Jun-2021	08:27	No	No
22-Jun-2021	08:51	No	No
23-Jun-2021	08:36	No	No
24-Jun-2021	09:00	No	No
25-Jun-2021	10:03	No	No
26-Jun-2021	08:14	No	No
28-Jun-2021	08:22	No	No
29-Jun-2021	10:18	No	No
30-Jun-2021	08:33	No	No
02-Jul-2021	09:25	No	No
03-Jul-2021	09:30	No	No
05-Jul-2021	07:59	No	No
06-Jul-2021	10:19	No	No
07-Jul-2021	10:07	No	No
08-Jul-2021	08:22	Yes	Yes
09-Jul-2021	08:18	No	No
10-Jul-2021	15:00	No	No
12-Jul-2021	07:56	No	No
13-Jul-2021	11:00	No	No
14-Jul-2021	08:26	No	No
15-Jul-2021	10:57	Yes	No
16-Jul-2021	09:03	No	No
17-Jul-2021	14:00	No	No
19-Jul-2021	08:13	No	No
20-Jul-2021	09:10	No	No
21-Jul-2021	08:41	No	No
22-Jul-2021	07:54	No	No
23-Jul-2021	07:56	No	No
24-Jul-2021	13:15	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS – COMPOST STORMWATER MANAGEMENT POND

Date Inspected	Time (24 Hr)	Water Present (>150 mm) (Yes/No)	Sampled (Yes/No)
26-Jul-2021	09:41	No	No
27-Jul-2021	08:53	No	No
29-Jul-2021	11:37	Yes	Yes
30-Jul-2021	11:16	No	No
31-Jul-2021	13:00	No	No
03-Aug-2021	11:08	No	No
04-Aug-2021	10:56	No	No
05-Aug-2021	10:07	No	No
06-Aug-2021	09:30	No	No
07-Aug-2021	08:14	No	No
09-Aug-2021	09:43	No	No
10-Aug-2021	13:06	No	No
11-Aug-2021	09:39	No	No
12-Aug-2021	09:29	No	No
13-Aug-2021	10:00	No	No
14-Aug-2021	08:30	No	No
16-Aug-2021	09:55	No	No
17-Aug-2021	11:40	No	No
18-Aug-2021	09:52	No	No
19-Aug-2021	15:00	No	No
20-Aug-2021	09:52	No	No
21-Aug-2021	08:00	No	No
23-Aug-2021	09:30	No	No
24-Aug-2021	09:14	No	No
25-Aug-2021	09:26	No	No
26-Aug-2021	09:37	No	No
27-Aug-2021	08:22	No	No
28-Aug-2021	14:00	No	No
30-Aug-2021	10:15	No	No
31-Aug-2021	09:35	No	No
01-Sep-2021	08:38	No	No
02-Sep-2021	08:52	No	No
03-Sep-2021	08:17	No	No
04-Sep-2021	14:30	No	No
07-Sep-2021	10:30	No	No
08-Sep-2021	13:30	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS – COMPOST STORMWATER MANAGEMENT POND

Date Inspected	Time (24 Hr)	Water Present (>150 mm) (Yes/No)	Sampled (Yes/No)
09-Sep-2021	13:00	No	No
10-Sep-2021	11:00	No	No
11-Sep-2021	08:22	No	No
13-Sep-2021	10:45	No	No
14-Sep-2021	13:30	No	No
15-Sep-2021	13:00	No	No
16-Sep-2021	09:00	No	No
17-Sep-2021	09:30	No	No
18-Sep-2021	08:11	No	No
20-Sep-2021	09:00	No	No
21-Sep-2021	09:30	No	No
22-Sep-2021	10:40	No	No
23-Sep-2021	08:30	Yes	Yes
24-Sep-2021	09:00	No	No
25-Sep-2021	08:45	No	No
27-Sep-2021	11:30	No	No
28-Sep-2021	08:30	No	No
29-Sep-2021	08:45	No	No
30-Sep-2021	08:30	No	No
01-Oct-2021	08:30	No	No
02-Oct-2021	14:30	No	No
04-Oct-2021	09:30	No	No
05-Oct-2021	08:40	No	No
06-Oct-2021	08:45	No	No
07-Oct-2021	08:40	No	No
08-Oct-2021	08:40	No	No
09-Oct-2021	08:18	No	No
12-Oct-2021	08:30	No	No
13-Oct-2021	09:45	No	No
14-Oct-2021	08:30	No	No
15-Oct-2021	09:00	No	No
16-Oct-2021	08:30	No	No
18-Oct-2021	08:30	No	No
19-Oct-2021	09:45	No	No
20-Oct-2021	09:00	No	No
21-Oct-2021	08:45	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS – COMPOST STORMWATER MANAGEMENT POND

Date Inspected	Time (24 Hr)	Water Present (>150 mm) (Yes/No)	Sampled (Yes/No)
22-Oct-2021	08:30	No	No
23-Oct-2021	08:40	No	No
25-Oct-2021	08:30	No	No
26-Oct-2021	08:40	No	No
27-Oct-2021	08:15	No	No
28-Oct-2021	08:30	No	No
29-Oct-2021	08:40	No	No
30-Oct-2021	08:10	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS – POND 2

Date Inspected	Time (24 Hr)	24 Hr Precipitation (>15 mm) (Yes/No)	Sampled (Yes/No)
15-Mar-2021	13:30	No	No
16-Mar-2021	11:15	No	No
17-Mar-2021	10:00	No	No
18-Mar-2021	13:30	No	No
19-Mar-2021	13:30	No	No
20-Mar-2021	08:30	No	No
22-Mar-2021	13:30	No	No
23-Mar-2021	14:00	No	No
24-Mar-2021	15:00	No	No
25-Mar-2021	11:00	No	No
26-Mar-2021	09:00	Yes	Yes
27-Mar-2021	14:00	No	No
29-Mar-2021	14:20	No	No
30-Mar-2021	15:00	No	No
31-Mar-2021	13:45	No	No
01-Apr-2021		No	No
03-Apr-2021	13:45	No	No
06-Apr-2021	11:30	No	No
07-Apr-2021	14:00	No	No
08-Apr-2021	14:00	No	No
09-Apr-2021	11:00	No	No
10-Apr-2021	11:15	No	No
12-Apr-2021	11:00	No	No
13-Apr-2021	10:45	No	No
14-Apr-2021	12:00	No	No
15-Apr-2021	10:00	No	No
16-Apr-2021	14:00	No	No
17-Apr-2021	13:30	No	No
19-Apr-2021	10:00	No	No
20-Apr-2021	10:30	No	No
21-Apr-2021	14:30	No	No
22-Apr-2021	14:00	No	No
23-Apr-2021	14:30	No	No
24-Apr-2021	08:28	No	No
26-Apr-2021	10:30	No	No
27-Apr-2021	11:00	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS – POND 2

Date Inspected	Time (24 Hr)	24 Hr Precipitation (>15 mm) (Yes/No)	Sampled (Yes/No)
28-Apr-2021	13:30	No	No
29-Apr-2021	14:00	No	No
30-Apr-2021	10:30	No	No
01-May-2021	16:00	No	No
03-May-2021	13:15	No	No
04-May-2021	09:30	No	No
05-May-2021	11:43	No	No
06-May-2021	10:30	No	No
07-May-2021	13:30	No	No
10-May-2021	15:30	No	No
11-May-2021	15:34	No	No
12-May-2021	14:00	No	No
13-May-2021	08:40	No	No
14-May-2021	09:55	No	No
15-May-2021	09:30	No	No
17-May-2021	13:49	No	No
18-May-2021	08:22	No	No
19-May-2021	08:56	No	No
20-May-2021	09:49	No	No
21-May-2021	10:02	No	No
22-May-2021	13:30	No	No
25-May-2021	08:20	No	No
26-May-2021	15:00	No	No
27-May-2021	15:36	No	No
28-May-2021	09:05	No	No
29-May-2021	09:30	No	No
31-May-2021	15:19	No	No
01-Jun-2021	12:17	No	No
02-Jun-2021	11:30	No	No
03-Jun-2021	10:30	No	No
04-Jun-2021	09:15	No	No
05-Jun-2021	09:30	No	No
06-Jun-2021	11:24	No	No
08-Jun-2021	10:50	No	No
09-Jun-2021	08:31	No	No
10-Jun-2021	11:16	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS – POND 2

Date Inspected	Time (24 Hr)	24 Hr Precipitation (>15 mm) (Yes/No)	Sampled (Yes/No)
11-Jun-2021	09:24	No	No
14-Jun-2021	10:45	No	No
15-Jun-2021	08:14	No	No
16-Jun-2021	09:08	No	No
17-Jun-2021	11:04	No	No
18-Jun-2021	09:04	No	No
19-Jun-2021		No	No
21-Jun-2021	08:27	No	No
22-Jun-2021	08:51	No	No
23-Jun-2021	08:36	No	No
24-Jun-2021	09:00	No	No
25-Jun-2021	10:03	No	No
26-Jun-2021	08:14	Yes	No
28-Jun-2021	08:22	Yes	No
29-Jun-2021	10:18	No	No
30-Jun-2021	08:33	No	No
02-Jul-2021	09:25	No	No
03-Jul-2021	09:30	No	No
05-Jul-2021	07:59	No	Np
06-Jul-2021	10:19	No	No
07-Jul-2021	10:07	No	No
08-Jul-2021	08:22	Yes	Yes
09-Jul-2021	08:18	No	No
10-Jul-2021	15:00	No	No
12-Jul-2021	07:56	No	No
13-Jul-2021	11:00	No	No
14-Jul-2021	08:26	No	No
15-Jul-2021	10:57	Yes	No
16-Jul-2021	09:03	No	No
17-Jul-2021	14:00	No	No
19-Jul-2021	08:13	No	No
20-Jul-2021	09:10	No	No
21-Jul-2021	08:41	No	No
22-Jul-2021	07:54	No	No
23-Jul-2021	07:56	No	No
24-Jul-2021	13:15	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS – POND 2

Date Inspected	Time (24 Hr)	24 Hr Precipitation (>15 mm) (Yes/No)	Sampled (Yes/No)
26-Jul-2021	09:41	No	No
27-Jul-2021	08:53	No	No
29-Jul-2021	11:37	Yes	Yes
30-Jul-2021	11:16	No	No
31-Jul-2021	13:00	No	No
03-Aug-2021	11:08	No	No
04-Aug-2021	10:56	No	No
05-Aug-2021	10:07	No	No
06-Aug-2021	09:30	No	No
07-Aug-2021	08:14	No	No
09-Aug-2021	09:43	No	No
10-Aug-2021	13:06	No	No
11-Aug-2021	09:39	No	No
12-Aug-2021	09:29	No	No
13-Aug-2021	10:00	No	No
14-Aug-2021	08:30	No	No
16-Aug-2021	09:55	No	No
17-Aug-2021	11:40	No	No
18-Aug-2021	09:52	No	No
19-Aug-2021	15:00	No	No
20-Aug-2021	09:52	No	No
21-Aug-2021	08:00	No	No
23-Aug-2021	09:30	No	No
24-Aug-2021	09:14	No	No
25-Aug-2021	09:26	No	No
26-Aug-2021	09:37	No	No
27-Aug-2021	08:22	No	No
28-Aug-2021	14:00	No	No
30-Aug-2021	10:15	No	No
31-Aug-2021	09:35	No	No
01-Sep-2021	08:38	No	No
02-Sep-2021	08:52	No	No
03-Sep-2021	08:17	No	No
04-Sep-2021	14:30	No	No
07-Sep-2021	10:30	No	No
08-Sep-2021	13:30	Yes	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS – POND 2

Date Inspected	Time (24 Hr)	24 Hr Precipitation (>15 mm) (Yes/No)	Sampled (Yes/No)
09-Sep-2021	13:00	No	No
10-Sep-2021	11:00	No	No
11-Sep-2021	08:22	No	No
13-Sep-2021	10:45	No	No
14-Sep-2021	13:30	No	No
15-Sep-2021	13:00	Yes	No
16-Sep-2021	09:00	No	No
17-Sep-2021	09:30	No	No
18-Sep-2021	08:11	No	No
20-Sep-2021	09:00	No	No
21-Sep-2021	09:30	No	No
22-Sep-2021	10:40	Yes	No
23-Sep-2021	08:30	Yes	Yes
24-Sep-2021	09:00	No	No
25-Sep-2021	08:45	No	No
27-Sep-2021	11:30	No	No
28-Sep-2021	08:30	No	No
29-Sep-2021	08:45	No	No
30-Sep-2021	08:30	No	No
01-Oct-2021	08:30	No	No
02-Oct-2021	14:30	No	No
04-Oct-2021	09:30	No	No
05-Oct-2021	08:40	No	No
06-Oct-2021	08:45	No	No
07-Oct-2021	08:40	No	No
08-Oct-2021	08:40	No	No
09-Oct-2021	08:18	No	No
12-Oct-2021	08:30	No	No
13-Oct-2021	09:45	No	No
14-Oct-2021	08:30	No	No
15-Oct-2021	09:00	No	No
16-Oct-2021	08:30	No	No
18-Oct-2021	08:30	Yes	No
19-Oct-2021	09:45	No	No
20-Oct-2021	09:00	No	No
21-Oct-2021	08:45	No	No

**BARRIE LANDFILL STORMWATER MANAGEMENT FACILITY
2021 ANNUAL MONITORING REPORT**

MONITORING RESULTS – POND 2

Date Inspected	Time (24 Hr)	24 Hr Precipitation (>15 mm) (Yes/No)	Sampled (Yes/No)
22-Oct-2021	08:30	No	No
23-Oct-2021	08:40	No	No
25-Oct-2021	08:30	No	No
26-Oct-2021	08:40	Yes	No
27-Oct-2021	08:15	No	No
28-Oct-2021	08:30	No	No
29-Oct-2021	08:40	No	No
30-Oct-2021	08:10	No	No

Appendix C

2021 Stormwater Sampling Results



E3 Laboratories Inc.

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
Justin Haskett
272 Ferndale Drive
Barrie
L4M 4T5
Tel: 705-739-4220

Fax:
Email: justin.haskett@barrie.ca

Work Order No.:2620947
Received : 2021-03-29
PO Number: 4500000032
Reported: 2021-04-05
Project Name: Landfill SWM
Chain of Custody No.: 2620947

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date		Method
	Date	Lab ID					Analyzed		
Pond 2	2021-03-26	674718	Alkalinity (CaCO3)	34	mg/L	18	2021-03-29	EPA 310.2	
			Ammonia (Total)	0.10	mg/L	0.03	2021-03-31	APHA 4500	
			Chloride	162	mg/L	0.25	2021-03-31	HACH 8113	
			DOC	See	Attached			Subcontracted	
			F1-F4 PHC	See	Attached			Subcontracted	
			Metals	See	Attached			Subcontracted	
			pH	8.08	SU	N/A	2021-03-29	APHA 4500 H-B	
			Phenolics	See	Attached			Subcontracted	
			TP	0.09	mg/L	0.02	2021-03-31	APHA 4500	
			TPH (GDH)	See	Attached			Subcontracted	
			TSS	29	mg/L	1	2021-04-01	APHA 2540 D	

Reported by:

Nilou Ghazi, Ph.D.,P.Eng.
Laboratory Manager



E3 Laboratories Inc.

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
Justin Haskett
272 Ferndale Drive
Barrie
L4M 4T5
Tel: 705-739-4220

Fax:
Email: justin.haskett@barrie.ca

Work Order No.:2620947
Received : 2021-03-29
PO Number: 4500000032
Reported: 2021-04-05
Project Name: Landfill SWM
Chain of Custody No.: 2620947

Quality Control Summary

Lab ID	Analyte	QC Recovery	QC limits	Spike Recovery	Spike Limits	Dup RPD	Dup Limits	Blank
674718	Alkalinity (CaCO3)	101	80-120	90	80-120	2	0-20	<18
	Ammonia (Total)	95	80-120	98	80-120	3	0-20	<0.03
	Chloride	101	80-120	101	80-120	2	0-20	
	DOC					0		
	F1-F4 PHC					0		
	Metals					0		
	pH	100	80-120	N/A	N/A	0	0-20	N/A
	Phenolics					0		
	TP	99	80-120	99	80-120	0	0-20	<0.02
	TPH (GDH)					0		
	TSS	102	80-120	N/A	N/A		0-20	<1

Reported by:

Nilou Ghazi, Ph.D.,P.Eng.
Laboratory Manager

All work has been performed using accepted testing methodologies, except where otherwise agreed to by the client in writing. Our total liability in connection with this work shall be limited to the amount paid by the client. Results relate only to items tested as received.



E3 Laboratories Inc.

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
Justin Haskett
272 Ferndale Drive
Barrie
L4M 4T5
Tel: 705-739-4220

Fax:
Email: justin.haskett@barrie.ca

Work Order No.:2620946
Received : 2021-03-29
PO Number: 4500000032
Reported: 2021-04-07
Project Name: Landfill SWM
Chain of Custody No.: 2620946

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date		Method
	Date	Lab ID					Analyzed		
Compost Pond	2021-03-26	674717	Alkalinity (CaCO3)	28	mg/L	18	2021-03-29	EPA 310.2	
			Ammonia (Total)	0.04	mg/L	0.03	2021-03-31	APHA 4500	
			cBOD	<40	mg/L	2.0	2021-03-29	APHA 5210 B	
			Chloride	47.9	mg/L	0.25	2021-03-31	HACH 8113	
			DOC	25.8	mg/L	0.5	2021-03-31	Subcontracted	
			Iron	2.45	mg/L	0.100	2021-03-31	Subcontracted	
			Lead	0.0062	mg/L	0.0001	2021-03-31	Subcontracted	
			NO2 (Nitrite)	0.023	mg/L	0.004	2021-04-06	APHA 4500	
			NO3 (Nitrate)	0.17	mg/L	0.04	2021-04-06	APHA 4500	
			pH	7.37	SU	N/A	2021-03-29	APHA 4500 H-B	
			Sulfate (SO4)	11.5	mg/L	10.0	2021-03-31	HACH 8051	
			TDS	250	mg/L	50	2021-03-31	APHA 2540C (GRAV)	
			TKN	2.8	mg/L	0.2	2021-03-31	APHA 4500-NorgD	
			TP	0.84	mg/L	0.02	2021-03-31	APHA 4500	
			TSS	99	mg/L	1	2021-04-01	APHA 2540 D	

Reported by:

Nilou Ghazi, Ph.D.,P.Eng.
Laboratory Manager

**E3 Laboratories Inc.**

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
 Justin Haskett
 272 Ferndale Drive
 Barrie
 L4M 4T5
 Tel: 705-739-4220

Fax:
Email: justin.haskett@barrie.ca

Work Order No.:2620946
 Received : 2021-03-29
 PO Number: 4500000032
 Reported: 2021-04-07
 Project Name: Landfill SWM
 Chain of Custody No.: 2620946

Quality Control Summary

Lab ID	Analyte	QC Recovery	QC limits	Spike Recovery	Spike Limits	Dup RPD	Dup Limits	Blank
674717	Alkalinity (CaCO3)	99	80-120	101	80-120	1	0-20	<18
	Ammonia (Total)	95	80-120	98	80-120	3	0-20	<0.03
	cBOD	90	80-120	N/A	N/A	2	0-20	
	Chloride	101	80-120	101	80-120	2	0-20	
	DOC							
	Iron		80-120		80-120		0-20	
	Lead		80-120		80-120		0-20	
	NO2 (Nitrite)	102	80-120	98	80-120	0	0-20	<0.004
	NO3 (Nitrate)	95	80-120	101	80-120	0	0-20	<0.04
	pH	100	80-120	N/A	N/A	0	0-20	N/A
	Sulfate (SO4)	102	80-120	94	80-120	3	0-20	
	TDS	109	80-120				0-10.6	
	TKN	100	80-120	102	80-120	0	0-20	<0.2
	TP	104	80-120	102	80-120	3	0-20	<0.02
TSS	102	80-120	N/A	N/A		0-20	<1	

Reported by:

 Nilou Ghazi, Ph.D.,P.Eng.
 Laboratory Manager

Page 2 of 2

All work has been performed using accepted testing methodologies, except where otherwise agreed to by the client in writing. Our total liability in connection with this work shall be limited to the amount paid by the client.
 Results relate only to items tested as received.

**E3 Laboratories Inc.**

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
 Justin Haskett
 272 Ferndale Drive
 Barrie
 L4M 4T5
 Tel: 705-739-4220

Fax:
 Email: justin.haskett@barrie.ca

Work Order No.:2624603
 Received : 2021-07-09
 PO Number: 4500000032
 Reported: 2021-07-16
 Project Name: Landfill SWM
 Chain of Custody No.: 2624603

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date	Method
	Date	Lab ID					Analyzed	
Pond 2 Outlet	2021-07-08	686105	Alkalinity (CaCO ₃)	37	mg/L	18	2021-07-12	EPA 310.2
			Ammonia (Total)	0.03	mg/L	0.03	2021-07-14	APHA 4500
			Chloride	1.20	mg/L	0.25	2021-07-12	HACH 8113
			DOC	3.9	mg/L	0.5	2021-07-12	Subcontracted
			F1-F4 PHC	See	Attached		2021-07-12	Subcontracted
			Hardness (CaCO ₃)	28.0	mg/L		2021-07-12	Subcontracted
			Metals	See	Attached		2021-07-12	Subcontracted
			pH	7.99	SU	N/A	2021-07-09	APHA 4500 H-B
			Phenolics	<0.001	mg/L	0.001	2021-07-12	Subcontracted
			TP	0.03	mg/L	0.02	2021-07-14	APHA 4500
			TPH (GDH)	See	Attached		2021-07-13	Subcontracted
			TSS	2	mg/L	1	2021-07-14	APHA 2540 D

Reported by:

Nilou Ghazi, Ph.D.,P.Eng.
 Laboratory Manager



E3 Laboratories Inc.

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
Justin Haskett
272 Ferndale Drive
Barrie
L4M 4T5
Tel: 705-739-4220

Fax:
Email: justin.haskett@barrie.ca

Work Order No.:2624603
Received : 2021-07-09
PO Number: 4500000032
Reported: 2021-07-16
Project Name: Landfill SWM
Chain of Custody No.: 2624603

Quality Control Summary

Lab ID	Analyte	QC Recovery	QC limits	Spike Recovery	Spike Limits	Dup RPD	Dup Limits	Blank
686105	Alkalinity (CaCO3)	100	80-120	98	80-120	1	0-20	<18
	Ammonia (Total)	101	80-120	105	80-120	0	0-20	<0.03
	Chloride	98	80-120	101	70-130	1	0-20	
	DOC							
	F1-F4 PHC							
	Hardness (CaCO3)							
	Metals							
	pH	100	80-120	N/A	N/A	0	0-20	N/A
	Phenolics							
	TP	101	80-120	98	80-120	0	0-20	<0.02
TPH (GDH)								
TSS	102	80-120	N/A	N/A	1	0-20	<1	

Certificate of Analysis

E-3 Laboratories Inc.

RR#4, 360 York Rd. Unit 10
Niagara-on-the-Lake, ON L0S 1J0
Attn: Kristy Berry

Client PO: 2624603
Project: City of Barrie
Custody:

Report Date: 15-Jul-2021
Order Date: 9-Jul-2021

Order #: 2128634

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2128634-01	686105

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 15-Jul-2021

Client: E-3 Laboratories Inc.

Order Date: 9-Jul-2021

Client PO: 2624603

Project Description: City of Barrie

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	12-Jul-21	12-Jul-21
Hardness	Hardness as CaCO ₃	12-Jul-21	12-Jul-21
Metals, ICP-MS	EPA 200.8 - ICP-MS	12-Jul-21	12-Jul-21
PHC F1	CWS Tier 1 - P&T GC-FID	12-Jul-21	13-Jul-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	14-Jul-21	14-Jul-21
Phenolics	EPA 420.2 - Auto Colour, 4AAP	12-Jul-21	12-Jul-21
TPH (diesel)	E3420 - GC-FID, extraction	14-Jul-21	14-Jul-21
TPH (gasoline)	E3420 - P&T GC-FID	12-Jul-21	13-Jul-21
TPH (heavy oil)	SM5520F - Gravimetric	12-Jul-21	13-Jul-21

Certificate of Analysis

Report Date: 15-Jul-2021

Client: E-3 Laboratories Inc.

Order Date: 9-Jul-2021

Client PO: 2624603

Project Description: City of Barrie

Client ID:	686105	-	-	-
Sample Date:	08-Jul-21 00:00	-	-	-
Sample ID:	2128634-01	-	-	-
MDL/Units	Water	-	-	-

General Inorganics

Hardness	mg/L	28.0	-	-	-
Dissolved Organic Carbon	0.5 mg/L	3.9	-	-	-
Phenolics	0.001 mg/L	<0.001	-	-	-

Metals

Arsenic	0.001 mg/L	<0.001	-	-	-
Cadmium	0.0001 mg/L	<0.0001	-	-	-
Calcium	0.100 mg/L	10.2	-	-	-
Chromium	0.001 mg/L	<0.001	-	-	-
Cobalt	0.0005 mg/L	<0.0005	-	-	-
Iron	0.100 mg/L	<0.100	-	-	-
Lead	0.0001 mg/L	0.0003	-	-	-
Magnesium	0.200 mg/L	0.623	-	-	-

Hydrocarbons

F1 PHCs (C6-C10)	25 ug/L	<25	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-
TPH (gasoline)	0.2 mg/L	<0.2	-	-	-
TPH (diesel)	0.1 mg/L	<0.1	-	-	-
TPH (heavy oil)	0.5 mg/L	<0.5	-	-	-

Certificate of Analysis

Report Date: 15-Jul-2021

Client: E-3 Laboratories Inc.

Order Date: 9-Jul-2021

Client PO: 2624603

Project Description: City of Barrie

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Dissolved Organic Carbon	ND	0.5	mg/L						
Phenolics	ND	0.001	mg/L						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
TPH (gasoline)	ND	0.2	mg/L						
TPH (diesel)	ND	0.1	mg/L						
TPH (heavy oil)	ND	0.5	mg/L						
Metals									
Arsenic	ND	0.001	mg/L						
Cadmium	ND	0.0001	mg/L						
Calcium	ND	0.100	mg/L						
Chromium	ND	0.001	mg/L						
Cobalt	ND	0.0005	mg/L						
Iron	ND	0.100	mg/L						
Lead	ND	0.0001	mg/L						
Magnesium	ND	0.200	mg/L						

Certificate of Analysis

Report Date: 15-Jul-2021

Client: E-3 Laboratories Inc.

Order Date: 9-Jul-2021

Client PO: 2624603

Project Description: City of Barrie

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Dissolved Organic Carbon	7.6	0.5	mg/L	8.3			7.8	37	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
TPH (gasoline)	ND	0.2	mg/L	ND			NC	30	
TPH (heavy oil)	ND	0.5	mg/L	ND			NC	30	
Metals									
Arsenic	ND	0.001	mg/L	ND			NC	20	
Cadmium	ND	0.0001	mg/L	ND			NC	20	
Calcium	32.8	0.100	mg/L	32.1			1.9	20	
Chromium	ND	0.001	mg/L	ND			NC	20	
Cobalt	ND	0.0005	mg/L	ND			NC	20	
Iron	ND	0.100	mg/L	ND			NC	20	
Lead	ND	0.0001	mg/L	ND			NC	20	
Magnesium	8.10	0.200	mg/L	7.58			6.6	20	

Certificate of Analysis

Report Date: 15-Jul-2021

Client: E-3 Laboratories Inc.

Order Date: 9-Jul-2021

Client PO: 2624603

Project Description: City of Barrie

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Dissolved Organic Carbon	18.5	0.5	mg/L	8.3	103	60-133			
Phenolics	0.024	0.001	mg/L	ND	95.7	69-132			
Hydrocarbons									
F1 PHCs (C6-C10)	2160	25	ug/L	ND	108	68-117			
F2 PHCs (C10-C16)	1460	100	ug/L	ND	91.2	60-140			
F3 PHCs (C16-C34)	3500	100	ug/L	ND	89.2	60-140			
F4 PHCs (C34-C50)	2350	100	ug/L	ND	94.6	60-140			
TPH (gasoline)	2.16	0.2	mg/L	ND	108	68-117			
TPH (diesel)	3.54	0.1	mg/L	ND	88.5	46-135			
TPH (heavy oil)	8.2	0.5	mg/L	ND	82.0	65-110			
Metals									
Arsenic	52.1	0.001	mg/L	0.6	103	80-120			
Cadmium	45.6	0.0001	mg/L	0.01	91.1	80-120			
Calcium	40000	0.100	mg/L	32100	78.4	80-120			QM-07
Chromium	50.9	0.001	mg/L	0.3	101	80-120			
Cobalt	50.0	0.0005	mg/L	0.02	100	80-120			
Iron	2470	0.100	mg/L	22	97.9	80-120			
Lead	49.8	0.0001	mg/L	0.04	99.6	80-120			
Magnesium	17100	0.200	mg/L	7580	94.9	80-120			

Certificate of Analysis

Report Date: 15-Jul-2021

Client: E-3 Laboratories Inc.

Order Date: 9-Jul-2021

Client PO: 2624603

Project Description: City of Barrie

Qualifier Notes:

Login Qualifiers :

Sample not received in Paracel verified container / media

Applies to samples: 686105

QC Qualifiers :

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.



E3 Laboratories Inc.

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
Justin Haskett
272 Ferndale Drive
Barrie
L4M 4T5
Tel: 705-739-4220

Fax:
Email: justin.haskett@barrie.ca

Work Order No.:2624602
Received : 2021-07-09
PO Number: 4500000722
Reported: 2021-07-19
Project Name: Landfill SWM
Chain of Custody No.: 2624602

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date		Method
	Date	Lab ID					Analyzed		
Compost Pond Outlet	2021-07-08	686104	Alkalinity (CaCO3)	30	mg/L	18	2021-07-12	EPA 310.2	
			Ammonia (Total)	0.17	mg/L	0.03	2021-07-14	APHA 4500	
			cBOD	<6	mg/L	2.0	2021-07-09	APHA 5210 B	
			Chloride	6.80	mg/L	0.25	2021-07-12	HACH 8113	
			DOC	8.3	mg/L	0.5	2021-07-12	Subcontracted	
			Iron	0.573	mg/L	0.100	2021-07-12	Subcontracted	
			Lead	0.0017	mg/L	0.0001	2021-07-12	Subcontracted	
			NO2 (Nitrite)	0.016	mg/L	0.004	2021-07-12	APHA 4500	
			NO3 (Nitrate)	0.18	0mg/L	0.04	2021-07-12	APHA 4500	
			pH	8.08	SU	N/A	2021-07-09	APHA 4500 H-B	
			Sulfate (SO4)	20.7	mg/L	10.0	2021-07-19	HACH 8051	
			TDS	60	mg/L	50	2021-07-14	APHA 2540C (GRAV)	
			TKN	0.9	mg/L	0.2	2021-07-14	APHA 4500-NorgD	
			TP	0.16	mg/L	0.02	2021-07-14	APHA 4500	
			TSS	21	mg/L	1	2021-07-14	APHA 2540 D	

Reported by:

Nilou Ghazi, Ph.D.,P.Eng.
Laboratory Manager

All work has been performed using accepted testing methodologies, except where otherwise agreed to by the client in writing. Our total liability in connection with this work shall be limited to the amount paid by the client. Results relate only to items tested as received.

**E3 Laboratories Inc.**

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
 Justin Haskett
 272 Ferndale Drive
 Barrie
 L4M 4T5
 Tel: 705-739-4220

Fax:
 Email: justin.haskett@barrie.ca

Work Order No.:2624602
 Received : 2021-07-09
 PO Number: 450000722
 Reported: 2021-07-19
 Project Name: Landfill SWM
 Chain of Custody No.: 2624602

Quality Control Summary

Lab ID	Analyte	QC Recovery	QC limits	Spike Recovery	Spike Limits	Dup RPD	Dup Limits	Blank
686104	Alkalinity (CaCO3)	100	80-120	98	80-120	1	0-20	<18
	Ammonia (Total)	101	80-120	105	80-120	0	0-20	<0.03
	cBOD	86	80-120	N/A	N/A	3	0-20	
	Chloride	98	80-120	101	70-130	1	0-20	
	DOC							
	Iron		80-120		80-120		0-20	
	Lead		80-120		80-120		0-20	
	NO2 (Nitrite)	98	80-120	96	80-120	0	0-20	<0.004
	NO3 (Nitrate)	104	80-120	97	80-120	0	0-20	<0.04
	pH	100	80-120	N/A	N/A	0	0-20	N/A
	Sulfate (SO4)	105	80-120	108	80-120	2	0-20	
	TDS	94	80-120				0-10.6	
	TKN	100	80-120	104	80-120	0	0-20	<0.2
	TP	101	80-120	98	80-120	0	0-20	<0.02
TSS	102	80-120	N/A	N/A	1	0-20	<1	



E3 Laboratories Inc.

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
Justin Haskett
272 Ferndale Drive
Barrie
L4M 4T5
Tel: 705-739-4220

Fax:
Email: justin.haskett@barrie.ca

Work Order No.:2625322
Received : 2021-07-30
PO Number: 4500000722
Reported: 2021-08-09
Project Name: Landfill SWM
Chain of Custody No.:

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date	Method
	Date	Lab ID					Analyzed	
Pond 2 Outlet	2021-07-29	688378	Alkalinity (CaCO3)	23	mg/L	18	2021-08-03	EPA 310.2
			Ammonia (Total)	0.11	mg/L	0.03	2021-08-06	APHA 4500
			Chloride	1.90	mg/L	0.25	2021-08-03	HACH 8113
			DOC	5.8	mg/L	0.5	2021-08-05	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2021-08-05	Subcontracted
			Metals	See	Attached	N/A	2021-08-03	Subcontracted
			pH	7.55	SU	N/A	2021-07-30	APHA 4500 H-B
			Phenolics	0.007	mg/L	0.001	2021-08-04	Subcontracted
			TP	0.07	mg/L	0.02	2021-08-06	APHA 4500
			TPH (GDH)	See	Attached		2021-08-04	Subcontracted
			TSS	2	mg/L	1	2021-08-04	APHA 2540 D

Reported by:

Nilou Ghazi, Ph.D.,P.Eng.
Laboratory Manager

All work has been performed using accepted testing methodologies, except where otherwise agreed to by the client in writing. Our total liability in connection with this work shall be limited to the amount paid by the client. Results relate only to items tested as received.

**E3 Laboratories Inc.**

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
 Justin Haskett
 272 Ferndale Drive
 Barrie
 L4M 4T5
 Tel: 705-739-4220

Fax:
Email: justin.haskett@barrie.ca

Work Order No.:2625322
 Received : 2021-07-30
 PO Number: 4500000722
 Reported: 2021-08-09
 Project Name: Landfill SWM
 Chain of Custody No.:

Quality Control Summary

Lab ID	Analyte	QC Recovery	QC limits	Spike Recovery	Spike Limits	Dup RPD	Dup Limits	Blank
688378	Alkalinity (CaCO3)	97	80-120	96	80-120	1	0-20	<18
	Ammonia (Total)	105	80-120	98	80-120	0	0-20	<0.03
	Chloride	102	80-120	101	70-130	0	0-20	
	DOC							
	F1-F4 PHC							
	Metals							
	pH	100	80-120	N/A	N/A	0	0-20	N/A
	Phenolics							
	TP	93	80-120	104	80-120	0	0-20	<0.02
	TPH (GDH)							
TSS	100	80-120	N/A	N/A	0	0-20	<1	

Certificate of Analysis

E-3 Laboratories Inc.

RR#4, 360 York Rd. Unit 10
Niagara-on-the-Lake, ON L0S 1J0
Attn: Kristy Berry

Client PO: 2625322
Project: City of Barrie
Custody:

Report Date: 6-Aug-2021
Order Date: 30-Jul-2021

Order #: 2131692

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2131692-01	688378- Pond 2 Outlet

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 06-Aug-2021

Client: E-3 Laboratories Inc.

Order Date: 30-Jul-2021

Client PO: 2625322

Project Description: City of Barrie

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	5-Aug-21	5-Aug-21
Hardness	Hardness as CaCO ₃	3-Aug-21	3-Aug-21
Metals, ICP-MS	EPA 200.8 - ICP-MS	3-Aug-21	3-Aug-21
PHC F1	CWS Tier 1 - P&T GC-FID	3-Aug-21	3-Aug-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	5-Aug-21	5-Aug-21
Phenolics	EPA 420.2 - Auto Colour, 4AAP	4-Aug-21	4-Aug-21
TPH (diesel)	E3420 - GC-FID, extraction	5-Aug-21	5-Aug-21
TPH (gasoline)	E3420 - P&T GC-FID	3-Aug-21	3-Aug-21
TPH (heavy oil)	SM5520F - Gravimetric	4-Aug-21	4-Aug-21

Certificate of Analysis

Report Date: 06-Aug-2021

Client: E-3 Laboratories Inc.

Order Date: 30-Jul-2021

Client PO: 2625322

Project Description: City of Barrie

Client ID:	688378- Pond 2 Outlet	-	-	-
Sample Date:	29-Jul-21 10:13	-	-	-
Sample ID:	2131692-01	-	-	-
MDL/Units	Water	-	-	-

General Inorganics

Hardness	mg/L	32.7	-	-	-
Dissolved Organic Carbon	0.5 mg/L	5.8	-	-	-
Phenolics	0.001 mg/L	0.007	-	-	-

Metals

Arsenic	0.001 mg/L	<0.001	-	-	-
Cadmium	0.0001 mg/L	<0.0001	-	-	-
Calcium	0.100 mg/L	11.7	-	-	-
Chromium	0.001 mg/L	0.002	-	-	-
Cobalt	0.0005 mg/L	<0.0005	-	-	-
Iron	0.100 mg/L	<0.100	-	-	-
Lead	0.0001 mg/L	0.0003	-	-	-
Magnesium	0.200 mg/L	0.821	-	-	-

Hydrocarbons

F1 PHCs (C6-C10)	25 ug/L	<25	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-
TPH (gasoline)	0.2 mg/L	<0.2	-	-	-
TPH (diesel)	0.1 mg/L	<0.1	-	-	-
TPH (heavy oil)	0.5 mg/L	<0.5	-	-	-

Certificate of Analysis

Report Date: 06-Aug-2021

Client: E-3 Laboratories Inc.

Order Date: 30-Jul-2021

Client PO: 2625322

Project Description: City of Barrie

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Dissolved Organic Carbon	ND	0.5	mg/L						
Phenolics	ND	0.001	mg/L						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
TPH (gasoline)	ND	0.2	mg/L						
TPH (diesel)	ND	0.1	mg/L						
TPH (heavy oil)	ND	0.5	mg/L						
Metals									
Arsenic	ND	0.001	mg/L						
Cadmium	ND	0.0001	mg/L						
Calcium	ND	0.100	mg/L						
Chromium	ND	0.001	mg/L						
Cobalt	ND	0.0005	mg/L						
Iron	ND	0.100	mg/L						
Lead	ND	0.0001	mg/L						
Magnesium	ND	0.200	mg/L						

Certificate of Analysis

Report Date: 06-Aug-2021

Client: E-3 Laboratories Inc.

Order Date: 30-Jul-2021

Client PO: 2625322

Project Description: City of Barrie

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Dissolved Organic Carbon	7.3	0.5	mg/L	6.8			6.8	37	
Phenolics	0.006	0.001	mg/L	0.007			2.9	10	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
TPH (gasoline)	ND	0.2	mg/L	ND			NC	30	
Metals									
Arsenic	0.0047	0.001	mg/L	0.0045			3.2	20	
Cadmium	ND	0.0001	mg/L	ND			NC	20	
Calcium	270	1.00	mg/L	276			2.3	20	
Chromium	ND	0.001	mg/L	0.0010			NC	20	
Cobalt	0.00141	0.0005	mg/L	0.00142			0.9	20	
Iron	11.9	0.100	mg/L	12.2			2.1	20	
Lead	ND	0.0001	mg/L	0.00010			NC	20	
Magnesium	68.5	0.200	mg/L	68.8			0.4	20	

Certificate of Analysis

Report Date: 06-Aug-2021

Client: E-3 Laboratories Inc.

Order Date: 30-Jul-2021

Client PO: 2625322

Project Description: City of Barrie

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Dissolved Organic Carbon	18.4	0.5	mg/L	6.8	116	60-133			
Phenolics	0.030	0.001	mg/L	0.007	93.7	69-132			
Hydrocarbons									
F1 PHCs (C6-C10)	2180	25	ug/L	ND	109	68-117			
F2 PHCs (C10-C16)	1400	100	ug/L	ND	87.5	60-140			
F3 PHCs (C16-C34)	3790	100	ug/L	ND	96.7	60-140			
F4 PHCs (C34-C50)	2660	100	ug/L	ND	107	60-140			
TPH (gasoline)	2.18	0.2	mg/L	ND	109	68-117			
TPH (diesel)	3.80	0.1	mg/L	ND	95.0	46-135			
TPH (heavy oil)	10.2	0.5	mg/L	ND	102	65-110			
Metals									
Arsenic	99.4	0.001	mg/L	4.5	94.9	80-120			
Cadmium	74.2	0.0001	mg/L	ND	74.2	80-120			QS-02
Calcium	16900	0.100	mg/L	ND	84.3	80-120			
Chromium	111	0.001	mg/L	1.0	110	80-120			
Cobalt	99.5	0.0005	mg/L	1.42	98.1	80-120			
Iron	4170	0.100	mg/L	ND	83.4	80-120			
Lead	82.8	0.0001	mg/L	ND	82.8	80-120			
Magnesium	17000	0.200	mg/L	ND	85.2	80-120			

Certificate of Analysis

Report Date: 06-Aug-2021

Client: E-3 Laboratories Inc.

Order Date: 30-Jul-2021

Client PO: 2625322

Project Description: City of Barrie

Qualifier Notes:

Login Qualifiers :

Sample not received in Paracel verified container / media

Applies to samples: 688378- Pond 2 Outlet

QC Qualifiers :

QS-02 : Spike level outside of control limits. Analysis batch accepted based on other QC included in the batch.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

**E3 Laboratories Inc.**

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
 Justin Haskett
 272 Ferndale Drive
 Barrie
 L4M 4T5
 Tel: 705-739-4220

Fax:
Email: justin.haskett@barrie.ca

Work Order No.:2625323
 Received : 2021-07-30
 PO Number: 4500000722
 Reported: 2021-08-09
 Project Name: Landfill SWM
 Chain of Custody No.:

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date		Method
	Date	Lab ID					Analyzed		
Compost Pond Outlet	2021-07-29	688379	Alkalinity (CaCO3)	32	mg/L	18	2021-08-03	EPA 310.2	
			Ammonia (Total)	0.21	mg/L	0.03	2021-08-06	APHA 4500	
			cBOD	4.7	mg/L	2.0	2021-07-30	APHA 5210 B	
			Chloride	5.10	mg/L	0.25	2021-08-03	HACH 8113	
			DOC	<0.5	mg/L	0.5	2021-08-05	Subcontracted	
			Iron	0.471	mg/L	0.100	2021-08-03	Subcontracted	
			Lead	0.0016	mg/L	0.0001	2021-08-03	Subcontracted	
			NO2 (Nitrite)	0.016	mg/L	0.004	2021-08-03	APHA 4500	
			NO3 (Nitrate)	0.16	mg/L	0.04	2021-08-03	APHA 4500	
			pH	7.60	SU	N/A	2021-07-30	APHA 4500 H-B	
			Sulfate (SO4)	22.5	mg/L	10.0	2021-08-03	HACH 8051	
			TDS	184	mg/L	50	2021-08-05	APHA 2540C (GRAV)	
			TKN	1.1	mg/L	0.2	2021-08-06	APHA 4500-NorgD	
			TP	0.27	mg/L	0.02	2021-08-06	APHA 4500	
			TSS	18	mg/L	1	2021-08-04	APHA 2540 D	

Reported by:

Nilou Ghazi, Ph.D.,P.Eng.
 Laboratory Manager

Page 1 of 2

All work has been performed using accepted testing methodologies, except where otherwise agreed to by the client in writing. Our total liability in connection with this work shall be limited to the amount paid by the client.
 Results relate only to items tested as received.



E3 Laboratories Inc.

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
Justin Haskett
272 Ferndale Drive
Barrie
L4M 4T5
Tel: 705-739-4220

Fax:
Email: justin.haskett@barrie.ca

Work Order No.:2625323
Received : 2021-07-30
PO Number: 450000722
Reported: 2021-08-09
Project Name: Landfill SWM
Chain of Custody No.:

Quality Control Summary

Lab ID	Analyte	QC Recovery	QC limits	Spike Recovery	Spike Limits	Dup RPD	Dup Limits	Blank
688379	Alkalinity (CaCO3)	97	80-120	96	80-120	1	0-20	<18
	Ammonia (Total)	105	80-120	98	80-120	0	0-20	<0.03
	cBOD	86	80-120	N/A	N/A	3	0-20	
	Chloride	102	80-120	101	70-130	0	0-20	
	DOC							
	Iron		80-120		80-120		0-20	
	Lead		80-120		80-120		0-20	
	NO2 (Nitrite)	101	80-120	104	80-120	0	0-20	<0.004
	NO3 (Nitrate)	97	80-120	107	80-120	0	0-20	<0.04
	pH	100	80-120	N/A	N/A	0	0-20	N/A
	Sulfate (SO4)	101	80-120	104	80-120	1	0-20	
	TDS		80-120				0-10.6	
	TKN	106	80-120	103	80-120	0	0-20	<0.2
	TP	93	80-120	104	80-120	0	0-20	<0.02
TSS	100	80-120	N/A	N/A	0	0-20	<1	

**E3 Laboratories Inc.**

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
 Justin Haskett
 272 Ferndale Drive
 Barrie
 L4M 4T5
 Tel: 705-739-4220

Fax:
Email: justin.haskett@barrie.ca

Work Order No.:2627278
 Received : 2021-09-24
 PO Number: 4500000722
 Reported: 2021-10-01
 Project Name: Landfill SWM
 Chain of Custody No.: 2627278

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date		Method
	Date	Lab ID					Analyzed		
Compost Pond Outlet	2021-09-23	694482	Alkalinity (CaCO3)	<18	mg/L	18	2021-09-27	EPA 310.2	
			Ammonia (Total)	0.61	mg/L	0.03	2021-09-28	APHA 4500	
			cBOD	5.9	mg/L	2.0	2021-09-24	APHA 5210 B	
			Chloride	6.50	mg/L	0.25	2021-09-28	HACH 8113	
			DOC	18.2	mg/L	0.5	2021-09-27	Subcontracted	
			Iron	0.995	mg/L	0.100	2021-09-27	Subcontracted	
			Lead	0.0020	mg/L	0.0001	2021-09-27	Subcontracted	
			NO2 (Nitrite)	0.055	mg/L	0.004	2021-09-27	APHA 4500	
			NO3 (Nitrate)	0.19	mg/L	0.04	2021-09-27	APHA 4500	
			pH	7.03	SU	N/A	2021-09-24	APHA 4500 H-B	
			Sulfate (SO4)	24.6	mg/L	10.0	2021-09-28	HACH 8051	
			TDS	180	mg/L	50	2021-09-24	APHA 2540C (GRAV)	
			TKN	4.9	mg/L	0.2	2021-09-30	APHA 4500-NorgD	
			TP	0.84	mg/L	0.02	2021-09-30	APHA 4500	
			TSS	38	mg/L	1	2021-09-29	APHA 2540 D	

Reported by:

Nilou Ghazi, Ph.D.,P.Eng.
 Laboratory Manager



E3 Laboratories Inc.

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
Justin Haskett
272 Ferndale Drive
Barrie
L4M 4T5
Tel: 705-739-4220

Fax:
Email: justin.haskett@barrie.ca

Work Order No.:2627278
Received : 2021-09-24
PO Number: 4500000722
Reported: 2021-10-01
Project Name: Landfill SWM
Chain of Custody No.: 2627278

Quality Control Summary

Lab ID	Analyte	QC Recovery	QC limits	Spike Recovery	Spike Limits	Dup RPD	Dup Limits	Blank
694482	Alkalinity (CaCO3)	91	80-120	82	80-120	1	0-20	<18
	Ammonia (Total)	99	80-120	102	80-120	0	0-20	<0.03
	cBOD	88	80-120	N/A	N/A	10	0-20	
	Chloride	105	80-120	100	70-130	1	0-20	
	DOC							
	Iron		80-120		80-120		0-20	
	Lead		80-120		80-120		0-20	
	NO2 (Nitrite)	100	80-120	95	80-120	0	0-20	<0.004
	NO3 (Nitrate)	106	80-120	105	80-120	0	0-20	<0.04
	pH	100	80-120	N/A	N/A	0	0-20	N/A
	Sulfate (SO4)	101	80-120	102	80-120	1	0-20	
	TDS	104	80-120			0	0-10.6	
	TKN	100	80-120	97	80-120	0	0-20	<0.2
	TP	102	80-120	100	80-120	0	0-20	<0.02
TSS	95	80-120	N/A	N/A		0-20	<1	



E3 Laboratories Inc.

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
Justin Haskett
272 Ferndale Drive
Barrie
L4M 4T5
Tel: 705-739-4220

Fax:
Email: justin.haskett@barrie.ca

Work Order No.:2627279
Received : 2021-09-24
PO Number: 4500000722
Reported: 2021-10-01
Project Name: Landfill SWM
Chain of Custody No.: 2627279

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date	Method
	Date	Lab ID					Analyzed	
Pond 2 Outlet	2021-09-23	694483	Alkalinity (CaCO3)	29	mg/L	18	2021-09-27	EPA 310.2
			Ammonia (Total)	0.05	mg/L	0.03	2021-09-28	APHA 4500
			Chloride	1.17	mg/L	0.25	2021-09-28	HACH 8113
			DOC	3.9	mg/L	0.5	2021-09-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2021-09-28	Subcontracted
			Metals	See	Attached	N/A	2021-09-27	Subcontracted
			pH	7.06	SU	N/A	2021-09-24	APHA 4500 H-B
			Phenolics	<0.002	mg/L	0.001	2021-09-27	Subcontracted
			TP	0.11	mg/L	0.02	2021-09-30	APHA 4500
			TPH (GDH)	See	Attached		2021-09-30	Subcontracted
			TSS	6	mg/L	1	2021-09-29	APHA 2540 D

Reported by:

Nilou Ghazi, Ph.D.,P.Eng.
Laboratory Manager

All work has been performed using accepted testing methodologies, except where otherwise agreed to by the client in writing. Our total liability in connection with this work shall be limited to the amount paid by the client. Results relate only to items tested as received.



E3 Laboratories Inc.

SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0

Email: info@e3labs.ca

Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Corporation of the City of Barrie
Justin Haskett
272 Ferndale Drive
Barrie
L4M 4T5
Tel: 705-739-4220

Fax:
Email: justin.haskett@barrie.ca

Work Order No.:2627279
Received : 2021-09-24
PO Number: 4500000722
Reported: 2021-10-01
Project Name: Landfill SWM
Chain of Custody No.: 2627279

Quality Control Summary

Lab ID	Analyte	QC Recovery	QC limits	Spike Recovery	Spike Limits	Dup RPD	Dup Limits	Blank
694483	Alkalinity (CaCO3)	91	80-120	82	80-120	1	0-20	<18
	Ammonia (Total)	99	80-120	102	80-120	0	0-20	<0.03
	Chloride	105	80-120	100	70-130	1	0-20	
	DOC							
	F1-F4 PHC							
	Metals							
	pH	100	80-120	N/A	N/A	0	0-20	N/A
	Phenolics							
	TP	102	80-120	100	80-120	0	0-20	<0.02
	TPH (GDH)							
TSS	95	80-120	N/A	N/A	5	0-20	<1	

All work has been performed using accepted testing methodologies, except where otherwise agreed to by the client in writing. Our total liability in connection with this work shall be limited to the amount paid by the client. Results relate only to items tested as received.

Certificate of Analysis

E-3 Laboratories Inc.

RR#4, 360 York Rd. Unit 10
Niagara-on-the-Lake, ON L0S 1J0
Attn: Kristy Berry

Client PO: 2627279
Project: City of Barrie
Custody:

Report Date: 30-Sep-2021
Order Date: 24-Sep-2021

Order #: 2139599

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2139599-01	694483 - Pond 2 Outlet

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 30-Sep-2021

Client: E-3 Laboratories Inc.

Order Date: 24-Sep-2021

Client PO: 2627279

Project Description: City of Barrie

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	27-Sep-21	27-Sep-21
Hardness	Hardness as CaCO ₃	27-Sep-21	27-Sep-21
Metals, ICP-MS	EPA 200.8 - ICP-MS	27-Sep-21	27-Sep-21
PHC F1	CWS Tier 1 - P&T GC-FID	27-Sep-21	27-Sep-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	27-Sep-21	28-Sep-21
Phenolics	EPA 420.2 - Auto Colour, 4AAP	27-Sep-21	27-Sep-21
TPH (diesel)	E3420 - GC-FID, extraction	27-Sep-21	28-Sep-21
TPH (gasoline)	E3420 - P&T GC-FID	27-Sep-21	27-Sep-21
TPH (heavy oil)	SM5520F - Gravimetric	27-Sep-21	30-Sep-21

Certificate of Analysis

Report Date: 30-Sep-2021

Client: E-3 Laboratories Inc.

Order Date: 24-Sep-2021

Client PO: 2627279

Project Description: City of Barrie

Client ID:	694483 - Pond 2 Outlet	-	-	-
Sample Date:	23-Sep-21 10:15	-	-	-
Sample ID:	2139599-01	-	-	-
MDL/Units	Water	-	-	-

General Inorganics

Hardness	mg/L	53.4	-	-	-
Dissolved Organic Carbon	0.5 mg/L	3.9	-	-	-
Phenolics	0.001 mg/L	<0.002 [2]	-	-	-

Metals

Arsenic	0.001 mg/L	<0.001	-	-	-
Cadmium	0.0001 mg/L	<0.0001	-	-	-
Calcium	0.100 mg/L	18.5	-	-	-
Chromium	0.001 mg/L	0.001	-	-	-
Cobalt	0.0005 mg/L	<0.0005	-	-	-
Iron	0.100 mg/L	0.265	-	-	-
Lead	0.0001 mg/L	0.0012	-	-	-
Magnesium	0.200 mg/L	1.74	-	-	-

Hydrocarbons

F1 PHCs (C6-C10)	25 ug/L	<25	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-
TPH (gasoline)	0.2 mg/L	<0.2	-	-	-
TPH (diesel)	0.1 mg/L	<0.1	-	-	-
TPH (heavy oil)	0.5 mg/L	<1.0 [1]	-	-	-

Certificate of Analysis

Report Date: 30-Sep-2021

Client: E-3 Laboratories Inc.

Order Date: 24-Sep-2021

Client PO: 2627279

Project Description: City of Barrie

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Dissolved Organic Carbon	ND	0.5	mg/L						
Phenolics	ND	0.001	mg/L						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
TPH (gasoline)	ND	0.2	mg/L						
TPH (diesel)	ND	0.1	mg/L						
TPH (heavy oil)	ND	0.5	mg/L						
Metals									
Arsenic	ND	0.001	mg/L						
Cadmium	ND	0.0001	mg/L						
Calcium	ND	0.100	mg/L						
Chromium	ND	0.001	mg/L						
Cobalt	ND	0.0005	mg/L						
Iron	ND	0.100	mg/L						
Lead	ND	0.0001	mg/L						
Magnesium	ND	0.200	mg/L						

Certificate of Analysis

Report Date: 30-Sep-2021

Client: E-3 Laboratories Inc.

Order Date: 24-Sep-2021

Client PO: 2627279

Project Description: City of Barrie

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Dissolved Organic Carbon	13.1	0.5	mg/L	12.6			4.0	37	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
TPH (gasoline)	ND	0.2	mg/L	ND			NC	30	
Metals									
Arsenic	0.0022	0.001	mg/L	0.0023			5.2	20	
Cadmium	ND	0.0001	mg/L	ND			NC	20	
Calcium	59.2	0.100	mg/L	65.1			9.4	20	
Chromium	0.0067	0.001	mg/L	0.0073			8.4	20	
Cobalt	0.00205	0.0005	mg/L	0.00222			7.9	20	
Iron	4.90	0.100	mg/L	5.33			8.5	20	
Lead	0.00419	0.0001	mg/L	0.00472			11.8	20	
Magnesium	9.34	0.200	mg/L	10.9			15.0	20	

Certificate of Analysis

Report Date: 30-Sep-2021

Client: E-3 Laboratories Inc.

Order Date: 24-Sep-2021

Client PO: 2627279

Project Description: City of Barrie

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Dissolved Organic Carbon	22.9	0.5	mg/L	12.6	103	60-133			
Phenolics	0.024	0.001	mg/L	ND	96.1	69-132			
Hydrocarbons									
F1 PHCs (C6-C10)	1840	25	ug/L	ND	92.2	68-117			
F2 PHCs (C10-C16)	1170	100	ug/L	ND	73.0	60-140			
F3 PHCs (C16-C34)	3480	100	ug/L	ND	88.7	60-140			
F4 PHCs (C34-C50)	2210	100	ug/L	ND	89.1	60-140			
TPH (gasoline)	1.84	0.2	mg/L	ND	92.2	68-117			
TPH (diesel)	3.50	0.1	mg/L	ND	87.5	46-135			
TPH (heavy oil)	ND	0.5	mg/L	ND		65-110			
Metals									
Arsenic	42.4	0.001	mg/L	2.3	80.2	80-120			
Cadmium	44.5	0.0001	mg/L	ND	89.0	80-120			
Calcium	8710	0.100	mg/L	ND	87.1	80-120			
Chromium	54.9	0.001	mg/L	7.3	95.2	80-120			
Cobalt	48.2	0.0005	mg/L	2.22	92.0	80-120			
Iron	2110	0.100	mg/L	ND	84.2	80-120			
Lead	40.6	0.0001	mg/L	0.31	80.5	80-120			
Magnesium	8240	0.200	mg/L	ND	82.4	80-120			

Certificate of Analysis

Report Date: 30-Sep-2021

Client: E-3 Laboratories Inc.

Order Date: 24-Sep-2021

Client PO: 2627279

Project Description: City of Barrie

Qualifier Notes:

Login Qualifiers :

Sample not received in Paracel verified container / media

Applies to samples: 694483 - Pond 2 Outlet

Sample Qualifiers :

1 : Elevated Reporting Limits due to limited sample volume.

2 : Elevated Reporting Limit due to matrix interference.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

Appendix D

2021 Stormwater Inspection Report

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal

INTRODUCTION

The Barrie Landfill Site Stormwater Management Facilities consists of eight stormwater ponds that receive runoff from the landfill and perimeter roads via various conveyance swales, culverts, and ditches. A ninth stormwater pond, referred herein as Compost Pond, designed to control stormwater runoff from the area of the Environmental Centre, including the compost pad is located at the north end of the site. This pond is outfitted with a manually operated sluice gate valve that remains in the closed position during normal site operations.

The assessment of the stormwater facilities was conducted between September 9th and September 30th, 2021, in accordance with Stormwater Environmental Compliance Approval (ECA) 1681-AFGMVU Section 5.3 *“The Owner shall inspect the Works at least once a year and, if necessary, clean and maintain the Works to prevent the excessive build-up of sediments and/or vegetation.”* Included is the storm water management (SWM) ponds 1 – 8, the Compost Pond, sediment forebays, conveyance ditches, culverts and catch basins. Assessment and cleaning of catch basins was conducted between September 13 – 20, 2021. Note some photos within this report were taken during the inspection period as well as on November 1 and November 22, 2021.

Photographic records along with observations are included within this inspection report.

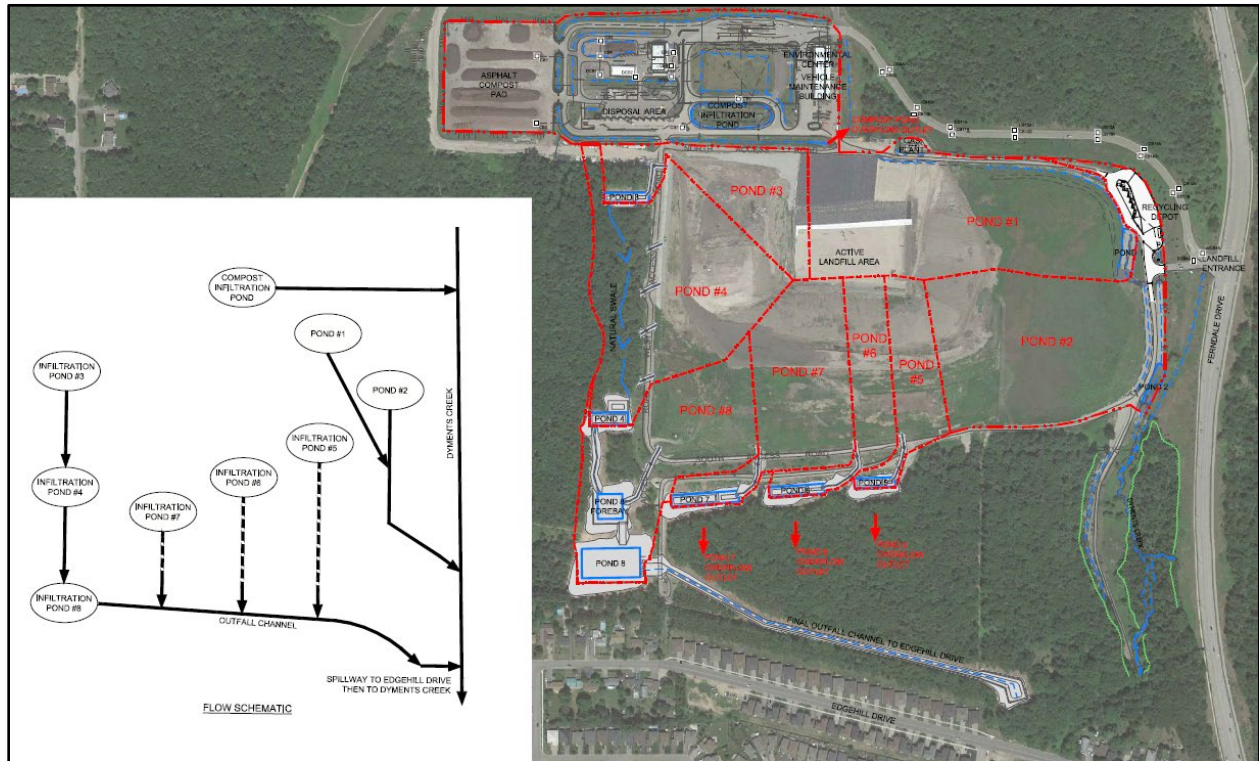


Figure 1: Site Overview



CITY OF BARRIE

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal

EASTERN STORMWATER MANAGEMENT FACILITY

The Eastern Stormwater Management Facility consists of two extended detention ponds (Pond 1 and Pond 2) as described below:

Pond 1 services a total of 8.77 hectares (ha) of drainage area including portions of Cells 1, Cell 2, Cell 3 and portions of landfill access roads, located on the north side of the landfill. Pond 1 discharges through a Hickenbottom structure into a conveyance ditch, eventually flowing to a culvert crossing into Pond 2 as described below; and

Pond 2 services a total 0.97 ha of drainage area located on the east side of the Site. Pond 2 includes a plunge pool at the outlet which discharges into a ditch eventually flowing to Dyments Creek.

OBSERVATIONS

Pond 1:

- No signs of erosion or disturbed areas.
- No accumulation of sediment in the bottom of the pond.
- Minimal vegetation growth.
- Outlet structures appeared to be in good condition.
- No litter accumulation within pond.

Pond 2:

- No signs of erosion or disturbed areas within Pond 2 conveyance channel or pond.
- No accumulation of sediment within the pond.
- Minor vegetation growth in the pond.
- Outlet structures appeared to be in good condition.
- No litter accumulation with pond or plunge pool.
- Minor erosion observed at plunge pool discharge beneath fence line adjacent Dyments Creek.

Ditches and Culverts:

- No signs of erosion or sediment.
- Minor vegetation noted in ditches.
- Structures and culverts appeared to be in good condition.

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 1: Pond 1 Conveyance Channel, view northeast



Image 2: Pond 1 Conveyance Channel, view west



Image 3: Pond 1 Conveyance Channel, view west



Image 4: Pond 1, view southeast

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 5: Pond 1, view northwest

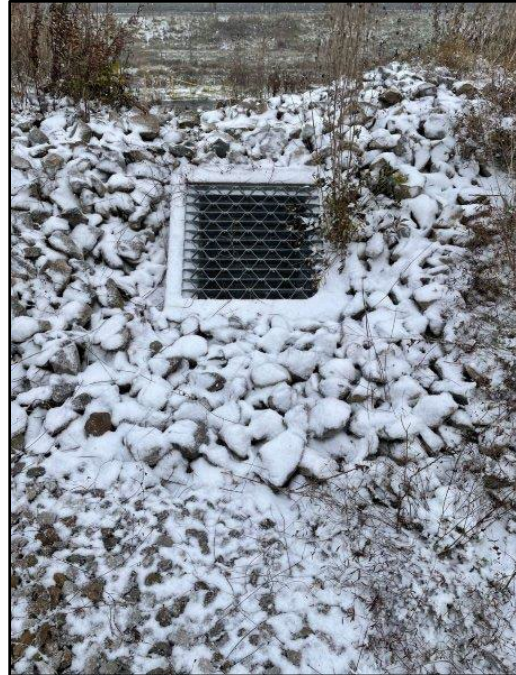


Image 7: Pond 1 Overflow Structure



Image 6: Pond 1 Hickenbottom Drain



Image 8: Pond 1 Discharge and Overflow Channel

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 9: Pond 1 Discharge and Overflow Channel



Image 11: Pond 2 West Conveyance Channel and Ditch Inlet Structure, view north



Image 10: Pond 2 West Conveyance Channel, view southeast



Image 12: Pond 2 West Conveyance Channel, view south

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 13: Pond 2 East Conveyance Channel, view southeast

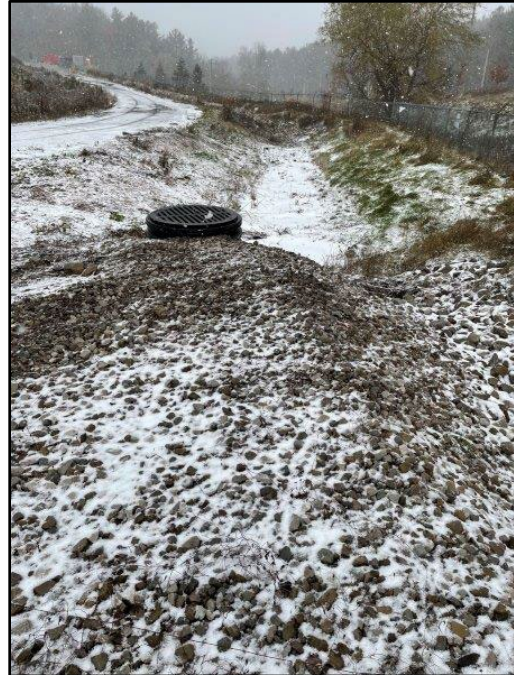


Image 15: Pond 2, view north

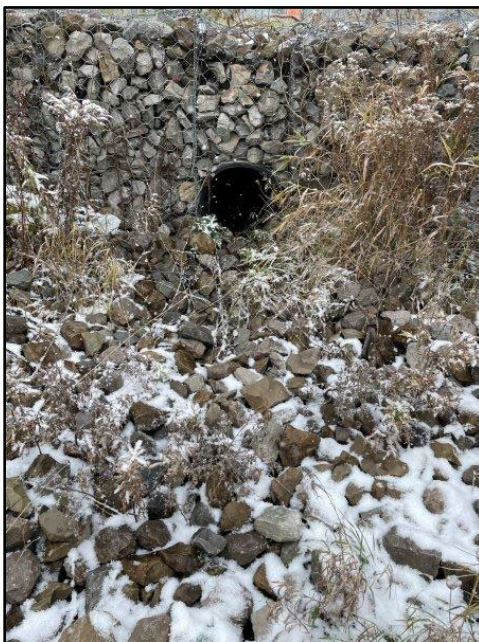


Image 14: Pond 2 East Conveyance Channel Headwall and Culvert at East Gate



Image 16: Pond 2 Plunge Pool

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 17: Pond 2 Plunge Pool Discharge Channel to Dyments Creek



CITY OF BARRIE

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal

WESTERN AND SOUTHERN STORMWATER MANAGEMENT FACILITY

The Western and Southern Stormwater Management Facility consists of six infiltration ponds (Pond 3, Pond 4, Pond 5, Pond 6, Pond 7, and Pond 8) and a Final Outflow Channel with a flow spreader terminus, as described below:

Pond 3 services a total of 1.99 ha of drainage area including portions of Cell 3C and portions of landfill access roads. The pond is located on the west side of the Site adjacent to Cell 3C and south of the Waste and Recycling Depot. Pond 3 discharges into natural swale eventually flowing into Pond 4 as described below;

Pond 4 services a total of 4.22 ha of drainage area including portions of Cell 3A, Cell 3B, Cell 3C and a portion of the west landfill access road. The pond is located on the west side of the Site adjacent to Cell 3A and southwest of the Cell 2B/3B exterior leachate collection maintenance hole. Pond 4 discharges into a conveyance swale eventually flowing into Pond 8 as described below;

Pond 5 services a total of 3.92 ha of drainage area including portions of Cell 2A, Cell 2B and portions of the south landfill access and purgewell roads. The pond is located on the south side of the Site south of purgewells PW2 and PW3. Pond 5 discharges to a natural slope directing any overflows to the Final Outflow Channel as described below;

Pond 6 services a total of 3.0 ha of drainage are including portions of Cell 2A, Cell 2B and portions of the south landfill access and purgewell roads. The pond is located on the south side of the Site south of purgewells PW1 and PW2. Pond 6 discharges to a natural slope directing any overflows to the Final Outflow Channel as described below;

Pond 7 services a total of 4.19 ha of drainage area including portions of Cell 2A, Cell 2B, Cell 3A, Cell 3B and portions of the south landfill access and purgewell roads. The pond is located on the south side of the Site situated between Pond 6 and Pond 8 Forebay. Pond 7 discharges to a natural slope directing any overflows to the Final Outflow Channel as described below;

Pond 8 services a total 3.39 ha of drainage area including portions of Cell 3A, Cell 3B and portions of the south and west landfill access roads. The pond is located on the south side of the Site and south of Pond 8 Forebay. Pond 8 discharges into the Final Outflow Channel as described below;

The Final Outflow Channel and Flow Spreader consists of a large conveyance channel flowing in an easterly direction to a flow spreader located on the southeast side of the Site, discharging towards Edgehill Drive and eventually to Dyments Creek. The discharge from this channel is expected to only occur in the event of a major storm, notably under frozen conditions when the stormwater ponds will not sufficiently attenuate and infiltrate flows.

OBSERVATIONS

Pond 3:

- No signs of erosion or disturbed areas.
- No accumulation of sediment in the bottom of the pond.
- Minimal vegetation growth in the bottom of the pond.
- Bottom of Pond 3 was tilled in September 2021.
- The conveyance channels and outlet structures appeared to be in good condition.
- No litter accumulation within pond.



CITY OF BARRIE

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal

Pond 4:

- No signs of erosion or disturbed areas.
- No accumulation of sediment or vegetation growth were noted in the bottom of the pond.
- Bottom of Pond 4 was tilled in September 2021.
- The conveyance channels and outlet structures appeared to be in good condition.
- No litter accumulation within pond.

Pond 5:

- No signs of erosion or disturbed areas.
- No accumulation of sediment or vegetation growth were noted in the bottom of the pond.
- Bottom of Pond 5 was tilled in September 2021.
- The conveyance channels and outlet structures appeared to be in good condition.
- No litter accumulation within pond.

Pond 6:

- No signs of erosion or disturbed areas.
- No accumulation of sediment or vegetation growth were noted in the bottom of the pond.
- Bottom of Pond 6 was tilled in September 2021.
- The conveyance channels and outlet structures appeared to be in good condition.
- No litter accumulation within pond.

Pond 7:

- No signs of erosion or disturbed areas.
- No accumulation of sediment or vegetation growth were noted in the bottom of the pond.
- Bottom of Pond 7 was tilled in September 2021.
- The conveyance channels and outlet structures appeared to be in good condition.
- No litter accumulation within pond.

Pond 8:

- No signs of erosion or disturbed areas.
- No accumulation of sediment or vegetation growth were noted in the bottom of the pond.
- The conveyance channels and outlet structures appeared to be in good condition.
- No litter accumulation within pond.

Final Outflow Channel and Flow Spreader:

- No signs of erosion or disturbed areas.
- No accumulation of sediment in the bottom of the channel.
- Minor and sporadic vegetative growth in the bottom of the channel.
- The conveyance channel and flow spreader appeared to be in good condition.
- No litter accumulation within channel or flow spreader.

Culverts and Ditches:

- No signs of erosion or disturbed areas.
- No accumulation of sediment.
- Minor to moderate vegetative growth noted in the conveyance channels of Pond 3 and Pond 4.
- The conveyance channels and outlet structures appeared to be in good condition.
- No litter accumulation within culverts and ditches.

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 18: Pond 3 Conveyance Channel, view northwest



Image 19: Pond 3 Forebay, view southwest

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 20: Pond 3 Forebay, view northeast



Image 21: Pond 3, view southwest

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 22: Pond 3, view northeast



Image 23: Pond 3 Outfall Natural Swale, view southeast

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 24: Pond 4 Forebay, view east



Image 25: Pond 4 Forebay, view west

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 26: Pond 4



Image 27: Pond 5 Conveyance Channel

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 28: Pond 5 Forebay, view southwest



Image 29: Pond 5, view west

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 30: Pond 5, view east



Image 31: Pond 6 Conveyance Channel

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 32: Pond 6 Forebay, view southwest



Image 33: Pond 6 Forebay, view northeast

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 34: Pond 6, view southwest



Image 35: Pond 6, view northeast

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 36: Pond 7 Conveyance Channel



Image 37: Pond 7 Conveyance Channel

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 38: Pond 7 Forebay, view southwest



Image 39: Pond 7 Forebay, view northeast

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 40: Pond 7, view southwest



Image 41: Pond 7, view northeast

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 42: Pond 8 West Conveyance Swale



Image 43: Pond 8 West Conveyance Swale, view northwest

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 44: Pond 8 East Conveyance Swale



Image 45: Pond 8 East Conveyance Swale

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 46: Pond 8 Forebay, view northeast



Image 47: Pond 8, view southwest

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 48: Pond 8, view west



Image 49: Pond 8, view northeast

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 50: Final Outfall Channel to Edgehill Drive, view east



Image 51: Final Outfall Channel to Edgehill Drive, view west

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 52: Final Outfall Channel to Edgehill Drive, view east

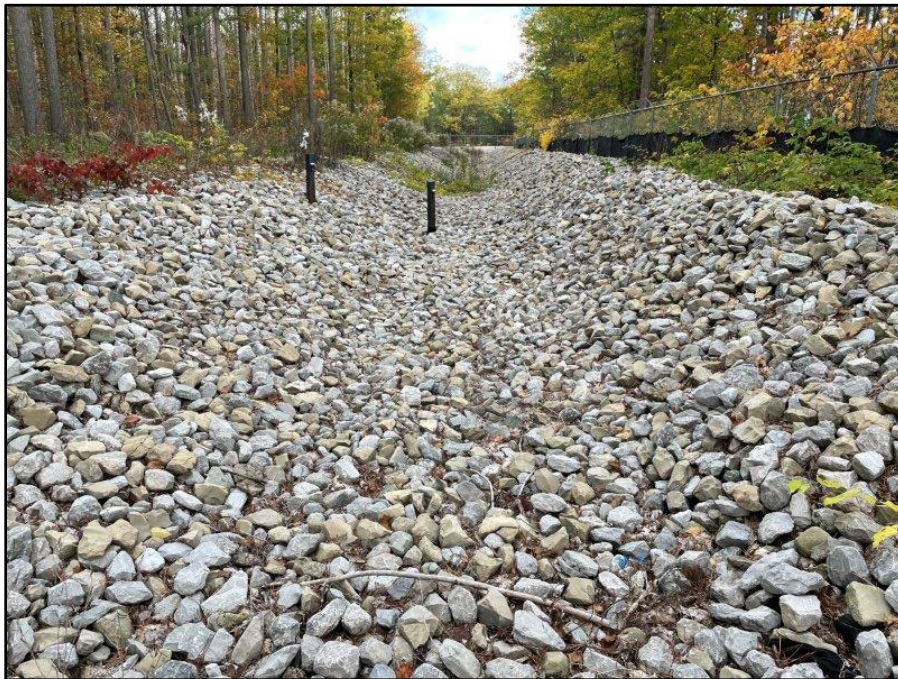


Image 53: Final Outfall Channel to Edgehill Drive, view east

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 54: Final Outfall Channel to Edgehill Drive, view west



Image 55: Final Outfall Channel to Edgehill Drive, view west

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 56: Final Outfall Channel Flow Spreader to Edgehill Drive, view west



Image 57: Final Outfall Channel Flow Spreader to Edgehill Drive, view east



CITY OF BARRIE

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal

NORTHERN STORMWATER MANAGEMENT FACILITY

The Northern Stormwater Management Facility is controlled by one infiltration pond which controls flow from the Environmental Centre compound including the compost pad. In 2021 the City contracted an Environmental Centre drainage improvement project to improve drainage and address localized ponding water concerns in, and around, the coverall building located to the north of the Waste and Recycling Depot and west of the Household Hazardous Waste and Commodities building. The drainage project involved full depth asphalt removal, regrading of granular base, installation of two new catch basins, placement of new granular base, regrading, and new asphalt paving with revised grades. An amendment to the Environmental Compliance Approval (ECA) was not required due to the project addressing site concerns and the catchment areas remaining unchanged. The Northern Stormwater Management Facility system now includes seventeen (17) catch basins (CB), and four (4) double catch basins (DCB), as described below;

Compost Pond services a total of 6.49 ha of drainage area and is designed to reduce post development flow level to the discharging water course, Dyments Creek. Discharge from the pond is controlled by a manually operated emergency sluice gate valve, which can be closed in the event of spills or sediment levels exceeding the requirements of the Stormwater Environmental Compliance Approval. The valve remains closed during normal operation periods and was closed during the annual stormwater inspection.

CBs 1, 2, 3, 4, 5, 6, 7, New STM CB1, New STM CB2, DCB 1, DCB2 and DCB3 collect stormwater from various paved sections of the Environmental Operations area including the compost pad. Stormwater collected is ultimately discharged to the compost pond via various culverts and ditches;

CB 8 is sited to collect potential spills from tanker trucks that are off-loading at the City’s designated receiving station. The catch basin leads into the same sanitary connection as the dumping station and is directed to the City’s sanitary infrastructure located immediately west of Ferndale Drive for treatment at the City’s Wastewater Treatment Facility (WwTF);

CB 9, 10, 11, 12, 13, 14, 15 and DCB 4 collect stormwater along the main landfill roadway entrance. Stormwater collected is ultimately directed to Ferndale Drive stormwater collection infrastructure, ultimately discharging to Dyments Creek.

OBSERVATIONS

Compost Pond:

- Minor accumulation of sediment and moderate vegetative growth in the bottom of the pond.
- Minor accumulation of sediment at the pond culvert inlets.
- Vegetation within Compost Pond was cut and the bottom of Compost Pond was tilled in September 2021.
- The outlet sluice gate valve at the pond outlet was closed at the time of inspection.
- No litter accumulation within pond.



CITY OF BARRIE

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal

Culverts and Ditches:

- Minimal litter was present.
- Acceptable vegetative growth was observed in ditches.
- No signs of erosion or disturbed areas.
- The conveyance ditches and outlet structures appeared to be in good condition.

CB1:

- Grate and concrete structure are in good condition.

CB2:

- Grate and concrete structure are in good condition.

CB3:

- Grate and concrete structure are in good condition.

CB4:

- Grate and concrete structure are in good condition.

DCB1:

- Grate and concrete structure are in good condition.

DCB2:

- Grate and concrete structure are in good condition.

DCB3:

- Grate and concrete structure are in good condition.

CB5:

- Grate and concrete structure are in good condition.

CB6:

- Grate and concrete structure are in good condition.

CB7:

- Grate is in good condition. The surrounding asphalt pavement requires repair.

CB8:

- Grate and concrete structure are in good condition.

CB9 A/B:

- Grates and concrete structures were in good condition.

CB10 A/B:

- Grates and concrete structures are in good condition.

CB11 A/B:

- Grates and concrete structures are in good condition.



CITY OF BARRIE

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal

CB12 A/B:

- Grates and concrete structures are in good condition.

CB13 A/B:

- Grates and concrete structures are in good condition.

CB14 A/B:

- Grates and concrete structures are in good condition. City Roads, Fleet, and Stormwater Operations department repaired asphalt and granular deficiency around catch basin noted in 2020 annual inspection.

CB15 A/B:

- Grates and concrete structures are in good condition

DCB1:

- Grates and concrete structures are in good condition.

DCB2:

- Grates and concrete structures are in operable condition. Eastern most catch basin frame is damaged. The damage does not impede the functionality of the catch basin structure or inflow of stormwater.

DBC3:

- Grates and concrete structures are in good condition.

DCB4 A/B:

- Grates and concrete structures are in fair condition. Minor damage to grate.

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal

North Stormwater Management Facility, Compost Pond



Image 58: Cutting Vegetation in Compost Pond, view northeast



Image 59: Cut Vegetation in Compost Pond, view north

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 60: Compost Pond, view northeast



Image 62: Compost Pond Outlet Sluice Gate



Image 61: Compost Pond, view southwest



Image 63: Compost Pond Southwest Culvert Inlet

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 64: Compost Pond Northwest Culvert Inlets



Image 65: Compost Pond Northeast Culvert Inlet

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal

Ditches and Culverts



Image 66: Compost Pond Conveyance Ditch, view southeast



Image 67: Compost Pond Conveyance Ditch, view northwest

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal

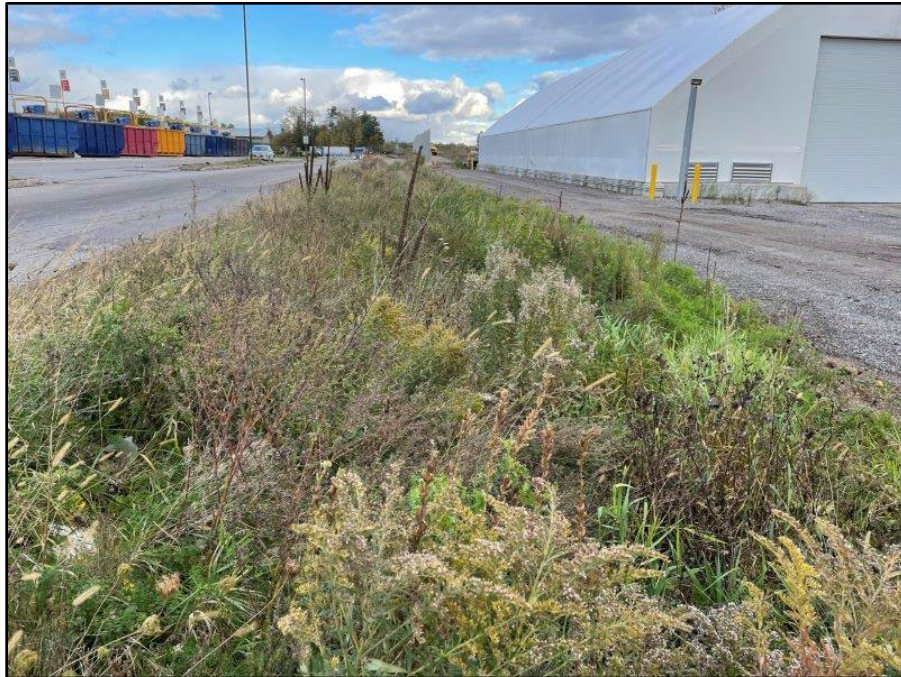


Image 68: Compost Pond Conveyance Ditch, view northeast



Image 69: Compost Pond Conveyance Ditch at West Access Road, view southwest

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 70: West Access Road Culvert Outlets



Image 71: West Access Road Culvert Outlet and Ditch, view northeast

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 72: North Access Road Ditch, view southwest



Image 73: North Access Road Ditch, view northeast

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 74: North Access Road Ditch, view southwest

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 75: Recycling Depot CB



Image 77: Recycling Depot DCB



Image 76: Recycling Depot, DCB



Image 78: Recycling Depot DCB

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 79: Recycling Depot DCB

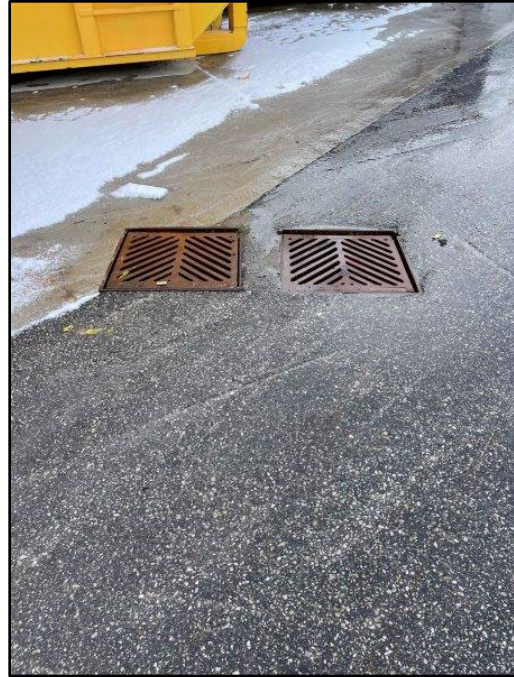


Image 81: Recycling Depot DCB



Image 80: Recycling Depot DCB



Image 82: Recycling Depot DCB

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 83: Recycling Depot DCB



Image 85: CB2



Image 84: CB1



Image 86: Finished Compost Storage

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 87: CB3



Image 89: CB5



Image 88: CB4



Image 90: CB6

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 91: DCB3



Image 92: CB7



Image 93: CB8

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal

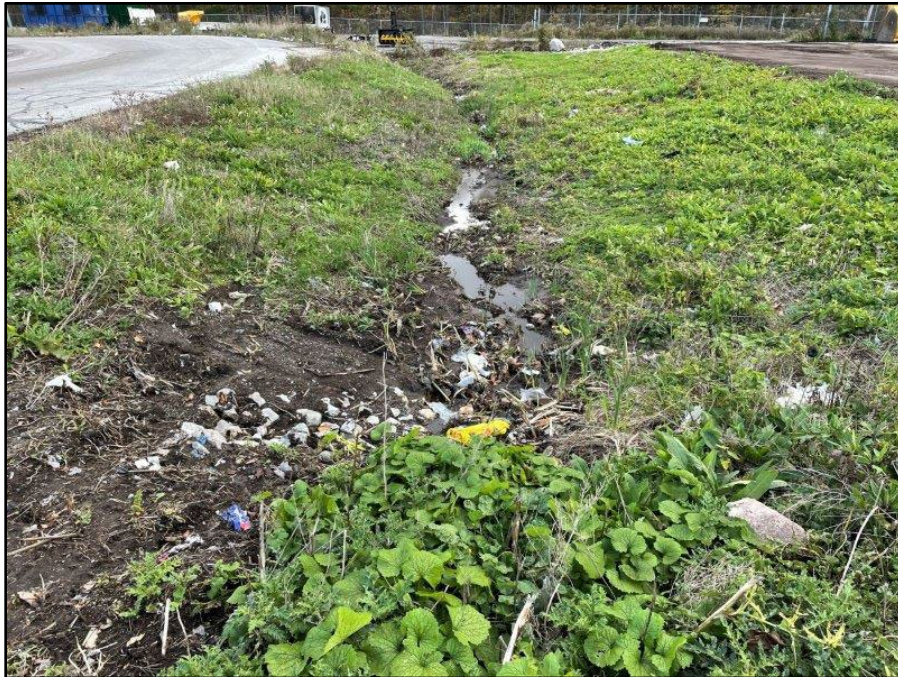


Image 94: West Ditch, view southeast



Image 95: West Ditch, view northwest

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 96: New Sod Installed in West Ditch, view west



Image 97: West Ditch, view southeast

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 98: West Ditch Culvert Inlet at North Entrance to Compost Pad



Image 99: Culvert Outlet Southeast of Waste & Recycling Depot

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 100: Culvert Inlet Southeast of Waste and Recycling Depot



Image 101: Ditch West of Waste and Recycling Depot, view northwest

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 102: Culvert Outlet in Ditch West of Waste and Recycling Depot



Image 103: Ditch West of Waste and Recycling Depot, view southeast

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 104: Ditch West of Household Hazardous Waste and Commodities, view northwest



Image 105: Ditch West of Household Hazardous Waste and Commodities, view northeast

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 106: Ditch North of Household Hazardous Waste and Commodities, view southwest



Image 107: Ditch East of Compost Pad, view north



Image 108: Ditch East of Compost Pad, view south

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal



Image 109: North Ditch, view northeast



Image 111: North Ditch, view northeast



Image 110: North Ditch, view west

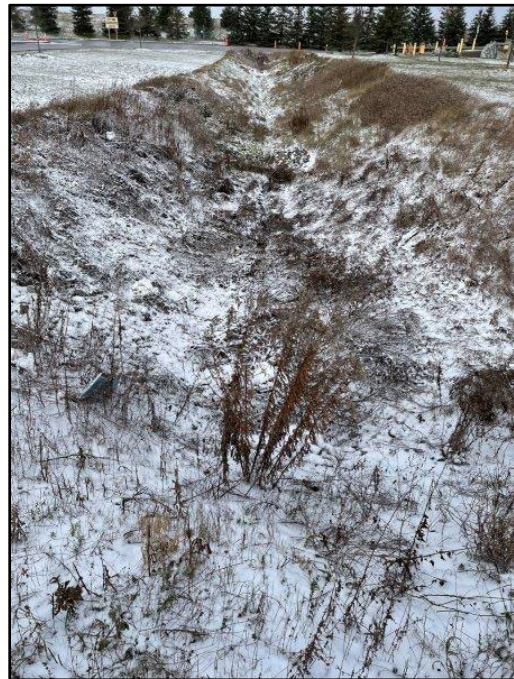


Image 112: Ditch East of Household Hazardous Waste and Commodities, view northwest

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal

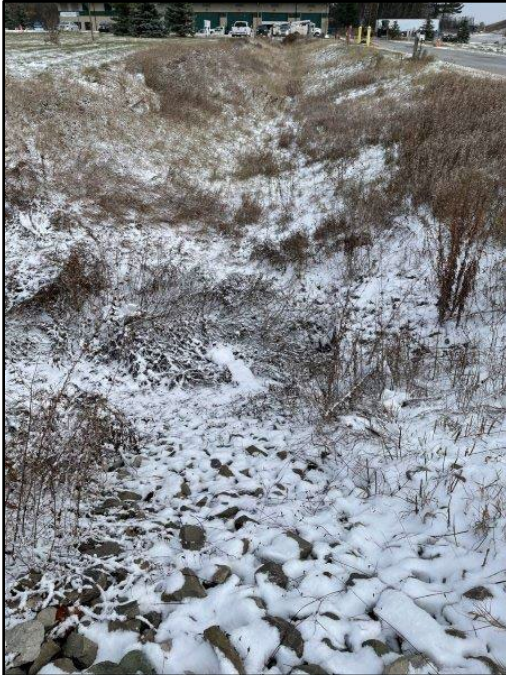


Image 113: Ditch North of Compost Pond, view northeast



Image 114: Ditch West of Environmental Administration Centre, view southeast

CONCLUSIONS

It is imperative that vegetation and sediment deposition continue to be monitored, maintained, and removed from all stormwater ponds as soon as practical in the 2021 year. Proactive maintenance of the stormwater facilities completed by the City each year allows for proper infiltration of water and for the spring freshet to be properly controlled by the SWM system. Scarifying operations at each Pond should continue to be undertaken annually to prevent vegetative establishment.

The following maintenance items were completed since the last fall inspection (September 25, 2021):

- Removed accumulated sediment from ditch east of the compost pad and placed new sod.
- Cut vegetation within stormwater ponds and tilled bottom of ponds.
- Sewer Technologies Inc. completed the annual leachate and stormwater system flushing and inspections.
- Contracted an Environmental Centre drainage improvement project to address localized drainage and ponding water concerns inside, and around, the coverall storage building, including the installation of two (2) new catch basins, and regrading granulars and asphalt paving.



CITY OF BARRIE

BARRIE LANDFILL EXISTING STORMWATER CONTROLS INSPECTION

Date: September 9 - 30, 2021	Weather: Sun, Cloud, & Rain; Low 6°C, High 22.8°C
Performed by: Justin Haskett Landfill Systems Technologist	Review: Lindsay Quinn Supervisor of Waste Disposal

Recommendations:

- Continue with vegetation removal and tilling bottom of ponds annually.
- Inspect catch basin grates, ditches, and culverts on a regular basis and remove sediment or debris when necessary.
- Continue annual flushing and inspection of stormwater catch basins and culverts.
- Monitor and repair, if necessary, erosion at Pond 2 plunge pool discharge to Dyments Creek.